

TYPES 2N1273, 2N1274, 2N1370, 2N1371 P-N-P ALLOY-JUNCTION GERMANIUM TRANSISTORS



TYPES 2N1273, 2N1274, 2N1370, 2N1371
 BULLETIN NO. DL-S 1140, AUGUST 1959

Specifically designed for small-signal audio-amplifiers



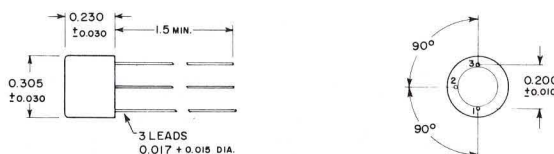
qualification testing

To ensure maximum reliability, stability, and long life, all units are heat cycled from -55°C and room humidity to $+85^{\circ}\text{C}$ 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)

| | 2N1273 | 2N1274 | 2N1370 | 2N1371 | unit |
|--------------------------------|------------|------------|------------|------------|------|
| Collector — Base Voltage | 15 | 25 | 25 | 45 | v |
| Emitter — Base Voltage | 10 | 10 | 10 | 10 | v |
| Collector — Emitter Voltage | 15 | 25 | 25 | 45 | v |
| Collector Current | 150 | 150 | 150 | 150 | ma |
| Total Device Dissipation | 150 | 150 | 150 | 150 | mw |
| Collector Junction Temperature | 85 | 85 | 85 | 85 | °C |
| Storage Temperature Range | -55 to +85 | -55 to +85 | -55 to +85 | -55 to +85 | °C |

electrical characteristics at 25°C ambient temperature

| | | TEST CONDITIONS | | | | |
|---|--------|-------------------------|-----------------------|-----|-----|---------------|
| I_{CBO} Collector Reverse Current | (max) | $V_{CB} = -12\text{v}$ | $I_E = 0$ | -14 | -14 | μa |
| | (max) | $V_{CB} = -20\text{v}$ | $I_E = 0$ | | | μa |
| | (typ) | $V_{CB} = -1.5\text{v}$ | $I_E = 0$ | | | μa |
| I_{EBO} Emitter Reverse Current | (typ) | $V_{EB} = -1.5\text{v}$ | $I_C = 0$ | -3 | -3 | μa |
| | (min) | $V_{CE} = -1.0\text{v}$ | $I_C = -50\text{ma}$ | | | μa |
| h_{FE} dc Forward Current Transfer Ratio* | (typ) | | | 30 | 30 | |
| | (max) | | | 50 | 50 | |
| | (max) | | | 150 | 150 | |
| V_{BE} Base-Emitter Voltage | (max) | $V_{CE} = -1.0\text{v}$ | $I_C = -100\text{ma}$ | | 0.5 | v |
| $f_{\alpha B}$ Alpha-Cutoff Frequency | (typ) | $V_{CB} = -5.0\text{v}$ | $I_E = 1\text{ma}$ | | 2 | mc |
| | (typ)† | $V_{CB} = -5.0\text{v}$ | $I_E = 1\text{ma}$ | 6.5 | 6.5 | db |

*Tolerance on all values $\pm 10\%$ for test set correlation.

†Conventional noise compared to 1000 cps and 1 cycle bandwidth.

LICENSED UNDER BELL SYSTEM PATENTS

SEMICONDUCTOR-COMPONENTS DIVISION

TEXAS INSTRUMENTS
 INCORPORATED
 SEMICONDUCTOR-COMPONENTS DIVISION
 P. O. BOX 312 • 13500 N. CENTRAL EXPRESSWAY
 DALLAS, TEXAS

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COLOR CODING

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:

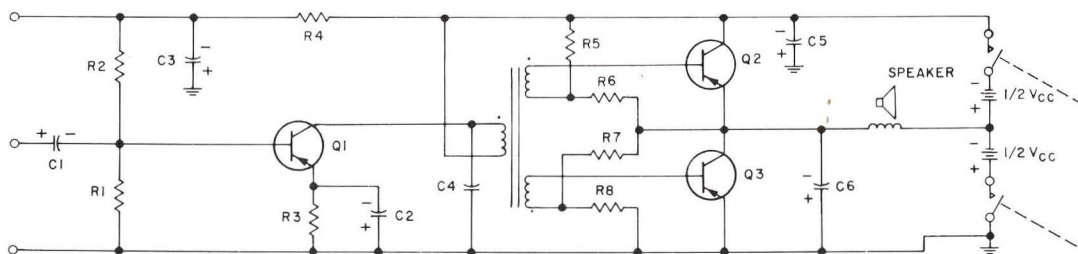
| Bracket No. | Beta Range* | Color Code |
|-------------|-------------|------------|
| 1 | 30-38 | Brown |
| 2 | 38-50 | Red |
| 3 | 50-60 | Orange |
| 4 | 60-75 | Yellow |
| 5 | 75-95 | Green |
| 6 | 95-120 | Blue |
| 7 | 120-150 | Violet |

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 |

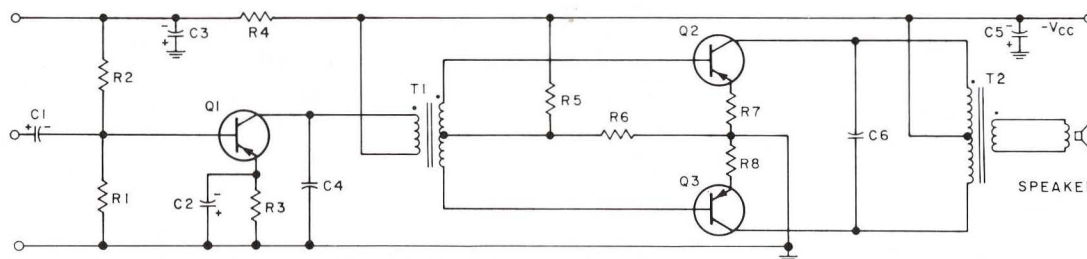
For additional information regarding the use of this system in audio amplifiers, contact your nearest Texas Instruments field sales office.

*Tolerance on all values $\pm 10\%$ for test set correlation.



PARTS LIST, PUSH-PUSH AMPLIFIER

| | |
|--------------------------|------------------------------------|
| $V_{cc} = 9\text{ v}$ | $C_1 = 5\ \mu\text{f}/3\text{v}$ |
| $R_1 = 4.7\ \text{K}$ | $C_2 = 100\ \mu\text{f}/3\text{v}$ |
| $R_2 = 27\ \text{K}$ | $C_3 = 50\ \mu\text{f}/12\text{v}$ |
| $R_3 = 820\ \text{ohms}$ | $C_4 = 0.002\ \mu\text{f}$ |
| $R_4 = 220\ \text{ohms}$ | $C_5 = 50\ \mu\text{f}$ |
| $R_5 = 1.2\ \text{K}$ | $C_6 = 1\ \mu\text{f}/12\text{v}$ |
| $R_6 = 56\ \text{ohms}$ | Speaker 30 ohms |
| $R_7 = 1.2\ \text{K}$ | $Q_1; Q_2; Q_3$ 2N1274 per table |
| $R_8 = 56\ \text{ohms}$ | T-1 8.8 K to 50 ohms split |



PARTS LIST, PUSH-PULL AMPLIFIER

| | |
|--------------------------|------------------------------------|
| $V_{cc} = 9\ \text{v}$ | $C_1 = 5\ \mu\text{f}/3\text{v}$ |
| $R_1 = 4.7\ \text{K}$ | $C_2 = 100\ \mu\text{f}/3\text{v}$ |
| $R_2 = 33\ \text{K}$ | $C_3 = 50\ \mu\text{f}/3\text{v}$ |
| $R_3 = 1\ \text{K}$ | $C_4 = 0.001\ \mu\text{f}$ |
| $R_4 = 220\ \text{ohms}$ | $C_5 = 50\ \mu\text{f}/12\text{v}$ |
| $R_5 = 3.3\ \text{K}$ | $C_6 = 0.068\ \mu\text{f}$ |
| $R_6 = 56\ \text{ohms}$ | Speaker 3.2 ohms |
| $R_7 = 4.7\ \text{ohms}$ | $Q_1; Q_2; Q_3$ 2N1274 per table |
| $R_8 = 4.7\ \text{ohms}$ | T_1 16.5 K to 1.32 K split |
| | T_2 366 ohms C.T. to 3.2 ohms |

TYPICAL PERFORMANCE DATA

| | Push-Pull | Push-Push |
|---------------------------|------------------|------------------|
| Supply Voltage | 9v | 9 v |
| Rated Power Out | 250 mw | 250 mw |
| Power at 10% Distortion | 312 mw | 300 mw |
| Distortion at Rated Power | 5% | 6% |
| Distortion at 50 mw Power | 2% | 2% |
| Input Impedance | 1.2 K | 1 K |
| Input voltage for 50 mw | | |
| Power Out | 3 mv | 4 mv |
| Power Gain | 68 db | 65 db |
| Response Down | 130 cps | 100 cps |
| 3 db at | 5.0 kc | 4.5 kc |
| Battery Drain | | |
| Zero Out | 9.5 | 7.5 ma |
| Rated Out | 60 ma | 48 ma |



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TYPICAL CHARACTERISTICS AND DATA

