

WYLE ELECTRONICS
MARKETING
LABORATORIES GROUP

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 **SPRAGUE**®

PASSIVE
ELECTRONIC COMPONENTS
FOR INDUSTRIAL AND
MILITARY ELECTRONICS

C-567B



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- WR-504** Integrated Circuits
- CN-250** Transistors and Diodes
- SN-500** Hall Effect and Optoelectronic Sensors

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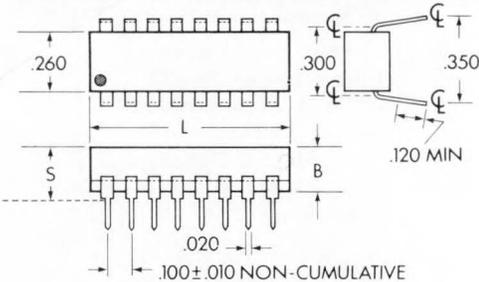
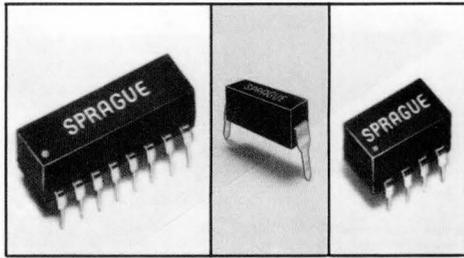
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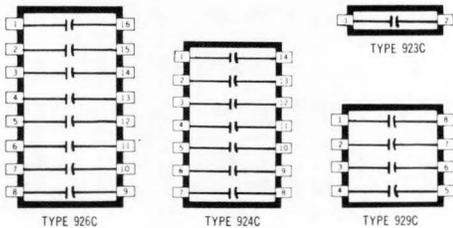
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SERIES 920C DUAL IN-LINE MONOLYTHIC[®] CERAMIC CAPACITORS



DIMENSIONS (in inches)*

Type No.	Max. Length (L)	Size Code	Body Height (B)	Seated Height (S)
923C	.098	B	.135	.175
929C	.395	D	.165	.195
924C	.695	F	.250	.275
926C	.795			

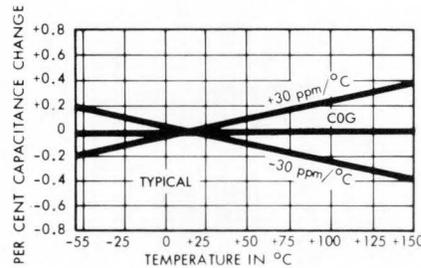
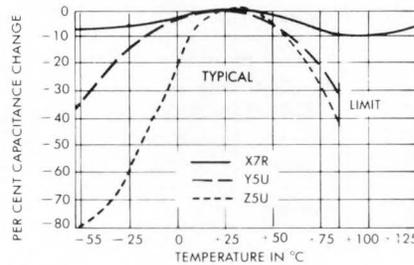


- Useful for noise by-passing and signal coupling applications in high-frequency signal or data processing systems.
- Molded DIP package offers superior mechanical protection during insertion into printed wiring boards as well as excellent reliability under severe environmental conditions.
- Provide the superior high-frequency performance required in many TTL and ECL circuit designs.
- Manufactured by alternately depositing extremely thin layers of metallic electrodes and ceramic dielectric mate-

- rial, then fired into an almost indestructible homogeneous block.
- Can be placed end-to-end in standard 14- or 16-pin DIP sockets, making them ideal for use in breadboarding.
- Standard pin spacing, .100".
- Capacitors listed below have 2 pins. For units with 8 pins, change 3rd character in catalog number from 3 to 9; for 14 pins, change to 4; for 16 pins, change to 6.
- For complete technical data, refer to latest issue of Engineering Bulletin 6242.

PERFORMANCE CHARACTERISTICS

CAPACITANCE vs. TEMPERATURE



- Operating Temperature Range:** Z5U and Y5U, -55°C to +85°C; X7R and COG, -55°C to +125°C.
- Capacitance Change:** Allowable capacitance change with temperature for EIA class Z5U shall be -56%, +22% from +10°C to +85°C; for Y5U, -56%, +22% from -30°C to +85°C; for X7R, ±15% from -55°C to +125°C; for COG, ±30 ppm/°C from -55°C to +125°C.
- Dissipation Factor:** Maximum for Z5U and Y5U, 4.0%; X7R, 2.5%; COG, 0.1%.
- Dielectric Strength:** Capacitors shall withstand 250% of rated voltage for a period of not less than 1 nor more than 5 seconds at +25°C.
- Insulation Resistance:** The minimum product of insulation resistance and capacitance for Z5U, Y5U, and X7R shall be 1000 megohm-microfarads. Minimum insulation resistance for COG shall be 100,000 megohms.
- Life Test:** Z5U and Y5U units shall be capable of withstanding 1000 hour life test at 150% of rated voltage at +85°C. X7R and COG units shall withstand a 1000 hour life test at 200% of rated voltage at +125°C.

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
EIA CHARACTERISTIC Z5U\$ 50 WVDC @ +85°C			EIA CHARACTERISTIC X7R‡ 100 WVDC @ +85°C 50 WVDC @ +125°C			EIA CHARACTERISTIC Y5U** 50 WVDC @ +85°C		
.01	B	923CZ5U103M050B*	.0010	B	923CX7R102K050B◊	0.001	B	923CY5U103M050B
.015	B	923CZ5U153M050B	.0012	B	923CX7R122K050B	0.015	B	923CY5U153M050B
.022	B	923CZ5U223M050B*	.0022	B	923CX7R222K050B◊	0.022	B	923CY5U223M050B
.033	B	923CZ5U333M050B	.0027	B	923CX7R272K050B	0.033	B	923CY5U333M050B
.047	B	923CZ5U473M050B*	.0033	B	923CX7R332K050B◊	0.047	B	923CY5U473M050B
.068	B	923CZ5U683M050B	.0039	B	923CX7R392K050B	0.068	B	923CY5U683M050B
.1	B	923CZ5U104M050B*	.0047	B	923CX7R472K050B◊	0.1	B	923CY5U104M050B
.15	B	923CZ5U154M050B	.0056	B	923CX7R562K050B	0.15	B	923CY5U154M050B
.22	B	923CZ5U224M050B*	.0068	B	923CX7R682K050B◊	0.22	B	923CY5U224M050B
.33	D	923CZ5U334M050D	.0082	B	923CX7R822K050B	0.33	D	923CY5U334M050D
.47	D	923CZ5U474M050D*	.010	B	923CX7R103K050B◊	0.47	F	923CY5U474M050F
.68	F	923CZ5U684M050F	.012	B	923CX7R123K050B	0.68	F	923CY5U684M050F
1.0	F	923CZ5U105M050F*	.015	B	923CX7R153K050B◊			
			.018	B	923CX7R183K050B			
			.022	B	923CX7R223K050B◊			
			.027	B	923CX7R273K050B			
			.033	B	923CX7R333K050B◊			
			.039	B	923CX7R393K050B			
			.047	B	923CX7R473K050B◊			
			.056	B	923CX7R563K050B			

\$Z5U catalog numbers have capacitance tolerance of ±20%. Numbers followed by star (*) also available as +80, -20% units, change 11th character of catalog number from M to Z.

‡X7R catalog numbers have capacitance tolerance of ±10%. Numbers followed by diamond (◊) also available as ±20% units; change 11th character of catalog number from K to M.

**Y5U catalog numbers have capacitance tolerance of ±20%.

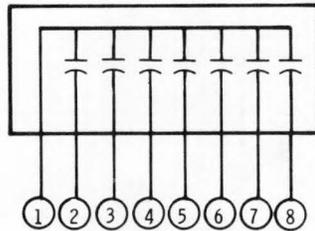
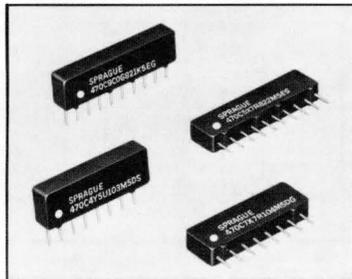
DIP MONOLYTHIC® CERAMIC CAPACITORS, continued

EIA CHARACTERISTIC COG†
100 WVDC @ +85°C
50 WVDC @ +125°C

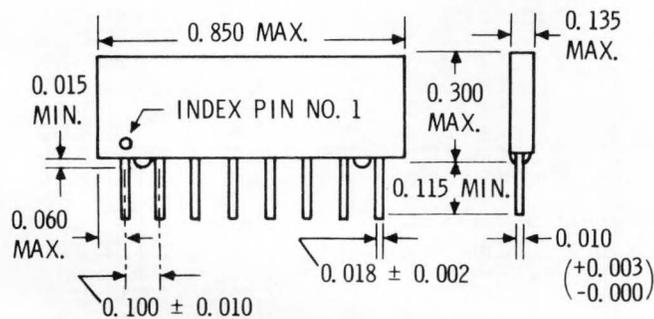
pF	Size Code	Catalog Number	pF	Size Code	Catalog Number	pF	Size Code	Catalog Number	pF	Size Code	Catalog Number
10	B	923CC0G100J050B*	56	B	923CC0G560J050B*	330	B	923CC0G331J050B*	1800	B	923CC0G182J050B*
11	B	923CC0G110J050B	62	B	923CC0G620J050B	360	B	923CC0G361J050B	2000	B	923CC0G202J050B
12	B	923CC0G120J050B*	68	B	923CC0G680J050B*	390	B	923CC0G391J050B*	2200	B	923CC0G222J050B*
13	B	923CC0G130J050B	75	B	923CC0G750J050B	430	B	923CC0G431J050B	2400	B	923CC0G242J050B
15	B	923CC0G150J050B*	82	B	923CC0G820J050B*	470	B	923CC0G471J050B*	2700	B	923CC0G272J050B*
16	B	923CC0G160J050B	91	B	923CC0G910J050B	510	B	923CC0G511J050B	3000	B	923CC0G302J050B
18	B	923CC0G180J050B*	100	B	923CC0G101J050B*	560	B	923CC0G561J050B*	3300	B	923CC0G332J050B*
20	B	923CC0G200J050B	110	B	923CC0G111J050B	620	B	923CC0G621J050B	3600	B	923CC0G362J050B
22	B	923CC0G220J050B*	120	B	923CC0G121J050B*	680	B	923CC0G681J050B*	3900	B	923CC0G392J050B*
24	B	923CC0G240J050B	130	B	923CC0G131J050B	750	B	923CC0G751J050B	4300	B	923CC0G432J050B
27	B	923CC0G270J050B*	150	B	923CC0G151J050B*	820	B	923CC0G821J050B*	4700	B	923CC0G472J050B*
30	B	923CC0G300J050B	160	B	923CC0G161J050B	910	B	923CC0G911J050B	5100	D	923CC0G512J050D
33	B	923CC0G330J050B*	180	B	923CC0G181J050B*	1000	B	923CC0G102J050B*	5600	D	923CC0G562J050D*
36	B	923CC0G360J050B	200	B	923CC0G201J050B	1100	B	923CC0G112J050B	6200	F	923CC0G622J050F
39	B	923CC0G390J050B*	220	B	923CC0G221J050B*	1200	B	923CC0G122J050B*	6800	F	923CC0G682J050F*
43	B	923CC0G430J050B	240	B	923CC0G241J050B	1300	B	923CC0G132J050B	7500	F	923CC0G752J050F
47	B	923CC0G470J050B*	270	B	923CC0G271J050B*	1500	B	923CC0G152J050B*	8200	F	923CC0G822J050F*
51	B	923CC0G510J050B	300	B	923CC0G301J050B	1600	B	923CC0G162J050B	9100	F	923CC0G912J050F
									10000	F	923CC0G103J050F*

†COG catalog numbers have capacitance tolerance of 5%. Numbers followed by star (*) also available as +10% units, change 11th character of catalog number from J to K.

TYPE 470C SINGLE IN-LINE PACKAGED MONOLYTHIC® MULTILAYER CERAMIC CAPACITOR NETWORKS



- Primarily intended for use in signal and data processing equipment where repetitive capacitor values and space economy are required.
- Molded-case single-ended configuration results in rugged device suitable for automatic insertion, while producing significant space savings.
- Multi-layer construction provides very high capacitance/volume ratio with minimum self-inductance.
- 7 capacitor sections in each 8-lead package.
- Additional ceramic formulations, circuit configurations, capacitance values and tolerances available on special order.
- For complete technical data, refer to latest issue of Engineering Bulletin 6244.

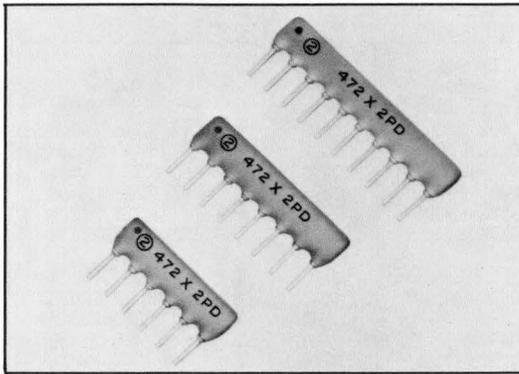


PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** Z5U units, -55°C to +85°C; X7R units, -55°C to +125°C.
- Dissipation Factor:** (1 kHz at +25°C) Z5U units, maximum 4.0%; X7R units, maximum 2.5%.
- Dielectric Strength:** Capacitors shall withstand 250% of rated voltage for not less than 1 nor more than 5 seconds at +25°C.
- Humidity Resistance:** After 100 hours of 95% relative humidity at +40°C, capacitors shall have minimum insulation resistance equal to 50% of initial requirement.
- Life Test:** Capacitors shall withstand 1000 hour life test at 200% of rated voltage at +125°C.

Z5U GENERAL APPLICATION 50 WVDC @ +85°C, ±20% TOL.		X7R TEMPERATURE STABLE 50 WVDC @ +125°C; 100 WVDC @ +85°C, ±10% TOL.	
μF	Catalog Number	μF	Catalog Number
.01	470C7Z5U103M5DG	.001	470C7X7R102K5DG
.022	470C7Z5U223M5DG	.0022	470C7X7R222K5DG
.047	470C7Z5U473M5DG	.0047	470C7X7R472K5DG
.10	470C7Z5U104M5DG	.01	470C7X7R103K5DG
.22	470C7Z5U224M5DG	.022	470C7X7R223K5DG
		.047	470C7X7R473K5DG
		.1	470C7X7R104K5DG

TYPE 210C ECONOLINE™ SINGLE IN-LINE THICK-FILM RESISTOR NETWORKS



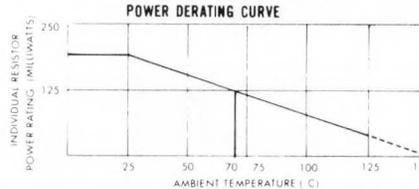
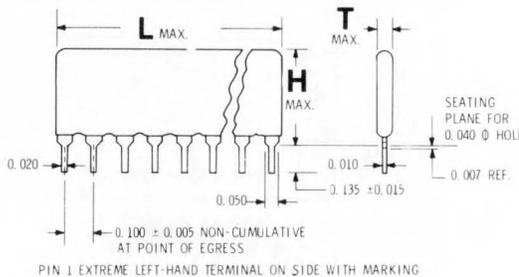
- Ideal for use in signal and data processing applications where repetitive values and patterns are required.
- Designed for pull-up/pull-down, and interface.

- Cut component count, reduce board space requirements, reduce equipment size.
- For complete technical data, refer to latest issue of Short Form Catalog RN-210.

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +125°C.
2. **Power:** 0.125 Watts/Resistor @ +70°C.
3. **Resistance Tolerance:** ± 2 ohms for 22 to 100 ohm units; ± 2% for 100 to 1 MΩ.
4. **TCR Tracking:** ± 50 ppm/°C.

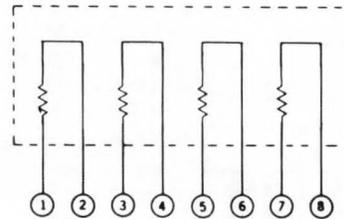
5. **Temperature Coefficient of Resistance:** ± 200 ppm/°C.
6. **Environmental Characteristics:** Meets the requirements of MIL-R-83401, Characteristic M, Groups B and C.
7. **Low-Cost Units Available.** Type 210C resistor networks with ± 5% tolerance and ± 350 ppm/°C TCR are available on special order. Change the X2 code in the Catalog No. to X5.



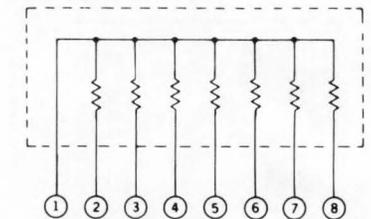
NOTE: If power requirement is more than .125 Watts/Resistor @ +70°C, use Type 216C.

NOTE: ALL CIRCUITS AVAILABLE AS STANDARD IN 6, 8, and 10 PINS. Catalog numbers listed below are for 8 pins. For 6 pins, change 5th character in catalog number from H to F; for 10 pins, change H to K.

Multiple-Isolated Resistors (Circuit SR)



Pull-Up/Pull-Down and Interface Networks (Circuit PD)

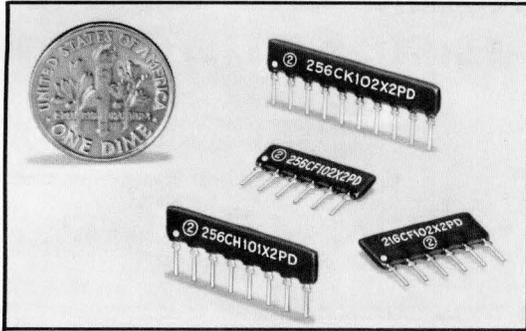


DIMENSIONS (in inches)*

(L) Length (Max.) For Size Code				
H	T	F 6-Pins	H 8-Pins	K 10-Pins
.200	.10	.60	.80	1.00

Ohms	Catalog No.	Ohms	Catalog No.	Ohms	Catalog No.	Ohms	Catalog No.
Multiple-Isolated Resistors (Circuit SR)		Pull-Up/Pull Down and Interface Networks (Circuit PD)					
22	210CH220X2SR	3900	210CH392X2SR	22	210CH220X2PD	3900	210CH392X2PD
27	210CH270X2SR	4700	210CH472X2SR	27	210CH270X2PD	4700	210CH472X2PD
33	210CH330X2SR	5600	210CH562X2SR	33	210CH330X2PD	5600	210CH562X2PD
39	210CH390X2SR	6800	210CH682X2SR	39	210CH390X2PD	6800	210CH682X2PD
47	210CH470X2SR	8200	210CH822X2SR	47	210CH470X2PD	8200	210CH822X2PD
56	210CH560X2SR	10000	210CH103X2SR	56	210CH560X2PD	10000	210CH103X2PD
68	210CH680X2SR	12000	210CH123X2SR	68	210CH680X2PD	12000	210CH123X2PD
82	210CH820X2SR	15000	210CH153X2SR	82	210CH820X2PD	15000	210CH153X2PD
100	210CH101X2SR	18000	210CH183X2SR	100	210CH101X2PD	18000	210CH183X2PD
120	210CH121X2SR	22000	210CH223X2SR	120	210CH121X2PD	22000	210CH223X2PD
150	210CH151X2SR	27000	210CH273X2SR	150	210CH151X2PD	27000	210CH273X2PD
180	210CH181X2SR	33000	210CH333X2SR	180	210CH181X2PD	33000	210CH333X2PD
220	210CH221X2SR	39000	210CH393X2SR	220	210CH221X2PD	39000	210CH393X2PD
270	210CH271X2SR	47000	210CH473X2SR	270	210CH271X2PD	47000	210CH473X2PD
330	210CH331X2SR	56000	210CH563X2SR	330	210CH331X2PD	56000	210CH563X2PD
390	210CH391X2SR	68000	210CH683X2SR	390	210CH391X2PD	68000	210CH683X2PD
470	210CH471X2SR	82000	210CH823X2SR	470	210CH471X2PD	82000	210CH823X2PD
560	210CH561X2SR	100000	210CH104X2SR	560	210CH561X2PD	100000	210CH104X2PD
680	210CH681X2SR	120000	210CH124X2SR	680	210CH681X2PD	120000	210CH124X2PD
820	210CH821X2SR	150000	210CH154X2SR	820	210CH821X2PD	150000	210CH154X2PD
1000	210CH102X2SR	180000	210CH184X2SR	1000	210CH102X2PD	180000	210CH184X2PD
1200	210CH122X2SR	220000	210CH224X2SR	1200	210CH122X2PD	220000	210CH224X2PD
1500	210CH152X2SR	270000	210CH274X2SR	1500	210CH152X2PD	270000	210CH274X2PD
1800	210CH182X2SR	330000	210CH334X2SR	1800	210CH182X2PD	330000	210CH334X2PD
2200	210CH222X2SR	390000	210CH394X2SR	2200	210CH222X2PD	390000	210CH394X2PD
2700	210CH272X2SR	470000	210CH474X2SR	2700	210CH272X2PD	470000	210CH474X2PD
3300	210CH332X2SR	560000	210CH564X2SR	3300	210CH332X2PD	560000	210CH564X2PD
		680000	210CH684X2SR			680000	210CH684X2PD
		820000	210CH824X2SR			820000	210CH824X2PD
		1000000	210CH105X2SR			1000000	210CH105X2PD

TYPE 256C SINGLE IN-LINE RESIN-COATED PRECISION RESISTOR NETWORKS



- Made to same high standards as Type 420C Networks. Type 256C are low profile units. Type 216 networks are higher profile units with higher wattage ratings, and are available upon special order.
- Ideal for use in signal and data processing applications where repetitive values and patterns are required.

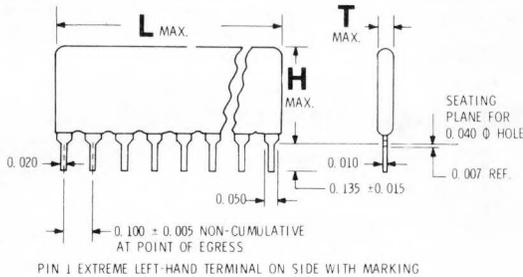
- Cut component count, reduce board space requirements. reduce equipment size.
- Designed for individual terminating, dual terminating, pull-up/pull down, and interface.
- For complete technical data, refer to latest issue of Engineering Bulletin 7041.

SELECTION GUIDELINES

1. For .200" maximum package height, use Type 420C.
2. If power requirement is more than .125 watts/resistor, use Type 216C.

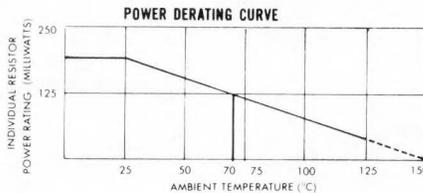
PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +125°C.
2. **Package Power Rating:** (At +25°C) Type 256C (216C) 6-Pin units, .90W (1.70W); 8-Pin, 1.25W (2.8W); 10-Pin, 1.5W (3.0W).
3. **Resistance Tolerance:** ±2 ohms for 22 to 100 ohm units; ±2% for 100 to 1 MΩ.
4. **TCR Tracking:** ±50 ppm/°C.
5. **Temperature Coefficient of Resistance:** ±200 ppm/°C.
6. **Overload Test:** A d-c potential of 2.5 times the rated continuous working voltage, but not to exceed 100 volts, shall be applied to each resistor in the network for 5 ± 1 seconds at 25°C. After test, there shall be no evidence of mechanical failure and the resistance value shall not change by more than 0.5%.
7. **Load-Life Test:** Networks shall be operated for 1000 hours with rated voltage applied in continuous cycles of 1.5 hours On and 0.5 hours Off, at +70°C. After test, there shall be no mechanical damage and resistance value shall not have changed by more than ±1%.



DIMENSIONS (in inches)*

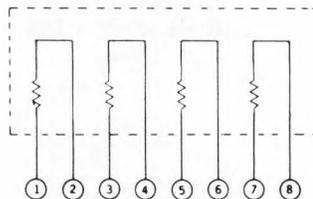
Type	H	T	(L) Length (Max.) For Size Code		
			F 6-Pins	H 8-Pins	K 10-Pins
256C	.225	.10	.60	.80	1.00
216C	.350	.10	.60	.80	1.00



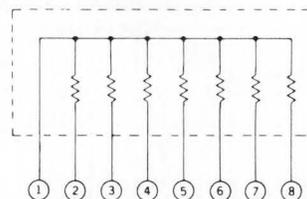
NOTE: ALL CIRCUITS AVAILABLE AS STANDARD IN 6, 8, AND 10 PINS.

Catalog numbers listed below are for 8 pins. For 6 pins, change 5th character in catalog number from H to F; for 10 pins, change H to K.

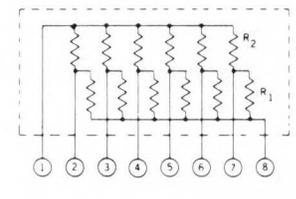
Multiple-Isolated Resistors (Circuit SR)



Pull-Up/Pull-Down and Interface Networks (Circuit PD)

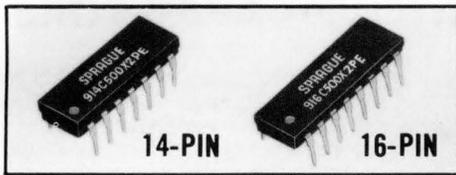


Thevenin Terminator Networks (Circuit TR)

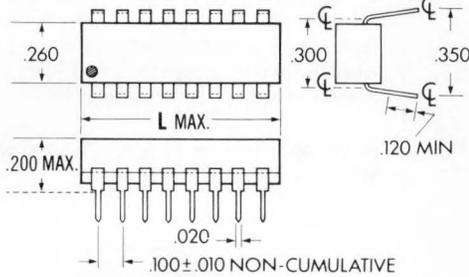


Type 216C Available on Special Order. When Ordering, Change 2nd Character in Catalog Number from 5 to 1.

Ohms	Cat. No.	Ohms	Cat. No.	Ohms	Cat. No.	Ohms	Cat. No.	
Multiple-Isolated Resistors (Circuit SR)		15000	256CH153X2SR	510	256CH511X2PD	27000	256CH273X2PD	
33	256CH330X2SR	22000	256CH223X2SR	560	256CH561X2PD	33000	256CH333X2PD	
47	256CH470X2SR	33000	256CH333X2SR	680	256CH681X2PD	39000	256CH393X2PD	
50	256CH500X2SR	47000	256CH473X2SR	820	256CH821X2PD	47000	256CH473X2PD	
56	256CH560X2SR	68000	256CH683X2SR	1000	256CH102X2PD	56000	256CH563X2PD	
68	256CH680X2SR	100000	256CH104X2SR	1200	256CH122X2PD	68000	256CH683X2PD	
100	256CH101X2SR	Pull-Up/Pull-Down and Interface Networks (Circuit PD)		1500	256CH152X2PD	82000	256CH823X2PD	
120	256CH121X2SR	33	256CH330X2PD	1800	256CH182X2PD	100000	256CH104X2PD	
150	256CH151X2SR	47	256CH470X2PD	2000	256CH202X2PD	Thevenin Terminator Networks (Circuit TR)		
180	256CH181X2SR	50	256CH500X2PD	2200	256CH222X2PD	R ₁	R ₂	Cat. No.
220	256CH221X2SR	56	256CH560X2PD	2700	256CH272X2PD	81	130	256CH500X2TR
270	256CH271X2SR	68	256CH680X2PD	3000	256CH302X2PD	121	195	256CH750X2TR
330	256CH331X2SR	82	256CH820X2PD	3300	256CH332X2PD	162	260	256CH101X2TR
390	256CH391X2SR	100	256CH101X2PD	3900	256CH392X2PD	180	390	256CH121X2TR
470	256CH471X2SR	120	256CH121X2PD	4700	256CH472X2PD	220	270	256CH121X2TRB
680	256CH681X2SR	150	256CH151X2PD	5600	256CH562X2PD	220	330	256CH131X2TR
1000	256CH102X2SR	180	256CH181X2PD	6000	256CH602X2PD	330	390	256CH181X2TR
1500	256CH152X2SR	220	256CH221X2PD	6800	256CH682X2PD	330	470	256CH191X2TR
2200	256CH222X2SR	270	256CH271X2PD	10000	256CH103X2PD	330	680	256CH221X2TR
3300	256CH332X2SR	330	256CH331X2PD	12000	256CH123X2PD	390	500	256CH221X2TRB
4700	256CH472X2SR	390	256CH391X2PD	15000	256CH153X2PD			
6800	256CH682X2SR	470	256CH471X2PD	18000	256CH183X2PD			
10000	256CH103X2SR	500	256CH501X2PD	22000	256CH223X2PD			



TYPE 914C, 916C DUAL IN-LINE PRECISION RESISTOR NETWORKS



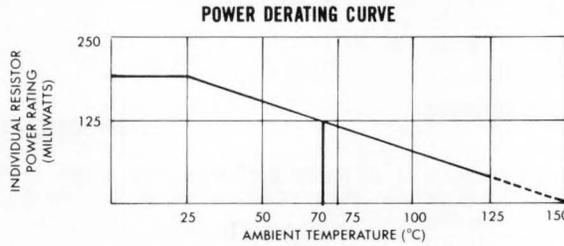
DIMENSIONS (in inches)*

Type No.	No. of Pins	Length (L) (Max.)	Package Power Rating Watts @ 70°C
914C	14	.780	1.75
916C	16	.880	2.00

- Ideal for data processing equipment, telecommunications switching systems, test instruments and any electronic circuit or application where repetitive resistance values and patterns are required.
- Machine insertable on printed wiring boards.

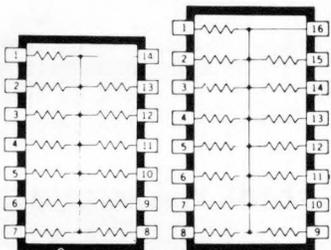
- Designed for individual terminating, dual terminating, pull-up/pull-down, and interface.
- For complete technical data, refer to latest issue of Engineering Bulletin 7042.

PERFORMANCE CHARACTERISTICS

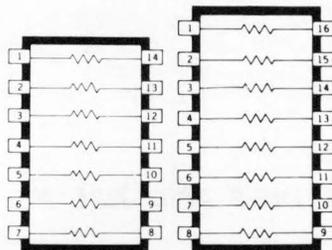


- Operating Temperature Range:** -55°C to +125°C.
- Resistance Tolerance:** ±2% (Under 100 Ω, ±2 Ω)
- TCR Tracking:** ±50 ppm/°C.
- Temperature Coefficient of Resistance:** ±200 ppm/°C.
- Overload Test:** A d-c potential of 2.5 times the rated continuous working voltage, but not to exceed 100 volts, shall be applied to each resistor in the network for 5 ± 1 seconds at 25°C. After test, the change in resistance shall not exceed ±0.5%.
- Load-Life Test:** Networks shall be operated for 1000 hours with rated voltage applied in continuous cycles of 1.5 hours On and 0.5 hours Off, at 70°C. After test, there shall be no mechanical damage and resistance value shall not have changed by more than ±1.0%.

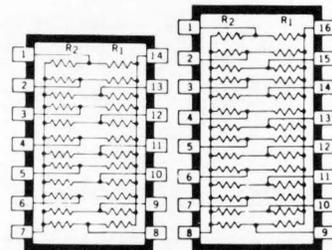
Pull-up/Pull-down and Interface Networks (Circuit PE)



Multiple-Isolated Resistors (Circuit SR)



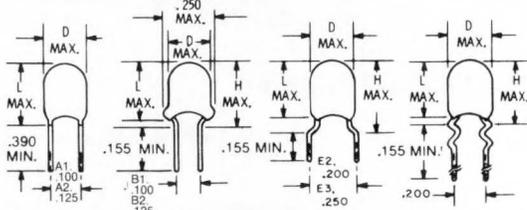
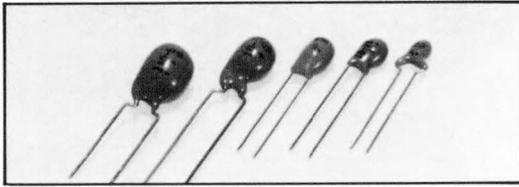
Thevenin Terminator Resistors (Circuit TR)



*Resistor networks listed below have 14 pins. For devices with 16 pins, change 3rd character in catalog number from 4 to 6.

Ohms	Cat. No.*	Ohms	Cat. No.*	Ohms	Cat. No.*	Ohms	Cat. No.*	Ohms	Cat. No.*
Pull-Up/Pull-Down and Interface Networks (Circuit PE)		680	914C681X2PE	13000	914C133X2PE	330	914C331X2SR	6800	914C682X2SR
50	914C500X2PE	750	914C751X2PE	15000	914C153X2PE	360	914C361X2SR	7500	914C752X2SR
56	914C560X2PE	820	914C821X2PE			390	914C391X2SR	8200	914C822X2SR
62	914C620X2PE	910	914C911X2PE	16000	914C163X2PE	430	914C431X2SR	9100	914C912X2SR
68	914C680X2PE	1000	914C102X2PE	18000	914C183X2PE	470	914C471X2SR	10000	914C103X2SR
75	914C750X2PE	1100	914C112X2PE	20000	914C203X2PE	500	914C501X2SR	11000	914C113X2SR
82	914C820X2PE	1200	914C122X2PE	22000	914C223X2PE	510	914C511X2SR	12000	914C123X2SR
91	914C910X2PE	1300	914C132X2PE	30000	914C333X2PE	560	914C561X2SR	13000	914C133X2SR
100	914C101X2PE	1500	914C152X2PE	47000	914C473X2PE	620	914C621X2SR	15000	914C153X2SR
110	914C111X2PE	1600	914C162X2PE	68000	914C683X2PE	680	914C681X2SR	16000	914C163X2SR
120	914C121X2PE	1800	914C182X2PE	100000	914C104X2PE	750	914C751X2SR	18000	914C183X2SR
130	914C131X2PE	2000	914C202X2PE			820	914C821X2SR	20000	914C203X2SR
150	914C151X2PE	2200	914C222X2PE	Multiple-Isolated Resistors (Circuit SR)		910	914C911X2SR	22000	914C223X2SR
160	914C161X2PE	2400	914C242X2PE	50	914C500X2SR	1000	914C102X2SR	24000	914C243X2SR
180	914C181X2PE	2700	914C272X2PE	56	914C560X2SR	1100	914C112X2SR	33000	914C333X2SR
200	914C201X2PE	3000	914C302X2PE	62	914C620X2SR	1200	914C122X2SR	47000	914C473X2SR
220	914C221X2PE	3300	914C332X2PE	68	914C680X2SR	1300	914C132X2SR	68000	914C683X2SR
240	914C241X2PE	3600	914C362X2PE	75	914C750X2SR	1500	914C152X2SR	82000	914C823X2SR
270	914C271X2PE	3900	914C392X2PE	82	914C820X2SR	1600	914C162X2SR	100000	914C104X2SR
300	914C301X2PE	4300	914C432X2PE	91	914C910X2SR	1800	914C182X2SR		
330	914C331X2PE	4700	914C472X2PE	100	914C101X2SR	2000	914C202X2SR	Thevenin Terminator Networks (Circuit TR)	
360	914C361X2PE	5100	914C512X2PE	110	914C111X2SR	2200	914C222X2SR	R ₁	R ₂
390	914C391X2PE	5600	914C562X2PE	120	914C121X2SR	2400	914C242X2SR	81	130
430	914C431X2PE	6200	914C622X2PE	130	914C131X2SR	2700	914C272X2SR	121	195
470	914C471X2PE	6800	914C682X2PE	150	914C151X2SR	3000	914C302X2SR	162	260
500	914C501X2PE	7500	914C752X2PE	160	914C161X2SR	3300	914C332X2SR	180	390
510	914C511X2PE	8200	914C822X2PE	180	914C181X2SR	3600	914C362X2SR	220	270
560	914C561X2PE	9100	914C912X2PE	200	914C201X2SR	3900	914C392X2SR	220	330
620	914C621X2PE	10000	914C103X2PE	220	914C221X2SR	4300	914C432X2SR	330	390
		11000	914C113X2PE	240	914C241X2SR	4700	914C472X2SR	330	470
		12000	914C123X2PE	270	914C271X2SR	5100	914C512X2SR	330	680
				300	914C301X2SR	5600	914C562X2SR	390	500
						6200	914C622X2SR	390	680

TYPE 199D TANTALEX® RESIN-COATED SOLID-TANTALUM CAPACITORS



TERMINAL A1, A2 TERMINAL B1, B2 TERMINAL E2, E3 TERMINAL G2

DIMENSIONS (in inches)*

Size Code	Terminal Codes Available	D Max.	L Max.	H Max.
A	A1, A2, B1, B2, E2, E3, G2	.177	.280	.340
B	A1, A2, B1, B2, E2, E3, G2	.196	.300	.360
C	A1, A2, B1, B2, E2, E3, G2	.216	.360	.420
D	A1, A2, B1, B2, E2, E3, G2	.236	.400	.460
E	E2, E3	.340	.492	.552
F	E2, E3	.380	.650	.710

Lead Space Tolerance: ± .030

NOTE: BOLD FACE LISTINGS ARE POPULAR RATINGS AND ARE MORE READILY AVAILABLE.

- Designed for use in entertainment and commercial equipment.
- Four lead styles for easy plug-in mounting on printed wiring boards.
- Priced competitively with any other capacitor of this type, domestic or offshore.
- Flame-retardant, moisture-resistant epoxy encapsulant will not crack or chip under temperature extremes.
- Capacitors listed have tolerance of ± 10%. For units with capacitance tolerance of ± 20%, change 9th digit in catalog number from 9 to 0.
- Capacitors listed below are standard stock items. Catalog numbers ending with A1 have lead spacing of .100". Other lead styles available on special order. For straight leads with .125" spacing, change last two characters in catalog number to A2. For hairpin leads with .100" spacing, change to B1; for .125" spacing, change to B2. For hockeystick leads with .200" spacing, change to E2; for .250" spacing, change to E3. For formed lock-in leads with .200" spacing, change to G2.
- For complete technical data, refer to latest issue of Engineering Bulletin 3547.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** - 55°C to + 125°C with voltage derating.
- Capacitance Tolerance:** ± 20, ± 10%.
- Dissipation Factor:** (At 25°C) For 0.1 to 1.0 μF, 4%; 1.2 to 6.8 μF, 6%; 8.2 to 68 μF, 8%; 82 to 680 μF, 10%.
- Leakage Current:** Max. d-c leakage current at 25°C is: capacitors in size code A, 0.5 μA; size code B, 1 μA; size code C, 2.5 μA; size code D, 5 μA; size code E, 7 μA; size code F, 10 μA.
- Impedance:** .2 to 250 max. ohms @ 10 KHz and 25°C.
- Life Test:** Capacitors shall withstand rated d-c voltage applied at + 85°C for 1000 hours, with a circuit resistance no greater than 3 ohms. Following life test the leakage current shall not exceed 125% of original requirement; the dissipation factor shall meet the initial requirement; and the change in capacitance shall not exceed ± 10%.

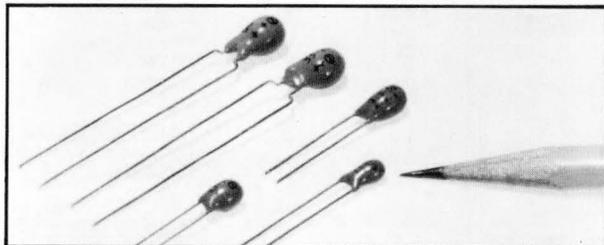
μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
3 WVDC, 3.6 VDC SURGE											
4.7	A	199D475X9003AA1	10	B	199D106X96R3BA1	47	E	199D467X9016EE2	.22	A	199D224X9035AA1
6.8	A	199D685X9003AA1	15	B	199D156X96R3BA1	68	E	199D686X9016EE2	.33	A	199D334X9035AA1
10	A	199D106X9003AA1	22	C	199D226X96R3CA1	100	F	199D107X9016FE2	.47	A	199D474X9035AA1
15	A	199D156X9003AA1	33	C	199D336X96R3CA1	150	F	199D157X9016FE2	.68	A	199D684X9035AA1
22	B	199D226X9003BA1	47	D	199D476X96R3DA1	20 WVDC, 26 VDC SURGE					
33	B	199D336X9003BA1	68	D	199D686X96R3DA1	3.3	B	199D335X9020BA1	1.0	A	199D105X9035AA1
47	C	199D476X9003CA1	100	D	199D107X96R3DA1	4.7	B	199D475X9020BA1	1.5	A	199D155X9035AA1
68	D	199D686X9003DA1	150	E	199D157X96R3EE2	6.8	C	199D685X9020CA1	2.2	B	199D225X9035BA1
100	D	199D107X9003DA1	220	E	199D227X96R3EE2	10	C	199D106X9020CA1	3.3	B	199D335X9035BA1
150	D	199D157X9003DA1	330	F	199D337X96R3FE2	15	D	199D156X9020DA1	4.7	C	199D475X9035CA1
220	E	199D227X9003EE2	10 WVDC, 12 VDC SURGE								
330	E	199D337X9003EE2	3.3	A	199D335X9010AA1	22	D	199D226X9020DA1	6.8	D	199D685X9035DA1
470	F	199D477X9003FE2	4.7	A	199D475X9010AA1	33	E	199D336X9020EE2	10	D	199D106X9035DA1
680	F	199D687X9003FE2	6.8	B	199D685X9010BA1	47	E	199D476X9020EE2	15	E	199D156X9035EE2
4 WVDC, 5.3 VDC SURGE											
6.8	A	199D685X9004AA1	10	B	199D106X9010BA1	68	F	199D686X9020FE2	22	E	199D226X9035EE2
10	A	199D106X9004AA1	15	C	199D156X9010CA1	100	F	199D107X9020FE2	33	F	199D336X9035FE2
15	A	199D156X9004AA1	22	C	199D226X9010CA1	150	F	199D157X9010FE2	47	F	199D476X9035FE2
22	B	199D226X9004BA1	33	D	199D336X9010DA1	25 WVDC, 30 VDC SURGE					
33	B	199D336X9004BA1	47	D	199D476X9010DA1	1.0	A	199D105X9025AA1	50 WVDC, 60 VDC SURGE		
47	C	199D476X9004CA1	68	D	199D686X9010DA1	1.5	A	199D155X9025AA1	.10	A	199D104X9050AA1
68	D	199D686X9004DA1	100	E	199D107X9010EE2	2.2	A	199D225X9025AA1	.15	A	199D154X9050AA1
100	D	199D107X9004DA1	150	E	199D157X9010EE2	3.3	B	199D335X9025BA1	.22	A	199D224X9050AA1
150	E	199D157X9004EE2	220	F	199D227X9010FE2	4.7	B	199D475X9025BA1	.33	A	199D334X9050AA1
220	E	199D227X9004EE2	16 WVDC, 19 VDC SURGE								
330	F	199D337X9004FE2	2.2	A	199D225X9016AA1	6.8	C	199D685X9025CA1	.47	A	199D474X9050AA1
6.3 WVDC, 8 VDC SURGE											
4.7	A	199D475X96R3AA1	10	C	199D106X9016CA1	15	D	199D156X9025DA1	.68	A	199D684X9050AA1
6.8	A	199D685X96R3AA1	15	C	199D156X9016CA1	22	D	199D226X9025DA1	1.0	B	199D105X9050BA1
35 WVDC, 42 VDC SURGE											
			22	D	199D226X9016DA1	33	E	199D336X9025EE2	1.5	C	199D155X9050CA1
			33	D	199D336X9016DA1	47	E	199D476X9025EE2	2.2	C	199D225X9050CA1
						68	F	199D686X9025FE2	3.3	D	199D335X9050DA1
									4.7	D	199D475X9050DA1
									6.8	F	199D685X9050FE2
									10	F	199D106X9050FE2
									15	F	199D156X9050FE2
									22	F	199D226X9050FE2

TYPE 196D TANTALEX[®] RESIN-COATED SOLID-TANTALUM CAPACITORS

“NOT FOR NEW DESIGNS”

SEE 199D ON PRECEDING PAGE.

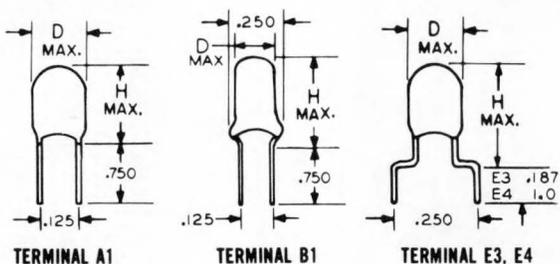
199D SERIES MEET ALL ELECTRICAL/MECHANICAL REQUIREMENTS OF 196D SERIES.



- Designed for use on printed wiring boards in consumer, commercial, and industrial electronic equipment.
- Protected by flame-retardant, hard, insulating resin coating, highly resistant to moisture and mechanical damage.
- High stability; very little capacitance change, even at outer limits of temperature range.
- Low leakage current limits and low capacitance change with temperature.
- Capacitors listed have tolerance of $\pm 10\%$. Capacitors with star (*) are also available with tolerance of $\pm 20\%$. For $\pm 20\%$ tolerance,

change ninth character in catalog number from 9 to 0.

- Low dissipation factor permits higher ripples.
- Catalog numbers ending with A1 indicate $\frac{3}{4}$ " straight leads with .125" spacing. Numbers ending with E4 indicate 1" hockeystick leads with .250" spacing. For short hockeystick pin leads (.187" long, .250" spacing), change A1 or E4 to E3. For $\frac{3}{4}$ " hairpin leads with .125" spacing, change A1 to B1. Refer to dimension drawings for terminal styles.
- For complete technical data, refer to latest issue of engineering Bulletin 3545.

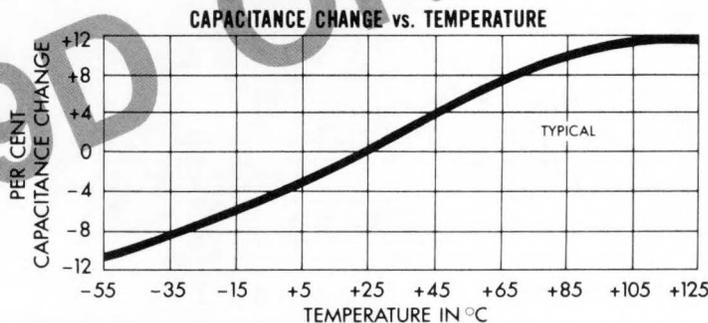


DIMENSIONS (in inches)*

Size Code	Terminal Codes Available	H	D
H	A1, B1	0.350	0.175
	E3	0.425	0.175
J	A1, B1	0.425	0.225
	E3	0.475	0.225
K	A1, B1	0.450	0.225
	E3	0.500	0.225
P	E3, E4	0.650	0.350
T	E3, E4	0.750	0.400

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to $+85^{\circ}\text{C}$; to $+125^{\circ}\text{C}$, with voltage derating.
- Capacitance Tolerance:** $\pm 10\%$, $\pm 20\%$.
- Dissipation Factor:** (At 25°C) For 0.1 to $1.0 \mu\text{F}$, 4%; 1.2 to $6.8 \mu\text{F}$, 6%; 8.2 to $68 \mu\text{F}$, 8%; 82 to $330 \mu\text{F}$, 10%.
- Leakage Current:** Max. d-c leakage current at 25°C is: capacitors in size code H, $1 \mu\text{A}$; size code J, $3 \mu\text{A}$; size code K, $5 \mu\text{A}$; size code P, $10 \mu\text{A}$; size code T, $20 \mu\text{A}$.
- Impedance:** 1.5 to 250 max. ohms @ 10 kHz and 25°C .
- Life Test:** Capacitors are capable of withstanding a 1000 hour life test at rated d-c working voltage. After life test, leakage current shall not be more than 125% of the original requirements, dissipation factor shall meet initial requirement, and capacitance at 25°C shall not have changed by more than $\pm 10\%$ from initial value.



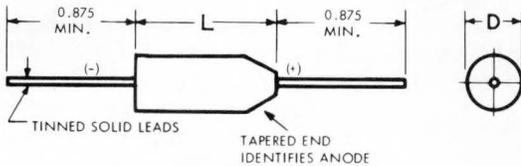
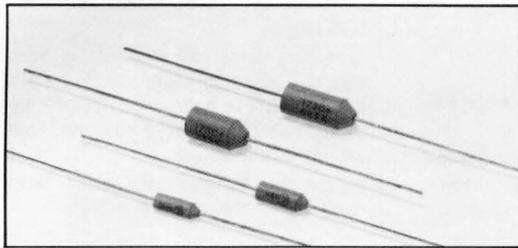
NOTE: BOLD FACE LISTINGS ARE POPULAR RATINGS AND ARE MORE READILY AVAILABLE.

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
4 WVDC, 5.3 VDC SURGE			82	K	196D826X9004KA1	10	See 20 WVDC Listing	
10	H	196D106X9004HA1*	100	K	196D107X9004KA1*	12	See 20 WVDC Listing	
12	H	196D126X9004HA1				15	See 15 WVDC Listing	
15	See 15 WVDC Listing		120	See 6 WVDC Listing		18	See 15 WVDC Listing	
18	See 15 WVDC Listing		150	See 6 WVDC Listing		22	See 10 WVDC Listing	
22	See 10 WVDC Listing		180	P	196D187X9004PE4	27	See 10 WVDC Listing	
27	See 10 WVDC Listing		220	P	196D227X9004PE4*	33	J	196D336X9006JA1*
33	See 6 WVDC Listing		270	See 6 WVDC Listing		39	J	196D396X9006JA1
39	See 6 WVDC Listing		330	See 6 WVDC Listing		47	J	196D476X9006JA1*
47	See 6 WVDC Listing		6 WVDC, 8 VDC SURGE			56	K	196D566X9006KA1
56	J	196D566X9004JA1	6.8	H	196D685X9006HA1*	68	K	196D686X9006KA1*
68	See 6 WVDC Listing		8.2	H	196D825X9006HA1	82	See 10 WVDC Listing	

“NOT FOR NEW DESIGNS”
SEE 199D ON PRECEDING PAGE.
**199D SERIES MEET ALL ELECTRICAL/
MECHANICAL REQUIREMENTS OF 196D SERIES.**
TYPE 196D TANTALEX® CAPACITORS, continued

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
100	See 10 WVDC Listing		20 WVDC, 26 VDC SURGE			0.39	H	196D394X9035HA1
120	P	196D127X9006PE4	2.7	H	196D275X9020HA1	0.47	H	196D474X9035HA1★
150	P	196D157X9006PE4★				0.56	H	196D564X9035HA1
180	See 10 WVDC Listing		3.3	See 35 WVDC Listing		0.68	H	196D684X9035HA1★
			3.9	See 35 WVDC Listing		0.82	H	196D824X9035HA1
220	See 10 WVDC Listing		4.7	See 35 WVDC Listing		1.0	H	196D105X9035HA1★
270	T	196D277X9006TE4	5.6	See 25 WVDC Listing		1.2	J	196D125X9035JA1
330	T	196D337X9006TE4★	6.8	See 25 WVDC Listing		1.5	J	196D155X9035JA1★
			8.2	See 25 WVDC Listing		1.8	J	196D185X9035JA1
10 WVDC, 13 VDC SURGE						2.2	J	196D225X9035JA1★
4.7	H	196D475X9010HA1★	10	J	196D106X9020JA1★	2.7	J	196D275X9035JA1
5.6	H	196D565X9010HA1	12	J	196D126X9020JA1	3.3	J	196D335X9035JA1★
6.8	See 25 WVDC Listing		15	K	196D156X9020KA1★	3.9	J	196D395X9035JA1
8.2	See 25 WVDC Listing		18	K	196D186X9020KA1	4.7	J	196D475X9035JA1★
10	See 20 WVDC Listing		22	See 35 WVDC Listing		5.6	K	196D565X9035KA1
12	See 20 WVDC Listing		27	See 25 WVDC Listing		6.8	K	196D685X9035KA1★
15	See 15 WVDC Listing					8.2	P	196D825X9035PE4
18	See 15 WVDC Listing		33	See 25 WVDC Listing		10	P	196D106X9035PE4★
22	J	196D226X9010JA1★	39	P	196D396X9020PE4	12	P	196D126X9035PE4
27	J	196D276X9010JA1	47	P	196D476X9020PE4★	15	P	196D156X9035PE4★
33	K	196D336X9010KA1★	56	See 25 WVDC Listing		18	P	196D186X9035PE4
39	K	196D396X9010KA1	68	See 25 WVDC Listing		22	P	196D226X9035PE4★
47	See 20 WVDC Listing		82	T	196D826X9020TE4	27	T	196D276X9035TE4
56	See 15 WVDC Listing		100	T	196D107X9020TE4★	33	T	196D336X9035TE4★
68	See 15 WVDC Listing		25 WVDC, 32 VDC SURGE			39	T	196D396X9035TE4
82	P	196D826X9010PE4	1.2	H	196D125X9025HA1	47	T	196D476X9035TE4★
100	P	196D107X9010PE4★	1.5	H	196D155X9025HA1★	50 WVDC, 65 VDC SURGE		
120	See 15 WVDC Listing		1.8	H	196D185X9025HA1	0.10	H	196D104X9050HA1★
150	See 15 WVDC Listing		2.2	H	196D225X9025HA1★	0.12	H	196D124X9050HA1
180	T	196D187X9010TE4	2.7	See 35 WVDC Listing		0.15	H	196D154X9050HA1★
220	T	196D227X9010TE4★	3.3	See 35 WVDC Listing		0.18	H	196D184X9050HA1
15 WVDC, 20 VDC SURGE			3.9	See 35 WVDC Listing		0.22	H	196D224X9050HA1★
3.3	H	196D335X9015HA1★	4.7	See 35 WVDC Listing		0.27	H	196D274X9050HA1
3.9	H	196D395X9015HA1	5.6	J	196D565X9025JA1	0.33	H	196D334X9050HA1★
4.7	See 35 WVDC Listing		6.8	J	196D685X9025JA1★	0.39	H	196D394X9050HA1
5.6	See 25 WVDC Listing		8.2	J	196D825X9025JA1	0.47	H	196D474X9050HA1★
6.8	See 25 WVDC Listing		10	K	196D106X9025KA1★	0.56	H	196D564X9050HA1
8.2	See 25 WVDC Listing		12	K	196D126X9025KA1	0.68	H	196D684X9050HA1★
10	See 20 WVDC Listing		15	See 35 WVDC Listing		0.82	H	196D824X9050HA1
12	See 20 WVDC Listing		18	See 35 WVDC Listing		1.0	H	196D105X9050HA1★
15	J	196D156X9015JA1★	22	See 35 WVDC Listing		1.2	J	196D125X9050JA1
18	J	196D186X9015JA1	27	P	196D276X9025PE4	1.5	J	196D155X9050JA1★
22	K	196D226X9015KA1★	33	P	196D336X9025PE4★	1.8	J	196D185X9050JA1
27	See 25 WVDC Listing		39	See 35 WVDC Listing		2.2	J	196D225X9050JA1★
33	See 25 WVDC Listing		47	See 35 WVDC Listing		2.7	J	196D275X9050JA1
39	See 20 WVDC Listing		56	T	196D566X9025TE4	3.3	J	196D335X9050JA1★
47	See 20 WVDC Listing		68	T	196D686X9025TE4★	3.9	K	196D395X9050KA1
56	P	196D566X9015PE4	35 WVDC, 46 VDC SURGE			4.7	K	196D475X9050KA1★
68	P	196D686X9015PE4★	0.10	H	196D104X9035HA1★	5.6	P	196D565X9050PE4
82	See 20 WVDC Listing		0.12	H	196D124X9035HA1	6.8	P	196D685X9050PE4★
100	See 20 WVDC Listing		0.15	H	196D154X9035HA1★	8.2	P	196D825X9050PE4
120	T	196D127X9015TE4	0.18	H	196D184X9035HA1	10	P	196D106X9050PE4★
150	T	196D157X9015TE4★	0.22	H	196D224X9035HA1★	12	P	196D126X9050PE4
			0.27	H	196D274X9035HA1	15	P	196D156X9050PE4★
			0.33	H	196D334X9035HA1★	18	T	196D186X9050TE4
						22	T	196D226X9050TE4★

TYPE 173D SOLID-ELECTROLYTE TANTALEX® CAPACITORS



DIMENSIONS (in inches)*

Size Code	D	L	Lead Diam.
U	0.095	0.260	0.020
V	0.110	0.290	0.020
W	0.180	0.345	0.020
X	0.180	0.420	0.020

NOTE: BOLD FACE LISTINGS ARE POPULAR RATINGS AND ARE MORE READILY AVAILABLE.

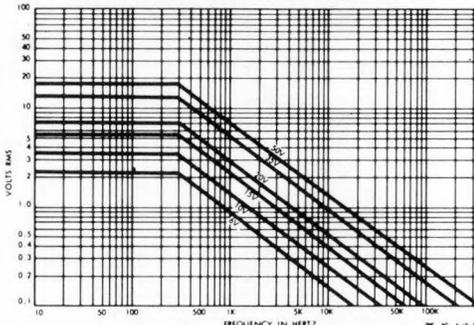
- Designed for use in automotive, industrial, and consumer electronic equipment.
- Precision-molded in thermosetting flame-retardant epoxy resin.
- Meet stringent environmental and electrical performance requirements.
- Rugged construction, low dissipation factor, and low leakage current.

- Furnished lead-taped for convenient handling and installation.
- Capacitors listed have capacitance tolerance of $\pm 10\%$. Units with star (*) also available with tolerance of $\pm 20\%$. Change 9th character in catalog number from 9 to 0.
- For complete technical data, refer to latest issue of Engineering Bulletin 3533.10.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to $+85^{\circ}\text{C}$; to $+125^{\circ}\text{C}$ with 33.3% voltage derating.
- Capacitance Tolerance:** $\pm 10\%$ and $\pm 20\%$.
- Dissipation Factor:** (At 25°C) 2 WVDC capacitors, 10%; 4 WVDC capacitors, 8%; 6 through 20 WVDC capacitors, 4 to 6%; 25 through 50 WVDC capacitors, 3 to 4%.

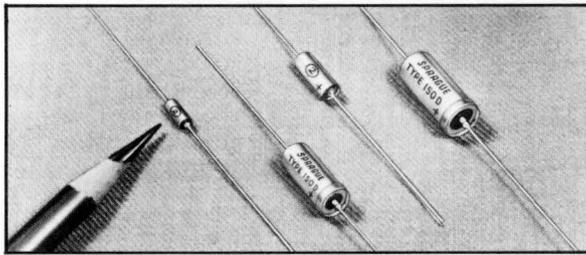
RIPPLE CURRENT vs. FREQUENCY



- Leakage Current:** Max. d-c leakage current at 25°V is: capacitors in size code U, $5 \mu\text{A}$; size code V, $1 \mu\text{A}$; size code W, $1.9 \mu\text{A}$; size code X, $5 \mu\text{A}$.
- Life Test:** Capacitors are capable of withstanding a 2000 hour life test at $+85^{\circ}\text{C}$, or 1000 hour test at $+125^{\circ}\text{C}$. After test, leakage current shall not be more than 125% of initial requirement, and capacitance at $+25^{\circ}\text{C}$ shall not have changed by more than $\pm 10\%$ of initial requirement.

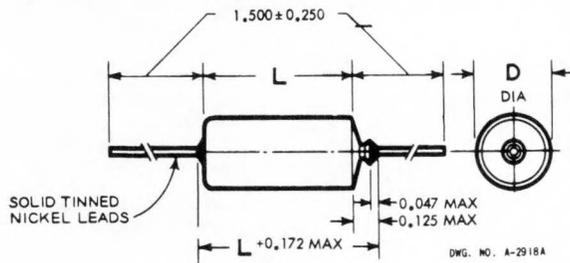
μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
2 WVDC, 2.5 VDC SURGE			27	W	173D276X9006W	20 WVDC, 26 VDC SURGE			.18	U	173D184X9035U
6.8	See 4 WVDC Listing		33	W	173D336X9006W*	1.0	See 25 WVDC Listing		.22	U	173D224X9035U*
8.2	U	173D825X9002U	39	See 10 WVDC Listing		1.2	U	173D125X9020U	.27	U	173D274X9035U
10	U	173D106X9002U*	47	X	173D476X9006X*	1.5	U	173D155X9020U*	.33	U	173D334X9035U*
12	See 6 WVDC Listing		56	X	173D566X9006X	1.8	V	173D185X9020V	.39	U	173D394X9035U
15	See 6 WVDC Listing		68	X	173D686X9006X*	2.2	V	173D225X9020V*	.47	U	173D474X9035U*
18	See 4 WVDC Listing		10 WVDC, 13 VDC SURGE			2.7	V	173D275X9020V	.56	V	173D564X9035V
22	See 4 WVDC Listing		2.2	See 15 WVDC Listing		3.3	V	173D335X9020V*	.68	V	173D684X9035V*
27	V	173D276X9002V	2.7	U	173D275X9010U	3.9	V	173D395X9020V	.82	V	173D824X9035V
33	V	173D336X9002V*	3.3	U	173D335X9010U*	4.7	V	173D475X9020V*	1.0	V	173D105X9035V*
39	See 4 WVDC Listing		3.9	V	173D395X9010V	5.6	See 25 WVDC Listing		1.2	V	173D125X9035V
47	See 4 WVDC Listing		4.7	V	173D475X9010V*	6.8	See 25 WVDC Listing		1.5	V	173D155X9035V*
56	W	173D566X9002W	5.6	V	173D565X9010V	8.2	See 25 WVDC Listing		1.8	W	173D185X9035W
68	W	173D686X9002W*	6.8	V	173D685X9010V*	10	See 25 WVDC Listing		2.2	W	173D225X9035W*
4 WVDC, 5 VDC SURGE			8.2	V	173D825X9010V	12	X	173D126X9020X	2.7	W	173D275X9035W
4.1	See 6 WVDC Listing		8.2	V	173D106X9010V*	15	X	173D156X9020X*	3.3	W	173D335X9035W*
5.6	U	173D565X9004U	10	See 15 WVDC Listing		18	X	173D186X9020X*	3.9	W	173D395X9035W
6.8	U	173D685X9004U*	12	See 15 WVDC Listing		22	X	173D226X9020X*	4.7	W	173D475X9035W*
8.2	See 10 WVDC Listing		15	See 15 WVDC Listing		5.6	X	173D565X9035X	5.6	X	173D565X9035X
10	See 10 WVDC Listing		18	W	173D186X9010W	6.8	X	173D685X9035X*	6.8	X	173D685X9035X*
12	See 6 WVDC Listing		22	W	173D226X9010W*	8.2	X	173D825X9035X*	8.2	X	173D825X9035X*
15	See 6 WVDC Listing		27	X	173D276X9010X	10	X	173D106X9035X*	10	X	173D106X9035X*
18	V	173D186X9004V	33	X	173D336X9010X*	25 WVDC, 32 VDC SURGE			50 WVDC, 65 VDC SURGE		
22	V	173D226X9004V*	39	X	173D396X9010X	.47	See 35 WVDC Listing		.10	U	173D104X9050U*
27	See 6 WVDC Listing		47	X	173D476X9010X*	.56	U	173D564X9025U	.12	U	173D124X9050U
33	See 6 WVDC Listing		15 WVDC, 20 VDC SURGE			.68	U	173D684X9025U*	.15	U	173D154X9050U*
39	W	173D396X9004W	1.5	See 20 WVDC Listing		.82	U	173D824X9025U	.18	U	173D184X9050U
47	W	173D476X9004W*	1.8	U	173D185X9015U	1.0	U	173D105X9025U*	.22	U	173D224X9050U*
56	See 6 WVDC Listing		2.2	U	173D225X9015U*	1.2	See 35 WVDC Listing		.27	U	173D274X9050U
68	X	173D686X9004X*	2.7	See 20 WVDC Listing		1.5	See 35 WVDC Listing		.33	V	173D334X9050V*
6 WVDC, 8 VDC SURGE			3.3	See 20 WVDC Listing		1.8	V	173D185X9025V	.39	V	173D394X9050V
3.3	See 10 WVDC Listing		3.9	See 20 WVDC Listing		2.2	V	173D225X9025V*	.47	V	173D474X9050V*
3.9	U	173D395X9006U	4.7	See 20 WVDC Listing		2.7	V	173D275X9025V	.56	V	173D564X9050V
4.7	U	173D475X9006U*	5.6	V	173D565X9015V	3.3	V	173D335X9025V*	.68	V	173D684X9050V*
5.6	See 10 WVDC Listing		6.8	V	173D685X9015V*	3.9	See 35 WVDC Listing		.82	V	173D824X9050V
6.8	See 10 WVDC Listing		8.2	See 25 WVDC Listing		4.7	See 35 WVDC Listing		1.0	V	173D105X9050V*
8.2	See 10 WVDC Listing		10	See 25 WVDC Listing		5.6	W	173D565X9025W	1.2	W	173D125X9050W
10	See 10 WVDC Listing		12	W	173D126X9015W	6.8	W	173D685X9025W*	1.5	W	173D155X9050W*
12	V	173D126X9006V	15	W	173D156X9015W*	8.2	W	173D825X9025W	1.8	W	173D185X9050W
15	V	173D156X9006V*	18	X	173D186X9015X	10	W	173D106X9025W*	2.2	W	173D225X9050W*
18	See 10 WVDC Listing		22	X	173D226X9015X*	12	X	173D126X9025X*	2.7	X	173D275X9050X
22	See 10 WVDC Listing		27	X	173D276X9015X*	15	X	173D156X9025X*	3.3	X	173D335X9050X*
			33	X	173D336X9015X*	35 WVDC, 46 VDC SURGE			3.9	X	173D395X9050X
						.10	U	173D104X9035U*	4.7	X	173D475X9050X*
						.12	U	173D124X9035U*			
						.15	U	173D154X9035U*			

TYPE 150D TANTALEX® SOLID-TANTALUM CAPACITORS



- Hermetically sealed metal cases.
- Recommended for industrial, military, and commercial applications.
- For capacitors which meet requirements of MIL-C-39003, see pages 18-21.
- Capacitors listed have outer plastic-film insulation. For bare case, change last character of catalog number from 2 to 0 and

- subtract .010" from diameter and .036" from length.
- Capacitors listed have capacitance tolerance of $\pm 10\%$. Units with star (*) are also available with tolerance of $\pm 20\%$. For tolerance of $\pm 20\%$, change X9 in middle of catalog number to X0.
- For complete technical data, refer to latest issue of Engineering Bulletin 3520.



DIMENSIONS (in inches)*

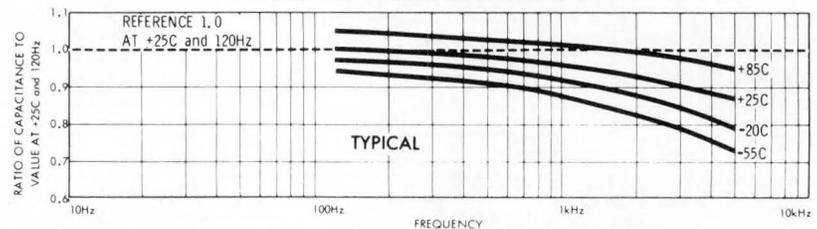
Size Code	D	L
A	0.135	0.286
B	0.185	0.474
R	0.289	0.686
S	0.351	0.786

NOTE: BOLD FACE LISTINGS ARE POPULAR RATINGS AND ARE MORE READILY AVAILABLE.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -80°C to $+85^{\circ}\text{C}$; to $+125^{\circ}\text{C}$ with voltage derating.
- Capacitance Tolerance:** $\pm 10\%$, $\pm 20\%$.
- Dissipation Factor:** (At 25°C) 6 through 20 WVDC capacitors, 2 to 8%; 35 through 100 WVDC capacitors, 2 to 6%; 125 WVDC capacitors, 2 to 4%.
- Leakage Current:** Max. d-c leakage current at 25°C is: capacitors in size code A, .5 to 1.5 μA ; size code B, .9 to 5 μA ; size code R, 2.5 to 12 μA ; size code S, 7.5 to 20 μA .
- Life Test:** (At 85°C) Capacitors are capable of withstanding a 2000 hour life test at rated d-c working voltage. After life test, leakage current shall not be less than 2 μA , dissipation factor shall meet initial requirement, and capacitance at 25°C shall not have changed by more than $\pm 10\%$ from initial value.

CAPACITANCE vs. FREQUENCY/TEMPERATURE



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC, 8 VDC SURGE											
.22	A	150D224X9006A2*	100	R	150D107X9006R2*	33	B	150D336X9010B2*	12	B	150D126X9015B2
.27	A	150D274X9006A2	120	R	150D127X9006R2*	39	B	150D396X9010B2	15	B	150D156X9015B2*
.33	A	150D334X9006A2*	150	R	150D157X9006R2*	47	R	150D476X9010R2*	18	B	150D186X9015B2
.39	A	150D394X9006A2	180	R	150D187X9006R2*	56	R	150D566X9010R2	22	B	150D226X9015B2*
.47	A	150D474X9006A2*	220	S	150D227X9006S2*	68	R	150D686X9010R2*	27	R	150D276X9015R2
.56	A	150D564X9006A2	270	S	150D277X9006S2*	82	R	150D826X9010R2	33	R	150D336X9015R2*
.68	A	150D684X9006A2*	330	S	150D337X9006S2*	100	R	150D107X9010R2*	39	R	150D396X9015R2
.82	A	150D824X9006A2	10 WVDC, 13 VDC SURGE						47	R	150D476X9015R2*
1.0	A	150D105X9006A2*	.22	A	150D224X9010A2*	.27	A	150D274X9010A2	56	R	150D566X9015R2
1.2	A	150D125X9006A2	.27	A	150D274X9010A2	.33	A	150D334X9010A2*	68	R	150D686X9015R2*
1.5	A	150D155X9006A2*	.33	A	150D334X9010A2*	.39	A	150D394X9010A2	82	S	150D826X9015S2
1.8	A	150D185X9006A2	.47	A	150D474X9010A2*	.47	A	150D474X9010A2*	100	S	150D107X9015S2*
2.2	A	150D225X9006A2*	.56	A	150D564X9010A2	.56	A	150D564X9010A2	120	S	150D127X9015S2
2.7	A	150D275X9006A2	.68	A	150D684X9010A2*	.68	A	150D684X9010A2*	150	S	150D157X9015S2*
3.3	A	150D335X9006A2*	.82	A	150D824X9010A2	.82	A	150D824X9010A2	20 WVDC, 23 VDC SURGE		
3.9	A	150D395X9006A2	1.0	A	150D105X9010A2*	1.0	A	150D105X9010A2*	.0047	A	150D472X9020A2*
4.7	A	150D475X9006A2*	1.2	A	150D125X9010A2	1.2	A	150D125X9010A2	.0056	A	150D526X9020A2
5.6	A	150D565X9006A2	1.5	A	150D155X9010A2*	1.5	A	150D155X9010A2*	.0068	A	150D682X9020A2
6.8	A	150D685X9006A2*	1.8	A	150D185X9010A2	1.8	A	150D185X9010A2	.0082	A	150D822X9020A2
8.2	B	150D825X9006B2	2.2	A	150D225X9010A2*	2.2	A	150D225X9010A2*	.01	A	150D103X9020A2*
10	B	150D106X9006B2*	2.7	A	150D275X9010A2	2.7	A	150D275X9010A2	.012	A	150D123X9020A2
12	B	150D126X9006B2*	3.3	A	150D335X9010A2*	3.3	A	150D335X9010A2*	.015	A	150D153X9020A2*
15	B	150D156X9006B2*	3.9	A	150D395X9010A2	3.9	A	150D395X9010A2	.018	A	150D183X9020A2
18	B	150D186X9006B2	4.7	A	150D475X9010A2*	4.7	A	150D475X9010A2*	.022	A	150D223X9020A2*
22	B	150D226X9006B2*	5.6	B	150D565X9010B2	5.6	B	150D565X9010B2	.027	A	150D273X9020A2
27	B	150D276X9006B2	6.8	B	150D685X9010B2*	6.8	B	150D685X9010B2*	.033	A	150D333X9020A2*
33	B	150D336X9006B2*	8.2	B	150D825X9010B2	8.2	B	150D825X9010B2	.039	A	150D393X9020A2
39	B	150D396X9006B2	10	B	150D106X9010B2*	10	B	150D106X9010B2*	.047	A	150D473X9020A2*
47	B	150D476X9006B2*	12	B	150D126X9010B2	12	B	150D126X9010B2	.056	A	150D563X9020A2
56	B	150D566X9006B2	15	B	150D156X9010B2*	15	B	150D156X9010B2*	.068	A	150D683X9020A2*
68	R	150D686X9006R2*	18	B	150D186X9010B2	18	B	150D186X9010B2	.082	A	150D823X9020A2
82	R	150D826X9006R2	22	B	150D226X9010B2*	22	B	150D226X9010B2*	.10	A	150D104X9020A2*
			27	B	150D276X9010B2	27	B	150D276X9010B2	.12	A	150D124X9020A2
									.15	A	150D154X9020A2*

TYPE 150D TANTALEX® SOLID-TANTALUM CAPACITORS, continued

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
.18	A	150D184X9020A2	.27	A	150D274X9035A2	1.0	A	150D105X9050A2*	3.9	B	150D395X9060B2
.22	A	150D224X9020A2*				1.2	B	150D125X9050B2	4.7	R	150D475X9060R2*
.27	A	150D274X9020A2	.33	A	150D334X9035A2*	1.5	B	150D155X9050B2*			
.33	A	150D334X9020A2*	.39	A	150D394X9035A2	1.8	B	150D185X9050B2	5.6	R	150D565X9060R2
.39	A	150D394X9020A2	.47	A	150D474X9035A2*	2.2	B	150D225X9050B2*	6.8	R	150D685X9060R2*
			.56	A	150D564X9035A2	2.7	B	150D275X9050B2	8.2	R	150D825X9060R2
.47	A	150D474X9020A2*	.68	A	150D684X9035A2*	3.3	B	150D335X9050B2*	10	R	150D106X9060R2*
.56	A	150D564X9020A2	.82	A	150D824X9035A2	3.9	B	150D395X9050B2	12	S	150D126X9060S2
.68	A	150D684X9020A2*				4.7	B	150D475X9050B2*	15	S	150D156X9060S2*
.82	A	150D824X9020A2	1.0	A	150D105X9035A2*	1.5	B	150D155X9035B2*	18	S	150D186X9060S2
			1.2	B	150D125X9035B2	1.8	B	150D185X9035B2	22	S	150D226X9060S2*
1.0	A	150D105X9020A2*	1.5	B	150D155X9035B2*	2.2	B	150D225X9035B2*	75 WVDC, 98 VDC SURGE		
1.2	A	150D125X9020A2	2.2	B	150D225X9035B2*	2.7	B	150D275X9035B2	.0047	A	150D472X9075A2*
1.5	A	150D155X9020A2*	3.3	B	150D335X9035B2*				.0056	A	150D562X9075A2
1.8	A	150D185X9020A2	3.9	B	150D395X9035B2	4.7	B	150D475X9035B2*	.0068	A	150D682X9075A2*
2.2	A	150D225X9020A2*	5.6	B	150D565X9035B2	6.8	B	150D685X9035B2*	.082	A	150D822X9075A2
2.7	B	150D275X9020B2	8.2	R	150D825X9035R2	8.2	R	150D825X9035R2			
									.01	A	150D103X9075A2*
3.3	B	150D335X9020B2*							.012	A	150D123X9075A2
3.9	B	150D395X9020B2	10	R	150D106X9035R2*				.015	A	150D153X9075A2*
4.7	B	150D475X9020B2*	12	R	150D126X9035R2				.018	A	150D183X9075A2
5.6	B	150D565X9020B2	15	R	150D156X9035R2*				.022	A	150D223X9075A2*
6.8	B	150D685X9020B2*	18	R	150D186X9035R2				.027	A	150D273X9075A2
8.2	B	150D825X9020B2	22	R	150D226X9035R2*						
									.033	A	150D333X9075A2*
10	B	150D106X9020B2*							.039	A	150D393X9075A2
12	B	150D126X9020B2							.047	A	150D473X9075A2*
15	B	150D156X9020B2*							.056	A	150D563X9075A2
18	R	150D186X9020R2							.068	A	150D683X9075A2*
22	R	150D226X9020R2*							.082	A	150D823X9075A2
27	R	150D276X9020R2									
									.1	A	150D104X9075A2*
33	R	150D336X9020R2*							.12	A	150D124X9075A2
39	R	150D336X9020R2							.15	A	150D154X9075A2*
47	R	150D476X9020R2*							.18	A	150D184X9075A2
56	S	150D566X9020S2							.22	A	150D224X9075A2*
									.27	A	150D274X9075A2
68	S	150D686X9020S2*							.33	A	150D334X9075A2*
82	S	150D826X9020S2							.39	A	150D394X9075A2
100	S	150D107X9020S2*							.47	A	150D474X9075A2*
									.56	A	150D564X9075A2
									.68	A	150D684X9075A2*
									.82	B	150D824X9075B2
									1.0	B	150D105X9075B2*
									1.2	B	150D125X9075B2
									1.5	B	150D155X9075B2*
									1.8	B	150D185X9075B2
									2.2	B	150D225X9075B2*
									2.7	B	150D275X9075B2
									3.3	B	150D335X9075B2*
									3.9	B	150D395X9075B2
									4.7	R	150D475X9075R2*
									5.6	R	150D565X9075R2
									6.8	R	150D685X9075R2*
									8.2	R	150D825X9075R2
									10.0	R	150D106X9075R2*
									12.0	S	150D126X9075S2
									15.0	S	150D156X9075S2*

TYPE 150D TANTALEX® SOLID-TANTALUM CAPACITORS, continued

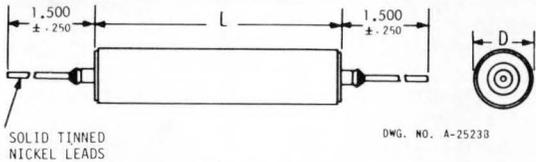
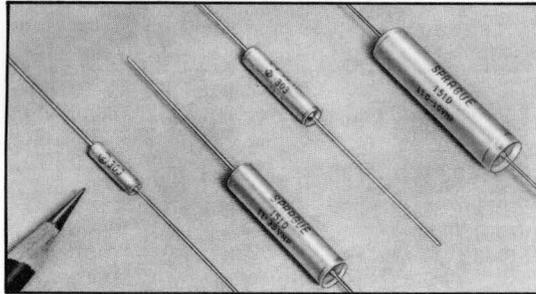
μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
100 WVDC, 130 VDC SURGE			.1	A	150D104X9100A2*	5.6	R	150D565X9100R2	.068	A	150D683X9125A2*
			.12	A	150D124X9100A2	6.8	R	150D685X9100R2*	.082	A	150D823X9125A2
			.15	A	150D154X9100A2*	125 WVDC, 140 VDC SURGE			.1	A	150D104X9125A2*
.0047	A	150D472X9100A2*	.18	A	150D184X9100A2	.0047	A	150D472X9125A2*	.12	A	150D124X9125A2
.0056	A	150D562X9100A2	.22	A	150D224X9100A2*	.0056	A	150D562X9125A2	.15	A	150D154X9125A2*
.0068	A	150D682X9100A2*	.27	A	150D274X9100A2	.0068	A	150D682X9125A2*	.18	A	150D184X9125A2
.0082	A	150D822X9100A2	.33	A	150D334X9100A2*	.0082	A	150D822X9125A2	.22	A	150D224X9125A2*
.01	A	150D103X9100A2*	.39	A	150D394X9100A2	.01	A	150D103X9125A2*	.27	A	150D274X9125A2
.012	A	150D123X9100A2	.47	A	150D474X9100A2*	.012	A	150D123X9125A2	.33	A	150D334X9125A2*
.015	A	150D153X9100A2*	.56	A	150D564X9100A2	.015	A	150D153X9125A2*	.39	A	150D394X9125A2
.018	A	150D183X9100A2	.68	B	150D684X9100B2*	.018	A	150D183X9125A2	.47	A	150D474X9125A2*
.022	A	150D223X9100A2*	.82	B	150D824X9100B2	.022	A	150D223X9125A2*	.56	B	150D564X9125B2
.027	A	150D273X9100A2	1.0	B	150D105X9100B2*	.027	A	150D273X9125A2	.68	B	150D684X9125B2*
.033	A	150D333X9100A2*	1.2	B	150D125X9100B2	.033	A	150D333X9125A2*	.82	B	150D824X9125B2
.039	A	150D393X9100A2	1.5	B	150D155X9100B2*	.039	A	150D393X9125A2	1.0	B	150D105X9125B2*
.047	A	150D473X9100A2*	1.8	B	150D185X9100B2	.047	A	150D473X9125A2*	1.2	B	150D125X9125B2
.056	A	150D563X9100A2	2.2	B	150D225X9100B2*	.056	A	150D563X9125A2	1.5	B	150D155X9125B2*
.068	A	150D683X9100A2*	2.7	B	150D275X9100B2	.068	A	150D683X9125A2*	1.8	B	150D185X9125B2
.082	A	150D823X9100A2	3.3	R	150D335X9100R2*	.082	A	150D823X9125A2	2.2	B	150D225X9125B2*
			3.9	R	150D395X9100R2*						
			4.7	R	150D475X9100R2*						

EXTENDED-RANGE TYPE 152D TANTALEX® CAPACITORS

• Extended capacitance ratings (higher capacitance values in smaller case sizes) required in some new equipment designs. • Available at premium prices.

μF	Size Code	Catalog Number									
6 WVDC, 8 VDC SURGE			82	B	152D826X9010B2	20 WVDC, 26 VDC SURGE			82	S	152D826X9030S2
			150	R	152D157X9010R2*				100	S	152D107X9030S2*
			180	R	152D187X9010R2	2.7	A	152D275X9020A2	35 WVDC, 46 VDC SURGE		
10	A	152D106X9006A2*	220	R	152D227X9010R2*	3.3	A	152D335X9020A2*	1.2	A	152D125X9035A2
12	A	152D126X9006A2	270	R	152D277X9010R2	3.9	A	152D395X9020A2	1.5	A	152D155X9035A2*
15	A	152D156X9006A2*	330	S	152D337X9010S2*	4.7	A	152D475X9020A2*	1.8	A	152D185X9035A2
68	B	152D686X9006B2*	390	S	152D397X9010S2	18	B	152D186X9020B2	8.2	B	152D825X9035B2
			470	S	152D477X9010S2*	22	B	152D226X9020B2*	10	B	152D106X9035B2*
82	B	152D826X9006B2	560	S	152D567X9010S2	27	B	152D276X9020B2	27	R	152D276X9035R2
100	B	152D107X9006B2*	15 WVDC, 20 VDC SURGE			56	R	152D566X9020R2	33	R	152D336X9035R2*
			3.9	A	152D395X9015A2	68	R	152D686X9020R2*	39	R	152D396X9035R2
330	R	152D337X9006R2*	4.7	A	152D475X9015A2*	82	R	152D826X9020R2	47	R	152D476X9035R2*
390	R	152D397X9006R2	5.6	A	152D565X9015A2	100	R	152D107X9020R2*	56	S	152D566X9035S2
470	R	152D477X9006R2*	6.8	A	152D685X9015A2*	120	R	152D127X9020R2	68	S	152D686X9035S2*
			27	B	152D276X9015B2	150	S	152D157X9020S2*	82	S	152D826X9035S2
560	S	152D567X9006S2	33	B	152D336X9015B2*	180	S	152D187X9020S2	100	S	152D107X9035S2*
680	S	152D687X9006S2*	39	B	152D396X9015B2	220	S	152D227X9020S2*	50 WVDC, 65 VDC SURGE		
820	S	152D827X9006S2	82	R	152D826X9015R2	30 WVDC, 39 VDC SURGE			1.2	A	152D125X9050A2
1000	S	152D108X9006S2*	100	R	152D107X9015R2*	2.2	A	152D225X9030A2*	1.5	A	152D155X9050A2*
			120	R	152D127X9015R2	2.7	A	152D275X9030A2	5.6	B	152D565X9050B2
10 WVDC, 13 VDC SURGE			150	R	152D157X9015R2*	12	B	152D126X9030B2	6.8	B	152D685X9050B2*
5.6	A	152D565X9010A2	180	R	152D187X9015R2	15	B	152D156X9030B2*	22	R	152D226X9050R2*
6.8	A	152D685X9010A2*	220	S	152D227X9015S2*	18	B	152D186X9030B2	27	R	152D276X9050R2
8.2	A	152D825X9010A2	270	S	152D277X9015S2	56	R	152D566X9030R2*	33	S	152D336X9050S2*
			330	S	152D337X9015S2*	68	R	152D686X9030R2*	39	S	152D396X9050S2
10	A	152D106X9010A2*							47	S	152D476X9050S2*
47	B	152D476X9010B2*									
56	B	152D566X9010B2									
68	B	152D686X9010B2*									

TYPE 151D NON-POLARIZED TANTALEX[®] SOLID-TANTALUM CAPACITORS



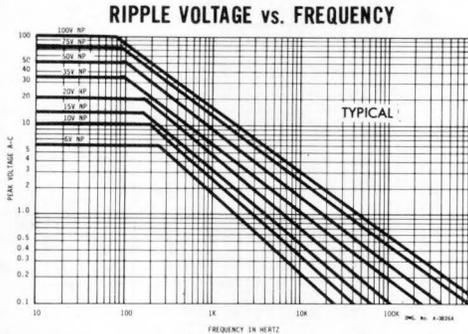
DIMENSIONS (in inches)*

Size Code	D	L
W	0.161	0.575
X	0.207	0.955
Y	0.314	1.350
Z	0.376	1.550

- Excellent electrical characteristics and outstanding service life.
- Hermetically sealed in metal cases.
- Capacitors have wide range of applications: servo systems, low-frequency tuned circuits, crossover networks, small low-voltage motors, bypass applications, etc.
- Capacitors listed have capacitance tolerance of ±10%. Units with star (*) are available in ±20% tolerance. For tolerance of ±20%, change X9 in middle of catalog number to X0.
- Capacitors listed have outer plastic-film insulation. For bare case, change 14th character of catalog number from 2 to 0.
- For complete technical data, refer to latest issue of Engineering Bulletin 3521.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C; to +125°C with voltage derating.
- Capacitance Tolerance:** ±10% and ±20%.
- Dissipation Factor:** (At 25°C) 6 through 20 WNP Capacitors, 2 to 8%; 35 through 100 WNP capacitors, 2 to 6%; 125 WNP capacitors, 2 to 4%.
- Leakage Current:** Max. d-c leakage current at 25°C is: capacitors in size code W, 1.5 μF, size code X, 5 μF; size code X, 12 μF; size code Z, 20 μF.
- Life Test:** (At 85°C) Capacitors are capable of withstanding a 2000 hour life test at rated d-c working voltage. After life test, leakage current shall not be more than 125% of original requirements, dissipation factor shall meet initial requirements, and capacitance at 25°C shall not have changed by more than ±10% from initial value.

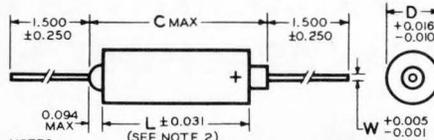
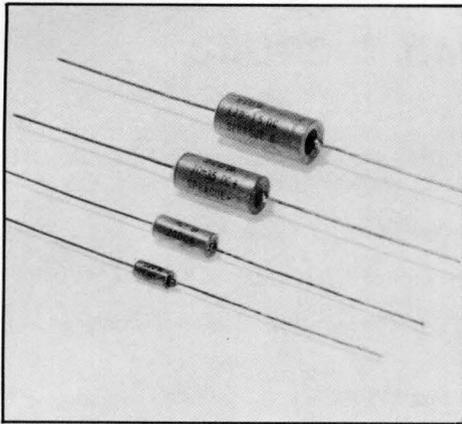


μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 VOLTS NP, 8 NP SURGE			110	Z	151D117X9006Z2*	75	Z	151D756X9010Z2*	20 VOLTS NP, 26 NP SURGE		
.11	W	151D114X9006W2*	130	Z	151D137X9006Z2*	90	Z	151D906X9010Z2	.0023	W	151D232X9020W2*
.13	W	151D134X9006W2	160	Z	151D167X9006Z2*	110	Z	151D117X9010Z2*	.0028	W	151D282X9020W2
.16	W	151D164X9006W2	10 VOLTS NP, 13 NP SURGE			15 VOLTS NP, 20 NP SURGE			.0034	W	151D342X9020W2*
.19	W	151D194X9006W2	.11	W	151D114X9010W2*	.11	W	151D114X9015W2*	.0041	W	151D412X9020W2
.23	W	151D234X9006W2*	.13	W	151D134X9010W2	.13	W	151D134X9015W2	.005	W	151D502X9020W2*
.28	W	151D284X9006W2	.16	W	151D164X9010W2*	.16	W	151D164X9015W2*	.006	W	151D602X9020W2
.34	W	151D344X9006W2*	.19	W	151D194X9010W2	.19	W	151D194X9015W2	.0075	W	151D752X9020W2*
.41	W	151D414X9006W2	.23	W	151D234X9010W2*	.23	W	151D234X9015W2*	.009	W	151D902X9020W2
.50	W	151D504X9006W2*	.28	W	151D284X9010W2	.28	W	151D284X9015W2	.011	W	151D113X9020W2*
.60	W	151D604X9006W2	.34	W	151D344X9010W2*	.34	W	151D344X9015W2*	.013	W	151D133X9020W2
.75	W	151D754X9006W2*	.41	W	151D414X9010W2	.41	W	151D414X9015W2	.016	W	151D163X9020W2*
.90	W	151D904X9006W2	.50	W	151D504X9010W2*	.50	W	151D504X9015W2*	.019	W	151D193X9020W2
1.1	W	151D115X9006W2*	.60	W	151D604X9010W2	.60	W	151D604X9015W2	.023	W	151D233X9020W2*
1.3	W	151D135X9006W2	.75	W	151D754X9010W2*	.75	W	151D754X9015W2*	.028	W	151D283X9020W2
1.6	W	151D165X9006W2*	.90	W	151D904X9010W2	.90	W	151D904X9015W2	.034	W	151D343X9020W2*
1.9	W	151D195X9006W2	1.1	W	151D115X9010W2*	1.1	W	151D115X9015W2*	.041	W	151D413X9020W2
2.3	W	151D235X9006W2*	1.3	W	151D135X9010W2	1.3	W	151D135X9015W2	.05	W	151D503X9020W2*
2.8	W	151D285X9006W2	1.6	W	151D165X9010W2*	1.6	W	151D165X9015W2*	.06	W	151D603X9020W2
3.4	W	151D345X9006W2*	1.9	W	151D195X9010W2	1.9	X	151D195X9015X2	.075	W	151D753X9020W2*
4.1	X	151D415X9006X2	2.3	W	151D235X9010W2*	2.3	X	151D235X9015X2*	.09	W	151D903X9020W2
5.0	X	151D505X9006X2*	2.8	X	151D285X9010X2	2.8	X	151D285X9015X2	.11	W	151D114X9020W2*
6.0	X	151D605X9006X2	3.4	X	151D345X9010X2*	3.4	X	151D345X9015X2*	.13	W	151D134X9020W2
7.5	X	151D755X9006X2*	4.1	X	151D415X9010X2	4.1	X	151D415X9015X2	.16	W	151D164X9020W2*
9.0	X	151D905X9006X2	5.0	X	151D505X9010X2*	5.0	X	151D505X9015X2	.19	W	151D194X9020W2
11	X	151D116X9006X2*	6.0	X	151D605X9010X2	6.0	X	151D605X9015X2*	.23	W	151D234X9020W2*
13	X	151D136X9006X2	7.5	X	151D755X9010X2*	7.5	X	151D755X9015X2*	.28	W	151D284X9020W2
16	X	151D166X9006X2*	9.0	X	151D905X9010X2	9.0	X	151D905X9015X2	.34	W	151D344X9020W2*
19	X	151D196X9006X2	11	X	151D116X9010X2*	11	X	151D116X9015X2*	.41	W	151D414X9020W2
23	X	151D236X9006X2*	13	X	151D136X9010X2	13	X	151D136X9015X2*	.50	W	151D504X9020W2*
28	X	151D286X9006X2	16	X	151D166X9010X2*	16	Y	151D166X9015Y2	.60	W	151D604X9020W2
30	X	151D306X9006X2*	19	X	151D196X9010X2	19	Y	151D196X9015Y2	.75	W	151D754X9020W2*
34	Y	151D346X9006Y2*	20	X	151D206X9010X2*	20	Y	151D206X9015Y2	.90	W	151D904X9020W2
41	Y	151D416X9006Y2	23	Y	151D236X9010Y2*	23	Y	151D236X9015Y2*	1.1	W	151D115X9020W2*
50	Y	151D506X9006Y2*	28	Y	151D286X9010Y2	28	Y	151D286X9015Y2*	1.3	X	151D135X9020X2
60	Y	151D606X9006Y2*	34	Y	151D346X9010Y2*	34	Y	151D346X9015Y2*	1.6	X	151D165X9020X2*
75	Y	151D756X9006Y2*	41	Y	151D416X9010Y2	41	Z	151D416X9015Z2	1.9	X	151D195X9020X2
90	Y	151D906X9006Y2*	50	Y	151D506X9010Y2*	50	Z	151D506X9015Z2*	2.3	X	151D235X9020X2*
			60	Y	151D606X9010Y2*	60	Z	151D606X9015Z2	2.8	X	151D285X9020X2
						75	Z	151D756X9015Z2*	3.4	X	151D345X9020X2*
									4.1	X	151D415X9020X2

TYPE 151D TANTALEX® SOLID-TANTALUM CAPACITORS, continued

μ F	Size Code	Catalog Number	μ F	Size Code	Catalog Number	μ F	Size Code	Catalog Number	μ F	Size Code	Catalog Number			
5.0	X	151D505X9020X2*	.0041	W	151D412X9050W2	.28	W	151D284X9060W2	.0041	W	151D412X9100W2*			
6.0	X	151D605X9020X2	.005	W	151D502X9050W2*	.34	W	151D344X9060W2*	.005	W	151D502X9100W2*			
7.5	X	151D755X9020X2*	.006	W	151D602X9050W2	.41	X	151D414X9060X2	.006	W	151D602X9100W2			
9.0	Y	151D905X9020Y2	.0075	W	151D752X9050W2*	.50	X	151D504X9060X2*	.0075	W	151D752X9100W2*			
11	Y	151D116X9020Y2*	.009	W	151D902X9050W2	.60	X	151D604X9060X2	.009	W	151D902X9100W2			
13	Y	151D136X9020Y2*	.011	W	151D113X9050W2*	.75	X	151D754X9060X2*	.011	W	151D113X9100W2*			
16	Y	151D166X9020Y2*	.013	W	151D133X9050W2	.90	X	151D904X9060X2	.013	W	151D133X9100W2			
19	Y	151D196X9020Y2	.016	W	151D163X9050W2*	1.1	X	151D115X9060X2*	.016	W	151D163X9100W2*			
23	Y	151D236X9020Y2*	.019	W	151D193X9050W2	1.3	X	151D135X9060X2	.019	W	151D193X9100W2			
28	Z	151D286X9020Z2	.023	W	151D233X9050W2*	1.6	X	151D165X9060X2*	.023	W	151D233X9100W2*			
34	Z	151D346X9020Z2*	.028	W	151D283X9050W2	1.9	X	151D195X9060X2	.028	W	151D283X9100W2			
41	Z	151D416X9020Z2	.034	W	151D343X9050W2*	2.3	Y	151D235X9060Y2*	.034	W	151D343X9100W2*			
50	Z	151D506X9020Z2*	.041	W	151D413X9050W2	2.8	Y	151D285X9060Y2	.041	W	151D413X9100W2			
35 VOLTS NP, 46 NP SURGE														
.0023	W	151D232X9035W2*	.05	W	151D503X9050W2*	3.4	Y	151D345X9060Y2*	.050	W	151D503X9100W2*			
.0028	W	151D282X9035W2	.06	W	151D603X9050W2	4.1	Y	151D415X9060Y2	.060	W	151D603X9100W2			
.0034	W	151D342X9035W2*	.075	W	151D753X9050W2*	5.0	Y	151D505X9060Y2*	.075	W	151D753X9100W2*			
.0041	W	151D412X9035W2	.09	W	151D903X9050W2	6.0	Z	151D605X9060Z2	.090	W	151D903X9100W2			
.005	W	151D502X9035W2*	.11	W	151D114X9050W2*	7.5	Z	151D755X9060Z2*	.11	W	151D114X9100W2*			
.006	W	151D602X9035W2	.13	W	151D134X9050W2	9.0	Z	151D905X9060Z2	.13	W	151D134X9100W2			
.0075	W	151D752X9035W2*	.16	W	151D164X9050W2*	11.0	Z	151D116X9060Z2*	.16	W	151D164X9100W2*			
.009	W	151D902X9035W2	.19	W	151D194X9050W2	75 VOLTS NP, 97 NP SURGE						.19	W	151D194X9100W2
.011	W	151D113X9035W2*	.23	W	151D234X9050W2*	.0023	W	151D232X9075W2*	.23	W	151D234X9100W2*			
.013	W	151D133X9035W2	.28	W	151D284X9050W2	.0028	W	151D282X9075W2	.28	W	151D284X9100W2			
.016	W	151D163X9035W2*	.34	W	151D344X9050W2*	.0034	W	151D342X9075W2*	.34	X	151D344X9100X2*			
.019	W	151D193X9035W2	.41	W	151D414X9050W2	.0041	W	151D412X9075W2	.41	X	151D414X9100X2			
.023	W	151D233X9035W2*	.50	W	151D504X9050W2*	.005	W	151D502X9075W2*	.50	X	151D504X9100X2*			
.028	W	151D283X9035W2	.60	X	151D604X9050X2	.006	W	151D602X9075W2	.60	X	151D604X9100X2			
.034	W	151D343X9035W2*	.75	X	151D754X9050X2*	.0075	W	151D752X9075W2*	.75	X	151D754X9100X2*			
.041	W	151D413X9035W2	.90	X	151D904X9050X2	.009	W	151D902X9075W2	.90	X	151D904X9100X2			
.050	W	151D503X9035W2*	1.1	X	151D115X9050X2*	.011	W	151D113X9075W2*	1.1	X	151D115X9100X2*			
.060	W	151D603X9035W2	1.3	X	151D135X9050X2	.013	W	151D133X9075W2*	1.3	X	151D135X9100X2			
.075	W	151D753X9035W2*	1.6	X	151D165X9050X2*	.016	W	151D163X9075W2*	1.6	Y	151D165X9100Y2*			
.090	W	151D903X9035W2	1.9	X	151D195X9050X2	.019	W	151D193X9075W2*	1.9	Y	151D195X9100Y2*			
.11	W	151D114X9035W2*	2.3	X	151D235X9050X2*	.023	W	151D233X9075W2*	2.3	Y	151D235X9100Y2*			
.13	W	151D134X9035W2	2.8	Y	151D285X9050Y2	.028	W	151D283X9075W2*	2.8	Y	151D285X9100Y2*			
.16	W	151D164X9035W2*	3.4	Y	151D345X9050Y2*	.034	W	151D343X9075W2*	3.4	Y	151D345X9100Y2*			
.19	W	151D194X9035W2	4.1	Y	151D415X9050Y2	.041	W	151D413X9075W2	125 VOLTS NP, 140 NP SURGE					
.23	W	151D234X9035W2*	5.0	Y	151D505X9050Y2*	.05	W	151D503X9075W2*	.0023	W	151D232X9125W2*			
.28	W	151D284X9035W2	6.0	Y	151D605X9050Y2	.06	W	151D603X9075W2	.0028	W	151D282X9125W2			
.34	W	151D344X9035W2*	7.5	Y	151D755X9050Y2*	.075	W	151D753X9075W2*	.0034	W	151D342X9125W2*			
.41	W	151D414X9035W2	9.0	Y	151D905X9050Y2	.09	W	151D903X9075W2	.0041	W	151D412X9125W2			
.50	W	151D504X9035W2*	11.0	Z	151D116X9050Z2*	.11	W	151D114X9075W2*	.005	W	151D502X9125W2*			
.60	X	151D604X9035X2	60 VOLTS NP, 78 NP SURGE									.006	W	151D602X9125W2
.75	X	151D754X9035X2*	.0023	W	151D232X9060W2*	.16	W	151D164X9075W2*	.0075	W	151D752X9125W2*			
.90	X	151D904X9035X2	.0028	W	151D282X9060W2	.19	W	151D194X9075W2	.009	W	151D902X9125W2			
1.1	X	151D115X9035X2*	.0034	W	151D342X9060W2*	.23	W	151D234X9075W2*	.011	W	151D113X9125W2*			
1.3	X	151D135X9035X2	.0041	W	151D412X9060W2	.28	W	151D284X9075W2	.013	W	151D133X9125W2			
1.6	X	151D165X9035X2*	.005	W	151D502X9060W2*	.34	W	151D344X9075W2*	.016	W	151D163X9125W2*			
1.9	X	151D195X9035X2	.006	W	151D602X9060W2	.41	X	151D414X9075X2	.019	W	151D193X9125W2			
2.3	X	151D235X9035X2*	.0075	W	151D752X9060W2*	.50	X	151D504X9075X2*	.023	W	151D233X9125W2*			
2.8	X	151D285X9035X2	.009	W	151D902X9060W2	.60	X	151D604X9075X2	.028	W	151D283X9125W2			
3.4	X	151D345X9035X2*	.011	W	151D113X9060W2*	.75	X	151D754X9075X2*	.034	W	151D343X9125W2*			
4.1	Y	151D415X9035Y2	.013	W	151D133X9060W2*	.90	X	151D904X9075X2	.041	W	151D413X9125W2			
5.0	Y	151D505X9035Y2*	.016	W	151D163X9060W2*	1.1	X	151D115X9075X2*	.05	W	151D503X9125W2*			
6.0	Y	151D605X9035Y2*	.019	W	151D193X9060W2	1.3	X	151D135X9075X2	.06	W	151D603X9125W2			
7.5	Y	151D755X9035Y2*	.023	W	151D233X9060W2*	1.6	X	151D165X9075X2*	.07	W	151D703X9125W2*			
9.0	Y	151D905X9035Y2	.028	W	151D283X9060W2*	1.9	X	151D195X9075X2	.09	W	151D903X9125W2			
11	Y	151D116X9035Y2*	.034	W	151D343X9060W2*	2.3	Y	151D235X9075Y2*	.11	W	151D114X9125W2*			
13	Z	151D136X9035Z2	.041	W	151D413X9060W2	2.8	Y	151D285X9075Y2	.13	W	151D134X9125W2			
16	Z	151D166X9035Z2*	.05	W	151D503X9060W2*	3.4	Y	151D345X9075Y2*	.16	W	151D164X9125W2*			
19	Z	151D196X9035Z2	.06	W	151D603X9060W2	4.1	Y	151D415X9075Y2	.19	W	151D194X9125W2			
23	Z	151D236X9035Z2*	.075	W	151D753X9060W2*	5.0	Y	151D505X9075Y2*	.23	W	151D234X9125W2*			
50 VOLTS NP, 65 NP SURGE												.28	X	151D284X9125X2
.0023	W	151D232X9050W2*	.09	W	151D903X9060W2	6.0	Z	151D605X9075Z2	.34	X	151D344X9125X2*			
.0028	W	151D282X9050W2	.11	W	151D114X9060W2*	7.5	Z	151D755X9075Z2*	.41	X	151D414X9125X2			
.0034	W	151D342X9050W2*	.13	W	151D134X9060W2	100 VOLTS NP, 115 NP SURGE						.50	X	151D504X9125X2*
60 VOLTS NP, 78 NP SURGE												.60	X	151D604X9125X2
.0023	W	151D232X9060W2*	.16	W	151D164X9060W2*	.0023	W	151D232X9100W2*	.75	X	151D754X9125X2*			
.0028	W	151D282X9060W2	.19	W	151D194X9060W2	.0028	W	151D282X9100W2	.90	X	151D904X9125X2			
.0034	W	151D342X9060W2*	.23	W	151D234X9060W2*	.0034	W	151D342X9100W2*	1.1	X	151D115X9125X2*			

STYLE CS12, CS13 SOLID TANTALUM CAPACITORS to MIL-C-26655



NOTES:
 1. THESE CAPACITORS ARE NOT INTENDED TO BE MOUNTED BY THEIR LEADS.
 2. FOR STYLE CS13 CAPACITORS, THE CASE INSULATION SHALL EXTEND 0.015 INCH MINIMUM BEYOND EACH END. HOWEVER, WHEN A SHRINK-FITTED INSULATION IS USED, IT SHALL LAP OVER THE ENDS OF THE CAPACITOR BODY.
 DWG NO. A-31288

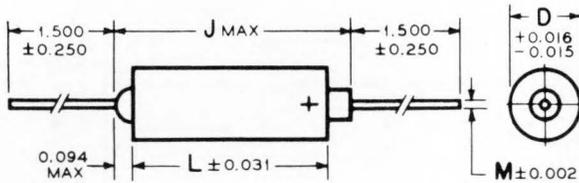
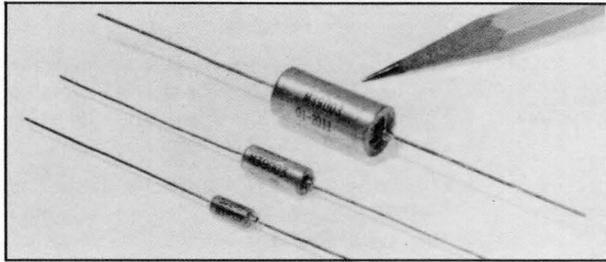
DIMENSIONS (in inches)*

Size Code	C	D	L	W
A	.422	.135	.286	.020
B	.610	.185	.474	.020
C	.822	.289	.686	.025
D	.922	.351	.786	.025

- Military version of Industrial Type 150D.
- Solid electrolyte; cannot seep even if hermetic seal is accidentally broken.
- Operating temperature range, -55°C to +85°C; to +125°C with voltage derating.
- Capacitors listed have outer plastic-film insulation. For bare case, change prefix of Type Designation from CS13 to CS12, and subtract .010" from diameter and .036" from length.
- Capacitors listed have capacitance tolerance of ±10%. Units with star (*) after Type Designation also available with tolerance of ±20%; change last character from K to M.

μF	Size Code	Style Designation	μF	Size Code	Style Designation	μF	Size Code	Style Designation
6 WVDC, 8 VDC SURGE			10 WVDC, 13 VDC SURGE			100 WVDC, 130 VDC SURGE		
5.6	A	CS13BB565K	.56	A	CS13BF564K	.68	A	CS13BH684K*
6.8	A	CS13BB685K*	.68	A	CS13BF684K*	.82	B	CS13BH824K*
47	B	CS13BB476K*	.82	A	CS13BF824K	1.0	B	CS13BH105K*
56	B	CS13BB566K	1.0	A	CS13BF105K*	1.2	B	CS13BH125K
150	C	CS13BB157K*	1.2	B	CS13BF125K	1.5	B	CS13BH155K*
180	C	CS13BB187K	1.5	B	CS13BF155K*	1.8	B	CS13BH185K
270	D	CS13BB277K	1.8	B	CS13BF185K	2.2	B	CS13BH225K*
330	D	CS13BB337K*	2.2	B	CS13BF225K*	2.7	B	CS13BH275K
15 WVDC, 20 VDC SURGE			50 WVDC, 65 VDC SURGE			75 WVDC, 98 VDC SURGE		
3.9	A	CS13BC395K	3.9	B	CS13BF395K	.10	A	CS13BH104K*
4.7	A	CS13BC475K*	4.7	B	CS13BF475K*	.12	A	CS13BH124K
27	B	CS13BC276K	5.6	B	CS13BF565K	.15	A	CS13BH154K*
33	B	CS13BC336K*	6.8	B	CS13BF685K*	.18	A	CS13BH184K
39	B	CS13BC396K	8.2	C	CS13BF825K	.22	A	CS13BH224K*
82	C	CS13BC826K	10	C	CS13BF106K*	.27	A	CS13BH274K
100	C	CS13BC107K*	12	C	CS13BF126K	.33	A	CS13BJ334K*
120	C	CS13BC127K	15	C	CS13BF156K*	.39	A	CS13BJ394K
180	D	CS13BC187K	18	C	CS13BF186K	.47	A	CS13BJ474K*
220	D	CS13BC227K*	22	C	CS13BF226K*	.56	A	CS13BJ564K
20 WVDC, 26 VDC SURGE			75 WVDC, 98 VDC SURGE			100 WVDC, 130 VDC SURGE		
1.2	A	CS13BE125K	1.0	A	CS13BG105K*	.0047	A	CS13BJ472K*
1.5	A	CS13BE155K*	1.2	B	CS13BG125K	.0056	A	CS13BJ562K
1.8	A	CS13BE185K	1.5	B	CS13BG155K*	.0068	A	CS13BJ682K*
2.2	A	CS13BE225K*	1.8	B	CS13BG185K	.0082	A	CS13BJ822K
8.2	B	CS13BE825K	2.2	B	CS13BG225K*	.01	A	CS13BJ103K*
10	B	CS13BE106K*	2.7	B	CS13BG275K	.012	A	CS13BJ123K
12	B	CS13BE126K	3.3	B	CS13BG335K*	.015	A	CS13BJ153K*
15	B	CS13BE156K*	3.9	B	CS13BG395K	.018	A	CS13BJ183K
27	C	CS13BE276K	4.7	B	CS13BG475K*	.022	A	CS13BJ223K*
33	C	CS13BE336K*	5.6	C	CS13BG565K	.027	A	CS13BJ273K
39	C	CS13BE396K	6.8	C	CS13BG685K*	.033	A	CS13BJ333K*
47	C	CS13BE476K*	8.2	C	CS13BG825K	.039	A	CS13BJ393K
56	D	CS13BE566K	10	C	CS13BG106K*	.047	A	CS13BJ473K*
68	D	CS13BE686K*	12	C	CS13BG126K	.056	A	CS13BJ563K
82	D	CS13BE826K	15	C	CS13BG156K*	.068	A	CS13BJ683K*
100	D	CS13BE107K*	18	C	CS13BG186K	.082	A	CS13BJ823K
35 WVDC, 46 VDC SURGE			75 WVDC, 98 VDC SURGE			100 WVDC, 130 VDC SURGE		
.33	A	CS13BF334K*	12	C	CS13BG126K	.10	A	CS13BJ104K*
.39	A	CS13BF394K	15	C	CS13BG156K*	.12	A	CS13BJ124K
.47	A	CS13BF474K*	18	C	CS13BG186K	.15	A	CS13BJ154K*
			22	D	CS13BG226K*	.18	A	CS13BJ184K
						.22	A	CS13BJ224K*
						.27	A	CS13BJ274K
						.33	A	CS13BJ334K*
						.39	A	CS13BJ394K
						.47	A	CS13BJ474K*
						.56	A	CS13BJ564K
						.68	B	CS13BJ684K*
						.82	B	CS13BJ824K
						1.0	B	CS13BJ105K*
						1.2	B	CS13BJ125K
						1.5	B	CS13BJ155K*
						1.8	B	CS13BJ185K
						2.2	B	CS13BJ225K*
						2.7	B	CS13BJ275K

ESTABLISHED RELIABILITY STYLE CSR13 SOLID TANTALUM CAPACITORS to MIL-C-39003



Size Code	J	D	L	M
A	0.422	0.135	0.286	0.020
B	0.610	0.185	0.474	0.020
C	0.822	0.289	0.686	0.025
D	0.922	0.351	0.786	0.025

- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-790. Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.
- Excellent stability with time and temperature.
- Glass-to-metal hermetic seal, metal encased with outer plastic insulating sleeve.
- Maximum D-C surge voltages at 85°C are approximately 30% greater than rated working voltage.
- Direct replacements for Style CS13 previously shown in MIL-C-26655.
- For complete technical data, refer to latest issue of Engineering Bulletin 3520.2.

PER CENT DISSIPATION FACTOR

Size Code	Working Volts D-C							
	6	10	15	20	35	50	75	100
A	4 or 6	4	4	4	—	2	2	2
B	6	6	6	6	4 or 6	4	2 or 4	2 or 4
C	8	6 or 8	6	6	6	4 or 6	4 or 6	6
D	8	8	8	6 or 8	6	6	6	—

μF	Cap. Tol. (±%)	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/01 — Failure Rate Level (% / 1000 hr.)					μF	Cap. Tol. (±%)	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/01 — Failure Rate Level (% / 1000 hr.)									
				L (2.0)	M (1.0)	P (0.1)	R (0.01)	S (0.001)					L (2.0)	M (1.0)	P (0.1)	R (0.01)	S (0.001)					
6 WVDC @ 85°C, 4 WVDC @ 125°C																						
5.6	10	A	CSR13B565K—	2001	2241	2481	2721	2961	39.0	10	B	CSR13C396K—	2019	2259	2499	2739	2979					
6.8	10	A	CSR13B685K—	2002	2242	2482	2722	2962	82.0	10	C	CSR13C826K—	2020	2260	2500	2740	2980					
6.8	20	A	CSR13B685M—	2003	2243	2483	2723	2963	100.0	10	C	CSR13C107K—	2021	2261	2501	2741	2981					
47.0	10	B	CSR13B476K—	2004	2244	2484	2724	2964	100.0	20	C	CSR13C107M—	2022	2262	2502	2742	2982					
47.0	20	B	CSR13B476M—	2005	2245	2485	2725	2965	120.0	10	C	CSR13C127K—	2023	2263	2503	2743	2983					
56.0	10	B	CSR13B566K—	2006	2246	2486	2726	2966	180.0	10	D	CSR13C187K—	2024	2264	2504	2744	2984					
150.0	10	C	CSR13B157K—	2007	2247	2487	2727	2967	220.0	10	D	CSR13C227K—	2025	2265	2505	2745	2985					
150.0	20	C	CSR13B157M—	2008	2248	2488	2728	2968	220.0	20	D	CSR13C227M—	2026	2266	2506	2746	2986					
180.0	10	C	CSR13B187K—	2009	2249	2489	2729	2969	15 WVDC @ 85°C, 10 WVDC @ 125°C													
270.0	10	D	CSR13B277K—	2010	2250	2490	2730	2970	2.7	10	A	CSR13D275K—	2027	2267	2507	2747	2987					
330.0	10	D	CSR13B337K—	2011	2251	2491	2731	2971	3.3	10	A	CSR13D335K—	2028	2268	2508	2748	2988					
330.0	20	D	CSR13B337M—	2012	2252	2492	2732	2972	3.3	20	A	CSR13D335M—	2029	2269	2509	2749	2989					
10 WVDC @ 85°C, 7 WVDC @ 125°C																						
3.9	10	A	CSR13C395K—	2013	2253	2493	2733	2973	18.0	10	B	CSR13D186K—	2030	2270	2510	2750	2990					
4.7	10	A	CSR13C475K—	2014	2254	2494	2734	2974	22.0	10	B	CSR13D226K—	2031	2271	2511	2751	2991					
4.7	20	A	CSR13C475M—	2015	2255	2495	2735	2975	22.0	20	B	CSR13D226M—	2032	2272	2512	2752	2992					
27.0	10	B	CSR13C276K—	2016	2256	2496	2736	2976	56.0	10	C	CSR13D566K—	2033	2273	2513	2753	2993					
33.0	10	B	CSR13C336K—	2017	2257	2497	2737	2977	68.0	10	C	CSR13D686K—	2034	2274	2514	2754	2994					
33.0	20	B	CSR13C336M—	2018	2258	2498	2738	2978	68.0	20	C	CSR13D686M—	2035	2275	2515	2755	2995					
15 WVDC @ 85°C, 10 WVDC @ 125°C																						
120.0	10	D	CSR13D127K—	2036	2276	2516	2756	2996	150.0	10	D	CSR13D157K—	2037	2277	2517	2757	2997					
150.0	10	D	CSR13D157K—	2037	2277	2517	2757	2997	150.0	20	D	CSR13D157M—	2038	2278	2518	2758	2998					
150.0	20	D	CSR13D157M—	2038	2278	2518	2758	2998														

*MIL Style designations for reference only. To complete number an 11th character must be added to denote failure rate. Insert "L" for 2%, "M" for 1%, "P" for .1%, "R" for .01%, "S" for .001%.

STYLE CSR13 SOLID TANTALUMS, continued

μF	Cap. Tol. (±%)	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/01 — Failure Rate Level (% / 1000 hr.)					μF	Cap. Tol. (±%)	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/01 — Failure Rate Level (% / 1000 hr.)																	
				L (2.0)	M (1.0)	P (0.1)	R (0.01)	S (0.001)					L (2.0)	M (1.0)	P (0.1)	R (0.01)	S (0.001)													
20 WVDC @ 85°C, 13 WVDC @ 125°C													0.033	10	A	CSR13G333K—	2089	2329	2569	2809	3049	0.033	20	A	CSR13G333M—	2090	2330	2570	2810	3050
1.2	10	A	CSR13E125K—	2039	2279	2519	2759	2999	0.039	10	A	CSR13G393K—	2091	2331	2571	2811	3051	0.047	10	A	CSR13G473K—	2092	2332	2572	2812	3052				
1.5	10	A	CSR13E155K—	2040	2280	2520	2760	3000	0.047	20	A	CSR13G473M—	2093	2333	2573	2813	3053	0.056	10	A	CSR13G563K—	2094	2334	2574	2814	3054				
1.5	20	A	CSR13E155M—	2041	2281	2521	2761	3001	0.068	10	A	CSR13G683K—	2095	2335	2575	2815	3055	0.068	20	A	CSR13G683M—	2096	2336	2576	2816	3056				
1.8	10	A	CSR13E185K—	2042	2282	2522	2762	3002	0.082	10	A	CSR13G823K—	2097	2337	2577	2817	3057	0.1	10	A	CSR13G104K—	2098	2338	2578	2818	3058				
2.2	10	A	CSR13E225K—	2043	2283	2523	2763	3003	0.1	20	A	CSR13G104M—	2099	2339	2579	2819	3059	0.12	10	A	CSR13G124K—	2100	2340	2580	2820	3060				
2.2	20	A	CSR13E225M—	2044	2284	2524	2764	3004	0.15	10	A	CSR13G154K—	2101	2341	2581	2821	3061	0.15	20	A	CSR13G154M—	2102	2342	2582	2822	3062				
8.2	10	B	CSR13E825K—	2045	2285	2525	2765	3005	0.18	10	A	CSR13G184K—	2103	2343	2583	2823	3063	0.22	10	A	CSR13G224K—	2104	2344	2584	2824	3064				
10.0	10	B	CSR13E106K—	2046	2286	2526	2766	3006	0.22	20	A	CSR13G224M—	2105	2345	2585	2825	3065	0.27	10	A	CSR13G274K—	2106	2346	2586	2826	3066				
10.0	20	B	CSR13E106M—	2047	2287	2527	2767	3007	0.33	10	A	CSR13G334K—	2107	2347	2587	2827	3067	0.33	20	A	CSR13G334M—	2108	2348	2588	2828	3068				
12.0	10	B	CSR13E126K—	2048	2288	2528	2768	3008	0.39	10	A	CSR13G394K—	2109	2349	2589	2829	3069	0.47	10	A	CSR13G474K—	2110	2350	2590	2830	3070				
15.0	10	B	CSR13E156K—	2049	2289	2529	2769	3009	0.47	20	A	CSR13G474M—	2111	2351	2591	2831	3071	0.56	10	A	CSR13G564K—	2112	2352	2592	2832	3072				
15.0	20	B	CSR13E156M—	2050	2290	2530	2770	3010	0.68	10	A	CSR13G684K—	2113	2353	2593	2833	3073	0.68	20	A	CSR13G684M—	2114	2354	2594	2834	3074				
27.0	10	C	CSR13E276K—	2051	2291	2531	2771	3011	0.82	10	A	CSR13G824K—	2115	2355	2595	2835	3075	1.0	10	A	CSR13G105K—	2116	2356	2596	2836	3076				
33.0	10	C	CSR13E336K—	2052	2292	2532	2772	3012	1.0	20	A	CSR13G105M—	2117	2357	2597	2837	3077	1.2	10	B	CSR13G125K—	2118	2358	2598	2838	3078				
33.0	20	C	CSR13E336M—	2053	2293	2533	2773	3013	1.5	10	B	CSR13G155K—	2119	2359	2599	2839	3079	1.5	20	B	CSR13G155M—	2120	2360	2600	2840	3080				
39.0	10	C	CSR13E396K—	2054	2294	2534	2774	3014	1.8	10	B	CSR13G185K—	2121	2361	2601	2841	3081	2.2	10	B	CSR13G225K—	2122	2362	2602	2842	3082				
47.0	10	C	CSR13E476K—	2055	2295	2535	2775	3015	2.2	20	B	CSR13G225M—	2123	2363	2603	2843	3083	2.7	10	B	CSR13G275K—	2124	2364	2604	2844	3084				
47.0	20	C	CSR13E476M—	2056	2296	2536	2776	3016	3.3	10	B	CSR13G335K—	2125	2365	2605	2845	3085	3.3	20	B	CSR13G335M—	2126	2366	2606	2846	3086				
56.0	10	D	CSR13E566K—	2057	2297	2537	2777	3017	3.9	10	B	CSR13G395K—	2127	2367	2607	2847	3087	4.7	10	B	CSR13G475K—	2128	2368	2608	2848	3088				
68.0	10	D	CSR13E686K—	2058	2298	2538	2778	3018	4.7	20	B	CSR13G475M—	2129	2369	2609	2849	3089	5.6	10	C	CSR13G565K—	2130	2370	2610	2850	3090				
68.0	20	D	CSR13E686M—	2059	2299	2539	2779	3019	6.8	10	C	CSR13G685K—	2131	2371	2611	2851	3091	6.8	20	C	CSR13G685M—	2132	2372	2612	2852	3092				
82.0	10	D	CSR13E826K—	2060	2300	2540	2780	3020	8.2	10	C	CSR13G825K—	2133	2373	2613	2853	3093	10.0	10	C	CSR13G106K—	2134	2374	2614	2854	3094				
100.0	10	D	CSR13E107K—	2061	2301	2541	2781	3021	10.0	20	C	CSR13G106M—	2135	2375	2615	2855	3095	12.0	10	C	CSR13G126K—	2136	2376	2616	2856	3096				
100.0	20	D	CSR13E107M—	2062	2302	2542	2782	3022	15.0	10	C	CSR13G156K—	2137	2377	2617	2857	3097	15.0	20	C	CSR13G156M—	2138	2378	2618	2858	3098				
35 WVDC @ 85°C, 23 WVDC @ 125°C													18.0	10	C	CSR13G186K—	2139	2379	2619	2859	3099	22.0	10	D	CSR13G226K—	2140	2380	2620	2860	3100
5.6	10	B	CSR13F565K—	2063	2303	2543	2783	3023	22.0	20	D	CSR13G226M—	2141	2381	2621	2861	3101	0.0047	10	A	CSR13G472K—	2074	2314	2554	2794	3034				
6.8	10	B	CSR13F685K—	2064	2304	2544	2784	3024	0.0047	20	A	CSR13G472M—	2075	2315	2555	2795	3035	0.0056	10	A	CSR13G562K—	2076	2316	2556	2796	3036				
6.8	20	B	CSR13F685M—	2065	2305	2545	2785	3025	0.0068	10	A	CSR13G682K—	2077	2317	2557	2797	3037	0.0068	20	A	CSR13G682M—	2078	2318	2558	2798	3038				
22.0	10	C	CSR13F226K—	2066	2306	2546	2786	3026	0.0082	10	A	CSR13G822K—	2079	2319	2559	2799	3039	0.01	10	A	CSR13G103K—	2080	2320	2560	2800	3040				
22.0	20	C	CSR13F226M—	2067	2307	2547	2787	3027	0.01	20	A	CSR13G103M—	2081	2321	2561	2801	3041	0.012	10	A	CSR13G123K—	2082	2322	2562	2802	3042				
27.0	10	D	CSR13F276K—	2068	2308	2548	2788	3028	0.015	10	A	CSR13G153K—	2083	2323	2563	2803	3043	0.015	20	A	CSR13G153M—	2084	2324	2564	2804	3044				
33.0	10	D	CSR13F336K—	2069	2309	2549	2789	3029	0.018	10	A	CSR13G183K—	2085	2325	2565	2805	3045	0.022	10	A	CSR13G223K—	2086	2326	2566	2806	3046				
33.0	20	D	CSR13F336M—	2070	2310	2550	2790	3030	0.022	20	A	CSR13G223M—	2087	2327	2567	2807	3047	0.027	10	A	CSR13G273K—	2088	2328	2568	2808	3048				
39.0	10	D	CSR13F396K—	2071	2311	2551	2791	3031	0.033	10	B	CSR13G335K—	2125	2365	2605	2845	3085	0.033	20	B	CSR13G335M—	2126	2366	2606	2846	3086				
47.0	10	D	CSR13F476K—	2072	2312	2552	2792	3032	0.039	10	B	CSR13G395K—	2127	2367	2607	2847	3087	0.039	20	B	CSR13G395M—	2128	2368	2608	2848	3088				
47.0	20	D	CSR13F476M—	2073	2313	2553	2793	3033	0.047	10	B	CSR13G475K—	2129	2369	2609	2849	3089	0.047	20	B	CSR13G475M—	2130	2370	2610	2850	3090				
50 WVDC @ 85°C, 33 WVDC @ 125°C													0.033	10	A	CSR13G333K—	2089	2329	2569	2809	3049	0.033	20	A	CSR13G333M—	2090	2330	2570	2810	3050
0.0047	10	A	CSR13G472K—	2074	2314	2554	2794	3034	0.039	10	A	CSR13G393K—	2091	2331	2571	2811	3051	0.047	10	A	CSR13G473K—	2092	2332	2572	2812	3052				
0.0047	20	A	CSR13G472M—	2075	2315	2555	2795	3035	0.047	20	A	CSR13G473M—	2093	2333	2573	2813	3053	0.056	10	A	CSR13G563K—	2094	2334	2574	2814	3054				
0.0056	10	A	CSR13G562K—	2076	2316	2556	2796	3036	0.068	10	A	CSR13G683K—	2095	2335	2575	2815	3055	0.068	20	A	CSR13G683M—	2096	2336	2576	2816	3056				
0.0068	10	A	CSR13G682K—	2077	2317	2557	2797	3037	0.082	10	A	CSR13G823K—	2097	2337	2577	2817	3057	0.1	10	A	CSR13G104K—	2098	2338	2578	2818	3058				
0.0068	20	A	CSR13G682M—	2078	2318	2558	2798	3038	0.1	20	A	CSR13G104M—	2099	2339	2579	2819	3059	0.12	10	A	CSR13G124K—	2100	2340	2580	2820	3060				
0.0082	10	A	CSR13G822K—	2079	2319	2559	2799	3039	0.15	10	A	CSR13G154K—	2101	2341	2581	2821	3061	0.15	20	A</										

STYLE CSR13 SOLID TANTALUMS, continued

μF	Cap. Tol. (±%)	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/01 — Failure Rate Level (% / 1000 hr.)					μF	Cap. Tol. ±%	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/01 — Failure Rate Level (% / 1000 hr.)				
				L (2.0)	M (1.0)	P (0.1)	R (0.01)	S (0.001)					L (2.0)	M (1.0)	P (0.1)	R (0.01)	S (0.001)
75 WVDC @ 85°C, 50 WVDC @ 125°C																	
0.1	10	A	CSR13H104K—	2142	2382	2622	2862	3102	0.015	10	A	CSR13J153K—	2192	2432	2672	2912	3152
0.1	20	A	CSR13H104M—	2143	2383	2623	2863	3103	0.015	20	A	CSR13J153M—	2193	2433	2673	2913	3153
0.12	10	A	CSR13H124K—	2144	2384	2624	2864	3104	0.018	10	A	CSR13J183K—	2194	2434	2674	2914	3154
0.15	10	A	CSR13H154K—	2145	2385	2625	2865	3105	0.022	10	A	CSR13J223K—	2195	2435	2675	2915	3155
0.15	20	A	CSR13H154M—	2146	2386	2626	2866	3106	0.022	20	A	CSR13J223M—	2196	2436	2676	2916	3156
0.18	10	A	CSR13H184K—	2147	2387	2627	2867	3107	0.027	10	A	CSR13J273K—	2197	2437	2677	2917	3157
0.22	10	A	CSR13H224K—	2148	2388	2628	2868	3108	0.033	10	A	CSR13J333K—	2198	2438	2678	2918	3158
0.22	20	A	CSR13H224M—	2149	2389	2629	2869	3109	0.033	20	A	CSR13J333M—	2199	2439	2679	2919	3159
0.27	10	A	CSR13H274K—	2150	2390	2630	2870	3110	0.039	10	A	CSR13J393K—	2200	2440	2680	2920	3160
0.33	10	A	CSR13H334K—	2151	2391	2631	2871	3111	0.047	10	A	CSR13J473K—	2201	2441	2681	2921	3161
0.33	20	A	CSR13H334M—	2152	2392	2632	2872	3112	0.047	20	A	CSR13J473M—	2202	2442	2682	2922	3162
0.39	10	A	CSR13H394K—	2153	2393	2633	2873	3113	0.056	10	A	CSR13J563K—	2203	2443	2683	2923	3163
0.47	10	A	CSR13H474K—	2154	2394	2634	2874	3114	0.068	10	A	CSR13J683K—	2204	2444	2684	2924	3164
0.47	20	A	CSR13H474M—	2155	2395	2635	2875	3115	0.068	20	A	CSR13J683M—	2205	2445	2685	2925	3165
0.56	10	A	CSR13H564K—	2156	2396	2636	2876	3116	0.082	10	A	CSR13J823K—	2206	2446	2686	2926	3166
0.68	10	A	CSR13H684K—	2157	2397	2637	2877	3117	0.1	10	A	CSR13J104K—	2207	2447	2687	2927	3167
0.68	20	A	CSR13H684M—	2158	2398	2638	2878	3118	0.1	20	A	CSR13J104M—	2208	2448	2688	2928	3168
0.82	10	B	CSR13H824K—	2159	2399	2639	2879	3119	0.12	10	A	CSR13J124K—	2209	2449	2689	2929	3169
1.0	10	B	CSR13H105K—	2160	2400	2640	2880	3120	0.15	10	A	CSR13J154K—	2210	2450	2690	2930	3170
1.0	20	B	CSR13H105M—	2161	2401	2641	2881	3121	0.15	20	A	CSR13J154M—	2211	2451	2691	2931	3171
1.2	10	B	CSR13H125K—	2162	2402	2642	2882	3122	0.18	10	A	CSR13J184K—	2212	2452	2692	2932	3172
1.5	10	B	CSR13H155K—	2163	2403	2643	2883	3123	0.22	10	A	CSR13J224K—	2213	2453	2693	2933	3173
1.5	20	B	CSR13H155M—	2164	2404	2644	2884	3124	0.22	20	A	CSR13J224M—	2214	2454	2694	2934	3174
1.8	10	B	CSR13H185K—	2165	2405	2645	2885	3125	0.27	10	A	CSR13J274K—	2215	2455	2695	2935	3175
2.2	10	B	CSR13H225K—	2166	2406	2646	2886	3126	0.33	10	A	CSR13J334K—	2216	2456	2696	2936	3176
2.2	20	B	CSR13H225M—	2167	2407	2647	2887	3127	0.33	20	A	CSR13J334M—	2217	2457	2697	2937	3177
2.7	10	B	CSR13H275K—	2168	2408	2648	2888	3128	0.39	10	A	CSR13J394K—	2218	2458	2698	2938	3178
3.3	10	B	CSR13H335K—	2169	2409	2649	2889	3129	0.47	10	A	CSR13J474K—	2219	2459	2699	2939	3179
3.3	20	B	CSR13H335M—	2170	2410	2650	2890	3130	0.47	20	A	CSR13J474M—	2220	2460	2700	2940	3180
3.9	10	B	CSR13H395K—	2171	2411	2651	2891	3131	0.56	10	A	CSR13J564K—	2221	2461	2701	2941	3181
4.7	10	C	CSR13H475K—	2172	2412	2652	2892	3132	0.68	10	B	CSR13J684K—	2222	2462	2702	2942	3182
4.7	20	C	CSR13H475M—	2173	2413	2653	2893	3133	0.68	20	B	CSR13J684M—	2223	2463	2703	2943	3183
5.6	10	C	CSR13H565K—	2174	2414	2654	2894	3134	0.82	10	B	CSR13J824K—	2224	2464	2704	2944	3184
6.8	10	C	CSR13H685K—	2175	2415	2655	2895	3135	1.0	10	B	CSR13J105K—	2225	2465	2705	2945	3185
6.8	20	C	CSR13H685M—	2176	2416	2656	2896	3136	1.0	20	B	CSR13J105M—	2226	2466	2706	2946	3186
8.2	10	C	CSR13H825K—	2177	2417	2657	2897	3137	1.2	10	B	CSR13J125K—	2227	2467	2707	2947	3187
10.0	10	C	CSR13H106K—	2178	2418	2658	2898	3138	1.5	10	B	CSR13J155K—	2228	2468	2708	2948	3188
10.0	20	C	CSR13H106M—	2179	2419	2659	2899	3139	1.5	20	B	CSR13J155M—	2229	2469	2709	2949	3189
12.0	10	D	CSR13H126K—	2180	2420	2660	2900	3140	1.8	10	B	CSR13J185K—	2230	2470	2710	2950	3190
15.0	10	D	CSR13H156K—	2181	2421	2661	2901	3141	2.2	10	B	CSR13J225K—	2231	2471	2711	2951	3191
15.0	20	D	CSR13H156M—	2182	2422	2662	2902	3142	2.2	20	B	CSR13J225M—	2232	2472	2712	2952	3192
100 WVDC @ 85°C, 67 WVDC @ 125°C																	
0.0047	10	A	CSR13J472K—	2183	2423	2663	2903	3143	3.3	10	C	CSR13J335K—	—	5157	5357	5557	5757
0.0047	20	A	CSR13J472M—	2184	2424	2664	2904	3144	3.3	20	C	CSR13J335M—	—	5158	5358	5558	5758
0.0056	10	A	CSR13J562K—	2185	2425	2665	2905	3145	3.9	10	C	CSR13J395K—	—	5160	5360	5560	5760
0.0068	10	A	CSR13J682K—	2186	2426	2666	2906	3146	4.7	10	C	CSR13J475K—	—	5162	5362	5562	5762
0.0068	20	A	CSR13J682M—	2187	2427	2667	2907	3147	4.7	20	C	CSR13J475M—	—	5163	5363	5563	5763
0.0082	10	A	CSR13J822K—	2188	2428	2668	2908	3148	5.6	10	C	CSR13J565K—	—	5165	5365	5565	5765
0.01	10	A	CSR13J103K—	2189	2429	2669	2909	3149	6.8	10	C	CSR13J685K—	—	5167	5367	5567	5767
0.01	20	A	CSR13J103M—	2190	2430	2670	2910	3150	6.8	20	C	CSR13J685M—	—	5168	5368	5568	5768
0.012	10	A	CSR13J123K—	2191	2431	2671	2911	3151									

* MIL Style designations for reference only. To complete number an 11th character must be added to denote failure level. Insert "L" for 2%, "M" for 1%, "P" for 0.1%, "R" for .01%, "S" for .001%.

ESTABLISHED RELIABILITY STYLE CSR23 SOLID TANTALUM CAPACITORS to MIL-C-39003

- Essentially the same as Type CSR13 capacitors but with extended capacitance ratings (higher capacitance in same size cases) required in some new equipment designs.
- Meet all requirements of Military Specification MIL-C-39003.
- Metal-encased, solid electrolyte, hermetically sealed.
- For complete technical data, refer to latest issue of Engineering Bulletin 3520.2.

PER CENT DISSIPATION FACTOR

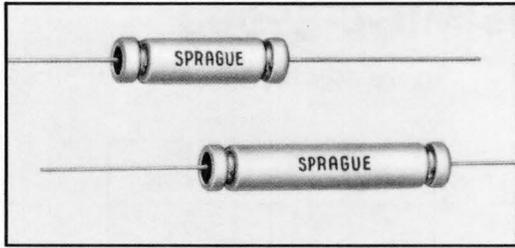
Size Code	Working Volts d-c					
	6	10	15	20	35	50
A	6	6	4	4	4	4
B	8	6	6	6	6	4 or 6†
C	8 or 10†	8	8	6	6	6
D	10	10	8	8	6	6

†Depending upon capacitance.

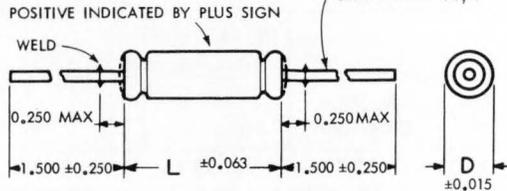
μF	Cap. Tol. ±%	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/03— Failure Rate Level (%/1000 hr.)				μF	Cap. Tol. ±%	Size Code	MIL Style* Designation	MIL PART NUMBER M39003/03— Failure Rate Level (%/1000 hr.)									
				L 2.0	M 1.0	P 0.1	R 0.01					L 2.0	M 1.0	P 0.1	R 0.01						
6 WVDC @ 85°C, 4 WVDC @ 125°C																					
10.0	10	A	CSR23B106K—	0001	0101	0201	0301	2.7	10	A	CSR23E275K—	0046	0146	0246	0346						
10.0	20	A	CSR23B106M—	0002	0102	0202	0302	3.3	10	A	CSR23E335K—	0047	0147	0247	0347						
12.0	10	A	CSR23B126K—	0003	0103	0203	0303	3.3	20	A	CSR23E335M—	0048	0148	0248	0348						
100.0	10	B	CSR23B107K—	0004	0104	0204	0304	3.9	10	A	CSR23E395K—	0049	0149	0249	0349						
100.0	20	B	CSR23B107M—	0005	0105	0205	0305	18.0	10	B	CSR23E186K—	0050	0150	0250	0350						
330.0	10	C	CSR23B337K—	0006	0106	0206	0306	22.0	10	B	CSR23E226K—	0051	0151	0251	0351						
330.0	20	C	CSR23B337M—	0007	0107	0207	0307	22.0	20	B	CSR23E226M—	0052	0152	0252	0352						
390.0	10	C	CSR23B397K—	0008	0108	0208	0308	27.0	10	B	CSR23E276K—	0053	0153	0253	0353						
470.0	10	C	CSR23B477K—	0009	0109	0209	0309	56.0	10	C	CSR23E566K—	0054	0154	0254	0354						
470.0	20	C	CSR23B477M—	0010	0110	0210	0310	68.0	10	C	CSR23E686K—	0055	0155	0255	0355						
680.0	10	D	CSR23B687K—	0011	0111	0211	0311	68.0	20	C	CSR23E686M—	0056	0156	0256	0356						
680.0	20	D	CSR23B687M—	0012	0112	0212	0312	82.0	10	C	CSR23E826K—	0057	0157	0257	0357						
820.0	10	D	CSR23B827K—	0013	0113	0213	0313	82.0	10	C	CSR23E107K—	0058	0158	0258	0358						
1000.0	10	D	CSR23B108K—	0014	0114	0214	0314	100.0	10	C	CSR23E107M—	0059	0159	0259	0359						
1000.0	20	D	CSR23B108M—	0015	0115	0215	0315	100.0	20	C	CSR23E107M—	0059	0159	0259	0359						
10 WVDC @ 85°C, 7 WVDC @ 125°C																					
6.8	10	A	CSR23C685K—	0016	0116	0216	0316	120.0	10	C	CSR23E127K—	0060	0160	0260	0360						
6.8	20	A	CSR23C685M—	0017	0117	0217	0317	150.0	10	D	CSR23E157K—	0061	0161	0261	0361						
8.2	10	A	CSR23C825K—	0018	0118	0218	0318	150.0	20	D	CSR23E157M—	0062	0162	0262	0362						
47.0	10	B	CSR23C476K—	0019	0119	0219	0319	180.0	10	D	CSR23E187K—	0063	0163	0263	0363						
47.0	20	B	CSR23C476M—	0020	0120	0220	0320	35 WVDC @ 85°C, 23 WVDC @ 125°C													
56.0	10	B	CSR23C566K—	0021	0121	0221	0321	1.8	10	A	CSR23F185K—	0064	0164	0264	0364						
68.0	10	B	CSR23C686K—	0022	0122	0222	0322	8.2	10	B	CSR23F825K—	0065	0165	0265	0365						
68.0	20	B	CSR23C686M—	0023	0123	0223	0323	10.0	10	B	CSR23F106K—	0066	0166	0266	0366						
82.0	10	B	CSR23C826K—	0024	0124	0224	0324	10.0	20	B	CSR23F106M—	0067	0167	0267	0367						
220.0	10	C	CSR23C227K—	0025	0125	0225	0325	33.0	10	C	CSR23F336K—	0068	0168	0268	0368						
220.0	20	C	CSR23C227M—	0026	0126	0226	0326	33.0	20	C	CSR23F336M—	0069	0169	0269	0369						
270.0	10	C	CSR23C277K—	0027	0127	0227	0327	39.0	10	C	CSR23F396K—	0070	0170	0270	0370						
390.0	10	D	CSR23C397K—	0028	0128	0228	0328	47.0	10	C	CSR23F476K—	0071	0171	0271	0371						
470.0	10	D	CSR23C477K—	0029	0129	0229	0329	47.0	20	C	CSR23F476M—	0072	0172	0272	0372						
470.0	20	D	CSR23C477M—	0030	0130	0230	0330	56.0	10	D	CSR23F566K—	0073	0173	0273	0373						
560.0	10	D	CSR23C567K—	0031	0131	0231	0331	68.0	10	D	CSR23F686K—	0074	0174	0274	0374						
15 WVDC @ 85°C, 10 WVDC @ 125°C																					
4.7	10	A	CSR23D475K—	0032	0132	0232	0332	68.0	20	D	CSR23F686M—	0075	0175	0275	0375						
4.7	20	A	CSR23D475M—	0033	0133	0233	0333	50 WVDC @ 85°C, 33 WVDC @ 125°C													
5.6	10	A	CSR23D565K—	0034	0134	0234	0334	1.2	10	A	CSR23G125K—	0076	0176	0276	0376						
33.0	10	B	CSR23D336K—	0035	0135	0235	0335	1.5	10	A	CSR23G155K—	0077	0177	0277	0377						
33.0	20	B	CSR23D336M—	0036	0136	0236	0336	1.5	20	A	CSR23G155M—	0078	0178	0278	0378						
39.0	10	B	CSR23D396K—	0037	0137	0237	0337	5.6	10	B	CSR23G565K—	0079	0179	0279	0379						
150.0	10	C	CSR23D157K—	0038	0138	0238	0338	6.8	10	B	CSR23G685K—	0080	0180	0280	0380						
150.0	20	C	CSR23D157M—	0039	0139	0239	0339	6.8	20	B	CSR23G685M—	0081	0181	0281	0381						
180.0	10	C	CSR23D187K—	0040	0140	0240	0340	22.0	10	C	CSR23G226K—	0082	0182	0282	0382						
220.0	10	D	CSR23D227K—	0041	0141	0241	0341	22.0	20	C	CSR23G226M—	0083	0183	0283	0383						
220.0	20	D	CSR23D227M—	0042	0142	0242	0342	27.0	10	C	CSR23G276K—	0084	0184	0284	0384						
270.0	10	D	CSR23D277K—	0043	0143	0243	0343	33.0	10	D	CSR23G336K—	0085	0185	0285	0385						
330.0	10	D	CSR23D337K—	0044	0144	0244	0344	33.0	20	D	CSR23G336M—	0086	0186	0286	0386						
330.0	20	D	CSR23D337M—	0045	0145	0245	0345	39.0	10	D	CSR23G396K—	0087	0187	0287	0387						

*MIL Style designations for reference only. To complete number an 11th character must be added to denote failure level. Insert "L" for 2%, "M" for 1%, "P" for 0.1%, "R" for .01%, "S" for .001%.

TANTALEX® FOIL-TANTALUM CAPACITORS



0.0253 DIA (NO. 22 AWG) SOLID SOLDERABLE LEADS FOR CASE CODES D, G, J, M, P; 0.032 DIA (NO. 20 AWG) FOR CASE CODES R, Y



DIMENSIONS OVER INSULATING SLEEVE (in inches)*

Size Code	D	L
D	.219	0.812
G	.312	1.000
J	.406	1.562
M	.406	2.250
P	.406	2.875
R	.500	2.875
Y	.562	2.875

- For use in military and industrial applications where small size, stable electrical characteristics, and long service life are important.
- TFE-fluorocarbon elastomer end-seal for very low diffusivity characteristics.
- High ripple current capability.

- Low impedance over wide frequency ranges.
- Capacitors listed have plastic film-insulating sleeve. For units with bare case, change last character in catalog number from 1 to 0, and subtract .032" from diameter and .125" from length.
- For complete technical data, refer to latest issue of Engineering Bulletin 3601.

PERFORMANCE CHARACTERISTICS

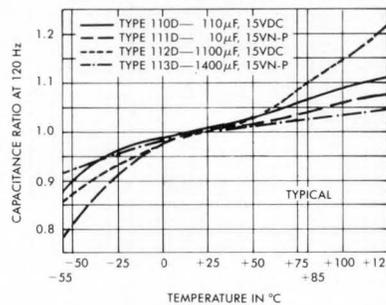
- Operating Temperature Range:** -55°C to +85°C; to +125°C with appropriate derating.
- Capacitance Tolerance:**

Type	3-30 V	50-75 V	100-150 V	200 V up
110D, 111D	±20%	±20%	±20%	±15%
112D, 113D	+75, -15%	+50, -15%	+30, -15%	+20%

- Equivalent Series Resistance:** The product of rated capacitance (μF) and equivalent series resistance (Ω) shall not exceed the following values:

Type	Voltage Range at +85°C			
	3-15 V	25-50 V	60-150 V	200 V up
110D, 111D	200	140	140	80
112D, 113D	400	330	200	140

CAPACITANCE vs. TEMPERATURE



- Life Test:** Capacitors are capable of withstanding a 2000 hour life test at rated d-c working voltage and +85°C. Non-polar units shall have their polarity reversed every 125 hours during life test. After life test, change in capacitance shall not exceed the following limits:

Type	Voltage Range at +85°C	
	3-150 V	200 V Up
110D, 111D	+10, -20%	±10%
112D, 113D	±15%	±10%

μF	Size Code	Catalog Number									
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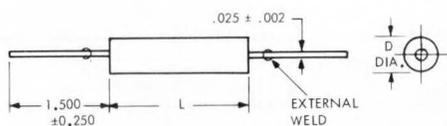
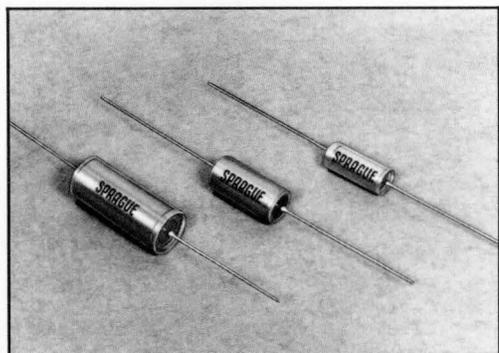
TYPE 110D — POLARIZED PLAIN-FOIL

3 WVDC @ 85°C, 2 WVDC @ 125°C	15 WVDC @ 85°C, 10 WVDC @ 125°C	150 R 110D157X0030R1 180 Y 110D187X0030Y1	14 J 110D146X0075J1	200 WVDC @ 85°C, 150 WVDC @ 125°C
10 D 110D106X0003D1 55 G 110D556X0003G1 160 J 110D167X0003J1 350 M 110D357X0003M1 440 P 110D447X0003P1 1100 R 110D118X0003R1 1300 Y 110D138X0003Y1	4.5 D 110D455X0015D1 18 G 110D186X0015G1 55 J 110D556X0015J1	50 WVDC @ 85°C, 30 WVDC @ 125°C	28 M 110D286X0075M1 40 P 110D406X0075P1	0.35 D 110D354X8200D1 1.5 G 110D155X8200G1 5 J 110D505X8200J1 10 M 110D106X8200M1
6 WVDC @ 85°C, 4 WVDC @ 125°C	25 WVDC @ 85°C, 15 WVDC @ 125°C	1.5 D 110D155X0050D1 6 G 110D605X0050G1 20 J 110D206X0050J1	70 R 110D706X0075R1 88 Y 110D886X0075Y1	15 P 110D156X8200P1 25 R 110D256X8200R1 35 Y 110D356X8200Y1
8 D 110D805X0006D1 35 G 110D356X0006G1 100 J 110D107X0006J1 200 M 110D207X0006M1 300 P 110D307X0006P1 460 R 110D467X0006R1 560 Y 110D567X0006Y1	3 D 110D305X0025D1 12 G 110D126X0025G1 35 J 110D356X0025J1	40 M 110D406X0050M1 55 P 110D556X0050P1	100 WVDC @ 85°C, 65 WVDC @ 125°C	250 WVDC @ 85°C, 165 WVDC @ 125°C
10 WVDC @ 85°C, 7 WVDC @ 125°C	30 WVDC @ 85°C, 20 WVDC @ 125°C	100 R 110D107X0050R1 120 Y 110D127X0050Y1	0.8 D 110D804X0100D1 3 G 110D305X0100G1 10 J 110D106X0100J1	0.3 D 110D304X8250D1 1.2 G 110D125X8250G1 4 J 110D405X8250J1 8 M 110D805X8250M1 12 P 110D126X8250P1 20 R 110D206X8250R1 30 Y 110D306X8250Y1
6 D 110D605X0010D1 25 G 110D256X0010G1 80 J 110D806X0010J1 160 M 110D167X0010M1 220 P 110D227X0010P1 350 R 110D357X0010R1 420 Y 110D427X0010Y1	2.5 D 110D255X0030D1 10 G 110D106X0030G1 30 J 110D306X0030J1	60 WVDC @ 85°C, 40 WVDC @ 125°C	150 WVDC @ 85°C, 100 WVDC @ 125°C	300 WVDC @ 85°C, 200 WVDC @ 125°C
		1.2 D 110D125X0060D1 5 G 110D505X0060G1 17 J 110D176X0060J1 34 M 110D346X0060M1	0.5 D 110D504X0150D1 2 G 110D205X0150G1 7 J 110D705X0150J1	0.25 D 110D254X8300D1 1 G 110D105X8300G1 3 J 110D305X8300J1 7 M 110D705X8300M1 10 P 110D106X8300P1 18 R 110D186X8300R1
		48 P 110D486X0060P1 85 R 110D856X0060R1 100 Y 110D107X0060Y1	14 M 110D146X0150M1 20 P 110D206X0150P1 40 R 110D406X0150R1 47 Y 110D476X0150Y1	
		75 WVDC @ 85°C, 50 WVDC @ 125°C		
		1 D 110D105X0075D1 4 G 110D405X0075G1		

STYLE 111D — NON-POLARIZED PLAIN-FOIL

6 WVNP @ 85°C, 4 WVNP @ 125°C	170 M 111D177X0006M1	470 Y 111D477X0006Y1	16 G 111D166X0010G1	150 P 111D157X0010P1
7 D 111D705X0006D1 25 G 111D256X0006G1 85 J 111D856X0006J1	250 P 111D257X0006P1	10 WVNP @ 85°C, 7 WVNP @ 125°C	55 J 111D556X0010J1	230 R 111D237X0010R1
	360 R 111D367X0006R1	4 D 111D405X0010D1	110 M 111D117X0010M1	280 Y 111D287X0010Y1

ESTABLISHED RELIABILITY STYLE CLR25, CLR27, CLR35, and CLR37 FOIL TANTALUM CAPACITORS to MIL-C-39006



INSULATED CASE DIMENSIONS (in inches)*

Size Code	D Max.	L Max.
A	.219	.668
B	.312	.969
C	.406	1.438
D	.406	2.125
E	.406	2.750

- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-790.
- Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.
- Capacitance tolerances: Style CLR25 and CLR27 ... 15 thru 30 V = +75, -15%; 50 thru 75 V = +50, -15%; 100 V and up = +30, -15%; Style CLR35 and CLR37 ... 15 thru 150 V = +20%; 200 V and up = ±15%.
- For optional random vibration requirement on failure rate level M or better, add 'H' after dash number.
- For complete technical data, refer to latest issue of Engineering Bulletin 3604.7.

μF	WVDC	Size Code	Failure Rate Level				μF	WVDC	Size Code	Failure Rate Level			
			L (2%)	M (1%)	P (.1%)	R (.01%)				L (2%)	M (1%)	P (.1%)	R (.01%)

STYLE CLR25 POLARIZED ETCHED FOIL (MIL PART No. M39006/01-)

15	15	A	3300	3307	3314	3321	75	50	E	3015	3044	3073	3102
60	15	B	3001	3030	3059	3088	100	50	D	3016	3045	3074	3103
200	15	C	3002	3031	3060	3089	150	50	E	3017	3046	3075	3104
400	15	D	3003	3032	3061	3090	3	75	A	3304	3311	3318	3325
580	15	E	3004	3033	3062	3091	12	75	B	3018	3047	3076	3105
10	25	A	3301	3308	3315	3322	30	75	C	3019	3048	3077	3106
40	25	B	3005	3034	3063	3092	70	75	D	3020	3049	3078	3107
120	25	C	3006	3035	3064	3093	100	75	E	3021	3050	3079	3108
250	25	D	3007	3036	3065	3094	2	100	A	3305	3312	3319	3326
350	25	E	3008	3037	3066	3095	8	100	B	3022	3051	3080	3109
8	30	A	3302	3309	3316	3323	25	100	C	3023	3052	3081	3110
32	30	B	3009	3038	3067	3096	50	100	D	3024	3053	3082	3111
110	30	C	3010	3039	3068	3097	100	100	E	3025	3054	3083	3112
220	30	D	3011	3040	3069	3098	1	150	A	3306	3313	3320	3327
300	30	E	3012	3041	3070	3099	4	150	B	3026	3055	3084	3113
4.5	50	A	3303	3310	3317	3324	13	150	C	3027	3056	3085	3114
18	50	B	3013	3042	3071	3100	25	150	D	3028	3057	3086	3115
60	50	C	3014	3043	3072	3101	36	150	E	3029	3058	3087	3116

STYLE CLR27, NON-POLARIZED ETCHED FOIL (MIL PART No. M39006/02-)

10	15	A	2500	2507	2514	2521	60	50	D	1214	1242	1270	1298
40	15	B	1200	1228	1256	1284	80	50	E	1215	1243	1271	1299
120	15	C	1201	1229	1257	1285	1.5	75	A	2504	2511	2518	2525
250	15	D	1202	1230	1258	1286	6	75	B	1216	1244	1272	1300
350	15	E	1203	1231	1259	1287	15	75	C	1217	1245	1273	1301
5	25	A	2501	2508	2515	2522	35	75	D	1218	1246	1274	1302
20	25	B	1204	1232	1260	1288	50	75	E	1219	1247	1275	1303
70	25	C	1205	1233	1261	1289	1.0	100	A	2505	2512	2519	2526
140	25	D	1206	1234	1262	1290	4	100	B	1220	1248	1276	1304
200	25	E	1207	1235	1263	1291	12	100	C	1221	1249	1277	1305
4.5	30	A	2502	2509	2516	2523							
18	30	B	1208	1236	1264	1292	25	100	D	1222	1250	1278	1306
60	30	C	1209	1237	1265	1293	35	100	E	1223	1251	1279	1307
120	30	D	1210	1238	1266	1294	0.5	150	A	2506	2513	2520	2527
170	30	E	1211	1239	1267	1295	2	150	B	1224	1252	1280	1308
2.5	50	A	2503	2510	2517	2524	6	150	C	1225	1253	1281	1309
10	50	B	1212	1240	1268	1296	12	150	D	1226	1254	1282	1310
30	50	C	1213	1241	1269	1297	18	150	E	1227	1255	1283	1311

STYLE CLR35, POLARIZED PLAIN FOIL (MIL PART No. M39006/03-)

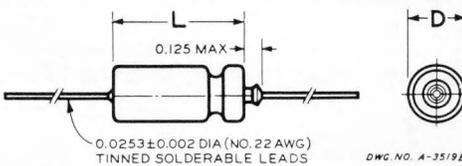
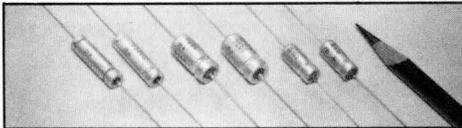
4.5	15	A	2700	2712	2724	2736	55	50	E	1316	1365	1414	1463
18	15	B	1300	1349	1398	1447	1.0	75	A	2704	2716	2728	2740
55	15	C	1301	1350	1399	1448	4	75	B	1317	1366	1415	1464
110	15	D	1302	1351	1400	1449	14	75	C	1318	1367	1416	1465
160	15	E	1303	1352	1401	1450	28	75	D	1319	1368	1417	1466
3	25	A	2701	2713	2725	2737	40	75	E	1320	1369	1418	1467
12	25	B	1304	1353	1402	1451	0.8	100	A	2705	2717	2729	2741
35	25	C	1305	1354	1403	1452	3	100	B	1321	1370	1419	1468
70	25	D	1306	1355	1404	1453	10	100	C	1322	1371	1420	1469
100	25	E	1307	1356	1405	1454	20	100	D	1323	1372	1421	1470
2.5	30	A	2702	2714	2726	2738	30	100	E	1324	1373	1422	1471
10	30	B	1308	1357	1406	1455							
30	30	C	1309	1358	1407	1456	0.5	150	A	2706	2718	2730	2742
60	30	D	1310	1359	1408	1457	2	150	B	1325	1374	1423	1472
85	30	E	1311	1360	1409	1458	7	150	C	1326	1375	1424	1473
68	35	A	1312	1361	1410	1459	14	150	D	1327	1376	1425	1474
1.5	50	B	2703	2715	2727	2739	20	150	E	1328	1377	1426	1475
6	50	C	1313	1362	1411	1460	0.35	200	A	2707	2719	2731	2743
20	50	D	1314	1363	1412	1461	1.5	200	B	1329	1378	1427	1476
40	50	E	1315	1364	1413	1462	5	200	C	1330	1379	1428	1477

STYLE CLR35 and CLR37, continued

μF	WVDC	Size Code	Failure Rate Level				μF	WVDC	Size Code	Failure Rate Level			
			L (2%)	M (1%)	P (.1%)	R (.01%)				L (2%)	M (1%)	P (.1%)	R (.01%)
STYLE CLR35, POLARIZED PLAIN FOIL (MIL PART No. M39006/03-) continued													
10	200	D	1331	1380	1429	1478	12	250	E	1336	1385	1434	1483
15	200	E	1332	1381	1430	1479							
0.30	250	A	2708	2720	2732	2744	0.27	300	A	2709	2721	2733	2745
1.2	250	B	1333	1382	1431	1480	1	300	B	1337	1386	1435	1484
4	250	C	1334	1383	1432	1481	3	300	C	1338	1387	1436	1485
8	250	D	1335	1384	1433	1482	7	300	D	1339	1388	1437	1486
							10	300	E	1340	1389	1438	1487

STYLE CLR37, NON-POLARIZED PLAIN FOIL (MIL PART No. 39006/04-)													
2.5	15	A	2700	2711	2722	2733	0.4	100	A	2705	2716	2727	2738
10	15	B	1200	1245	1290	1335	1.5	100	B	1220	1265	1310	1355
35	15	C	1201	1246	1291	1336	5	100	C	1221	1266	1311	1356
70	15	D	1202	1247	1292	1337	10	100	D	1222	1267	1312	1357
100	15	E	1203	1248	1293	1338	15	100	E	1223	1268	1313	1358
1.5	25	A	2701	2712	2723	2734	0.25	150	A	2706	2717	2728	2739
6	25	B	1204	1249	1294	1339	1	150	B	1224	1269	1314	1359
20	25	C	1205	1250	1295	1340	1.2	150	B	1225	1270	1315	1360
40	25	D	1206	1251	1296	1341	3.5	150	C	1226	1271	1316	1361
60	25	E	1207	1252	1297	1342	7	150	D	1227	1272	1317	1362
1.4	30	A	2702	2713	2724	2735	10	150	E	1228	1273	1318	1363
5.5	30	B	1208	1253	1298	1343	0.15	200	A	2707	2718	2729	2740
18	30	C	1209	1254	1299	1344	0.75	200	B	1229	1274	1319	1364
36	30	D	1210	1255	1300	1345	2.5	200	C	1230	1275	1320	1365
45	30	E	1211	1256	1301	1346	5	200	D	1231	1276	1321	1366
0.8	50	A	2703	2714	2725	2736	7.5	200	E	1232	1277	1322	1367
3	50	B	1212	1257	1302	1347	0.15	250	A	2708	2719	2730	2741
10	50	C	1213	1258	1303	1348	0.6	250	B	1233	1278	1323	1368
20	50	D	1214	1259	1304	1349	2	250	C	1234	1279	1324	1369
30	50	E	1215	1260	1305	1350	4	250	D	1235	1280	1325	1370
0.5	75	A	2704	2715	2726	2737	6	250	E	1236	1281	1326	1371
2	75	B	1216	1261	1306	1351	0.12	300	A	2709	2720	2731	2742
7	75	C	1217	1262	1307	1352	0.47	300	B	1237	1282	1327	1372
14	75	D	1218	1263	1308	1353	1.5	300	C	1238	1283	1328	1373
20	75	E	1219	1264	1309	1354	3.3	300	D	1239	1284	1329	1374
							4.7	300	E	1240	1285	1330	1375

STYLE CL66, CL67 SINTERED-ANODE CAPACITORS to MIL-C-3965



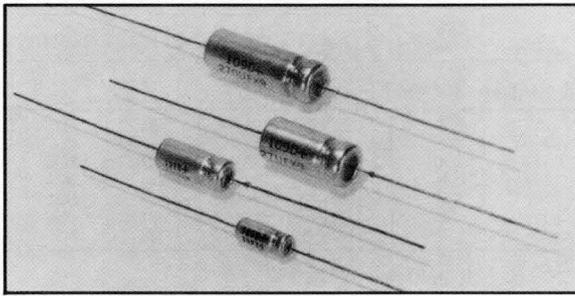
- Military version of industrial Type 137D.
- Glass-to-hermetic seal makes these capacitors especially well-suited for use in satellites and other applications requiring benefits of true hermetic sealing.
- May be operated at temperatures up to +175°C.
- Extremely low leakage current.
- Capacitors listed have capacitance tolerance of ±10%. For ±5% capacitance tolerance, change 10th character in catalog number from K to J. For ±20% tolerance, change K to M.
- Capacitors listed have insulating sleeve. For capacitors with bare case, (Type CL66), change 4th character in catalog number from 7 to 6, and subtract .031" from diameter and .063" from length.

INSULATED CASE DIMENSIONS (in inches)*

Size Code	D Max.	L Max.
A	.219	.516
B	.312	.704
C	.406	.829

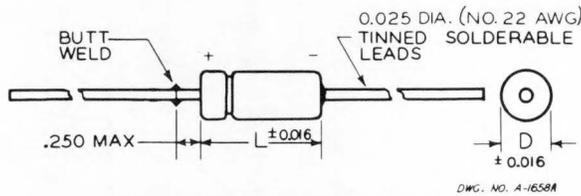
μF	Size Code	Style Designation	μF	Size Code	Style Designation	μF	Size Code	Style Designation	μF	Size Code	Style Designation
6 WVDC			15 WVDC			50 WVDC			15	B	CL67BL150KPG
30	A	CL67BB300KPG	15	A	CL67BE150KPG	5	A	CL67BJ050KPG	33	B	CL67BL330KPG
68	A	CL67BB680KPG	33	A	CL67BE330KPG	10	A	CL67BJ100KPG	40	C	CL67BL400KPG
140	B	CL67BB141KPG	70	B	CL67BE700KPG	25	B	CL67BJ250KPG	56	C	CL67BL560KPG
270	B	CL67BB271KPG	120	B	CL67BE121KPG	47	B	CL67BJ470KPG	100 WVDC		
330	C	CL67BB331KPG	170	C	CL67BE171KPG	60	C	CL67BJ600KPG	2.5	A	CL67BN2R5KPG
560	C	CL67BB561KPG	270	C	CL67BE271KPG	82	C	CL67BJ820KPG	4.7	A	CL67BN4R7KPG
8 WVDC			25 WVDC			60 WVDC			11	B	CL67BN110KPG
25	A	CL67BC250KPG	10	A	CL67BG100KPG	4	A	CL67BK040KPG	22	B	CL67BN220KPG
56	A	CL67BC560KPG	22	A	CL67BG220KPG	8.2	A	CL67BK8R2KPG	30	C	CL67BN300KPG
220	B	CL67BC221KPG	100	B	CL67BG101KPG	20	B	CL67BK200KPG	43	C	CL67BN430KPG
430	C	CL67BC431KPG	180	C	CL67BG181KPG	39	B	CL67BK390KPG	125 WVDC		
10 WVDC			30 WVDC			75 WVDC			1.7	A	CL67BP1R7KPG
20	A	CL67BD200KPG	8	A	CL67BH080KPG	50	C	CL67BK500KPG	3.6	A	CL67BP3R6KPG
47	A	CL67BD470KPG	15	A	CL67BH150KPG	68	C	CL67BK680KPG	9	B	CL67BP090KPG
100	B	CL67BD101KPG	40	B	CL67BH400KPG	3.5	A	CL67BL3R5KPG	14	B	CL67BP140KPG
180	B	CL67BD181KPG	68	B	CL67BH680KPG	6.8	A	CL67BL6R8KPG	25	C	CL67BP250KPG
250	C	CL67BD251KPG	100	C	CL67BH101KPG						
390	C	CL67BD391KPG	150	C	CL67BH151KPG						

TYPE 109D SINTERED-ANODE TANTALEX® CAPACITORS



- Reliable design for automotive, telecommunications, aerospace, and critical industrial equipment.
- Patented cathode manufacturing process eliminates catastrophic failures associated with silver migration under no-voltage conditions.
- Capacitors listed have capacitance tolerance of $\pm 10\%$. For units with $\pm 20\%$ tolerance, change ninth character in catalog number from 9 to 0.
- Capacitors listed have outer plastic film in-

- sulation. For bare case, change 14th character of catalog number from 2 to 0, and subtract .016" from diameter and .062" from length.
- Capacitors listed under "Preferred Ratings" have almost twice the capacitance in a given case size of those listed under "Original Ratings." The latter are intended for replacement use in older equipment designs.
- For complete technical data, refer to latest issue of Engineering Bulletin 3700.

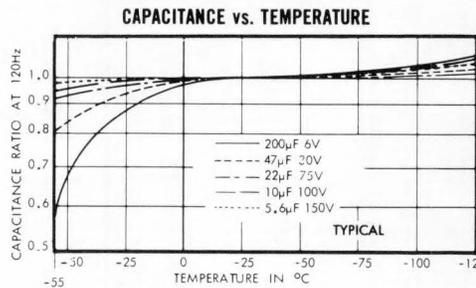


INSULATED CASE DIMENSIONS (in inches)*

Size Code	D ±.031	L Max.	Lead Length ±.25
C	.203	.515	1.50
F	.296	.703	2.25
T	.390	.828	2.25
K	.390	1.125	2.25

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to $+125^{\circ}\text{C}$.
- Capacitance Tolerance:** $\pm 10\%$ and $\pm 20\%$.
- Capacitance Change:** Allowable capacitance change with temperature: @ -55°C is -90 ; @ $+80^{\circ}\text{C}$ is $+30$; @ $+125^{\circ}\text{C}$ is $+30$.
- Equivalent Series Resistance:** 1.2 to 14 max. ohms @ 120 Hz, depending upon capacitance.
- Impedance:** 10 to 1090 max. ohms @ 120 Hz and -55°C , depending upon capacitance.
- Leakage Current:** Max. d-c leakage current @ 25°C , $10\ \mu\text{A}$; @ 85°C and $+125^{\circ}\text{C}$, $40\ \mu\text{A}$.
- Ripple Current:** 100 to 610 max. amperes RMS @ 120 Hz, depending upon capacitance.



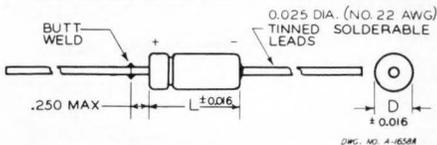
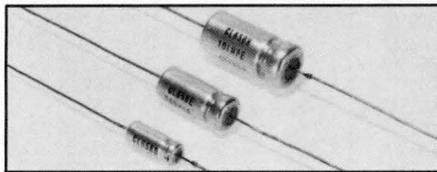
PREFERRED RATINGS

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC @ 85°C, 4 WVDC @ 125°C			390	F	109D397X9015F2	50 WVDC @ 85°C, 30 WVDC @ 125°C			180	K	109D187X9075K2
			680	T	109D687X9015T2	33	C	109D336X9050C2	220	K	109D227X9075K2
200	C	109D207X9006C2	820	T	109D827X9015T2	120	F	109D127X9050F2	100 WVDC @ 85°C, 70 WVDC @ 125°C		
820	F	109D827X9006F2	820	K	109D827X9015K2	270	T	109D277X9050T2	8.2	C	109D825X9100C2
1500	T	109D158X9006T2	1000	K	109D108X9015K2	330	K	109D337X9050K2	10	C	109D106X9100C2
2200	K	109D228X9006K2	25 WVDC @ 85°C, 15 WVDC @ 125°C			60 WVDC @ 85°C, 40 WVDC @ 125°C			33	F	109D336X9100F2
8 WVDC @ 85°C, 5 WVDC @ 125°C			68	C	109D686X9025C2	27	C	109D276X9060C2	39	F	109D396X9100F2
180	C	109D187X9008C2	270	F	109D277X9025F2	68	F	109D686X9060F2	56	T	109D566X9100T2
680	F	109D687X9008F2	560	T	109D567X9025T2	100	F	109D107X9060F2	68	T	109D686X9100T2
1400	T	109D148X9008T2	680	K	109D687X9025K2	75 WVDC @ 85°C, 50 WVDC @ 125°C			86	K	109D866X9100K2
1800	K	109D188X9008K2	30 WVDC @ 85°C, 20 WVDC @ 125°C			140	T	109D147X9060T2	125 WVDC @ 85°C, 85 WVDC @ 125°C		
10 WVDC @ 85°C, 7 WVDC @ 125°C			39	C	109D396X9030C2	220	T	109D227X9060T2	6.8	C	109D685X9125C2
120	C	109D127X9010C2	47	C	109D476X9030C2	270	K	109D277X9060K2	27	F	109D276X9125F2
150	C	109D157X9010C2	56	C	109D566X9030C2	150 WVDC @ 85°C, 100 WVDC @ 125°C			47	T	109D476X9125T2
470	F	109D477X9010F2	150	F	109D157X9030F2	12	C	109D126X9075C2	56	K	109D566X9125K2
560	F	109D567X9010F2	180	F	109D187X9030F2	15	C	109D156X9075C2	150 WVDC @ 85°C, 100 WVDC @ 125°C		
15 WVDC @ 85°C, 10 WVDC @ 125°C			220	F	109D227X9030F2	22	C	109D226X9075C2	1.7	C	109D175X9150C2
1000	T	109D108X9010T2	330	T	109D337X9030T2	47	F	109D476X9075F2	3.0	C	109D305X9150C2
1200	T	109D128X9010T2	390	T	109D397X9030T2	56	F	109D566X9075F2	5.6	C	109D565X9150C2
1200	K	109D128X9010K2	470	T	109D477X9030T2	82	F	109D826X9075F2	6.8	F	109D685X9150F2
1500	K	109D158X9010K2	470	K	109D477X9030K2	82	T	109D826X9075T2	150 WVDC @ 85°C, 100 WVDC @ 125°C		
15 WVDC @ 85°C, 10 WVDC @ 125°C			560	K	109D567X9030K2	110	T	109D117X9075T2	11	F	109D116X9150F2
82	C	109D826X9015C2									
100	C	109D107X9015C2									
330	F	109D337X9015F2									

TYPE 109D TANTALEX® CAPACITORS, continued

ORIGINAL RATINGS

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC @ 85C, 4 WVDC @ 125C			15 WVDC @ 85C, 10 WVDC @ 125C			50 WVDC @ 85C, 30 WVDC @ 125C			75 WVDC @ 85C, 50 WVDC @ 125C		
27	C	109D276X9006C2	13	C	109D136X9015C2	4.5	C	109D455X9050C2	3	C	109D305X9075C2
30	C	109D306X9006C2	15	C	109D156X9015C2	5	C	109D505X9050C2	3.5	C	109D355X9075C2
68	C	109D686X9006C2	33	C	109D336X9015C2	10	C	109D106X9050C2	6.8	C	109D685X9075C2
120	F	109D127X9006F2	55	F	109D556X9015F2	22	F	109D226X9050F2	13	F	109D136X9075F2
140	F	109D147X9006F2	70	F	109D706X9015F2	25	F	109D256X9050F2	15	F	109D156X9075F2
270	F	109D277X9006F2	120	F	109D127X9015F2	47	F	109D476X9050F2	33	F	109D336X9075F2
290	T	109D297X9006T2	150	T	109D157X9015T2	55	T	109D556X9050T2	35	T	109D356X9075T2
330	T	109D337X9006T2	170	T	109D177X9015T2	60	T	109D606X9050T2	40	T	109D406X9075T2
560	T	109D567X9006T2	270	T	109D277X9015T2	82	T	109D826X9050T2	56	T	109D566X9075T2
1200	K	109D128X9006K2	540	K	109D547X9015K2	160	K	109D167X9050K2	110	K	109D117X9075K2
8 WVDC @ 85C, 5 WVDC @ 125C			25 WVDC @ 85C, 15 WVDC @ 125C			60 WVDC @ 85C, 40 WVDC @ 125C			100 WVDC @ 85C, 70 WVDC @ 125C		
22	C	109D226X9008C2	9	C	109D905X9025C2	3.6	C	109D365X9060C2	2.5	C	109D255X9100C2
25	C	109D256X9008C2	10	C	109D106X9025C2	4	C	109D405X9060C2	4.7	C	109D475X9100C2
56	C	109D566X9008C2	22	C	109D226X9025C2	8.2	C	109D825X9060C2	10	F	109D106X9100F2
100	F	109D107X9008F2	45	F	109D456X9025F2	18	F	109D186X9060F2	11	F	109D116X9100F2
120	F	109D127X9008F2	50	F	109D506X9025F2	20	F	109D206X9060F2	22	F	109D226X9100F2
220	F	109D227X9008F2	100	F	109D107X9025F2	39	F	109D396X9060F2	27	T	109D276X9100T2
260	T	109D267X9008T2	100	T	109D107X9025T2	45	T	109D456X9060T2	30	T	109D306X9100T2
290	T	109D297X9008T2	110	T	109D117X9025T2	50	T	109D506X9060T2	43	T	109D436X9100T2
430	T	109D437X9008T2	180	T	109D187X9025T2	68	T	109D686X9060T2	125 WVDC @ 85C, 85 WVDC @ 125C		
850	K	109D857X9008K2	350	K	109D357X9025K2	140	K	109D147X9060K2	1.7	C	109D175X9125C2
10 WVDC @ 85C, 7 WVDC @ 125C			30 WVDC @ 85C, 20 WVDC @ 125C			150 WVDC @ 85C, 100 WVDC @ 125C			3.6	C	109D365X9125C2
18	C	109D186X9010C2	7	C	109D705X9030C2	14	T	109D146X9150T2	9	F	109D905X9125F2
20	C	109D206X9010C2	8	C	109D805X9030C2	22	T	109D226X9150T2	14	F	109D146X9125F2
47	C	109D476X9010C2							18	T	109D186X9125T2
85	F	109D856X9010F2							25	T	109D256X9125T2
100	F	109D107X9010F2							150 WVDC @ 85C, 100 WVDC @ 125C		
180	F	109D187X9010F2							14	T	109D146X9150T2
									22	T	109D226X9150T2



STYLE CL64, CL65 SINTERED-ANODE TANTALEX® CAPACITORS to MIL-C-3965

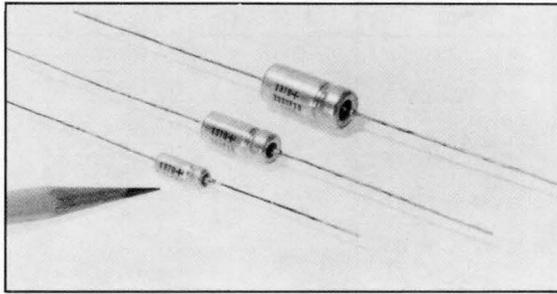
INSULATED CASE DIMENSIONS (in inches)*

Size Code	D ±.031	L Max.	Lead Length ±.25
T1	.203	.515	1.50
T2	.296	.703	2.25
T3	.390	.828	2.25

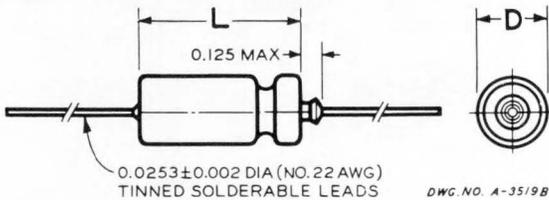
- Military version of proven Sprague Type 109D Capacitors.
- Capacitors listed meet requirements of Characteristic B (85°C).
- Capacitors listed have outer insulating sleeve. For bare case, change 4th character in Style Designation from 5 to 4, and subtract .016" from diameter and .062" from length.
- Capacitors listed have capacitance tolerance of ±20%. Also available with tolerance of ±10%; change 10th character of Style Designation from M to K.

μF	Size Code	Style Designation	μF	Size Code	Style Designation	μF	Size Code	Style Designation	μF	Size Code	Style Designation
6 WVDC			15 WVDC			50 WVDC			100 WVDC		
30	T1	CL65BB300MPE	15	T1	CL65BE150MPE	5	T1	CL65BJ050MPE	15	T2	CL65BL150MPE
68	T1	CL65BB680MPE	33	T1	CL65BE330MPE	10	T1	CL65BJ100MPE	33	T2	CL65BL330MPE
140	T2	CL65BB141MPE	70	T2	CL65BE700MPE	25	T2	CL65BJ250MPE	40	T3	CL65BL400MPE
270	T2	CL65BB271MPE	120	T2	CL65BE121MPE	47	T2	CL65BJ470MPE	56	T3	CL65BL560MPE
330	T3	CL65BB331MPE	170	T3	CL65BE171MPE	60	T3	CL65BJ600MPE	125 WVDC		
560	T3	CL65BB561MPE	270	T3	CL65BE271MPE	82	T3	CL65BJ820MPE	2.5	T1	CL65BN2R5MPE
8 WVDC			25 WVDC			60 WVDC			4.7	T1	CL65BN4R7MPE
25	T1	CL65BC250MPE	10	T1	CL65BG100MPE	4	T1	CL65BK040MPE	11	T2	CL65BN110MPE
56	T1	CL65BC560MPE	22	T1	CL65BG220MPE	8.2	T1	CL65BK8R2MPE	22	T2	CL65BN220MPE
220	T2	CL65BC221MPE	100	T2	CL65BG101MPE	20	T2	CL65BK200MPE	30	T3	CL65BN300MPE
430	T3	CL65BC431MPE	180	T3	CL65BG181MPE	39	T2	CL65BK390MPE	43	T3	CL65BN430MPE
10 WVDC			30 WVDC			75 WVDC			9	T2	CL65BP090MPE
20	T1	CL65BD200MPE	8	T1	CL65BH080MPE	3.5	T1	CL65BL3R5MPE	14	T2	CL65BP140MPE
47	T1	CL65BD470MPE	15	T1	CL65BH150MPE	6.8	T1	CL65BL6R8MPE	25	T3	CL65BP250MPE
100	T2	CL65BD101MPE	40	T2	CL65BH400MPE						
180	T2	CL65BD181MPE									
250	T3	CL65BD251MPE									
390	T3	CL65BD391MPE									

TYPE 137D HERMETICALLY-SEALED GELLED-ELECTROLYTE SINTERED-ANODE TANTALEX® CAPACITORS



- Glass-to-metal Hermetic Seal.
- Gelled-electrolyte for optimum performance characteristics.
- Capacitors listed have a capacitance of $\pm 20\%$. For units with tolerance of $+20\%$, -15% , change 8th and 9th characters of catalog number to C2; for $+75\%$, -15% , change to C7; for $\pm 10\%$, change to X9.
- High volumetric efficiency for space savings.
- Capacitors listed below have outer plastic-film insulation. For bare case, change last character of catalog number from 2 to 0, and subtract .032" from diameter and .062" from length.
- For complete technical data, see latest issue of Engineering Bulletin 3703.

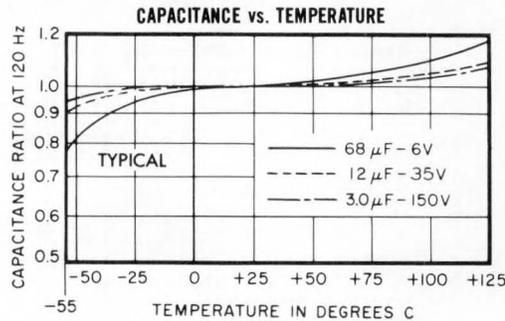


INSULATED CASE DIMENSIONS (in inches)*

Size Code	D	L
C	0.219	0.515
F	0.312	0.704
A	0.312	1.095
T	0.406	0.828
W	0.406	1.312

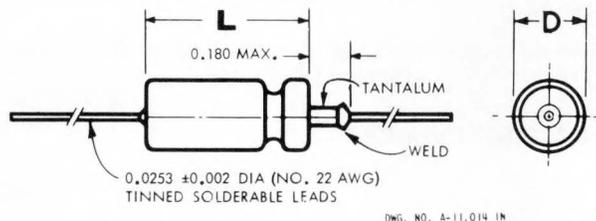
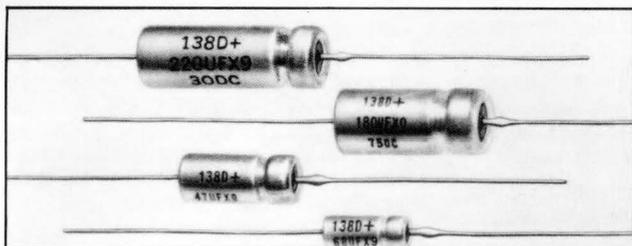
PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to $+175^{\circ}\text{C}$ with appropriate derating for higher temperature operation.
- Capacitance Change:** Maximum capacitance change with temperature @ -55°C , -85% ; @ 125°C , $+25\%$.
- Equivalent Series Resistance:** 1.2 to 8 max. ohms @ 120 Hz, depending upon capacitance.
- Leakage Current:** Max. d-c leakage current @ 25°C is $10\ \mu\text{A}$, depending upon capacitance.
- Life Test:** Satisfactory operation for 2000 hours at rated d-c working voltage, applied in an oven with circulating air, at a temperature of 85°C , or 125°C @ applicable working voltage.



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC, 7 VDC SURGE											
68	C	137D686X0006C2	120	F	137D127X0015F2	33	C	137D336X0035C2	47	A	137D476X0075A2
140	C	137D147X0006C2	270	F	137D277X0015F2	56	F	137D566X0035F2	47	T	137D476X0075T2
270	F	137D277X0006F2	270	A	137D277X0015A2	68	F	137D686X0035F2	56	F	137D566X0075F2
560	F	137D567X0006F2	270	T	137D277X0015T2	100	F	137D107X0035F2	56	A	137D566X0075A2
560	A	137D567X0006A2	540	T	137D547X0015T2	100	A	137D107X0035A2	56	T	137D566X0075T2
560	T	137D567X0006T2	560	W	137D567X0015W2	100	T	137D107X0035T2	82	T	137D826X0075T2
1000	T	137D108X0006T2				120	F	137D127X0035F2	100	W	137D107X0075W2
1200	W	137D128X0006W2				120	A	137D127X0035A2	110	T	137D117X0075T2
8 WVDC, 9 VDC SURGE											
56	C	137D566X0008C2	220	F	137D227X0020F2	180	T	137D187X0035T2	120	W	137D127X0075W2
120	C	137D127X0008C2	220	A	137D227X0020A2	220	T	137D227X0035T2	100 WVDC, 115 VDC SURGE		
220	F	137D227X0008F2	220	T	137D227X0020T2	220	W	137D227X0035W2	3.9	C	137D395X0100C2
470	F	137D477X0008F2	390	T	137D397X0020T2	270	W	137D227X0035W2	4.7	C	137D475X0100C2
470	A	137D477X0008A2	470	W	137D477X0020W2	50 WVDC, 57 VDC SURGE			15	F	137D156X0100F2
470	T	137D477X0008T2				10	C	137D106X0050C2	18	F	137D186X0100F2
850	T	137D857X0008T2				22	C	137D226X0050C2	22	F	137D226X0100F2
1000	W	137D108X0008W2				47	F	137D476X0050F2	33	A	137D336X0100A2
10 WVDC, 11 VDC SURGE											
39	C	137D396X0010C2	22	C	137D226X0025C2	82	F	137D826X0050F2	33	T	137D336X0100T2
47	C	137D476X0010C2	47	C	137D476X0025C2	82	A	137D826X0050A2	43	A	137D436X0100A2
82	C	137D826X0010C2	100	F	137D107X0025F2	82	T	137D826X0050T2	43	T	137D436X0100T2
100	C	137D107X0010C2	180	F	137D187X0025F2	160	T	137D167X0050T2	68	W	137D686X0100W2
150	F	137D157X0010F2	180	A	137D187X0025A2	180	W	137D187X0050W2	86	W	137D866X0100W2
180	F	137D187X0010F2	180	T	137D187X0025T2	60 WVDC, 69 VDC SURGE			125 WVDC, 143 VDC SURGE		
330	F	137D337X0010F2	350	T	137D357X0025T2	8.2	C	137D825X0060C2	3.6	C	137D365X0125C2
330	A	137D337X0010A2	390	W	137D397X0025W2	18	C	137D186X0060C2	9.0	F	137D905X0125F2
330	T	137D337X0010T2				39	F	137D396X0060F2	14	F	137D146X0125F2
390	F	137D397X0010F2				68	F	137D686X0060F2	18	T	137D186X0125T2
390	A	137D397X0010A2				68	A	137D686X0060A2	25	T	137D256X0125T2
390	T	137D397X0010T2				68	T	137D686X0060T2	28	A	137D286X0125A2
600	T	137D607X0010T2				140	T	137D147X0060T2	56	W	137D566X0125W2
680	W	137D687X0010W2				150	W	137D157X0060W2	150 WVDC, 165 VDC SURGE		
750	T	137D757X0010T2				75 WVDC, 86 VDC SURGE			1.7	C	137D175X0150C2
820	W	137D827X0010W2				5.6	C	137D565X0075C2	3.0	C	137D305X0150C2
15 WVDC, 17 VDC SURGE											
33	C	137D336X0015C2	12	C	137D126X0035C2	6.8	C	137D685X0075C2	6.8	F	137D685X0150F2
68	C	137D686X0015C2	15	C	137D156X0035C2	12	C	137D126X0075C2	11	F	137D116X0150F2
			27	C	137D276X0035C2	15	C	137D156X0075C2	14	T	137D146X0150T2
						27	F	137D276X0075F2	22	T	137D226X0150T2
						33	F	137D336X0075F2	22	A	137D226X0150A2
						47	F	137D476X0075F2	47	W	137D476X0150W2

TYPE 138D HERMETICALLY-SEALED GELLED-ELECTROLYTE SINTERED-ANODE TANTALEX® CAPACITORS



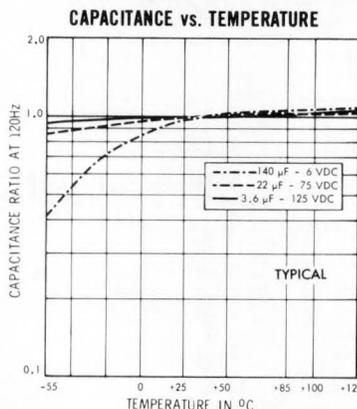
INSULATED CASE DIMENSIONS (in inches)*

Size Code	D Max.	L Max.
C	0.219	0.515
F	0.312	0.704
T	0.406	0.828
K	0.406	1.126

- Improved reliability through use of glass-to-tantalum hermetic anode seal.
- Improved construction eliminates all internal lead welds while retaining strength of conventional internal lead-welded parts.
- Designed to meet or exceed environmental and life test requirements of MIL-C-39006.
- Capacitors listed have capacitance of $\pm 20\%$. For units with a tolerance of $\pm 10\%$, change 9th character in catalog number from 0 to 9.
- Gelled-electrolyte gives premium performance for all capacitor parameters with respect to frequency and temperature.
- Capacitors listed have outer plastic film insulation. For bare case, change last character of catalog number from 2 to 0, and subtract .032" from diameter and .063" from length.
- For complete technical data, refer to latest issue of Engineering Bulletin 3704.

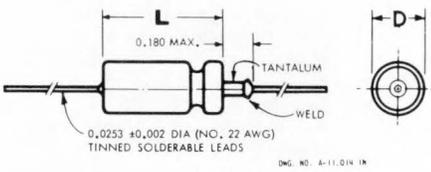
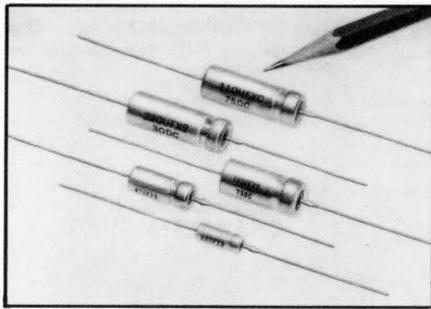
PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to $+85^{\circ}\text{C}$; to 125°C with voltage derating.
- Capacitance Tolerance:** $\pm 20\%$ and $\pm 10\%$.
- Capacitance Change:** Maximum capacitance change with temperature: @ -55°C , 80%; @ $+85^{\circ}\text{C}$, +25%; @ $+125^{\circ}\text{C}$, +25%.
- Equivalent Series Resistance:** 0.9 to 6.8 max. ohms @ 120 Hz, depending upon capacitance.
- Impedance:** 20 to 1250 max. ohms @ 120 Hz and -55°C .
- Leakage Current:** Max. d-c leakage current @ 25°C : for size code C, $1.0 \mu\text{A}$; size code F, $2.0 \mu\text{A}$; size code T, $4.0 \mu\text{A}$; size code K, $4.0 \mu\text{A}$.
- Ripple Current:** 100 to 670 max. amperes RMS @ 120 Hz, depending upon capacitance.



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC, 7 VDC SURGE			25 WVDC, 28 VDC SURGE			75 WVDC, 86 VDC SURGE		
30	C	138D306X0006C2	10	C	138D106X0025C2	3.5	C	138D355X0075C2
68	C	138D686X0006C2	22	C	138D226X0025C2	6.8	C	138D685X0075C2
140	F	138D147X0006F2	100	F	138D107X0025F2	15	F	138D156X0075F2
270	F	138D277X0006F2	180	T	138D187X0025T2	33	F	138D336X0075F2
330	T	138D337X0006T2	350	K	138D357X0025K2	40	T	138D406X0075T2
560	T	138D567X0006T2	30 WVDC, 34 VDC SURGE			56	T	138D566X0075T2
1200	K	138D128X0006K2	8.0	C	138D805X0030C2	110	K	138D117X0075K2
8 WVDC, 9 VDC SURGE			15	C	138D156X0030C2	100 WVDC, 115 VDC SURGE		
25	C	138D256X0008C2	40	F	138D406X0030F2	2.5	C	138D255X0100C2
56	C	138D566X0008C2	68	F	138D686X0030F2	4.7	C	138D475X0100C2
220	F	138D227X0008F2	100	T	138D107X0030T2	11	F	138D116X0100F2
430	T	138D437X0008T2	150	T	138D157X0030T2	22	F	138D226X0100F2
850	K	138D857X0008K2	300	K	138D307X0030K2	30	T	138D306X0100T2
10 WVDC, 11 VDC SURGE			50 WVDC, 57 VDC SURGE			43	T	138D436X0100T2
20	C	138D206X0010C2	5.0	C	138D505X0050C2	86	K	138D866X0100K2
47	C	138D476X0010C2	10	C	138D106X0050C2	125 WVDC, 143 VDC SURGE		
100	F	138D107X0010F2	25	F	138D256X0050F2	1.7	C	138D175X0125C2
180	F	138D187X0010F2	47	F	138D476X0050F2	3.6	C	138D365X0125C2
250	T	138D257X0010T2	60	T	138D606X0050T2	9.0	F	138D905X0125F2
390	T	138D397X0010T2	82	T	138D826X0050T2	14	F	138D146X0125F2
750	K	138D757X0010K2	160	K	138D167X0050K2	18	T	138D186X0125T2
15 WVDC, 17 VDC SURGE			60 WVDC, 69 VDC SURGE			25	T	138D256X0125T2
15	C	138D156X0015C2	4.0	C	138D405X0060C2	56	K	138D566X0125K2
33	C	138D336X0015C2	8.2	C	138D825X0060C2	150 WVDC, 165 VDC SURGE		
70	F	138D706X0015F2	20	F	138D206X0060F2	1.7	C	138D175X0150C2
120	F	138D127X0015F2	39	F	138D396X0060F2	3.0	C	138D305X0150C2
170	T	138D177X0015T2	50	T	138D506X0060T2	6.8	F	138D685X0150F2
270	T	138D277X0015T2	68	T	138D686X0060T2	11	F	138D116X0150F2
540	K	138D547X0015K2	140	K	138D147X0060K2	14	T	138D146X0150T2
						22	T	138D226X0150T2
						47	K	138D476X0150K2

ESTABLISHED RELIABILITY MIL-C-39006 STYLE CLR65 SINTERED-ANODE TANTALUM CAPACITORS

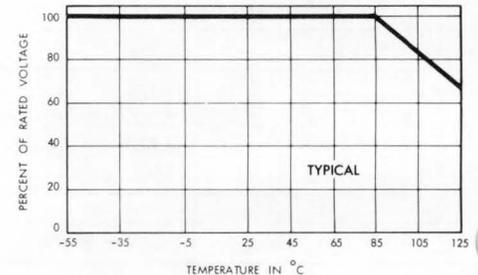


- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-790. Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.
- Polarized, wet sintered-anode Tantalex® capacitors in glass-to-tantalum hermetically-sealed cases.
- Capacitors have plastic insulating sleeving that extends 0.016 inches minimum, 0.062 inches maximum beyond each end of capacitor body.
- Failure rate level L is not intended for new design and should be used for replacement purposes only.
- In accordance with this specification, all capacitors are marked with the MIL part number rather than the older type designation, e.g. CLR65, and should be ordered as such. When ordering, use Military Specification Part Number M39006/09 — XXXX, where XXXX is the 4 digit number in the tables below.
- Rated for operation to +85°C; to +125°C with voltage derating.
- For complete technical data, refer to latest issue of Engineering Bulletin 3704.7.

D-C VOLTAGE CHARACTERISTICS

Rated Voltage to +85°C	Surge Voltage to +85°C	Rated Voltage at +125°C
6	6.9	4
8	9.2	5
10	11.5	7
15	17.2	10
25	28.8	15
30	34.5	20
50	57.5	30
60	69.0	40
75	86.2	50
100	115	65
125	144	85

VOLTAGE DERATING CURVE



BARE CASE DIMENSIONS (in inches)*

Size Code	Sprague	D ±.016	L +.031 -.016
T1	A	.188	.453
T2	B	.281	.641
T3	C	.375	.766
T4	D	.375	1.062

HERMETICALLY-SEALED CAPACITORS TO MIL-C-39006/9C

MIL Part No. M39006/09-											MIL Part No. M39006/09-												
μF	WVDC	Size Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		μF	WVDC	Size Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)			
			Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.				Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.
			±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%				±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%
30	6	A	6001	6002	6206	6207	6411	6412	6616	6617	120	15	B	6064	6065	6269	6270	6474	6475	6679	6680		
68	6	A	6004	6005	6209	6210	6414	6415	6619	6620	170	15	C	6067	6068	6272	6273	6477	6478	6682	6683		
140	6	B	6007	6008	6212	6213	6417	6418	6622	6623	270	15	C	6070	6071	6275	6276	6480	6481	6685	6686		
270	6	B	6010	6011	6215	6216	6420	6421	6625	6626	540	15	D	6073	6074	6278	6279	6483	6484	6688	6689		
330	6	C	6013	6014	6218	6219	6423	6424	6628	6629	10	25	A	6075	6076	6280	6281	6485	6486	6690	6691		
560	6	C	6016	6017	6221	6222	6426	6427	6631	6632	22	25	A	6078	6079	6283	6284	6488	6489	6693	6694		
1200	6	D	6019	6020	6224	6225	6429	6430	6634	6635	100	25	B	6081	6082	6286	6287	6491	6492	6696	6697		
25	8	A	6021	6022	6226	6227	6431	6432	6636	6637	180	25	C	6084	6085	6289	6290	6494	6495	6699	6700		
56	8	A	6024	6025	6229	6230	6434	6435	6639	6640	350	25	D	6087	6088	6292	6293	6497	6498	6702	6703		
220	8	B	6027	6028	6232	6233	6437	6438	6642	6643	8	30	A	6089	6090	6294	6295	6499	6500	6704	6705		
430	8	C	6030	6031	6235	6236	6440	6441	6645	6646	15	30	A	6092	6093	6297	6298	6502	6503	6707	6708		
850	8	D	6033	6034	6238	6239	6443	6444	6648	6649	40	30	B	6095	6096	6300	6301	6505	6506	6710	6711		
20	10	A	6035	6036	6240	6241	6445	6446	6650	6651	68	30	B	6098	6099	6303	6304	6508	6509	6713	6714		
47	10	A	6038	6039	6243	6244	6448	6449	6653	6654	100	30	C	6101	6102	6306	6307	6511	6512	6716	6717		
100	10	B	6041	6042	6246	6247	6451	6452	6656	6657	150	30	C	6104	6105	6309	6310	6514	6515	6719	6720		
180	10	B	6044	6045	6249	6250	6454	6455	6659	6660	300	30	D	6107	6108	6312	6313	6517	6518	6722	6723		
250	10	C	6047	6048	6252	6253	6457	6458	6662	6663	5	50	A	6109	6110	6314	6315	6519	6520	6724	6725		
390	10	C	6050	6051	6255	6256	6460	6461	6665	6666	10	50	A	6112	6113	6317	6318	6522	6523	6727	6728		
750	10	D	6053	6054	6258	6259	6463	6464	6668	6669	25	50	B	6115	6116	6320	6321	6525	6526	6730	6731		
15	15	A	6055	6056	6260	6261	6465	6466	6670	6671	47	50	B	6118	6119	6323	6324	6528	6529	6733	6734		
33	15	A	6058	6059	6263	6264	6468	6469	6673	6674	60	50	C	6121	6122	6326	6327	6531	6532	6736	6737		
70	15	B	6061	6062	6266	6267	6471	6472	6676	6677	82	50	C	6124	6125	6329	6330	6534	6535	6739	6740		
											160	50	D	6127	6128	6332	6333	6537	6538	6742	6743		

STYLE CLR65 TANTALUM CAPACITORS, continued

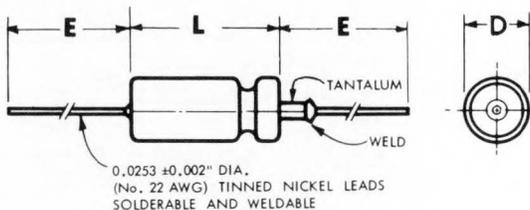
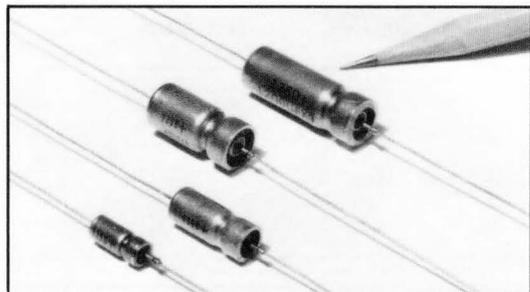
HERMETICALLY-SEALED CAPACITORS TO MIL-C-39006/9C, continued

MIL Part No. M39006/09-										MIL Part No. M39006/09-														
μF	Size	WVDC Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		μF	Size	WVDC Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)				
			Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.				Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.
			±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%				±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%	±20%
4	60	A	6129	6130	6334	6335	6539	6540	6744	6745	2.5	100	A	6169	6170	6374	6375	6579	6580	6784	6785			
8.2	60	A	6132	6133	6337	6338	6542	6543	6747	6748	4.7	100	A	6172	6173	6377	6378	6582	6583	6787	6788			
20	60	B	6135	6136	6340	6341	6545	6546	6750	6751	11	100	B	6175	6176	6380	6381	6585	6586	6790	6791			
39	60	B	6138	6139	6343	6344	6548	6549	6753	6754	22	100	B	6178	6179	6383	6384	6588	6589	6793	6794			
50	60	C	6141	6142	6346	6347	6551	6552	6756	6757	30	100	C	6181	6182	6386	6387	6591	6592	6796	6797			
68	60	C	6144	6145	6349	6350	6554	6555	6759	6760	43	100	C	6184	6185	6389	6390	6594	6595	6799	6800			
140	60	D	6147	6148	6352	6353	6557	6558	6762	6763	86	100	D	6187	6188	6392	6393	6597	6598	6802	6803			
3.5	75	A	6149	6150	6354	6355	6559	6560	6764	6765	1.7	125	A	6189	6190	6394	6395	6599	6600	6804	6805			
6.8	75	A	6152	6153	6357	6358	6562	6563	6767	6768	3.6	125	A	6192	6193	6397	6398	6602	6603	6807	6808			
15	75	B	6155	6156	6360	6361	6565	6566	6770	6771	9	125	B	6195	6196	6400	6401	6605	6606	6810	6811			
33	75	B	6158	6159	6363	6364	6568	6569	6773	6774	14	125	B	6198	6199	6403	6404	6608	6609	6813	6814			
40	75	C	6161	6162	6366	6367	6571	6572	6776	6777	18	125	C	6201	6202	6406	6407	6611	6612	6816	6817			
56	75	C	6164	6165	6369	6370	6574	6575	6779	6780	25	125	C	6204	6205	6409	6410	6614	6615	6819	6820			
110	75	D	6167	6168	6372	6373	6577	6578	6782	6783	36	125	D	7027	7028	7030	7031	7033	7034	7036	7037			

HERMETICALLY-SEALED CAPACITORS TO MIL-C-39006/9D

MIL Part No. M39006/09-										MIL Part No. M39006/09-												
μF	Size	WVDC Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		μF	Size	WVDC Code	Failure Rate L (2%)		Failure Rate M (1%)		Failure Rate P (0.1%)		Failure Rate R (0.01%)		
			Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.				Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.	Cap. Tol.
			±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%				±20%	±10%	±20%	±10%	±20%	±10%	±20%	±10%	±20%
30	6	A	8001	8002	8206	8207	8411	8412	8616	8617	150	30	C	8104	8105	8309	8310	8514	8515	8719	8720	
68	6	A	8004	8005	8209	8210	8414	8415	8619	8620	300	30	D	8107	8108	8312	8313	8517	8518	8722	8723	
140	6	B	8007	8008	8212	8213	8417	8418	8622	8623	5	50	A	8109	8110	8314	8315	8519	8520	8724	8725	
270	6	B	8010	8011	8215	8216	8420	8421	8625	8626	10	50	A	8112	8113	8317	8318	8522	8523	8727	8728	
330	6	C	8013	8014	8218	8219	8423	8424	8628	8629	25	50	B	8115	8116	8320	8321	8525	8526	8730	8731	
560	6	C	8016	8017	8221	8222	8426	8427	8631	8632	47	50	B	8118	8119	8323	8324	8528	8529	8733	8734	
1200	6	D	8019	8020	8224	8225	8429	8430	8634	8635	60	50	C	8121	8122	8326	8327	8531	8532	8736	8737	
25	8	A	8021	8022	8226	8227	8431	8432	8636	8637	82	50	C	8124	8125	8329	8330	8534	8535	8739	8740	
56	8	A	8024	8025	8229	8230	8434	8435	8639	8640	160	50	D	8127	8128	8332	8333	8537	8538	8742	8743	
220	8	B	8027	8028	8232	8233	8437	8438	8642	8643	4	60	A	8129	8130	8334	8335	8539	8540	8744	8745	
430	8	C	8030	8031	8235	8236	8440	8441	8645	8646	8.2	60	A	8132	8133	8337	8338	8542	8543	8747	8748	
850	8	D	8033	8034	8238	8239	8443	8444	8648	8649	20	60	B	8135	8136	8340	8341	8545	8546	8750	8751	
20	10	A	8035	8036	8240	8241	8445	8446	8650	8651	39	60	B	8138	8139	8343	8344	8548	8549	8753	8754	
47	10	A	8038	8039	8243	8244	8448	8449	8653	8654	50	60	C	8141	8142	8346	8347	8551	8552	8756	8757	
100	10	B	8041	8042	8246	8247	8451	8452	8656	8657	68	60	C	8144	8145	8349	8350	8554	8555	8759	8760	
180	10	B	8044	8045	8249	8250	8454	8455	8659	8660	140	60	D	8147	8148	8352	8353	8557	8558	8762	8763	
250	10	C	8047	8048	8252	8253	8457	8458	8662	8663	3.5	75	A	8149	8150	8354	8355	8559	8560	8764	8765	
390	10	C	8050	8051	8255	8256	8460	8461	8665	8666	6.8	75	A	8152	8153	8357	8358	8562	8563	8767	8768	
750	10	D	8053	8054	8258	8259	8463	8464	8668	8669	15	75	B	8155	8156	8360	8361	8565	8566	8770	8771	
15	15	A	8055	8056	8260	8261	8465	8466	8670	8671	33	75	B	8158	8159	8363	8364	8568	8569	8773	8774	
33	15	A	8058	8059	8263	8264	8468	8469	8673	8674	40	75	C	8161	8162	8366	8367	8571	8572	8776	8777	
70	15	B	8061	8062	8266	8267	8471	8472	8676	8677	56	75	C	8164	8165	8369	8370	8574	8575	8779	8780	
120	15	B	8064	8065	8269	8270	8474	8475	8679	8680	110	75	D	8167	8168	8372	8373	8577	8578	8782	8783	
170	15	C	8067	8068	8272	8273	8477	8478	8682	8683	2.5	100	A	8169	8170	8374	8375	8579	8580	8784	8785	
270	15	C	8070	8071	8275	8276	8480	8481	8685	8686	4.7	100	A	8172	8173	8377	8378	8582	8583	8787	8788	
540	15	D	8073	8074	8278	8279	8483	8484	8688	8689	11	100	B	8175	8176	8380	8381	8585	8586	8790	8791	
10	25	A	8075	8076	8280	8281	8485	8486	8690	8691	22	100	B	8178	8179	8383	8384	8588	8589	8793	8794	
22	25	A	8078	8079	8283	8284	8488	8489	8693	8694	30	100	C	8181	8182	8386	8387	8591	8592	8796	8797	
100	25	B	8081	8082	8286	8287	8491	8492	8696	8697	43	100	C	8184	8185	8389	8390	8594	8595	8799	8800	
180	25	C	8084	8085	8289	8290	8494	8495	8699	8700	86	100	D	8187	8188	8392	8393	8597	8598	8802	8803	
350	25	D	8087	8088	8292	8293	8497	8498	8702	8703	1.7	125	A	8189	8190	8394	8395	8599	8600	8804	8805	
8	30	A	8089	8090	8294	8295	8499	8500	8704	8705	3.6	125	A	8192	8193	8397	8398	8602	8603	8807	8808	
15	30	A	8092	8093	8297	8298	8502	8503	8707	8708	9	125	B	8195	8196	8400	8401	8605	8606	8810	8811	
40	30	B	8095	8096	8300	8301	8505	8506	8710	8711	14	125	B	8198	8199	8403	8404	8608	8609	8813	8814	
68	30	B	8098	8099	8303	8304	8508	8509	8713	8714	18	125	C	8201	8202	8406	8407	8611	8612	8816	8817	
100	30	C	8101	8102	8306	8307	8511	8512	8716	8717	25	125	C	8204	8205	8409	8410	8614	8615	8819	8820	
											56	125	D	9027	9028	9030	9031	9033	9034	9036</		

TYPE 135D TANTALUM-CASE GELLED-ELECTROLYTE SINTERED-ANODE TANTALEX® CAPACITORS



BARE CASE DIMENSIONS (in inches)*

Size Code	*D ±.016	L +.031 -.016	E
C	0.188	0.453	1.500
F	0.281	0.641	2.250
T	0.375	0.766	2.250
K	0.375	1.062	2.250

*For insulated parts add .005" to the diameter.

- Tantalum-encased capacitors with true glass-to-tantalum hermetic seal gives space-age reliability.
- Established reliability capacitors of this type can be furnished to meet MIL-C-39006/22 (USAF). These Style CLR79 capacitors are approved for failure rates M(1%), P(1%) and R(.01%). See page 33.
- Feature 3-volt reversal capability on continuous basis without degradation in either capacitor function or appearance.
- All tantalum construction . . . use of tantalum case eliminates possibility of silver migration problems.
- Hermetic end seal is welded to case, rather than being soldered in place.
- Unique features have been demonstrated under severe conditions of reverse voltage, high ripple current, high

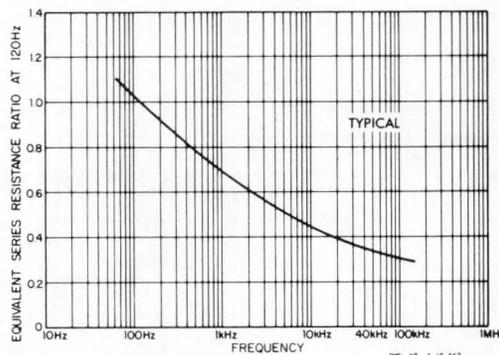
vacuum.

- Capacitors listed have plastic film-insulating sleeve. For units with bare case, change last character in catalog number from 2 to 0.
- Capacitors listed have capacitance tolerance of ±20%. For ±10% tolerance, change 9th character in catalog number from 0 to 9.
- For complete technical data, refer to latest issue of Engineering Bulletin 3760.

PERFORMANCE CHARACTERISTICS

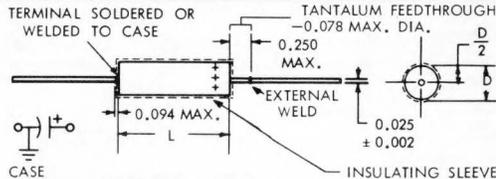
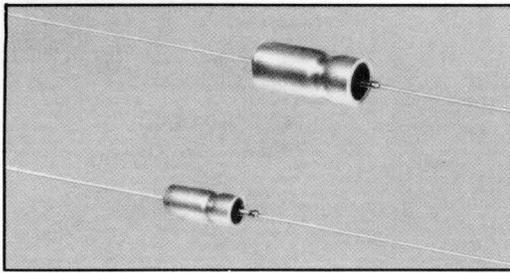
- Operating Temperature Range:** -55°C to +125°C; to +200°C with appropriate derating.
- Capacitance Tolerance:** ±20% and ±10%.
- Equivalent Series Resistance:** 1.8 to 15.6 max. amperes RMS @ 25°C and 120 Hz, depending upon capacitance.
- Impedance:** 20 to 1250 max. ohms @ 120 Hz, depending upon capacitance.
- Leakage Current:** Max. d-c leakage current at 25°C is: capacitors in size code C and F, 1 μA; size code T, 2 μA; size code K, 4 μA.
- Life Test:** (At 85°C) Capacitors are capable of withstanding a 2000 hour life test at rated d-c working voltage. After life test, leakage current shall meet initial requirement, equivalent series resistance shall not exceed 150% of initial requirement and capacitance value shall not change more than 10% from initial requirement.
- Surge Voltage:** 115% of rated voltage.

ESR vs. FREQUENCY



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC @ 85°C, 4 WVDC @ 125°C			390	T	135D397X0010T2	68	F	135D686X0030F2	6.8	C	135D685X0075C2
30	C	135D306X0006C2	750	K	135D757X0010K2	100	T	135D107X0030T2	15	F	135D156X0075F2
68	C	135D686X0006C2	15 WVDC @ 85°C, 10 WVDC @ 125°C			150	T	135D157X0030T2	33	F	135D336X0075F2
140	F	135D147X0006F2	15	C	135D156X0015C2	300	K	135D307X0030K2	40	T	135D406X0075T2
270	F	135D277X0006F2	33	C	135D336X0015C2	50 WVDC @ 85°C, 30 WVDC @ 125°C			56	T	135D566X0075T2
330	T	135D337X0006T2	70	F	135D706X0015F2	5	C	135D505X0050C2	110	K	135D117X0075K2
560	T	135D567X0006T2	120	F	135D127X0015F2	10	C	135D106X0050C2	100 WVDC @ 85°C, 65 WVDC @ 125°C		
1200	K	135D128X0006K2	170	T	135D177X0015T2	25	F	135D256X0050F2	2.5	C	135D255X0100C2
8 WVDC @ 85°C, 5 WVDC @ 125°C			270	T	135D277X0015T2	47	F	135D476X0050F2	4.7	C	135D475X0100C2
25	C	135D256X0008C2	540	K	135D547X0015K2	60	T	135D606X0050T2	11	F	135D116X0100F2
56	C	135D566X0008C2	25 WVDC @ 85°C, 15 WVDC @ 125°C			82	T	135D826X0050T2	22	F	135D226X0100F2
120	F	135D127X0008F2	10	C	135D106X0025C2	160	K	135D167X0050K2	30	T	135D306X0100T2
220	F	135D227X0008F2	22	C	135D226X0025C2	60 WVDC @ 85°C, 40 WVDC @ 125°C			43	T	135D436X0100T2
290	T	135D297X0008T2	50	F	135D506X0025F2	4	C	135D405X0060C2	86	K	135D866X0100K2
430	T	135D437X0008T2	100	F	135D107X0025F2	8.2	C	135D825X0060C2	125 WVDC @ 85°C, 85 WVDC @ 125°C		
850	K	135D857X0008K2	120	T	135D127X0025T2	20	F	135D206X0060F2	1.7	C	135D175X0125C2
10 WVDC @ 85°C, 7 WVDC @ 125°C			180	T	135D187X0025T2	39	F	135D396X0060F2	3.6	C	135D365X0125C2
20	C	135D206X0010C2	350	K	135D357X0025K2	50	T	135D506X0060T2	9	F	135D905X0125F2
47	C	135D476X0010C2	30 WVDC @ 85°C, 20 WVDC @ 125°C			68	T	135D686X0060T2	14	F	135D146X0125F2
100	F	135D107X0010F2	8	C	135D805X0030C2	140	K	135D147X0060K2	18	T	135D186X0125T2
180	F	135D187X0010F2	15	C	135D156X0030C2	75 WVDC @ 85°C, 50 WVDC @ 125°C			25	T	135D256X0125T2
250	T	135D257X0010T2	40	F	135D406X0030F2	3.5	C	135D355X0075C2	56	K	135D566X0125K2

ESTABLISHED RELIABILITY STYLE CLR79 SINTERED-ANODE CAPACITORS to MIL-C-39006



BARE CASE DIMENSIONS (in inches)*

Size Code	D ±.015	L +.031 / -.015	Size Code	D ±.015	L +.031 / -.015
T1	.188	.453	T3	.375	.766
T2	.281	.641	T4	.375	1.062

For Insulated Parts Add .005 to D.

- Handled by Sprague and Sprague industrial distributors in full compliance with MIL-STD-202. Manufactured, marked, packed, shipped, received, inspected, stored in separate area, free from contamination or mix-up with other components.
- Excellent stability with time and temperature.
- Glass-to-tantalum hermetic seal, tantalum encased, with outer plastic insulating sleeve.
- Operating temperature range: -55°C to +85°C; to +125°C with 32.5% voltage derating.
- For optional random vibration requirement on failure rate level M or better, add 'H' after dash number.

PER CENT DISSIPATION FACTOR

Size Code	Working Volts D-C										
	6	8	10	15	25	30	50	60	75	100	125
T1	9.1 to 20.4	7.6 to 17	6.1 to 18.1	5.7 to 12.5	4.6 to 8.2	4.5 to 9.1	3.4 to 6	3 to 5	2.5 to 4.1	5 to 3.6	7 to 4.1
T2	21.3 to 81.8	66.4	15.2 to 54.4	13.1 to 36.8	28.8 to 31.4	12.2 to 31	11.2 to 21.4	7.6 to 20.7	7.5 to 17.5	5 to 11.8	10.2 to 12.7
T3	7.9 to 128	91.5	37.8 to 87.6	25.4 to 60.9	54.3	19	13.6 to 29.4	15.3 to 30.7	15.2 to 2.6	9.1 to 19.7	15 to 19
T4	144.4	65.8	56.5	49	35	35	25.7	25.7	25.7	20.7	17.5

Mil Part Number M39006/22- Failure Rate Level (%/1000 hr.)						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
6 WVDC @ 85°C; 4 WVDC @ 125°C						
30	10	T1	0002	0222	0442	
30	20	T1	0001	0221	0441	
68	10	T1	0005	0225	0445	
68	20	T1	0004	0224	0444	
140	10	T2	0008	0228	0448	
140	20	T2	0007	0227	0447	
270	10	T2	0011	0231	0451	
270	20	T2	0010	0230	0450	
330	10	T3	0014	0234	0454	
330	20	T3	0013	0233	0453	
560	10	T3	0017	0237	0457	
560	20	T3	0016	0236	0456	
1200	10	T4	0020	0240	0460	
1200	20	T4	0019	0239	0459	

8 WVDC @ 85°C; 5 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
25	10	T1	0022	0242	0462	
25	20	T1	0021	0241	0461	
56	10	T1	0025	0245	0465	
56	20	T1	0024	0244	0464	
120	10	T2	0028	0248	0468	
120	20	T2	0027	0247	0467	
220	10	T2	0031	0251	0471	
220	20	T2	0030	0250	0470	
290	10	T3	0034	0254	0474	
290	20	T3	0033	0253	0473	
430	10	T3	0037	0257	0477	
430	20	T3	0036	0256	0476	
850	10	T4	0040	0260	0480	
850	20	T4	0039	0259	0479	

10 WVDC @ 85°C; 7 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
20	10	T1	0042	0262	0482	
20	20	T1	0041	0261	0481	
47	10	T1	0045	0265	0485	
47	20	T1	0044	0264	0484	
100	10	T2	0048	0268	0488	
100	20	T2	0047	0267	0487	
180	10	T2	0051	0271	0491	
180	20	T2	0050	0270	0490	
250	10	T3	0054	0274	0494	
250	20	T3	0053	0273	0493	

Mil Part Number M39006/22- Failure Rate Level (%/1000 hr.)						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
390	10	T3	0057	0277	0497	
390	20	T3	0056	0276	0496	
750	10	T4	0060	0280	0500	
750	20	T4	0059	0279	0499	
15 WVDC @ 85°C; 10 WVDC @ 125°C						
15	10	T1	0062	0282	0502	
15	20	T1	0061	0281	0501	
33	10	T1	0065	0285	0505	
33	20	T1	0064	0284	0504	
70	10	T2	0068	0288	0508	
70	20	T2	0067	0287	0507	
120	10	T2	0071	0291	0511	
120	20	T2	0070	0290	0510	
170	10	T3	0074	0294	0514	
170	20	T3	0073	0293	0513	
270	10	T3	0077	0297	0517	
270	20	T3	0076	0296	0516	
540	10	T4	0080	0300	0520	
540	20	T4	0079	0299	0519	

25 WVDC @ 85°C; 13 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
10	10	T1	0082	0302	0522	
10	20	T1	0081	0301	0521	
22	10	T1	0085	0305	0525	
22	20	T1	0084	0304	0524	
50	10	T2	0088	0308	0528	
50	20	T2	0087	0307	0527	
100	10	T2	0091	0311	0531	
100	20	T2	0090	0310	0530	
120	10	T3	0094	0314	0534	
120	20	T3	0093	0313	0533	
180	10	T3	0097	0317	0537	
180	20	T3	0096	0316	0536	
350	10	T4	0100	0320	0540	
350	20	T4	0099	0319	0539	

30 WVDC @ 85°C; 20 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
8	10	T1	0102	0322	0542	
8	20	T1	0101	0321	0541	
15	10	T1	0105	0325	0545	
15	20	T1	0104	0324	0544	
40	10	T2	0108	0328	0548	
40	20	T2	0107	0327	0547	

Mil Part Number M39006/22- Failure Rate Level (%/1000 hr.)						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
68	10	T2	0111	0331	0551	
68	20	T2	0110	0330	0550	
100	10	T3	0114	0334	0554	
100	20	T3	0113	0333	0553	
150	10	T3	0117	0337	0557	
150	20	T3	0116	0336	0556	
300	10	T4	0120	0340	0560	
300	20	T4	0119	0339	0559	
50 WVDC @ 85°C; 33 WVDC @ 125°C						
5	10	T1	0122	0342	0562	
5	20	T1	0121	0341	0561	
10	10	T1	0125	0345	0565	
10	20	T1	0124	0344	0564	
25	10	T2	0128	0348	0568	
25	20	T2	0127	0347	0567	
47	10	T2	0131	0351	0571	
47	20	T2	0130	0350	0570	
60	10	T3	0134	0354	0574	
60	20	T3	0133	0353	0573	
82	10	T3	0137	0357	0577	
82	20	T3	0136	0356	0576	
160	10	T4	0140	0360	0580	
160	20	T4	0139	0359	0579	

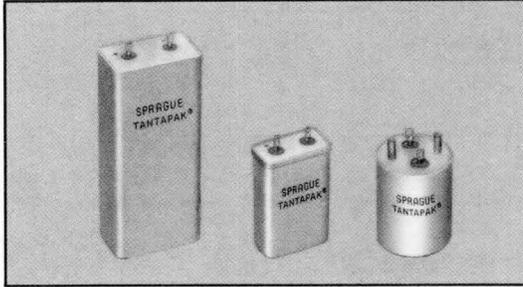
60 WVDC @ 85°C; 40 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
4	10	T1	0142	0362	0582	
4	20	T1	0141	0361	0581	
8.2	10	T1	0145	0365	0585	
8.2	20	T1	0144	0364	0584	
20	10	T2	0148	0368	0588	
20	20	T2	0147	0367	0587	
39	10	T2	0151	0371	0591	
39	20	T2	0150	0370	0590	
50	10	T3	0154	0374	0594	
50	20	T3	0153	0373	0593	
68	10	T3	0157	0377	0597	
68	20	T3	0156	0376	0596	
140	10	T4	0160	0380	0600	
140	20	T4	0159	0379	0599	

75 WVDC @ 85°C; 50 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
3.5	10	T1	0162	0382	0602	
3.5	20	T1	0161	0381	0601	

Mil Part Number M39006/22- Failure Rate Level (%/1000 hr.)						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
6.8	10	T1	0165	0385	0605	
6.8	20	T1	0164	0384	0604	
15	10	T2	0168	0388	0608	
15	20	T2	0167	0387	0607	
33	10	T2	0171	0391	0611	
33	20	T2	0170	0390	0610	
40	10	T3	0174	0394	0614	
40	20	T3	0173	0393	0613	
56	10	T3	0177	0397	0617	
56	20	T3	0176	0396	0616	
110	10	T4	0180	0400	0620	
110	20	T4	0179	0399	0619	

100 WVDC @ 85°C; 67 WVDC @ 125°C						
Cap. μF	Tol. (±%)	Size Code	M (1%)	P (.1%)	R (.01%)	
2.5	10	T1	0182	0402	0622	
2.5	20	T1	0181	0401	0621	
4.7	10	T1	0185	0405	0625	
4.7	20	T1	0184	0404	0624	
11	10	T2	0188	0408	0628	
11	20	T2	0187	0407	0627	
22	10	T2	0191	0411	0631	
22	20	T2	0190	0410	0630	
30	10	T3	0194	0		

TYPE 200D, 202D TANTAPAK® CAPACITOR ASSEMBLIES

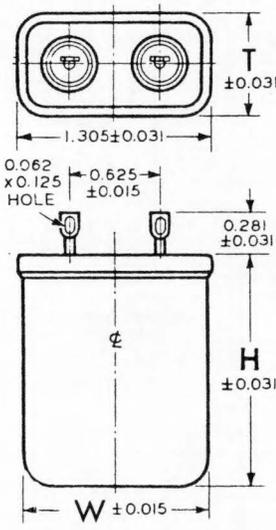


- Wet sintered-anode tantalum electrolytic capacitor assemblies for applications that require high capacitance at low voltage.
- Ideal for filtering, coupling, bypass, time delay circuit applications.
- Excellent shock and vibration resistance characteristics.
- Glass-to-metal positive solder-seal terminals to insure hermetic seals.
- Withstand long shelf life-without deterioration.
- Capacitors in Size Code C are cylindrical units — dimensions are for diameter and height.
- Catalog numbers listed are for capacitor assemblies with both terminals insulated from case. For assemblies with negative terminal grounded (available only in units where 13th

- character of catalog number is A), change 3rd digit of catalog number from 2 to 0.
- For complete technical data, refer to latest issue of Engineering Bulletin 3705.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +125°C.
- Capacitance Tolerance:** ±20%.
- Surge Voltage:** The surge voltage of all capacitors is 115% of rated d-c working voltage.
- Equivalent Series Resistance:** .05 to 132 max. ohms @ 120 Hz and 25°C.

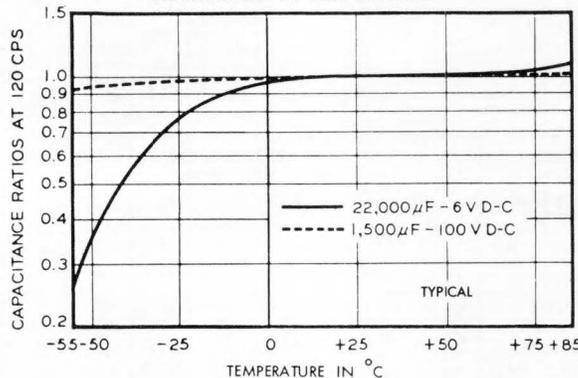


DIMENSIONS (in inches)*

Size Code	W	H	T
A	.875	1.625	.875
B	1.593	1.500	1.000
C	1.250†	1.625	
D	1.593	1.875	1.000
E	1.593	2.250	1.000
F	1.593	2.625	1.000
G	1.593	3.000	1.000
H	1.593	3.375	1.000
J	1.593	3.750	1.000
K	1.275	1.062	.720
L	1.275	1.375	.720
M	1.275	1.625	.720
N	1.275	1.062	.720
O	1.275	2.000	.720
P	1.275	2.500	.720

†diameter

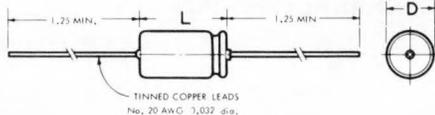
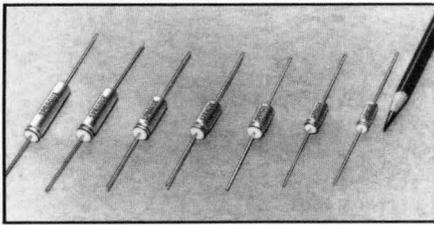
CAPACITANCE vs. TEMPERATURE



- Life Test:** Capacitors are capable of withstanding a 2000 hour life test at +125°C at rated d-c working voltage. After test, leakage current shall meet initial requirement, equivalent series resistance shall not be more than 130% of initial requirement, and the capacitance value shall not have changed by more than ±25%.

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6 WVDC @ 85°C, 4 V @ 125°C			2400	M	202D248X0015A3	3600	F	202D368X0030B4	75 WVDC @ 85°C, 50 V @ 125°C			360	P	202D367X0110A5
4800	A	202D488X0006D3	2400	P	202D248X0015A5	4200	G	202D428X0030B5	270	N	202D277X0075A1	125 WVDC @ 85°C, 85 V @ 125°C		
7200	B	202D728X0006B1	2900	O	202D298X0015A4	4800	H	202D488X0030B6	330	L	202D337X0075A2	170	N	202D177X0125A1
8400	C	202D848X0006C3	3200	B	202D328X0015B1	5400	J	202D548X0030B7	400	N	202D407X0075A1	220	L	202D227X0125A2
9600	D	202D968X0006B2	3800	C	202D388X0015C3	45 WVDC @ 85°C, 30 V @ 125°C			400	K	202D407X0075A3	220	A	202D227X0125D3
12000	E	202D129X0006B3	3900	P	202D398X0015A5	430	O	202D437X0045A1	440	M	202D447X0075D3	280	M	202D287X0125A3
14000	F	202D149X0006B4	4300	D	202D438X0015B2	450	L	202D457X0045A2	530	L	202D537X0075A2	340	O	202D347X0125A4
17000	G	202D179X0006B5	5400	E	202D548X0015B3	550	L	202D557X0045A2	600	O	202D607X0075A4	340	B	202D347X0125B4
19000	H	202D199X0006B6	6500	F	202D658X0015B4	570	N	202D577X0045A1	660	M	202D667X0075A3	340	B	202D347X0125B1
22000	J	202D229X0006B7	7600	G	202D768X0015B5	660	M	202D667X0045A3	660	P	202D667X0075A5	450	P	202D457X0125A5
8 WVDC @ 85°C, 5 V @ 125°C			8600	L	202D868X0015B6	750	H	202D757X0045A2	660	B	202D667X0075B1	450	D	202D457X0125B2
3400	A	202D348X0008D3	9700	J	202D978X0015B7	940	M	202D947X0045A3	770	C	202D777X0075C3	560	E	202D567X0125B3
5100	B	202D518X0008B1	25 WVDC @ 85°C, 15 V @ 125°C			1000	O	202D108X0045A4	790	O	202D797X0075A4	670	F	202D677X0125B4
6000	C	202D608X0008C3	1400	A	202D148X0025D3	1100	O	202D118X0045A4	880	D	202D887X0075B2	790	G	202D797X0125B5
6800	D	202D688X0008B2	2100	B	202D218X0025D1	1100	P	202D118X0045A5	1100	P	202D118X0075A5	900	L	202D907X0125B6
8500	E	202D858X0008B3	2500	C	202D258X0025C3	1500	P	202D158X0045A5	1100	E	202D118X0075B3	1000	J	202D108X0125B7
10000	F	202D109X0008B4	2800	D	202D288X0025B3	50 WVDC @ 85°C, 35 V @ 125°C			1400	F	202D148X0075B4	150 WVDC @ 85°C, 100 V @ 125°C		
12000	G	202D129X0008B5	3500	E	202D358X0025B3	640	A	202D647X0050D3	1500	G	202D158X0075B5	110	A	202D117X0150D3
14000	H	202D149X0008B6	4200	F	202D428X0025B4	960	B	202D967X0050B1	1800	H	202D188X0075B6	130	N	202D137X0150A1
15000	J	202D159X0008B7	4900	G	202D498X0025B5	1000	P	202D108X0050A5	2000	J	202D208X0075B7	170	L	202D177X0150A2
10 WVDC @ 85°C, 7 V @ 125°C			6300	J	202D638X0025B7	1100	O	202D118X0050C3	260	N	202D267X0100A1	220	M	202D227X0150A3
3000	A	202D308X0010D3	30 WVDC @ 85°C, 20 V @ 125°C			1300	D	202D138X0050B2	340	A	202D347X0100D3	260	O	202D267X0150A4
4500	B	202D458X0010B1	520	K	202D527X0030A1	1600	P	202D168X0050B3	350	L	202D357X0100A2	350	P	202D357X0150A5
5300	C	202D538X0010C3	660	L	202D667X0030A2	1900	F	202D198X0050B4	440	M	202D447X0100A3	440	M	202D447X0100A3
6000	D	202D608X0010B2	820	K	202D827X0030A1	2200	F	202D228X0050B5	510	B	202D517X0100B1	510	B	202D517X0100B1
7500	E	202D758X0010B3	860	L	202D867X0030A2	2600	H	202D268X0050B6	530	O	202D537X0100A4	530	O	202D537X0100A4
9000	F	202D908X0010B4	820	M	202D827X0030A3	2900	J	202D298X0050B7	600	C	202D607X0100C3	600	C	202D607X0100C3
10000	G	202D109X0010B5	1100	L	202D118X0030A2	60 WVDC @ 85°C, 40 V @ 125°C			680	D	202D687X0100B2	680	D	202D687X0100B2
12000	H	202D129X0010B6	1200	O	202D128X0030A4	560	A	202D567X0060D3	700	P	202D707X0100A5	700	P	202D707X0100A5
14000	J	202D149X0010B7	1200	A	202D128X0030D3	840	B	202D847X0060B1	850	E	202D857X0100B3	850	E	202D857X0100B3
15 WVDC @ 85°C, 10 V @ 125°C			1300	P	202D138X0030A5	980	C	202D987X0060C3	1000	F	202D108X0100B4	1000	F	202D108X0100B4
960	K	202D967X0015A1	1400	M	202D148X0030A3	1100	D	202D118X0060B2	1200	G	202D128X0100B5	1200	G	202D128X0100B5
1200	H	202D128X0015A2	1600	O	202D168X0030A4	1400	H	202D148X0100B6	1400	H	202D148X0100B6	1400	H	202D148X0100B6
1400	M	202D148X0015A3	1800	B	202D188X0030B1	1500	J	202D158X0100B7	1500	J	202D158X0100B7	1500	J	202D158X0100B7
1400	N	202D148X0015A1	2100	C	202D218X0030C3	110 WVDC @ 85°C, 75 V @ 125°C			260	N	202D267X0100A1	140	N	202D147X0110A1
1900	L	202D198X0015A2	2200	P	202D228X0030A5	1400	E	202D148X0060B3	180	L	202D187X0110A2	180	L	202D187X0110A2
2100	O	202D218X0015A4	2400	D	202D248X0030B2	1700	F	202D178X0060B4	220	M	202D227X0110A3	220	M	202D227X0110A3
2200	A	202D228X0015D3	3000	E	202D308X0030B3	2000	G	202D208X0060B5	320	O	202D327X0110A4	320	O	202D327X0110A4

TYPE 500D MINIATURE METAL-CASE ALUMINUM 'LYTICS



- New design with industrial quality at moderate prices.
- All-welded construction — no pressure joints to cause open or intermittent circuits.
- Long shelf life, extremely low leakage current.
- High capacitance in ultra-small physical size.
- Furnished with outer plastic-film insulating sleeve. For supplementary epoxy end-seal, change last character in catalog number from 2 to 5 and add .089" to length. For bare case, change last character in catalog number from 2 to 0 and subtract .010" from diameter and .036" from length.

• For complete technical data, refer to latest issue of Engineering Bulletin 3149.

PERFORMANCE CHARACTERISTICS

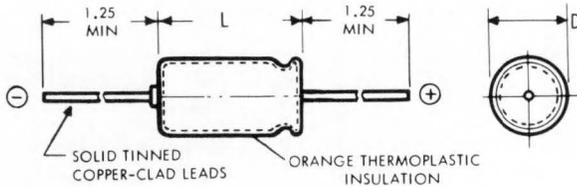
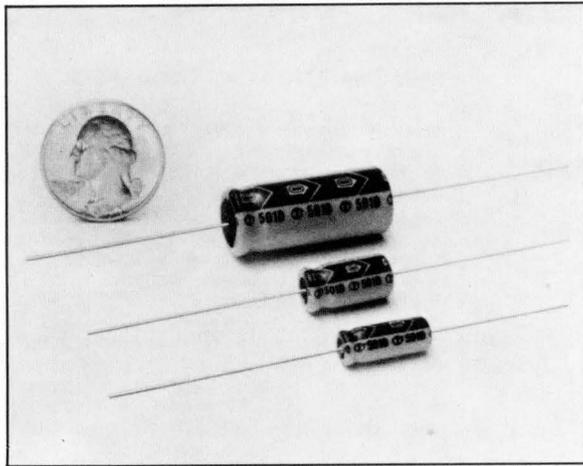
1. **Operating Temperature Range:** -40°C to +85°C for capacitors rated at 100 WVDC or less; -20°C to +85°C for capacitors rated above 100 WVDC.
2. **Capacitance Tolerance:** ±20%.
3. **Surge Voltage:** (At +25°C) Capacitors shall withstand the surge test voltage applied in series with a 1,000 ohm current-limiting resistor at the rate of ½ minute on, 4½ minutes off, for 1,000 successive test cycles.
4. **Equivalent Series Resistance:** (At +25°C) Max. value range: .105 to 199Ω at 120 Hz.
5. **Life Test:** Capacitors are capable of withstanding a 1000 hour life test at +85°C. After test, d-c leakage current shall meet initial requirement, and the product of capacitance in microfarads and the equivalent series resistance in ohms shall not exceed 150% of the initial requirement.

DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
BA	0.260	0.536	DH	0.385	1.536
BB	0.260	0.723	EF	0.448	1.286
CB	0.322	0.723	EH	0.448	1.536
CC	0.322	0.848	FH	0.500	1.536
DC	0.385	0.848	FK	0.500	1.797
DD	0.385	0.973	GH	0.635	1.536
DF	0.385	1.286	GK	0.635	1.797

μF	Size Code	Catalog Number												
0-6.3 WVDC, 8 VDC SURGE														
68	BA	500D686M6R3BA2	680	EF	500D687M025EF2	22	CC	500D226M080CC2	22	EF	500D226M200EF2			
150	BB	500D157M6R3BB2	1000	FH	500D108M025FH2	33	DC	500D336M080DC2	33	FK	500D336M200FK2			
680	DC	500D687M6R3DC2	1500	GH	500D158M025GH2	47	DC	500D476M080DC2	47	GH	500D476M200GH2			
1500	DH	500D158M6R3DH2	2200	GK	500D228M025GK2	68	DD	500D686M080DD2	68	GK	500D686M200GK2			
3300	FK	500D338M6R3FK2	0-35 WVDC, 40 VDC SURGE											
4700	GH	500D478M6R3GH2	15	BA	500D156M035BA2	15	EH	500D157M080EH2	0-250 WVDC, 300 VDC SURGE					
6800	GK	500D688M6R3GK2	330	CB	500D476M035CB2	470	EH	500D157M080EH2	1.5	CB	500D155M250CB2			
0-10 WVDC, 12 VDC SURGE														
47	BA	500D476M010BA2	470	EH	500D477M035EH2	220	FK	500D227M080FK2	2.2	CC	500D225M250CC2			
100	BB	500D107M010BB2	680	FK	500D687M035FK2	330	GH	500D337M080GH2	4.7	DC	500D475M250DC2			
220	CB	500D227M010CB2	1000	GH	500D108M035GH2	470	GK	500D477M080GK2	6.8	DD	500D685M250DD2			
330	CC	500D337M010CC2	1500	GK	500D158M035GK2	0-100 WVDC, 125 VDC SURGE								
470	DC	500D477M010DC2	0-50 WVDC, 65 VDC SURGE											
680	DD	500D687M010DD2	10	BA	500D106M050BA2	1.0	BA	500D105M100BA2	10	DF	500D106M250DF2			
1000	DF	500D108M010DF2	22	BB	500D226M050BB2	1.5	BA	500D155M100BA2	15	EF	500D156M250EF2			
1500	EH	500D158M010EH2	68	CC	500D686M050CC2	2.2	BA	500D225M100BA2	22	EH	500D226M250EH2			
2200	EH	500D228M010EH2	100	DC	500D107M050DC2	3.3	BA	500D335M100BA2	33	GH	500D336M250GH2			
3300	GH	500D338M010GH2	150	DD	500D157M050DD2	4.7	BB	500D475M100BB2	47	GK	500D476M250GK2			
4700	GK	500D478M010GK2	220	DF	500D227M050DF2	6.8	CB	500D685M100CB2	0-300 WVDC, 350 VDC SURGE					
0-16 WVDC, 20 VDC SURGE														
33	BA	500D336M016BA2	330	EF	500D337M050EF2	10	CB	500D106M100CB2	22	GH	500D226M300GH2			
68	BB	500D686M016BB2	470	FH	500D477M050FH2	15	CC	500D156M100CC2	0-350 WVDC, 400 VDC SURGE					
100	CB	500D107M016CB2	680	GH	500D687M050GH2	22	DC	500D226M100DC2	1.0	CB	500D105M350CB2			
150	CB	500D157M016CB2	1000	GK	500D108M050GK2	33	DD	500D336M100DD2	1.5	CC	500D155M350CC2			
220	CC	500D227M016CC2	0-63 WVDC, 75 VDC SURGE											
330	DC	500D337M016DC2	6.8	BA	500D685M063BA2	10	DF	500D476M100DF2	2.2	DC	500D225M350DC2			
470	DD	500D477M016DD2	15	BB	500D156M063BB2	15	DF	500D476M100DF2	3.3	DD	500D335M350DD2			
680	DF	500D687M016DF2	22	CB	500D226M063CB2	22	DC	500D226M100DC2	4.7	DF	500D475M350DF2			
1000	DH	500D108M016DH2	33	CB	500D336M063CB2	33	DD	500D336M100DD2	6.8	DH	500D685M350DH2			
1500	EH	500D158M016EH2	47	CC	500D476M063CC2	47	DC	500D476M100DC2	10	EH	500D106M350EH2			
2200	FK	500D228M016FK2	68	DC	500D686M063DC2	68	DH	500D686M100DH2	15	FK	500D156M350FK2			
3300	GK	500D338M016GK2	100	DD	500D107M063DD2	100	EH	500D107M100EH2	22	GK	500D226M350GK2			
0-25 WVDC, 35 VDC SURGE														
22	BA	500D226M025BA2	150	DF	500D157M063DF2	220	FK	500D227M100FK2	0-400 WVDC, 450 VDC SURGE					
33	BB	500D336M025BB2	220	DH	500D227M063DH2	330	GK	500D227M100GK2	1.5	DC	500D155M400DC2			
47	BB	500D476M025BB2	330	EH	500D337M063EH2	0-150 WVDC, 175 VDC SURGE								
68	CB	500D686M025CB2	470	FK	500D477M063FK2	1.0	BA	500D105M150BA2	1.5	DC	500D155M400DC2			
100	CC	500D107M025CC2	680	GK	500D687M063GK2	2.2	BB	500D225M150BB2	3.3	DH	500D335M400DH2			
150	DC	500D157M025DC2	0-80 WVDC, 100 VDC SURGE											
220	DC	500D227M025DC2	4.7	BA	500D475M080BA2	3.3	CB	500D335M150CB2	4.7	EF	500D475M400EF2			
330	DF	500D337M025DF2	6.8	BB	500D685M080BB2	6.8	CC	500D685M150CC2	6.8	EH	500D685M400EH2			
470	DF	500D477M025DF2	10	BB	500D106M080BB2	10	DD	500D106M150DD2	10	FK	500D106M400FK2			
0-200 WVDC, 250 VDC SURGE														
1.5	BB	500D155M200BB2	15	CB	500D156M080CB2	15	DD	500D156M150DD2	15	GK	500D156M400GK2			
2.2	CB	500D225M200CB2	0-450 WVDC, 500 VDC SURGE											
3.3	CC	500D335M200CC2	4.7	BA	500D475M450BA2	1.0	DC	500D105M450DC2	1.5	DD	500D155M450DD2			
6.8	DC	500D685M200DC2	6.8	BB	500D685M450BB2	2.2	DF	500D225M450DF2	2.2	DF	500D225M450DF2			
10	DD	500D106M200DD2	10	CB	500D335M450CB2	3.3	EF	500D335M450EF2	3.3	EF	500D335M450EF2			
15	DF	500D156M200DF2	15	CC	500D685M450CC2	4.7	EH	500D475M450EH2	4.7	EH	500D475M450EH2			

TYPE 501D MINILYTIC[®] ALUMINUM ELECTROLYTICS



DIMENSIONS (in inches)*

Size Code	Diameter	Length	Lead Diam.
LL	0.236	0.472	0.024
LM	0.236	0.630	0.024
MM	0.315	0.630	0.024
MN	0.315	0.787	0.024
NP	0.394	0.827	0.024
NR	0.394	1.02	0.024
PR	0.512	1.02	0.024
PS	0.512	1.24	0.024
QS	0.630	1.24	0.031

- For entertainment and commercial applications requiring miniature tubular 'lytics with good operating life.
- Intended for use in coupling, decoupling, bypass, and filtering circuits in radios, automobile receivers, portable tape recorders, Hi-Fi equipment, commercial amplifiers, and similar equipment.
- Feature high CV product per case size, yet are moderate in cost.
- All terminal connections welded, eliminating 'open' or intermittent contacts encountered with pressure connections of conventional capacitors.
- Very low equivalent series resistance and leakage current.
- Supplied with outer thermoplastic sleeve over aluminum case.
- For complete technical data, refer to latest issue of Engineering Bulletin 3151.1.

PERFORMANCE CHARACTERISTICS

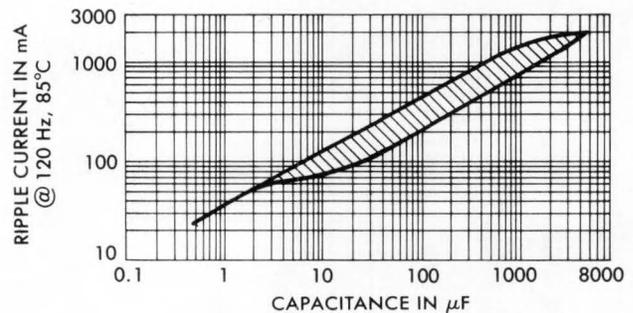
- Operating Temperature Range:** -40°C to +85°C.
- Capacitance Tolerance:** ±20%.
- Dissipation Factor:** Maximum @ 120 Hz, +25°C. For all size codes except QS... 6.3 WVDC, 22%; 10 WVDC, 19%; 16 WVDC, 16%; 25 WVDC, 14%; 35 WVDC, 12%; 50 WVDC, 10%; 63 WVDC, 9%. For size QS... 50 WVDC, 20%; 63 WVDC, 20%.
- Leakage Current:** Maximum is the greater of 4 μ A or the value calculated from the formula $I = 0.03 CV$. Where I is leakage current in μ A, is

rated voltage in volts, and C is rated capacitance in μ F.

5. **Life Test:** (At +85°C) Rated voltage shall be applied for 1000 hours. After test capacitors shall not have changed by more than +20% from original value. Dissipation factor shall not exceed 150% of initial requirement. The product of ESR in ohms and capacitance in microfarads shall not exceed 150% of initial requirement. Leakage current shall not exceed initial requirement.

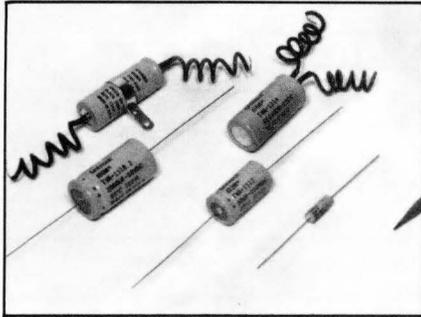
6. **Reverse Voltage:** Up to 1.0 volts may be applied without significant change in performance characteristics.

TYPICAL RIPPLE CURRENT LIMITS



μ F	Size Code	Catalog Number	μ F	Size Code	Catalog Number	μ F	Size Code	Catalog Number
0-6.3 WVDC, 8 V SURGE			100	MM	501D107M025MM	1000	QS	501D108M050QS
100	LL	501D107M6R3LL	150	MN	501D157M025MN	0-63 WVDC, 79 V SURGE		
0-10 WVDC, 13 V SURGE			220	MN	501D227M025MN	.47	LL	501D474M063LL
68	LL	501D686M010LL	330	NP	501D337M025NP	.68	LL	501D684M063LL
100	LM	501D107M010LM	470	NR	501D477M025NR	1.0	LL	501D105M063LL
0-16 WVDC, 20 V SURGE			1000	PR	501D108M025PR	1.5	LL	501D155M063LL
330	MM	501D337M010MM	0-35 WVDC, 44 V SURGE			2.2	LL	501D225M063LL
470	MN	501D477M010MN	22	LL	501D226M035LL	3.3	LL	501D335M063LL
0-25 WVDC, 32 V SURGE			33	LM	501D336M035LM	4.7	LL	501D475M063LL
680	NP	501D687M010NP	68	MM	501D686M035MM	6.8	LL	501D685M063LL
1000	NR	501D108M010NR	220	NP	501D227M035NP	10	LL	501D106M063LL
0-35 WVDC, 44 V SURGE			330	NR	501D337M035NR	15	LM	501D156M063LM
22	LL	501D226M035LL	680	PR	501D687M035PR	22	MM	501D226M063MM
33	LM	501D336M035LM	1000	PS	501D108M035PS	33	MM	501D336M063MM
0-50 WVDC, 63 V SURGE			0-50 WVDC, 63 V SURGE			47	MM	501D476M063MM
68	MM	501D686M035MM	15	LL	501D156M050LL	68	MN	501D686M063MN
220	NP	501D227M035NP	22	LM	501D226M050LM	100	NP	501D107M063NP
330	MN	501D337M016MN	100	MN	501D107M050MN	150	NR	501D157M063NR
470	NP	501D477M016NP	0-63 WVDC, 79 V SURGE			220	PR	501D227M063PR
680	NR	501D687M016NR	150	NP	501D157M050NP	330	PR	501D337M063PR
0-63 WVDC, 79 V SURGE			220	NR	501D227M050NR	470	PS	501D477M063PS
33	LL	501D336M025LL	470	PR	501D477M050PR	680	QS	501D687M063QS
47	LM	501D476M025LM						

TYPE TVA ATOM[®] ELECTROLYTICS



- Smallest dependable standard tubular capacitor.
- Ideal for application in TV sets, ac/dc sets, auto radios, home radio-phono combinations, or other electronic equipment servicing.
- Lower leakage currents, long shelf life.
- Capable of withstanding high temperatures, high ripple currents, and high surge voltages.
- Metal case construction with thermoplastic outer sleeve.
- Catalog numbers with TVAN prefix are non-polarized, and are ideal for speaker cross-over networks.
- Capacitors rated at 100 WVDC or less, operate at -40°C to $+85^{\circ}\text{C}$; above 100 WVDC ... -20°C to $+85^{\circ}\text{C}$.
- Units with diamond (\diamond) have mounting strap attached. Units with dagger (\dagger) are single-ended with 8-inch flexible leads.

BARE CAN DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
BA	.250	.500	HJ	.875	1.625
BB	.250	.687	HK	.875	1.875
CB	.312	.687	HL	.875	2.125
CC	.312	.812	JB	1.0	3.375
DC	.375	.812	JJ	1.0	1.625
DD	.375	.937	JK	1.0	1.875
DF	.375	1.250	JL	1.0	2.125
DH	.375	1.500	JN	1.0	2.375
EE	.500	1.125	JP	1.0	2.625
EF	.438	1.250	JR	1.0	2.875
EG	.500	1.375	JS	1.0	3.125
EH	.438	1.500	JU	1.0	3.625
EJ	.500	1.625	JW	1.0	3.875
FG	.625	1.375	KL	1.125	2.125
FH	.485	1.500	KN	1.125	2.375
FJ	.625	1.625	KP	1.125	2.625
FK	.485	1.750	KS	1.125	3.125
GE	.750	1.125	LP	1.250	2.625
GG	.750	1.375	LS	1.250	3.125
GH	.625	1.500	LT	1.250	3.625
GL	.750	2.125	MD	1.375	4.125
GK	.625	1.750	MN	1.375	2.375
GJ	.750	1.625	MS	1.375	3.125
HG	.875	1.375	MT	1.375	3.625

μF	WVDC	Size Code	Catalog Number	μF	WVDC	Size Code	Catalog Number	μF	WVDC	Size Code	Catalog Number	μF	WVDC	Size Code	Catalog Number
Single Units (Polarized)															
75	6	BA	TVA1100.5	4000	16	HL	TVA1175.4	3000	25	JL	TVA1214 \dagger	500	50	FH	TVA1315
150	6	BB	TVA1101.5	5000	16	JL	TVA1175.5	4000	25	KP	TVA1214.2	600	50	GH	TVA1315.2
200	6	CB	TVA1101.7	6000	16	KL	TVA1175.6	5000	25	KP	TVA1214.5	800	50	GH	TVA1315.4
250	6	CC	TVA1102	8000	16	KP	TVA1175.7	8000	25	LT	TVA1214.8	1000	50	GK	TVA1316
300	6	CB	TVA1102.1	10000	16	LP	TVA1175.8	10000	25	MT	TVA1214.10	1500	50	HL	TVA1318
400	6	DC	TVA1102.3	15000	16	LT	TVA1175.11	200	35	DF	TVA1223	2000	50	KL	TVA1318.2
500	6	DC	TVA1103	150	20	DC	TVA1180	500	35	EH	TVA1227	2500	50	KP	TVA1318.3
1000	6	DF	TVA1104	1500	20	GH	TVA1190	5500	35	JB	TVA1229	3000	50	LP	TVA1318.4
1500	6	DH	TVA1105	2300	20	GK	TVA1194	1	50	BA	TVA1300	4000	50	LS	TVA1318.5
2000	6	EF	TVA1106	8	25	BA	TVA1203.3	2	50	BA	TVA1301	5000	50	MS	TVA1318.7
4000	10	GH	TVA1129.4	10	25	BA	TVA1204	3	50	BA	TVA1302	8000	50	MD	TVA1318.10
5000	10	GK	TVA1129.5	15	25	BA	TVA1204.2	4	50	BA	TVA1302.7	250	60	EH	TVA1319
10000	10	JP	TVA1129.8	20	25	BA	TVA1204.5	5	50	BA	TVA1303	1	63	BA	TVA1319.10
290	12	DC	TVA1131.1	25	25	BA	TVA1205	6	50	BA	TVA1303.1	500	75	GK	TVA1319.5
3000	12	GK	TVA1135	30	25	BB	TVA1205.1	8	50	BA	TVA1303.2	1000	75	JN	TVA1319.7
20	16	BA	TVA1147	35	25	BB	TVA1205.2	10	50	BA	TVA1304	1500	75	JU	TVA1319.8 \dagger
25	16	BA	TVA1148	40	25	BB	TVA1205.7	15	50	BB	TVA1305	2000	75	MN	TVA1319.9
50	16	BB	TVA1150	50	25	BB	TVA1206	20	50	BB	TVA1305.5	4	100	BB	TVA1333
100	16	CB	TVA1160	75	25	CB	TVA1206.1	25	50	BB	TVA1306	6	100	CB	TVA1335
150	16	CB	TVA1160.3	100	25	CC	TVA1207	35	50	CB	TVA1306.2	10	100	CB	TVA1337
175	16	CC	TVA1160.4	150	25	DC	TVA1207.5	40	50	CC	TVA1306.5	15	100	CC	TVA1338
200	16	CC	TVA1160.6	200	25	DC	TVA1207.7	50	50	CC	TVA1308	20	100	DC	TVA1339
250	16	DC	TVA1161	250	25	DD	TVA1208	60	50	CC	TVA1309.3	25	100	DC	TVA1340
300	16	DC	TVA1161.1	300	25	DD	TVA1208.5	75	50	DC	TVA1309.4	30	100	DC	TVA1341
500	16	DD	TVA1162	350	25	DF	TVA1208.6	100	50	DC	TVA1310	50	100	DF	TVA1343
600	16	DF	TVA1162.2	400	25	DF	TVA1208.7	120	50	DD	TVA1310.1	60	100	DF	TVA1344
800	16	DF	TVA1162.3	450	25	DF	TVA1208.8	125	50	DD	TVA1310.2	75	100	DH	TVA1345
1000	16	DH	TVA1163	500	25	EF	TVA1209	150	50	DD	TVA1311	85	100	DH	TVA1345.2
1200	16	EH	TVA1164	600	25	EF	TVA1209.2	200	50	DF	TVA1311.5	100	100	EH	TVA1346
1500	16	EH	TVA1175.2	1000	25	FH	TVA1211	250	50	DH	TVA1312	150	100	FK	TVA1347
2000	16	FK	TVA1170	1500	25	GH	TVA1212	300	50	EF	TVA1312.1	200	100	GH	TVA1348
2500	16	GH	TVA1175.3	2000	25	GK	TVA1213	350	50	EH	TVA1312.2	250	100	GK	TVA1349
3000	16	GH	TVA1175	2500	25	JK	TVA1213.5	400	50	FH	TVA1313	300	100	JK	TVA1350

TYPE TVA ATOM[®] ELECTROLYTICS, continued

μF	WVDC	Size Code	Catalog Number	μF	WVDC	Size Code	Catalog Number	μF	WVDC	Size Code	Catalog Number	μF	WVDC	Size Code	Catalog Number
500	100	KL	TVA1376	150	200	JL	TVA1447+◇	12	350	FK	TVA1605	4	600	GE	TVA1960
1500	100	LT	TVA1382	200	200	JP	TVA1480+◇	15	350	FK	TVA1607	8	600	JR	TVA1962
2000	100	MD	TVA1384	500	200	LT	TVA1484	20	350	GK	TVA1608	10	600	JR	TVA1963
				2	250	CC	TVA1500.1					16	600	JW	TVA1965
1	150	BA	TVA1400					50	350	HL	TVA1612	20	600	JW	TVA1966
2	150	BB	TVA1400.1	3	250	DC	TVA1500.2	60	350	HL	TVA1613				
3	150	CB	TVA1400.2	4	250	DC	TVA1501	100	350	JP	TVA1620				
4	150	CC	TVA1402	6	250	DD	TVA1502.1	150	350	KP	TVA1622+				
5	150	CC	TVA1403	8	250	DF	TVA1503	160	350	KP	TVA1623				
6	150	CC	TVA1403.1	10	250	DF	TVA1504	200	350	LS	TVA1624+				
8	150	DC	TVA1405	12	250	EF	TVA1505	250	350	MT	TVA1627				
10	150	DC	TVA1406	20	250	EH	TVA1508	300	350	LT	TVA1628+				
15	150	DD	TVA1408	30	250	GH	TVA1510	6	400	EH	TVA1650				
16	150	DD	TVA1409	40	250	GK	TVA1511	30	400	HJ	TVA1658				
20	150	DF	TVA1410	50	250	HG	TVA1512	40	400	HK	TVA1659				
25	150	DF	TVA1411	60	250	HJ	TVA1513	200	400	LT	TVA1666				
30	150	EF	TVA1412	100	250	JK	TVA1522	1	450	DC	TVA1700				
35	150	EF	TVA1412.1	150	250	KL	TVA1525	2	450	DF	TVA1701				
40	150	EH	TVA1413	160	250	JL	TVA1526	3	450	EF	TVA1701.1				
50	150	EH	TVA1414	200	250	LP	TVA1528+	4	450	EH	TVA1702				
60	150	GH	TVA1415	225	250	JP	TVA1528.2	5	450	EH	TVA1703				
75	150	GH	TVA1416	250	250	LP	TVA1528.3	8	450	FK	TVA1704				
80	150	GK	TVA1418	300	250	LS	TVA1528.5	10	450	GK	TVA1705				
100	150	GK	TVA1420	400	250	LT	TVA1528.7	12	450	GK	TVA1706				
150	150	HL	TVA1422	450	250	MT	TVA1528.8	20	450	HJ	TVA1709				
200	150	JL	TVA1423	500	250	MT	TVA1528.9	25	450	HK	TVA1710				
250	150	KL	TVA1424+◇	600	250	MD	TVA1529	30	450	HK	TVA1711				
300	150	KP	TVA1425	1	300	CB	TVA1540	40	450	HL	TVA1712				
400	150	LP	TVA1426.1	5	300	DF	TVA1544	50	450	KL	TVA1713				
500	150	KN	TVA1428	10	300	EH	TVA1547	60	450	KL	TVA1714				
1000	150	MD	TVA1429	15	300	FK	TVA1549	80	450	JP	TVA1716				
1	200	BB	TVA1434	50	300	HK	TVA1570	100	450	LS	TVA1718				
2	200	CB	TVA1435	100	300	KL	TVA1573	120	450	KS	TVA1718.3				
3	200	CC	TVA1436	140	300	JS	TVA1575+◇	150	450	MT	TVA1719+				
4	200	DC	TVA1437	150	300	LP	TVA1576+◇	160	450	MT	TVA1719.2				
5	200	DC	TVA1438	200	300	LS	TVA1578+◇	200	450	MD	TVA1720+				
6	200	DC	TVA1439	300	300	MT	TVA1580	16	475	HJ	TVA1803.1				
8	200	DD	TVA1440	400	300	MD	TVA1582	1	500	EE	TVA1890				
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15	200	DF	TVA1442	2	350	DC	TVA1600	5	500	GE	TVA1901				
20	200	EF	TVA1442.1	3	350	DD	TVA1600.1	8	500	GJ	TVA1902				
25	200	EH	TVA1442.2	4	350	DF	TVA1601	10	500	GJ	TVA1903				
30	200	FK	TVA1442.3	5	350	DF	TVA1602.5	16	500	HL	TVA1905				
40	200	GH	TVA1442.5	6	350	DH	TVA1602.6	20	500	HL	TVA1906				
50	200	GH	TVA1443	8	350	EH	TVA1603	30	500	JJ	TVA1907				
100	200	HL	TVA1445	10	350	EH	TVA1604	40	500	JN	TVA1908				

Non-Polarized

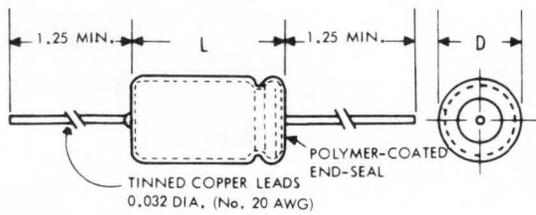
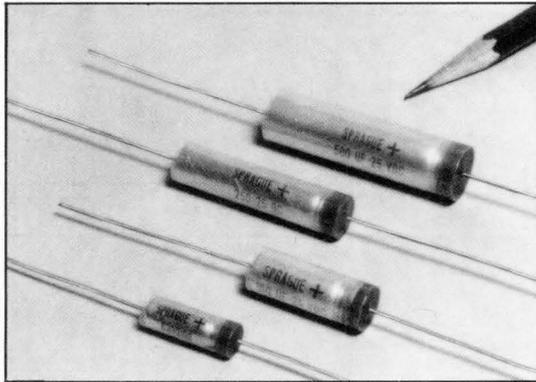
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60	50	DF	TVAN1309.2
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20	100	FJ	TVAN1335
40	100	GE	TVAN1340
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10	150	GG	TVAN1406.1
40	150	GL	TVAN1413.1
2	200	EG	TVAN1435.1
60	200	JP	TVAN1440
1	300	EG	TVAN1560
5	350	GJ	TVAN1602
10	350	JK	TVAN1604.1
10	400	HK	TVAN1650◇
20	400	JL	TVAN1652
10	450	JK	TVAN1705.1

Sprague is the foremost supplier of electronic components.

TYPE TE LITTL-LYTIC[®] ELECTROLYTICS, continued

μF	Size Code	Dist. Div. Cat. No.	Sprague O.E.M. Part No.	μF	Size Code	Dist. Div. Cat. No.	Sprague O.E.M. Part No.	μF	Size Code	Dist. Div. Cat. No.	Sprague O.E.M. Part No.
30		See 0-25 WVDC Listing		25	CB	TE1207	30D256G025CB2	100 WVDC			
35		See 0-25 WVDC Listing		30	CB	TE1207.5	30D306G025CB2	1	BA	TE1400	30D105F100BA2
50	CB	TE1160	30D506G016CB2	35	CB	TE1208	30D356G025CB2	2	BB	TE1401	30D205F100BB2
75	CC	TE1161	30D756G016CC2	50	CC	TE1209	30D506G025CC2	3	CB	TE1402	30D305F100CB2
90	CC	TE1161.7	30D906G016CC2	75	DC	TE1210	30D756G025DC2	4	CB	TE1403	30D405F100CB2
100	DC	TE1162	30D107G016DC2	100	DD	TE1211	30D107G025DD2	5	CC	TE1404	30D505F100CC2
130	DC	TE1162.5	30D137G016DC2	150	DF	TE1212	30D157G025DF2	6	CC	TE1405	30D605F100CC2
150	DD	TE1163	30D157G016DD2	200	DH	TE1213	30D207G025DH2	8	DC	TE1406	30D805F100DC2
180	DD	TE1163.7	30D187G016DD2	0-50 WVDC				10	DC	TE1407	30D106F100DC2
200	DF	TE1164	30D207G016DF2	1	BA	TE1300	30D105G050BA2	15	DD	TE1408	30D156F100DD2
250	DF	TE1164.5	30D257G016DF2	2	BA	TE1301	30D205G050BA2	20	DF	TE1409	30D206F100DF2
300	DH	TE1165.5	30D307G016DH2	3	BA	TE1302	30D305G050BA2	25	DH	TE1410	30D256F100DH2
350	DH	TE1166	30D357G016DH2	4	BA	TE1302.1	30D405G050BA2	30	DH	TE1411	30D306F100DH2
0-25 WVDC				5	BB	TE1303	30D505G050BB2	150 WVDC			
1		See 0-50 WVDC Listing		6	BB	TE1303.1	30D605G050BB2	1	BA	TE1500	30D105F150BA2
2		See 0-50 WVDC Listing		8	BB	TE1303.3	30D805G050BB2	2	BB	TE1501	30D205F150BB2
3		See 0-50 WVDC Listing		10	CB	TE1304	30D106G050CB2	3	CB	TE1502	30D305F150CB2
4		See 0-50 WVDC Listing		15	CB	TE1304.2	30D156G050CB2	4	CC	TE1503	30D405F150CC2
5	BA	TE1202	30D505G025BA2	20	CC	TE1305	30D206G050CC2	5	CC	TE1504	30D505F150CC2
6	BA	TE1203	30D605G025BA2	25	CC	TE1305.5	30D256G050CC2	6	DC	TE1505	30D605F150DC2
8	BA	TE1203.5	30D805G025BA2	35	CC	TE1306	30D356G050CC2	7	DC	TE1505.5	30D705F150DC2
10	BB	TE1204	30D106G025BB2	50	DD	TE1307	30D506G050DD2	8	DC	TE1506	30D805F150DC2
15	BB	TE1205	30D156G025BB2	75	DF	TE1308	30D756G050DF2	10	DD	TE1507	30D106F150DD2
20	CB	TE1206	30D206G025CB2	100	DH	TE1309	30D107G050DH2	15	DF	TE1508.1	30D156F150DF2
								20	DH	TE1509	30D206F150DH2

TYPE 630D EXTRALYTIC[®] ALUMINUM ELECTROLYTICS



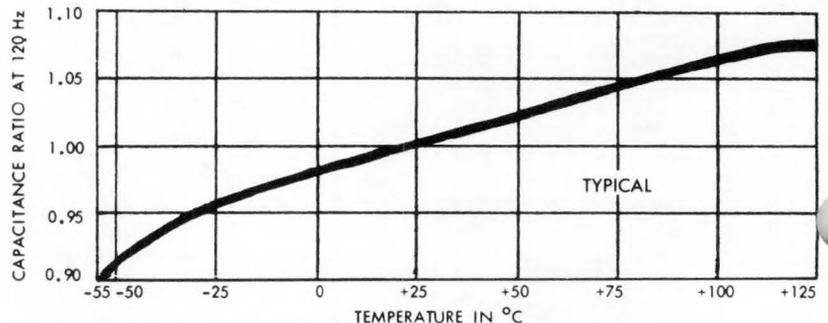
μF	WVDC	DIMENSIONS (in inches)*		Catalog Number
		D. x L.		
10	25	.270	.812	630D100
25	25	.332	.812	630D101
50	25	.332	.937	630D102
100	25	.395	1.062	630D103
250	25	.395	1.625	630D104
500	25	.505	1.875	630D105

- Designed for use in critical long-interval timing circuits.
- Exceptionally high capacitance stability.
- Excellent shelf and life characteristics.
- All terminal connections welded, eliminating possibility of "open" or intermittent contacts encountered in pressure connections.
- Outer plastic-film insulation and polymer-coated end seals eliminate possible problems with solvent-cleaning.
- For complete technical data, refer to latest issue of Engineering Bulletin 3454.

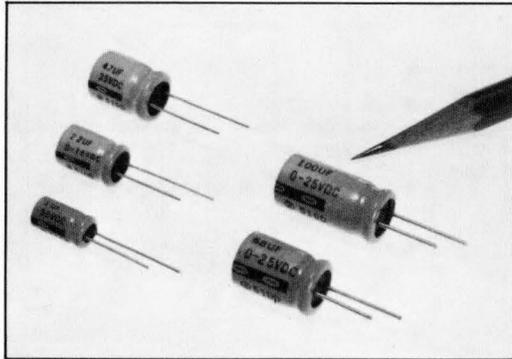
PERFORMANCE CHARACTERISTICS

- Operating Range:** -55°C to $+125^{\circ}\text{C}$.
- Capacitance Tolerance:** $\pm 10\%$.
- Leakage Current:** Max. d-c leakage current at 25°C is: for 10 μF capacitors ... 1 μA ; 25 μF capacitors ... 1.2 μA ; 50 μF ... 1.5 μA ; 100 μF ... 2 μA ; 250 μF ... 3 μA ; 500 μF ... 5 μA .
- Equivalent Series Resistance:** 3 to 13.3 max. ohms @ 120 Hz and $+25^{\circ}\text{C}$.
- Life Test:** Capacitors are capable of withstanding a 2000 hour life test at rated voltage and $+85^{\circ}\text{C}$. After test, capacitance value shall not have changed by more than $\pm 20\%$, the equivalent series resistance shall not exceed 150% of initial requirement, and the leakage current shall not have exceeded initial requirement.
- Shelf Test:** After storage for 500 hours at $+85^{\circ}\text{C}$ with no voltage applied, the capacitance and equivalent series resistance shall meet initial requirements, and the d-c leakage current shall not exceed 300% of the initial requirements.

CAPACITANCE vs. TEMPERATURE



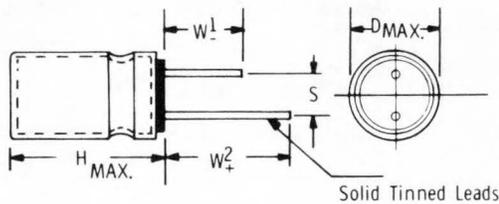
TYPE 510D PREMIUM-PERFORMANCE MINIATURE ALUMINUM ELECTROLYTICS



BEST REPLACEMENT CHOICE FOR SOLID TANTALUMS

- Broad operating temperature range, outstanding performance characteristics, excellent reliability, plus high volumetric efficiency approaching that of tantalums, makes Type 510D the best choice for replacing solid tantalums.
- For data processing, telecommunications, and other high-performance industrial and commercial applications requiring broad operating temperature range.
- Exceptionally low leakage current and low dissipation factor.
- Stable impedance characteristic over life and at elevated temperatures.
- Highest reliability of any Sprague miniature aluminum electrolytic.
- Low impedance levels at high frequencies make them especially well-suited for high-frequency applications.
- Thermoplastic insulating sleeve with polymer-coated end-seal.
- For complete technical data, refer to latest issue of Engineering Bulletin 3155.

PERFORMANCE CHARACTERISTICS



DIMENSIONS (in inches)*

Size Code	D	H	S	W ₁	W ₂ ⁺	LEAD AWG No.
AA	0.256	0.597	0.100	0.787	0.948	22
BB	0.335	0.638	0.138	0.787	0.948	22
CC	0.414	0.650	0.200	0.787	0.948	22
CD	0.414	0.784	0.200	0.562	0.688	22
CG	0.414	0.945	0.200	0.562	0.688	22

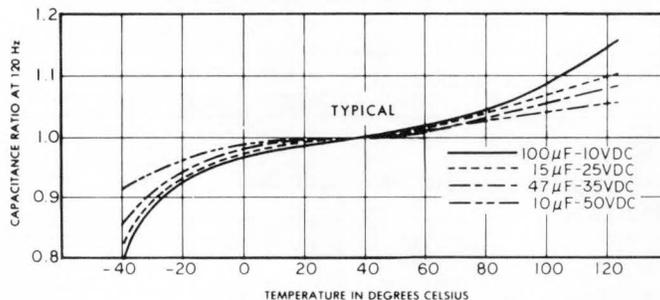
- Operating Temperature Range:** -40°C to +105°C.
- Capacitance Tolerance:** ±20%.
- Dissipation Factor:** (At 120 Hz, +25°C) 6 to 18% maximum, with typical values 50% of limits.
- Leakage Current:** (At +25°C) 1 to 5 μA maximum at full rated voltage.
- Impedance:** (At +25°C) Maximum at 20 kHz, 0.5 to 13.5Ω; at 100 kHz, 0.46 to 6.0Ω.
- Low Temperature Impedance:** (At -40°C, 120 Hz) Impedance shall not exceed +25°C value by a factor of 6 for 6.3 WVDC units; 4 for 10 WVDC; and 3 for 16-63 WVDC.
- Ripple Current:** (At +85°C) Maximum rms current limits at 120 Hz, 0.025 to 0.260 am-

peres; at 20-100 kHz, 0.060 to 0.325 amperes.

- Ripple Current and Temperature:** When operated at temperatures other than +85°C, permissible 120 Hz rms ripple current limits change by the multiplication factor... 0.4 for operation at +105°C; 0.8 @ +95°C; 1.0 @ +85°C; 1.2 @ +75°C; 1.3 @ +65°C or less.
- Ripple Current and Frequency:** When operated at frequencies other than 120 Hz, the +85°C rms ripple current limits change by the multiplication factor for...

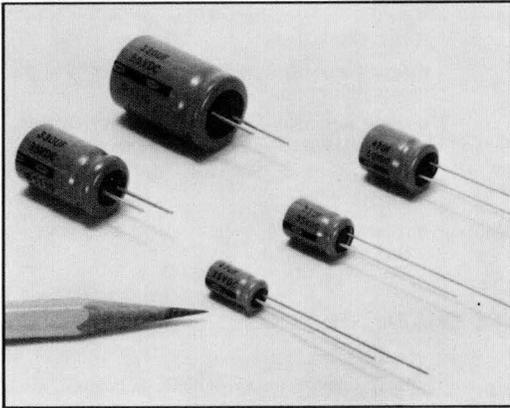
Frequency	0-25 WVDC	35-63 WVDC
60 Hz	.85	.80
400 Hz	1.04	1.30
1 to 19 kHz	1.08	1.40
- Life Test:** (At +105°C) After rated d-c voltage has been applied for 2000 hours, capacitance shall not have changed by more than 15% for units rated at 6.3 to 10 WVDC and 10% for 16-63 WVDC units. Dissipation factor shall not exceed 125% of initial specified limit. Leakage current shall meet initial requirement.
- Failure Rate:** When subjected to full rated voltage at +85°C, rate is equal to or better than 0.05% per 1000 hours at 60% confidence level.
- Operating Life:** Expectancy in excess of 10 years when used in typical circuit environments and operating conditions.

CAPACITANCE vs. TEMPERATURE



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6.3 WVDC, 9 VDC SURGE			16 WVDC, 20 VDC SURGE			35 WVDC, 45 VDC SURGE			10	See 63 Volt Listing.	
47	AA	510D476M6R3AA3D	22	AA	510D226M016AA3D	10	AA	510D106M035AA3D	15	BB	510D156M050BB3D
100	BB	510D107M6R3BB3D	47	BB	510D476M016BB3D	22	BB	510D226M035BB3D	22	CC	510D226M050CC3D
150	CC	510D157M6R3CC3D	68	CC	510D686M016CC3D	33	CC	510D336M035CC3D	63 WVDC, 80 VDC SURGE		
220	CD	510D227M6R3CD3F	100	CD	510D107M016CD3F	47	CC	510D476M035CC3D	1.0	AA	510D105M063AA3D
330	CG	510D337M6R3CG3F	150	CG	510D157M016CG3F	50 WVDC, 65 VDC SURGE			1.5	AA	510D155M063AA3D
10 WVDC, 15 VDC SURGE			25 WVDC, 35 VDC SURGE			1.0	See 63 Volt Listing.		2.2	AA	510D225M063AA3D
33	AA	510D336M010AA3D	15	AA	510D156M025AA3D	1.5	See 63 Volt Listing.		3.3	AA	510D335M063AA3D
68	BB	510D686M010BB3D	33	BB	510D336M025BB3D	2.2	See 63 Volt Listing.		4.7	AA	510D475M063AA3D
100	CC	510D107M010CC3D	68	CD	510D686M025CD3F	3.3	See 63 Volt Listing.		6.8	BB	510D685M063BB3D
150	CD	510D157M010CD3F	100	CG	510D107M025CG3F	4.7	See 63 Volt Listing.		10	BB	510D106M063BB3D
220	CG	510D227M010CG3F				6.8	AA	510D685M050AA3D	15	CC	510D156M063CC3D

TYPE 511D SINGLE-ENDED MINIATURE ALUMINUM ELECTROLYTICS

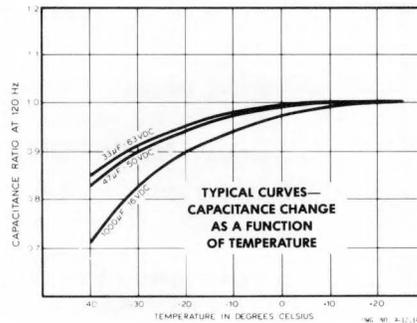


DIMENSIONS (in inches)*

Size Code	D	H	S	L ₁ -	L ₂ +	Lead AWG No.
AA	0.256	0.472	0.100	0.787	0.984	22
BB	0.335	0.512	0.138	0.787	0.984	22
CC	0.414	0.551	0.200	0.787	0.984	22
CD	0.414	0.669	0.200	0.437	0.563	22
CG	0.414	0.846	0.200	0.437	0.563	22
DG	0.512	0.846	0.200	0.354	0.437	22
DK	0.512	1.043	0.200	0.354	0.437	22
EK	0.650	1.043	0.300	0.354	0.437	20
EN	0.650	1.319	0.300	0.787	0.984	20
ER	0.650	1.476	0.300	0.787	0.984	20

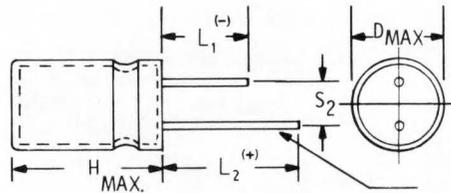
- High-efficiency type capacitors feature maximum capacitance for specific voltage ratings and size.
- ESR and d-c leakage current are very stable for long periods at temperatures as high as +105°C.
- Ideally suited for application in high-performance industrial and commercial data processing and telecommunications equipment.

- Very high volumetric efficiency.
- Typical impedance performance at high frequencies make them well-suited for high-frequency applications.
- Supplied with thermoplastic-film insulating sleeve.
- For complete technical data, refer to latest issue of Engineering Bulletin 3157.



PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -40°C to +105°C.
- Capacitance Tolerance:** ±20%.
- Leakage Current:** (At +25°C) Maximum is 0.005 CV microamperes for 6.3 through 63 VDC ratings, and 0.01 CV microamperes for 100 VDC rated units.
- Low Temperature Impedance:** (At -40°C, 120 Hz) Impedance shall not exceed +25°C value by a factor of 12 for 6.3 WVDC units; 10 for 10 WVDC; 8 for 16 WVDC; 6 for 25-35 WVDC; and 3 for 50-100 WVDC.
- Life Test:** (At +105°C) After rated d-c voltage has been applied for 1000 hours, capacitance shall not have changed by more than ±15% for units rated at 6.3 to 16 WVDC and ±10% for 25 to 100 WVDC units. ESR shall not exceed 120% of initial specified limit.

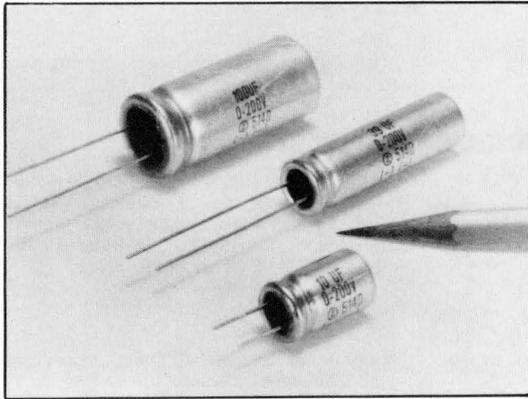


Solid Tinned Leads

DWG. NO. A-12,149

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6.3 VOLTS D-C, 8 VDC SURGE			16 VOLTS D-C, 20 VDC SURGE			35 VOLTS D-C, 44 VDC SURGE			100 VOLTS D-C, 125 VDC SURGE		
470	CC	511D477M6R3CC4D	47	AA	511D476M016AA4D	22	AA	511D226M035AA4D	22	BB	511D226M063BB4D
1000	CG	511D108M6R3CG4F	100	BB	511D107M016BB4D	47	BB	511D476M035BB4D	33	CC	511D336M063CC4D
2200	DK	511D228M6R3DK4W	220	CC	511D227M016CC4D	100	CG	511D107M063CG4F	47	CD	511D476M063CD4F
3300	EK	511D338M6R3EK4W	330	CD	511D337M016CD4F	220	CG	511D227M035CG4F	100	CG	511D107M063CG4F
4700	EN	511D478M6R3EN4D	470	CG	511D477M016CG4F	100	DG	511D337M035DG4W	220	EK	511D227M063EK4W
10 VOLTS D-C, 13 VDC SURGE			1000	DK	511D108M016DK4W	220	CG	511D227M035CG4F	330	EK	511D337M063EK4W
100	AA	511D107M010AA4D	2200	EK	511D228M016EK4W	330	DG	511D337M035DG4W	470	EN	511D477M063EN4D
220	BB	511D227M010BB4D	3300	ER	511D338M016ER4D	470	DK	511D477M035DK4W	100 VOLTS D-C, 125 VDC SURGE		
330	CC	511D337M010CC4D	25 VOLTS D-C, 32 VDC SURGE			1000	EN	511D108M035EN4D	4.7	AA	511D475M100AA4D
470	CD	511D477M010CD4F	33	AA	511D336M025AA4D	50 VOLTS D-C, 63 VDC SURGE			10	BB	511D106M100BB4D
1000	DG	511D108M010DG4W	220	CD	511D227M025CD4F	33	BB	511D336M050BB4D	22	CD	511D226M100CD4F
3300	EN	511D338M010EN4D	32 VOLTS D-C, 40 VDC SURGE			47	CC	511D476M050CC4D	33	CG	511D336M100CG4F
4700	ER	511D478M010ER4D	330	CG	511D337M025CG4F	220	DK	511D227M050DK4W	47	CG	511D476M100CG4F
			470	DG	511D477M025DG4W	63 VOLTS D-C, 70 VDC SURGE			100	EK	511D107M100EK4W
			1000	EK	511D108M025EK4W	10	AA	511D106M063AA4D	220	EN	511D227M100EN4D

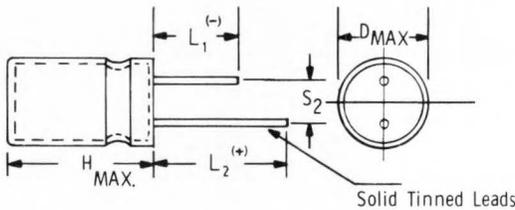
TYPE 514D HIGH-PERFORMANCE MINIATURE ALUMINUM ELECTROLYTICS



- Designed especially for ballast applications in new, energy-efficient lighting systems.
- Outstanding temperature and ripple current capability, and low ESR.
- Extremely stable capacitance and ESR versus time, at elevated temperature and operating frequency.
- Cost, size and weight advantage over larger filter capacitors currently in use.
- For complete technical data, refer to latest issue of Engineering Bulletin 3160.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -40°C to +130°C.
- Capacitance Tolerance:** ±20%.
- Leakage Current:** (At ±25°C) Maximum shall not exceed value calculated from following formula:
 $I = 0.03 CV + 20$
 Where, I = Leakage Current in microamperes
 V = Rated Voltage in volts
 C = Capacitance in microfarads
- Impedance:** (At -40°C, 120 Hz) Impedance shall increase no more than 4.5 times the original +25°C measured value.
- Ripple Current:** The sum of applied d-c voltage plus peak value of the impressed a-c voltage must not exceed rated d-c working voltage.
- Load Life:** 5000 hours at 130°C and rated d-c voltage.

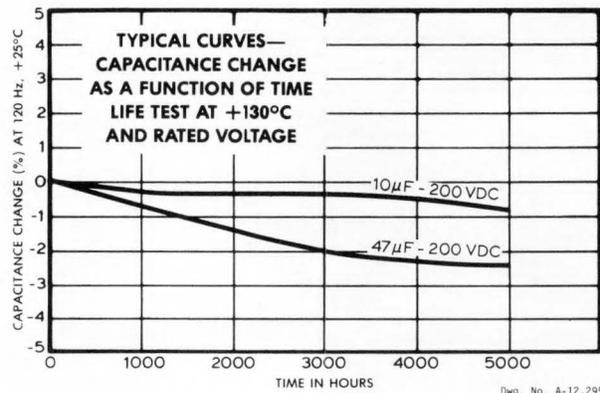


DIMENSIONS (in inches)*

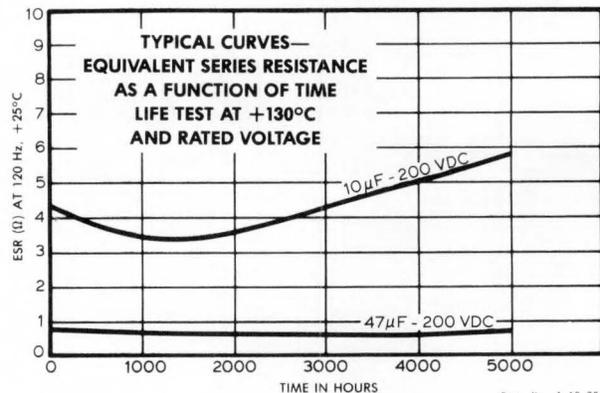
Size Code	D	H	S	L ₁	L ₂
DG	0.512	0.846	0.200	0.354	0.437
DK	0.512	1.043	0.200	0.354	0.437
DM	0.512	1.102	0.200	0.354	0.437
DS	0.512	1.732	0.200	0.787	0.984
EK	0.650	1.043	0.300	0.354	0.437
ET	0.650	1.358	0.300	0.787	0.984
EU	0.650	1.614	0.300	0.787	0.984
FR	0.728	1.476	0.300	0.787	0.984
FV	0.728	1.654	0.300	0.787	0.984

200 WVDC, 225 VDC SURGE

µF	Size Code	Catalog Number
10	DG	514D106M200DG2W
12	DG	514D126M200DG2W
18	DK	514D186M200DK2W
20	DM	514D206M200DM2W
30	EK	514D306M200EK2W
39	DS	514D396M200DS2D
47	ET	514D476M200ET2D
60	EU	514D606M200EU2D
80	FR	514D806M200FR2D
100	FV	514D107M200FV2D

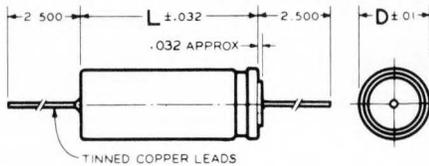
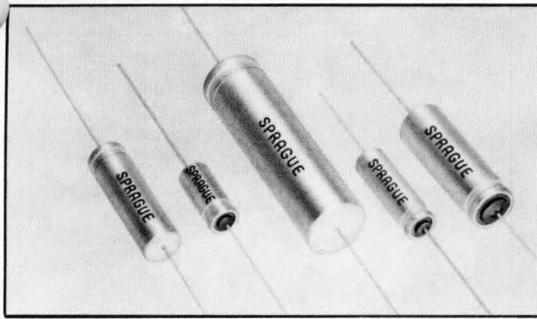


Dwg. No. A-12,295



Dwg. No. A-12,295

TYPE 39D POWERLYTIC® ELECTROLYTICS



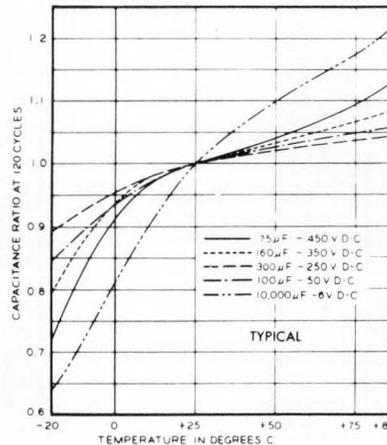
DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
EE	0.562	1.250	HE	0.937	1.250
EJ	0.562	1.750	HJ	0.937	1.750
EL	0.562	2.250	HL	0.937	2.250
FE	0.687	1.250	HP	0.937	2.750
FJ	0.687	1.750	HS	0.937	3.250
FL	0.687	2.250	JE	1.062	1.250
FP	0.687	2.750	JJ	1.062	1.750
GE	0.812	1.250	JL	1.062	2.250
GJ	0.812	1.750	JP	1.062	2.750
GL	0.812	2.250	JS	1.062	3.250
GP	0.812	2.750	JT	1.062	3.750

RECOMMENDED FOR REPLACEMENT APPLICATIONS

- Designed for applications requiring greatest possible capacitance in small physical case sizes.
- Supplement original Type 36D can-type capacitors, offering lower capacitance values in smaller sizes with axial leads.
- Welds at all critical anode and cathode terminals eliminate riveted or pressure connections to assure freedom from open circuits even when operated in the microvolt or millivolt signal range.
- Improved molded phenolic and seals.
- Pressure-sensitive safety vent.
- Service life of 10 yrs. or more in normal circuit applications.
- Capacitors listed have outer plastic-film insulation. For bare case, change last character of catalog number from 4 to 0, and subtract .062" from diameter and .125" from length.
- For complete technical data, see latest issue of Engineering Bulletin 3415.

CAPACITANCE vs. TEMPERATURE



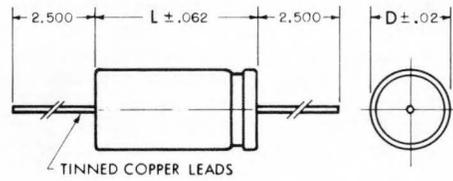
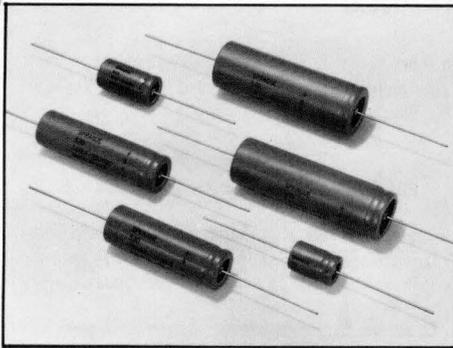
PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -20°C to +85°C.
2. **Capacitance Tolerance:** 3 to 75 WVDC capacitors ... +75, -10%; 100 to 450 WVDC capacitors ... +50, -10%.
3. **Dissipation Factor:** (At 25°C) 3 and 6 WVDC capacitors, 230%; 10 and 15 WVDC capacitors, 150%; 25 and 30 WVDC capacitors, 60%; 40 and 50 WVDC capacitors, 45%; 75 and 100 WVDC capacitors, 30%; 150 to 450 WVDC capacitors, 18%.
4. **Ripple Current:** 20 to 3140 max. amperes RMS (α 120 Hz and 85°C, depending upon capacitance).
5. **Life Test:** Satisfactory operation for 500 hours at rated d-c voltage, applied in an oven circulating air, at a temperature of 85°C.

µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number
3 WVDC, 4 VDC SURGE			4000	GP	39D408G006GP4	1200	FL	39D128G015FL4
400	EE	39D407G003EE4	4200	JJ	39D428G006JJ4	1300	GJ	39D138G015GJ4
900	EJ	39D907G003EJ4	6000	HP	39D608G006HP4	1600	FP	39D168G015FP4
1300	EL	39D138G003EL4	6300	JL	39D638G006JL4	1900	GL	39D198G015GL4
1400	GE	39D148G003GE4	7500	HS	39D758G006HS4	2500	GP	39D258G015GP4
1800	FJ	39D188G003FJ4	8500	JP	39D858G006JP4	2600	JJ	39D268G015JJ4
2100	HE	39D218G003HE4	10000	JS	39D109G006JS4	3800	HP	39D388G015HP4
2700	FL	39D278G003FL4	12000	JT	39D129G006JT4	4000	JL	39D408G015JL4
2900	GJ	39D298G003GJ4	10 WVDC, 12 VDC SURGE			4700	HS	39D478G015HS4
3000	JE	39D308G003JE4	250	EE	39D257G010EE4	5300	JP	39D538G015JP4
3600	FP	39D368G003FP4	500	EJ	39D507G010EJ4	6600	JS	39D668G015JS4
4200	HJ	39D428G003HJ4	800	EL	39D807G010EL4	8000	JT	39D808G015JT4
4300	GL	39D438G003GL4	850	GE	39D857G010GE4	25 WVDC, 30 VDC SURGE		
5700	GP	39D578G003GP4	1000	FJ	39D108G010FJ4	100	EE	39D107G025EE4
6000	JJ	39D608G003JJ4	1200	HE	39D128G010HE4	200	EJ	39D207G025EJ4
8500	HP	39D858G003HP4	1600	FL	39D168G010FL4	350	EL	39D357G025EL4
9000	JL	39D908G003JL4	1700	GJ	39D178G010GJ4	450	FJ	39D457G025FJ4
10000	HS	39D109G003HS4	2100	FP	39D218G010FP4	500	HE	39D507G025HE4
12000	JP	39D129G003JP4	2500	GL	39D258G010GL4	700	FL	39D707G025FL4
15000	JS	39D159G003JS4	3400	GP	39D348G010GP4	750	GJ	39D757G025GJ4
18000	JT	39D189G003JT4	3500	JJ	39D358G010JJ4	800	JE	39D807G025JE4
6 WVDC, 8 VDC SURGE			5000	HP	39D508G010HP4	950	FP	39D957G025FP4
300	EE	39D307G006EE4	5200	JL	39D528G010JL4	1000	GL	39D108G025GL4
600	EJ	39D607G006EJ4	6300	HS	39D638G010HS4	1100	HJ	39D118G025HJ4
900	EL	39D907G006EL4	7100	JP	39D718G010JP4	1500	GP	39D158G025GP4
1000	GE	39D108G006GE4	8800	JS	39D888G010JS4	1600	JJ	39D168G025JJ4
1200	FJ	39D128G006FJ4	10000	JT	39D109G010JT4	1700	HL	39D178G025HL4
1500	HE	39D158G006HE4	15 WVDC, 18 VDC SURGE			2200	HP	39D228G025HP4
1900	FL	39D198G006FL4	200	EE	39D207G015EE4	2400	JL	39D248G025JL4
2000	GJ	39D208G006GJ4	400	EJ	39D407G015EJ4	2800	HS	39D288G025HS4
2100	JE	39D218G006JE4	600	EL	39D607G015EL4	3200	JP	39D328G025JP4
2500	FP	39D258G006FP4	800	FJ	39D807G015FJ4	4000	JS	39D408G025JS4
3000	GL	39D308G006GL4	950	HE	39D957G015HE4	4700	JT	39D478G025JT4

TYPE 53D POWERLYTIC® ALUMINUM ELECTROLYTICS

RECOMMENDED FOR NEW EQUIPMENT DESIGNS



- Designed as state-of-the-art replacement for Sprague Type 39D, providing high performance and maximum volumetric efficiency.
- Welds at all critical anode and cathode terminals eliminate riveted or pressure type connections to assure freedom from open circuits even under high stress conditions or when operated in the microvolt or millivolt signal range.
- Pressure-sensitive safety vent.
- Service life of 10 years or more in normal circuit applications.
- Capacitors listed have outer plastic-film insulation. For polymer coated end seals, change last character of catalog

- number from 6 to 7, and add .010'' to length.
- For complete technical data, see latest issue of Engineering Bulletin 3416.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -40°C to +85°C.
- Capacitance Tolerance:** 6.3 to 63 WVDC capacitors ... -10, +75%; 100 to 450 WVDC capacitors ... -10, +50%.
- Equivalent Series Resistance:** .016 to 19.76 ohms max. at 120 Hz and 25°C, dependent upon capacitance and voltage.
- Ripple Current:** .100 to 8.888 amperes RMS at 120 Hz and 85°C, dependent upon capacitance and voltage.
- Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.
- Life Test:** (At 85°C) Capacitors are capable of withstanding a 1000 hour life test at rated d-c working voltage. After life test, leakage current shall not exceed 3 mA at 25°C or 9 mA at 85°C, capacitance value shall be within ±15% of initial value, equivalent series resistance shall not exceed 150% of initial requirement.

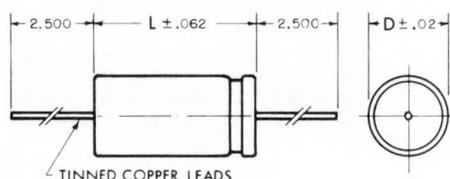
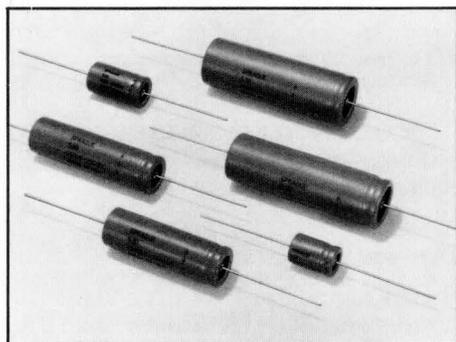
DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
GE	0.760	1.141	JS	1.010	3.141
GJ	0.760	1.641	JT	1.010	3.641
HJ	0.885	1.641	KT	1.135	3.641
HL	0.885	2.141	KD	1.135	4.141
JL	1.010	2.141	LD	1.260	4.141
JP	1.010	2.641	MD	1.385	4.141

µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number
6.3 WVDC, 8 VDC SURGE			25 WVDC, 35 VDC SURGE			63 WVDC, 80 VDC SURGE			350 WVDC, 400 VDC SURGE		
6800	GE	53D682G6R3GE6	1800	GE	53D182G025GE6	680	GE	53D681G063GE6	15	GE	53D150F350GE6
10000	GJ	53D103G6R3GJ6	3300	GJ	53D332G025GJ6	1200	GJ	53D122G063GJ6	33	GJ	53D330F350GJ6
15000	HJ	53D153G6R3HJ6	4700	HJ	53D472G025HJ6	1800	HJ	53D182G063HJ6	56	HJ	53D560F350HJ6
22000	HL	53D223G6R3HL6	6800	HL	53D682G025HL6	2200	HL	53D222G063HL6	82	HL	53D820F350HL6
33000	JL	53D333G6R3JL6	10000	JL	53D103G025JL6	3300	JL	53D332G063JL6	100	JL	53D101F350JL6
39000	JP	53D393G6R3JP6	12000	JP	53D123G025JP6	4700	JP	53D472G063JP6	150	JP	53D151F350JP6
47000	JS	53D473G6R3JS6	15000	JS	53D153G025JS6	5600	JS	53D562G063JS6	180	JS	53D181F350JS6
56000	JT	53D563G6R3JT6	18000	JT	53D183G025JT6	6800	JT	53D682G063JT6	220	JT	53D221F350JT6
68000	KT	53D683G6R3KT6	22000	KT	53D223G025KT6	8200	KT	53D822G063KT6	270	KT	53D271F350KT6
82000	KD	53D823G6R3KD6	27000	KD	53D273G025KD6	10000	KD	53D103G063KD6	330	KD	53D331F350KD6
100000	LD	53D104G6R3LD6	33000	LD	53D333G025LD6	12000	LD	53D123G063LD6	390	LD	53D391F350LD6
120000	MD	53D124G6R3MD6	39000	MD	53D393G025MD6	15000	MD	53D153G063MD6	470	MD	53D471F350MD6
7.5 WVDC, 9 VDC SURGE			35 WVDC, 45 VDC SURGE			100 WVDC, 135 VDC SURGE			400 WVDC, 450 VDC SURGE		
5600	GE	53D562G7R5GE6	1500	GE	53D152G035GE6	330	GE	53D331F100GE6	12	GE	53D120F400GE6
10000	GJ	53D103G7R5GJ6	2700	GJ	53D272G035GJ6	470	GJ	53D471F100GJ6	33	GJ	53D330F400GJ6
15000	HJ	53D153G7R5HJ6	3900	HJ	53D392G035HJ6	820	HJ	53D821F100HJ6	47	HJ	53D470F400HJ6
18000	HL	53D183G7R5HL6	5600	HL	53D562G035HL6	1000	HL	53D102F100HL6	68	HL	53D680F400HL6
27000	JL	53D273G7R5JL6	8200	JL	53D822G035JL6	1500	JL	53D152F100JL6	100	JL	53D101F400JL6
39000	JP	53D393G7R5JP6	10000	JP	53D103G035JP6	1800	JP	53D182F100JP6	120	JP	53D121F400JP6
47000	JS	53D473G7R5JS6	12000	JS	53D123G035JS6	2200	JS	53D222F100JS6	150	JS	53D151F400JS6
56000	JT	53D563G7R5JT6	15000	JT	53D153G035JT6	2700	JT	53D272F100JT6	180	JT	53D181F400JT6
68000	KT	53D683G7R5KT6	18000	KT	53D183G035KT6	3300	KT	53D332F100KT6	220	KT	53D221F400KT6
82000	KD	53D823G7R5KD6	22000	KD	53D223G035KD6	3900	KD	53D392F100KD6	270	KD	53D271F400KD6
100000	LD	53D104G7R5LD6	27000	LD	53D273G035LD6	4700	LD	53D472F100LD6	330	LD	53D331F400LD6
120000	MD	53D124G7R5MD6	33000	MD	53D333G035MD6	5600	MD	53D562F100MD6	390	MD	53D391F400MD6
10 WVDC, 12 VDC SURGE			50 WVDC, 70 VDC SURGE			200 WVDC, 250 VDC SURGE			450 WVDC, 525 VDC SURGE		
4700	GE	53D472G010GE6	1000	GE	53D102G050GE6	68	GE	53D680F200GE6	8.2	GE	53D82R2F450GE6
8200	GJ	53D822G010GJ6	1800	GJ	53D182G050GJ6	120	GJ	53D121F200GJ6	18	GJ	53D180F450GJ6
12000	HJ	53D123G010HJ6	2700	HJ	53D272G050HJ6	180	HJ	53D181F200HJ6	33	HJ	53D330F450HJ6
18000	HL	53D183G010HL6	3900	HL	53D392G050HL6	270	HL	53D271F200HL6	47	HL	53D470F450HL6
22000	JL	53D223G010JL6	4700	JL	53D472G050JL6	390	JL	53D391F200JL6	68	JL	53D680F450JL6
33000	JP	53D333G010JP6	6800	JP	53D682G050JP6	470	JP	53D471F200JP6	82	JP	53D820F450JP6
39000	JS	53D393G010JS6	8200	JS	53D822G050JS6	680	JS	53D681F200JS6	100	JS	53D101F450JS6
47000	JT	53D473G010JT6	10000	JT	53D103G050JT6	820	JT	53D821F200JT6	120	JT	53D121F450JT6
56000	KT	53D563G010KT6	12000	KT	53D123G050KT6	1000	KT	53D102F200KT6	150	KT	53D151F450KT6
68000	KD	53D683G010KD6	15000	KD	53D153G050KD6	1200	KD	53D122F200KD6	180	KD	53D181F450KD6
82000	LD	53D823G010LD6	18000	LD	53D183G050LD6	1500	LD	53D152F200LD6	220	LD	53D221F450LD6
100000	MD	53D104G010MD6	22000	MD	53D223G050MD6	1800	MD	53D182F200MD6	270	MD	53D271F450MD6
16 WVDC, 18 VDC SURGE			250 WVDC, 300 VDC SURGE			500 WVDC, 600 VDC SURGE			1000 WVDC, 1200 VDC SURGE		
3300	GE	53D332G016GE6	56	GE	53D560F250GE6	56	GE	53D560F250GE6	100	GE	53D101F250GE6
5600	GJ	53D562G016GJ6	100	GJ	53D101F250GJ6	100	GJ	53D101F250GJ6	120	GJ	53D121F250GJ6
8200	HJ	53D822G016HJ6	150	HJ	53D151F250HJ6	150	HJ	53D151F250HJ6	150	HJ	53D151F250HJ6
12000	HL	53D123G016HL6	220	HL	53D221F250HL6	220	HL	53D221F250HL6	180	KD	53D181F450KD6
18000	JL	53D183G016JL6	330	JL	53D331F250JL6	330	JL	53D331F250JL6	220	LD	53D221F450LD6
			390	JP	53D391F250JP6	390	JP	53D391F250JP6	270	MD	53D271F450MD6

TYPE 53D POWERLYTIC[®] ALUMINUM ELECTROLYTICS

ORIGINAL RATINGS



- Designed as state-of-the-art replacement for Sprague Type 39D, providing high performance and maximum volumetric efficiency.
- Welds at all critical anode and cathode terminals eliminate riveted or pressure type connections to assure freedom from open circuits even under high stress conditions or when operated in the microvolt or millivolt signal range.
- Pressure-sensitive safety vent.
- Service life of 10 years or more in normal circuit applications.
- Capacitors listed have outer plastic-film insulation. For polymer coated end seals, change last character of catalog

- number from 6 to 7, and add .010" to length.
- For complete technical data, see latest issue of Engineering Bulletin 3416.

PERFORMANCE CHARACTERISTICS

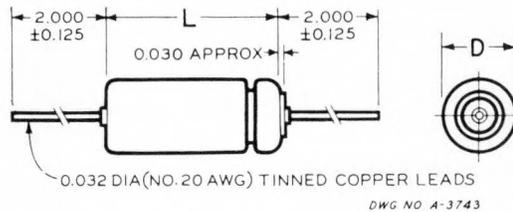
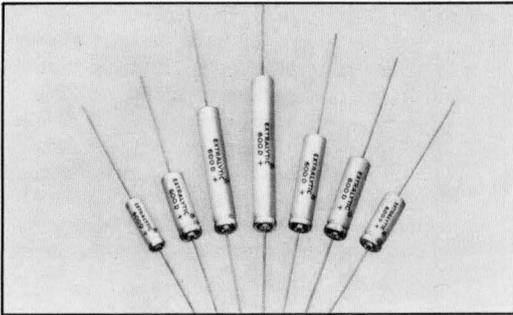
- Operating Temperature Range:** -40°C to +85°C.
- Capacitance Tolerance:** 6.3 to 63 WVDC capacitors ... -10, +75%; 100 to 450 WVDC capacitors ... -10, +50%.
- Equivalent Series Resistance:** .015 to 19.76 ohms max. at 120 Hz and 25°C, dependent upon capacitance and voltage.
- Ripple Current:** .100 to 8.888 amperes RMS at 120 Hz and 85°C, dependent upon capacitance and voltage.
- Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.
- Life Test:** (At 85°C) Capacitors are capable of withstanding a 1000 hour life test at rated d-c working voltage. After life test, leakage current shall not exceed 3 mA at 25°C or 9 mA at 85°C, capacitance value shall be within ±15% of initial value, equivalent series resistance shall not exceed 150% of initial requirement.

DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
GE	0.760	1.141	JS	1.010	3.141
GJ	0.760	1.641	JT	1.010	3.641
HJ	0.885	1.641	KT	1.135	3.641
HL	0.885	2.141	KD	1.135	4.141
JL	1.010	2.141	LD	1.260	4.141
JP	1.010	2.641	MD	1.385	4.141

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6.3 WVDC, 8 VDC SURGE			25 WVDC, 35 VDC SURGE			63 WVDC, 80 VDC SURGE			250 WVDC, 300 VDC SURGE		
4800	GE	53D482G6R3GE6	1400	GE	53D142G025GE6	7400	JT	53D742G050JT6	48	GE	53D480F250GE6
8700	GJ	53D872G6R3GJ6	2800	GJ	53D282G025GJ6	9400	KT	53D942G050KT6	93	GJ	53D930F250GJ6
13000	HJ	53D133G6R3HJ6	4300	HJ	53D432G025HJ6	10000	KD	53D103G050KD6	130	HJ	53D131F250HJ6
19000	HL	53D193G6R3HL6	6200	HL	53D622G025HL6	13000	LD	53D133G050LD6	200	HL	53D201F250HL6
26000	JL	53D263G6R3JL6	8400	JL	53D842G025JL6	16000	MD	53D163G050MD6	280	JL	53D281F250JL6
35000	JP	53D353G6R3JP6	11000	JP	53D113G025JP6	520	GE	53D521G063GE6	370	JP	53D371F250JP6
43000	JS	53D433G6R3JS6	13000	JS	53D133G025JS6	1000	GJ	53D102G063GJ6	460	JS	53D461F250JS6
51000	JT	53D513G6R3JT6	16000	JT	53D163G025JT6	1500	HJ	53D152G063HJ6	550	JT	53D551F250JT6
64000	KT	53D643G6R3KT6	20000	KT	53D203G025KT6	3000	JL	53D302G063JL6	690	KT	53D691F250KT6
75000	KD	53D753G6R3KD6	23000	KD	53D233G025KD6	4000	JP	53D402G063JP6	800	KD	53D801F250KD6
93000	LD	53D933G6R3LD6	29000	LD	53D293G025LD6	4900	JS	53D492G063JS6	990	LD	53D991F250LD6
110000	MD	53D114G6R3MD6	35000	MD	53D353G025MD6	5900	JT	53D592G063JT6	1100	MD	53D112F250MD6
7.5 WVDC, 9 VDC SURGE			35 WVDC, 45 VDC SURGE			100 WVDC, 135 VDC SURGE			350 WVDC, 400 VDC SURGE		
4300	GE	53D432G7R5GE6	1100	GE	53D112G035GE6	210	GE	53D211F100GE6	50	HJ	53D500F350HJ6
7700	GJ	53D772G7R5GJ6	2100	GJ	53D212G035GJ6	410	GJ	53D411F100GJ6	75	HL	53D750F350HL6
11000	HJ	53D113G7R5HJ6	3200	HJ	53D322G035HJ6	620	HJ	53D621F100HJ6	140	JP	53D141F350JP6
16000	HL	53D163G7R5HL6	4700	HL	53D472G035HL6	900	HL	53D901F100HL6	170	JS	53D171F350JS6
23000	JL	53D233G7R5JL6	6300	JL	53D632G035JL6	1200	JL	53D122F100JL6	210	JT	53D211F350JT6
31000	JP	53D313G7R5JP6	8300	JP	53D832G035JP6	1500	JP	53D152F100JP6	260	KT	53D261F350KT6
38000	JS	53D383G7R5JS6	10000	JS	53D103G035JS6	1900	JS	53D192F100JS6	310	KD	53D311F350KD6
45000	JT	53D453G7R5JT6	12000	JT	53D123G035JT6	2300	JT	53D232F100JT6	380	LD	53D381F350LD6
57000	KT	53D573G7R5KT6	15000	KT	53D153G035KT6	2900	KT	53D292F100KT6	460	MD	53D461F350MD6
65000	KD	53D653G7R5KD6	18000	KD	53D183G035KD6	3400	KD	53D342F100KD6	400 WVDC, 450 VDC SURGE		
83000	LD	53D833G7R5LD6	22000	LD	53D223G035LD6	4200	LD	53D422F100LD6	28	GJ	53D280F400GJ6
100000	MD	53D104G7R5MD6	27000	MD	53D273G035MD6	5100	MD	53D512F100MD6	63	HL	53D630F400HL6
10 WVDC, 12 VDC SURGE			50 WVDC, 70 VDC SURGE			200 WVDC, 250 VDC SURGE			450 WVDC, 525 VDC SURGE		
3700	GE	53D372G010GE6	660	GE	53D661G050GE6	60	GE	53D600F200GE6	28	HJ	53D280F450HJ6
6700	GJ	53D672G010GJ6	1300	GJ	53D132G050GJ6	110	GJ	53D111F200GJ6	42	HL	53D420F450HL6
10000	HJ	53D103G010HJ6	1900	HJ	53D192G050HJ6	170	HJ	53D171F200HJ6	57	JL	53D570F450JL6
14000	HL	53D143G010HL6	2800	HL	53D282G050HL6	240	HL	53D241F200HL6	77	JP	53D770F450JP6
20000	JL	53D203G010JL6	3800	JL	53D382G050JL6	350	JL	53D351F200JL6	96	JS	53D960F450JS6
27000	JP	53D273G010JP6	5000	JP	53D502G050JP6	460	JP	53D461F200JP6	110	JT	53D111F450JT6
33000	JS	53D333G010JS6	2800	HL	53D282G050HL6	570	JS	53D571F200JS6	140	KT	53D141F450KT6
39000	JT	53D393G010JT6	3800	JL	53D382G050JL6	670	JT	53D671F200JT6	170	KD	53D171F450KD6
50000	KT	53D503G010KT6	5000	JP	53D502G050JP6	850	KT	53D851F200KT6	210	LD	53D211F450LD6
58000	KD	53D583G010KD6	6200	JS	53D622G050JS6	990	KD	53D991F200KD6	250	MD	53D251F450MD6
72000	LD	53D723G010LD6				1200	LD	53D122F200LD6			
87000	MD	53D873G010MD6				1400	MD	53D142F200MD6			

TYPE 600D MIL-C-39018/01 (CU13) EXTRALYTIC[®] ALUMINUM ELECTROLYTICS



DIMENSIONS (in inches)*

Size Code	D	L
KD	0.296	1.000
DD	0.390	1.000
DE	0.390	1.187
DG	0.390	1.437
DJ	0.390	1.687
DL	0.390	2.249
DX	0.390	2.749

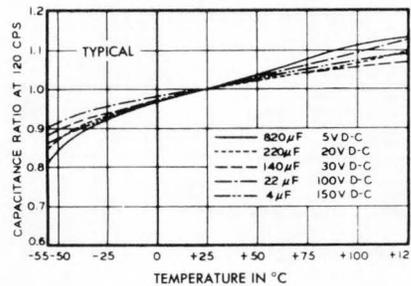
- Dual rating makes possible operation @ either 85°C or 125°C.
- Voltage ratings up to 250 Volts d-c.
- Improved oxide systems, etching techniques, and end seals; a new electrolyte makes the Type 600D equivalent to or better than comparable foil tantalum capacitors.
- Lower cost and one-third the weight of comparable foil tantalums.
- Capacitors listed have outer plastic-film insulation. For bare case, change the last character of catalog number from 4 to 0, and subtract 1/64" from diameter and 1/16" from the length.
- For complete technical data, refer to latest issue of Engineering Bulletin 3455.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +125°C.
- Capacitance Tolerance:** 7 to 60 WDC capacitors ... -10, +75%; 75 to 250 WDC capacitors ... -10, +50%.
- Surge Voltage:** The surge voltage of all capacitors shall not exceed those given below.

Rated V @ 125°C	Surge V @ 125°C	Surge V @ 85°C	Rated V @ 125°C	Surge V @ 125°C	Surge V @ 85°C
5	7	10	50	60	70
7	10	15	60	75	90
10	15	20	75	100	125
15	20	23	100	125	175
20	30	40	150	175	225
30	40	45	200	225	275
40	50	60			

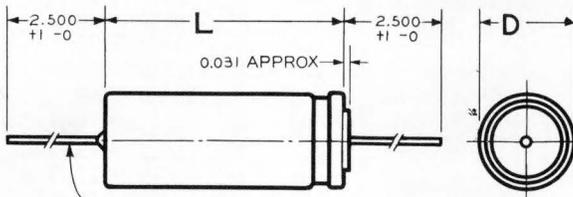
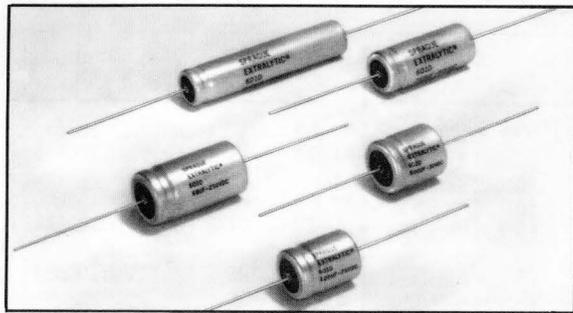
CAPACITANCE vs. TEMPERATURE



- Equivalent Series Resistance:** The product of rated capacitance (µF) and equivalent series resistance (Ω) @ 120 Hz for rated voltage @ 125°C equal to or less than 20 WDC shall not exceed 265, for 30 WDC and greater, 135.
- Ripple Current:** Typically not more than 1µA.
- Life Test:** Satisfactory operation for 2000 hours at rated d-c working voltage, applied in an oven with circulating air, at a temperature of 85°C.

µF	Size Code	Industrial Catalog No.	MIL Part No. M39018/01-	µF	Size Code	Industrial Catalog No.	MIL Part No. M39018/01-	µF	Size Code	Industrial Catalog No.	MIL Part No. M39018/01-	µF	Size Code	Industrial Catalog No.	MIL Part No. M39018/01-
7 WVDC @ 85°C, 5 WVDC @ 125°C				30 WVDC @ 85°C, 20 WVDC @ 125°C				75 WVDC @ 85°C, 60 WVDC @ 125°C				250 WVDC @ 85°C, 200 WVDC @ 125°C			
120	KD	600D127G007KD4	—	33	KD	600D336G030KD4	0722	12	KD	600D126F075KD4	0739	3.9	KD	—	0761
220	DD	600D227G007DD4	0701	47	KD	600D476G030KD4	0723	22	DD	600D226F075DD4	0740	4	KD	600D405F200KD4	—
270	DE	600D277G007DE4	0702	82	DD	600D826G030DD4	0724	33	DE	600D336F075DE4	0741	5.6	DD	—	0762
390	DG	600D397G007DG4	0703	100	DE	600D107G030DE4	0725	47	DG	600D476F075DG4	0742	6	DD	600D605F200DD4	—
560	DJ	600D567G007DJ4	0704	120	DG	600D127G030DG4	0726	68	DJ	600D686F075DJ4	0743	8	DE	600D805F200DE4	—
820	DL	600D827G007DL4	0705	150	DG	600D157G030DG4	0727	100	DL	600D107F075DL4	0744	8.2	DE	—	0763
1000	DX	600D108G007DX4	0706	220	DJ	600D227G030DJ4	0728	120	DX	600D127F075DX4	0745	12	DG	—	0764
10 WVDC @ 85°C, 7 WVDC @ 125°C				40 WVDC @ 85°C, 30 WVDC @ 125°C				100 WVDC @ 85°C, 75 WVDC @ 125°C				300 WVDC @ 85°C, 225 WVDC @ 125°C			
100	KD	600D107G010KD4	0707	30	KD	600D306G040KD4	—	8.2	KD	600D825F100KD4	0746	2.2	KD	—	0791
180	DD	600D187G010DD4	0708	50	DD	600D506G040DD4	—	12	DD	600D126F100DD4	0747	3.3	KD	600D335F250KD4	0768
220	DE	600D227G010DE4	0709	70	DE	600D706G040DE4	—	15	DE	600D156F100DE4	0748	5.6	DD	600D565F250DD4	0769
330	DG	600D337G010DG4	0710	100	DG	600D107G040DG4	—	22	DG	600D226F100DG4	0749	6.8	DE	600D685F250DE4	0770
470	DJ	600D477G010DJ4	0711	140	DJ	600D147G040DJ4	—	33	DJ	600D336F100DJ4	0750	10	DG	600D106F250DG3	0771
680	DL	600D687G010DL4	0712	210	DL	600D217G040DL4	—	47	DL	600D476F100DL4	0751	12	DJ	600D126F250DJ4	0772
820	DX	600D827G010DX4	0713	280	DX	600D287G040DX4	—	68	DX	600D686F100DX4	0752	22	DL	600D226F250DL4	0773
15 WVDC @ 85°C, 10 WVDC @ 125°C				50 WVDC @ 85°C, 40 WVDC @ 125°C				150 WVDC @ 85°C, 100 WVDC @ 125°C				300 WVDC @ 85°C, 225 WVDC @ 125°C			
68	KD	600D686G015KD4	0714	22	KD	600D226G050KD4	0731	4.7	KD	600D475F150KD4	0753	1.5	KD	—	0792
82	KD	600D826G015KD4	0715	33	DD	600D336G050DD4	0732	5.6	KD	600D565F150KD4	0754	2.2	KD	—	0775
150	DD	600D157G015DD4	0716	47	DE	600D476G050DE4	0733	8.2	DD	600D825F150DD4	0755	3.9	DD	—	0793
180	DE	600D187G015DE4	0717	56	DG	600D566G050DG4	0734	12	DE	600D126F150DE4	0756	4.7	DD	—	0776
270	DG	600D277G015DG4	0718	68	DG	600D686G050DG4	0735	18	DG	600D186F150DG4	0757	5.6	DE	—	0789
390	DJ	600D397G015DJ4	0719	100	DJ	600D107G050DJ4	0736	22	DJ	600D226F150DJ4	0758	8.2	DG	—	0778
560	DL	600D567G015DL4	0720	150	DL	600D157G050DL4	0737	33	DL	600D336F150DL4	0759	10	DJ	—	0779
680	DX	600D687G015DX4	0721	180	DX	600D187G050DX4	0738	56	DX	600D566F150DX4	0760	16	DL	—	0780
20 WVDC @ 85°C, 15 WVDC @ 125°C				60 WVDC @ 85°C, 50 WVDC @ 125°C				200 WVDC @ 85°C, 150 WVDC @ 125°C				300 WVDC @ 85°C, 225 WVDC @ 125°C			
68	KD	600D686G020KD4	—	17	KD	600D176G060KD4	—	3.3	KD	—	0790	18	DX	—	0781
100	DD	600D107G020DD4	—	25	DD	600D256G060DD4	—								
140	DE	600D147G020DE4	—	40	DE	600D406G060DE4	—								
220	DG	600D227G020DG4	—												
290	DJ	600D297G020DJ4	—												
440	DL	600D447G020DL4	—												

TYPE 601D EXTRALYTIC[®] ALUMINUM ELECTROLYTICS



TINNED COPPER LEADS
 NO. 20 AWG (0.032 DIA) 0.500 AND 0.625 DIA
 NO. 18 AWG (0.040 DIA) 0.750 DIA AND UP *DWG. NO. A-4092B*

DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
FE	0.687	1.250	HE	0.937	1.250
FJ	0.687	1.750	HJ	0.937	1.750
FL	0.687	2.250	HL	0.937	2.250
FP	0.687	2.750	HP	0.937	2.750
FS	0.687	3.250	HS	0.937	3.250
FT	0.687	3.750	HT	0.937	3.750
GE	0.812	1.250	JE	1.062	1.250
GJ	0.812	1.750	JJ	1.062	1.750
GL	0.812	2.250	JL	1.062	2.250
GP	0.812	2.750	JP	1.062	2.750
GS	0.812	3.250	JS	1.062	3.250
GT	0.812	3.750	JT	1.062	3.750

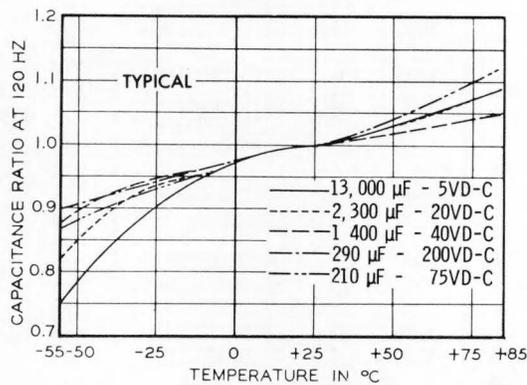
ORIGINAL RATINGS

- Supplement Type 600D with larger case sizes and higher capacitance values.
- Industrial version MIL-Style CU16 and CU17 capacitors.
- High-gain etched foil, improved oxide system provide long life with superior electrical characteristics.
- Superior performance characteristics equal those of more costly foil-tantalum capacitors.
- High volumetric efficiency, long shelf life, low leakage current.
- Capability to withstand higher ripple current than conventional aluminum electrolytic capacitors of similar size.
- Capacitance values exceed capacitance ranges of axial-lead foil-tantalum capacitors.
- Extended temperature range . . . will operate satisfactorily at low temperatures, unlike conventional aluminum electrolytic capacitors.
- Capacitors listed have outer insulation. For bare case, change 4 to 0 at end of catalog number and subtract .062" from diameter and .125" from length.
- Patented pressure-sensitive safety vent formed into wall of container.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C.
- Capacitance Tolerance:** 5 to 50 WVDC, +75, -10%; 75 to 200 WVDC, +50, -10%.
- Equivalent Series Resistance:** .1 to 8 ohms max. @ 120 Hz, depending upon capacitance and voltage rating.
- Ripple Current:** .013 to 4.10 max. amperes RMS @ 120 Hz and +85°C, depending upon capacitance.
- Life Test:** Satisfactory operations for 2000 hours at rated d-c voltage, applied in an oven with circulating air, at a temperature of 85°C.

CAPACITANCE vs. TEMPERATURE

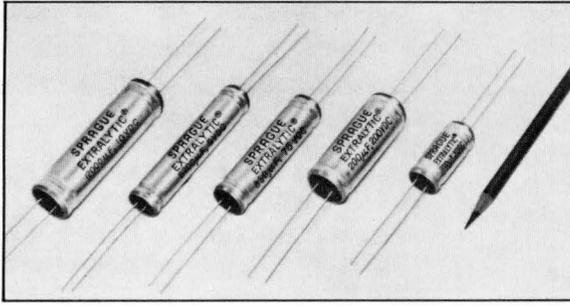


μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
5 WVDC, 7 VDC SURGE											
750	FE	601D757G005FE4	8300	JP	601D838G005JP4	4600	GS	601D468G7R5GS4	2500	GL	601D258G010GL4
1200	GE	601D128G005GE4	9600	HT	601D968G005HT4	5100	HP	601D518G7R5HP4	2900	FT	601D298G010FT4
1500	FJ	601D158G005FJ4	10000	JS	601D109G005JS4	5600	GT	601D568G7R5GT4	3000	GP	601D308G010GP4
1700	HE	601D178G005HE4	13000	JT	601D139G005JT4	6000	JL	601D608G7R5JL4	3300	JJ	601D338G010JJ4
2300	FL	601D238G005FL4	7.5 WVDC, 10 VDC SURGE			6600	HS	601D668G7R5HS4	3600	HL	601D368G010HL4
2400	GJ	601D248G005GJ4	650	FE	601D657G7R5FE4	7000	JP	601D708G7R5JP4	3800	GS	601D388G010GS4
2700	FP	601D278G005FP4	1000	GE	601D108G7R5GE4	8100	HT	601D818G7R5HT4	4200	HP	601D428G010HP4
3500	FS	601D358G005FS4	1300	FJ	601D138G7R5FJ4	9000	JS	601D908G7R5JS4	4700	GT	601D478G010GT4
3600	GL	601D368G005GL4	1400	HE	601D148G7R5HE4	11000	JT	601D119G7R5JT4	5000	JL	601D508G010JL4
4200	FT	601D428G005FT4	1900	FL	601D198G7R5FL4	10 WVDC, 15 VDC SURGE			5500	HS	601D558G010HS4
4300	GP	601D438G005GP4	2000	GJ	601D208G7R5GJ4	540	FE	601D547G010FE4	5800	JP	601D588G010JP4
4700	JJ	601D478G005JJ4	2200	FP	601D228G7R5FP4	850	GE	601D857G010GE4	6700	HT	601D678G010HT4
5200	HL	601D528G005HL4	2900	FS	601D298G7R5FS4	1000	FJ	601D108G010FJ4	7500	JS	601D758G010JS4
5500	GS	601D558G005GS4	3000	GL	601D308G7R5GL4	1200	HE	601D128G010HE4	9100	JT	601D918G010JT4
6100	HP	601D618G005HP4	3500	FT	601D358G7R5FT4	1600	FL	601D168G010FL4	15 WVDC, 20 VDC SURGE		
6700	GT	601D678G005GT4	3600	GP	601D368G7R5GP4	1700	GJ	601D178G010GJ4	400	FE	601D407G015FE4
7100	JL	601D718G005JL4	4000	JJ	601D408G7R5JJ4	1800	FP	601D188G010FP4	650	GE	601D657G015GE4
7900	HS	601D798G005HS4	4400	HL	601D448G7R5HL4	2400	FS	601D248G010FS4	800	FJ	601D807G015FJ4
									930	HE	601D937G015HE4

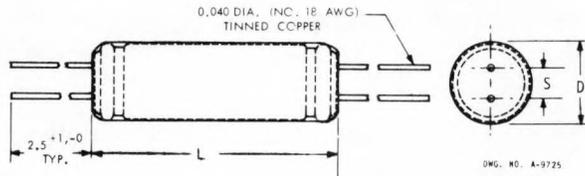
TYPE 601D EXTRALYTIC® ALUMINUM ELECTROLYTICS, continued

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
1200	FL	601D128G015FL4	2200	HS	601D228G025HS4	50 WVDC, 74 VDC SURGE			180	JJ	601D187F100JJ4
1300	GJ	601D138G015GJ4	2300	JP	601D238G025JP4	110	FE	601D117G050FE4	200	GS	601D207F100GS4
1400	FP	601D148G015FP4				170	GE	601D177G050GE4	230	HP	601D237F100HP4
1800	FS	601D188G015FS4	2700	HT	601D278G025HT4	220	FJ	601D227G050FJ4	250	GT	601D257F100GT4
			3000	JS	601D308G025JS4	250	HE	601D257G050HE4	280	JL	601D287F100JL4
1900	GL	601D198G015GL4	3700	JT	601D378G025JT4	330	FL	601D337G050FL4	300	HS	601D307F100HS4
2200	FT	601D228G015FT4	30 WVDC, 45 VDC SURGE			340	JE	601D347G050JE4	320	JP	601D327F100JP4
2500	JJ	601D258G015JJ4	190	FE	601D197G030FE4	350	GJ	601D357G050GJ4	370	HT	601D377F100HT4
2700	HL	601D278G015HL4	310	GE	601D317G030GE4	380	FP	601D387G050FP4	420	JS	601D427F100JS4
2900	GS	601D298G015GS4	390	FJ	601D397G030FJ4	500	FS	601D507G050FS4	500	JT	601D507F100JT4
3200	HP	601D328G015HP4	440	HE	601D447G030HE4	600	FT	601D607G050FT4	150 WVDC, 200 VDC SURGE		
3500	GT	601D358G015GT4	580	FL	601D587G030FL4	680	JJ	601D687G050JJ4	18	FE	601D186F150FE4
3800	JL	601D388G015JL4	600	JE	601D607G030JE4	750	HJ	601D757G050HJ4	30	GE	601D306F150GE4
4200	HS	601D428G015HS4	620	GJ	601D627G030GJ4	790	GS	601D797G050GS4	35	FJ	601D356F150FJ4
4400	JP	601D448G015JP4	680	FP	601D687G030FP4	870	HP	601D877G050HP4	45	HE	601D456F150HE4
5100	HT	601D518G015HT4	870	FS	601D877G030FS4	950	GT	601D957G050GT4	55	FL	601D556F150FL4
5700	JS	601D578G015JS4	880	HJ	601D887G030HJ4	1000	JL	601D108G050JL4	60	GJ	601D606F150GJ4
6900	JT	601D698G015JT4	930	GL	601D937G030GL4	1100	HS	601D118G050HS4	65	FP	601D656F150FP4
20 WVDC, 30 VDC SURGE			1000	FT	601D108G030FT4	1500	JS	601D158G050JS4	85	FS	601D856F150FS4
290	FE	601D297G020FE4	1200	JJ	601D128G030JJ4	1800	JT	601D188G050JT4	90	HJ	601D906F150HJ4
460	GE	601D467G020GE4	1400	GS	601D148G030GS4	75 WVDC, 100 VDC SURGE			95	GL	601D956F150GL4
580	FJ	601D587G020FJ4	1500	HP	601D158G030HP4	45	FE	601D456F075FE4	100	FT	601D107F150FT4
660	HE	601D667G020HE4	1700	GT	601D178G030GT4	75	GE	601D756F075GE4	130	JJ	601D137F150JJ4
900	GJ	601D907G020GJ4	1800	JL	601D188G030JL4	95	FJ	601D956F075FJ4	140	GS	601D147F150GS4
1000	FP	601D108G020FP4	2000	HS	601D208G030HS4	100	HE	601D107F075HE4	160	HP	601D167F150HP4
1300	FS	601D138G020FS4	2100	JP	601D218G030JP4	140	FL	601D147F075FL4	170	GT	601D177F150GT4
1600	FT	601D168G020FT4	2400	HT	601D248G030HT4	150	GJ	601D157F075GJ4	190	JL	601D197F150JL4
1800	JJ	601D188G020JJ4	2700	JS	601D278G030JS4	160	FP	601D167F075FP4	210	HS	601D217F150HS4
1900	HL	601D198G020HL4	3300	JT	601D338G030JT4	210	FS	601D217F075FS4	230	JP	601D237F150JP4
2000	GS	601D208G020GS4	40 WVDC, 60 VDC SURGE			220	GL	601D227F075GL4	260	HT	601D267F150HT4
2300	HP	601D238G020HP4	140	FE	601D147G040FE4	260	FT	601D267F075FT4	290	JS	601D297F150JS4
2500	GT	601D258G020GT4	220	GE	601D227G040GE4	290	JJ	601D297F075JJ4	360	JT	601D367F150JT4
2700	JL	601D278G020JL4	270	FJ	601D277G040FJ4	320	HL	601D327F075HL4	200 WVDC, 250 VDC SURGE		
2900	HS	601D298G020HS4	300	HE	601D307G040HE4	340	GS	601D347F075GS4	16	FE	601D166F200FE4
3100	JP	601D318G020JP4	400	FL	601D407G040FL4	380	HP	601D387F075HP4	25	GE	601D256F200GE4
3600	HT	601D368G020HT4	430	JE	601D437G040JE4	400	GT	601D407F075GT4	30	FJ	601D306F200FJ4
4000	JS	601D408G020JS4	440	GJ	601D447G040GJ4	440	JL	601D447F075JL4	35	HE	601D356F200HE4
4900	JT	601D498G020JT4	480	FP	601D487G040FP4	490	HS	601D497F075HS4	45	FL	601D456F200FL4
25 WVDC, 40 VDC SURGE			620	FS	601D627G040FS4	500	JP	601D507F075JP4	50	GJ	601D506F200GJ4
220	FE	601D227G025FE4	630	HJ	601D637G040HJ4	600	HT	601D607F075HT4	55	FP	601D556F200FP4
350	GE	601D357G025GE4	660	GL	601D667G040GL4	660	JS	601D667F075JS4	70	FS	601D706F200FS4
440	FJ	601D447G025FJ4	760	FT	601D767G040FT4	800	JT	601D807F075JT4	75	GL	601D756F200GL4
500	HE	601D507G025HE4	770	GP	601D777G040GP4	100 WVDC, 150 VDC SURGE			85	FT	601D856F200FT4
660	FL	601D667G025FL4	860	JJ	601D867G040JJ4	25	FE	601D256F100FE4	90	GP	601D906F200GP4
680	JE	601D687G025JE4	950	HL	601D957G040HL4	45	GE	601D456F100GE4	100	GS	601D107F200GS4
700	GJ	601D707G025GJ4	1000	GS	601D108G040GS4	55	FJ	601D556F100FJ4	110	HL	601D117F200HL4
770	FP	601D777G025FP4	1100	HP	601D118G040HP4	65	HE	601D656F100HE4	130	HP	601D137F200HP4
990	FS	601D997G025FS4	1200	GT	601D128G040GT4	80	FL	601D806F100FL4	140	GT	601D147F200GT4
1000	GL	601D108G025GL4	1400	HS	601D148G040HS4	90	GJ	601D906F100GJ4	160	JL	601D167F200JL4
1200	FT	601D128G025FT4	1500	JP	601D158G040JP4	95	FP	601D956F100FP4	170	HS	601D177F200HS4
1300	JJ	601D138G025JJ4	1700	HT	601D178G040HT4	120	FS	601D127F100FS4	180	JP	601D187F200JP4
1500	GS	601D158G025GS4	1900	JS	601D198G040JS4	130	GL	601D137F100GL4	210	HT	601D217F200HT4
1700	HP	601D178G025HP4	2300	JT	601D238G040JT4	150	FT	601D157F100FT4	240	JS	601D247F200JS4
1900	GT	601D198G025GT4							290	JT	601D297F200JT4
2000	JL	601D208G025JL4									

TYPE 604D FOUR-TERMINAL EXTRALYTIC® ALUMINUM 'LYTICS



- Premium grade, with true four-terminal construction, specifically designed for use in switching regulators and other high frequency applications.
- Low equivalent series resistance, low inductance, low impedance.
- Impedance limits at 10 kHz are as low as 17 mΩ.
- Guaranteed inductance limit of 2 nH, with typical values of less than 1 nH when used in the four-terminal mode.
- Outer plastic film insulation with polymer-coated end seals permits degreasing in halogenated solvents.
- For complete technical data, refer to latest issue of Engineering Bulletin 3458.

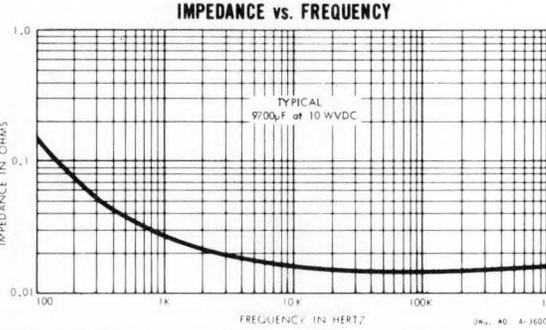


DIMENSIONS (in inches)*

Size Code	D	L	S	Size Code	D	L	S
GJ	0.812	1.843	0.250	HS	0.937	3.343	0.300
GL	0.812	2.343	0.250	HT	0.937	3.843	0.300
GP	0.812	2.843	0.250	JJ	1.062	1.843	0.400
GS	0.812	3.343	0.250	JL	1.062	2.343	0.400
GT	0.812	3.843	0.250	JP	1.062	2.843	0.400
HJ	0.937	1.843	0.300	JS	1.062	3.343	0.400
HL	0.937	2.343	0.300	JT	1.062	3.843	0.400
HP	0.937	2.843	0.300				

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +105°C.
- Impedance:** .042 to .780 max. ohms @ 10 kHz and 25°C.
- Capacitance Tolerance:** 5 through 50 WVDC capacitors... +50%, -10; 75 through 200 WVDC capacitors... +75%, -10.
- Inductance:** Shall not exceed 2 nH when measured at 1 MHz and within .125" of body of capacitor.

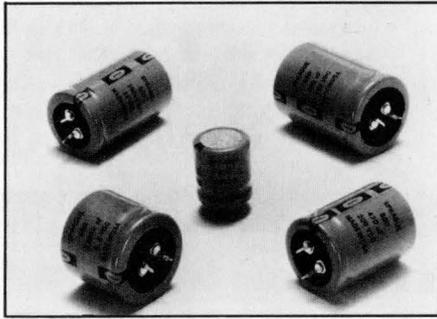


- Equivalent Series Resistance:** .022 to 2.6 max. ohms @ 25°C and 120 Hz, depending upon capacitance.
- Ripple Current:** .60 to 7.0 max. amperes RMS @ 10 kHz, 85°C, and 20A d-c.

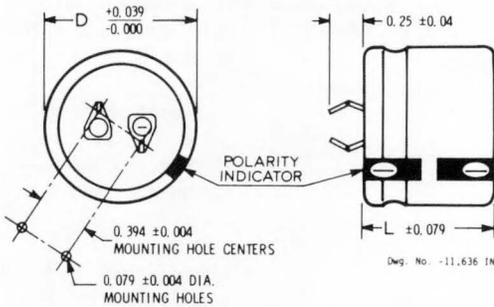
µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number
5 WVDC, 7 VDC SURGE											
2400	GJ	604D242G005GJ6	4800	HP	604D482G010HP6	1600	GP	604D162G025GP6	870	JL	604D871G050JL6
3300	GL	604D332G005GL6	5100	JL	604D512G010JL6	2000	HL	604D202G025HL6	1000	HP	604D102G050HP6
3700	HJ	604D372G005HJ6	6300	HS	604D632G010HS6	2500	JL	604D252G025JL6	1200	JP	604D122G050JP6
4400	GP	604D442G005GP6	7500	JP	604D752G010JP6	2800	HP	604D282G025HP6	1600	JS	604D162G050JS6
5000	HL	604D502G005HL6	9700	JS	604D972G010JS6	3600	JP	604D362G025JP6	2000	JT	604D202G050JT6
5700	GS	604D572G005GS6	12000	JT	604D123G010JT6	4700	JS	604D472G025JS6	75 WVDC, 100 VDC SURGE		
6200	HP	604D622G005HP6	16 WVDC, 20 VDC SURGE			5700	JT	604D572G025JT6	200	GJ	604D201F075GJ6
7200	JL	604D722G005JL6	1400	GJ	604D142G016GJ6	30 WVDC, 40 VDC SURGE			260	GL	604D261F075GL6
8800	HS	604D882G005HS6	1900	GL	604D192G016GL6	700	GJ	604D701G030GJ6	350	HJ	604D351F075HJ6
10000	JP	604D103G005JP6	2100	HJ	604D212G016HJ6	900	GL	604D901G030GL6	450	HL	604D451F075HL6
13000	JS	604D133G005JS6	2700	HL	604D272G016HL6	1300	GP	604D132G030GP6	570	JL	604D571F075JL6
16000	JT	604D163G005JT6	3400	GS	604D342G016GS6	1600	HL	604D162G030HL6	650	HP	604D651F075HP6
7.5 WVDC, 10 VDC SURGE			4200	JL	604D422G016JL6	2000	JL	604D202G030JL6	850	HS	604D851F075HS6
2000	GJ	604D202G7R5GJ6	5200	HS	604D522G016HS6	2200	HP	604D222G030HP6	1000	JS	604D102F075JS6
3000	HJ	604D302G7R5HJ6	6100	JP	604D612G016JP6	2800	JP	604D282G030JP6	1300	JT	604D132F075JT6
3800	GP	604D382G7R5GP6	6400	HT	604D642G016HT6	3000	HS	604D302G030HS6	100 WVDC, 125 VDC SURGE		
4400	HL	604D442G7R5HL6	8000	JS	604D802G016JS6	3600	JS	604D362G030JS6	130	GJ	604D131F100GJ6
4800	JJ	604D482G7R5JJ6	10000	JT	604D103G016JT6	4500	JT	604D452G030JT6	170	GL	604D171F100GL6
5000	GS	604D502G7R5GS6	20 WVDC, 25 VDC SURGE			40 WVDC, 50 VDC SURGE			230	HJ	604D231F100HJ6
5800	HP	604D582G7R5HP6	1200	GJ	604D122G020GJ6	550	GJ	604D551G040GJ6	300	HL	604D301F100HL6
6200	JL	604D622G7R5JL6	1800	HJ	604D182G020HJ6	700	GL	604D701G040GL6	380	JL	604D381F100JL6
7500	HS	604D752G7R5HS6	2200	GP	604D222G020GP6	900	HJ	604D901G040HJ6	430	HP	604D431F100HP6
9000	JP	604D902G7R5JP6	2400	HL	604D242G020HL6	1200	HL	604D122G040HL6	550	JP	604D551F100JP6
11000	JS	604D113G7R5JS6	2900	GS	604D292G020GS6	1500	JL	604D152G040JL6	700	JS	604D701F100JS6
14000	JT	604D143G7R5JT6	3400	HP	604D342G020HP6	1700	HP	604D172G040HP6	850	JT	604D851F100JT6
10 WVDC, 15 VDC SURGE			3700	JL	604D372G020JL6	2300	HS	604D232G040HS6	200 WVDC, 250 VDC SURGE		
1700	GJ	604D172G010GJ6	4500	HS	604D452G020HS6	2900	JS	604D292G040JS6	50	GL	604D500F200GJ6
2300	GL	604D232G010GL6	5300	JP	604D532G020JP6	3600	JT	604D362G040JT6	85	HJ	604D850F200HJ6
2600	HJ	604D262G010HJ6	7000	JS	604D702G020JS6	50 WVDC, 75 VDC SURGE			100	HL	604D101F200HL6
3000	GP	604D302G010GP6	8600	JT	604D862G020JT6	300	GJ	604D301G050GJ6	150	HP	604D151F200HP6
3600	HL	604D362G010HL6	25 WVDC, 30 VDC SURGE			400	GL	604D401G050GL6	200	JP	604D201F200JP6
4100	GS	604D412G010GS6	900	GJ	604D901G025GJ6	530	HJ	604D531G050HJ6	250	HT	604D251F200HT6
			1200	GL	604D122G025GL6	700	HL	604D701G050HL6	320	JT	604D321F200JT6

TYPE 80D SNAP-MOUNT ALUMINUM ELECTROLYTICS

RECOMMENDED FOR NEW EQUIPMENT DESIGN



DIMENSIONS (in inches)*



DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
HA	.87	1.00	KB	1.18	1.18
HB	.87	1.18	KC	1.18	1.38
HD	.87	1.57	KD	1.18	1.57
JA	1.00	1.00	KE	1.18	2.00
JB	1.00	1.18	MB	1.38	1.18
JC	1.00	1.38	MC	1.38	1.38
JD	1.00	1.57	MD	1.38	1.57
JE	1.00	2.00	ME	1.38	2.00
KA	1.18	1.00			

PERFORMANCE CHARACTERISTICS

- Snap-lock terminals provide secure locking into PC Boards for low-cost solder assembly.
- Ideally suited for use as input and output filter capacitors in switching power supplies and in other industrial and commercial applications.
- Excellent high frequency characteristics and parametric stability through 100 kHz.
- High volumetric efficiency, low equivalent series resistance, and high ripple current ratings.
- Metal-encased with thermoplastic outer insulating sleeve and polymer end seal.
- For complete technical data refer to latest issue of Engineering Bulletin 3156.

1. **Operating Temperature Range:** -40°C to +85°C.
2. **Capacitance Tolerance:** -10%, +30%.
3. **Equivalent Series Resistance:** 32 to 928 mΩ @ 120 Hz and +25°C, dependent upon capacitance.
4. **Ripple Current:** 600 to 3800 max. amperes RMS @ 120 Hz and +85°C, dependent upon capacitance.
5. **Life Test:** Capacitors are capable of withstanding a 1000 hour life test at rated voltage and +85°C. After test, capacitance shall not have changed by more than ±15%, equivalent series resistance shall not have increased by more than 150% of initial requirement, and leakage current shall meet initial requirement.
6. **Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.

*Available until present stocks are depleted.

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6.3 WVDC, 8 VDC SURGE			6800	HB	80D682P010HB5	16 WVDC, 20 VDC SURGE			22000	MC	80D223P016MC5
6800	HA	80D682P6R3HA5	6800	JA	80D682P010JA5★	3300	HA	80D332P016HA5★	27000	MD	80D273P016MD5
10000	HB	80D103P6R3HB5	8200	JA	80D822P010JA5	3900	HA	80D392P016HA5	33000	ME	80D333P016ME5
10000	JA	80D103P6R3JA5	10000	HD	80D103P010HD5★	4700	HB	80D472P016HB5★	25 WVDC, 30 VDC SURGE		
12000	JB	80D123P6R3JB5	10000	JB	80D103P010JB5	4700	JA	80D472P016JA5★	2200	HA	80D222P025HA5★
15000	HD	80D153P6R3HD5	10000	KA	80D103P010KA5★	5600	HB	80D562P016HB5	2700	HA	80D272P025HA5
15000	KA	80D153P6R3KA5	12000	HD	80D123P010HD5	5600	JA	80D562P016JA5	3300	HB	80D332P025HB5
18000	JC	80D183P6R3JC5	12000	JC	80D123P010JC5	6800	HD	80D682P016HD5★	3300	JA	80D332P025JA5★
22000	JD	80D223P6R3JD5	12000	KA	80D123P010KA5	6800	KA	80D682P016KA5★	3900	JA	80D392P025JA5
22000	KB	80D223P6R3KB5	15000	JD	80D153P010JD5	8200	HD	80D822P016HD5	4700	HD	80D472P025HD5★
27000	JE	80D273P6R3JE5	15000	KB	80D153P010KB5	8200	JB	80D822P016JB5	4700	JB	80D472P025JB5
27000	KC	80D273P6R3KC5	18000	JE	80D183P010JE5★	8200	KA	80D822P016KA5	4700	KA	80D472P025KA5★
27000	MB	80D273P6R3MB5	18000	KC	80D183P010KC5	10000	JC	80D103P016JC5	5600	HD	80D562P025HD5
33000	KD	80D333P6R3KD5	18000	KE	80D183P010KE5★	10000	JD	80D103P016JD5★	5600	JC	80D562P025JC5
33000	KE	80D333P6R3KE5★	22000	JE	80D223P010JE5	10000	KB	80D103P016KB5★	5600	KA	80D562P025KA5
39000	MC	80D393P6R3MC5	22000	KE	80D223P010KE5★	12000	JD	80D123P016JD5	6800	JD	80D682P025JD5★
47000	KE	80D473P6R3KE5	22000	MB	80D223P010MB5	12000	KB	80D123P016KB5	6800	KB	80D682P025KB5
47000	MD	80D473P6R3MD5	27000	KD	80D273P010KD5	15000	JE	80D153P016JE5	8200	JD	80D822P025JD5
56000	ME	80D563P6R3ME5	27000	MC	80D273P010MC5	15000	KC	80D153P016KC5	10000	JE	80D103P025JE5
10 WVDC, 12 VDC SURGE			33000	KE	80D333P010KE5	15000	MB	80D153P016MB5	10000	KC	80D103P025KC5
4700	HA	80D472P010HA5★	33000	MD	80D333P010MD5	18000	KD	80D183P016KD5	10000	MB	80D103P025MB5
5600	HA	80D562P010HA5	47000	ME	80D473P010ME5	22000	KE	80D223P016KE5	12000	KD	80D123P025KD5

TYPE 80D SNAP-MOUNT ALUMINUM ELECTROLYTICS, continued

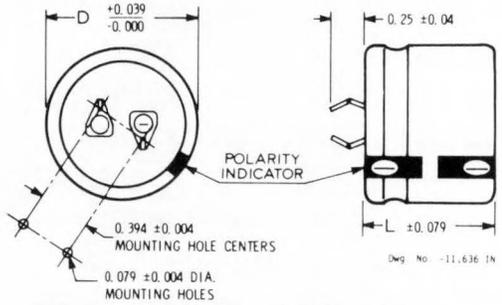
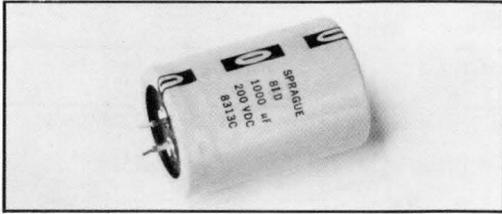
µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number
12000	MC	80D123P025MC5	3300	KB	80D332P050KB5	1000	KA	80D102P080KA5★	120	HB	80D121P200HB5
15000	KE	80D153P025KE5	3900	JE	80D392P050JE5	1200	JB	80D122P080JB5	150	JA	80D151P200JA5
15000	MD	80D153P025MD5	3900	KC	80D392P050KC5	1200	KA	80D122P080KA5	180	JB	80D181P200JB5
22000	ME	80D223P025ME5	4700	JE	80D472P050JE5★	1500	HD	80D152P080HD5	220	HD	80D221P200HD5
35 WVDC, 44 VDC SURGE			4700	KD	80D477P050KD5	1500	JC	80D152P080JC5	220	JC	80D221P200JC5
1800	HA	80D182P035HA5	4700	MB	80D472P050MB5	1800	JD	80D182P080JD5	220	KA	80D221P200KA5
2200	HB	80D222P035HB5★	5600	MC	80D562P050MC5	1800	KB	80D182P080KB5	270	JD	80D271P200JD5
2200	JA	80D222P035JA5★	6800	KE	80D682P050KE5	2200	JE	80D222P080JE5★	270	KB	80D271P200KB5
2700	HB	80D272P035HB5	6800	MD	80D682P050MD5	2200	KC	80D222P080KC5	330	KC	80D331P200KC5
2700	JA	80D272P035JA5	8200	ME	80D822P050ME5	2200	MB	80D222P080MB5★	390	JE	80D391P200JE5
3300	HD	80D332P035HD5★	63 WVDC, 79 VDC SURGE			2700	JE	80D272P080JE5	390	MB	80D391P200MB5
3300	KA	80D332P035KA5★	680	HA	80D681P063HA5★	2700	KD	80D272P080KD5	470	KD	80D471P200KD5
3900	HD	80D392P035HD5	820	HA	80D821P063HA5	2700	MB	80D272P080MB5	470	MB	80D471P200MB5
3900	JB	80D392P035JB5	1000	HB	80D102P063HB5★	3300	KE	80D332P080KE5★	560	KE	80D561P200KE5
3900	KA	80D392P035KA5	1000	JA	80D102P063JA5★	3300	MC	80D332P080MC5	560	MC	80D561P200MC5
4700	JC	80D472P035JC5	1200	HB	80D122P063HB5	3900	KE	80D392P080KE5	680	KD	80D681P200KD5
4700	JD	80D472P035JD5★	1200	JA	80D122P063JA5	3900	MD	80D392P080MD5	680	MD	80D681P200MD5
4700	KB	80D472P035KB5★	1500	HD	80D152P063HD5★	5600	ME	80D562P080ME5	820	ME	80D821P200ME5
5600	JD	80D562P035JD5	1500	JB	80D152P063JB5	100 WVDC, 125 VDC SURGE			1000	MD	80D102P200MD5
5600	KB	80D562P035KB5	1800	HD	80D182P063HD5	390	HA	80D391P100HA5	1000	ME	80D102P200ME5
6800	JE	80D682P035JE5	1800	JC	80D182P063JC5	470	HB	80D471P100HB5★	1200	ME	80D122P200ME5
6800	KC	80D682P035KC5	1800	KA	80D182P063KA5	560	HB	80D561P100HB5	250 WVDC, 300 VDC SURGE		
6800	MB	80D682P035MB5★	2200	JD	80D222P063JD5	560	JA	80D561P100JA5	82	HA	80D820P250HA5
8200	KD	80D822P035KD5	2200	KB	80D222P063KB5	680	HD	80D681P100HD5★	100	JA	80D101P250JA5
8200	MB	80D822P035MB5	2700	KC	80D272P063KC5	680	JB	80D681P100JB5	120	HB	80D121P250HB5
10000	KE	80D103P035KE5★	3300	JE	80D332P063JE5	820	HD	80D821P100HD5	150	JB	80D151P250JB5
10000	MC	80D103P035MC5	3300	MB	80D332P063MB5	820	JC	80D821P100JC5	150	KA	80D151P250KA5
12000	KE	80D123P035KE5	3900	KD	80D392P063KD5	820	KA	80D821P100KA5	180	HD	80D181P250HD5
12000	MD	80D123P035MD5	3900	MC	80D392P063MC5	1000	JD	80D102P100JD5★	180	JC	80D181P250JC5
15000	ME	80D153P035ME5	4700	KE	80D472P063KE5	1000	KB	80D102P100KB5	220	JD	80D221P250JD5
50 WVDC, 63 VDC SURGE			5600	MD	80D562P063MD5	1200	JD	80D122P100JD5	220	KB	80D221P250KB5
1000	HA	80D102P050HA5★	6800	ME	80D682P063ME5	1200	KC	80D122P100KC5	270	KC	80D271P250KC5
1200	HA	80D122P050HA5	80 WVDC, 100 VDC SURGE			1500	JE	80D152P100JE5	330	JE	80D331P250JE5
1500	HB	80D152P050HB5	470	HA	80D471P080HA5★	1500	MB	80D152P100MB5	330	KD	80D331P250KD5
1500	JA	80D152P050JA5	680	HA	80D681P080HA5	1800	KD	80D182P100KD5	330	MB	80D331P250MB5
2200	HD	80D222P050HD5	680	HB	80D681P080HB5★	1800	MC	80D182P100MC5	390	MC	80D391P250MC5
2200	JB	80D222P050JB5	680	JA	80D681P080JA5★	2200	KE	80D222P100KE5	470	KE	80D471P250KE5
2200	KA	80D222P050KA5	820	HB	80D821P080HB5	2200	MD	80D222P100MD5	470	MD	80D471P250MD5
2700	JC	80D272P050JC5	820	JA	80D821P080JA5	3300	ME	80D332P100ME5	680	ME	80D681P250ME5
3300	JD	80D332P050JD5	820	JD	80D821P080JD5	200 WVDC, 250 VDC SURGE			100	HA	80D101P200HA5
			1000	HD	80D102P080HD5★	100	HA	80D101P200HA5			

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*For conversion to millimetres, use basis of 1" = 25.4 mm

Sizes subject to change without notice.

TYPE 81D + 105°C SNAP-MOUNT ALUMINUM ELECTROLYTICS



- Ideally suited for use as input and output filter capacitors in switching power supplies and in other industrial and commercial applications.
- Snap-lock terminals provide secure locking in PC Boards for low-cost solder assembly.
- High volumetric efficiency, low equivalent series resistance, and high ripple current ratings.

- Metal-encased with thermoplastic outer insulating sleeve.
- For complete technical data refer to latest issue of Engineering Bulletin 3162.

DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
HA	.87	1.00	KB	1.18	1.18
HB	.87	1.18	KC	1.18	1.38
HD	.87	1.57	KD	1.18	1.57
JA	1.00	1.00	KE	1.18	2.00
JB	1.00	1.18	MB	1.38	1.18
JC	1.00	1.38	MC	1.38	1.38
JD	1.00	1.57	MD	1.38	1.57
JE	1.00	2.00	ME	1.38	2.00
KA	1.18	1.00			

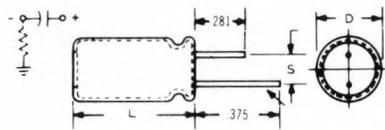
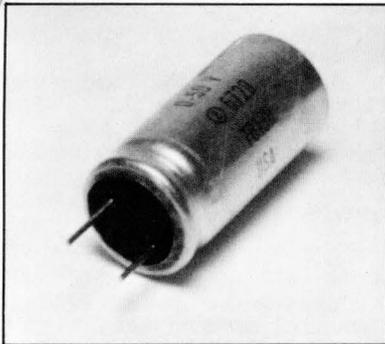
PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -40°C to +105°C.
2. **Capacitance Tolerance:** ± 20%.
3. **Equivalent Series Resistance:** (At 120 Hz and 25°C) 21 to 273 mΩ for 6.3 to 100 WVDC units.
4. **Ripple Current:** 1.19 to 11.8 max. amperes RMS @ 120 Hz and +85°C, dependent upon capacitance.
5. **Life Test:** Capacitors are capable of withstanding a 2000 hour life test at rated voltage and +105°C. After test, capacitance shall not have changed by more than ± 15%, equivalent series resistance shall not have increased by more than 150% of initial requirement, and leakage current shall meet initial requirement.
6. **Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.

µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number			
6.3 WVDC, 8 VDC SURGE														
6800	HA	81D682M6R3HA2	22000	KE	81D223M016KE2	3900	KC	81D392M050KC2	820	KA	81D821M100KA2			
10000	HB	81D103M6R3HB2	22000	MC	81D223M016MC2	4700	KD	81D472M050KD2	1000	KB	81D102M100KB2			
10000	JA	81D103M6R3JA2	27000	MD	81D273M016MD2	4700	MB	81D472M050MB2	1200	JD	81D122M100JD2			
12000	JB	81D123M6R3JB2	33000	ME	81D333M016ME2	5600	MC	81D562M050MC2	1200	KC	81D122M100KC2			
15000	HD	81D153M6R3HD2	25 WVDC, 30 VDC SURGE											
15000	KA	81D153M6R3KA2	2700	HA	81D272M025HA2	6800	KE	81D682M050KE2	1500	JE	81D152M100JE2			
18000	JC	81D183M6R3JC2	3300	HB	81D332M025HB2	6800	MD	81D682M050MD2	1500	MB	81D152M100MB2			
22000	JD	81D223M6R3JD2	3900	JA	81D392M025JA2	8200	JD	81D822M025JD2	1800	KD	81D182M100KD2			
22000	KB	81D223M6R3KB2	4700	JB	81D472M025JB2	10000	JE	81D103M025JE2	1800	MC	81D182M100MC2			
27000	JE	81D273M6R3JE2	5600	HD	81D562M025HD2	10000	KC	81D103M025KC2	2200	KE	81D222M100KE2			
27000	KC	81D273M6R3KC2	5600	JC	81D562M025JC2	10000	MB	81D103M025MB2	2200	MD	81D222M100MD2			
27000	MB	81D273M6R3MB2	5600	KA	81D562M025KA2	12000	KD	81D123M025KD2	3300	ME	81D332M100ME2			
33000	KD	81D333M6R3KD2	6800	KB	81D682M025KB2	12000	MC	81D123M025MC2	63 WVDC, 79 VDC SURGE					
39000	MC	81D393M6R3MC2	8200	JD	81D822M025JD2	12000	KE	81D123M025KE2	820	HA	81D821M063HA2			
47000	KE	81D473M6R3KE2	10000	JE	81D103M025JE2	1800	KA	81D182M063KA2	1200	HB	81D122M063HB2			
47000	MD	81D473M6R3MD2	10000	KC	81D103M025KC2	1800	JD	81D182M063JD2	1200	JA	81D122M063JA2			
56000	ME	81D563M6R3ME2	10000	MB	81D103M025MB2	2200	KB	81D222M063KB2	1500	JB	81D152M063JB2			
10 WVDC, 12 VDC SURGE														
5600	HA	81D562M010HA2	12000	KD	81D123M025KD2	2700	KC	81D272M063KC2	1800	HD	81D182M063HD2			
6800	HB	81D682M010HB2	12000	MC	81D123M025MC2	3300	JE	81D332M063JE2	1800	JC	81D182M063JC2			
8200	JA	81D822M010JA2	15000	KE	81D153M025KE2	3300	MB	81D332M063MB2	1800	KA	81D182M063KA2			
10000	JB	81D103M010JB2	15000	MD	81D153M025MD2	3900	KD	81D392M063KD2	2200	JD	81D222M063JD2			
12000	HD	81D123M010HD2	22000	ME	81D223M025ME2	3900	MC	81D392M063MC2	2200	KB	81D222M063KB2			
12000	JC	81D123M010JC2	35 WVDC, 44 VDC SURGE											
12000	KA	81D123M010KA2	1800	HA	81D182M035HA2	4700	KE	81D472M063KE2	2700	KC	81D272M063KC2			
15000	JD	81D153M010JD2	2700	HB	81D272M035HB2	4700	MD	81D472M063MD2	2700	JE	81D272M063JE2			
15000	KB	81D153M010KB2	2700	JA	81D272M035JA2	5600	ME	81D562M063ME2	3300	MB	81D332M063MB2			
18000	KC	81D183M010KC2	3900	HD	81D392M035HD2	5600	80 WVDC, 100 VDC SURGE							
22000	JE	81D223M010JE2	3900	JB	81D392M035JB2	6800	680	HA	81D681M080HA2	820	HB	81D821M080HB2		
22000	MB	81D223M010MB2	3900	KA	81D392M035KA2	8200	820	JA	81D821M080JA2	1200	JB	81D122M080JB2		
27000	KD	81D273M010KD2	4700	JC	81D472M035JC2	8200	1200	KB	81D122M080KB2	1200	KA	81D122M080KA2		
27000	MC	81D273M010MC2	5600	JD	81D562M035JD2	8200	1200	HD	81D122M080HD2	1500	HD	81D152M080HD2		
33000	KE	81D333M010KE2	5600	KB	81D562M035KB2	8200	1500	JC	81D152M080JC2	1500	JC	81D152M080JC2		
33000	MD	81D333M010MD2	6800	JE	81D682M035JE2	8200	1800	JD	81D182M080JD2	1800	JD	81D182M080JD2		
47000	ME	81D473M010ME2	6800	KC	81D682M035KC2	8200	1800	KB	81D182M080KB2	1800	KB	81D182M080KB2		
16 WVDC, 20 VDC SURGE														
3900	HA	81D392M016HA2	8200	KD	81D822M035KD2	8200	2200	KC	81D222M080KC2	2200	KC	81D222M080KC2		
5600	HB	81D562M016HB2	8200	MB	81D822M035MB2	8200	2700	JE	81D272M080JE2	2700	JE	81D272M080JE2		
5600	JA	81D562M016JA2	10000	MC	81D103M035MC2	10000	2700	KD	81D272M080KD2	2700	KD	81D272M080KD2		
8200	HD	81D822M016HD2	12000	KE	81D123M035KE2	12000	2700	MB	81D272M080MB2	2700	MB	81D272M080MB2		
8200	JB	81D822M016JB2	12000	MD	81D123M035MD2	12000	3300	MC	81D332M080MC2	3300	MC	81D332M080MC2		
8200	KA	81D822M016KA2	15000	ME	81D153M035ME2	15000	3900	KE	81D392M080KE2	3900	KE	81D392M080KE2		
10000	JC	81D103M016JC2	50 WVDC, 63 VDC SURGE											
12000	JD	81D123M016JD2	1200	HA	81D122M050HA2	3900	3900	MD	81D392M080MD2	3900	MD	81D392M080MD2		
12000	KB	81D123M016KB2	1500	HB	81D152M050HB2	3900	5600	ME	81D562M080ME2	5600	ME	81D562M080ME2		
15000	JE	81D153M016JE2	1500	JA	81D152M050JA2	2200	100 WVDC, 125 VDC SURGE							
15000	KC	81D153M016KC2	2200	HD	81D222M050HD2	2200	390	HA	81D391M100HA2	560	HB	81D561M100HB2		
15000	MB	81D153M016MB2	2200	JB	81D222M050JB2	2200	560	JA	81D561M100JA2	680	JB	81D681M100JB2		
18000	KD	81D183M016KD2	2200	KA	81D222M050KA2	2200	820	HD	81D821M100HD2	820	HD	81D821M100HD2		
22000	KE	81D223M016KE2	2700	JC	81D272M050JC2	2700	820	JC	81D821M100JC2	820	JC	81D821M100JC2		
			3300	JD	81D332M050JD2	3300								
			3300	KB	81D332M050KB2	3300								
			3900	JE	81D392M050JE2	3900								

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TYPE 672D EXTRALYTIC® ALUMINUM CAPACITORS



SOLID TINNED LEADS
TYPE 672D—NO 20AWG 0.032"

- Specifically designed for use in switching regulators and other high frequency applications.
- High capacitance values combined with low inductance (max. 25 nH) and low ESR limits make these capacitors very useful for bus bar decoupling in data processing applications.
- High ripple current capability, low impedance values.
- High performance capability over wide temperature range.
- Ideal for mounting on flat printed wiring boards or in conventional upright position.
- Furnished with outer plastic-film insulation with supplementary polymer coated end-seal.
- For complete technical data, refer to latest issue of Engineering Bulletin 3452.

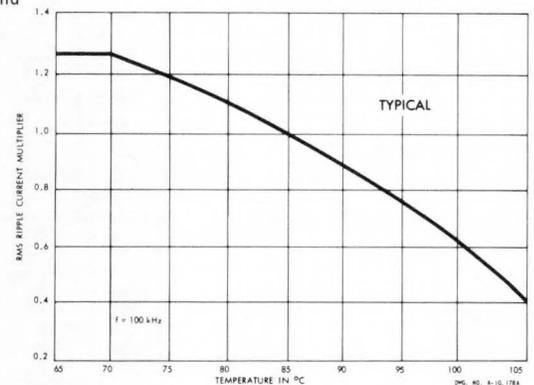
PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +105°C.
- Capacitance Tolerance:** -10, +100%.
- Equivalent Series Resistance:** .033 to 19.80 max. ohms @ 120 Hz, depending upon capacitance.
- Ripple Current:** .20 to 7.50 max. ampered RMS @ 100 kHz and 85°C, depending upon capacitance.
- Impedance:** .24 to 3.0 max. ohms @ 100 kHz and 25°C, depending upon capacitance.
- Life Test:** Capacitors are capable of withstanding a 2000 hour life test at rated working voltage and +105°C. After test, capacitance shall not have changed by more than +15%, the equivalent series resistance shall not exceed 150% of initial requirements, and the d-c leakage current shall meet the initial requirement.

DIMENSIONS (in inches)*

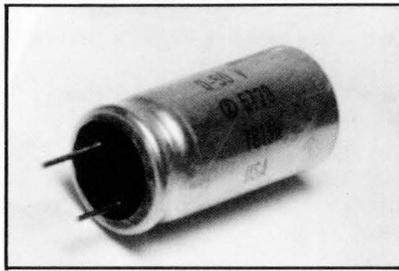
Size Code	D	L	S	Size Code	D	L	S	Size Code	D	L	S
CC	.399	.532	.200	DT	.500	1.315	.200	ET	.635	1.315	.300
CD	.399	.640	.200	DS	.500	1.690	.200	EU	.635	1.570	.300
CG	.399	.815	.200	EK	.635	1.000	.300	FV	.713	1.619	.300
DM	.500	1.065	.200								

RIPPLE CURRENT vs. TEMPERATURE



µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number
6.3 WVDC, 9 VDC SURGE			470	DT	672D477H015DT5C	390	DS	672D397H040DS5C	100 WVDC, 125 VDC SURGE		
150	CD	672D157H6R3CD5C	680	EK	672D687H015EK5C	820	FV	672D827H040FV5C	82	CC	672D825H100CC5C
220	CG	672D227H6R3CG5C	820	DS	672D827H015DS5C	50 WVDC, 75 VDC SURGE			10	DC	672D106H100DC5C
680	DM	672D687H6R3DM5C	1000	ET	672D108H015ET5C	22	CD	672D226H050CD5C	33	DM	672D336H100DM5C
1000	EK	672D108H6R3EK5C	1800	FV	672D188H015FV5C	100	DT	672D107H050DT5C	68	EK	672D686H100EK5C
1200	DS	672D128H6R3DS5C	20 WVDC, 30 VDC SURGE			150	EK	672D157H050EK5C	120	ET	672D127H100ET5C
1500	ET	672D158H6R3ET5C	68	CD	672D686H020CD5C	180	DS	672D187H050DS5C	180	FV	672D187H100FV5C
3300	FV	672D338H6R3FV5C	100	CG	672D107H020CG5C	220	ET	672D227H050ET5C	150 WVDC, 200 VDC SURGE		
7.5 WVDC, 10 VDC SURGE			330	DM	672D337H020DM5C	470	FV	672D477H050FV5C	6.8	CG	672D685H150CG5C
100	CC	672D107H7R5CC5C	470	EK	672D477H020EK5C	60 WVDC, 85 VDC SURGE			22	DT	672D226H150DT5C
150	CD	672D157H7R5CD5C	560	DS	672D567H020DS5C	15	CD	672D156H060CD5C	39	ET	672D396H150ET5C
680	DT	672D687H7R5DT5C	680	ET	672D687H020ET5C	22	CG	672D226H060CG5C	68	FV	672D686H150FV5C
1000	ET	672D108H7R5ET5C	1500	FV	672D158H020FV5C	68	DM	672D686H060DM5C	200 WVDC, 250 VDC SURGE		
2700	FV	672D278H7R5FV5C	25 WVDC, 35 VDC SURGE			100	EK	672D107H060EK5C	4.7	CG	672D475H200CG5C
12 WVDC, 16 VDC SURGE			47	CC	672D476H025CC5C	120	DS	672D127H060DS5C	15	DT	672D156H200DT5C
100	CC	672D107H012CC5C	68	CD	672D686H025CD5C	150	ET	672D157H060ET5C	27	ET	672D276H200ET5C
150	CG	672D157H012CG5C	330	DT	672D337H025DT5C	390	FV	672D397H060FV5C	47	FV	672D476H200FV5C
470	DM	672D477H912DM5C	470	DS	672D477H025DS5C	75 WVDC, 100 VDC SURGE			250 WVDC, 300 VDC SURGE		
680	DT	672D687H012DT5C	680	EU	672D687H025EU5C	12	CD	672D126H075CD5C	8.2	DM	672D825H250DM5C
1000	DS	672D108H012DS5C	1200	FV	672D128H025FV5C	18	CG	672D186H075CG5C	10	DT	672D106H250DT5C
2200	FV	672D228H012FV5C	40 WVDC, 55 VDC SURGE			82	EK	672D826H075EK5C	22	ET	672D226H250ET5C
15 WVDC, 20 VDC SURGE			47	CD	672D476H040CD5C	120	ET	672D127H075ET5C	39	FV	672D396H250FV5C
100	CD	672D107H015CD5C	220	EK	672D227H040EK5C	270	FV	672D277H075FV5C			
150	CG	672D157H015CG5C	330	ET	672D337H040ET5C						

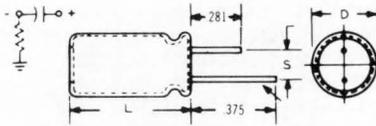
TYPE 673D, 674D, EXTRALYTIC® ALUMINUM CAPACITORS



- Specifically designed for use in switching regulators and other high frequency applications.
- High capacitance values combined with low inductance and low ESR limits make these capacitors very useful for bus bar decoupling in data processing applications.
- High ripple current capability, low impedance values.
- High performance capability over wide temperature range.
- Ideal for mounting on flat printed wiring boards or in conventional upright position.
- Furnished with outer plastic-film insulation with supplementary polymer coated end-seal.
- For applications requiring single-ended, 3-lead capacitor (0.250" lead length), change Type Number 673D to 674D and the last letter of the Part Number from C to A.
- For complete technical data, refer to latest issue of Engineering Bulletin 3452.1.

PERFORMANCE CHARACTERISTICS

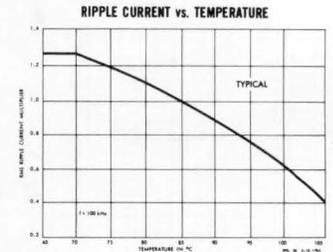
1. **Operating Temperature Range:** -55°C to +105°C.
2. **Capacitance Tolerance:** -10, +100%.
3. **Equivalent Series Resistance:** .014 to 19.80 max. ohms @ 120 Hz, depending upon capacitance.
4. **Ripple Current:** .20 to 7.50 max. amperes RMS @ 100 kHz, and 85°C, depending upon capacitance.
5. **Impedance:** .24 to 3.0 max. ohms @ 100 kHz and 25°C, depending upon capacitance.
6. **Life Test:** Capacitors are capable of withstanding a 2000 hour life test at rated working voltage and +105°C. After test, capacitance shall not have changed by more than ± 15%, the equivalent series resistance shall not exceed 150% of initial requirement, and the d-c leakage current shall meet the initial requirement.



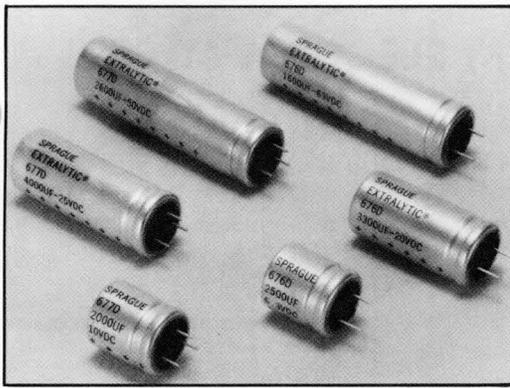
SOLID TINNED LEADS
TYPE 672D—NO. 20 AWG, 0.032"
TYPE 673D—NO. 18 AWG, 0.040"

DIMENSIONS (in inches)*

Size Code	D	L	S	Size Code	D	L	S	Size Code	D	L	S
GE	0.760	1.140	0.250	HE	0.885	1.140	0.300	JE	1.010	1.140	0.400
GJ	0.760	1.640	0.250	HJ	0.885	1.640	0.300	JJ	1.010	1.640	0.400
GL	0.760	2.140	0.250	HL	0.885	2.140	0.300	JL	1.010	2.140	0.400
GP	0.760	2.640	0.250	HP	0.885	2.640	0.300	JP	1.010	2.640	0.400
GS	0.760	3.140	0.250	HS	0.885	3.140	0.300	JS	1.010	3.140	0.400
GT	0.760	3.640	0.250	HT	0.885	3.640	0.300	JT	1.010	3.640	0.400



µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number						
6.3 WVDC, 9 VDC SURGE																	
1500	GE	673D158H6R3GE5C	5600	JL	673D568H012JL5C	680	JE	673D687H040JE5C	1000	JP	673D108H075JP5C						
2200	HE	673D228H6R3HE5C	6800	HS	673D688H012HS5C	1000	HJ	673D108H040HJ5C	1200	JS	673D128H075JS5C						
2700	JE	673D278H6R3JE5C	8200	JP	673D828H012JP5C	1200	GP	673D128H040GP5C	1500	JT	673D158H075JT5C						
3900	HJ	673D398H6R3HJ5C	10000	JS	673D109H012JS5C	1500	JJ	673D158H040JJ5C	100 WVDC, 125 VDC SURGE								
5600	JJ	673D568H6R3JJ5C	12000	JT	673D129H012JT5C	1800	GS	673D188H040GS5C	68	GE	673D686H100GE5C						
6800	GS	673D688H6R3GS5C	15 WVDC, 20 VDC SURGE			2200	JL	673D228H040JL5C	120	HE	673D127H100HE5C						
8200	JL	673D828H6R3JL5C	820	GE	673D827H015GE5C	2700	JP	673D278H040JP5C	150	JE	673D157H100JE5C						
10000	HS	673D109H6R3HS5C	1500	HE	673D158H015HE5C	3300	JS	673D338H040JS5C	220	HJ	673D227H100HJ5C						
12000	JP	673D129H6R3JP5C	1800	JE	673D188H015JE5C	3900	JT	673D398H040JT5C	270	GP	673D277H100GP5C						
15000	JS	673D159H6R3JS5C	2700	HJ	673D278H015HJ5C	50 WVDC, 75 VDC SURGE			330	JJ	673D337H100JJ5C						
18000	JT	673D189H6R3JT5C	3300	GP	673D338H015GP5C	270	GE	673D277H050GE5C	390	GT	673D397H100GT5C						
7.5 WVDC, 10 VDC SURGE												390	HE	673D397H050HE5C	470	GJ	673D477H050GJ5C
1200	GE	673D128H7R5GE5C	3900	JJ	673D398H015JJ5C	470	HE	673D477H050HE5C	560	JP	673D567H100JP5C						
1800	HE	673D188H7R5HE5C	5600	JL	673D568H015JL5C	560	GJ	673D567H050GJ5C	680	JS	673D687H100JS5C						
2700	JE	673D278H7R5JE5C	6800	JP	673D688H015JP5C	820	HJ	673D827H050HJ5C	820	JT	673D827H100JT5C						
3900	HJ	673D398H7R5HJ5C	8200	JS	673D828H015JS5C	1000	JJ	673D108H050JJ5C	150 WVDC, 200 VDC SURGE								
4700	JJ	673D478H7R5JJ5C	12000	JT	673D129H015JT5C	1200	HL	673D128H050HL5C	56	GE	673D566H150GE5C						
5600	HL	673D568H7R5HL5C	20 WVDC, 30 VDC SURGE			1500	JL	673D158H050JL5C	82	HE	673D826H150HE5C						
6800	HP	673D688H7R5HP5C	680	GE	673D687H020GE5C	1800	HS	673D188H050HS5C	100	GJ	673D107H150GJ5C						
8200	JL	673D828H7R5JL5C	1000	HE	673D108H020HE5C	2200	JP	673D228H050JP5C	150	GL	673D157H150GL5C						
10000	JP	673D109H7R5JP5C	1500	JE	673D158H020JE5C	2700	JS	673D278H050JS5C	220	HL	673D227H150HL5C						
12000	JS	673D129H7R5JS5C	2200	HJ	673D228H020HJ5C	3300	JT	673D338H050JT5C	330	JL	673D337H150JL5C						
15000	JT	673D159H7R5JT5C	2700	JJ	673D278H020JJ5C	60 WVDC, 85 VDC SURGE			470	JP	673D477H150JP5C						
10 WVDC, 14 VDC SURGE												470	HT	673D477H150HT5C			
1000	GE	673D108H010GE5C	3300	HL	673D338H020HL5C	180	GE	673D187H060GE5C	560	JS	673D567H150JS5C						
1500	HE	673D158H010HE5C	3900	GT	673D398H020GT5C	270	HE	673D277H060HE5C	680	JT	673D687H150JT5C						
2200	JE	673D228H010JE5C	4700	JL	673D478H020JL5C	330	GJ	673D337H060GJ5C	200 WVDC, 250 VDC SURGE								
3300	HJ	673D338H010HJ5C	5600	JP	673D568H020JP5C	390	JE	673D397H060JE5C	33	GE	673D336H200GE5C						
3900	GP	673D398H010GP5C	6800	JS	673D688H020JS5C	560	HJ	673D567H060HJ5C	56	HE	673D566H200HE5C						
4700	JJ	673D478H010JJ5C	8200	JT	673D828H020JT5C	680	GP	673D687H060GP5C	82	JE	673D826H200JE5C						
5600	HL	673D568H010HP5C	25 WVDC, 35 VDC SURGE			820	JJ	673D827H060JJ5C	150	JJ	673D157H200JJ5C						
6800	HP	673D688H010HP5C	560	GE	673D567H025GE5C	1000	GT	673D108H060GT5C	150	JL	673D227H200JL5C						
8200	JL	673D828H010JL5C	820	HE	673D827H025HE5C	1200	JL	673D128H060JL5C	220	HT	673D337H200HT5C						
8200	JP	673D828H010JP5C	1200	JE	673D128H025JE5C	1500	JP	673D158H060JP5C	330	JS	673D397H200JS5C						
10000	JS	673D109H010JS5C	1500	GL	673D158H025GL5C	1800	JS	673D188H060JS5C	470	JT	673D477H200JT5C						
12000	JT	673D129H010JT5C	1800	HJ	673D188H025HJ5C	2200	JT	673D228H060JT5C	250 WVDC, 300 VDC SURGE								
12 WVDC, 16 VDC SURGE												220	JE	673D227H075JE5C	22	GE	673D226H250GE5C
1000	GE	673D108H012GE5C	2200	JJ	673D228H025JJ5C	330	HJ	673D337H075HJ5C	47	GJ	673D476H250GJ5C						
1500	HE	673D158H012HE5C	2700	HL	673D278H025HL5C	470	JJ	673D477H075JJ5C	100	GP	673D107H250GP5C						
2200	JE	673D228H012JE5C	3300	HP	673D338H025HP5C	560	HL	673D567H075HL5C	150	HP	673D157H250HP5C						
2700	GL	673D278H012GL5C	3900	JP	673D398H025JP5C	680	JL	673D687H075JL5C	220	JP	673D227H250JP5C						
3300	HJ	673D338H012HJ5C	4700	JS	673D478H025JS5C	820	HS	673D827H075HS5C	270	JS	673D277H250JS5C						
3900	HJ	673D398H012HJ5C	5600	JT	673D568H025JT5C	75 WVDC, 100 VDC SURGE			330	JT	673D337H250JT5C						
4700	HL	673D478H012HL5C	6800	HE	673D688H025HE5C	120	GE	673D127H075GE5C	300 WVDC, 300 VDC SURGE								
40 WVDC, 55 VDC SURGE												180	HE	673D187H075HE5C	22	GE	673D226H250GE5C
330	GE	673D337H040GE5C	40 WVDC, 55 VDC SURGE			220	JE	673D227H075JE5C	47	GJ	673D476H250GJ5C						
560	HE	673D567H040HE5C	330	GE	673D337H040GE5C	330	HJ	673D337H075HJ5C	100	GP	673D107H250GP5C						
40 WVDC, 55 VDC SURGE												470	JJ	673D477H075JJ5C	150	HP	673D157H250HP5C
330	GE	673D337H040GE5C	470	JJ	673D477H075JJ5C	560	HL	673D567H075HL5C	220	JP	673D227H250JP5C						
560	HE	673D567H040HE5C	560	HL	673D567H075HL5C	680	JL	673D687H075JL5C	270	JS	673D277H250JS5C						
40 WVDC, 55 VDC SURGE												820	HS	673D827H075HS5C	330	JT	673D337H250JT5C
330	GE	673D337H040GE5C	560	HL	673D567H075HL5C												
560	HE	673D567H040HE5C	680	JL	673D687H075JL5C												
820	HS	673D827H075HS5C	820	HS	673D827H075HS5C												

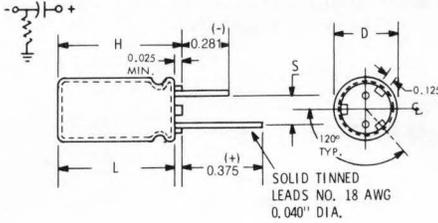


TYPE 676D, 677D PREMIUM + 105°C EXTRALYTIC® ALUMINUM CAPACITORS

- Especially designed for switched-mode power supplies and regulators.
- Lowest ESR, inductance and impedance of any comparably-sized aluminum electrolytic capacitor in these ratings.
- ESR is specified at ± 30% over frequency range of 20 to 100 kHz.
- High performance capability over wide temperature range.
- Ideal for mounting on flat printed wiring boards or in conventional upright position.
- Furnished with outer polyester-film insulation with polymer-coated end-seal.
- For applications requiring single-ended, 3-lead capacitor (0.250" lead length), change Type Number 676D to 677D and the last letter of the Part Number from C to A.
- For complete technical data, refer to latest issue of Engineering Bulletin 3453.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +105°C.
- Capacitance Tolerance:** ± 20%.
- Equivalent Series Resistance:** (At 120 Hz and +25°C) 11.0 to 400 max. mΩ; depending upon capacitance.
- Ripple Current:** 0.94 to 11.68 max. amperes RMS @ 120 Hz and +85°C, depending upon capacitance.
- Impedance:** 10.3 to 67.4 max. mΩ @ 100 kHz and +25°C, depending upon capacitance.
- Life Test:** Capacitors are capable of withstanding a 2000 hour life test at rated working voltage and +105°C. After test, capacitance shall not have changed by more than 15%, the equivalent series resistance shall not exceed 150% of initial requirement, and the d-c leakage current shall meet the initial requirement.



DIMENSIONS (in inches)*

Size Code	D	L	H	S	Size Code	D	L	H	S	Size Code	D	L	H	S
GE	0.760	1.140	1.246	0.250	HE	0.885	1.140	1.246	0.300	JE	1.010	1.140	1.246	0.400
GJ	0.760	1.640	1.746	0.250	HJ	0.885	1.640	1.746	0.300	JL	1.010	1.640	1.746	0.400
GL	0.760	2.140	2.246	0.250	HL	0.885	2.140	2.246	0.300	JL	1.010	2.140	2.246	0.400
GP	0.760	2.640	2.746	0.250	HP	0.885	2.640	2.746	0.300	JP	1.010	2.640	2.746	0.400
GS	0.760	3.140	3.246	0.250	HS	0.885	3.140	3.246	0.300	JS	1.010	3.140	3.246	0.400
GT	0.760	3.640	3.746	0.250	HT	0.885	3.640	3.746	0.300	JT	1.010	3.640	3.746	0.400

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6.3 WVDC, 9 VDC SURGE			9000	HT	676D908M010HT5C	3300	JL	676D338M020JL5C	3000	JS	676D308M040JS5C
3900	GL	676D398M6R3GL5C	2000	JE	676D208M010JE5C	4400	JP	676D448M020JP5C	3600	JT	676D368M040JT5C
6400	GS	676D648M6R3GS5C	4000	JJ	676D408M010JJ5C	5500	JS	676D558M020JS5C	50 WVDC, 75 VDC SURGE		
7700	GT	676D778M6R3GT5C	6000	JL	676D608M010JL5C	6600	JT	676D668M020JT5C	220	GE	676D227M050GE5C
3900	HJ	676D398M6R3HJ5C	8000	JP	676D808M010JP5C	25 WVDC, 35 VDC SURGE			440	GJ	676D447M050GJ5C
5700	HL	676D578M6R3HL5C	10000	JS	676D109M010JS5C	500	GE	676D507M025GE5C	660	GL	676D667M050GL5C
7700	HP	676D778M6R3HP5C	12 WVDC, 16 VDC SURGE			1000	GJ	676D108M025GJ5C	900	GP	676D907M050GP5C
9600	HS	676D968M6R3HS5C	900	GE	676D907M012GE5C	1400	GL	676D148M025GL5C	1100	GS	676D118M050GS5C
7700	JL	676D778M6R3JL5C	1800	GJ	676D188M012GJ5C	2000	GP	676D208M025GP5C	1300	GT	676D138M050GT5C
15000	JT	676D159M6R3JT5C	2800	GL	676D288M012GL5C	2400	GS	676D248M025GS5C	330	HE	676D337M050HE5C
7.5 WVDC, 10 VDC SURGE			3600	GP	676D368M012GP5C	3000	GT	676D308M025GT5C	670	HJ	676D677M050HJ5C
1200	GE	676D128M7R5GE5C	4600	GS	676D468M012GS5C	750	HE	676D757M025HE5C	1000	HL	676D108M050HL5C
2500	GJ	676D258M7R5GJ5C	5500	GT	676D558M012GT5C	1400	HJ	676D148M025HJ5C	1300	HP	676D138M050HP5C
3700	GL	676D378M7R5GL5C	1300	HE	676D138M012HE5C	2200	HL	676D228M025HL5C	1600	HS	676D168M050HS5C
5100	GP	676D518M7R5GP5C	2800	HJ	676D288M012HJ5C	3000	HP	676D308M025HP5C	2000	HT	676D208M050HT5C
6300	GS	676D638M7R5GS5C	4200	HL	676D428M012HL5C	3700	HS	676D378M025HS5C	440	JE	676D447M050JE5C
7600	GT	676D768M7R5GT5C	5500	HP	676D558M012HP5C	4500	HT	676D458M025HT5C	900	JJ	676D907M050JJ5C
1900	HE	676D198M7R5HE5C	6900	HS	676D698M012HS5C	1000	JE	676D108M025JE5C	1300	JL	676D138M050JL5C
3700	HJ	676D378M7R5HJ5C	8400	HT	676D849M012HT5C	2000	JJ	676D208M025JJ5C	1800	JP	676D188M050JP5C
5100	HL	676D518M7R5HL5C	1800	JE	676D188M012JE5C	3000	JL	676D308M025JL5C	2200	JS	676D228M050JS5C
7600	HP	676D768M7R5HP5C	3600	JJ	676D368M012JJ5C	4000	JP	676D408M025JP5C	2600	JT	676D268M050JT5C
9500	HS	676D958M7R5HS5C	5500	JL	676D558M012JL5C	5100	JS	676D518M025JS5C	63 WVDC, 85 VDC SURGE		
11000	HT	676D119M7R5HT5C	7400	JP	676D748M012JP5C	6100	JT	676D618M025JT5C	140	GE	676D147M063GE5C
2500	JE	676D258M7R5JE5C	9200	JS	676D928M012JS5C	40 WVDC, 55 VDC SURGE			290	GJ	676D297M063GJ5C
5100	JJ	676D518M7R5JJ5C	11000	JT	676D119M012JT5C	300	GE	676D307M040GE5C	430	GL	676D437M063GL5C
7600	JL	676D768M7R5JL5C	550	GE	676D557M020GE5C	600	GJ	676D607M040GJ5C	570	GP	676D577M063GP5C
10000	JP	676D109M7R5JP5C	1100	GJ	676D118M020GJ5C	900	GL	676D907M040GL5C	720	GS	676D727M063GS5C
12000	JS	676D129M7R5JS5C	1600	GL	676D168M020GL5C	1200	GP	676D128M040GP5C	870	GT	676D877M063GT5C
14000	JT	676D149M7R5JT5C	2200	GP	676D228M020GP5C	1400	GS	676D148M040GS5C	210	HE	676D217M063HE5C
10 WVDC, 14 VDC SURGE			2800	GS	676D288M020GS5C	1800	GT	676D188M040GT5C	430	HJ	676D437M063HJ5C
1000	GE	676D108M010GE5C	3300	GT	676D338M020GT5C	450	HE	676D457M040HE6C	650	HL	676D657M063HL5C
2000	GJ	676D208M010GJ5C	840	HE	676D847M020HE5C	900	HJ	676D907M040HJ5C	870	HP	676D877M063HP5C
3000	GL	676D308M010GL5C	1600	HJ	676D168M020HJ5C	1300	HL	676D138M040HL5C	1100	HS	676D118M063HS5C
4000	GP	676D408M010GP5C	2400	HL	676D248M020HL5C	1800	HP	676D188M040HP5C	1200	HT	676D128M063HT5C
5000	GS	676D508M010GS5C	3300	HP	676D338M020HP5C	2200	HS	676D228M040HS5C	290	JE	676D297M063JE5C
6000	GT	676D608M010GT5C	4200	HS	676D428M020HS5C	2600	HT	676D268M040HT5C	570	JJ	676D577M063JJ5C
1400	HE	676D148M010HE5C	5000	HT	676D508M020HT5C	600	JE	676D607M040JE5C	870	JL	676D877M063JL5C
3000	HJ	676D308M010HJ5C	1100	JE	676D118M020JE5C	1200	JJ	676D128M040JJ5C	1100	JP	676D118M063JP5C
4500	HL	676D458M010HL5C	2200	JJ	676D228M020JJ5C	1800	JL	676D188M040JL5C	1400	JS	676D148M063JS5C
6000	HP	676D608M010HP5C	2200	JE	676D228M020JE5C	2400	JP	676D248M040JP5C	1600	JT	676D168M063JT5C
7500	HS	676D758M010HS5C									

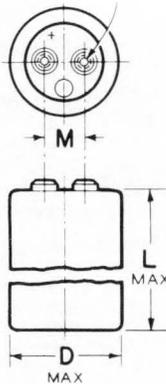
TYPE 36DX POWERLYTIC® ALUMINUM ELECTROLYTICS



RECOMMENDED FOR NEW EQUIPMENT DESIGNS

- State-of-the-art computer designed capacitors for optimum performance in power supply filters and other high energy applications requiring high capacitance, high ripple current capability and excellent load life.
- New foil technology allows as much as 50% more capacitance per case size than was available in previous designs.
- 1000 hours at 85°C load life capability.
- Utilizes proven pressure relief vent in case cover.
- Operational life in excess of 10 years in normal circuit conditions.
- Capacitors listed have outer plastic-film insulation and low screw inserts. For high insert terminals, change last digit to B.
- For complete technical data, refer to latest issue of Engineering Bulletin 3431.

Tapped Hole,
No. 10-32 Thd.



TERMINAL "A"
Low Screw Insert

PERFORMANCE CHARACTERISTICS

- Operating Temperature:** -40°C to +85°C.
- Capacitance Tolerance:** -10, +50%.
- Equivalent Series Resistance:** (At +25°C) .0145 to 2.0856 ohms maximum at 120 Hz, dependent upon capacitance and voltage.
- Ripple Current:** (At +85°C) .53 to 19.87 amperes RMS at 120 Hz, dependent upon capacitance and voltage.
- Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.
- Life Test:** After 1000 hours at +85°C in an air circulated oven and with full rated voltage applied, following stabilization, capacitance shall be within ±15% of initial value; and equivalent series resistance shall not have increased more than 150% of initial requirement.

DIMENSIONS (in inches)*

Size Code	D Max.	L Max.	M ±.016
AN	1.428	1.734	0.500
AA	1.428	2.234	0.500
AB	1.428	3.234	0.500
AC	1.428	4.234	0.500
BB	2.053	3.234	0.875
BC	2.053	4.234	0.875
BF	2.053	5.734	0.875
CD	2.553	4.734	1.125
CF	2.553	5.734	1.125
DF	3.053	5.734	1.250
DJ	3.053	8.734	1.250

µF	Size Code	Catalog Number												
150 WVDC, 175 VDC SURGE														
420	AN	36DX421F150AN2A	2900	BF	36DX292F200BF2A	4100	CD	36DX412F250CD2A	3300	DF	36DX332F350DF2A			
700	AA	36DX701F150AA2A	3400	CC	36DX342F200CC2A	4200	CF	36DX422F250CF2A	3700	DF	36DX372F350DF2A			
1300	AB	36DX132F150AB2A	4200	BF	36DX422F200BF2A	5300	CF	36DX532F250CF2A	5100	DJ	36DX512F350DJ2A			
1900	AC	36DX192F150AC2A	4900	CF	36DX492F200CF2A	6300	DF	36DX632F250DF2A	6100	DJ	36DX612F350DJ2A			
2700	BB	36DX272F150BB2A	5600	CD	36DX562F200CD2A	7800	DF	36DX782F250DF2A	450 WVDC, 525 VDC SURGE					
4100	BC	36DX412F150BC2A	7200	CF	36DX722F200CF2A	10000	DJ	36DX103F250DJ2A	63	AN	36DX630F450AN2A			
6100	BF	36DX612F150BF2A	7400	DF	36DX742F200DF2A	12000	DJ	36DX123F250DJ2A	80	AA	36DX800F450AA2A			
8200	CD	36DX822F150CD2A	10000	DF	36DX103F200DF2A	18000	DJ	36DX183F200DJ2A	99	AA	36DX990F450AA2A			
10000	CF	36DX103F150CF2A	250 WVDC, 300 VDC SURGE									160	AB	36DX161F450AB2A
15000	DF	36DX153F150DF2A	200	AN	36DX201F250AN2A	350 WVDC, 400 VDC SURGE						190	AB	36DX191F450AB2A
25000	DJ	36DX253F150DJ2A	250	AA	36DX251F250AA2A	100	AN	36DX101F350AN2A	230	AC	36DX231F450AC2A			
200 WVDC, 250 VDC SURGE												270	AC	36DX271F450AC2A
280	AN	36DX281F200AN2A	340	AA	36DX341F250AA2A	130	AA	36DX131F350AA2A	270	AC	36DX271F450AC2A			
300	AA	36DX301F200AA2A	500	AB	36DX501F250AB2A	160	AA	36DX161F350AA2A	350	AF	36DX351F450AF2A			
470	AA	36DX471F200AA2A	680	AB	36DX681F250AB2A	260	AB	36DX261F350AB2A	380	BB	36DX381F450BB2A			
590	AB	36DX591F200AB2A	740	AC	36DX741F250AC2A	320	AB	36DX321F350AB2A	540	BC	36DX541F450BC2A			
850	AC	36DX851F200AC2A	990	AC	36DX991F250AC2A	380	AC	36DX381F350AC2A	570	BC	36DX571F450BC2A			
930	AB	36DX931F200AB2A	1100	AF	36DX112F250AF2A	470	AC	36DX471F350AC2A	800	BF	36DX801F450BF2A			
1200	AF	36DX122F200AF2A	1200	BB	36DX122F250BB2A	580	AF	36DX581F350AF2A	860	BF	36DX861F450BF2A			
1300	AC	36DX132F200AC2A	1300	BB	36DX132F250BB2A	610	BB	36DX611F350BB2A	930	CC	36DX931F450CC2A			
1400	BB	36DX142F200BB2A	1700	BC	36DX172F250BC2A	660	BB	36DX661F350BB2A	1100	CD	36DX112F450CD2A			
1800	BB	36DX182F200BB2A	2000	BC	36DX202F250BC2A	880	BC	36DX881F350BC2A	1300	CF	36DX132F450CF2A			
2000	BC	36DX202F200BC2A	2500	BF	36DX252F250BF2A	990	BC	36DX991F350BC2A	1400	CF	36DX142F450CF2A			
2800	BC	36DX282F200BC2A	2900	CC	36DX292F250CC2A	1300	BF	36DX132F350BF2A	2000	DF	36DX202F450DF2A			
			3000	BF	36DX302F250BF2A	1400	BF	36DX142F350BF2A	2200	DF	36DX222F450DF2A			
						1500	CC	36DX152F350CC2A	3100	DJ	36DX312F450DJ2A			
						1900	CD	36DX192F350CD2A	3500	DJ	36DX352F450DJ2A			
						2200	CF	36DX222F350CF2A						
						2500	CF	36DX252F350CF2A						

TYPE 36DX POWERLYTIC ALUMINUM ELECTROLYTICS

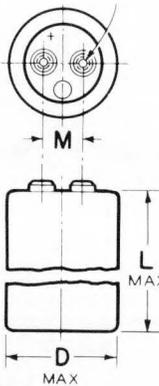


ORIGINAL RATINGS

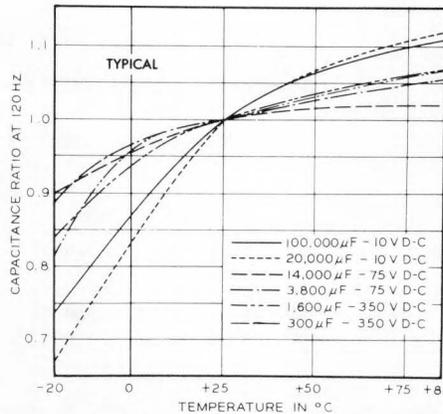
- Designed for use in computer power supplies, industrial control equipment, energy storage applications, etc.
- Very high capacitance per case size, high ripple current ratings, low leakage currents, excellent shelf and operating life.
- Uses the most reliable seal developed by Sprague for aluminum electrolytic capacitors — beaded can is crimped onto rubber gasket recessed in rigid molded cover.
- Case covers have reliable pressure-type safety vents employing silicone rubber.
- Capacitors listed have outer plastic-film insulation. For bare case, change 14th character of catalog number from 2 to 0 and subtract .078" from diameter and .125" from length. Capacitors listed have low-insert terminals. For "special" high-insert or solder-lug terminals, change last character from A to B or C, respectively.
- For complete technical data, refer to latest issue of Engineering Bulletin 3431.

DIMENSIONS (in inches)*

0.219 DEEP TAPPED HOLE NO. 10-32 SCREW



Size Code	D	L	M
AA	1.453	2.250	.500
AB	1.453	3.250	.500
AC	1.453	4.250	.500
AD	1.453	4.750	.500
AE	1.453	5.250	.500
AF	1.453	5.750	.500
BB	2.078	3.250	.875
BC	2.078	4.250	.875
BD	2.078	4.750	.875
BE	2.078	5.250	.875
BF	2.078	5.750	.875
CB	2.578	3.250	1.125
CC	2.578	4.250	1.125
CD	2.578	4.750	1.125
CE	2.578	5.250	1.125
CF	2.578	5.750	1.125
DC	3.078	4.250	1.250
DD	3.078	4.750	1.250
DE	3.078	5.250	1.250
DF	3.078	5.750	1.250
DJ	3.078	8.750	1.250



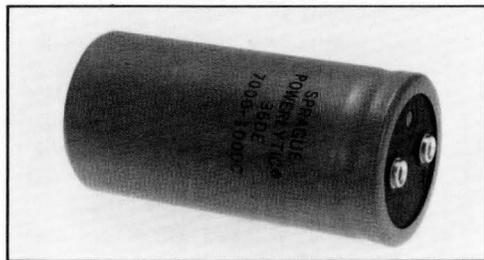
PERFORMANCE CHARACTERISTICS

- Operating Temperature:** -40°C to +85°C.
- Capacitance Tolerance:** 10 to 100 WVDC capacitors ... +75, -10%; 200 to 450 WVDC capacitors ... +50, -10%.
- Equivalent Series Resistance:** .012 to 2.8 max. ohms @ 120 Hz, depending upon capacitance.
- Ripple Current:** .064 to 30.7 max. amperes RMS @ 120 Hz and 65°C, depending upon capacitance.
- Life Test:** Satisfactory operation for 500 hours at rated d-c voltage, applied in an oven with circulating air, at a temperature of 85°C.

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
10 WVDC, 12 VDC SURGE			30 WVDC, 40 VDC SURGE			75 WVDC, 95 VDC SURGE			250 WVDC, 300 VDC SURGE		
9000	AA	36DX902G010AA2A	4000	AA	36DX402G030AA2A	1400	AA	36DX142G075AA2A	250	AA	36DX251F250AA2A
18000	AB	36DX183G010AB2A	8000	AB	36DX802G030AB2A	2800	AB	36DX282G075AB2A	500	AB	36DX501F250AB2A
27000	AC	36DX273G010AC2A	12000	AC	36DX123G030AC2A	4200	AC	36DX422G075AC2A	740	AC	36DX741F250AC2A
41000	AF	36DX413G010AF2A	18000	AF	36DX183G030AF2A	6300	AF	36DX632G075AF2A	1100	AF	36DX112F250AF2A
58000	BC	36DX583G010BC2A	26000	BC	36DX263G030BC2A	10000	BC	36DX103G075BC2A	1200	BB	36DX122F250BB2A
88000	BF	36DX883G010BF2A	39000	BF	36DX393G030BF2A	15000	BF	36DX153G075BF2A	1700	BC	36DX172F250BC2A
100000	CC	36DX104G010CC2A	44000	CC	36DX443G030CC2A	17000	CC	36DX173G075CC2A	2500	BF	36DX252F250BF2A
150000	CF	36DX154G010CF2A	66000	CF	36DX663G030CF2A	25000	CF	36DX253G075CF2A	2900	CC	36DX292F250CC2A
150000	DC	36DX154G010DC2A	66000	DC	36DX663G030DC2A	25000	DC	36DX253G075DC2A	4200	CF	36DX422F250CF2A
230000	DF	36DX234G010DF2A	97000	DF	36DX973G030DF2A	37000	DF	36DX373G075DF2A	6300	DF	36DX632F250DF2A
390000	DJ	36DX394G010DJ2A	160000	DJ	36DX164G030DJ2A	60000	DJ	36DX603G075DJ2A	10000	DJ	36DX103F250DJ2A
15 WVDC, 18 VDC SURGE			40 WVDC, 50 VDC SURGE			100 WVDC, 125 VDC SURGE			350 WVDC, 400 VDC SURGE		
7500	AA	36DX752G015AA2A	2900	AA	36DX292G040AA2A	850	AA	36DX851G100AA2A	130	AA	36DX131F350AA2A
15000	AB	36DX153G015AB2A	5800	AB	36DX582G040AB2A	1700	AB	36DX172G100AB2A	260	AB	36DX261F350AB2A
22000	AC	36DX223G015AC2A	8700	AC	36DX872G040AC2A	2600	AC	36DX262G100AC2A	380	AC	36DX381F350AC2A
34000	AF	36DX343G015AF2A	13000	AF	36DX133G040AF2A	3800	AF	36DX382G100AF2A	580	AF	36DX581F350AF2A
50000	BC	36DX503G015BC2A	20000	BC	36DX203G040BC2A	5800	BC	36DX582G100BC2A	610	BB	36DX611F350BB2A
75000	BF	36DX753G015BF2A	30000	BF	36DX303G040BF2A	8700	BF	36DX872G100BF2A	880	BC	36DX881F350BC2A
83000	CC	36DX833G015CC2A	34000	CC	36DX343G040CC2A	9800	CC	36DX982G100CC2A	1300	BF	36DX132F350BF2A
120000	CF	36DX124G015CF2A	51000	CF	36DX513G040CF2A	15000	CF	36DX153G100CF2A	1500	CC	36DX152F350CC2A
120000	DC	36DX124G015DC2A	51000	DC	36DX513G040DC2A	15000	DC	36DX153G100DC2A	2200	CF	36DX222F350CF2A
180000	DF	36DX184G015DF2A	76000	DF	36DX763G040DF2A	21000	DF	36DX213G100DF2A	3300	DF	36DX332F350DF2A
300000	DJ	36DX304G015DJ2A	120000	DJ	36DX124G040DJ2A	36000	DJ	36DX363G100DJ2A	5100	DJ	36DX512F350DJ2A
25 WVDC, 30 VDC SURGE			50 WVDC, 65 VDC SURGE			200 WVDC, 250 VDC SURGE			450 WVDC, 525 VDC SURGE		
4500	AA	36DX452G025AA2A	2400	AA	36DX242G050AA2A	300	AA	36DX301F200AA2A	80	AA	36DX800F450AA2A
9000	AB	36DX902G025AB2A	4800	AB	36DX482G050AB2A	590	AB	36DX591F200AB2A	160	AB	36DX161F450AB2A
13000	AC	36DX133G025AC2A	7200	AC	36DX722G050AC2A	850	AC	36DX851F200AC2A	230	AC	36DX231F450AC2A
20000	AF	36DX203G025AF2A	11000	AF	36DX113G050AF2A	1200	AF	36DX122F200AF2A	350	AF	36DX351F450AF2A
30000	BC	36DX303G025BC2A	16000	BC	36DX163G050BC2A	1400	BB	36DX142F200BB2A	380	BB	36DX381F450BB2A
45000	BF	36DX453G025BF2A	24000	BF	36DX243G050BF2A	2000	BC	36DX202F200BC2A	540	BC	36DX541F450BC2A
50000	CC	36DX503G025CC2A	27000	CC	36DX273G050CC2A	2900	BF	36DX292F200BF2A	800	BF	36DX801F450BF2A
75000	CF	36DX753G025CF2A	40000	CF	36DX403G050CF2A	3400	CC	36DX342F200CC2A	930	CC	36DX931F450CC2A
75000	DC	36DX753G025DC2A	41000	DC	36DX413G050DC2A	4900	CF	36DX492F200CF2A	1300	CF	36DX132F450CF2A
110000	DF	36DX114G025DF2A	61000	DF	36DX613G050DF2A	7400	DF	36DX742F200DF2A	2000	DF	36DX202F450DF2A
190000	DJ	36DX194G025DJ2A	100000	DJ	36DX104G050DJ2A	12000	DJ	36DX123F200DJ2A	3100	DJ	36DX312F450DJ2A

TYPE 36DE POWERLYTIC® ALUMINUM ELECTROLYTICS

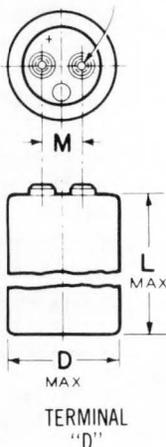
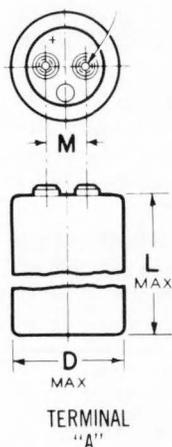
RECOMMENDED FOR NEW EQUIPMENT DESIGNS



- State-of-the-art computer designed, large cylindrical case, low voltage aluminum electrolytic capacitors.
- New foil technology and electrolyte systems allow as much as 100% more capacitance per case size and equivalent series resistance values nearly 70% lower than previous designs.
- Operational life in excess of 10 years in normal circuit applications.
- Capacitors listed have outer plastic-film insulation and low screw inserts. For high insert terminals, change last digit to B.
- For ripple current ratings above 30 amperes in 2.5" and 3" diameters, high current, low insert terminals must be specified by changing last digit to D.
- For complete technical data, refer to latest issue of Engineering Bulletin 3432.

Tapped Hole, No. 10-32 Thd.

Tapped Hole, No. ¼-28 NF-2B



PERFORMANCE CHARACTERISTICS

1. **Operating Temperature:** -40°C to +95°C.

2. **Capacitance Tolerance:** -10, +75%.

3. **Equivalent Series Resistance:** (At +25°C) .0038 to .087 ohms max. at 120 Hz; .0031 to .041 ohms max. at 20-40 kHz, dependent upon capacitance and voltage.

4. **Ripple Current:** (At +85°C) 3.59 to 47.52 amperes RMS at 120 Hz; 5.17 to 50.0 amperes RMS at 20-40 kHz, dependent upon capacitance and voltage.

5. **Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.

6. **Life Test:** After 2000 hours at full rated voltage applied in air circulated oven, at 85°C, capacitance shall be within ±15% of initial value; and equivalent series resistance shall not increase more than 150% of initial requirement.

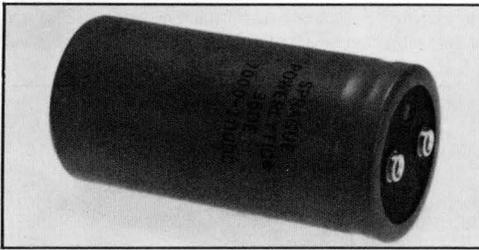
DIMENSIONS (in inches)*

Size Code	D Max.	L Max.	M ±.016
AA	1.453	2.250	.500
AB	1.453	3.250	.500
AC	1.453	4.250	.500
BB	2.078	3.250	.875
BC	2.078	4.250	.875
BF	2.078	5.750	.875
CD	2.578	4.750	1.125
CF	2.578	5.750	1.125
DF	3.078	5.750	1.125
DJ	3.078	8.750	1.125

µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number												
6.3 WVDC, 8 VDC SURGE																							
38000	AA	36DE383G6R3AA2A	53000	AC	36DE533G015AC2A	60000	BF	36DE603G040BF2A	54000	CF	36DE543G060CF2A												
69000	AB	36DE693G6R3AB2A	74000	BB	36DE743G015BB2A	81000	CD	36DE813G040CD2A	80000	DF	36DE803G060DF2A												
100000	AC	36DE104G6R3AC2A	110000	BC	36DE114G015BC2A	100000	CF	36DE104G040CF2A	130000	DJ	36DE134G060DJ2D												
140000	BB	36DE144G6R3BB2A	160000	BF	36DE164G015BF2A	150000	DF	36DE154G040DF2A	75 WVDC, 95 VDC SURGE														
210000	BC	36DE214G6R3BC2A	220000	CD	36DE224G015CD2A	250000	DJ	36DE254G040DJ2D	3000	AA	36DE302G075AA2A												
310000	BF	36DE314G6R3BF2A	280000	CF	36DE284G015CF2A	50 WVDC, 65 VDC SURGE						5800	AB	36DE582G075AB2A									
420000	CD	36DE424G6R3CD2A	420000	DF	36DE424G015DF2A	5600	AA	36DE562G050AA2A	8400	AC	36DE842G075AC2A												
540000	CF	36DE544G6R3CF2A	700000	DJ	36DE704G015DJ2D	10000	AB	36DE103G050AB2A	11000	BB	36DE113G075BB2A												
790000	DF	36DE794G6R3DF2A	25 WVDC, 30 VDC SURGE						15000	AC	36DE153G050AC2A	17000	BC	36DE173G075BC2A									
1300000	DJ	36DE135G6R3DJ2D	10000	AA	36DE103G025AA2A	21000	BB	36DE213G050BB2A	26000	BF	36DE263G075BF2A												
10 WVDC, 12 VDC SURGE												35000	CD	36DE353G075CD2A	45000	CF	36DE453G075CF2A	67000	DF	36DE673G075DF2A			
29000	AA	36DE293G010AA2A	20000	AB	36DE203G025AB2A	31000	BC	36DE313G050BC2A	110000	DJ	36DE114G075DJ2D												
52000	AB	36DE523G010AB2A	29000	AC	36DE293G025AC2A	47000	BF	36DE473G050BF2A	100 WVDC, 125 VDC SURGE														
75000	AC	36DE753G010AC2A	40000	BB	36DE403G025BB2A	64000	CD	36DE643G050CD2A	1700	AA	36DE172G100AA2A												
100000	BB	36DE104G010BB2A	61000	BC	36DE613G025BC2A	82000	CF	36DE823G050CF2A	3100	AB	36DE312G100AB2A												
150000	BC	36DE154G010BC2A	91000	BF	36DE913G025BF2A	120000	DF	36DE124G050DF2A	4500	AC	36DE452G100AC2A												
230000	BF	36DE234G010BF2A	120000	CD	36DE124G025CD2A	200000	DJ	36DE204G050DJ2D	6300	BB	36DE632G100BB2A												
310000	CD	36DE314G010CD2A	150000	CF	36DE154G025CF2A	60 WVDC, 75 VDC SURGE						9500	BC	36DE952G100BC2A									
400000	CF	36DE404G010CF2A	230000	DF	36DE234G025DF2A	3600	AA	36DE362G060AA2A	14000	BF	36DE143G100BF2A												
590000	DF	36DE594G010DF2A	380000	DJ	36DE384G025DJ2D	7000	AB	36DE702G060AB2A	19000	CD	36DE193G100CD2A												
990000	DJ	36DE994G010DJ2D	40 WVDC, 50 VDC SURGE						10000	AC	36DE103G060AC2A	24000	CF	36DE243G100CF2A									
15 WVDC, 18 VDC SURGE												14000	BB	36DE143G060BB2A	36000	DF	36DE363G100DF2A	60000	DJ	36DE603G100DJ2D			
20000	AA	36DE203G015AA2A	7100	AA	36DE712G040AA2A	42000	CD	36DE423G060CD2A															
37000	AB	36DE373G015AB2A	13000	AB	36DE133G040AB2A																		
												19000	AC	36DE193G040AC2A									
												26000	BB	36DE263G040BB2A									
												40000	BC	36DE403G040BC2A									

TYPE 36DE POWERLYTIC[®] ALUMINUM ELECTROLYTICS

ORIGINAL RATINGS



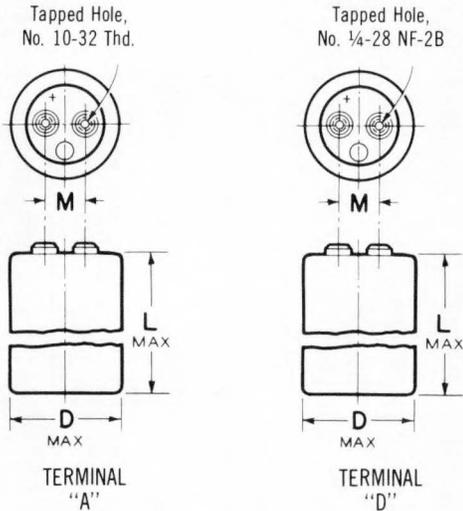
- State-of-the-art computer designed, large cylindrical case, low voltage aluminum electrolytic capacitors.
- New foil technology and electrolyte systems allow as much as 100% more capacitance per case size and equivalent series resistance values nearly 70% lower than previous designs.
- Operational life in excess of 10 years in normal circuit applications.
- Capacitors listed have outer plastic-film insulation and low screw inserts. For high insert terminals, change last digit to B.
- For ripple current ratings above 30 amperes in 2.5" and 3" diameters, high current, low insert terminals must be specified by changing last digit to D.
- For complete technical data, refer to latest issue of Engineering Bulletin 3432.

PERFORMANCE CHARACTERISTICS

- Operating Temperature:** -40°C to +95°C.
- Capacitance Tolerance:** -10, +75%.
- Equivalent Series Resistance:** (At +25°C) .004 to .1415 ohms max. at 120 Hz; .0036 to .0646 ohms max. at 20-40 kHz, dependent upon capacitance and voltage.
- Ripple Current:** (At +85°C) 2.05 to 37.83 amperes RMS at 120 Hz; 3.04 to 39.88 amperes RMS at 20-40 kHz, dependent upon capacitance and voltage.
- Reverse Voltage:** Up to 1.5 volts may be applied without significant change in performance characteristics.
- Life Test:** After 2000 hours at full rated voltage applied in air circulated oven, at 85°C, capacitance shall be within ±15% of initial value; and equivalent series resistance shall not increase more than 150% of initial requirement.

DIMENSIONS (in inches)*

Size Code	D Max.	L Max.	M ±.016
AN	1.453	1.750	.500
AA	1.453	2.250	.500
AB	1.453	3.250	.500
AC	1.453	4.250	.500
BB	2.078	3.250	.875
BC	2.078	4.250	.875
BF	2.078	5.750	.875
CD	2.578	4.750	1.125
CF	2.578	5.750	1.125
DF	3.078	5.750	1.125
DJ	3.078	8.750	1.125



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
6.3 WVDC, 8 VDC SURGE			25 WVDC, 30 VDC SURGE			60 WVDC, 75 VDC SURGE		
20000	AN	36DE203G6R3AN2A	5800	AN	36DE582G025AN2A	1900	AN	36DE192G060AN2A
33000	AA	36DE333G6R3AA2A	9700	AA	36DE972G025AA2A	3300	AA	36DE332G060AA2A
60000	AB	36DE603G6R3AB2A	18000	AB	36DE183G025AB2A	6300	AB	36DE632G060AB2A
87000	AC	36DE873G6R3AC2A	26000	AC	36DE263G025AC2A	9100	AC	36DE912G060AC2A
120000	BB	36DE124G6R3BB2A	36000	BB	36DE363G025BB2A	12000	BB	36DE123G060BB2A
180000	BC	36DE184G6R3BC2A	54000	BC	36DE543G025BC2A	19000	BC	36DE193G060BC2A
270000	BF	36DE274G6R3BF2A	82000	BF	36DE823G025BF2A	28000	BF	36DE283G060BF2A
360000	CD	36DE364G6R3CD2A	110000	CD	36DE114G025CD2A	38000	CD	36DE383G060CD2A
460000	CF	36DE464G6R3CF2A	140000	CF	36DE144G025CF2A	49000	CF	36DE493G060CF2A
680000	DF	36DE684G6R3DF2A	200000	DF	36DE204G025DF2A	72000	DF	36DE723G060DF2A
1100000	DJ	36DE115G6R3DJ2D	340000	DJ	36DE344G025DJ2D	120000	DJ	36DE124G060DJ2D
10 WVDC, 12 VDC SURGE			40 WVDC, 50 VDC SURGE			75 WVDC, 95 VDC SURGE		
14000	AN	36DE143G010AN2A	3800	AN	36DE382G040AN2A	1600	AN	36DE162G075AN2A
23000	AA	36DE233G010AA2A	6300	AA	36DE632G040AA2A	2700	AA	36DE272G075AA2A
42000	AB	36DE423G010AB2A	12000	AB	36DE123G040AB2A	5200	AB	36DE522G075AB2A
62000	AC	36DE623G010AC2A	17000	AC	36DE173G040AC2A	7500	AC	36DE752G075AC2A
86000	BB	36DE863G010BB2A	24000	BB	36DE243G040BB2A	10000	BB	36DE103G075BB2A
120000	BC	36DE124G010BC2A	36000	BC	36DE363G040BC2A	15000	BC	36DE153G075BC2A
190000	BF	36DE194G010BF2A	54000	BF	36DE543G040BF2A	23000	BF	36DE233G075BF2A
250000	CD	36DE254G010CD2A	72000	CD	36DE723G040CD2A	31000	CD	36DE313G075CD2A
330000	CF	36DE334G010CF2A	93000	CF	36DE933G040CF2A	40000	CF	36DE403G075CF2A
490000	DF	36DE494G010DF2A	130000	DF	36DE134G040DF2A	59000	DF	36DE593G075DF2A
810000	DJ	36DE814G010DJ2D	220000	DJ	36DE224G040DJ2D	99000	DJ	36DE993G075DJ2D
15 WVDC, 18 VDC SURGE			50 WVDC, 65 VDC SURGE			100 WVDC, 125 VDC SURGE		
10000	AN	36DE103G015AN2A	2600	AN	36DE262G050AN2A	740	AN	36DE741G100AN2A
17000	AA	36DE173G015AA2A	4400	AA	36DE442G050AA2A	1200	AA	36DE122G100AA2A
30000	AB	36DE303G015AB2A	8400	AB	36DE842G050AB2A	2300	AB	36DE232G100AB2A
44000	AC	36DE443G015AC2A	12000	AC	36DE123G050AC2A	3400	AC	36DE342G100AC2A
62000	BB	36DE623G015BB2A	16000	BB	36DE163G050BB2A	4700	BB	36DE472G100BB2A
93000	BC	36DE933G015BC2A	25000	BC	36DE253G050BC2A	7000	BC	36DE702G100BC2A
130000	BF	36DE134G015BF2A	37000	BF	36DE373G050BF2A	10000	BF	36DE103G100BF2A
180000	CD	36DE184G015CD2A	50000	CD	36DE503G050CD2A	14000	CD	36DE143G100CD2A
230000	CF	36DE234G015CF2A	65000	CF	36DE653G050CF2A	18000	CF	36DE183G100CF2A
350000	DF	36DE354G015DF2A	96000	DF	36DE963G050DF2A	26000	DF	36DE263G100DF2A
580000	DJ	36DE584G015DJ2D	160000	DJ	36DE164G050DJ2D	44000	DJ	36DE443G100DJ2D

TYPE 36D POWERLYTIC® ALUMINUM ELECTROLYTICS

ORIGINAL RATINGS

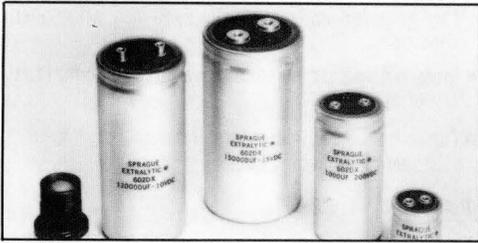
• Same features and performance characteristics as Type 36DX, except for lower capacitance per case size.

• Capacitors listed have outer plastic-film insulation. For bare case, change 13th character of catalog number from 2 to 0 and subtract .078" from diameter and .125" from length. Capacitors listed have low-insert terminals. For "special" high-insert or solder-lug terminals, change last character from A to B or C, respectively.

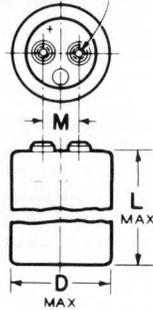
μF	Size Code	Cat. No.	μF	Size Code	Cat. No.	μF	Size Code	Cat. No.	μF	Size Code	Cat. No.	μF	Size Code	Cat. No.
3 WVDC, 4 VDC SURGE														
10000	AA	36D103G003AA2A	21000	BB	36D213G015BB2A	31000	DC	36D313G040DC2A	900	AC	36D901F150AC2A	1400	CC	36D142F300CC2A
20000	AB	36D203G003AB2A	31000	BC	36D313G015BC2A	32000	CF	36D323G040CF2A	1100	AD	36D112F150AD2A	1600	CD	36D162F300CD2A
30000	AC	36D303G003AC2A	36000	CB	36D363G015CB2A	37000	DD	36D373G040DD2A	1200	AE	36D122F150AE2A	1800	CE	36D182F300CE2A
36000	AD	36D363G003AD2A	37000	BD	36D373G015BD2A	42000	DE	36D423G040DE2A	1300	AF	36D132F150AF2A	2100	CF	36D212F300CF2A
41000	AE	36D413G003AE2A	42000	BE	36D423G015BE2A	48000	DF	36D483G040DF2A	1400	BB	36D142F150BB2A	2100	DC	36D212F300DC2A
46000	AF	36D463G003AF2A	47000	BF	36D473G015BF2A				2100	BC	36D212F150BC2A	2400	DD	36D242F300DD2A
47000	BB	36D473G003BB2A	54000	CC	36D543G015CC2A	50 WVDC, 65 VDC SURGE								
70000	BC	36D703G003BC2A	63000	CD	36D633G015CD2A	1300	AA	36D132G050AA2A	2700	BE	36D272F150BE2A	3100	BF	36D312F150BF2A
80000	CB	36D803G003CB2A	72000	CE	36D723G015CE2A	2600	AB	36D262G050AB2A	3100	BF	36D312F150BF2A	3600	CC	36D362F150CC2A
82000	BD	36D823G003BD2A	80000	DC	36D803G015DC2A	3900	AC	36D392G050AC2A	4200	CD	36D422F150CD2A	4200	CD	36D422F150CD2A
94000	BE	36D943G003BE2A	81000	CF	36D813G015CF2A	4600	AD	36D462G050AD2A	4700	CE	36D472F150CE2A	5300	CF	36D532F150CF2A
100000	BF	36D104G003BF2A	93000	DD	36D933G015DD2A	5200	AE	36D522G050AE2A	5300	CF	36D532F150CF2A	5300	CF	36D532F150CF2A
120000	CC	36D124G003CC2A	100000	DE	36D104G015DE2A	5900	AF	36D592G050AF2A	5300	CF	36D532F150CF2A	6200	DD	36D622F150DD2A
140000	CD	36D144G003CD2A	120000	DF	36D124G015DF2A	6000	BB	36D602G050BB2A	7000	DE	36D702F150DE2A	7800	DF	36D782F150DF2A
160000	CE	36D164G003CE2A				9000	BC	36D902G050BC2A						
170000	DC	36D174G003DC2A	25 WVDC, 30 VDC SURGE											
180000	CF	36D184G003CF2A	2700	AA	36D272G025AA2A	12000	BE	36D123G050BE2A	200 WVDC, 250 VDC SURGE					
200000	DD	36D204G003DD2A	5500	AB	36D552G025AB2A	13000	BF	36D133G050BF2A	250	AA	36D251F200AA2A	430	AB	36D431F200AB2A
230000	DE	36D234G003DE2A	8200	AC	36D822G025AC2A	15000	CC	36D153G050CC2A	640	AC	36D641F200AC2A	640	AC	36D641F200AC2A
270000	DF	36D274G003DF2A	9600	AD	36D962G025AD2A	18000	CD	36D183G050CD2A	770	AD	36D771F200AD2A	770	AD	36D771F200AD2A
			11000	AE	36D113G025AE2A	20000	CE	36D203G050CE2A	850	AE	36D851F200AE2A	850	AE	36D851F200AE2A
			12000	AF	36D123G025AF2A	22000	DC	36D223G050DC2A	950	AF	36D951F200AF2A	950	AF	36D951F200AF2A
			18000	BC	36D183G025BC2A	23000	CF	36D233G050CF2A	1400	BC	36D142F200BC2A	1600	CB	36D162F200CB2A
			21000	CB	36D213G025CB2A	26000	DD	36D263G050DD2A	1700	BD	36D172F200BD2A	1700	BD	36D172F200BD2A
			22000	BD	36D223G025BD2A	30000	DE	36D303G050DE2A	1900	BE	36D192F200BE2A	2100	BF	36D212F200BF2A
			25000	BE	36D253G025BE2A	34000	DF	36D343G050DF2A	2100	BF	36D212F200BF2A	2500	CC	36D252F200CC2A
			28000	BF	36D283G025BF2A				2900	CD	36D292F200CD2A	2900	CD	36D292F200CD2A
			32000	CC	36D323G025CC2A	75 WVDC, 95 VDC SURGE								
			38000	CD	36D383G025CD2A	850	AA	36D851G075AA2A	1700	AB	36D172G075AB2A	1900	BE	36D192F200BE2A
			43000	CE	36D433G025CE2A	2500	AC	36D252G075AC2A	2500	AC	36D252G075AC2A	2100	BF	36D212F200BF2A
			47000	DC	36D473G025DC2A	3000	AD	36D302G075AD2A	3400	AE	36D342G075AE2A	3300	CE	36D332F200CE2A
			48000	CF	36D483G025CF2A	3400	AE	36D342G075AE2A	3800	AF	36D382G075AF2A	3700	CF	36D372F200CF2A
			55000	DD	36D553G025DD2A	3800	AF	36D382G075AF2A	3900	BB	36D392G075BB2A	3700	DC	36D372F200DC2A
			63000	DE	36D633G025DE2A	3900	BB	36D392G075BB2A	5900	BC	36D592G075BC2A	4300	DD	36D432F200DD2A
			71000	DF	36D713G025DF2A	6700	CB	36D672G075CB2A	6900	BD	36D692G075BD2A	4800	DE	36D482F200DE2A
						6900	BD	36D692G075BD2A	7800	BE	36D782G075BE2A	5500	DF	36D552F200DF2A
						7800	BE	36D782G075BE2A	8800	BF	36D882G075BF2A			
						8800	BF	36D882G075BF2A	10000	CC	36D103G075CC2A	250 WVDC, 300 VDC SURGE		
						10000	CC	36D103G075CC2A	11000	CD	36D113G075CD2A	170	AA	36D171F250AA2A
						11000	CD	36D113G075CD2A	13000	CE	36D133G075CE2A	350	AB	36D351F250AB2A
						13000	CE	36D133G075CE2A	14000	DC	36D143G075DC2A	530	AC	36D531F250AC2A
						14000	DC	36D143G075DC2A	15000	CF	36D153G075CF2A	630	AD	36D631F250AD2A
						15000	CF	36D153G075CF2A	17000	DD	36D173G075DD2A	700	AE	36D701F250AE2A
						17000	DD	36D173G075DD2A	20000	DE	36D203G075DE2A	780	AF	36D781F250AF2A
						20000	DE	36D203G075DE2A	22000	DF	36D223G075DF2A	800	BB	36D801F250BB2A
						22000	DF	36D223G075DF2A				1200	BC	36D122F250BC2A
									1300	CB	36D132F250CB2A	1300	CB	36D132F250CB2A
									1400	BD	36D142F250BD2A	1400	BD	36D142F250BD2A
									1500	BE	36D152F250BE2A	1500	BE	36D152F250BE2A
									1700	BF	36D172F250BF2A	1700	BF	36D172F250BF2A
									2000	CC	36D202F250CC2A	2000	CC	36D202F250CC2A
									2400	CD	36D242F250CD2A	2400	CD	36D242F250CD2A
									2700	CE	36D272F250CE2A	2700	CE	36D272F250CE2A
									3000	CF	36D302F250CF2A	3000	CF	36D302F250CF2A
									3000	DC	36D302F250DC2A	3000	DC	36D302F250DC2A
									3500	DD	36D352F250DD2A	3500	DD	36D352F250DD2A
									4000	DE	36D402F250DE2A	4000	DE	36D402F250DE2A
									4500	DF	36D452F250DF2A	4500	DF	36D452F250DF2A
												300 WVDC, 350 VDC SURGE		
									120	AA	36D121F300AA2A	240	AB	36D241F300AB2A
									240	AB	36D241F300AB2A	370	AC	36D371F300AC2A
									450	AD	36D451F300AD2A	450	AD	36D451F300AD2A
									500	AE	36D501F300AE2A	500	AE	36D501F300AE2A
									550	AF	36D551F300AF2A	820	BC	36D821F300BC2A
									820	BC	36D821F300BC2A	950	BD	36D951F300BD2A
									1100	BE	36D112F300BE2A	1100	BE	36D112F300BE2A
									1200	BF	36D122F300BF2A	1200	BF	36D122F300BF2A
												400 WVDC, 475 VDC SURGE		
												65	AA	36D650F400AA2A
												120	AB	36D121F400AB2A
												190	AC	36D191F400AC2A
												230	AD	36D231F400AD2A
												270	AE	36D271F400AE2A
												290	BB	36D291F400BB2A
												300	AF	36D301F400AF2A
												420	BC	36D421F400BC2A
												490	CC	36D491F400CC2A
												530	BD	36D531F400BD2A
												610	BE	36D611F400BE2A
												680	BF	36D681F400BF2A
												790	CC	36D791F400CC2A
												910	CD	36D911F400CD2A
												1000	CE	36D102F400CE2A
												1000	CD	36D102F400CD2A
												1100	CF	36D112F400CF2A

TYPE 602D EXTRALYTIC® ALUMINUM ELECTROLYTICS

ORIGINAL RATINGS



TAPPED HOLE, NO. 10-32 THD.



DIMENSIONS (in inches)*

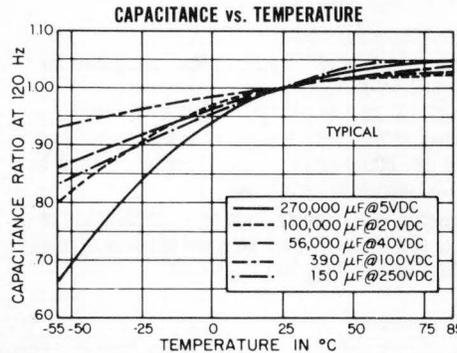
Size Code	D	L	M
AA	1.453	2.250	500
AB	1.453	3.250	500
AC	1.453	4.250	500
AD	1.453	4.750	500
AE	1.453	5.250	500
AF	1.453	5.750	500
BB	2.078	3.250	875
BC	2.078	4.250	875
BD	2.078	4.750	875
BE	2.078	5.250	875
BF	2.078	5.750	875
CB	2.578	3.250	1125
CC	2.578	4.250	1125
CD	2.578	4.750	1125
CE	2.578	5.250	1125
CF	2.578	5.750	1125
DC	3.078	4.250	1250
DD	3.078	4.750	1250
DE	3.078	5.250	1250
DF	3.078	5.750	1250

- Designed specifically for use as input and output capacitors in power supplies of signal and data processing equipment.
- Extremely low ESR, very high ripple current capability.
- Cost and weight advantages, coupled with wide operating temperature range and environmental capabilities, make Type 602D capacitors ideal for military and aerospace applications.
- Superior humidity seal for long, trouble-free life.

- Capacitors listed have outer plastic-film insulation. For bare case, change 14th character of catalog number from 2 to 0 and subtract .078" from diameter and .125" from length. Capacitors listed have low-insert terminals. For high-insert terminals, change last character from A to B.
- For complete technical data, refer to latest issue of Engineering Bulletin 3457.

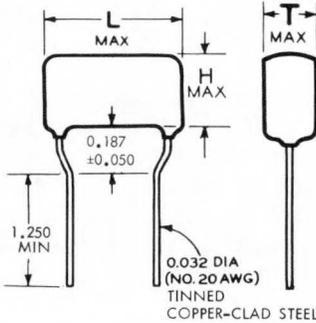
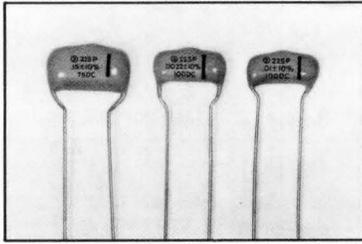
PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C.
- Capacitance Tolerance:** 5 through 50 WVDC capacitors . . . +75, -10%; 75 and 100 WVDC capacitors . . . +50, -10%.
- Equivalent Series Resistance:** .01 to .6 max. ohms @ 120 Hz, depending upon capacitance.
- Ripple Current:** 1.6 to 28.3 max. amperes RMS @ 120 Hz and 85°C, depending upon capacitance.
- Life Test:** Satisfactory operation for 2000 hours at rated d-c voltage while capacitors are maintained at ambient temperature of 85°C.



µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number	µF	Size Code	Catalog Number
5 WVDC, 7 VDC SURGE				20 WVDC, 30 VDC SURGE				30 WVDC, 40 VDC SURGE			
8.000	AA	602D802G005AA2A	2.800	AA	602D282G020A2A	2.200	AA	602D222G030AA2A	13.000	BE	602D133G050BE2A
17.000	AB	602D173G005AB2A	5.100	AB	602D512G020AB2A	4.400	AB	602D442G030AB2A	15.000	BF	602D153G050BF2A
25.000	AC	602D253G005AC2A	8.600	AC	602D862G020AC2A	6.600	AC	602D662G030AC2A	17.000	CC	602D173G050CC2D
29.000	AD	602D293G005AD2A	10.000	AD	602D103G020AD2A	7.700	AD	602D772G030AD2A	20.000	CD	602D203G050CD2D
34.000	AE	602D343G005AE2A	11.000	AE	602D113G020AE2A	8.800	AE	602D882G030AE2A	22.000	CE	602D223G050CE2D
37.000	AF	602D373G005AF2A	13.000	AF	602D133G020AF2A	9.900	AF	602D992G030AF2A	25.000	CF	602D253G050CF2D
40.000	BB	602D403G005BB2A	20.000	BC	602D203G020BC2A	10.000	BB	602D103G030BB2A	25.000	DC	602D253G050DC2D
60.000	BC	602D603G005BC2A	23.000	BD	602D233G020BD2A	15.000	BC	602D153G030BC2A	30.000	DD	602D303G050DD2D
67.000	CB	602D673G005CB2D	24.000	BE	602D243G020BE2A	17.000	BD	602D173G030BD2A	34.000	DE	602D343G050DE2D
70.000	BD	602D703G005BD2A	26.000	BF	602D263G020BF2A	18.000	CB	602D183G030CB2D	39.000	DF	602D393G050DF2D
80.000	BE	602D803G005BE2A	30.000	BF	602D303G020BF2A	20.000	BE	602D203G030BE2A			
90.000	BF	602D903G005BF2A	37.000	CC	602D373G020CC2D	22.000	BF	602D223G030BF2A			
100.000	CC	602D104G005CC2D	43.000	CD	602D433G020CD2D	26.000	CC	602D263G030CC2D			
110.000	CD	602D114G005CD2D	47.000	CE	602D473G020CE2D	30.000	CD	602D303G030CD2D			
130.000	CE	602D134G005CE2D	54.000	DC	602D543G020DC2D	34.000	CE	602D343G030CE2D			
150.000	CF	602D154G005CF2D	55.000	CF	602D553G020CF2D	38.000	DC	602D383G030DC2D			
150.000	DC	602D154G005DC2D	63.000	DD	602D633G020DD2D	39.000	DD	602D393G030DD2D			
170.000	DD	602D174G005DD2D	73.000	DE	602D733G020DE2D	45.000	DF	602D453G030DF2D			
200.000	DE	602D204G005DE2D	82.000	DF	602D823G020DF2D	52.000	DE	602D523G030DE2D			
220.000	DF	602D224G005DF2D				58.000	DF	602D583G030DF2D			
10 WVDC, 15 VDC SURGE				25 WVDC, 40 VDC SURGE				40 WVDC, 55 VDC SURGE			
5.000	AA	602D502G010AA2A	2.500	AA	602D252G025AA2A	1.800	AA	602D182G040AA2A	5.000	BE	602D502F075BE2A
10.000	AB	602D103G010AB2A	5.000	AB	602D502G025AB2A	3.700	AB	602D372G040AB2A	5.800	BF	602D582F075BF2A
15.000	AC	602D153G010AC2A	7.500	AC	602D752G025AC2A	5.500	AC	602D552G040AC2A	6.600	CC	602D662F075CC2D
17.000	AD	602D173G010AD2A	8.700	AD	602D872G025AD2A	6.400	AD	602D642G040AD2A	7.700	CD	602D772F075CD2D
20.000	AE	602D203G010AE2A	10.000	AE	602D103G025AE2A	7.400	AE	602D742G040AE2A	8.800	CE	602D882F075CE2D
22.000	AF	602D223G010AF2A	11.000	AF	602D113G025AF2A	8.200	AF	602D822G040AF2A	9.500	DC	602D952F075DC2D
24.000	BB	602D243G010BB2A	17.000	BC	602D173G025BC2A	9.000	BB	602D902G040BB2A	9.900	CF	602D992F075CF2D
37.000	BC	602D373G010BC2A	20.000	BD	602D203G025BD2A	13.000	BC	602D133G040BC2A	11.000	DD	602D113F075DD2D
42.000	CB	602D423G010CB2D	20.000	CB	602D203G025CB2D	15.000	BD	602D153G040BD2A	13.000	DE	602D133F075DE2D
43.000	BD	602D433G010BD2A	23.000	BE	602D233G025BE2A	15.000	CB	602D153G040CB2D	14.000	DF	602D143F075DF2D
48.000	BE	602D483G010BE2A	25.000	BF	602D253G025BF2A	18.000	BE	602D183G040BE2A			
55.000	BF	602D553G010BF2A	30.000	CC	602D303G025CC2D	19.000	BF	602D193G040BF2A			
64.000	CC	602D643G010CC2D	35.000	CD	602D353G025CD2D	22.000	CC	602D223G040CC2D			
75.000	CD	602D753G010CD2D	40.000	CE	602D403G025CE2D	25.000	CD	602D253G040CD2D			
86.000	CE	602D863G010CE2D	44.000	DC	602D443G025DC2D	28.000	CE	602D283G040CE2D			
94.000	DC	602D943G010DC2D	45.000	CF	602D453G025CF2D	32.000	DC	602D323G040DC2D			
96.000	CF	602D963G010CF2D	52.000	DD	602D523G025DD2D	33.000	CF	602D333G040CF2D			
110.000	DD	602D114G010DD2D	60.000	DE	602D603G025DE2D	37.000	DD	602D373G040DD2D			
120.000	DE	602D124G010DE2D	67.000	DF	602D673G025DF2D	43.000	DE	602D433G040DE2D			
140.000	DF	602D144G010DF2D				48.000	DF	602D483G040DF2D			
15 WVDC, 20 VDC SURGE				50 WVDC, 75 VDC SURGE				75 WVDC, 100 VDC SURGE			
4.000	AA	602D402G015AA2A	1.400	AA	602D142G050AA2A	2.400	BE	602D242F100BE2A			
8.000	AB	602D802G015AB2A	2.900	AB	602D292G050AB2A	2.600	BF	602D262F100BF2A			
12.000	AC	602D123G015AC2A	4.400	AC	602D442G050AC2A	3.100	CC	602D312F100CC2D			
14.000	AD	602D143G015AD2A	5.100	AD	602D512G050AD2A	3.600	CD	602D362F100CD2D			
16.000	AE	602D163G015AE2A	5.800	AE	602D582G050AE2A	4.100	CE	602D412F100CE2D			
18.000	AF	602D183G015AF2A	6.600	AF	602D662G050AF2A	4.500	CF	602D452F100CF2D			
20.000	BB	602D203G015BB2A	9.000	BC	602D902G050BC2A	4.600	DC	602D462F100DC2D			
30.000	BC	602D303G015BC2A	11.000	BD	602D113G050BD2A	5.500	DD	602D552F100DD2D			
			12.000	CB	602D123G050CB2D	6.000	DE	602D602F100DE2D			
						6.700	DF	602D672F100DF2D			

TYPE 225P ORANGE DROP® POLYESTER CAPACITORS



- Designed specifically for printed wiring board applications and furnished with radial leads to facilitate insertion on boards.
- Wide application: television sets, instruments, commercial electronic equipment, etc.
- Utilize minimum space on printed wiring boards.

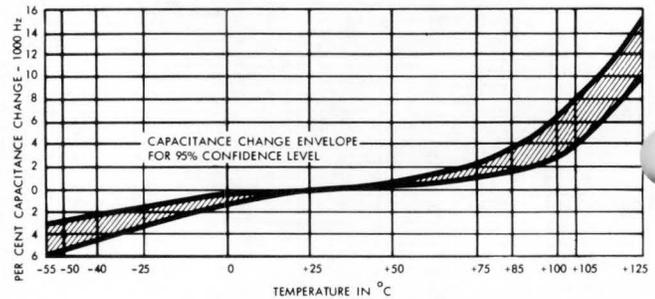
- Capacitor sections wound from polyester film and thin-gage foil under carefully controlled atmospheric conditions.
- Protected against moisture by wax-free conformal coating of epoxy.
- For complete technical data, refer to latest issue of Engineering Bulletin 2062.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C; to +105°C with 30% voltage derating; to +125°C with 50% voltage derating of +85°C value.
- Capacitance Tolerance:** ±10%.
- Dissipation Factor:** (At +25°C) Max. dissipation factor shall be 0.75%.
- Insulation Resistance:** (At +25°C) The minimum product of insulation resistance, which need not exceed 100,000 megohms, and capacitance, shall be 25,000 megohms-microfarads.
- Dielectric Withstanding Voltage:** Capacitors are capable of withstanding d-c potential of 250% of rated voltage for not more than 5 seconds.
- Humidity Test:** Capacitors are capable of withstanding humidity test for 72 hours at 95% relative humidity at +75°C with no voltage applied, and dried in circulating air for 4 hours. After test, minimum product of insulation resistance and capacitance shall be 5000 megohm-microfarads, and insulation resistance need not exceed 10,000 megohms.
- Life Test:** Capacitors are capable of withstanding a 500 hour life test at +85°C at 150% of rated working voltage. After test, capacitance shall not have changed by more than 5% of initial value, insulation resistance shall not have decreased by more than 50% of initial limit, and dissipation factor shall not have increased by more than 1%.

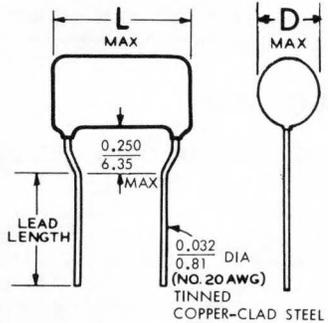
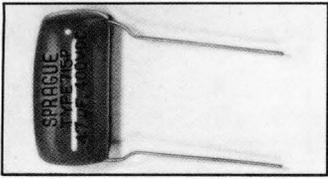
Size Code	H	T	L	Size Code	H	T	L	Size Code	H	T	L
AB	.315	.815	.703	CA	.562	.234	.812	DJ	.812	.484	.812
AC	.328	.234	.703	CB	.593	.250	.812	EA	.890	.562	1.187
AD	.343	.250	.703	CC	.265	.281	.812	EB	.906	.513	1.187
AE	.375	.281	.703	CD	.640	.312	.812	EC	.953	.656	1.187
AF	.531	.328	.703	CE	.718	.375	.812	ED	.984	.734	1.187
BA	.593	.375	.812	CF	.375	.421	.812	FA	.718	.421	1.187
BB	.625	.406	.812	CG	.781	.468	.812	FB	.843	.500	1.187
BC	.171	.439	.812	DA	.843	.531	.812	FC	1.140	.843	1.187
BD	.718	.468	.812	DE	.593	.250	.812	GA	.812	.484	1.187
BE	.375	.500	.812	DF	.593	.281	.812	GB	.890	.562	1.187
BF	.781	.531	.812	DG	.593	.312	.812	GC	1.0	.734	1.187
BG	.812	.562	.812	DH	.656	.343	.812	GD	1.140	.843	1.187
BH	.875	.625	.812	DI	.656	.421	.812				

CAPACITANCE CHANGE vs. TEMPERATURE



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
100 WVDC			200 WVDC			400 WVDC		
.001	AB	225P10291WD3	.001	CA	225P10292XD3	.001	CA	225P10294XD3
.0012	AB	225P12291WD3	.0015	CA	225P15292XD3	.0015	CA	225P15294XD3
.0015	AB	225P15291WD3	.0022	CA	225P22292XD3	.0022	CA	225P22294XD3
.0018	AB	225P18291WD3	.0033	CA	225P33292XD3	.0033	CA	225P33294XD3
.0022	AB	225P22291WD3	.0047	CA	225P47292XD3	.0047	CA	225P47294XD3
.0027	AB	225P27291WD3	.0068	CB	225P68292XD3	.0068	CB	225P68294XD3
.0033	AB	225P33291WD3	.01	CB	225P10392XD3	.01	CB	225P10394XD3
.0039	AB	225P39291WD3	.015	CB	225P15392XD3	.015	DF	225P15394XD3
.0047	AB	225P47291WD3	.022	CB	225P22392XD3	.022	DG	225P22394XD3
.0056	AB	225P56291WD3	.033	CB	225P33392XD3	.033	DH	225P33394XD3
.0068	AB	225P68291WD3	.047	CA	225P47292XD3	.047	DI	225P47394XD3
.0082	AB	225P82291WD3	.068	CB	225P68292XD3	.068	DJ	225P68394XD3
.01	AB	225P10391WD3	.1	CB	225P10392XD3	.1	DA	225P10494XD3
.012	AB	225P12391WD3	.15	CB	225P15392XD3	.15	GA	225P15494XD3
.015	AB	225P15391WD3	.22	CB	225P22392XD3	.22	GB	225P22494XD3
.018	AB	225P18391WD3	.33	CC	225P33392XD3	.33	GC	225P33494XD3
.022	AB	225P22391WD3	.47	CC	225P47392XD3	.47	GD	225P47494XD3
.027	AC	225P27391WD3						
.033	AC	225P33391WD3						
.039	AD	225P39391WD3						
.047	AD	225P47391WD3						
.056	AE	225P56391WD3						
.068	AE	225P68391WD3						
.082	AF	225P82391WD3						

TYPE 715P ORANGE DROP® POLYPROPYLENE DIPPED TUBULARS



DIMENSIONS (in inches)*

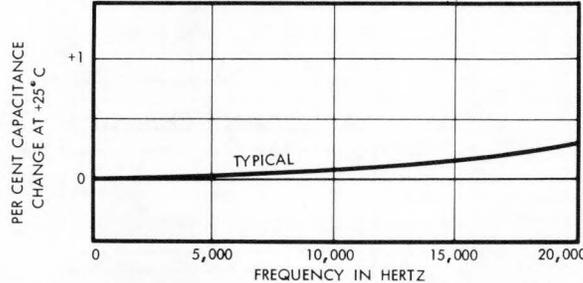
Size Code	D	L	Size Code	D	L
AJ	.375	.750	HL	.625	1.300
BJ	.400	.750	NL	.650	1.300
CJ	.425	.750	PL	.700	1.300
DJ	.450	.750	QL	.750	1.300
CK	.425	.950	NM	.650	1.700
DK	.450	.950	PM	.700	1.700
EK	.500	.950			
FK	.550	.950	QM	.750	1.700
DL	.450	1.300	RM	.800	1.700
EL	.500	1.300	SM	.850	1.700
FL	.550	1.300	TM	.900	1.700
GL	.600	1.300	UM	.950	1.700

- Polypropylene film capacitors are similar to polystyrene units with their high a-c current-carrying capability, but have added advantage of operating temperatures to +105°C and extremely low dissipation factor.
- Ideal for high a-c current applications, such as snubbers and CRT deflection for r-f generators and pulse-forming networks, where dielectric heating is often a problem.
- Temperature coefficient is negative and virtually linear at 180 ppm/°C over the temperature range of +25°C to +105°C, making them suitable for matching with positive TC resistors and inductors to maintain circuit stability.
- Conformally coated with flame-retardant epoxy which provides protection from humidity and mechanical damage.
- Furnished with 1.250" long "hockeystick" crimped leads.
- For complete technical data, refer to latest issue of Engineering Bulletin 2090.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C; to +105°C with 50% voltage derating.
- Capacitance Tolerance:** ±5%.
- Capacitance Change with Temperature:** Less than 3% over entire operating temperature range.
- Dissipation Factor:** (At +25°C) Max. 0.1%.
- Insulation Resistance:** (At +25°C) The minimum product of insulation resistance, which need not exceed 100,000 megohms, and capacitance shall be 50,000 megohm-microfarads. At +85°C ... 20,000 megohms and 2500 megohm-microfarads; at +105°C ... 2000 megohms and 500 megohm-microfarads.
- Dielectric Strength:** Units rated up to 800 volts shall withstand a d-c potential of 250% of rated voltage for not more than 5 seconds. Units rated above 800 volts ... 200%.
- D-C Life Test:** Capacitors shall withstand 150% of rated voltage for 500 hours at +85°C, or +105°C with appropriate derating. After test, capacitance change shall not be more than 5%; insulation resistance shall not decrease by more than 50%; dissipation factor shall not exceed 0.1%.
- A-C Life Test:** (At 60 Hz) Same as d-c life test, except 200 WVDC units shall withstand 115 volts a-c; 400 and 600 WVDC ... 200 volts a-c; 800 WVDC and up ... 500 volts a-c.

CAPACITANCE vs. FREQUENCY

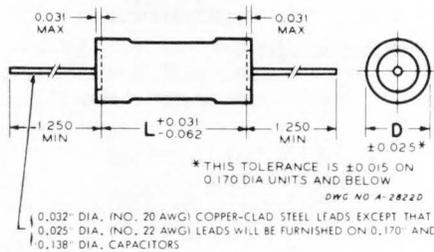
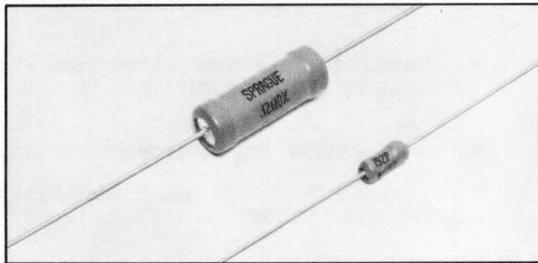


EQUIVALENT VAC RMS RATINGS

Volts D-C	Capacitance Range (μF)	1000 Hz		5000 Hz		10000 Hz		15000 Hz		20000 Hz	
		85°C	105°C	85°C	105°C	85°C	105°C	85°C	105°C	85°C	105°C
200	.012 - .068 .082 - .47	155	75	115	75	85	60	70	50	60	45
		155	75	75	60	55	40	45	35	40	30
400	.0039 - .033 .039 - .47	200	100	190	100	135	105	110	85	95	75
		200	100	100	80	75	55	60	45	50	40
600	.001 - .033 .039 - .22	200	140	200	165	160	120	130	100	110	85
		200	140	125	95	90	65	75	55	65	45
800	.0056 - .033 .039 - .10	500	250	500	190	500	150	450	120	405	100
		500	250	400	120	240	100	185	75	140	60
1200	.0027 - .01 .012 - .047	500	390	500	340	500	190	500	155	440	115
		500	390	500	175	400	150	295	90	230	70
1600	.0018 - .01 .012 - .033	500	500	500	370	500	215	500	175	490	130
		500	500	500	220	500	155	410	110	315	85

μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
200 WVDC			.015	DJ	715P15354JD3	.01	DK	715P10356KD3	1200 WVDC		
.015	AJ	715P15352JD3	.033	EK	715P33354KD3	.015	EK	715P15356KD3	.015	NL	715P153512LD3
.022	AJ	715P22352JD3	.15	NL	715P15454LD3	.022	FK	715P22356KD3	.047	SM	715P473512MD3
.033	CJ	715P33352JD3	.22	PM	715P22454MD3	.047	GL	715P47356LD3	1600 WVDC		
.047	CK	715P47352KD3	.33	RM	715P33454MD3	.068	NL	715P68356LD3	.0022	EL	715P222516LD3
.068	DK	715P68352KD3	.47	TM	715P47454MD3	.1	QL	715P10456LD3	.0033	FL	715P332516LD3
0.1	DL	715P10452LD3	600 WVDC			.15	QM	715P15456MD3	.0047	GL	715P472516LD3
0.15	FL	715P15452LD3	.001	BJ	715P10256JD3	.22	SM	715P22456MD3	.0068	NL	715P682516LD3
0.22	HL	715P22452LD3	.0015	BJ	715P15256JD3	800 WVDC			.01	PL	715P103516LD3
0.33	NM	715P33452MD3	.0022	BJ	715P22256JD3	.015	FL	715P15358LD3	.015	QM	715P153516MD3
0.47	QM	715P47452MD3	.0033	BJ	715P33256JD3	.022	GL	715P22358LD3	.022	SM	715P223516MD3
400 WVDC			.0047	DJ	715P47256JD3	.033	PL	715P33358LD3	.033	UM	715P333516MD3
.01	BJ	715P10354JD3	.0068	DJ	715P68256JD3	.068	RM	715P68358MD3			
						.1	TM	715P10458MD3			

TYPE 192P PACER® POLYESTER CAPACITORS



DIMENSIONS (in inches)*

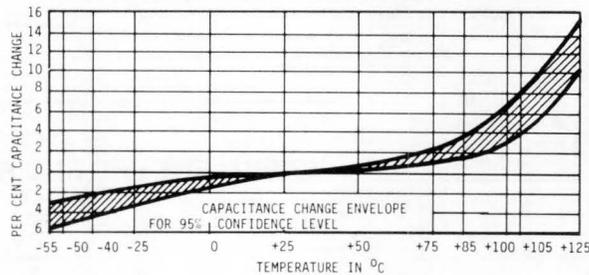
Size Code	D	L	Size Code	D	L
AA	.218	.437	BF	.234	.562
AB	.218	.562	BG	.296	.500
BA	.140	.312	BH	.296	.625
BB	.171	.375	BJ	.328	.865
BC	.171	.437	BK	.328	.875
BD	.171	.500	BL	.328	1.187
BE	.171	.312			

- Superior high frequency performance—extended foil film sections terminate in end caps with wire leads assuring best possible non-inductive section.
- Controlled dimensions permit use of automatic insertion equipment for installing Pacer® capacitors on printed wiring boards.
- Rugged orange outer sleeve with epoxy end-fill.
- Wound with ultra-thin polyester film dielectric and thin gage foil under controlled atmospheric conditions.
- 600 WVDC available upon request.
- For complete technical data, refer to latest issue of Engineering Bulletin 2066.

PERFORMANCE CHARACTERISTICS

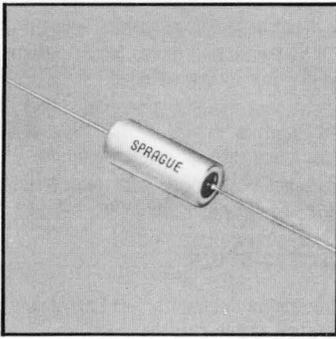
- Operating Temperature Range:** -55°C to +85°C; to +125°C with 50% voltage derating.
- Capacitance Tolerance:** ±10%.
- Dissipation Factor:** Max. dissipation factor of all capacitors shall be 1%.
- Insulation Resistance:** When measured after a two minute charge at rated voltage, or 500 volts d-c, whichever is less, minimum insulation resistance shall be: (at 85°C) 15,000 megohms; (at 125°C) 200 megohms.
- Humidity Test:** Capacitors are capable of withstanding a humidity test with no voltage applied for 500 hours at 95% relative humidity and +40°C, and dried in circulating air for 4 hours. After test, minimum insulation resistance shall be 50,000 megohms.
- Life Test:** Capacitors are capable of withstanding a 250 hour life test at +85°C, at 150% of rated voltage. After test, capacitance values shall not have changed by more than 10%, insulation resistance shall not have changed by more than 50% of initial values, and dissipation factor shall not have changed by more than 1%.

CAPACITANCE CHANGE vs. TEMPERATURE



μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
80/100 WVDC											
.0022	BA	192P2229R8	.22	BJ	192P2249R8	.0039	BC	192P39292	.00068	BB	192P68194
.0027	BA	192P2729R8	.27	BK	192P2749R8	.0047	BC	192P47292	.00082	BB	192P82194
.0033	BA	192P3329R8	.33	BL	192P3349R8	.0056	BC	192P56292	.001	BB	192P10294
.0039	BA	192P3929R8	.39	BL	192P3949R8	.0068	BC	192P68292	.0012	BB	192P12294
200 WVDC											
.0047	BA	192P4729R8	.0001	BA	192P10192	.0082	BD	192P82292	.0015	BB	192P15294
.0056	BB	192P5629R8	.00012	BA	192P12192	.01	BD	192P10392	.0018	BC	192P18294
.0068	BB	192P6829R8	.00015	BA	192P15192	.012	AA	192P12392	.0022	BC	192P22294
.0082	BB	192P8229R8	.00018	BA	192P18192	.015	AA	192P15392	.0027	AA	192P27294
.01	BB	192P1039R8	.00022	BA	192P22192	.018	AB	192P18392	.0033	AA	192P33294
.012	BC	192P1239R8	.00027	BA	192P27192	.022	AB	192P22392	.0039	AA	192P39294
.015	BC	192P1539R8	.00033	BA	192P33192	.027	BF	192P27392	.0047	AA	192P47294
.018	BD	192P1839R8	.00039	BA	192P39192	.033	BF	192P33392	.0056	BF	192P56294
.022	BD	192P2239R8	.00047	BA	192P47192	.039	BG	192P39392	.0068	BF	192P68294
.027	AA	192P2739R8	.00056	BA	192P56192	.047	BG	192P47392	.0082	BF	192P82294
.033	AA	192P3339R8	.00068	BA	192P68192	.056	BH	192P56392	.01	BF	192P10394
.039	AB	192P3939R8	.00082	BA	192P82192	.068	BH	192P68392	.012	BG	192P12394
.047	AB	192P4739R8	.001	BA	192P10292	.082	BJ	192P82392	.015	BG	192P15394
.056	BE	192P5639R8	.0012	BA	192P12292	.1	BJ	192P10492	.018	BH	192P18394
.068	BF	192P6839R8	.0015	BA	192P15292	.12	BK	192P12492	.022	BH	192P22394
.082	BG	192P8239R8	.0018	BE	192P18292	.15	BK	192P15492	.027	BJ	192P27394
.1	BG	192P1049R8	.0022	BE	192P22292	.18	BL	192P18492	.033	BJ	192P33394
.12	BH	192P1249R8	.0027	BE	192P27292	.22	BL	192P22492	.039	BK	192P39394
.15	BH	192P1549R8	.0033	BE	192P33292	400 WVDC					
.18	BJ	192P1849R8				.00047	BB	192P47194	.047	BK	192P47394
						.00056	BB	192P56194	.056	BL	192P56394
									.068	BL	192P68394

TYPE 118P DIFILM[®] METALLIZED CAPACITORS



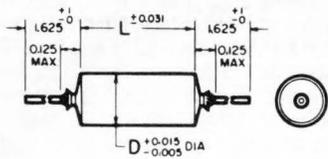
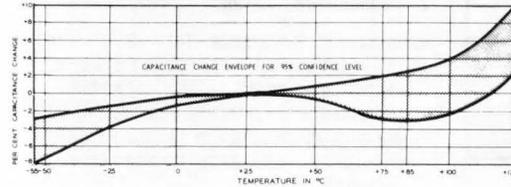
- Have broad application in military electronics and allied industrial use, where reliability and economy of space are important.
- Unique dual dielectric — combination of metallized paper and polyester film, impregnated with high-temperature mineral wax.
- Can be used at extremely low voltages where metallized paper construction has previously been unsatisfactory.
- Capacitors listed are ungrounded case (insulated section) without outer insulating sleeves. For units with insulating sleeves, change last digit in catalog number from 2 to 4.

- Capacitors listed have capacitance tolerance of $\pm 10\%$. For units with $\pm 20\%$ tolerance, change 8th character in catalog number from 9 to 0.
- For complete technical data, refer to latest issue of Engineering Bulletin 2211.

PERFORMANCE CHARACTERISTICS

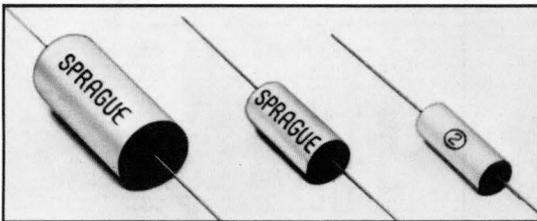
1. **Operating Temperature Range:** -55°C to $+125^{\circ}\text{C}$.
2. **Capacitance Tolerance:** $\pm 10\%$ and $\pm 20\%$.
3. **Insulation Resistance:** (At $+25^{\circ}\text{C}$) The minimum product of insulation resistance and capacitance shall be 2,000 megohm-microfarads; in no case need the insulation resistance exceed 12,000 megohms.
4. **Power Factor:** (At $+25^{\circ}\text{C}$) Max. power factor shall be 1%.
5. **Life Test:** Capacitors are capable of withstanding a life test of 250 hours at $+125^{\circ}\text{C}$, at 140% of rated voltage between terminals. After test, capacitance values shall not have dropped by more than 90% of initial requirement, and insulation resistance shall not have dropped to less than 1200 megohm-microfarads at 25°C .

CAPACITANCE CHANGE vs. TEMPERATURE



μF	D	L	Catalog Number	μF	D	L	Catalog Number	μF	D	L	Catalog Number	μF	D	L	Catalog Number
200 WVDC				.27	.400	1.124	118P27492S2	5.0	1.000	1.874	118P50592S2	600 WVDC			
.01	.175	.749	118P10392S2	.33	.400	1.124	118P33492S2	6.0	1.000	1.874	118P60592S2	.01	.312	.874	118P10396S2
.015	.195	.749	118P15392S2	.47	.500	1.124	118P47492S2	8.0	1.000	1.874	118P80592S2	.047	.400	1.124	118P47396S2
.022	.235	.749	118P22392S2	.56	.500	1.124	118P56492S2	10.0	1.000	2.374	118P10692S2	.1	.500	1.124	118P10496S2
.033	.235	.749	118P33392S2	.68	.500	1.124	118P68492S2	12.0	1.000	2.624	118P12692S2	.15	.562	1.124	118P15496S2
.047	.312	.874	118P47392S2	.82	.562	1.124	118P82492S2	400 WVDC				.22	.562	1.374	118P22496S2
.068	.312	.874	118P68392S2	1.0	.562	1.124	118P10592S2	.15	.500	1.124	118P15494S2	.33	.562	1.624	118P33496S2
.082	.312	.874	118P82392S2	1.5	.562	1.624	118P15592S2	1.0	.750	1.874	118P10594S2	.47	.670	1.624	118P47496S2
.1	.312	.874	118P10492S2	2.0	.670	1.624	118P20592S2	2.0	1.000	1.874	118P20594S2	1.0	1.000	1.874	118P10596S2
.15	.312	1.124	118P15492S2	3.0	.670	1.874	118P30592S2	3.0	1.000	2.624	118P30594S2	2.0	1.000	2.124	118P20596S2
.22	.400	.874	118P22492S2	4.0	.750	1.874	118P40592S2					2.5	1.000	2.624	118P25596S2

TYPE 430P METFILM[®] POLYESTER CAPACITORS



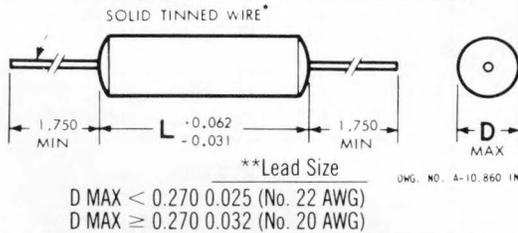
- Unique construction gives definite space advantages over metal-encased, molded, or wax-coated cardboard-case tubulars of comparable ratings.
- Axial-lead metallized polyester-film capacitor section protected against moisture by outer wrap of polyester-film tape.
- Improved end seal of plastic resin bonds with

film wrap and tinned leads, providing superior humidity resistance.

- Because of small size, these capacitors are particularly well-suited for potting or encapsulating in electronic assemblies.
- For complete technical data, refer to latest issue of Engineering Bulletin 2445.

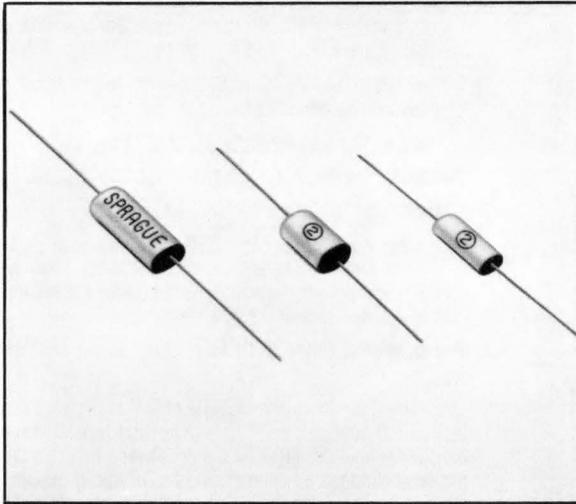
PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to $+85^{\circ}\text{C}$.
2. **Capacitance Tolerance:** $\pm 10\%$.
3. **Insulation Resistance:** (At $+25^{\circ}\text{C}$) The minimum product of insulation resistance, expressed in megohms, and capacitance, expressed in microfarads, shall be 10,000 megohm-microfarads; in no case need the insulation resistance exceed 25,000 megohms.
4. **Dissipation Factor:** (At $+25^{\circ}\text{C}$) Max. dissipation factor shall be 1%.
5. **Life Test:** Capacitors are capable of withstanding a 250 hour life test at 85°C at 125% of rated voltage. After test, insulation resistance shall not be less than 50% of initial requirement, dissipation factor shall not be greater than 1.25% of initial requirement, and capacitance shall not have changed by more than 10% of initial requirement.



μF	D	L	Catalog Number	μF	D	L	Catalog Number	μF	D	L	Catalog Number
50 WVDC				100 WVDC				200 WVDC			
0.15	0.210	0.625	430P154X9R5	0.1	0.204	0.625	430P104X91	0.047	0.200	0.625	430P473X92
0.22	0.240	0.625	430P224X9R5	0.15	0.233	0.625	430P154X91	0.1	0.221	0.750	430P104X92
0.33	0.279	0.625	430P334X9R5	0.22	0.228	0.750	430P224X91	0.15	0.254	0.750	430P154X92
0.47	0.269	0.750	430P474X9R5	0.33	0.264	0.750	430P334X91	0.22	0.295	0.750	430P224X92
1.0	0.291	1.000	430P105X9R5	0.47	0.246	1.000	430P474X91	0.33	0.279	1.000	430P334X92
2.0	0.400	1.000	430P205X9R5	1.0	0.286	1.250	430P105X91	0.47	0.321	1.000	430P474X92
5.0	0.476	1.500	430P505X9R5	2.0	0.393	1.250	430P205X91	1.0	0.380	1.250	430P105X92
10.0	0.647	1.500	430P106X9R5	2.5	0.430	1.250	430P255X91	2.0	0.469	1.500	430P205X92
15.0	0.709	1.750	430P156X9R5	5.0	0.544	1.500	430P505X91	2.5	0.516	1.500	430P255X92
				10.0	0.678	1.750	430P106X91	5.0	0.641	1.750	430P505X92
				15.0	0.707	2.250	430P156X91	10.0	0.763	2.250	430P106X92
								12.0	0.830	2.250	430P126X92

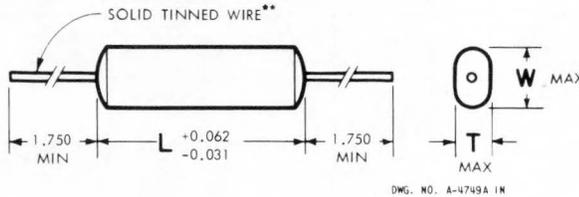
TYPE 431P METFILM® POLYESTER CAPACITORS



- Unique construction gives definite space advantages over metal-encased, molded, or wax-coated cardboard-case tubulars of comparable ratings.
- Improved end seal of plastic resin bonds with film wrap and tinned leads, providing superior humidity resistance.
- Because of small size, these capacitors are particularly well-suited for potting or encapsulating in electronic assemblies.
- Axial-lead metallized polyester-film capacitor section protected against moisture by outer wrap of polyester-film tape.
- For complete technical data, refer to latest issue of Engineering Bulletin 2445.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C.
- Capacitance Tolerance:** ±10%.
- Insulation Resistance:** (At +25°C) The minimum product of insulation resistance, expressed in megohms, and capacitance, expressed in microfarads, shall be 10,000 megohm-microfarads; in no case need the insulation resistance exceed 25,000 megohms.
- Dissipation Factor:** (At +25°C) Max. dissipation factor shall be 1%.
- Life Test:** Capacitors are capable of withstanding a 250 hour life test at 85°C at 125% of rated voltage. After test, insulation resistance shall not be less than 50% of initial requirement, dissipation factor shall not be greater than 1.25% of initial requirement, and capacitance shall not have changed by more than 10% of initial requirement.

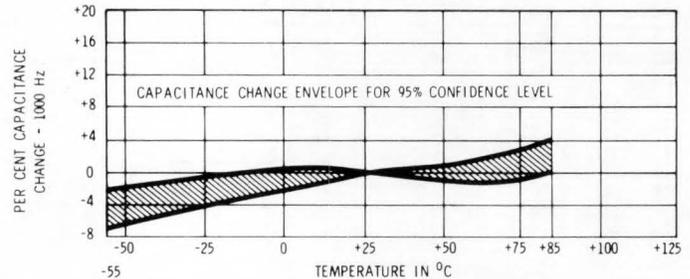


DMG. NO. A-4749A 1N

**Lead Size

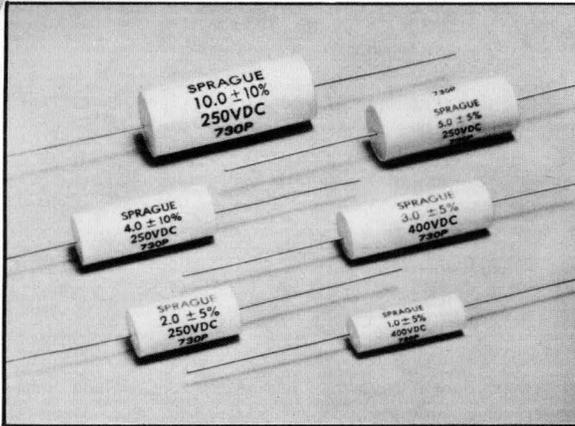
T MAX < .20	0.025 (No. 22 AWG)
T MAX ≥ .20	0.032 (No. 20 AWG)

CAPACITANCE vs. TEMPERATURE



μF	T	W	L	Catalog Number	μF	T	W	L	Catalog Number	μF	T	W	L	Catalog Number
50 WVDC														
1.5	.252	.408	1.000	431P155X9R5	7.0	.479	.733	1.500	431P705X91	.1	.230	.362	.750	431P104X94
2.0	.274	.480	1.000	431P205X9R5	10.0	.478	.831	1.750	431P106X91	.15	.214	.345	1.000	431P154X94
2.5	.311	.517	1.000	431P255X9R5	12.0	.483	.738	2.250	431P126X91	.22	.251	.407	1.000	431P224X94
3.0	.283	.488	1.250	431P305X9R5	15.0	.505	.857	2.250	431P156X91	.33	.258	.415	1.250	431P334X94
100 WVDC														
4.0	.307	.513	1.250	431P405X9R5	200 WVDC					.47	.272	.428	1.500	431P474X94
5.0	.349	.554	1.500	431P505X9R5	.1	.191	.298	.625	431P104X92	.68	.297	.453	1.750	431P684X94
6.0	.365	.620	1.500	431P605X9R5	.15	.186	.293	.750	431P154X92	1.0	.344	.550	1.750	431P105X94
7.0	.400	.654	1.500	431P705X9R5	.22	.215	.347	.750	431P224X92	1.5	.411	.665	1.750	431P155X94
10.0	.492	.747	1.500	431P106X9R5	.33	.200	.332	1.000	431P334X92	2.0	.486	.740	1.750	431P205X94
12.0	.496	.740	1.750	431P126X9R5	.47	.231	.387	1.000	431P474X92	2.5	.507	.860	1.750	431P255X94
15.0	.507	.860	1.750	431P156X9R5	.68	.282	.438	1.000	431P684X92	3.0	.467	.820	2.250	431P305X94
400 WVDC														
.22	.200	.307	.625	431P224X91	1.0	.287	.443	1.250	431P105X92	4.0	.557	.910	2.250	431P405X94
.33	.196	.303	.750	431P334X91	1.5	.336	.541	1.250	431P155X92	600 WVDC				
.47	.178	.285	1.000	431P474X91	2.0	.341	.547	1.500	431P205X92	.01	.171	.278	.625	431P103X96
.68	.204	.336	1.000	431P684X91	2.5	.366	.628	1.500	431P255X92	.015	.199	.331	.625	431P153X96
1.0	.208	.339	1.250	431P105X91	3.0	.407	.662	1.500	431P305X92	.022	.189	.296	.750	431P223X96
1.5	.246	.403	1.250	431P155X91	4.0	.427	.682	1.750	431P405X92	.033	.221	.353	.750	431P333X96
2.0	.288	.444	1.250	431P205X91	5.0	.486	.741	1.750	431P505X92	.047	.191	.323	1.000	431P473X96
2.5	.304	.509	1.250	431P255X91	6.0	.496	.848	1.750	431P605X92	.068	.231	.363	1.000	431P683X96
3.0	.337	.542	1.250	431P305X91	7.0	.544	.897	1.750	431P704X92	.1	.272	.429	1.000	431P104X96
4.0	.345	.600	1.500	431P405X91	10.0	.558	.910	2.250	431P106X92	.15	.275	.432	1.250	431P154X96
5.0	.393	.648	1.500	431P505X91	12.0	.622	.975	2.250	431P126X92	.22	.2	.448	1.500	431P224X96
6.0	.437	.692	1.500	431P605X91	400 WVDC					.33	.302	.507	1.750	431P334X96
400 WVDC														
.033	.173	.280	.625	431P333X94	.033	.173	.280	.625	431P333X94	.47	.348	.603	1.750	431P474X96
.047	.206	.313	.625	431P473X94	.047	.206	.313	.625	431P473X94	.68	.432	.687	1.750	431P684X96
.068	.198	.305	.750	431P683X94	.068	.198	.305	.750	431P683X94	1.0	.488	.742	2.000	431P105X96

TYPE 730P METALLIZED POLYPROPYLENE CAPACITORS

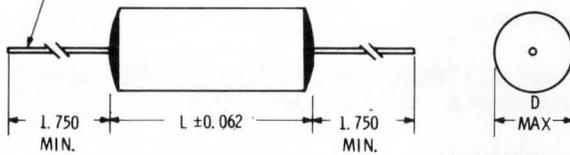


- Designed for general-purpose and switching applications.
- Recommended where low-loss, circuit stability, and minimum cost, size and weight are important considerations.
- Very high insulation resistance with low dielectric absorption and very low dissipation factor make units excellent choice for timing and integrating applications.
- For complete technical data, refer to latest issue of Engineering Bulletin 2751.

PERFORMANCE CHARACTERISTICS

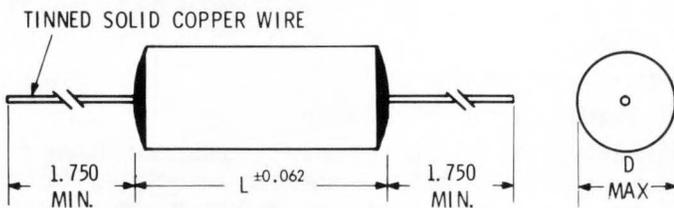
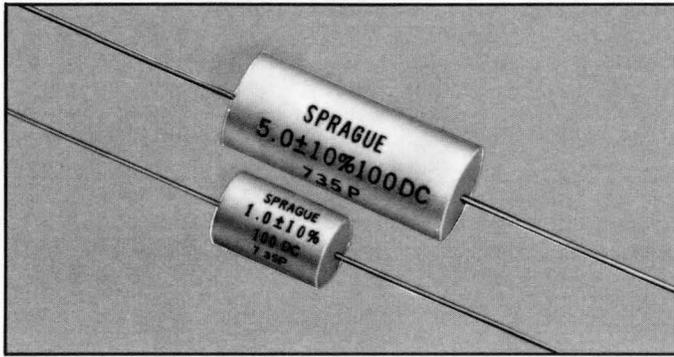
1. **Operating Temperature Range:** -55°C to $+85^{\circ}\text{C}$; to 105°C max. with 50% voltage derating.
2. **Capacitance Tolerance:** $\pm 10\%$.
3. **Dissipation Factor:** (1 kHz @ 25°C) 0.1% max.
4. **Insulation Resistance:** The minimum product of insulation resistance, expressed in megohms, and capacitance, expressed in microfarads, shall be 200,000 megohms-microfarads, and in no case shall the insulation resistance exceed 400,000 megohms.
5. **Capacitance Change with Temperature:** At -55°C , $+1.5\%$ typical; at $+105^{\circ}\text{C}$, -2.5% typical.

0.032 NOMINAL
DIA. (NO. 20 AWG)
SOLID TINNED WIRE

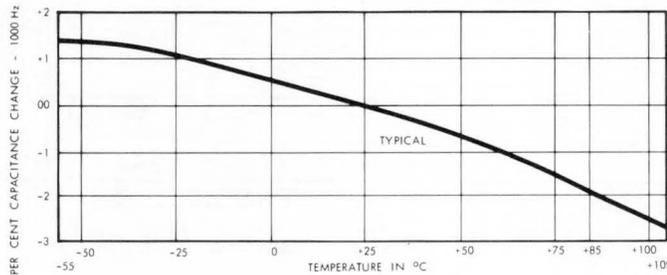


μF	Catalog Number*	Dimensions*		μF	Catalog Number*	Dimensions*		μF	Catalog Number*	Dimensions*	
		D_{MAX}	L			D_{MAX}	L			D_{MAX}	L
100 WVDC				0.47	730P474X9250	0.422	1.00	1.0	730P105X9400	0.655	1.25
0.22	730P224X9100	0.275	0.75	0.68	730P684X9250	0.425	1.25	2.0	730P205X9400	0.752	1.75
0.33	730P334X9100	0.324	0.75	1.0	730P105X9250	0.513	1.25	3.0	730P305X9400	0.909	1.75
0.47	730P474X9100	0.376	0.75	2.0	730P205X9250	0.700	1.25	3.9	730P395X9400	1.031	1.75
0.68	730P684X9100	0.348	1.00	3.0	730P305X9250	0.703	1.75	630 WVDC			
1.0	730P105X9100	0.421	1.00	4.0	730P405X9250	0.803	1.75	0.022	730P223X9630	0.283	0.75
2.0	730P205X9100	0.486	1.25	5.0	730P505X9250	0.892	1.75	0.033	730P333X9630	0.334	0.75
3.0	730P305X9100	0.581	1.25	10.0	730P106X9250	1.060	2.25	0.047	730P473X9630	0.388	0.75
4.0	730P405X9100	0.537	1.75	400 WVDC				0.068	730P683X9630	0.346	1.00
5.0	730P505X9100	0.593	1.75	0.047	730P473X9400	0.258	0.75	0.1	730P104X9630	0.408	1.00
10.0	730P106X9100	0.815	1.75	0.068	730P683X9400	0.297	0.75	0.15	730P154X9630	0.496	1.00
250 WVDC				0.1	730P473X9400	0.258	0.75	0.22	730P224X9630	0.496	1.25
0.1	730P104X9250	0.279	0.75	0.068	730P683X9400	0.297	0.75	0.33	730P334X9630	0.593	1.25
0.15	730P154X9250	0.327	0.75	0.1	730P104X9400	0.348	0.75	0.47	730P474X9630	0.696	1.25
0.22	730P224X9250	0.306	1.00	0.15	730P154X9400	0.328	1.00	0.68	730P684X9630	0.664	1.75
0.33	730P334X9250	0.362	1.00	0.22	730P224X9400	0.385	1.00	1.0	730P105X9630	0.794	1.75
				0.33	730P334X9400	0.469	1.00				
				0.47	730P474X9400	0.545	1.00				
				0.68	730P684X9400	0.551	1.25				

TYPE 735P HIGH-CURRENT, METALLIZED-POLYPROPYLENE CAPACITORS FOR SWITCHED-MODE POWER SUPPLIES



CAPACITANCE vs. TEMPERATURE



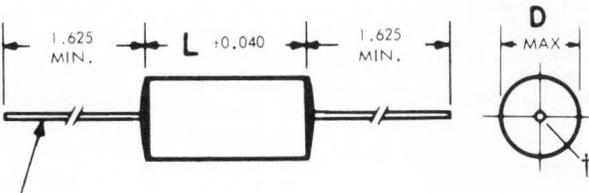
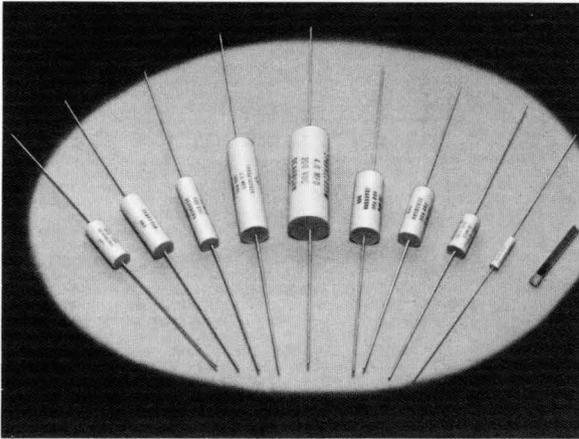
- Metallized-polypropylene dielectric affords high insulation resistance and excellent capacitance stability as a function of time and temperature.
- Ideal for high-performance input filter, d-c blocking, and output filter applications in advanced high-frequency switched-mode power supplies.
- Low inductance, low ESR, and ripple current capability as high as 15 amps at frequencies of 20 to 100 kHz.
- Flame-retardant film-wrap and epoxy end-fill.
- Capacitors listed have capacitance tolerance of $\pm 10\%$.
- For complete A-C application information and other technical data, refer to latest issue of Engineering Bulletin 2752.

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to $+105^{\circ}\text{C}$.
2. **Capacitance Tolerance:** $\pm 10\%$.
3. **Dissipation Factor:** (At $+25^{\circ}\text{C}$) Max. dissipation factor of all capacitors shall be .1% when measured at a frequency of 1000 Hz.
4. **Insulation Resistance:** The minimum product of insulation resistance, expressed in megohms, and capacitance, expressed in microfarads, shall be 200,000 megohm-microfarads, and in no case shall the insulation resistance exceed 400,000 megohms.
5. **Humidity Test:** Capacitors shall be conditioned in a humidity chamber with no voltage applied for 250 hours at 95% relative humidity at a temperature of $+40^{\circ}\text{C}$, and dried in circulating air for 4 hours under room conditions. After test, capacitance shall not have changed by more than 1% of initial requirement, insulation resistance shall not have decreased by more than 20% from initial requirement.

μF	WVDC	DIMENSIONS (in inches)*		Catalog Number	μF	WVDC	DIMENSIONS (in inches)*		Catalog Number
		D	L				D	L	
1	100	0.531	0.750	735P105X9100NJL	3	200	0.747	1.500	735P305X9200SSL
2	100	0.596	0.938	735P205X9100PLL	5	200	0.862	1.750	735P505X9200UTL
3	100	0.717	0.938	735P305X9100SLL	10	200	1.030	2.250	735P106X9200WWL
5	100	0.733	1.250	735P505X9100SPL	20	200	1.440	2.250	735P206X9200ZVL
10	100	0.898	1.500	735P106X9100USL	1	400	0.713	1.500	735P105X9400SSL
20	100	1.000	2.250	735P206X9100WWL	2	400	0.895	1.750	735P205X9400UTL
30	100	1.200	2.250	735P306X9100YVL	3	400	1.086	1.750	735P305X9400WTL
1	200	0.512	1.250	735P105X9200NPL	5	400	1.192	2.250	735P505X9400XVL
2	200	0.698	1.250	735P205X9200RPL	10	400	1.668	2.250	735P106X9400ZVL

TYPE LP66 DELTAFILM® METALLIZED POLYCARBONATE CAPACITORS IN WRAP-AND-FILL TUBULAR CONSTRUCTION



TINNED COPPER-CLAD STEEL

†Leads to be within +0.062" of center line at gress, but not less than 0.031" from edge.

- Small, lightweight units are well suited for applications requiring high packaging density, high performance and moderate cost.
- Exceptional capacitance stability, long life, low dissipation factor (high Q), and low temperature coefficient.
- High insulation resistance makes units ideal for critical coupling applications.
- Rugged construction... the extended electrode capacitor sections are protected by plastic vapor-seal film-wrap, and tough epoxy end seals.
- Many additional capacitance values in 100, 200, and 400 WVDC are available upon special request.
- For complete technical data, refer to latest issue of Engineering Bulletin DB-152.

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +125°C.
2. **Insulation Resistance:** (At +25°C) The minimum product of insulation resistance and capacitance shall be 50,000 megohm-microfarads. Capacitance values of 0.5 μF or less need not exceed 4000 megohms.
3. **Capacitance Tolerance:** ±5%.
4. **Dissipation Factor:** (At +25°C) Maximum shall be 0.5%; capacitors rated at 1 μF or less measured at frequency of 1000 Hz; capacitors rated greater than 1 μF measured at frequency of 60 Hz.

μF	Case Size (in inches)*		Catalog Number	μF	Case Size (in inches)*		Catalog Number	μF	Case Size (in inches)*		Catalog Number
	D	L			D	L			D	L	
50 WVDC											
.01	.170	.440	LP66N1A103J	.15	.230	.440	LP66N1A154J	2.0	.400	.750	LP66N1A205J
.015	.170	.440	LP66N1A153J	.22	.230	.560	LP66N1A224J	2.2	.400	.750	LP66N1A225J
.022	.170	.440	LP66N1A223J	.33	.250	.560	LP66N1A334J	3.0	.400	1.000	LP66N1A305J
.033	.170	.440	LP66N1A333J	.47	.310	.560	LP66N1A474J	3.3	.400	1.000	LP66N1A335J
.047	.170	.440	LP66N1A473J	.68	.310	.560	LP66N1A684J	4.7	.450	1.250	LP66N1A475J
.068	.170	.560	LP66N1A683J	1.0	.310	.750	LP66N1A105J	10.0	.600	1.310	LP66N1A106J
.10	.190	.560	LP66N1A104J	1.5	.350	.750	LP66N1A155J				

OTHER AXIAL-LEADED FILM CAPACITORS AVAILABLE ON SPECIAL ORDER:

TYPE LP88 Metallized Polycarbonate Capacitors In Wrap-and-Fill Tubular Construction. Capacitance Range: .01 μF to 18 μF; Voltage Range: 50 WVDC to 200 WVDC.

TYPE 430P Film Wrapped Metfilm® 'E' High Voltage Capacitors. Capacitance Range: .001 μF to 1.0 μF; Voltage Range: 1000 WVDC to 15000 WVDC.

TYPE 439P Metallized-Polyester Capacitors for General-Purpose A-C Applications. Capacitance

Range: .047 μF to 12 μF; Voltage Range: 100 VRMS to 440 VRMS, 60 Hz.

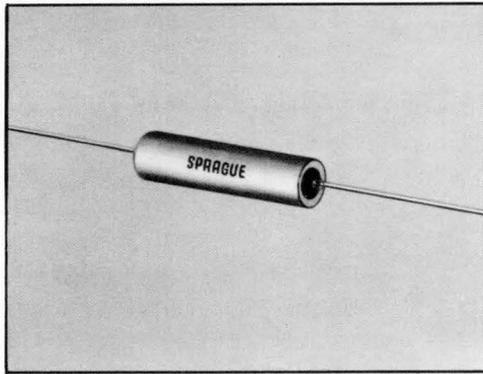
TYPE 622P Low-Cost Hermetically-Sealed Metallized-Polycarbonate Capacitors. Capacitance Range: .001 μF to 22 μF; Voltage Range: 30 WVDC to 400 WVDC.

TYPE 628P Metfilm® 'K' Metallized-Polycarbonate Capacitors for 400 Hz to 40 kHz A-C Operation. Capacitance Range: .33 μF to 15 μF; Voltage Range: 120 VRMS to 200 VRMS, 400 Hz.

TYPE 710P White Jacket®, Low-Loss, High-Frequency Polypropylene-Film Capacitors. Capacitance Range: .001 μF to 1.0 μF; Voltage Range: 200 WVDC to 800 WVDC.

TYPE 714P Precision High-Stability White Jacket® Polypropylene-Film Capacitors. Capacitance Range: .0068 μF to .47 μF; Voltage Range: 100 WVDC to 200 WVDC.

ESTABLISHED RELIABILITY STYLE CRH01 thru CRH05 METALLIZED POLYCARBONATE CAPACITORS to MIL-C-83421/01 (USAF)

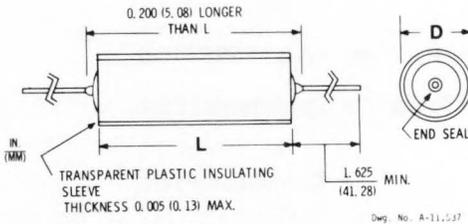


- Preferred values are S (.001%) failure rate level. Capacitors to failure rate M (1%), P (0.1%), and R (.01%) available.

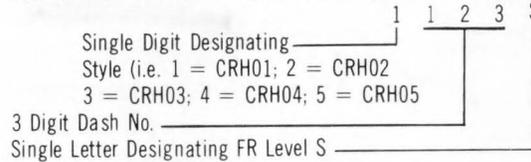
DIMENSIONS (in inches)*

Size Code	D	L	Size Code	D	L
AA	.170	.500	EB	.400	1.063
AB	.170	.562	EC	.400	1.375
AC	.170	.687	FA	.500	1.125
BA	.193	.562	FB	.500	1.375
BB	.193	.687	GA	.562	1.125
BC	.193	.813	GB	.562	1.375
CA	.235	.562	GC	.562	1.875
CB	.235	.687	HA	.670	1.375
CC	.235	.813	HB	.670	1.875
DA	.312	.687	HB	.670	1.875
DB	.312	.813	JA	.750	1.875
DC	.312	1.063	KA	1.0	1.875
EA	.400	.813	KB	1.0	2.375

- Styles CRH06, 07, 08, 09, and 00 available.
- Style CRH01 and CRH02 have capacitance tolerance of $\pm 1\%$. Units with $\pm 2\%$, $\pm 5\%$, and $\pm 10\%$ capacitance tolerance available.
- Style CRH03 have capacitance tolerance of $\pm 2\%$. Units with $\pm 1\%$, $\pm 5\%$, and $\pm 10\%$ capacitance tolerance available.
- Styles CRH04 and CRH05 have capacitance tolerance of $\pm 5\%$. Units with $\pm 1\%$, $\pm 2\%$, and $\pm 10\%$ capacitance tolerance available.
- Low dissipation factor: less than .3% above 25°C, .55% below 25°C.
- Low temperature coefficient: Less than $\pm 2\%$ over temperature range of -55°C to $+125^\circ\text{C}$.
- For complete technical data, refer to latest issue of Engineering Bulletin 2712.1.



Part Number: Consists of the Basic Number with a Dash No. Coded as follows Basic No. M83421/01-



NOTE: BOLD FACE LISTINGS ARE POPULAR RATINGS AND ARE MORE READILY AVAILABLE.

μF	Size Code	MIL Part No.	μF	Size Code	MIL Part No.	μF	Size Code	MIL Part No.	μF	Size Code	MIL Part No.
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STYLE CRH01 (30 WVDC)

0.001	AA	M83421/01-1003S	0.018	AA	M83421/01-1105S	0.22	CB	M83421/01-1195S	2.7	EB	M83421/01-1387S
0.0012	AA	M83421/01-1009S	0.02	AA	M83421/01-1111S	0.27	CB	M83421/01-1201S	3.0	EB	M83421/01-1291S
0.0015	AA	M83421/01-1015S	0.022	AA	M83421/01-1117S	0.33	CB	M83421/01-1207S	3.3	EB	M83421/01-1297S
0.0018	AA	M83421/01-1021S	0.027	AB	M83421/01-1123S	0.39	CB	M83421/01-1213S	3.9	EC	M83421/01-1303S
0.002	AA	M83421/01-1027S	0.033	AB	M83421/01-1129S	0.47	DA	M83421/01-1219S	4.7	FB	M83421/01-1315S
0.0022	AA	M83421/01-1033S	0.039	AB	M83421/01-1135S	0.50	DA	M83421/01-1225S	5.0	FB	M83421/01-1321S
0.0027	AA	M83421/01-1039S	0.047	AB	M83421/01-1141S	0.56	DA	M83421/01-1231S	5.6	FB	M83421/01-1327S
0.0033	AA	M83421/01-1045S	0.05	AB	M83421/01-1147S	0.68	DA	M83421/01-1237S	6.8	GB	M83421/01-1333S
0.0039	AA	M83421/01-1051S	0.056	AB	M83421/01-1153S	0.82	DB	M83421/01-1243S	8.0	GB	M83421/01-1339S
0.0047	AA	M83421/01-1057S	0.068	AC	M83421/01-1159S	1.0	DB	M83421/01-1249S	8.2	GB	M83421/01-1345S
0.005	AA	M83421/01-1063S	0.082	AC	M83421/01-1165S	1.2	EA	M83421/01-1255S	10.0	GB	M83421/01-1351S
0.0056	AA	M83421/01-1069S	0.1	BB	M83421/01-1171S	1.5	EA	M83421/01-1261S	12.0	GC	M83421/01-1381S
0.0068	AA	M83421/01-1075S	0.12	BB	M83421/01-1177S	1.8	EA	M83421/01-1267S	15.0	GC	M83421/01-1357S
0.0082	AA	M83421/01-1081S	0.15	CA	M83421/01-1183S	2.0	EA	M83421/01-1273S	20.0	HB	M83421/01-1363S
0.01	AA	M83421/01-1087S	0.18	CB	M83421/01-1375S	2.2	EA	M83421/01-1279S	22.0	HB	M83421/01-1369S
0.012	AA	M83421/01-1093S	0.20	CB	M83421/01-1189S						
0.015	AA	M83421/01-1099S									

STYLE CRH02 (50 WVDC)

0.001	AA	M83421/01-2003S	0.0039	AA	M83421/01-2051S	0.015	AB	M83421/01-2099S	0.05	AC	M83421/01-2147S
0.0012	AA	M83421/01-2009S	0.0047	AA	M83421/01-2057S	0.018	BA	M83421/01-2105S	0.056	BB	M83421/01-2153S
0.0015	AA	M83421/01-2015S	0.005	AA	M83421/01-2063S	0.02	BA	M83421/01-2111S	0.068	BB	M83421/01-2159S
0.0018	AA	M83421/01-2021S	0.0056	AA	M83421/01-2069S	0.022	BA	M83421/01-2117S	0.082	BC	M83421/01-2165S
0.002	AA	M83421/01-2027S	0.0068	AA	M83421/01-2075S	0.027	BA	M83421/01-2123S	0.10	BC	M83421/01-2171S
0.0022	AA	M83421/01-2033S	0.0082	AB	M83421/01-2081S	0.033	BA	M83421/01-2129S	0.12	CB	M83421/01-2177S
0.0027	AA	M83421/01-2039S	0.01	AB	M83421/01-2087S	0.039	AC	M83421/01-2135S	0.15	CB	M83421/01-2183S
0.0033	AA	M83421/01-2045S	0.012	AB	M83421/01-2093S	0.047	AC	M83421/01-2141S			

STYLE CRH01/CRH05 METALLIZED POLYCARBONATE CAPACITORS, continued

µF	Size Code	MIL Part No.	µF	Size Code	MIL Part No.	µF	Size Code	MIL Part No.	µF	Size Code	MIL Part No.
STYLE CRH02 (50 WVDC), continued											
0.18	CC	M83421/01-2189S	0.50	DB	M83421/01-2231S	1.8	EB	M83421/01-2273S	3.9	GB	M83421/01-2309S
0.20	CC	M83421/01-2195S	0.56	EA	M83421/01-2237S	2.0	FA	M83421/01-2279S	4.7	HA	M83421/01-2321S
0.22	CC	M83421/01-2201S	0.68	EA	M83421/01-2243S	2.2	FA	M83421/01-2285S	5.0	HA	M83421/01-2327S
0.27	DA	M83421/01-2207S	0.82	EB	M83421/01-2249S	2.7	FB	M83421/01-2291S	5.6	HA	M83421/01-2333S
0.33	DA	M83421/01-2213S	1.0	EB	M83421/01-2255S	3.0	FB	M83421/01-2297S	6.8	HB	M83421/01-2339S
0.39	DB	M83421/01-2219S	1.2	EB	M83421/01-2261S	3.3	FB	M83421/01-2303S	8.0	HB	M83421/01-2345S
0.47	DB	M83421/01-2225S	1.5	EB	M83421/01-2267S				8.2	HB	M83421/01-2351S

STYLE CRH03 (100 WVDC)

0.001	AA	M83421/01-3004S	0.01	AC	M83421/01-3088S	0.10	DA	M83421/01-3172S	1.2	GA	M83421/01-3262S
0.0012	AA	M83421/01-3010S	0.012	AC	M83421/01-3094S	0.12	DA	M83421/01-3178S	1.5	GB	M83421/01-3268S
0.0015	AA	M83421/01-3016S	0.015	AC	M83421/01-3100S	0.15	DB	M83421/01-3184S	2.0	HA	M83421/01-3274S
0.0018	AA	M83421/01-3022S	0.018	BB	M83421/01-3106S	0.18	DB	M83421/01-3190S	2.2	HA	M83421/01-3280S
0.002	AA	M83421/01-3028S	0.02	BB	M83421/01-3112S	0.20	DB	M83421/01-3196S	2.7	HB	M83421/01-3286S
0.0022	AA	M83421/01-3034S	0.022	BB	M83421/01-3118S	0.22	DB	M83421/01-3202S	3.0	HB	M83421/01-3292S
0.0027	AA	M83421/01-3040S	0.027	BB	M83421/01-3124S	0.27	DC	M83421/01-3208S	3.3	HB	M83421/01-3298S
0.0033	AA	M83421/01-3046S	0.033	BB	M83421/01-3130S	0.33	DC	M83421/01-3214S	3.9	JA	M83421/01-3304S
0.0039	AA	M83421/01-3052S	0.039	CB	M83421/01-3136S	0.39	EB	M83421/01-3220S	4.7	JA	M83421/01-3316S
0.0047	AA	M83421/01-3058S	0.047	CB	M83421/01-3142S	0.47	EB	M83421/01-3226S	5.0	JA	M83421/01-3322S
0.005	AA	M83421/01-3064S	0.050	CB	M83421/01-3148S	0.5	EB	M83421/01-3232S	5.6	JA	M83421/01-3328S
0.0056	AA	M83421/01-3070S	0.056	CB	M83421/01-3154S	0.56	EB	M83421/01-3238S	6.8	KB	M83421/01-3334S
0.0068	AB	M83421/01-3076S	0.068	CC	M83421/01-3160S	0.68	FA	M83421/01-3244S	8.0	KB	M83421/01-3340S
0.0082	AB	M83421/01-3082S	0.082	DA	M83421/01-3166S	0.82	FA	M83421/01-3250S	8.2	KB	M83421/01-3346S
						1.0	GA	M83421/01-3256S	10.0	KB	M83421/01-3352S

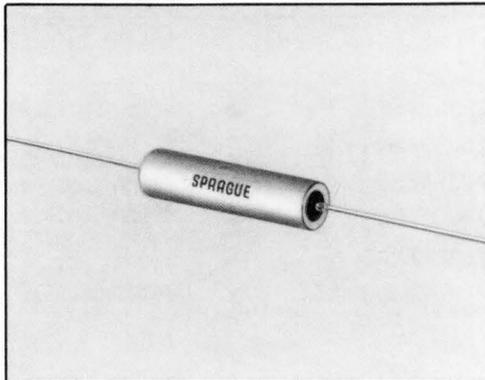
STYLE CRH04 (200 WVDC)

0.001	AB	M83421/01-4005S	0.01	BA	M83421/01-4089S	0.10	DB	M83421/01-4173S	0.82	GC	M83421/01-4251S
0.0012	AB	M83421/01-4011S	0.012	BA	M83421/01-4095S	0.12	DB	M83421/01-4179S	1.0	GC	M83421/01-4257S
0.0015	AB	M83421/01-4017S	0.015	CA	M83421/01-4101S	0.15	EB	M83421/01-4185S	1.2	GC	M83421/01-4263S
0.0018	AB	M83421/01-4023S	0.018	CB	M83421/01-4107S	0.18	EC	M83421/01-4191S	1.5	HB	M83421/01-4269S
0.002	AB	M83421/01-4029S	0.02	CB	M83421/01-4113S	0.20	EC	M83421/01-4197S	1.8	JA	M83421/01-4275S
0.0022	AB	M83421/01-4035S	0.022	CB	M83421/01-4119S	0.22	EC	M83421/01-4203S	2.0	JA	M83421/01-4281S
0.0027	AB	M83421/01-4041S	0.027	DA	M83421/01-4125S	0.27	FB	M83421/01-4209S	2.2	JA	M83421/01-4287S
0.0033	AB	M83421/01-4047S	0.033	DA	M83421/01-4131S	0.33	FB	M83421/01-4215S	2.5	JA	M83421/01-4293S
0.0039	AB	M83421/01-4053S	0.039	DA	M83421/01-4137S	0.39	FB	M83421/01-4221S	2.7	JA	M83421/01-4299S
0.0047	AB	M83421/01-4059S	0.047	DA	M83421/01-4143S	0.47	FB	M83421/01-4227S	3.0	KA	M83421/01-4305S
0.005	AB	M83421/01-4065S	0.050	DA	M83421/01-4149S	0.5	FB	M83421/01-4233S	3.3	KA	M83421/01-4311S
0.0056	AB	M83421/01-4071S	0.056	DB	M83421/01-4155S	0.56	FB	M83421/01-4239S	3.9	KB	M83421/01-4317S
0.0068	AB	M83421/01-4077S	0.068	DB	M83421/01-4161S	0.68	GB	M83421/01-4245S			
0.0082	BA	M83421/01-4083S	0.082	DB	M83421/01-4167S						

STYLE CRH05 (400 WVDC)

0.001	BA	M83421/01-5005S	0.0068	CB	M83421/01-5077S	0.05	EA	M83421/01-5143S	0.39	GC	M83421/01-5209S
0.0012	BA	M83421/01-5011S	0.0082	CB	M83421/01-5083S	0.056	EA	M83421/01-5149S	0.47	GC	M83421/01-5215S
0.0015	BA	M83421/01-5017S	0.01	CB	M83421/01-5089S	0.068	EA	M83421/01-5155S	0.50	GC	M83421/01-5221S
0.0018	BA	M83421/01-5023S	0.012	CB	M83421/01-5095S	0.082	EB	M83421/01-5161S	0.56	GC	M83421/01-5227S
0.002	BA	M83421/01-5029S	0.015	CC	M83421/01-5101S	0.10	EB	M83421/01-5167S	0.68	JA	M83421/01-5233S
0.0022	BA	M83421/01-5035S	0.018	DB	M83421/01-5107S	0.12	EB	M83421/01-5173S	0.82	JA	M83421/01-5239S
0.0027	CA	M83421/01-5041S	0.02	DB	M83421/01-5125S	0.15	EC	M83421/01-5179S	1.0	JA	M83421/01-5245S
0.0033	CA	M83421/01-5047S	0.022	DB	M83421/01-5113S	0.18	FB	M83421/01-5281S	1.2	KA	M83421/01-5251S
0.0039	CA	M83421/01-5053S	0.027	DB	M83421/01-5119S	0.20	FB	M83421/01-5185S	1.5	KB	M83421/01-5257S
0.0047	CA	M83421/01-5059S	0.033	DB	M83421/01-5125S	0.22	FB	M83421/01-5191S	1.8	KB	M83421/01-5263S
0.005	CA	M83421/01-5065S	0.039	DB	M83421/01-5131S	0.27	GB	M83421/01-5197S	2.0	KB	M83421/01-5269S
0.0056	CA	M83421/01-5071S	0.047	EA	M83421/01-5137S	0.33	GB	M83421/01-5203S			

TYPE 196P VITAMIN Q[®] SUBMINIATURE PAPER CAPACITORS

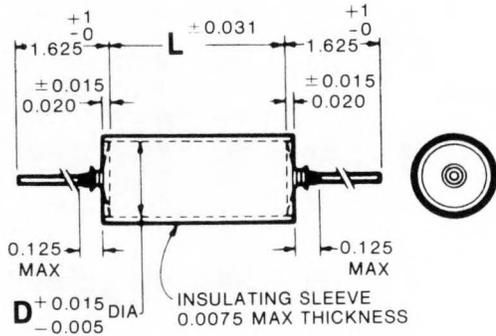


- Type 196P widely used in snubber applications requiring high reliability.
- Hermetically sealed in metal case.
- Electrically and mechanically designed to meet stringent operating requirements.
- Impregnated with Vitamin Q[®], a substantially linear, controlled molecular weight hydrocarbon polymer, exclusive with Sprague.
- Vitamin Q impregnation provides higher insulation resistance, longer life than ordinary oils used in conventional capacitors.

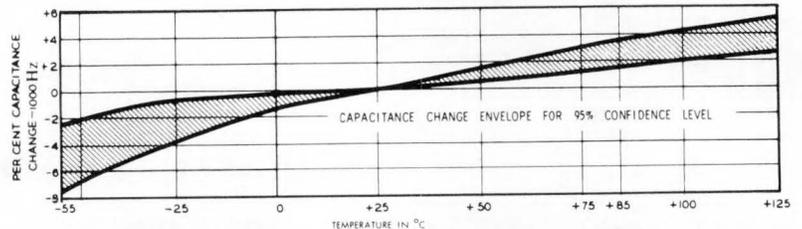
- Exceed performance requirements of MIL-C-25A.
- Capacitors listed have outer plastic-film insulating sleeve. For bare case, change last digit of catalog number from 4 to 2 and subtract .04" ($\pm .03$ ") from length and .015" (Max.) from diameter.
- For complete data, refer to latest issue of Engineering Bulletin 2110.

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to $+125^{\circ}\text{C}$.
2. **Capacitance Tolerance:** $\pm 10\%$.
3. **Insulation Resistance:** (At $+25^{\circ}\text{C}$) The minimum product of insulation resistance, expressed in megohms, and capacitance, expressed in microfarads, shall be 20,000 megohms-microfarads; in no case need the insulation resistance exceed 3,000 megohms.
4. **Dissipation Factor:** The maximum dissipation factor for all capacitors shall be 1%.
5. **Life Test:** Capacitors are capable of withstanding a 250 hour life test at 1.4 times rated voltage at 125°C . After test, capacitance changed by more than 5% of initial requirement, insulation shall not have resistance changed by more than 50% of initial requirement, and dissipation factor shall not exceed 1%.



CAPACITANCE vs. TEMPERATURE



TYPE 196P, EXTENDED FOIL CONSTRUCTION, 125°C OPERATION

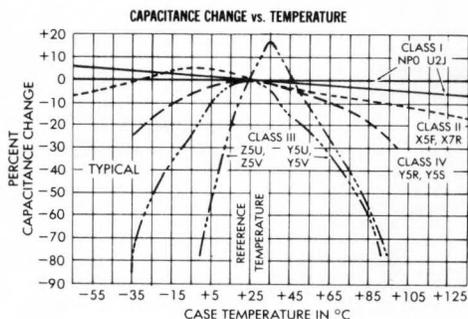
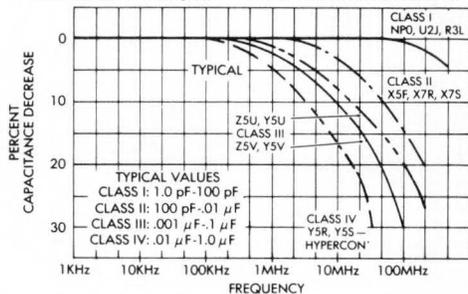
μF	Catalog Number	DIMENSIONS (in inches)		RMS A-C Ratings at 85°C		Maximum Peak Current (Amperes)
		D	L	60 Hz	400 Hz	
600 VOLTS D-C						
0.01	196P10396S4	0.312	0.875	420	420	10
0.022	196P22396S4	0.400	0.875	420	420	22
0.047	196P47396S4	0.400	1.375	420	420	47
0.1	196P10496S4	0.562	1.375	420	420	100
0.22	196P22496S4	0.670	1.625	420	410	220
0.47	196P47496S4	0.750	2.375	420	320	500
1000 VOLTS D-C						
0.01	196P103910S4	0.400	0.875	500	500	15
0.022	196P223910S4	0.400	1.375	500	500	33
0.047	196P473910S4	0.562	1.375	500	500	70
0.1	196P104910S4	0.670	1.625	500	500	150
0.22	196P224910S4	0.750	2.125	500	450	330
0.47	196P474910S4	1.00	2.375	500	400	700

CERAMIC DISC CAPACITOR APPLICATION NOTES

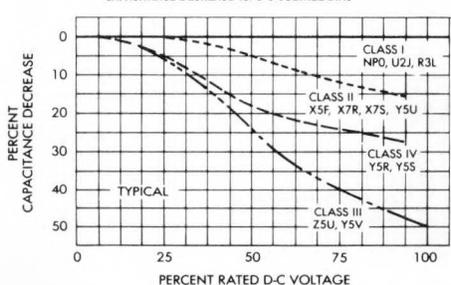
- **HIGH K:** For small size and higher values of capacitance. EIA 198C Class III, Z5U, Z5V, Y5U, Y5V. This type is usually broad tolerance: $\pm 20\%$, $+80 - 20\%$ and $+100 - 0\%$.
- **MODERATELY HIGH K:** Here the materials are blended to provide better capacitance stability against change in temperature or voltage; but may be larger in size than the HIGH K types, especially in the higher capacitance values. EIA 198C Class II, X5F, X7R, X5P. Usually tighter tolerance: $\pm 10\%$ at 25°C .
- **LOW K FORMULATIONS FOR PRECISION CAPACITORS:** This class provides ultra stable capacitance over the broadest temperature, frequency ranges and voltage variation. Also provides very high Q . $Q = \frac{1.0}{\text{Dissipation Factor}}$ This allows application in circuits for reference or in filters up to 500 megahertz. EIA Class I, NPO, U2J, and R3L. Usually $\pm 5\%$ or better initial tolerance.
- **HYPERCON[®]** construction gives the highest capacitance density for larger values. This type is made by forming a

dielectric barrier layer at each electrode surface and connecting these layers through the titanate substrate utilizing the conductive property of the material. The thin dielectric layer produces very high capacitance and good temperature stability. Improvements have extended the range of application to 100 VDC rating. Industry standard EIA 198C Class IV, Y5R and Y5S.

CAPACITANCE CHANGE vs. FREQUENCY — LOW VOLTAGE (TO 1000V) CERAMIC DISCS



CAPACITANCE DECREASE vs. D-C VOLTAGE BIAS



Frequency:

- Operating frequency range is usually determined primarily by capacitor value and self resonance due to lead inductance. This typically occurs at 500 megahertz for 100 picofarads, decreasing to 50 megahertz at .01 microfarads and 10 MHz at 0.1 μF .
- Class III and IV can be used for power and logic bus coupling and decoupling, d-c blocking and broad band bypass filtering. Class I and II are chosen for frequency discriminating filters.

Temperature

- Capacitors are designed for service temperatures of -55°C to $+85^\circ\text{C}$. The limiting factor is the life of the polymer coating. Ceramic discs are not injured by short time exposure up to 125°C .
- In applications where there is continuous heat dissipation in the capacitor, such as in snubber networks for power semiconductors, the case temperature rise should be limited to 30°C . EIA Temperature Characteristic X5F, X7R and Y5U are especially well suited for snubber service.

Voltage:

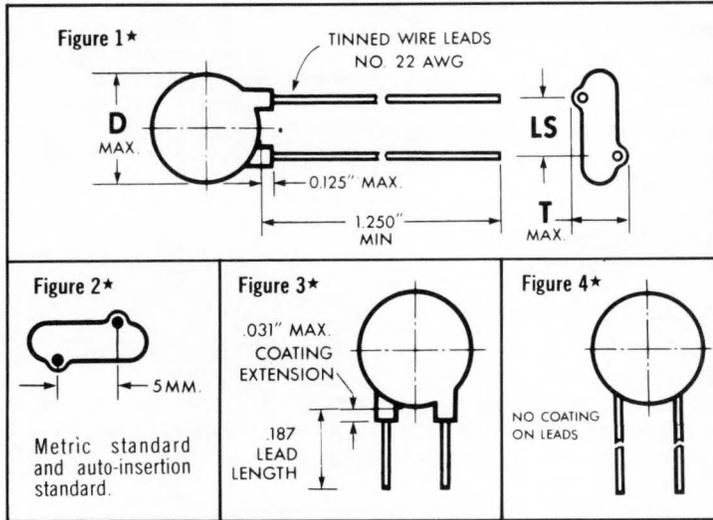
- The extensive range of d-c voltage ratings available allows selection of the appropriate device to minimize d-c voltage effects in the circuit.
 - A-C voltage ratings for low voltage capacitors (up to 1000 volts) applies to applications where energy and current are limited by circuit impedance. 1000 ohms impedance at the maximum a-c voltage rating is adequate.
- See 125L and 440L Series for a-c power line service.

CERAMIC DISC CAPACITOR TEMPERATURE COEFFICIENT MARKING

	Temperature Coefficient				MARKING CODE
	$+10^\circ$ $+85^\circ\text{C}$	-30° $+85^\circ\text{C}$	-55° $+85^\circ\text{C}$	-55° $+125^\circ\text{C}$	
$\pm 7.5\%$	Z5F	Y5F	X5F	X7F	B
$\pm 10\%$	Z5P	Y5P	X5P	X7P	C
$\pm 15\%$	Z5R	Y5R	X5R	X7R	C
$\pm 22\%$	Z5S	Y5S	X5S	X7S	C
$\pm 22-33\%$	Z5T	Y5T	X5T	X7T	D
$\pm 22-56\%$	Z5U	Y5U	X5U	X7U	E
$\pm 22-82\%$	Z5V	Y5V	X5V	X7V	F

Temp. Coef.	MARKING CODE	Temp. Coef.	MARKING CODE
NPO	A	N030	H
N080	L	N150	P
N220	R	N330	S
N470	T	N750	U
N1000	V	N1500	W
N2200	X		

LOW-VOLTAGE DISC CAPACITORS



*Figures 2, 3 and 4 show exceptions to Figure 1. Dimensions not noted in Figures 2, 3 and 4 are per Figure 1 and dimension chart.

TAPE AND REEL: Many Ceramic Disc Capacitors are available in tape and reel packaging on Special Order; 5000 piece minimum.

DIMENSIONS (in inches)*

Size Code	Maximum Diameter	Maximum Thickness	Std. Lead Spacing
C†	.250	.156	.250
E†	.295	.156	.250
F†	.375	.156	.250
G†	.440	.156	.250
H†	.490	.156	.250
J	.560	.156	.375
K	.630	.156	.375
L	.680	.156	.375
M	.760	.156	.375
P	.890	.156	.375
R	.510	.220	.250
S	.360	.220	.250
W	.700	.220	.375
X	.770	.220	.375
Y	.900	.220	.375

CAPACITANCE TOLERANCE CODE

J = ± 5%	M = ± 20%	Z = + 80%, - 20%
K = ± 10%	Y = + 50%, - 20%	P = + 100%, - 0%

†These sizes are also available with 5mm (.197") lead spacing in tape and reel packaging per EIA RS468.

**See page 77 for application limits on a-c voltage.

100 VOLT MINIATURIZED

• **Application Range:**
Up to 250 VDC, 75 VAC RMS**

• **Insulation Resistance:** 10,000 MΩ minimum; 500 ΩF.
• **Dissipation Factor:** 3.0%.

• **Dielectric Strength:**
750 VDC, 250 VAC RMS.

pF	Tol. Code	Catalog Number	Size		Temp. Coef.	μF	Tol. Code	Catalog Number	Size		Temp. Coef.
			Figure	Code					Figure	Code	
10	J	TCXQ10	3	C	NPO	.005	M	TGD50	1	E	Z5U
22	J	TCXQ22	3	C	NPO	.01	M	TGS10	1	F	Z5U
47	K	TCXQ47	3	C	NPO	.01	Y	TGTS10	2	F	Z5U
100	K	TST10	2	C	X7R	.01	Z	TGXS10	3	F	Y5V
220	K	TST22	2	C	X7R	.01	M	TGCS10	4	F	Y5V
470	K	TST47	2	C	X7R	.02	M	TGS20	1	H	Z5U
.001 μF	M	TSD10	2	C	X7R	.05	M	TGS50	1	R	Z5U
.001	M	TSXD10	3	C	X7S	.10	M	TGP10	1	W	Z5U

HYPERCON® HIGH-CAPACITANCE DISCS

Continuous Voltage Rating	Transient Voltage Dielectric Strength	Insulation Resistance	Temperature Coefficient	Dissipation Factor
12 VDC	25 VDC	.05 ΩF	Y5R	6.0%
25 VDC	50 VDC	5 ΩF	Y5R	5.0%
50 VDC	100 VDC	25 ΩF	Y5S	4.0%
100 VDC	200 VDC	100 ΩF (Except .1 μF = 500 MΩ)	Y5S	3.0%

μF	Tol. Code	Catalog Number	Size		μF	Tol. Code	Catalog Number	Size		μF	Tol. Code	Catalog Number	Size	
			Figure	Code				Figure	Code				Figure	Code
12 WVDC					25 WVDC cont.					50 WVDC				
.05	Y	HY105	1	E	.033	Z	HY530	1	F	.01	M	HY920	1	C
.10	M	HY110	1	G	.047	Z	HY535	1	G	.022	M	HY925	1	F
.22	M	HY122	1	J	.047	M	HY835	1	G	.047	M	HY935	1	G
.47	M	HY147	1	P	.047	Y	HY735	1	G	.10	M	HY950	1	H
1.0	Y	HY111	1	Y	.050	M	HY838	1	G	100 WVDC				
25 WVDC					.068	Y	HY740	1	G	.0022	M	HMMD22	2	C
.01	Z	HY520	1	C	.10	Z	HY550	1	H	.0047	M	HMMD47	2	C
.01	M	HY820	1	C	.10	Y	HY750	1	H	.01	M	HMMS10	1	E
.01	M	HY820X	3	C	.10	M	HY850	1	H	.01	M	MHHTS10	2	E
.022	Z	HY525	1	E	.15	M	HY865	1	K	.01	M	HMMXS10	3	E
.022	M	HY825	1	E	.20	Z	HY570	1	L	.1	M	HMP10	1	L

500 VOLT, ALL TYPES

• **Application Range:**
Up to 600 VDC, 100 VAC RMS**

• **Insulation Resistance:** 15,000 M Ω min.; 500 Ω F.
• **Dissipation Factor:** 3.0%

• **Dielectric Strength:**
1500 VDC, 300 VAC RMS

μ F	Tol. Code	Catalog Number	Size		Temp. Coef.	μ F	Tol. Code	Catalog Number	Size		Temp. Coef.
			Figure	Code					Figure	Code	
.001	K	5TSD10	1	E	X7R	.01	M	5GASS10	1	G	Z5U
.001	M	5TSSD10	1	C	Y5U	.01	Z	5HKSS10	1	G	Z5U
.0022	K	5TSD22	1	F	X7R	.02	M	5GASS20	1	J	Z5U
.0033	K	5TSD33	1	G	X7R	.05	M	5GAS50	1	P	Z5U
.0047	K	5TSD47	1	H	X7R	.05	Z	5HKS50	1	W	Z5U
.005	Z	5TSD50	1	F	Z5U	.10	M	5GAP10	1	Y	Z5U
.01	M	5TSS10	1	K	X7S	.10	Z	5HKP10	1	Y	Z5U

1000 VOLT, WIDE TOLERANCE

• **Application Range:**
Up to 1000 VDC, 150 VAC RMS**

• **Insulation Resistance:** 20,000 M Ω min.; 500 Ω F.
• **Dissipation Factor:** 2.5%

• **Dielectric Strength:**
2500 VDC, 500 VAC RMS

pF	Tol. Code	Catalog Number	Size		Temp. Coef.	μ F	Tol. Code	Catalog Number	Size		Temp. Coef.	μ F	Tol. Code	Catalog Number	Size		Temp. Coef.
			Figure	Code					Figure	Code					Figure	Code	
10	M	5GAQ10	1	E	NPO	.001	M	5GAD10	1	E	Y5U	.0047	M	5GAD47	1	F	Z5U
20	M	5GAQ20	1	E	U2J	.001	M	5GAD10	2	E	Y5U	.0050	M	5GAD50	1	F	Z5U
33	M	5GAQ33	1	E	U2J	.001	P	5HKD10	1	E	Z5U	.0068	M	5GAD68	1	G	Z5U
47	M	5GAQ47	1	E	U2J	.0012	M	5GAD12	1	E	Z5U	.0082	M	5GAD82	1	H	Z5U
100	M	5GAT10	1	E	X5F	.0015	M	5GAD15	1	E	Z5U	.01	M	5GAS10	1	J	Z5U
150	M	5GAT15	1	C	X5F	.0020	M	5GAD20	1	E	Z5U	.01	Z	5HKZS10	1	H	Z5U
200	M	5GAT20	1	E	X5F	.0022	M	5GAD22	1	E	Z5U	.01	Z	5HKS10	1	J	Z5U
220	M	5GAT22	1	E	X5F	.0025	M	5GAD25	1	E	Z5U	.015	M	5GAS15	1	K	Z5U
330	M	5GAT33	1	E	X5F	.0027	M	5GAD27	1	E	Z5U	.020	M	5GAS20	1	L	Z5U
470	M	5GAT47	1	E	X5F	.0030	M	5GAD30	1	E	Z5U	.050	Z	10HKS50	1	X	Z5U
500	M	5GAT50	1	E	X5F	.0033	M	5GAD33	1	F	Z5U	.10	M	10GAP10	1	Y	Z5U

TEMPERATURE AND VOLTAGE STABILIZED

• **Application Range:**
Up to 1000 VDC, 200 VAC RMS.**

• **Insulation Resistance:** 50,000 M Ω min.; 1000 Ω F.
• **Dissipation Factor:** 2.0%

• **Dielectric Strength:**
2500 VDC, 750 VAC RMS

1000 WVDC, 10% TOLERANCE

pF	Catalog Number	Size		Temp. Coef.	pF	Catalog Number	Size		Temp. Coef.	pF	Catalog Number	Size		Temp. Coef.
		Figure	Code				Figure	Code				Figure	Code	
10	10TSQ10	1	E	NPO	100	10TST10	1	C	X5F	500	10TST50	1	E	X5F
25	10TSQ25	1	E	NPO	120	10TST12	1	C	X5F	560	10TST56	1	E	X5F
27	10TSQ27	1	E	U2J	150	10TST15	1	C	X5F	680	10TST68	1	E	X5F
30	10TSQ30	1	E	U2J	180	10TST18	1	E	X5F	750	10TST75	1	F	X5F
33	10TSQ33	1	E	U2J	200	10TST20	1	E	X5F	820	10TST82	1	F	X5F
39	10TSQ39	1	E	U2J	220	10TST22	1	E	X5F	.001 μ F	10TSD10	1	F	X5F
47	10TSQ47	1	E	U2J	250	10TST25	1	E	X5F	.0015	10TSD15	1	G	X5F
50	10TSQ50	1	E	U2J	270	10TST27	1	E	X5F	.0020	10TSD20	1	J	X5F
56	10TSQ56	1	C	X5F	300	10TST30	1	E	X5F	.0022	10TSD22	1	J	X5F
68	10TSQ68	1	C	X5F	330	10TST33	1	E	X5F	.0027	10TSD27	1	J	X5F
75	10TSQ75	1	C	X5F	390	10TST39	1	E	X5F	.0033	10TSD33	1	J	X5F
82	10TSQ82	1	C	X5F	470	10TST47	1	E	X5F	.0047	10TSD47	1	L	X5P

NPO PRECISION DISC CAPACITORS

Temperature/Frequency/Voltage Stable

• **Application Range:**
Up to 1000 VDC, 300 VAC RMS**

• **Dissipation Factor:** 0.1%

• **High Q:** 1000

• **Insulation Resistance:** 100,000 M Ω min.; 1000 Ω F.

• **Dielectric Strength:**
2500 VDC, 750 VAC RMS

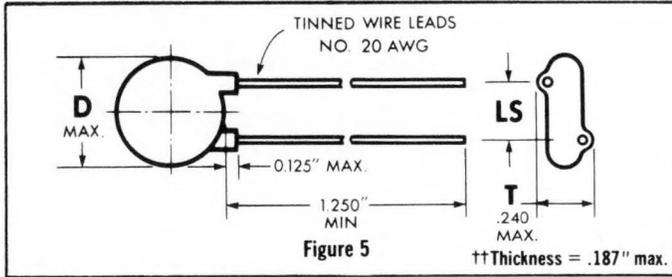
• **Capacitance Tolerance:** For values up to and including 10 pF, ± 0.5 pF; above 10 pF, $\pm 5\%$.

1000 WVDC, 5% TOLERANCE

pF	Catalog Number	Size		pF	Catalog Number	Size		pF	Catalog Number	Size	
		Figure	Code			Figure	Code			Figure	Code
1.0	10TCCV10	1	S	10	10TCCQ10	1	E	47	10TCCQ47	1	G
2.2	10TCCV22	1	E	12	10TCCQ12	1	E	50	10TCCQ50	1	G
2.7	10TCCV27	1	E	15	10TCCQ15	1	E	56	10TCCQ56	1	G
3.0	10TCCV30	1	E	18	10TCCQ18	1	E	68	10TCCQ68	1	H
3.3	10TCCV33	1	E	20	10TCCQ20	1	E	82	10TCCQ82	1	J
3.9	10TCCV39	1	E	22	10TCCQ22	1	E	100	10TCCQ100	1	J
4.7	10TCCV47	1	E	25	10TCCQ25	1	E	120	10TCCQ120	1	K
5.0	10TCCV50	1	E	27	10TCCQ27	1	F	150	10TCCQ150	1	K
5.6	10TCCV56	1	E	30	10TCCQ30	1	F	180	10TCCQ180	1	L
6.8	10TCCV68	1	E	33	10TCCQ33	1	F	220	10TCCQ220	1	M
8.2	10TCCV82	1	E	39	10TCCQ39	1	F	270	10TCCQ270	1	P

A-C RATED DISC CERAMIC CAPACITORS

125 VAC, 250 VAC and 480 VAC

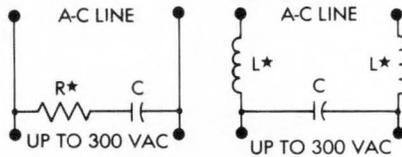


DIMENSIONS (in inches)

Size Code	D Max.	Lead Spacing	Size Code	D Max.	Lead Spacing
E	.330	.250	K	.680	.375
F	.400	.250	L	.720	.375
G	.460	.250	M	.790	.375
G ³	.460	.375	P	.900	.375
H	.530	.250	W	.740	.375
H ³	.530	.375	X	.830	.375
J	.620	.375	Y	.920	.375

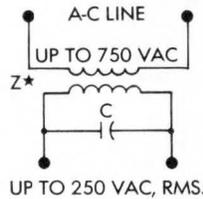
PERFORMANCE DATA	125L SERIES	440L SERIES
Continuous Voltage Rating	300 VAC, 2000 VDC	500 VAC, 3500 VDC
Transient Voltage (Dielectric Strength)	1250 VAC, 5000 VDC	2000 VAC, 7000 VDC
Insulation Resistance Min.	50,000 MΩ; 500 ΩF	150,000 MΩ; 750 ΩF
Dissipation Factor Max.	2.5%	1.5%
Case Breakdown/Flammability Rating	1500 VAC/94VO	2500 VAC/94VO
Application Service	IEC 161 Class X	IEC Class Y or X
Safety Codes Reference (See Note 2 Below)	Line By-Pass	Across the Line
Initial Tolerance	±20% of value at 20°C to 25°C, 24 to 72 hour reading.	
Permissible Change of Capacity with Temperature	Y Type: +20%, -55%, -10°C to +75°C (VDE Method) X Type: +15%, -63%, -10°C to +85°C (EIA Method)	
Typical EIA Characteristics	Y5V and Z5U	

TYPICAL APPLICATION DIAGRAMS

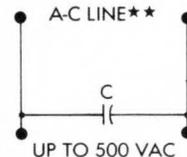


* REPRESENTS MEANS TO LIMIT TRANSIENT CURRENT TO 100 AMPERES OR LESS

X Type, 125L Series



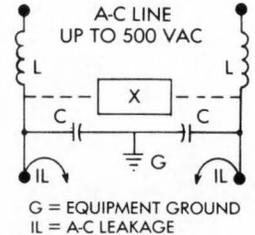
UP TO 250 VAC, RMS.



Note: Y-Type can be used for any X-Type

***NO MEANS TO LIMIT TRANSIENT CURRENT PROVIDED

Y Type, 440L Series



G = EQUIPMENT GROUND
IL = A-C LEAKAGE

125L SERIES, 20% TOLERANCE				440L SERIES, 20% TOLERANCE				A-C Leakage @ 250 V RMS, 60 Hz
μF	Catalog Number	Size		μF	Catalog Number	Size		
		Figure	Code			Figure	Code	
.001	125LD10	5††	F	330pF	440LT33	5	F	0.10 mA
				680	440LT68	5	F	0.13 mA
.0047	125LD47	5††	H	.001μF	440LD10	5	G ³	0.15 mA
.005	125LD50	5††	H ³	.0022	440LD22	5	G ³	0.34 mA
				.0027	440LD27	5	H ³	0.42 mA
.01	125LS10	5††	L	.0033	440LD33	5	J	0.50 mA
				.0047	440LD47	5	K	0.72 mA
.02	125LS20	5	W	.0056	440LD56	5	K	0.90 mA
.022	125LS22	5††	P	.0068	440LD68	5	L	1.10 mA
.03	125LS30	5	X	.01	440LS10	5	P	1.50 mA

APPLICATION NOTES:

1. Low voltage power systems experience voltage and current transient surges from system disturbances that have been measured at peaks of 9000 volts and 1000 amperes. Duration is typically from 0.1 to 3.0 microseconds. Computer terminals, communication and entertainment equipment and other electronic systems are equipped with a-c line filters to minimize EMI and RFI.

2. These requirements have led to the development of national and international safety standards establishing safe limits for a-c leakage currents to ground and for transient voltage and current surge withstandability. The 125L Series and 440L Series are designed for these applications.

Relevant Standards are: 125L Series: UL478 and 1283; VDE0565 Class X; UL1414 and CSA 22.2 Line Bypass. 440L Series: VDE0565 Class Y; SEV1055; CSA22.2 and UL1414 Across the Line. These standards change periodically. Consult factory for approval or recognition status.

3000 VOLT, 20% TOLERANCE

• **Application Range:**
Up to 4000 VDC, 1000 VAC RMS.

• **Insulation Resistance:** 50,000 M Ω minimum.
• **Dissipation Factor:** 2.0%

• **Dielectric Strength:**
5250 VDC, 1500 VAC

pF	Catalog Number	Size		Temp. Coef.	μ F	Catalog Number	Size		Temp. Coef.
		Figure	Code				Figure	Code	
10	30GAQ10	5	E	U2J	390pF	30GAT39	5	E	X5R
12	30GAQ12	5	E	U2J	470	30GAT47	5	E	X5S
15	30GAQ15	5	E	U2J	680	30GAT68	5	E	Y5U
22	30GAQ22	5	E	R3L	.001 μ F	30GAD10	5	E	Z5U
27	30GAQ27	5	E	R3L	.0015	30GAD15	5	F	Z5U
33	30GAQ33	5	E	R3L	.0022	30GAD22	5	G	Z5U
47	30GAQ47	5	E	X5F	.0027	30GAD27	5	H	Z5U
56	30GAQ56	5	E	X5F	.0033	30GAD33	5	H	Z5U
68	30GAQ68	5	E	X5F	.0039	30GAD39	5	J	Z5U
100	30GAT10	5	E	X5F	.0047	30GAD47	5	J	Z5U
150	30GAT15	5	E	X5F	.0068	30GAD68	5	L	Z5U
220	30GAT22	5	E	X5F	.0082	30GAD82	5	M	Z5U
270	30GAT27	5	E	X5F	.01	30GAS10	5	P	Z5U
330	30GAT33	5	E	X5R	.01	30GASS10	5	M	Y5V

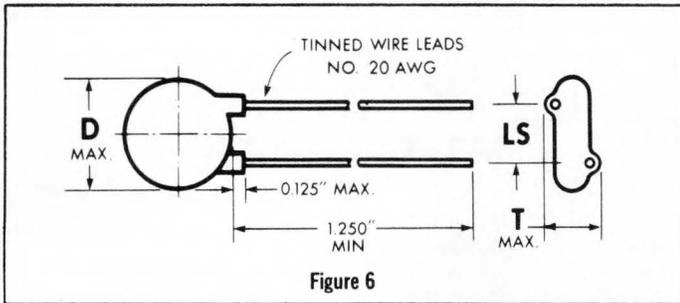


Figure 6

DIMENSIONS (in inches)*

Code	D Max.	T Max.	Lead Spacing	Code	D Max.	T Max.	Lead Spacing
6000 VOLT				7500 VOLT			
F	.400	.280	.375	H	.530	.320	.500
G	.460	.280	.375	J	.620	.320	.500
H	.530	.280	.375	K	.680	.320	.500
K	.680	.280	.375	L	.740	.320	.500
L	.740	.280	.375	M	.805	.280	.375
M	.805	.280	.375	P	.930	.280	.375
P	.930	.280	.375				

6000 VOLT, 20% TOLERANCE

• **Application Range:**
Up to 6000 VDC, 100 VAC RMS.

• **Insulation Resistance:** 75,000 M Ω minimum.
• **Dissipation Factor:** 2.0%

• **Dielectric Strength:**
10,500 VDC, 3000 VAC

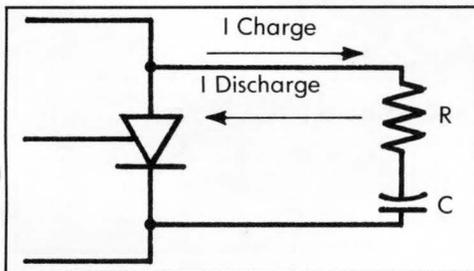
pF	Catalog Number	Size		Temp. Coef.	μ F	Catalog Number	Size		Temp. Coef.
		Figure	Code				Figure	Code	
10	60GAQ10	6	F	NPO	470pf	60GAT47	6	F	Y5U
22	60GAQ22	6	F	U2J	560	60GAT56	6	F	Y5U
33	60GAQ33	6	F	R3L	.001 μ F	60GAD10	6	F	Z5U
47	60GAQ47	6	F	R3L	.0022	60GAD22	6	H	Z5U
100	60GAT10	6	F	X5F	.0033	60GAD33	6	K	Z5U
220	60GAT22	6	F	X5F	.0047	60GAD47	6	M	Z5U
330	60GAT33	6	F	X5S					

7500 VOLT, +50%-20% TOLERANCE

• **Application Range:**
Up to 8000 VDC, 2500 VAC RMS.
• **Insulation Resistance:** 100,000 M Ω minimum.
• **Dissipation Factor:** 2.0%
• **Dielectric Strength:**
13,200 VDC, 3750 VAC

pF	Catalog Number	Size		Temp. Coef.
		Figure	Code	
100	75GAT10	6	H	X5F
470	75GAT47	6	J	X5F
.001 μ F	75GAD10	6	J	Y5U
.0025 μ F	75GAD25	6	K	Z5U

CERAMIC DISC CAPACITORS AS SNUBBERS



ALLOWABLE POWER DISSIPATIONS (Watts)
(At +30°C Case Temperature Rise)

Size	Voltage Rating			
	500 V	1000 V	3000 V	6000 V
E	.25 W	.50 W	1 W	—
H	.50 W	.75 W	1.5 W	1.7 W
K	1 W	1.5 W	3 W	3.3 W
P	2 W	3 W	5 W	5.5 W

CERA-MITE® HIGH-VOLTAGE CAPACITORS

- Unique ceramic formulations, carefully constructed lead and terminal configurations, and expansion-matched epoxy coatings contribute to the reliability and safety factor needed for high voltage capacitors.
- 10,000 volt and 15,000 volt rated capacitors are available with radial leads with conformal epoxy coating. Wide lead spacing is suitable for most power supplies.
- 10,000 volt to 40,000 volt rated capacitors are available with axial type screw terminals in the familiar cast epoxy "Doorknob" shape. Two terminal adapters to facilitate wiring of series or parallel combinations, as often necessary for high voltage divider circuits or energy storage reservoirs, are provided.

PERFORMANCE DATA

- Operating Temperature Range:** -55°C to +85°C.
- Capacitance Tolerance:** +80%, -20%.
- Dissipation Factor:** 1.5% maximum.
- Dielectric Strength:** 150% of rated voltage at 25°C.
- Insulation Resistance:** 200,000 M Ω minimum at 180 VDC, 1000 Ω F.
- Temperature Coefficient:** Z5U or better.
- Corona Limit:** 100 picocoulombs at rated a-c voltage.
- Charging Current:** Limit to 50.0 milliamperes maximum.
- Self Resonant Frequency:** Ranges from 50 megahertz for small diameters to 10 megahertz for large diameters.
- Discharge Current:** Limit to 100 amperes peak.
- Power Dissipation:** Limit to 25°C temperature rise on case.

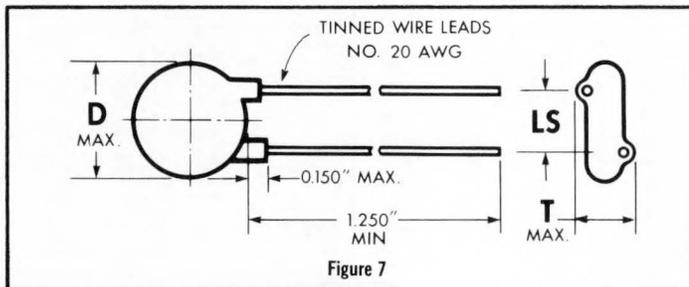


Figure 7

DIMENSIONS (in inches)*

Code	D Max.	T Max.	Lead Spacing	Code	D Max.	T Max.	Lead Spacing
10,000 VDC				15,000 VDC			
A	.67	.350	.500	A	.67	.500	.750
B	.75	.350	.500	B	.75	.500	.750
C	.81	.350	.500	C	.81	.500	.750
D	.98	.350	.500	D	.98	.500	.750

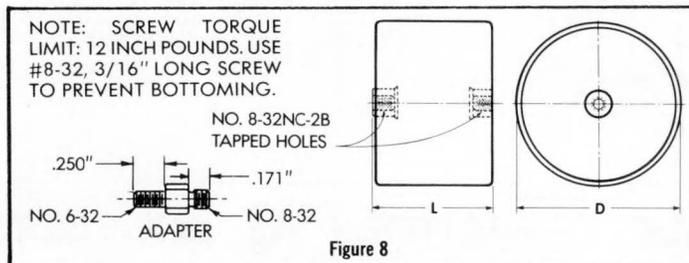


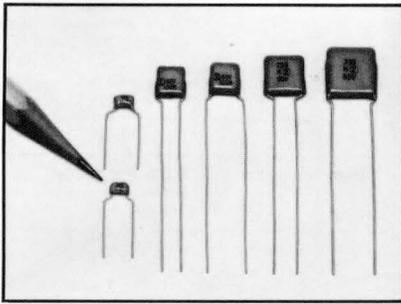
Figure 8

DIMENSIONS (in inches)*

Diameter				Length	
Code	Max.	Code	Max.	Code	Max.
B	1.05	F	2.13	K	.805
C	1.30	G	2.30	L	1.00
D	1.55	H	2.42	M	1.18
E	1.80			N	1.36

pF	Catalog Number	Size		
		Figure	D Code	L Code
10,000 VDC, 3000 VAC RMS, 60 Hz				
100	100GAT10	7	A	—
250	100GAT25	7	A	—
500	100GAT50	7	A	—
1000	100GAD10	7	B	—
2500	100GAD25	7	C	—
4700	100GAD47	7	D	—
.01 μ F	10DKS10	8	E	K
.02	10DKS20	8	F	K
15,000 VDC, 4500 VAC RMS, 60 Hz				
100	150GAT10	7	A	—
250	150GAT25	7	A	—
500	150GAT50	7	B	—
1000	150GAD10	7	C	—
2500	150GAD25	7	D	—
4700	15DKD47	8	C	K
.01 μ F	15DKS10	8	E	K
20,000 VDC, 6000 VAC RMS, 60 Hz				
500	20DKT5	8	B	M
1000	20DKD10	8	C	L
2500	20DKD25	8	D	L
4700	20DKD47	8	F	L
6800	20DKD68	8	H	L
30,000 VDC, 7500 VAC RMS, 60 Hz				
500	30DKT5	8	B	N
1000	30DKD10	8	C	M
2500	30DKD25	8	E	M
3300	30DKD33	8	F	M
4700	30DKD47	8	H	M
40,000 VDC, 10,000 VAC RMS, 60 Hz				
470	40DKT5	8	B	N
1000	40DKD10	8	D	N
2500	40DKD25	8	F	N
3300	40DKD33	8	G	N

TYPE 1C, 2C, 3C, and 5C MONOLYTHIC[®] CERAMIC CAPACITORS



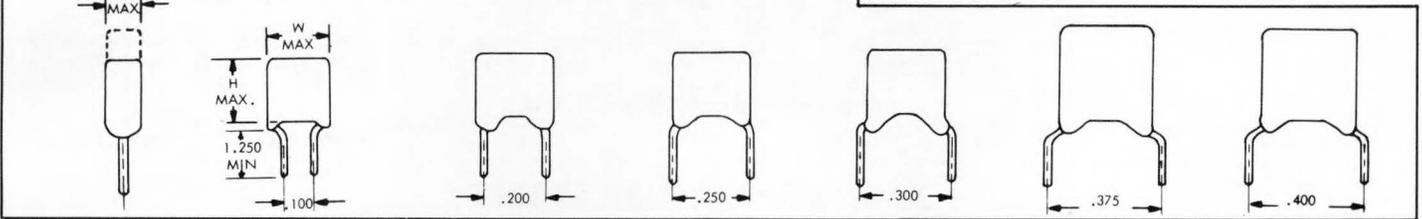
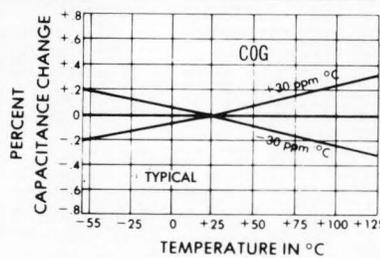
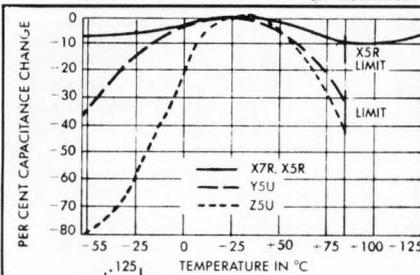
- Proven reliable in wide usage over many years of exacting service.
- For applications ranging from high frequency to 1000 MHz.
- Over 100 combinations of dielectric formulations, case sizes, and lead spacing.
- Multi-layer construction provides very high capacitance/volume ratio with minimum self-inductance.
- Made by depositing alternate layers of ceramic dielectric material and metallic electrodes, then firing into a single, all but indestructible homogeneous block.
- General-Application Type Z5U, for by-pass and filtering applications, have highest possible capacitance per case size.
- Temperature-Stable Type X7R and X5R are intended for bypass

- and decoupling in radio and television receivers, computers, servo systems, audio tone and coupling, etc., where moderate capacitance variations are permissible and dissipation factor is not critical.
- Temperature-Compensating Type COG have little or no change in capacitance with variations in temperature. Hence, they are used in radio-frequency oscillators, precision timing circuits, ultra-stable amplifiers, etc.
- Leads on Types 1C, 2C, and 3C are No. 24 AWG (0.020 dia.); Type 5C leads are No. 22 AWG (0.025 dia.).
- For complete technical data, refer to latest issue of Engineering Bulletin 6201.

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** Z5U and X5R, -55°C to +85°C; X7R and COG, -55°C to +125°C.
2. **Capacitance Change With Temperature:** Z5U ... -56, +22% from +10°C to +85°C; X5R ... ±15% from -55°C to +85°C; X7R, ±15% and COG, ±30 ppm/°C from -55°C to +125°C.
3. **Dissipation Factor:** Max. for Z5U, 4%; X5R and X7R, 2.5%; COG, 0.1%.
4. **Dielectric Strength:** Shall withstand 250% of rated voltage for 1 to 5 seconds at +25°C.
5. **Insulation Resistance:** Min. for COG, 100,000 megohms. Min. product of insulation resistance and capacitance for Z5U, X5R, and X7R, 1000 megohm-microfarads.
6. **Life Test:** Z5U units shall withstand 1000 hours at 150% of rated voltage @ +85°C; X5R ... 200% @ +85°C; X7R and COG ... 200% @ +125°C.

CAPACITANCE VS. TEMPERATURE



Z5U GENERAL APPLICATION

50 WVDC @ +85°C — ±20% CAP. TOL.★

μF	LEAD SPACING*					
	.100"§	.200"	.250"	.300"	.375"	.400"
	Catalog Number					
TYPE 1C (.200" High, .200" Wide, .125" Thick)*						
0.01	1C10Z5U103M050B	1C20Z5U103M050B	1C25Z5U103M050B	1C30Z5U103M050B	—	—
0.015	1C10Z5U153M050B	1C20Z5U153M050B	1C25Z5U153M050B	1C30Z5U153M050B	—	—
0.022	1C10Z5U223M050B	1C20Z5U223M050B	1C25Z5U223M050B	1C30Z5U223M050B	—	—
0.033	1C10Z5U333M050B	1C20Z5U333M050B	1C25Z5U333M050B	1C30Z5U333M050B	—	—
0.047	1C10Z5U473M050B	1C20Z5U473M050B	1C25Z5U473M050B	1C30Z5U473M050B	—	—
0.068	1C10Z5U683M050B	1C20Z5U683M050B	1C25Z5U683M050B	1C30Z5U683M050B	—	—
0.1	1C10Z5U104M050B	1C20Z5U104M050B	1C25Z5U104M050B	1C30Z5U104M050B	2C37Z5U104M050B	2C40Z5U104M050B
0.15	1C10Z5U154M050B	1C20Z5U154M050B	1C25Z5U154M050B	1C30Z5U154M050B	2C37Z5U154M050B	2C40Z5U154M050B
0.22	1C10Z5U224M050B	1C20Z5U224M050B	1C25Z5U224M050B	1C30Z5U224M050B	2C37Z5U224M050B	2C40Z5U224M050B
0.33	1C10Z5U334M050B	1C20Z5U334M050B	1C25Z5U334M050B	1C30Z5U334M050B	2C37Z5U334M050B	2C40Z5U334M050B
0.47	1C10Z5U474M050B	1C20Z5U474M050B	1C25Z5U474M050B	1C30Z5U474M050B	2C37Z5U474M050B	2C40Z5U474M050B
TYPE 2C (.300" High, .300" Wide, .125" Thick)*						
0.68	—	2C20Z5U684M050B	2C25Z5U684M050B	2C30Z5U684M050B	2C37Z5U684M050B	2C40Z5U684M050B
1.0	—	2C20Z5U105M050B	2C25Z5U105M050B	2C30Z5U105M050B	2C37Z5U105M050B	2C40Z5U105M050B
1.5	—	2C20Z5U155M050B	2C25Z5U155M050B	2C30Z5U155M050B	2C37Z5U155M050B	2C40Z5U155M050B
TYPE 3C (.400" High, .400" Wide, .125" Thick)*						
2.2	—	3C20Z5U225M050B	3C25Z5U225M050B	3C30Z5U225M050B	3C37Z5U225M050B	3C40Z5U225M050B
3.3	—	3C20Z5U335M050B	3C25Z5U335M050B	3C30Z5U335M050B	3C37Z5U335M050B	3C40Z5U335M050B
TYPE 5C (.500" High, .500" Wide, .125" Thick)*						
4.7	—	—	—	—	5C37Z5U475M050B	5C40Z5U475M050B

*Also available with cap. tol. of +80, -20%; change "M" in catalog number to "Z".
§Units with .100" lead spacing have smaller body width of .200".

TYPE 1C, 2C, 3C, and 5C CERAMIC CAPACITORS — continued
Y5U GENERAL APPLICATION

50 WVDC @ +85°C — ±20% CAP. TOL. ◊

μF	LEAD SPACING*					
	.100"§	.200"	.250"	.300"	.375"	.400"
	Catalog Number					
TYPE 1C (.200" High, .200" Wide, .125" Thick)*						
0.01	1C10Y5U103M050B	1C20Y5U103M050B	1C25Y5U103M050B	1C30Y5U103M050B	—	—
0.015	1C10Y5U153M050B	1C20Y5U153M050B	1C25Y5U153M050B	1C30Y5U153M050B	—	—
0.022	1C10Y5U223M050B	1C20Y5U223M050B	1C25Y5U223M050B	1C30Y5U223M050B	—	—
0.033	1C10Y5U333M050B	1C20Y5U333M050B	1C25Y5U333M050B	1C30Y5U333M050B	—	—
0.047	1C10Y5U473M050B	1C20Y5U473M050B	1C25Y5U473M050B	1C30Y5U473M050B	—	—
0.068	1C10Y5U683M050B	1C20Y5U683M050B	1C25Y5U683M050B	1C30Y5U683M050B	—	—
0.1	1C10Y5U104M050B	1C20Y5U104M050B	1C25Y5U104M050B	1C30Y5U104M050B	2C37Y5U104M050B	2C40Y5U104M050B
0.15	1C10Y5U154M050B	1C20Y5U154M050B	1C25Y5U154M050B	1C30Y5U154M050B	2C37Y5U154M050B	2C40Y5U154M050B
0.22	1C10Y5U224M050B	1C20Y5U224M050B	1C25Y5U224M050B	1C30Y5U224M050B	2C37Y5U224M050B	2C40Y5U224M050B
0.33	1C10Y5U334M050B	1C20Y5U334M050B	1C25Y5U334M050B	1C30Y5U334M050B	2C37Y5U334M050B	2C40Y5U334M050B
0.47	1C10Y5U474M050B	1C20Y5U474M050B	1C25Y5U474M050B	1C30Y5U474M050B	2C37Y5U474M050B	2C40Y5U474M050B
TYPE 2C (.300" High, .300" Wide, .125" Thick)*						
0.68	—	2C20Y5U684M050B	2C25Y5U684M050B	2C30Y5U684M050B	2C37Y5U684M050B	2C40Y5U684M050B
1.0	—	2C20Y5U105M050B	2C25Y5U105M050B	2C30Y5U105M050B	2C37Y5U105M050B	2C40Y5U105M050B
1.5	—	2C20Y5U155M050B	2C25Y5U155M050B	2C30Y5U155M050B	2C37Y5U155M050B	2C40Y5U155M050B
TYPE 3C (.400" High, .400" Wide, .125" Thick)*						
2.2	—	3C20Y5U225M050B	3C25Y5U225M050B	3C30Y5U225M050B	3C37Y5U225M050B	3C40Y5U225M050B
3.3	—	3C20Y5U335M050B	3C25Y5U335M050B	3C30Y5U335M050B	3C37Y5U335M050B	3C40Y5U335M050B
TYPE 5C (.500" High, .500" Wide, .125" Thick)*						
4.7	—	—	—	—	5C37Y5U475M050B	5C40Y5U475M050B

X5R TEMPERATURE STABLE

100 WVDC @ +85°C — ±10% CAP. TOL. †

μF	LEAD SPACING*					
	.100"§	.200"	.250"	.300"	.375"	.400"
	Catalog Number					
TYPE 1C (.200" High, .200" Wide, .125" Thick)*						
0.001	1C10X5R102K100B	1C20X5R102K100B	1C25X5R102K100B	1C30X5R102K100B	—	—
0.0015	1C10X5R152K100B	1C20X5R152K100B	1C25X5R152K100B	1C30X5R152K100B	—	—
0.0022	1C10X5R222K100B	1C20X5R222K100B	1C25X5R222K100B	1C30X5R222K100B	—	—
0.0033	1C10X5R332K100B	1C20X5R332K100B	1C25X5R332K100B	1C30X5R332K100B	—	—
0.0047	1C10X5R472K100B	1C20X5R472K100B	1C25X5R472K100B	1C30X5R472K100B	—	—
0.0068	1C10X5R682K100B	1C20X5R682K100B	1C25X5R682K100B	1C30X5R682K100B	—	—
0.01	1C10X5R103K100B	1C20X5R103K100B	1C25X5R103K100B	1C30X5R103K100B	—	—
0.015	1C10X5R153K100B	1C20X5R153K100B	1C25X5R153K100B	1C30X5R153K100B	—	—
0.022	1C10X5R223K100B	1C20X5R223K100B	1C25X5R223K100B	1C30X5R223K100B	—	—
0.033	1C10X5R333K100B	1C20X5R333K100B	1C25X5R333K100B	1C30X5R333K100B	—	—
0.047	1C10X5R473K100B	1C20X5R473K100B	1C25X5R473K100B	1C30X5R473K100B	—	—
0.068	1C10X5R683K100B	1C20X5R683K100B	1C25X5R683K100B	1C30X5R683K100B	—	—
0.1	1C10X5R104K100B	1C20X5R104K100B	1C25X5R104K100B	1C30X5R104K100B	—	—
TYPE 2C (.300" High, .300" Wide, .125" Thick)*						
0.1	—	—	—	—	2C37X5R104K100B	2C40X5R104K100B
0.15	—	2C20X5R154K100B	2C25X5R154K100B	2C30X5R154K100B	2C37X5R154K100B	2C40X5R154K100B
0.22	—	2C20X5R224K100B	2C25X5R224K100B	2C30X5R224K100B	2C37X5R224K100B	2C40X5R224K100B
0.33	—	2C20X5R334K100B	2C25X5R334K100B	2C30X5R334K100B	2C37X5R334K100B	2C40X5R334K100B
0.47	—	2C20X5R474K100B	2C25X5R474K100B	2C30X5R474K100B	2C37X5R474K100B	2C40X5R474K100B
TYPE 3C (.400" High, .400" Wide, .125" Thick)*						
0.68	—	3C20X5R684K100B	3C25X5R684K100B	3C30X5R684K100B	3C37X5R684K100B	3C40X5R684K100B
1.0	—	3C20X5R105K100B	3C25X5R105K100B	3C30X5R105K100B	3C37X5R105K100B	3C40X5R105K100B
TYPE 5C (.500" High, .500" Wide, .125" Thick)*						
1.5	—	—	—	—	5C37X5R155K100B	5C40X5R155K100B

◊Also available with cap. tol. of ±10%; change "M" in catalog number to "K".

†Also available with cap. tol. of ±20%; change "K" in catalog number to "M".

§Units with .100" lead spacing have smaller body width of .200".

TYPE 1C, 2C, 3C, and 5C CERAMIC CAPACITORS — continued
X7R TEMPERATURE STABLE — continued
 100 WVDC @ +85°C, 50 WVDC @ +125°C — ±10% CAP. TOL.†

μF	LEAD SPACING*					
	.100"§	.200"	.250"	.300"	.375"	.400"
	Catalog Number					
TYPE 1C (.200" High, .200" Wide, .125" Thick)*						
0.001	1C10X7R102K050B	1C20X7R102K050B	1C25X7R102K050B	1C30X7R102K050B	—	—
0.0015	1C10X7R152K050B	1C20X7R152K050B	1C25X7R152K050B	1C30X7R152K050B	—	—
0.0022	1C10X7R222K050B	1C20X7R222K050B	1C25X7R222K050B	1C30X7R222K050B	—	—
0.0033	1C10X7R332K050B	1C20X7R332K050B	1C25X7R332K050B	1C30X7R332K050B	—	—
0.0047	1C10X7R472K050B	1C20X7R472K050B	1C25X7R472K050B	1C30X7R472K050B	—	—
0.0068	1C10X7R682K050B	1C20X7R682K050B	1C25X7R682K050B	1C30X7R682K050B	—	—
0.01	1C10X7R103K050B	1C20X7R103K050B	1C25X7R103K050B	1C30X7R103K050B	—	—
0.015	1C10X7R153K050B	1C20X7R153K050B	1C25X7R153K050B	1C30X7R153K050B	—	—
0.022	1C10X7R223K050B	1C20X7R223K050B	1C25X7R223K050B	1C30X7R223K050B	—	—
0.033	1C10X7R333K050B	1C20X7R333K050B	1C25X7R333K050B	1C30X7R333K050B	—	—
0.047	1C10X7R473K050B	1C20X7R473K050B	1C25X7R473K050B	1C30X7R473K050B	—	—
0.068	1C10X7R683K050B	1C20X7R683K050B	1C25X7R683K050B	1C30X7R683K050B	—	—
0.1	1C10X7R104K050B	1C20X7R104K050B	1C25X7R104K050B	1C30X7R104K050B	—	—
TYPE 2C (.300" High, .300" Wide, .125" Thick)*						
0.1	—	—	—	—	2C37X7R104K050B	2C40X7R104K050B
0.15	—	2C20X7R154K050B	2C25X7R154K050B	2C30X7R154K050B	2C37X7R154K050B	2C40X7R154K050B
0.22	—	2C20X7R224K050B	2C25X7R224K050B	2C30X7R224K050B	2C37X7R224K050B	2C40X7R224K050B
0.33	—	2C20X7R334K050B	2C25X7R334K050B	2C30X7R334K050B	2C37X7R334K050B	2C40X7R334K050B
0.47	—	2C20X7R474K050B	2C25X7R474K050B	2C30X7R474K050B	2C37X7R474K050B	2C40X7R474K050B
TYPE 3C (.400" High, .400" Wide, .125" Thick)*						
0.68	—	3C20X7R684K050B	3C25X7R684K050B	3C30X7R684K050B	3C37X7R684K050B	3C40X7R684K050B
1.0	—	3C20X7R105K050B	3C25X7R105K050B	3C30X7R105K050B	3C37X7R105K050B	3C40X7R105K050B
TYPE 5C (.500" High, .500" Wide, .125" Thick)*						
1.5	—	—	—	—	5C37X7R155K050B	5C40X7R155K050B

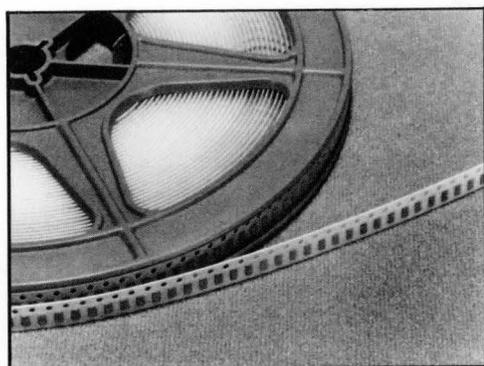
COG TEMPERATURE COMPENSATING
 100 WVDC @ +85°C, 50 WVDC @ +125°C — ±5% CAP. TOL.*

pF	TYPE 1C (.200" High, .200" Wide, .125" Thick)*					
	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
10	1C10C0G100J050B	1C20C0G100J050B	1C25C0G100J050B	1C30C0G100J050B	—	—
15	1C10C0G150J050B	1C20C0G150J050B	1C25C0G150J050B	1C30C0G150J050B	—	—
22	1C10C0G220J050B	1C20C0G220J050B	1C25C0G220J050B	1C30C0G220J050B	—	—
33	1C10C0G330J050B	1C20C0G330J050B	1C25C0G330J050B	1C30C0G330J050B	—	—
47	1C10C0G470J050B	1C20C0G470J050B	1C25C0G470J050B	1C30C0G470J050B	—	—
68	1C10C0G680J050B	1C20C0G680J050B	1C25C0G680J050B	1C30C0G680J050B	—	—
100	1C10C0G101J050B	1C20C0G101J050B	1C25C0G101J050B	1C30C0G101J050B	—	—
150	1C10C0G151J050B	1C20C0G151J050B	1C25C0G151J050B	1C30C0G151J050B	—	—
220	1C10C0G221J050B	1C20C0G221J050B	1C25C0G221J050B	1C30C0G221J050B	—	—
330	1C10C0G331J050B	1C20C0G331J050B	1C25C0G331J050B	1C30C0G331J050B	—	—
470	1C10C0G471J050B	1C20C0G471J050B	1C25C0G471J050B	1C30C0G471J050B	—	—
680	1C10C0G681J050B	1C20C0G681J050B	1C25C0G681J050B	1C30C0G681J050B	—	—
1000	1C10C0G102J050B	1C20C0G102J050B	1C25C0G102J050B	1C30C0G102J050B	—	—
1500	1C10C0G152J050B	1C20C0G152J050B	1C25C0G152J050B	1C30C0G152J050B	—	—
2200	1C10C0G222J050B	1C20C0G222J050B	1C25C0G222J050B	1C30C0G222J050B	—	—
3300	1C10C0G332J050B	1C20C0G332J050B	1C25C0G332J050B	1C30C0G332J050B	—	—
4700	1C10C0G472J050B	1C20C0G472J050B	1C25C0G472J050B	1C30C0G472J050B	—	—
TYPE 2C (.300" High, .300" Wide, .125" Thick)*						
0.0068	—	2C20C0G682J050B	2C25C0G682J050B	2C30C0G682J050B	2C37C0G682J050B	2C40C0G682J050B
0.01	—	2C20C0G103J050B	2C25C0G103J050B	2C30C0G103J050B	2C37C0G103J050B	2C40C0G103J050B
0.015	—	2C20C0G153J050B	2C25C0G153J050B	2C30C0G153J050B	2C37C0G153J050B	2C40C0G153J050B
0.022	—	2C20C0G223J050B	2C25C0G223J050B	2C30C0G223J050B	2C37C0G223J050B	2C40C0G223J050B
TYPE 3C (.400" High, .400" Wide, .125" Thick)*						
0.033	—	3C20C0G333J050B	3C25C0G333J050B	3C30C0G333J050B	3C37C0G333J050B	3C40C0G333J050B
0.047	—	3C20C0G473J050B	3C25C0G473J050B	3C30C0G473J050B	3C37C0G473J050B	3C40C0G473J050B
TYPE 5C (.500" High, .500" Wide, .125" Thick)*						
0.068	—	—	—	—	5C37C0G683J050B	5C40C0G683J050B

†Also available with cap. tol. of ±20%; change "K" in catalog number to "M".

*Capacitance values also available with cap. tol. of ±10%; change "J" in catalog number to "K".

§Units with .100" lead spacing have smaller body width of .200".

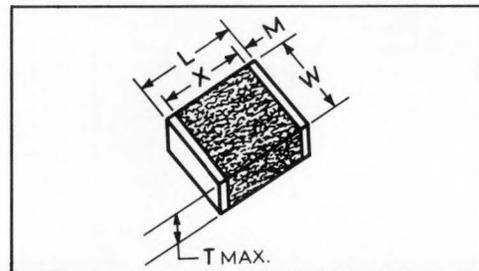


TYPE 11C MONOLYTHIC[®] CERAMIC CHIP SURFACE-MOUNT CAPACITORS

- Wide selection of capacitance ranges and temperature characteristics.
- Consistently reliable performance, with high volumetric efficiency.
- Leadless, unencapsulated multilayer chip capacitors with metallized terminations have wide application.
- Higher capacitance values can be used with silicon monolithic integrated circuits.
- Provide superior high-frequency performance.
- Can be attached to microcircuit substrates by solder reflow techniques, conductive epoxies, and semiconductor bonding techniques.
- Available in tape and reel packaging in accordance with EIA Standard RS-481, for use in automatic mounting machinery in PWB applications.
- Sizes are compatible with EIA Standard RS-198.
- For complete technical data, refer to latest issue of Engineering Bulletin 6200.

DIMENSIONS (in inches)*

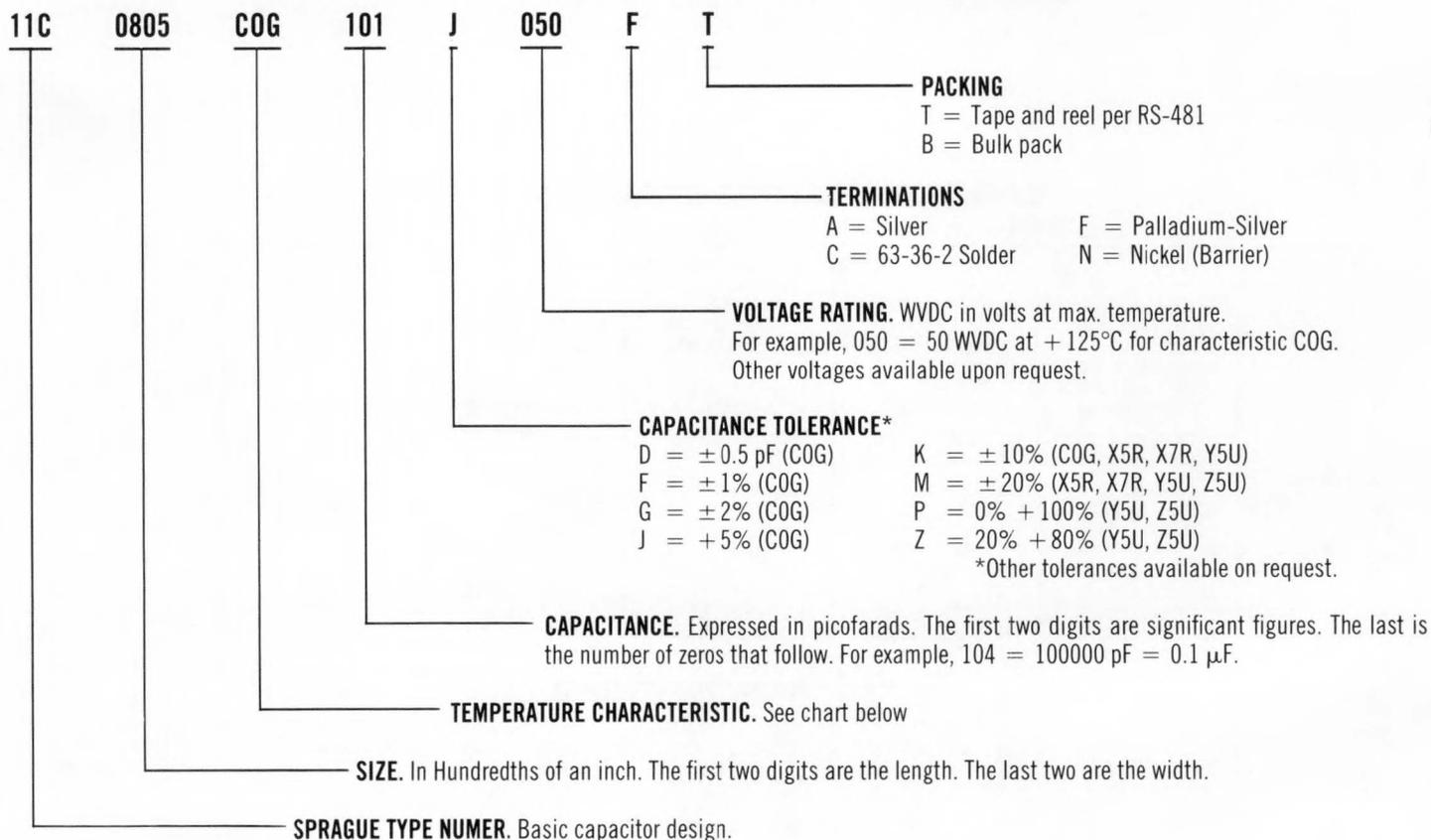
Size Code	L + 0.010	W + 0.010	M		X Min.	T Max.
			Min.	Max.		
0805	0.080	0.050	0.010	0.030	0.015	0.060
1206	0.125	0.060	0.010	0.040	0.020	0.060
1210	0.125	0.100	0.010	0.040	0.020	0.060
1812	0.180	0.125	0.010	0.050	0.050	0.060
1825	0.180	0.250(3)	0.010	0.050	0.050	0.060
2225	0.225(3)	0.250(3)	0.010	0.050	0.080	0.060



- NOTES:
1. Other sizes available on request.
 2. For solder terminations, increase positive tolerance on length, width, and thickness dimensions by 0.015 in. for chip sizes 1210 and smaller. For larger chips, increase tolerance by 0.025 in.

3. Tolerance on dimension = ± 0.015 in.

PART NUMBER SYSTEM FOR ORDERING



TEMPERATURE CHARACTERISTICS

CHARACTERISTIC	TEMPERATURE RANGE	MAXIMUM CHANGE OVER TEMPERATURE RANGE	TOLERANCES AVAILABLE
COG (NP0)	-55°C to +125°C	0 \pm 30 ppm/°C	C,D,F,G,J,K,M
X7R	-55°C to +125°C	$\pm 15\%$	K,M,Z,P
Z5U	+10°C to +85°C	-56%, +22%	M,Z,P

TYPE 11C CERAMIC CHIP SURFACE-MOUNT CAPACITORS, continued

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +125°C.
2. **Temperature Coefficient of Capacitance:** 0 ± 30 ppm/°C.
3. **Operating Voltage:** 50 WVDC at +125°C.
4. **Dissipation Factor:** 0.1% Maximum.
5. **Dielectric Test:** 2.5 x rated voltage.
6. **Insulation Resistance:** (Rated voltage @ +25°C) 100,000 megohms minimum.
7. **Life Test:** Capacitors shall withstand 200% of rated d-c voltage @ +125°C for 1000 hours.
8. **Capacitance Tolerance:** C (± 0.25 pF), D (± 0.5 pF), F (± 1%), G (± 2%), J (± 5%), K (± 10%), M (± 20%).
(F and G tolerances not available in all capacitance values.)

COG TEMPERATURE COMPENSATING

pF	Size Code												Cap. Code	
	0805		1206		1210		1812		1825		2225			
	100	50	100	50	100	50	100	50	100	50	100	50		
10														100
12														120
15														150
18														180
22														220
27														270
33														330
39														390
47														470
56														560
68														680
82														820
100														101
120														121
150														151
180														181
220														221
270														271
330														331
390														391
470														471
560														561
680														681
820														821
1000														102
1200														122
1500														152
1800														182
2200														222
2700														272
3300														332
3900														392
4700														472
5600														562
6800														682
8200														822
10000														103
12000														123
15000														153

**STANDARD ITEM
AVAILABLE THROUGH
DISTRIBUTION**

(See page 86 for catalog numbering system for ordering)

**AVAILABLE THROUGH
DISTRIBUTION AS
NON-INVENTORY ITEM**

TYPE 11C CERAMIC CHIP SURFACE-MOUNT CAPACITORS, continued
PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +125°C.
2. **Capacitance Change with Temperature:** ±15%.
3. **Operating Voltage:** 50 WVDC at +125°C.
4. **Dissipation Factor:** 2.5% Maximum.
5. **Dielectric Test:** 2.5 x rated voltage.
6. **Insulation Resistance:** Minimum product of insulation resistance and capacitance shall be 1000 megohm-microfarads.
7. **Life Test:** Capacitors shall withstand 200% of rated d-c voltage @ +125°C for 1000 hours.
8. **Capacitance Tolerances:** K (±10%), M (±20%), Z (-20, +80%), P (+100, -0%).

X7R SEMI-STABLE

Cap.	Size Code												Cap. Code
	0805		1206		1210		1812		1825		2225		
	WVDC RATINGS												
	100	50	100	50	100	50	100	50	100	50	100	50	
330 pF	✓	✓											331
390 pF	✓	✓											391
470 pF	✓	✓	✓										471
560 pF	✓	✓											561
680 pF	✓	✓											681
820 pF	✓	✓											821
1000 pF	✓	✓											102
1200 pF	✓	✓											122
1500 pF	✓	✓			✓								152
1800 pF	✓	✓			✓								182
2200 pF	✓	✓											222
2700 pF	✓	✓											272
3300 pF		✓	✓					✓					332
3900 pF		✓	✓					✓					392
4700 pF		✓	✓					✓					472
5600 pF		✓	✓					✓					562
6800 pF		✓	✓					✓					682
8200 pF		✓	✓					✓					822
0.010 μF												✓	103
0.012 μF												✓	123
0.015 μF												✓	153
0.018 μF												✓	183
0.022 μF												✓	223
0.027 μF												✓	273
0.033 μF												✓	333
0.039 μF												✓	393
0.047 μF												✓	473
0.056 μF												✓	563
0.068 μF												✓	683
0.082 μF												✓	823
0.10 μF												✓	104
0.12 μF												✓	124
0.15 μF												✓	154
0.18 μF												✓	184
0.22 μF												✓	224
0.27 μF												✓	274
0.33 μF												✓	334
0.39 μF												✓	394

Note: COG temperature characteristic units recommended for lower capacitance values.

**STANDARD ITEM
AVAILABLE THROUGH
DISTRIBUTION**

(See page 86 for catalog numbering system for ordering)

**AVAILABLE THROUGH
DISTRIBUTION AS
NON-INVENTORY ITEM**

TYPE 11C CERAMIC CHIP SURFACE-MOUNT CAPACITORS, continued

PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +85°C.
2. **Capacitance Change with Temperature:** +22, -56% from +10°C to +85°C.
3. **Operating Voltage:** 50 WVDC.
4. **Dissipation Factor:** 3% Maximum.
5. **Dielectric Test:** 2.5 x rated voltage.
6. **Insulation Resistance:** Minimum product of insulation resistance and capacitance shall be 1000 megohm-microfarads.
7. **Life Test:** Capacitors shall withstand 150% of rated d-c voltage @ +85°C for 1000 hours.
8. **Capacitance Tolerances:** M (+20%), Z (-20%, +80%), P (+100, -0%).

Z5U GENERAL PURPOSE

μF	Size Code												Cap. Code	
	0805		1206		1210		1812		1825		2225			
	100	50	100	50	100	50	100	50	100	50	100	50		
0.0010	✓	✓												102
0.0022	✓	✓	✓											222
0.0033	✓	✓	✓											332
0.0047	✓	✓	✓											472
0.0056	✓	✓	✓	✓										562
0.0068	✓	✓	✓	✓	✓									682
0.010	✓	✓	✓	✓	✓	✓								103
0.015	✓	✓	✓	✓	✓	✓	✓							153
0.022		✓	✓	✓	✓	✓	✓	✓						223
0.027		✓	✓	✓	✓	✓	✓	✓	✓					273
0.033		✓	✓	✓	✓	✓	✓	✓	✓	✓				333
0.039		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			393
0.047		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		473
0.068			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	683
0.10				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	104
0.15					✓	✓	✓	✓	✓	✓	✓	✓	✓	154
0.22						✓	✓	✓	✓	✓	✓	✓	✓	224
0.33							✓	✓	✓	✓	✓	✓	✓	334
0.47								✓	✓	✓	✓	✓	✓	474
0.68									✓	✓	✓	✓	✓	684
0.82										✓	✓	✓	✓	824
1.0											✓	✓	✓	105
1.5												✓	✓	155

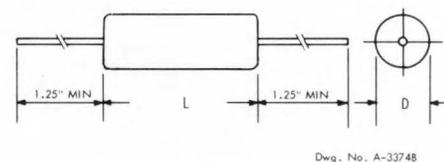
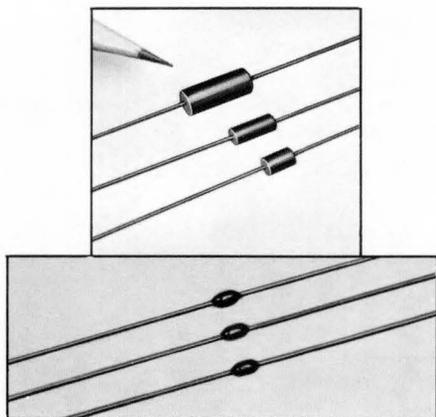
Note: X7R temperature characteristic units recommended for lower capacitance values.

**STANDARD ITEM
AVAILABLE THROUGH
DISTRIBUTION**

(See page 86 for catalog numbering system for ordering)

**AVAILABLE THROUGH
DISTRIBUTION AS
NON-INVENTORY ITEM**

TYPE 292C, 592C MONOLYTHIC[®] CERAMIC CAPACITORS



Dwg. No. A-33748

DIMENSIONS (in inches)*

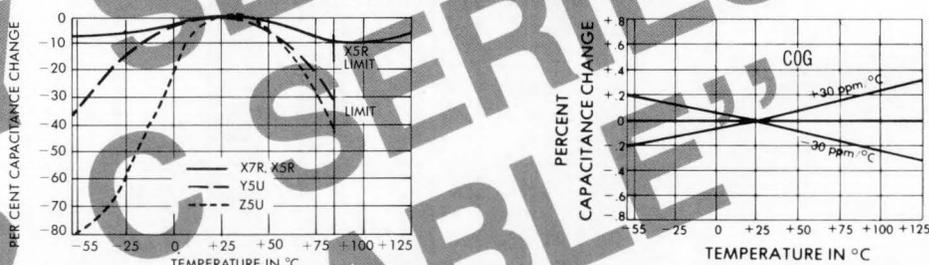
Size Code	D Max.	L Max.
B	.100	.170
C	.100	.260
D	.150	.270
E	.140	.390

- Type 292C is molded; Type 592C is conformally coated.
- Miniature, low-cost, axial-leaded capacitors with high reliability and minimum self-inductance.
- Made by depositing alternate layers of ceramic dielectric material and metallic electrodes, then firing into a single, all but indestructible homogeneous block.
- Formulation Z5U and Y5U for by-pass filtering have highest possible capacitance in smallest case size.
- Formulation X5R and X7R are for by-pass and coupling where small size, low-cost are prime considerations.
- Formulation COG (NPO) are for circuits that require little or no capacitance change with temperature variations.
- Furnished lead-taped for convenient handling/installation.
- For complete technical information on Type 292C, refer to latest issue of Engineering Bulletin 6250; for Type 592C, refer to latest issue of Engineering Bulletin 6248.

PERFORMANCE CHARACTERISTICS

- Operating Temperature Range:** -55°C to +85°C for Z5U, Y5U, and X5R; -55°C to +125°C for X7R and COG.
- Capacitance Change With Temperature:** For EIA class Z5U... -56, +22% over the temperature range of +10°C to +85°C; Y5U... -56, +22% over -30°C to +85°C; X5R... ±15% over -55°C to +85°C; X7R... ±15% over -55°C to +125°C; COG... ±30 ppm/°C over -55°C to +125°C.
- Dissipation Factor:** Max. for Z5U and Y5U, 4%; X5R and X7R, 2.5%; COG, 0.1%.
- Insulation Resistance:** Minimum product of insulation resistance and capacitance shall be 1000 megohm-microfarads for Z5U, Y5U, X5R, and X7R. Minimum insulation resistance for COG shall be 100,000 megohms.
- Dielectric Strength:** Capacitors shall withstand a d-c potential of 250% of rated voltage for a period of 1 to 5 seconds at +25°C.
- Life Test:** Z5U and Y5U units shall be capable of withstanding a 1000 hour life test at 150% of rated voltage at +85°C; X5R... 200% at +85°C; X7R and COG... 200% at +125°C.

TYPICAL CAPACITANCE CHANGE vs. TEMPERATURE



TYPE 292C

COG TEMPERATURE COMPENSATING** (50 WVDC @ 125°C, 100 WVDC @ 85°C)			μF	Size Code	Catalog Number	μF	Size Code	Catalog Number
pF	Size Code	Catalog Number	4700	E	292CC0G472J050E	0.10	E	292CX5R104K100E
			6800	E	292CC0G682J050E	0.15	E	292CX5R154K100E
			10000	E	292CC0G103J050E	SEMI-STABLE FORMULATION X7R** (50 WVDC @ 125°C, 100 WVDC @ 85°C)		
			SEMI-STABLE FORMULATION X5R** (100 WVDC @ 85°C)			0.0010	B	292CX7R102K050B
10	B	292CC0G100J050B	0.0015	B	292CX5R152K100B	0.0015	B	292CX7R152K050B
15	B	292CC0G150J050B	0.0022	B	292CX5R222K100B	0.0022	B	292CX7R222K050B
22	B	292CC0G220J050B	0.0033	B	292CX5R332K100B	0.0033	B	292CX7R332K050B
33	B	292CC0G330J050B	0.0047	B	292CX5R472K100B	0.0047	B	292CX7R472K050B
47	B	292CC0G470J050B	0.0068	B	292CX5R682K100B	0.0068	B	292CX7R682K050B
68	B	292CC0G680J050B	0.010	B	292CX5R103K100B	0.010	B	292CX7R103K050B
100	B	292CC0G101J050B	0.015	C	292CX5R153K100C	0.015	C	292CX7R153K050C
150	B	292CC0G151J050B	0.022	C	292CX5R223K100C	0.022	C	292CX7R223K050C
220	B	292CC0G221J050B	0.033	E	292CX5R333K100E	0.033	E	292CX7R333K050E
330	B	292CC0G331J050B	0.047	E	292CX5R473K100E	0.047	E	292CX7R473K050E
470	B	292CC0G471J050B	0.068	E	292CX5R683K100E	0.068	E	292CX7R683K050E
680	C	292CC0G681J050C	0.10	E	292CX5R104K100E	0.10	E	292CX7R104K050E
1000	C	292CC0G102J050C	0.15	E	292CX5R154K100E	0.15	E	292CX7R154K050E
1500	E	292CC0G152J050E						
2200	E	292CC0G222J050E						
3300	E	292CC0G332J050E						

**Z5U and Y5U have capacitance tolerance of ±20%; listings with (±) also available as +80%, -20%; change 11th character in catalog number from M to Z. X5R and X7R have tolerance of ±10%; also available as ±20%; change K to M; COG units ±5%; also available as ±10%; change J to K.

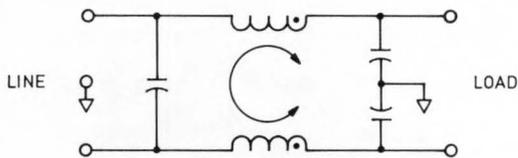
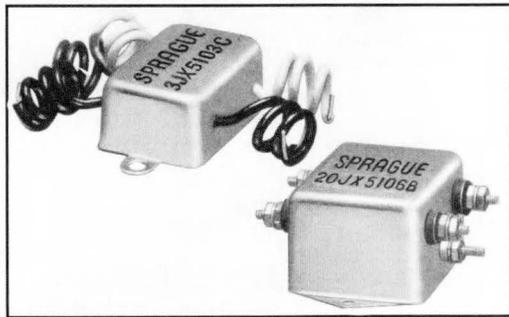
TYPE 292C, 592C MONOLYTHIC® CERAMIC CAPACITORS, continued

TYPE 292C			TYPE 592C			TYPE 592C		
Y5U GENERAL APPLICATION FORMULATION** (50 WVDC @ 85°C)			pF	Size Code	Catalog Number	SEMI-STABLE FORMULATION X7R** (50 WVDC @ 125°C, 100 WVDC @ 85°C)		
µF	Size Code	Catalog Number				µF	Size Code	Catalog Number
0.01	B	292CY5U103M050B‡	22	B	592CC0G220J050B	0.001	B	592CX7R102K050B
0.015	B	292CY5U153M050B	33	B	592CC0G330J050B	0.0015	B	592CX7R152K050B
0.022	B	292CY5U223M050B‡	47	B	592CC0G470J050B	0.0022	B	592CX7R222K050B
0.033	B	292CY5U333M050B	68	B	592CC0G680J050B	0.0033	B	592CX7R332K050B
0.047	B	292CY5U473M050B‡	100	B	592CC0G101J050B	0.0047	B	592CX7R472K050B
0.068	C	292CY5U683M050C	150	B	592CC0G151J050B	0.0068	B	592CX7R682K050B
0.1	C	292CY5U104M050C‡	220	B	592CC0G221J050B	0.010	B	592CX7R108K050B
0.15	E	292CY5U154M050E	330	B	592CC0G331J050B	0.015	B	592CX7R153K050B
0.22	E	292CY5U224M050E‡	470	B	592CC0G471J050B	0.022	B	592CX7R223K050B
0.33	E	292CY5U334M050E	680	B	592CC0G681J050B	0.033	B	592CX7R333K050B
0.47	E	292CY5U474M050E‡	1000	B	592CC0G102J050B	0.047	C	592CX7R473K050C
Z5U GENERAL APPLICATION** (50 WVDC @ 85°C)			1500	C	592CC0G152J050C	0.068	D	592CX7R683K050D
µF	Size Code	Catalog Number	2200	C	592CC0G222J050C	0.10	D	592CX7R104K050D
0.010	B	292CZ5U103M050B	3300	D	592CC0G332J050D	0.15	E	592CX7R154K050E
0.015	B	292CZ5U153M050B	4700	E	592C0G472J050E	0.22	E	592CX7R224K050E
0.022	B	292CZ5U223M050B	6800	E	592C0G682J050E	Z5U GENERAL APPLICATION** (50 WVDC @ 85°C)		
0.033	B	292CZ5U333M050B	10000	E	592C0G103J050E	µF	Size Code	Catalog Number
0.047	B	292CZ5U473M050B	SEMI-STABLE FORMULATION X5R** (100 WVDC @ 85°C)			0.010	B	592CZ5U103M050B
0.068	C	292CZ5U683M050C	µF	Size Code	Catalog Number	0.015	B	592CZ5U153M050B
0.10	C	292CZ5U104M050C	0.0010	B	592CX5R102K100B	0.022	B	592CZ5U223M050B
0.15	E	292CZ5U154M050E	0.0015	B	592CX5R152K100B	0.033	B	592CZ5U333M050B
0.22	E	292CZ5U224M050E	0.0022	B	592CX5R222K100B	0.047	B	592CZ5U472M050B
0.33	E	292CZ5U334M050E	0.0033	B	592CX5R332K100B	0.068	B	592CZ5U683M050B
0.47	E	292CZ5U474M050E	0.0047	B	592CX5R472K100B	0.10	B	592CZ5U104M050B
0.68	E	292CZ5U684M050E	0.010	B	592CX5R103K100B	0.15	C	592CZ5U154M050C
TYPE 592C			0.015	B	592CX5R153K100B	0.22	D	592CZ5U224M050D
COG TEMPERATURE COMPENSATING** (50 WVDC @ 125°C, 100 WVDC @ 85°C)			0.022	B	592CX5R223K100B	0.33	D	592CZ5U334M050D
pF	Size Code	Catalog Number	0.033	B	592CX5R333K100B	0.47	E	592CZ5U474M050E
10	B	592CC0G100J050B	0.047	C	592CX5R473K100C	0.68	E	592CZ5U684M050E
15	B	592CC0G150J050B	0.068	D	592CX5R683K100D	1.0	E	592CZ5U105M050E
			0.10	D	592CX5R104K100D			
			0.15	E	592CX5R154K100E			
			0.22	E	592CX5R224K100E			

Type 592C 200 V ratings are also available on Special Order.

**Z5U and Y5U have capacitance tolerance of ± 20%; listings with (‡) also available as + 80%, - 20%; change 11th character in catalog number from M to Z. X5R and X7R have tolerance of ± 10%; also available as ± 20%; change K to M; COG units ± 5%; also available as ± 10%; change J to K.

SERIES JX5100 GENERAL-PURPOSE POWER-LINE FILTERS



- Low-cost power-line filters for suppression of low-to-moderate levels of common-mode interference.
- **UL RECOGNIZED (UL1283) AND CSA CERTIFIED (CSA22.2)** for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **TÜV APPROVED (DIN57565/0565-3)** for operation up to 250 VAC, 50 Hz.
- Filters in JX5120 group meet leakage requirements for portable equipment established by SEV and VDE, also meet UL544 leakage requirements for 120 VAC non-patient-connected medical equipment.

- Ideal for eliminating broadcast band and high-frequency interference . . . useful in VHF range and in microwave oven applications.
- May be used in any combination of voltage and frequency up to and including maximum of 250 VAC, 50 Hz, at full rated current.
- For complete technical data, refer to latest issue of Engineering Bulletin 8211.

PERFORMANCE CHARACTERISTICS

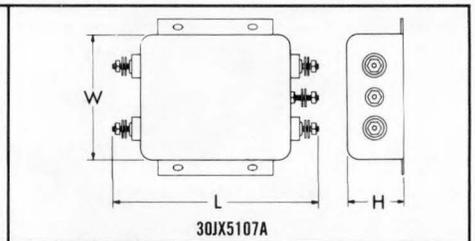
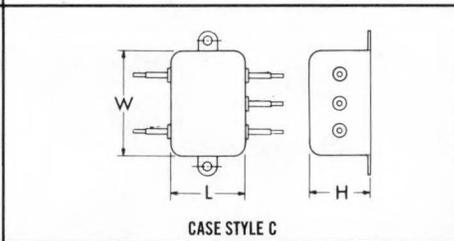
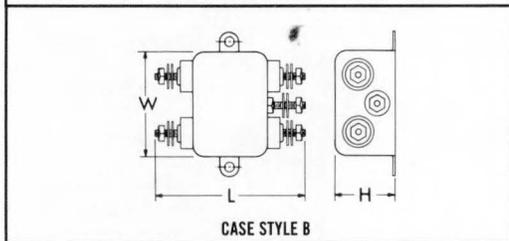
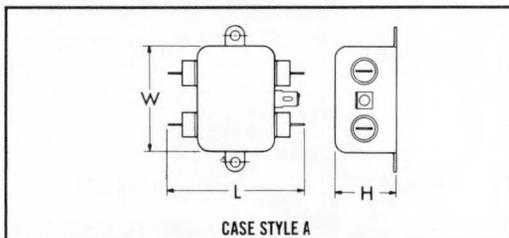
- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC; Line-to-Ground: 2250 VDC.
- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

	120 VAC	250 VAC
JX5100 Group	0.5 mA	1.0 mA
JX5110 Group	0.5 mA	1.0 mA
JX5120 Group	0.25 mA	0.4 mA
- Insulation Resistance:** IR, as measured from either line to case shall be 6000 megohms, minimum, at 200 VDC.

5. Insertion Loss in dB:

JX5100 and JX5110 Groups Line-to-Ground, 50 Ω Circuit						
Current Rating @ 120 VAC	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
1A, 3A,	15	30	38	50	50	50
2A, 5A, 10A, 20A, 30A	7.0	20	25	40	45	48

JX5120 Group Line-to-Ground, 50 Ω Circuit						
	15	29	35	45	45	48
1A, 3A	15	29	35	45	45	48
2A, 5A, 10A, 20A, 30A	7.0	19	23	34	37	42



Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
1.0	1.0	A	2.25	1.82	0.66	1JX5101A	3.0	3.0	A	2.61	1.82	0.78	3JX5103A
		C	0.96	1.82	0.66	1JX5101C			C	1.32	1.82	0.78	3JX5103C
		A	2.25	1.82	0.66	1JX5111A			A	2.61	1.82	0.78	3JX5123A
		C	0.96	1.82	0.66	1JX5111C			C	1.32	1.82	0.78	3JX5123C
		A	2.61	1.82	0.78	1JX5113A			A	2.61	1.82	0.78	5JX5104A
		C	1.32	1.82	0.78	1JX5113C			C	1.32	1.82	0.78	5JX5104C
2.0	2.0	A	2.25	1.82	0.66	1JX5121A	5.0	5.0	A	2.61	1.82	0.78	5JX5114A
		C	0.96	1.82	0.66	1JX5121C			C	1.32	1.82	0.78	5JX5114C
		A	2.25	1.82	0.66	2JX5102A			A	2.61	1.82	0.78	5JX5124A
		C	0.96	1.82	0.66	2JX5102C			C	1.32	1.82	0.78	5JX5124C
		A	2.25	1.82	0.66	2JX5112A			A	2.61	1.82	1.16	10JX5105A
		C	0.96	1.82	0.66	2JX5112C			C	1.32	1.82	1.16	10JX5105C
10.0	10.0	A	2.25	1.82	0.66	2JX5122A	10.0	10.0	A	2.61	1.82	1.16	10JX5115A
		C	0.96	1.82	0.66	2JX5122C			C	1.32	1.82	1.16	10JX5115C
		A	2.25	1.82	0.66	2JX5122A			A	2.61	1.82	1.16	10JX5125A
		C	0.96	1.82	0.66	2JX5122C			C	1.32	1.82	1.16	10JX5125C

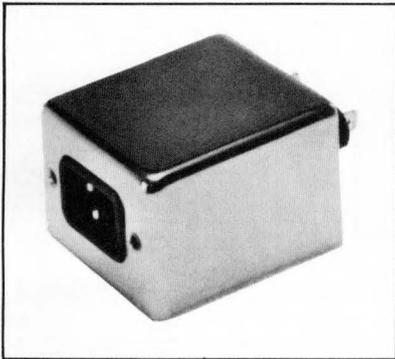
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SERIES JX5100, continued

Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
20.0	16.0	A	3.36	2.07	1.16	20JX5106A	20.0	16.0	A	3.36	2.07	1.16	20JX5126A
		B	3.58	2.07	1.16	20JX5106B				3.58	2.07	1.16	20JX5126B
		A	3.36	2.07	1.16	20JX5116A	30.0	30.0	5107	5.45	3.38	1.53	30JX5107A ⁽¹⁾
		B	3.58	2.07	1.16	20JX5116B							

1. UL, CSA only.

SERIES JX5200 GENERAL-PURPOSE POWER-LINE FILTERS



- Similar to JX5100 devices with added feature of being highly-effective in controlling line-to-line interference in addition to line-to-ground RFI.

- **UL RECOGNIZED (UL1283) and CSA CERTIFIED (CSA22.2)** for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **TÜV APPROVED (DIN57565/0565-3)** for operation up to 250 VAC, 50 Hz.

- Low-cost power-line filters for suppression of low-to-moderate levels of differential mode and common-mode interference on power lines.

- Filters in JX5220 group meet leakage requirements for portable equipment by SEV and VDE, as well as the UL544 leakage maximum for 120 VAC non-patient-connected medical equipment.

- Particularly effective where pulsed, continuous and/or intermittent RFI is encountered.

- May be used in any combination of voltage and frequency up to and including maximum of 250 VAC, 50 Hz, at full rated current.

- For complete technical data, refer to latest issue of Engineering Bulletin 8211.

PERFORMANCE CHARACTERISTICS

1. **Dielectric Withstanding Voltage:** (1 minute) Line-to-Line: 1450 VDC; Line-to-Ground: 2250 VDC.
2. **Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
3. **Maximum A-C Leakage Current:**

	120 VAC	250 VAC
JX5200 Group	0.5 mA	1.0 mA
JX5210 Group	0.5 mA	1.0 mA
JX5220 Group	0.25 mA	0.4 mA
4. **Insulation Resistance:** IR, as measured from either line to case shall be 6000 megohms, minimum, at 200 VDC. A bleeder resistor is incorporated between lines.
5. **Insertion Loss in dB:**

**JX5200 and JX5210 Groups
Line-to-Ground, 50 Ω Circuit**

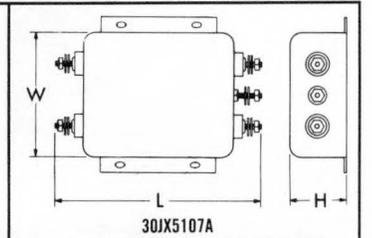
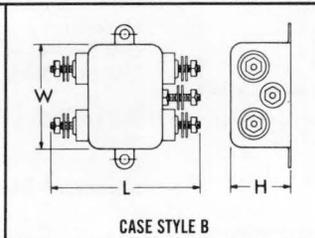
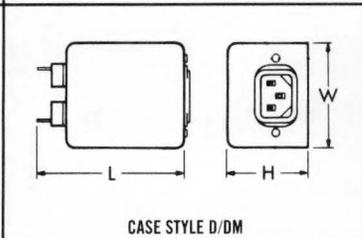
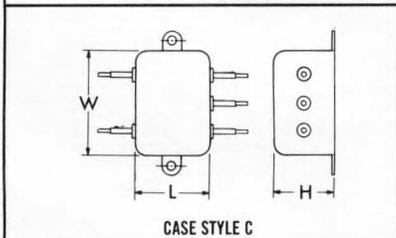
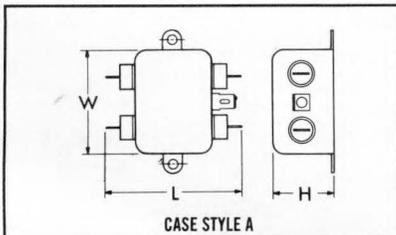
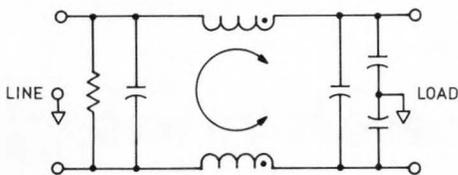
Current Rating	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
@120 VAC						
1A, 3A	15	30	38	50	50	50
2A, 5A, 10A, 20A, 30A	6.0	19	28	42	45	50

**JX5200 Group
Line-to-Ground, 50 Ω Circuit**

1A, 3A	15	29	35	45	45	50
2A, 5A, 10A, 20A, 30A	8.0	19	25	38	40	45

**JX5200, JX5210 & JX5220 Groups
Line-to-Line, 50 Ω Circuit**

1A, 3A	—	—	48	55	50	35
2A, 5A, 10A, 20A, 30A	—	—	30	50	30	30

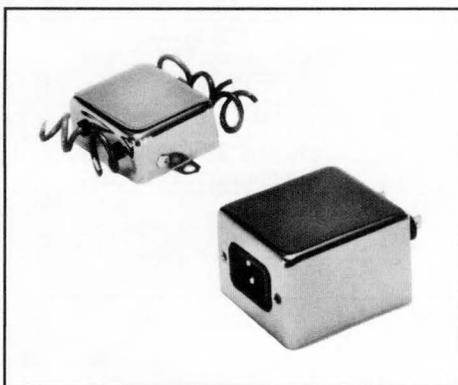


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SERIES JX5200, continued

Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
1.0	1.0	A	3.10	2.07	0.91	1JX5201A	5.0	5.0	D	3.21	2.25	1.28	5JX5214D
		C	1.81	2.07	0.91	1JX5201C			DM	3.21	2.25	1.28	5JX5214DM
		A	3.10	2.07	0.91	1JX5211A			A	3.10	2.07	1.16	5JX5224A
		C	1.81	2.07	0.91	1JX5211C			C	1.81	2.07	1.16	5JX5224C
		A	3.10	2.07	0.91	1JX5221A			D	3.21	2.25	1.28	5JX5224D
		C	1.81	2.07	0.91	1JX5221C			DM	3.21	2.25	1.28	5JX5224DM
2.0	.20	A	3.10	2.07	0.91	2JX5202A	10	10	A	3.35	2.07	1.16	10JX5205A
		C	1.81	2.07	0.91	2JX5202C			C	2.07	2.07	1.16	10JX5205C
		A	3.10	2.07	0.91	2JX5212A			5205	3.46	2.07	1.16	10JX5205D
		C	1.81	2.07	0.91	2JX5212C			A	3.35	2.07	1.16	10JX5215A
		A	3.10	2.07	0.91	2JX5222A			C	2.07	2.07	1.16	10JX5215C
		C	1.81	2.07	0.91	2JX5222C			D	3.71	2.25	1.28	10JX5215D
3.0	3.0	A	3.10	2.07	1.16	3JX5203A	10	10	DM	3.71	2.25	1.28	10JX5215DM
		C	1.81	2.07	1.16	3JX5203C			A	3.35	2.07	1.16	10JX5225A
		A	3.10	2.07	1.16	3JX5213A			C	2.07	2.07	1.16	10JX5225C
		C	1.81	2.07	1.16	3JX5213C			D	3.71	2.25	1.28	10JX5225D
		D	3.21	2.25	1.28	3JX5213D			DM	3.71	2.25	1.28	10JX5225DM
		DM	3.21	2.25	1.28	3JX5213DM			5206	3.60	2.56	1.53	20JX5206A
5.0	5.0	A	3.10	2.07	1.16	5JX5204A	20	16	A	3.35	2.56	1.53	20JX5216A
		C	1.81	2.07	1.16	5JX5204C			A	3.35	2.56	1.53	20JX5226A
		A	3.10	2.07	1.16	5JX5214A			5207	5.45	3.38	1.53	30JX5207A ⁽¹⁾
		C	1.81	2.07	1.16	5JX5214C							

SERIES JX5200 + IMPROVED GENERAL-PURPOSE FILTERS



- **UL RECOGNIZED** (UL1283) and **CSA CERTIFIED** (CSA22.2) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **VDE LICENSE** (Pending) for operation up to 250 VAC, 50 Hz.
- High-performance, premium suppression of differential and common-mode interference while retaining popular JX5200 circuit configuration.

- Designed to reduce noise to levels acceptable under FCC Part 15 and VDE 0871.
- Filters in JX5420 group meet leakage-current requirements for portable equipment established by SEV and VDE, as well as the UL544 leakage maximum for 120 VAC non-patient-connected medical equipment.

PERFORMANCE CHARACTERISTICS

- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VDC
- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

	120 VAC	250 VAC
JX5230 Group	0.5 mA	1.0 mA
JX5240 Group	0.25 mA	0.4 mA

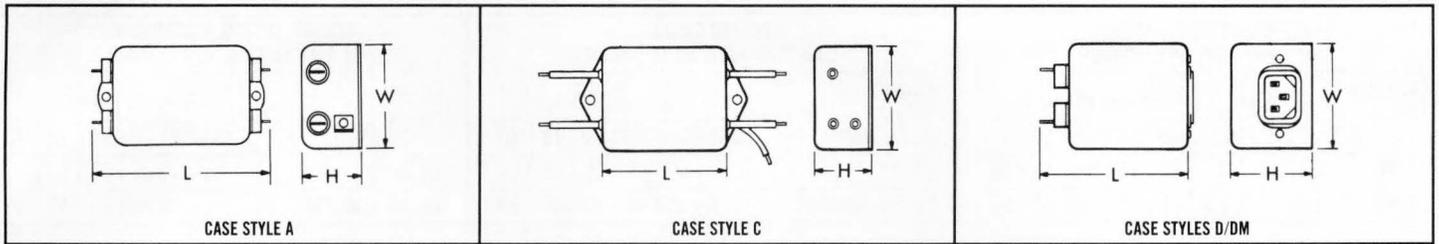
4. Insertion Loss in dB:

SERIES JX5200 + Line-to-Ground, 50 Ω Circuit										
Group	Frequency in MHz									
	0.01	0.08	0.1	0.15	0.5	1.0	5.0	10	30	
JX5230	4.0	23	25	29	43	44	42	42	30	
JX5240	4.0	22	24	28	42	40	36	36	27	

SERIES JX5200 + Line-to-Line, 50 Ω Circuit										
Catalog Number	Frequency in MHz									
	0.01	0.08	0.1	0.15	0.5	1.0	5.0	10	30	
3JX5233	1.0	3.0	10	25	59	65	62	40	40	
3JX5243	1.0	3.0	10	25	59	65	62	40	40	
6JX5236	1.0	3.0	10	25	59	65	62	40	40	
6JX5244	1.0	3.0	10	25	59	65	62	40	40	
10JX5235	1.0	3.0	3.0	10	55	65	65	50	50	
10JX5245	1.0	3.0	3.0	10	55	65	65	65	45	

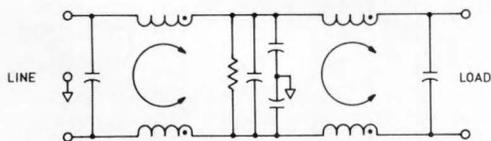
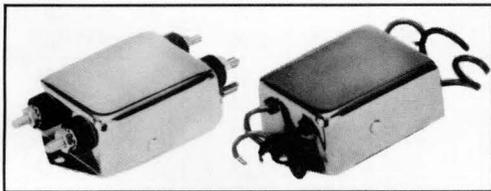
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SERIES JX5200+, continued



Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number		
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.			
3.0	1.5	A	3.85	2.07	1.16	3JX5233A	6.0	4.0	A	4.34	2.25	1.28	61X5244A		
		C	2.56	2.07	1.16	3JX5233C			C	3.05	2.25	1.28	61X5244C		
		D	3.21	2.25	1.53	3JX5233A			D	3.21	2.25	1.78	6JX5244D		
		DM	3.21	2.25	1.53	3JX5233DM			DM	3.21	2.25	1.78	6JX5244DM		
		A	3.85	2.07	1.16	3JX5243A			10	6.0	A	4.97	2.25	1.78	10JX5235A
		C	2.56	2.07	1.16	3JX5243C					C	3.69	2.25	1.78	10JX5235C
D	3.21	2.25	1.53	3JX5243D	D	4.33	2.25	1.78			10JX5235D				
6.0	4.0	DM	3.21	2.25	1.53	3JX5243DM	DM	4.33	2.25	1.78	10JX5235DM				
		A	4.34	2.25	1.28	6JX5234A	A	4.97	2.25	1.78	10JX5245A				
		C	3.05	2.25	1.28	6JX5234C	C	3.69	2.25	1.78	10JX5245C				
		D	3.21	2.25	1.78	6JX5234D	D	4.33	2.25	1.78	10JX5245D				
		DM	3.21	2.25	1.78	6JX5234DM	DM	4.33	2.25	1.78	10JX5245DM				

SERIES JX5300 GENERAL PURPOSE POWER-LINE FILTERS



• Especially useful for suppression of moderate-to-high interference levels in low impedance applications.

- **UL RECOGNIZED** (UL1283) and **CSA CERTIFIED** (CSA22.2) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **TÜV APPROVED** (DIN57565/0565-3) for operation up to 250 VAC, 50 Hz.
- Filters in JX5320 group meet leakage requirements for portable equipment established by SEV and VDE, also meet UL544 leakage maximum for 120 VAC non-patient-connected medical equipment.
- Specifically designed for pulsed, continuous, and/or intermittent interference.
- Provides protection from externally generated interference while reducing internally generated noise to acceptable regulatory levels in equipment without switched-mode power supplies.
- May be used at any combination of voltage and frequency up to and including maximum of 250 VAC, 50 Hz, at full rated current.
- For complete technical data, refer to latest issue of Engineering Bulletin 8211.

PERFORMANCE CHARACTERISTICS

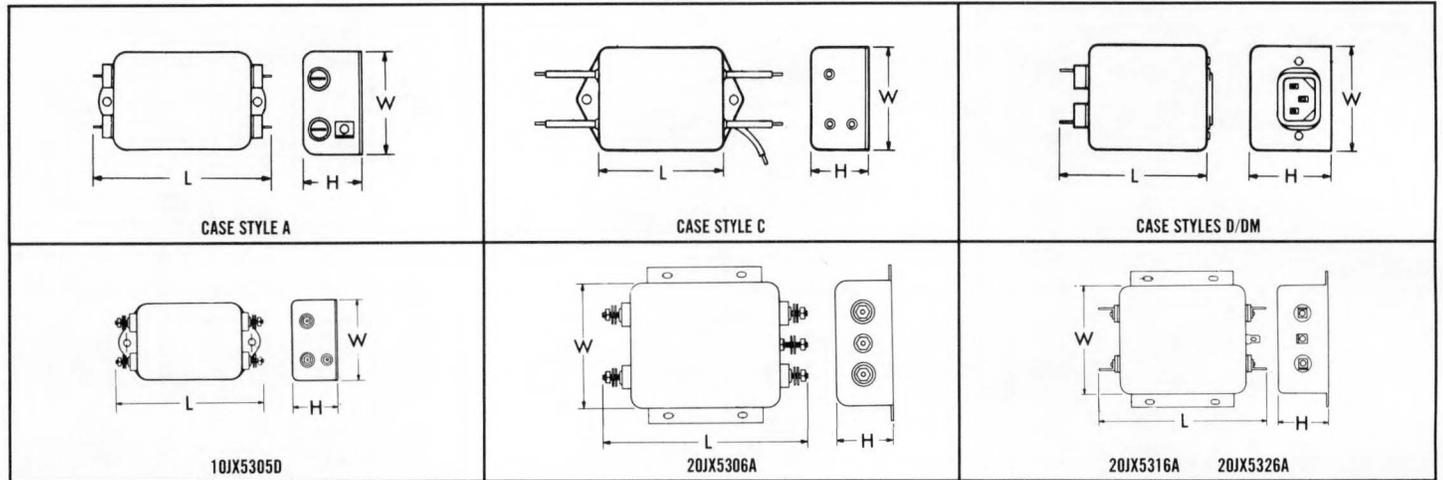
- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VDC
- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

	120 VAC	250 VAC
JX5300 Group	0.5 mA	1.0 mA
JX5310 Group	0.5 mA	1.0 mA
JX5320 Group	0.25 mA	0.4 mA
- Insulation Resistance:** IR, as measured from either line to case shall be 6000 megohms, minimum, at 200 VDC. A bleeder resistor is incorporated between lines.

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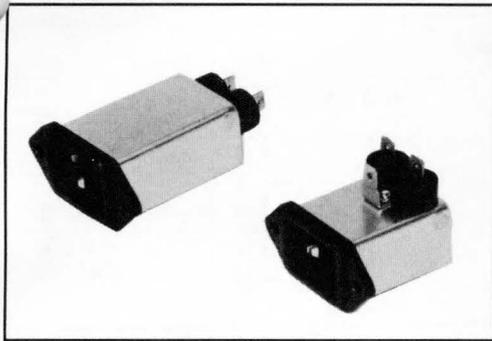
SERIES JX5300, continued
5. Insertion Loss in dB:

JX5300 and JX5310 Groups Line-to-Ground, 50 Ω Circuit							JX5320 Group Line-to-Ground, 50 Ω Circuit							JX5300, JX5310, JX5320 Groups Line-to-Line, 50 Ω Circuit						
Current Rating @120 VAC	Frequency in MHz						Current Rating @120 VAC	Frequency in MHz						Current Rating @120 VAC	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30		0.15	0.5	1.0	5.0	10	30		0.15	0.5	1.0	5.0	10	30
1A, 3A	30	65	65	65	65	65	1A, 3A	25	60	65	65	65	65	1A, 3A	—	—	65	60	54	46
2A, 5A, 10A, 20A	5.0	44	60	65	65	60	2A, 5A, 10A, 20A	2.0	35	51	63	60	50	2A, 5A, 10A, 20A	—	—	35	60	57	45

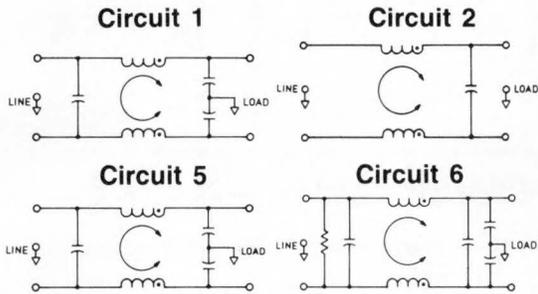


Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.		
1.0	1.0	A	3.35	1.81	1.16	1JX5301A	5.0	5.0	A	3.85	2.07	1.16	5JX5304A	
		C	2.07	1.81	1.16	1JX5301C			C	2.56	2.07	1.16	5JX5304C	
		A	3.35	1.81	1.16	1JX5311A			A	3.85	2.07	1.16	5JX5314A	
		C	2.07	1.81	1.16	1JX5311C			C	2.56	2.07	1.16	5JX5314C	
		A	3.35	1.81	1.16	1JX5321A			D	4.33	2.25	1.28	5JX5314D	
		C	2.07	1.81	1.16	1JX5321C			DM	4.33	2.25	1.28	5JX5314DM	
2.0	2.0	A	3.35	1.81	1.16	2JX5302A	10	6.0	A	3.85	2.07	1.16	5JX5324A	
		C	2.07	1.81	1.16	2JX5302C			C	2.56	2.07	1.16	5JX5324C	
		A	3.35	1.81	1.16	2JX5312A			D	4.33	2.25	1.28	5JX5324D	
		C	2.07	1.81	1.16	2JX5312C			DM	4.33	2.25	1.28	5JX5324DM	
		A	3.35	1.81	1.16	2JX5322A			5305	A	3.85	2.07	1.53	10JX5305A
		C	2.07	1.81	1.16	2JX5322C				C	2.56	2.07	1.53	10JX5305C
3.0	3.0	A	3.85	2.07	1.16	3JX5303A	20	10	A	3.85	2.07	1.53	10JX5315A	
			3.85	2.07	1.16	3JX5303C				C	2.56	2.07	1.53	10JX5315C
		A	3.85	2.07	1.16	3JX5313A			D	4.33	2.25	1.53	10JX5315D	
			3.85	2.07	1.16	3JX5313C				DM	4.33	2.25	1.53	10JX5315DM
		D	4.33	2.25	1.28	3JX5313D			A	3.85	2.07	1.53	10JX5325A	
			4.33	2.25	1.28	3JX5313DM				C	2.56	2.07	1.53	10JX5325C
		A	3.85	2.07	1.16	3JX5323A			D	4.33	2.25	1.53	10JX5325D	
			3.85	2.07	1.16	3JX5323C				DM	4.33	2.25	1.53	10JX5325DM
		D	4.33	2.25	1.28	3JX5323D			5306	5.34	3.37	1.53	20JX5206A	
			4.33	2.25	1.28	3JX5323DM				5316	5.23	3.37	1.53	20JX5316A
									5326	5.23	3.37	1.53	20JX5326A	

SERIES JX5400 FILTERS WITH INTEGRAL IEC CONNECTORS



- Incorporates standard I.E.C. integral male line cord receptacle.
- **UL RECOGNIZED** (UL1283), **CSA CERTIFIED** (CSA22.2) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **VDE LICENSED** (VDE0565-3) and **TUV APPROVED** (DIN57565/0565-3) for operation up to 250 VAC, 50 Hz.
- Particularly effective in protecting equipment containing low level logic circuitry.
- Available in 4 circuit designs including moderate common-mode rejection and low A-C leakage (Circuit 1), very low A-C leakage (Circuit 2), differential-mode and premium common-mode suppression (Circuit 5), common-mode and premium differential-mode suppression (Circuit 6).
- Choice of 2 standard cases . . . with load terminals extending from back of plated steel housing or from top of housing.
- Cases include combination mounting bracket/receptacle, backed with metal, which is an electrically-integral part of the shielded case, assuring high insertion loss and isolation.
- For complete technical data, see the latest issue of Engineering Bulletin 8212.



PERFORMANCE CHARACTERISTICS

- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VDC
- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

Circuit	120 VAC	250 VAC
Styles 1, 5, 6	0.25 mA	0.5 mA
Style 2	1.0 μA	2.5 μA
- Insulation Resistance:** 6,000 megohms, minimum, at 200 VDC.
- Insertion Loss in dB:**

1JX5400 Group Line-to-Ground, 50 Ω Circuit						
Circuit Style	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
1	22	35	40	46	50	49
2	20	31	34	24	18	18
5	26	35	36	49	50	50
6	24	35	42	49	52	54

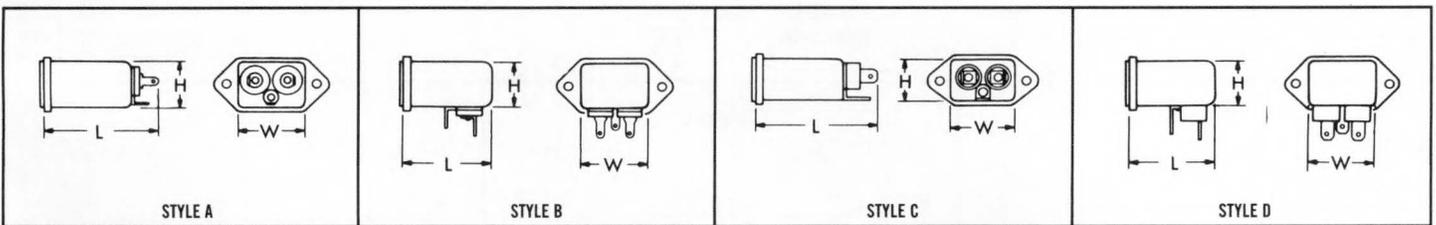
3JX5400 Group Line-to-Ground, 50 Ω Circuit						
1	15	25	30	45	50	54
2	16	25	34	30	26	21
5	20	30	37	47	49	50
6	20	29	36	45	50	54

6JX5400 Group Line-to-Ground, 50 Ω Circuit						
Circuit Style	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
1	9	20	25	41	45	50
2	10	19	22	25	22	19
5	14	23	28	42	46	50
6	14	23	30	41	45	50

1JX5400 Group Line-to-Line, 50 Ω Circuit						
5	1.0	1.0	50	60	60	40
6	3.0	15	20	37	37	36

3JX5400 Group Line-to-Line, 50 Ω Circuit						
Circuit Style	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
5	1.0	1.0	45	60	55	34
6	3.0	15	20	37	37	36

6JX5400 Group Line-to-Line, 50 Ω Circuit						
5	1.0	1.0	40	65	60	40
6	3.0	15	20	31	35	35



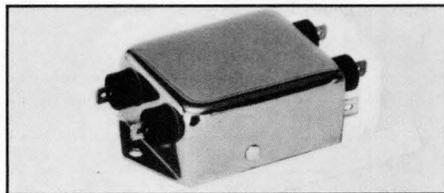
Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
CIRCUIT 1													
1.0	1.0	A	2.00	1.19	0.81	1JX5411A	3.0	3.0	C	2.20	1.19	0.81	3JX5421C
		B	1.60	1.19	0.85	1JX5411B			D	1.60	1.19	0.81	3JX5421D
		C	2.20	1.19	0.81	1JX5411C			A	2.00	1.19	0.81	6JX5431A
		D	1.60	1.19	0.85	1JX5411D			B	1.60	1.19	0.85	6JX5431B
3.0	3.0	A	2.00	1.19	0.81	3JX5421A	6.0	6.0	C	2.20	1.19	0.81	6JX5431C
		B	1.60	1.19	0.85	3JX5421B			D	1.60	1.19	0.85	6JX5431D

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SERIES JX5400, continued

Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
CIRCUIT 2													
1.0	1.0	A	2.00	1.19	0.81	1JX5412A	1.0	1.0	C	2.20	1.19	0.81	1JX5415C
		B	1.60	1.19	0.85	1JX5412B			D	1.60	1.19	0.85	1JX5415D
		C	2.20	1.19	0.81	1JX5412C	3.0	3.0	C	2.20	1.19	0.81	3JX5425C
		D	1.60	1.19	0.85	1JX5412D			D	1.60	1.19	0.85	3JX5425D
3.0	3.0	A	2.00	1.19	0.81	3JX5422A	6.0	6.0	C	2.20	1.19	0.81	6JX5435C
		B	1.60	1.19	0.85	3JX5422B			D	1.60	1.19	0.85	6JX5435D
CIRCUIT 6													
		C	2.20	1.19	0.81	3JX5422C	1.0	1.0	C	2.62	1.19	0.81	1JX5416C
		D	1.60	1.19	0.85	3JX5422D			D	2.00	1.19	0.82	1JX5416D
6.0	6.0	A	2.00	1.19	0.81	6JX5432A	3.0	3.0	C	2.62	1.19	0.81	3JX5426C
		B	1.60	1.19	0.85	6JX5432B			D	2.00	1.19	0.82	3JX5426D
		C	2.20	1.19	0.81	6JX5432C	6.0	6.0	C	2.62	1.19	0.81	6JX5436C
		D	1.60	1.19	0.85	6JX5432D			D	2.00	1.19	0.82	6JX5436D

SERIES JX5600 HIGH-PERFORMANCE-POWER LINE FILTERS



- Designed for applications in moderate-to-severe suppression situations, whether for conducted emission or conducted susceptibility.
- UL RECOGNIZED** (UL1283) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz.
- High-performance for applications such as switching regulated power supplies and equipment that operates with low level logic.
- CIRCUIT TYPE S FILTERS.** Low cost devices which offer two suppression elements ('L' Filter) for common-mode signals and three elements ('Pi' Filter) for differential-mode interference. Most effective

where low-frequency common-mode problem is least severe and high-frequency load impedance is relatively high.

- CIRCUIT TYPE V FILTERS.** Medium cost devices which offer three suppression elements ('T' Filter) for common-mode signals and three elements ('Pi' Filters) for differential-mode interference. Most effective where a relatively low load impedance is presented to common-mode signals.
- CIRCUIT TYPE W FILTERS.** Most effective in common-mode problems, Type W offers four suppression elements (Double 'L' Filter) for common-mode signals and three elements ('Pi' Filter) for differential-mode interference.
- For complete technical data, refer to latest issue of Engineering Bulletin 8213.

- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

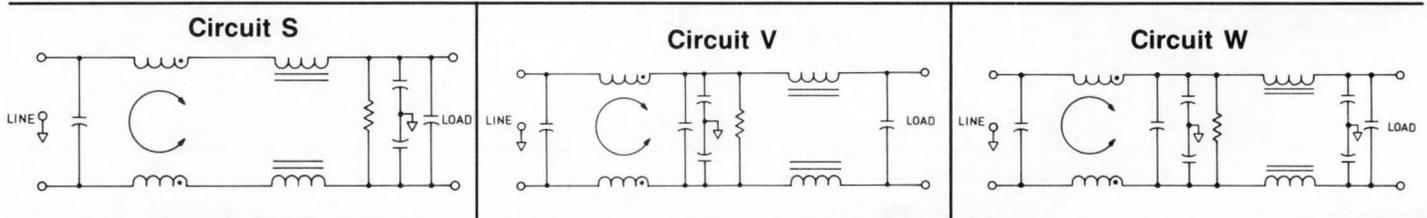
	120 VAC	250 VAC
	0.5 mA	1.0 mA
- Insulation Resistance:** 6000 megohms minimum, at 200 VDC from either line to case. A 10 megohm $\pm 20\%$ bleeder resistor incorporated between lines.
- Insertion Loss in dB:**

PERFORMANCE CHARACTERISTICS

- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VAC

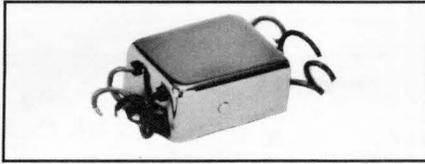
SERIES JX5600
Line-to-Ground, 50 Ω Circuit

Circuit Type	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
S	20	25	30	40	40	40
V	20	25	40	50	40	40
W	20	25	50	60	60	40



Current Rating (Amperes)		Circuit Type	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Circuit Type	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
3.0	3.0	S	3.21	1.82	1.28	3JX5603S	6.0	6.0	W	3.71	2.08	1.53	6JX5606W
		V	3.21	1.82	1.28	3JX5603V			S	3.71	2.08	1.53	10JX5610S
		W	3.21	1.82	1.28	3JX5603W			V	3.71	2.08	1.53	10JX5610V
6.0	6.0	S	3.71	2.08	1.53	6JX5606S	10	10	W	3.71	2.08	1.53	10JX5610W
		V	3.71	2.08	1.53	6JX5606V			W	3.71	2.08	1.53	10JX5610W

SERIES JX5600 + IMPROVED HIGH-PERFORMANCE FILTERS



- Enhanced performance for use in applications with severe suppression requirements.
- **UL RECOGNIZED** (Pending) **CSA CERTIFIED** (Pending) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **VDE LICENSE** (Pending) for operation up to 250 VAC, 50 Hz.
- Especially useful in reducing interference generated by switched-mode power supplies and series-regulated power supplies.
- Provide superior interference protection for equipment containing low-level logic and operating in noisy environments.

- Includes several variations on Circuit Type S of the original Series JX5600.
- Available in three termination styles, one of which has a standard built-in three-pin power line connector.

PERFORMANCE CHARACTERISTICS

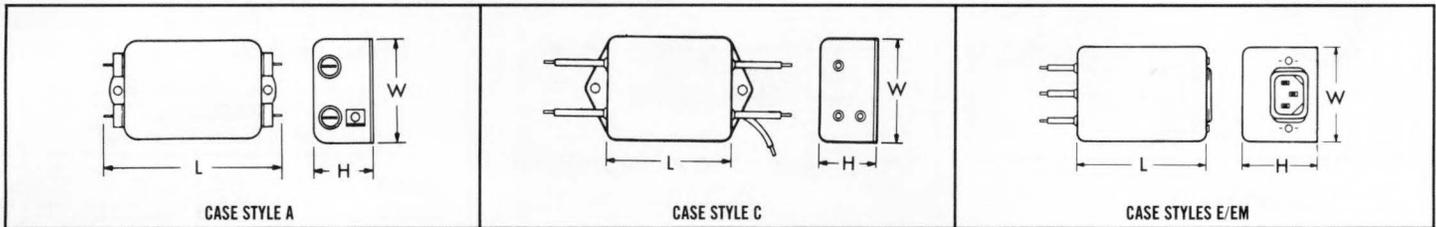
- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VDC
- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

Catalog Number	120 VAC	250 VAC
3JX5613	2.0 mA	3.0 mA
3JX5623	0.25 mA	0.5 mA
6JX5614	2.0 mA	3.0 mA
6JX5624	0.25 mA	0.5 mA

4. Insertion Loss in dB:

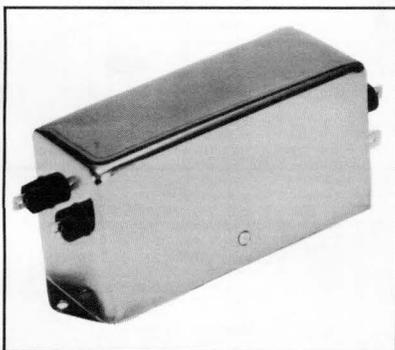
SERIES JX5600 + Line-to-Ground, 50 Ω Circuit						
Catalog Number	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
3JX5613	50	55	55	55	50	55
3JX5623	47	75	50	60	60	40
6JX5614	75	83	83	83	70	60
6JX5624	72	80	80	80	65	53

SERIES JX5600 + Line-to-Line, 50 Ω Circuit						
Catalog Number	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
3JX5613	65	75	75	60	65	65
3JX5623	65	75	75	65	65	60
6JX5614	75	83	85	85	75	80
6JX5624	73	80	80	80	70	75



Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.	
3.0	3.0	A	3.85	2.07	1.78	3JX5613A	3.0	3.0	E	3.07	2.25	1.78	3JX5623E
		C	2.56	2.07	1.78	3JX5613C			EM	3.07	2.25	1.78	3JX5623EM
		E	3.07	2.25	1.78	3JX5613E	6.0	6.0	A	4.98	2.25	1.78	6JX5614A
		EM	3.07	2.25	1.78	3JX5613EM			C	3.69	2.25	1.78	6JX5614C
		A	3.85	2.07	1.78	3JX5623A			A	4.98	2.25	1.78	6JX5624A
		C	2.56	2.07	1.78	3JX5623C			C	3.69	2.25	1.78	6JX5624C

SERIES JX5800 ULTRA-ATTENUATING POWER-LINE FILTERS



- For applications requiring effective attenuation of very high levels of common-mode and differential-mode interference.
- **UL RECOGNIZED** (UL1283) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz.
- Provide the ultra-high degree of suppression needed to maintain equipment compatibility in very noisy environments and to enable compliance of noise-generating equipment with FCC Part 15.

2. **Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.

3. **Maximum A-C Leakage Current:**

	120 VAC	250 VAC
	2.0 mA	3.0 mA

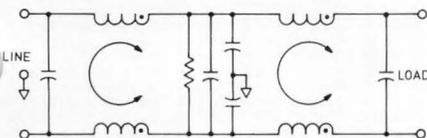
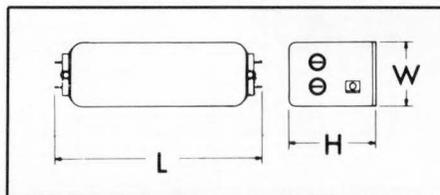
4. Insertion Loss in dB:

SERIES JX5800 Line-to-Ground, 50 Ω Circuit						
Current Rating @120 VAC	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
3A, 6A, 10A	65	70	70	70	65	30

SERIES JX5800 Line-to-Line, 50 Ω Circuit						
Current Rating @120 VAC	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
3A	35	65	65	65	65	57
6A, 10A	35	65	65	60	55	37

PERFORMANCE CHARACTERISTICS

- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VAC

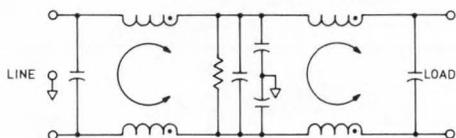
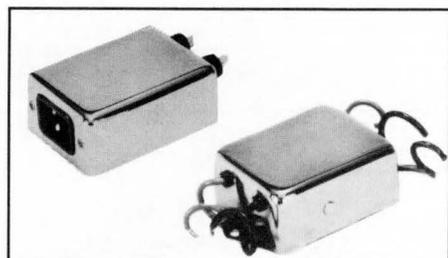


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SERIES JX5800, continued

Current Rating (Amperes)		DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		DIMENSIONS (in inches)*			Catalog Number
@120 VAC	@250 VAC	L Max.	W Max.	H Max.		@120 VAC	@250 VAC	L Max.	W Max.	H Max.	
3.0	3.0	6.62	2.07	1.78	3JX5803SP	10.0	10.0	6.62	2.07	2.78	10JX5810SP
6.0	6.0	6.62	2.07	2.28	6JX5806SP						

SERIES JX5900 PREMIUM PERFORMANCE POWER-LINE FILTERS



• Designed for use in electronic equipment that must comply with FCC Part 15, Germany's VDE 0871, and for applications with similar 10 kHz—30 MHz attenuation requirements.

• **UL RECOGNIZED** (UL1283) and **CSA CERTIFIED** (CSA22.2) for operation up to 250 VAC, 50 Hz or 120 VAC, 60 Hz; **VDE LICENSED** (VDE0565-3) and **TÜV APPROVED** (DIN57565/0565-3) for operation up to 250 VAC, 50 Hz.

• Available with insulated stranded leads (lead ends stripped) or with slotted quick-connect tab terminals that may be used as solder terminals.

• For complete technical data, refer to latest issue of Engineering Bulletin 8216.

PERFORMANCE CHARACTERISTICS

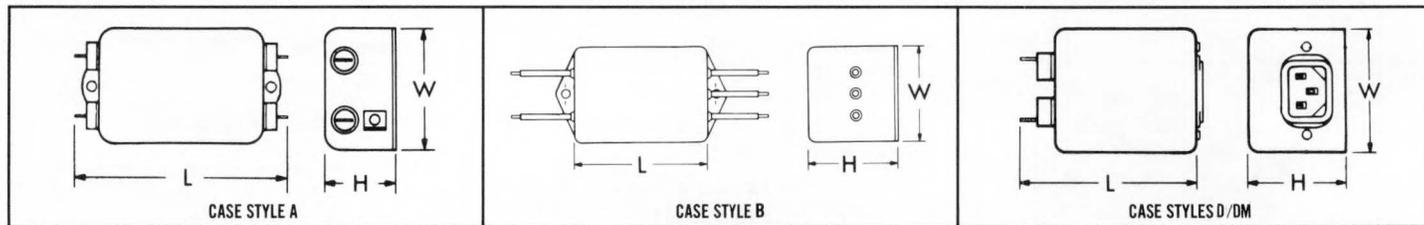
- Dielectric Withstanding Voltage:** (1 minute)
Line-to-Line: 1450 VDC
Line-to-Ground: 2250 VAC
- Voltage Rating:** 120 VAC at 60 Hz and 250 VAC at 50 Hz.
- Maximum A-C Leakage Current:**

120 VAC	250 VAC
0.25 mA	0.5 mA
- Insulation Resistance:** 6000 megohms, minimum, at 200 VDC from either line to case. A bleeder resistor is incorporated between lines.

5. Insertion Loss in dB:

SERIES JX5900 Line-to-Ground, 50 Ω Circuit						
Catalog Number	Frequency in MHz					
	0.15	0.5	1.0	5.0	10	30
All	60	65	65	65	60	55

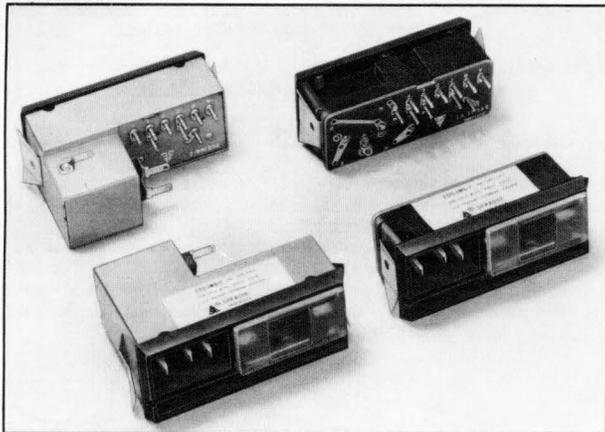
SERIES JX5900 Line-to-Line, 50 Ω Circuit						
3JX5903A	36	65	65	65	65	58
3JX5903B	36	65	65	65	65	58
3JX5903D	36	55	55	54	53	51
3JX5903DM	36	55	55	54	53	51
6JX5906A	30	65	65	65	65	35
6JX5906B	30	65	65	65	65	35
10JX5910A	30	65	65	65	65	35
10JX5910B	30	65	65	65	65	35



Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	Current Rating (Amperes)		Case Style	DIMENSIONS (in inches)*			Catalog Number	
@120 VAC	@250 VAC		L Max.	W Max.	H Max.		@120 VAC	@250 VAC		L Max.	W Max.	H Max.		
3.0	1.5	A	3.85	2.07	1.78	3JX5903A	6.0	4.5	A	6.44	2.07	2.28	6JX5906A	
		B	2.56	2.07	1.78	3JX5903B			B	5.25	2.07	2.28	6JX5906B	
		D	DM	3.21	2.25	1.78	3JX5903D	10	6.0	A	6.44	2.07	2.78	10JX5910A
				3.21	2.25	1.78	3JX5903DM			B	5.25	2.07	2.78	10JX5910B

TYPE 200JM6 FUSED MULTI-VOLTAGE CONNECTORS

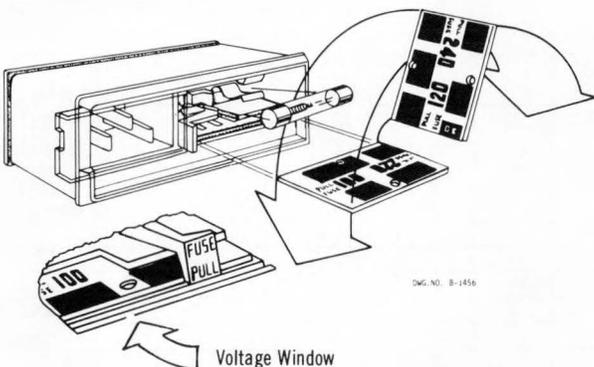
FOR INTERNATIONAL EQUIPMENT MANUFACTURERS



200JM6-2

200JM6-1

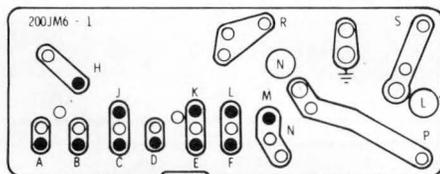
- Accepts standard IEC Type V 3-pin plug, and operates with choice of 4 line voltages.
- Eliminates need for internal wiring changes, special power supplies, or stocking of different line cords.
- **U.L. RECOGNIZED** and **C.S.A. CERTIFIED**. The 200JM6-1 is licensed by VDE.
- Conforms to requirements of CEE publication 22, Type VI, and IEC 161, category 10/70/21.
- Two types . . . 200JM6-1 and 200JM6-2. Type 200JM6-2 has added feature of output interference filter for equipment protection from conducted RFI/EMI.
- Integral Fuse holder with fuse pull— makes changing fuses and voltage levels a snap. Accepts standard 3 AG Fuse.
- No Hardware needed for installation; unique mounting tabs provide self-locking.
- Fit panel cutout 1.063 x 2.6'' with panel thickness from 0.06 to 0.08''.
- Tough, shockproof thermoplastic housing.
- For complete technical data, refer to latest issue of Engineering Bulletin 8801.



VOLTAGE SELECTION

1. Slide cover door left, rotate fuse-pull to left. Remove fuse.
2. Remove selector card, align to desired voltage. Replace card, pushing firmly into card slot.
3. Rotate fuse-pull back to the right, replace fuse. Close door.
4. Desired voltage rating should appear on top left side of card, in voltage window, as shown above.

TYPE 200JM6-1 REAR VIEW



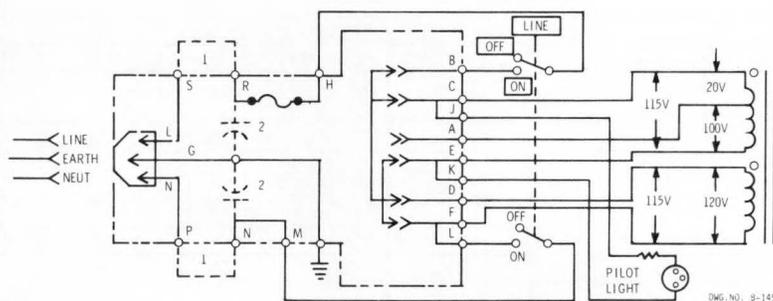
○ OPEN HOLE
● PIN

Dwg. No. A-11,337

PERFORMANCE CHARACTERISTICS

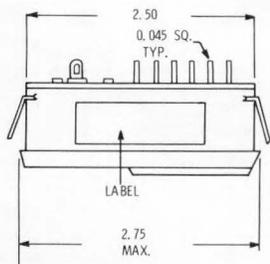
1. **Operating Voltages:** 100, 115-120, 220, or 230-240 VAC.
2. **Operating Current:** Maximum 6.0A a-c.
3. **Operating Frequency:** 48 to 440 Hz.
4. **Dielectric Test:** (At +25°C) Connectors will withstand 1 minute of 1.5 KVAC or 2.25 KVDC applied from both sides of line to ground; 1.414 KVDC applied line to line.
6. **Typical Insertion Loss.** (For 200JM6-2 only) Line to ground in 50Ω circuit per MIL-STD-220 . . . at .15 MHz, 12 db; 0.2 MHz, 15 db; 0.5 MHz, 25 db; 10 and 20 MHz, 55 db.
7. **Terminals:** Input . . . accepts CEE-22 type V Female connector. Output . . . standard .045'' sq. wire wrap pins.

TYPE 200JM6-1 SCHEMATIC DIAGRAM

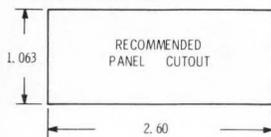


NOTES: 1. If inductors are not used for input filtering, jumper terminals as shown.
2. If capacitors are required install from terminals R and N to ground as shown.

TYPE 200JM6-1

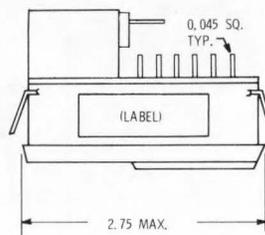


DIMENSIONS IN INCHES*

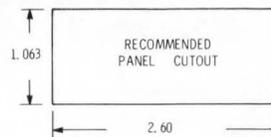


Dwg. No. A-11,885 1N

TYPE 200JM6-2

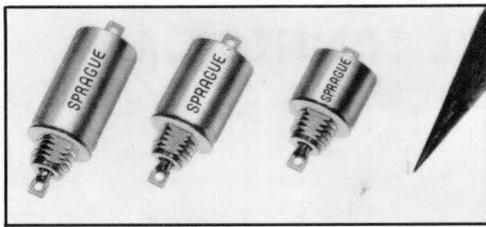


DIMENSIONS IN INCHES*

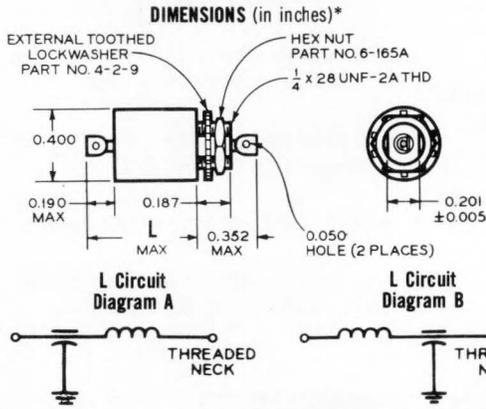


Dwg. No. A-11,886 1N

SUBMINIATURE EMI FILTERS

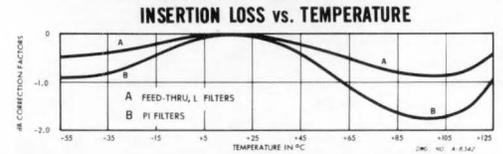


- The broadest line of subminiature interference control components available.
- Small size and high performance make them well suited for high-density packaging in a wide variety of applications, including power and control lines.
- Hermetically sealed with glass-to-metal seals in corrosion resistant metal cases.
- Low terminal-to-terminal d-c resistance. Especially desirable in low-voltage circuitry where any reduction in power supply voltage is critical.
- Threaded-neck construction is ideal where leads being filtered pass through chassis or bulkhead.
- For complete technical data, refer to latest issue of Sprague Engineering Bulletins 8132, 8132.1, and 8132.3.

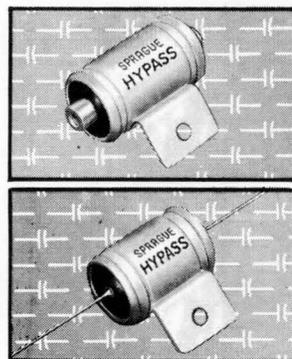


PERFORMANCE CHARACTERISTICS

1. **Operating Temperature Range:** -55°C to +125°C.
2. **Capacitance Change with Temperature:** Less than 15% over entire range; affects insertion loss, see curve below.
3. **Insulation Resistance:** (At +25°C) 1000 megohms minimum from either terminal to case.
4. **Dielectric Withstanding Voltage:** Filters shall withstand for 1 minute a d-c potential of twice the rated voltage between either terminal and case.
5. **Insertion Loss (db):** Filters shall meet values shown in table when measured in accordance with MIL-STD-220 at full-rated current.
6. **Environmental Tests:** Units hermetically sealed and meet environmental tests of MIL-STD-202 for barometric pressure, terminal strength, solderability, corrosion, temp. cycling, immersion cycling, shock, vibration, moisture resistance, and life test.



Circuit Type	Circuit Diagram	Dimension L	Current (Amperes)	Voltage Rating			Max. D-C Resistance (Ohms)	Min. Full Load Insertion Loss (dB)						Catalog Number
				A-C @ 125°C	D-C @ 85°C	D-C @ 125°C		30 kHz	150 kHz	300 kHz	1 MHz	10 MHz	20 MHz	
feed-thru	—	0.370	15	—	50	30	0.004	16	30	36	46	50	60	15JX2529
feed-thru	—	0.440	10	—	100	50	0.01	10	24	30	40	50	60	7JX2503
feed-thru	—	0.440	5	125, 400 Hz	—	—	0.01	—	15	21	31	48	60	5JX3502
			7											
L	A	0.630	0.1	—	100	50	1.7	19	47	60	70	70	70	1JX2603
L	A	0.630	0.5	—	100	50	0.35	15	37	49	70	70	70	1JX2623
L	A	0.630	5	—	100	50	0.01	8	20	26	37	70	70	5JX2693
L	B	0.630	0.1	—	100	50	1.7	19	47	60	70	70	70	1JX2608
L	B	0.630	0.5	—	100	50	0.35	15	37	49	70	70	70	1JX2628
L	B	0.630	5	—	100	50	0.01	8	20	26	37	70	70	5JX2698
Pi	C	0.730	0.5	—	100	50	0.35	20	65	80	80	80	80	1JX2713
Pi	C	0.730	1	—	100	50	0.14	—	54	71	80	80	80	1JX2718
Pi	C	0.730	2	—	100	50	0.06	—	44	62	80	80	80	2JX2723
Pi	C	0.730	5	—	100	50	0.01	—	18	40	80	80	80	5JX2732
L	A	0.630	0.1	125, 400 Hz	250	150	1.7	10	38	51	60	60	60	1JX3601
L	A	0.630	0.5	125, 400 Hz	250	150	0.35	—	27	36	57	60	60	1JX3603
L	A	0.630	4	125, 400 Hz	250	150	0.01	—	7	15	28	57	60	5JX3623
			5	125, 60 Hz										
			—	—										
L	B	0.630	0.1	125, 400 Hz	250	150	1.7	10	38	51	60	60	60	1JX3606
L	B	0.630	0.5	125, 400 Hz	250	150	0.35	—	27	36	57	60	60	1JX3608
L	B	0.630	4	125, 400 Hz	250	150	0.01	—	7	15	28	57	60	5JX3613
			5	125, 60 Hz										
			—	—										
Pi	C	0.730	0.5	125, 400 Hz	250	150	0.35	—	47	64	70	70	70	1JX3703
Pi	C	0.730	1.5	125, 400 Hz	250	150	0.06	—	20	44	70	70	70	2JX3705
Pi	C	0.730	3.5	125, 400 Hz	250	150	0.01	—	—	—	48	70	70	5JX3709
			5	125, 60 Hz										



HYPASS® CAPACITORS

- Exclusive Sprague 3-terminal network feed-thru capacitors
 - Bypass V-H-F currents where ordinary "non-inductive" capacitors are ineffective.
 - Suppress TVI from short-wave transmitters, diathermy machines, electronic heating apparatus, etc.
 - Eliminate interference caused by line-conducted radiation between neighboring TV sets.
 - Install leads in series with circuit being filtered and ground the case.
- *Type 48P have female screw terminals
†Type 80P have bulkhead mounting
◇ = VAC

μF	Amps.	WVDC	Dia. x Length	Cat. No.
.5	40	50	1.000 x 1.813	*48P18
.5	60	50	1.000 x 1.813	*48P100
.25	20	200	0.750 x 1.813	*48P10
.25	20	200	0.688 x 1.813	†80P5
.5	20	200	1.000 x 1.813	*48P14
.1	20	250 ◇	0.688 x 1.813	*48P9
.1	20	400	0.688 x 1.813	*48P6
.1	20	400	0.688 x 1.813	†80P1
.1	20	600	0.688 x 1.813	*48P8
.1	20	600	0.688 x 1.813	*†80P3
.25	20	600	1.000 x 1.813	*48P12
.5	100	600	1.125 x 3.000	†80P500

MOUNTING CLAMPS FOR CYLINDRICAL CAPACITORS*

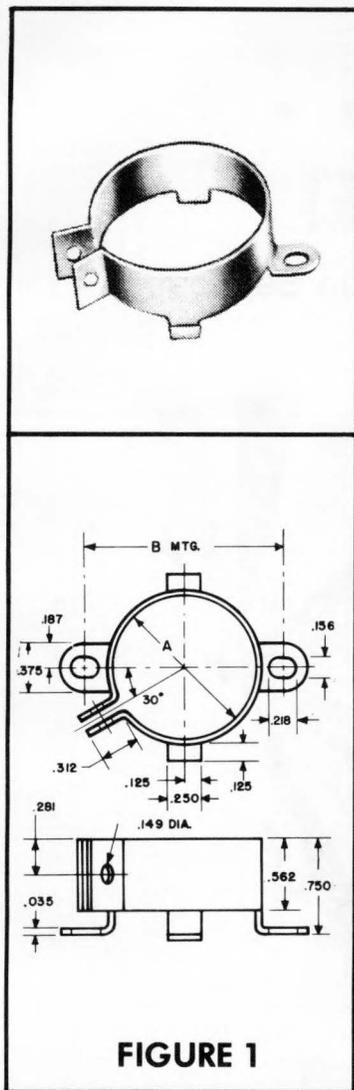


FIGURE 1

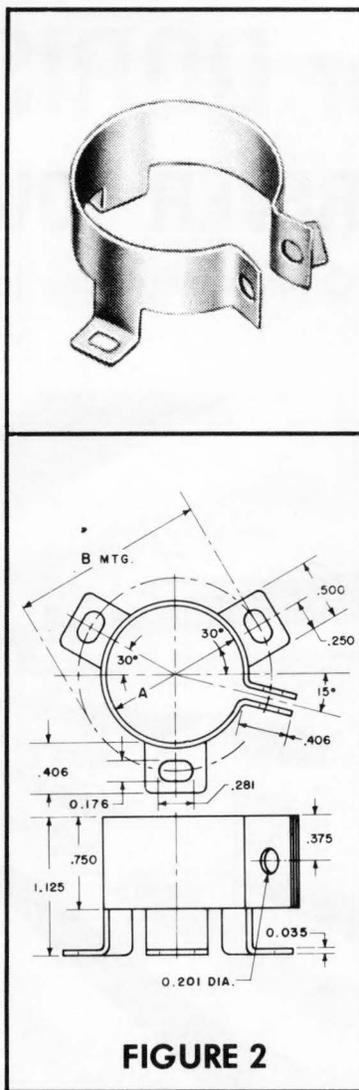


FIGURE 2

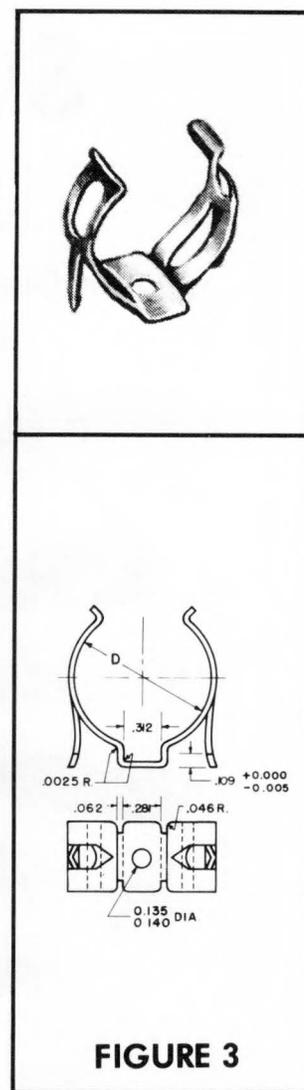


FIGURE 3

VERTICAL MOUNTING CLAMPS FOR CYLINDRICAL CAPACITORS			
Catalog Number	Figure No.	A	B
4586-97	1	1.000	1.875
4586-97A	1	1.375	1.781
4586-97B	1	1.500	1.937
4586-97C	1	1.750	2.187
4-36-14M	2	1.750	2.187
4586-48	2	2.000	2.500
4586-1	2	2.500	3.000
4586-2	2	3.000	3.500

HORIZONTAL MOUNTING CLIPS FOR CYLINDRICAL CAPACITORS		
Catalog Number	Figure No.	D
36-520J	3	.500
36-520M	3	.875
36-520G	3	1.000
36-520H	3	1.375

KRAFTBOARD INSULATING TUBES★

Tightly-fitting closed-top black Knaflex.
For "above-ground" use with can-type capacitors.

Catalog Number	Description
407-174E	For 1 in. diam. can
407-174P	For 1.375 in. diam. can
407-57	For 0.750 x 2.000" can

★Available until present stocks are depleted.

MOUNTING PLATES

For use with Twist-Lok® capacitors

Cat. No	Description
36-17	Metal, for 1.000 D. capacitor
36-18	Metal, for 1.375 D. capacitor
36-19	Phenolic, for .750 D. capacitor
36-20	Phenolic, for 1.000 D. capacitor
36-21	Phenolic, for 1.375 D. capacitor

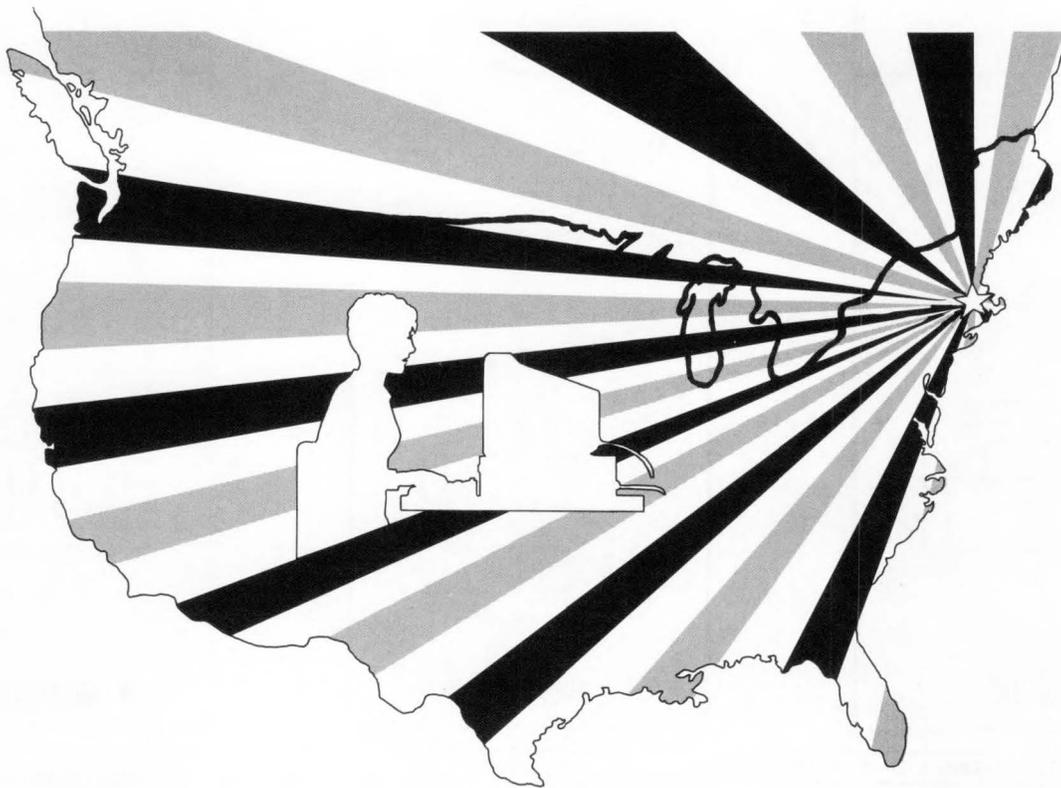
PRINTED WIRING BOARD ADAPTERS

Used on terminals and lugs of twist-prong-type units so that capacitors may be mounted on printed boards. Eight adapters per package, complete with instructions.

Package of 8 Cat. No. PC8

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