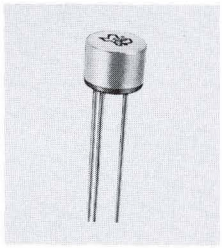
# TYPES 2N1382, 2N1383

## PNP ALLOY-JUNCTION GERMANIUM TRANSISTORS





## Specifically designed for small-signal medium power audio-amplifiers

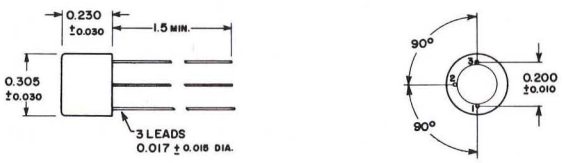
### qualification testing

To ensure maximum reliability, stability, and long life, all units are heat cycled from −55°C and room humidity to +85°C and 95% relative humidity for four complete cycles over an eight hour period. All transistors are thoroughly tested for rigid adherence to specified design characteristics on CAT (Central Automatic Testing) equipment.

### mechanical data

Metal case with new glass-to-metal hermetic seal between case and leads eliminates all welding and soldering operations from the sealing process. Standard JEDEC E3-51 base, TO-9 package. Approximate unit weight 1 gram.

ALL LEADS INSULATED FROM CASE




ALL DIMENSIONS IN INCHES

### maximum ratings at 25°C ambient temperature (unless otherwise noted)

| | 2N1382 | 2N1383 |
|---|---|---|
| Collector – Base Voltage | −25v | −25v |
| Emitter – Base Voltage | −15v | −15v |
| Collector – Emitter Voltage | −25v | −25v |
| Collector Current | −200ma | −200ma |
| Total Device Dissipation | 200mw | 200mw |
| Collector Junction Temperature | 85°C | 85°C |
| Storage Temperature Range | −55°C to +85°C | |

### electrical characteristics at 25°C ambient temperature

| PARAMETER | | TEST CONDITIONS | 2N1382 | | | 2N1383 | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | min. | typ. | max. | |
| $I_{CBO}$ | Collector Reverse Current | $V_{CB}$=−20v, $I_E$=0 | | | −14 | | | −14 | μa |
| $I_{EBO}$ | Emitter Reverse Current | $V_{EB}$=−1.5v, $I_C$=0 | | −3 | | | −3 | | μa |
| $h_{FE}$ | dc Forward Current Transfer Ratio* | $V_{CE}$=−1v, $I_C$=−50 ma | 50 | 80 | 150 | 30 | 50 | 150 | — |
| $f_{\alpha B}$ | Alpha-Cutoff Frequency | $V_{CB}$=−5v, $I_C$=−1 ma | | 2 | | | 1.5 | | mc |
| $h_{fe}$ | ac Common-Emitter Forward Current Transfer Ratio | f=1000 cps, $V_{CE}$=−5v, $I_E$=1 ma | | 80 | | | 50 | | — |
| $h_{ib}$ | Common-Base Input Impedance | f=1000 cps, $V_{BE}$=−5v, $I_E$=1 ma | | 30 | | | 30 | | ohm |
| $h_{ob}$ | Common-Base Output Admittance | f=1000 cps, $V_{BE}$=−5v, $I_E$=1 ma | | 0.5 | | | 0.6 | | μmho |
| $h_{rb}$ | Common-Base Reverse Voltage Transfer Ratio | f=1000 cps, $V_{BE}$=−5v, $I_E$=1 ma | | 5 | | | 4 | | $X10^{-4}$ |
| | Noise Figure 1000 cps† | | | 6.5 | | | 7.0 | | db |

*Tolerance on all values ± 10% for test set correlation.
†Conventional noise compared to 1000 cps and 1 cycle bandwidth.

LICENSED UNDER BELL SYSTEM PATENTS

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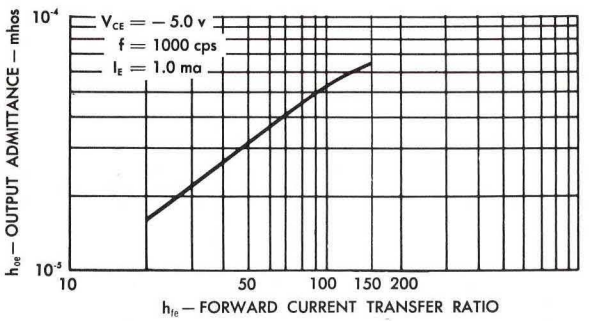
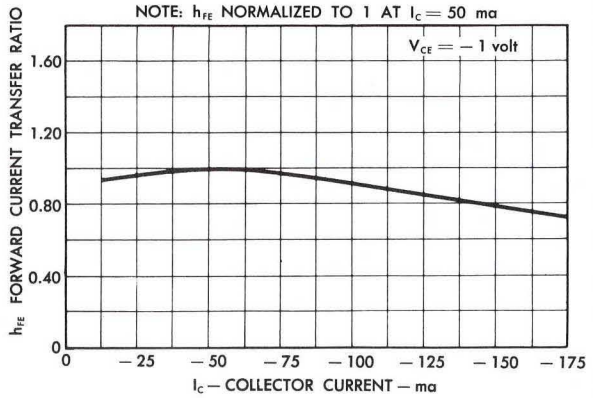
## TYPICAL CHARACTERISTICS

**COMMON-EMITTER SMALL-SIGNAL OUTPUT ADMITTANCE vs FORWARD CURRENT TRANSFER RATIO**

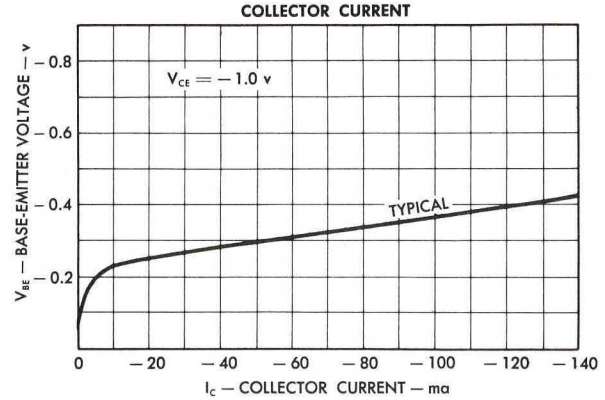



**NORMALIZED COMMON-EMITTER DC FORWARD CURRENT TRANSFER RATIO vs COLLECTOR CURRENT**

NOTE: $h_{FE}$ NORMALIZED TO 1 AT $I_C = 50$ ma




**COMMON-EMITTER-BASE-EMITTER VOLTAGE vs COLLECTOR CURRENT**

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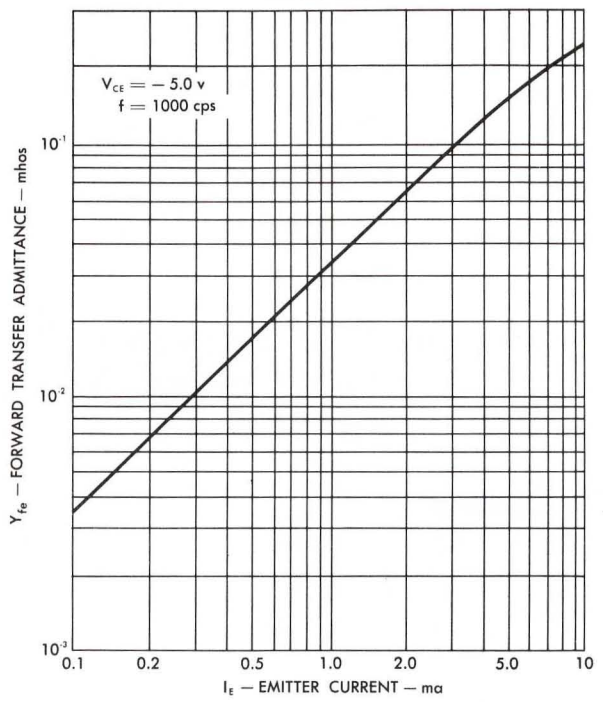
# TYPES 2N1382, 2N1383

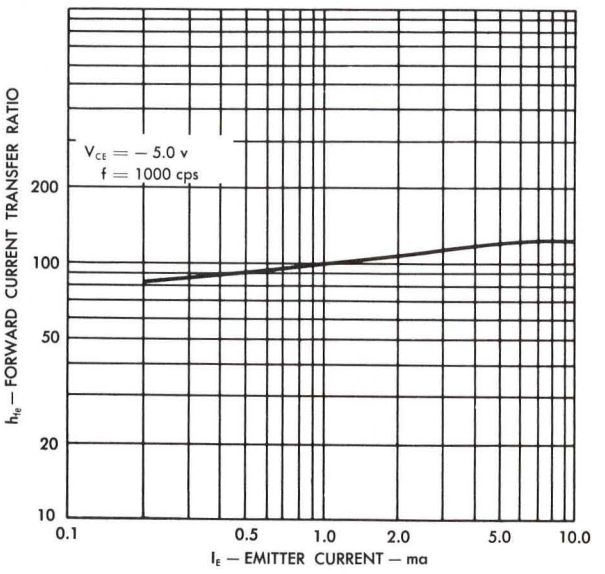
## TYPICAL CHARACTERISTICS

**COMMON-EMITTER SMALL-SIGNAL FORWARD TRANSFER ADMITTANCE vs EMITTER CURRENT**

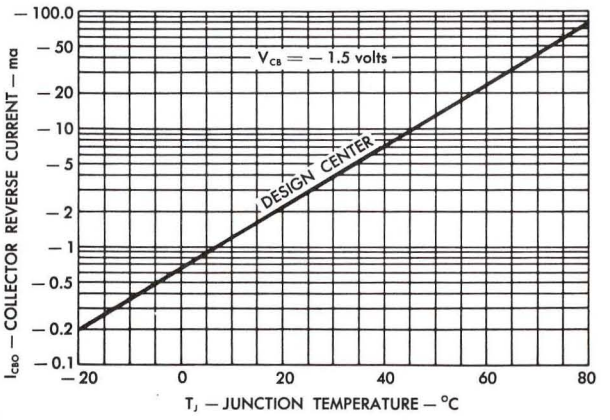



**NORMALIZED COMMON-EMITTER SMALL-SIGNAL FORWARD CURRENT TRANSFER RATIO vs EMITTER CURRENT**

NOTE: NORMALIZED TO 100 AT $I_E = 1$ ma

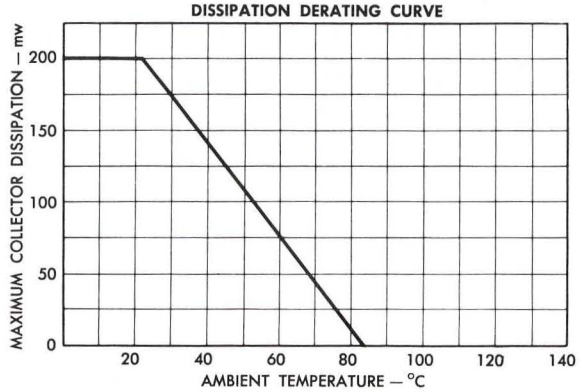



**COLLECTOR REVERSE CURRENT VS. JUNCTION TEMPERATURE**

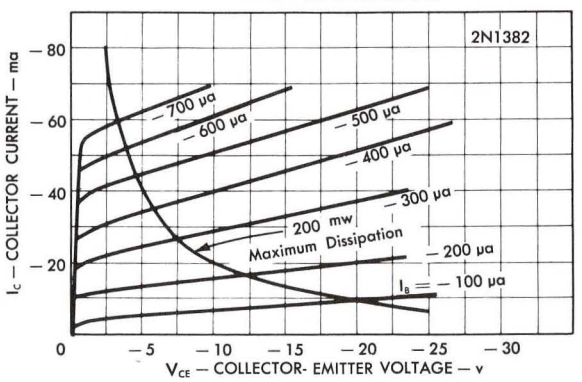


## TYPICAL CHARACTERISTICS

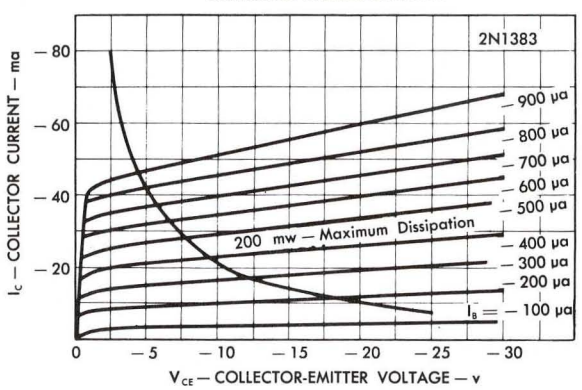
DISSIPATION DERATING CURVE




COLLECTOR CHARACTERISTICS




COLLECTOR CHARACTERISTICS

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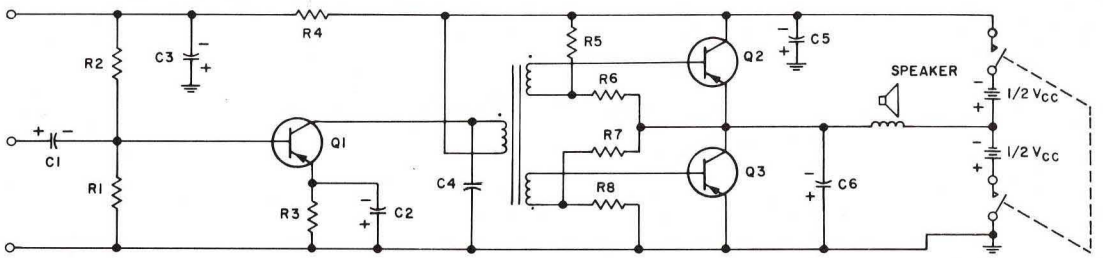
## TYPICAL AMPLIFIER CIRCUITS

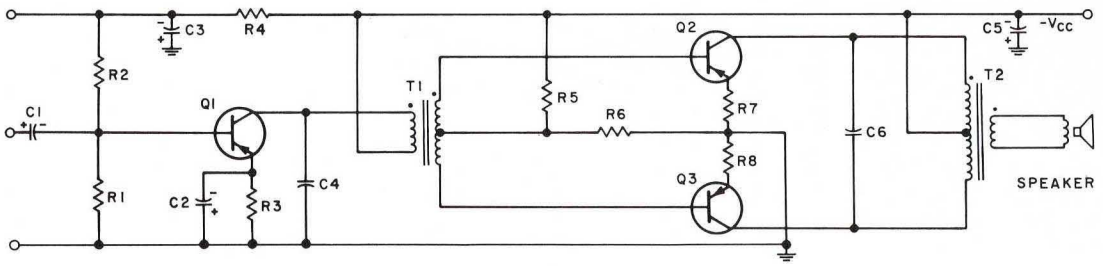
### PUSH-PUSH AMPLIFIER




**PARTS LIST 12V PUSH-PUSH AMPLIFIER**

| | |
|---|---|
| Vcc = 12 v | $C_1$ 5 µf/3v |
| $R_1$ = 3.3 K | $C_2$ 150 µf/3v |
| $R_2$ = 39 K | $C_3$ 50 µf/12v |
| $R_3$ = 470 ohm | $C_4$ 0.0022 µf |
| $R_4$ = 330 ohms | $C_5$ 50 µf/12v |
| $R_5$ = 2.7 K | $C_6$ 1 µf/12v |
| $R_6$ = 680 ohms | Speaker 25 ohms |
| $R_7$ = 2.7 K | $Q_1$; $Q_2$; $Q_3$ 2N1383 per table |
| $R_8$ = 68 ohms | $T_1$ 6.5 K to 600 ohms split |

### PUSH-PULL AMPLIFIER




**PARTS LIST 12V PUSH-PULL AMPLIFIER**

| | |
|---|---|
| Vcc = 12 v | $C_1$ 5 µf/3v |
| $R_1$ = 4.7 K | $C_2$ 100 µf/ |
| $R_2$ = 27 K | $C_3$ 50 µf/12v |
| $R_3$ = 1 K | $C_4$ 0.001 µf |
| $R_4$ = 330 ohms | $C_5$ 50 µf/12v |
| $R_5$ = 3.9 K | $C_6$ 0.068 µf |
| $R_6$ = 47 ohms | Speaker 3. 2 ohms |
| $R_7$ = 4.7 ohms | $Q_1$; $Q_2$; $Q_3$ 2N1383 per table |
| $R_8$ = 4.7 ohms | $T_1$ 7.5 K to 1.48 K center tapped |
| | $T_2$ 288 ohms C.T. to 3.2 ohms |

**AMPLIFIER PERFORMANCE DATA**

| | Push-Push | Pull-Pull |
|---|---|---|
| Supply Voltage | 12 v | 12 v |
| Rated Power Out | 500 mw | 500 mw |
| Power at 10% Distortion | 620 mw | 620 mw |
| Distortion at Rated Power | 6% | 7% |
| Distortion at 100 mw Power | 3% | 3% |
| Input Impedance | 1.0 K | 1 K |
| Input Voltage for 100 mw Power Out | 4 mv | 5 mv |
| Power Gain | 67 db | 65 db |
| Response Down 3 db at | 120 cps<br>5.0 kc | 120 cps<br>5 kc |
| Battery Drain Zero Out<br>Rated Out | 9.0 ma<br>57 ma | 8 ma<br>69 ma |

## TYPICAL AMPLIFIER CIRCUITS

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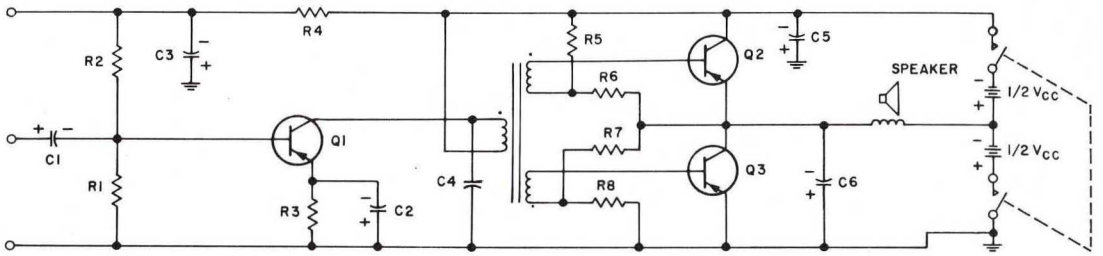


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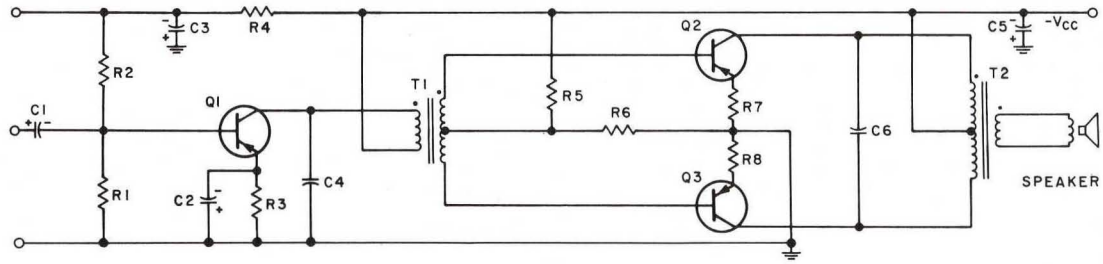


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**Color Dots and Beta Brackets**

The transistors are color coded to identify matched pairs for push-pull audio applications. The dc Beta spread is divided into 7 equal brackets such that the maximum current gain variation per bracket is 2 db. Any two units within a bracket constitute a matched pair. The 7 brackets, beta range, and corresponding color codes are indicated below:

| Bracket No. | Beta Range* | Color Code |
|---|---|---|
| 1 | 30-38 | Brown |
| 2 | 38-50 | Red |
| 3 | 50-60 | Orange |
| 4 | 60-75 | Yellow |
| 5 | 75-95 | Green |
| 6 | 95-120 | Blue |
| 7 | 120-150 | Violet |

The above bracketing can be utilized to minimize the gain variation in driver-output combinations. The group combinations shown below will match high and low gain units by color code for outstanding uniformity in production amplifiers.

| | Combination | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Driver Bracket | 4 | 5 | 6 | 7 |
| Output Bracket | 4 | 3 | 2 | 1 |

For additional information regarding the use of this system in audio amplifiers, contact your nearest Texas Instruments field sales office.

*Tolerance on all values ±10% for test set correlation.

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