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# 2N5954-2N5956, 2N6372-2N6374, 2N6465-2N6468, 40829-40831

# Silicon N-P-N and P-N-P Medium-Power Transistors

General-Purpose Types for Switching Applications

2N5954, -2N5955, and -2N5956 are multiple-epitaxial p-n-p transistors. 2N6372, -2N6373, and -2N6374 are multiple-epitaxial n-p-n transistors. They are complements to 2N5954, 2N5955, and 2N5956.

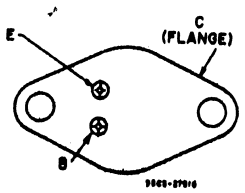
The 2N6465 and 2N6466 are multiple-epitaxial n-p-n transistors. They are complements to the 2N6467, and 2N6468, multiple-epitaxial p-n-p transistors. These devices differ in voltage ratings and in the currents at which the parameters are controlled.

All are supplied in the JEDEC TO-66 package.

*Features:*

- 2N5954-2N5956 complements to 2N6372-2N6374
- 2N6465, 2N6466 complements to 2N6467, 2N6468
- Low saturation voltages
- Maximum-safe-area-of-operation curves
- Thermal-cycle ratings
- Hermetically-sealed JEDEC TO-66 package

TERMINAL DESIGNATIONS




JEDEC TO-66

MAXIMUM RATINGS, *Absolute-Maximum Values:*

| | N-P-N | 2N6374 | 2N6373 | 2N6372 | 2N6465 | 2N6466 | |
|---|---|---|---|---|---|---|---|
| | P-N-P | 2N5956♦ 40831♦ | 2N5955♦ 40830♦ | 2N5954♦ 40829♦ | 2N6467♦ | 2N6468♦ | |
| $^{*}V_{CBO}$ | | 50 | 70 | 90 | 110 | 130 | V |
| $^{*}V_{CEX(sus)}$ $V_{BE}$ = −1.5 V, $R_{BE}$ = 100 Ω | | 50 | 70 | 90 | 110 | 130 | V |
| $V_{CER(sus)}$ $R_{BE}$ = 100 Ω | | 45 | 65 | 85 | 105 | 125 | V |
| $V_{CEO(sus)}$ | | 40 | 60 | 80 | 100 | 120 | V |
| $^{*}V_{EBO}$ | | 5 | 5 | 5 | 5 | 5 | V |
| $^{*}I_{C}$ | | 6 | 6 | 6 | 4 | 4 | A |
| $^{*}I_{B}$ | | 2 | 2 | 2 | 2 | 2 | A |
| $^{*}P_{T}$ | | | | | | | |
| At $T_C$ up to 25°C | | 40 (2N6374) (2N5956) | 40 (2N6373) (2N5955) | 40 (2N6372) (2N5954) | 40 | 40 | W |
| At $T_A$ up to 25°C | | 5.8 (40831) | 5.8 (40830) | 5.8 (40829) | – | – | W |
| At $T_C$ above 25°C | | Derate linearly to 200°C | | | | | |
| $^{*}T_J$, $T_{stg}$ | | −65 to +200 | | | | | °C |
| $^{*}T_L$ At distances ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max. | | +235 | | | | | °C |

**ELECTRICAL CHARACTERISTICS,** *At Case Temperature ($T_C$) = 25°C unless otherwise specified*

| CHARACTERISTIC | TEST CONDITIONS◆ | | | | LIMITS | | | | | | UNITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | VOLTAGE V dc | | CURRENT A dc | | 2N6374 2N5956◆ 40831◆ | | 2N6373 2N5955◆ 40830◆ | | 2N6372 2N5954◆ 40829◆ | | |
| | $V_{CE}$ | $V_{BE}$ | $I_C$ | $I_B$ | Min. | Max. | Min. | Max. | Min. | Max. | |
| • $I_{CER}$ $R_{BE}$=100 Ω | 35 | | | | – | 100 | – | – | – | – | μA |
| | 55 | | | | – | – | – | 100 | – | – | |
| | 75 | | | | – | – | – | – | – | 100 | |
| • $I_{CEX}$ $R_{BE}$=100 Ω | 45 | −1.5 | | | – | 100 | – | – | – | – | μA |
| | 65 | −1.5 | | | – | – | – | 100 | – | – | |
| | 85 | −1.5 | | | – | – | – | – | – | 100 | |
| • $R_{BE}$=100 Ω, $T_C$=150°C | 45 | −1.5 | | | – | 2 | – | – | – | – | mA |
| | 65 | −1.5 | | | – | – | – | 2 | – | – | |
| | 85 | −1.5 | | | – | – | – | – | – | 2 | |
| • $I_{CEO}$ | 25 | | | | – | 1 | – | – | – | – | mA |
| | 45 | | | | – | – | – | 1 | – | – | |
| | 65 | | | | – | – | – | – | – | 1 | |
| • $I_{EBO}$ | | −5 | | | – | 0.1 | – | 0.1 | – | 0.1 | mA |
| • $h_{FE}$ | 4 | | 3[a] | | 20 | 100 | – | – | – | – | |
| | 4 | | 2.5[a] | | – | – | 20 | 100 | – | – | |
| | 4 | | 2[a] | | – | – | – | – | 20 | 100 | |
| | 4 | | 6[a] | | 5 | – | 5 | – | 5 | – | |
| • $V_{CEO(sus)}$ | | | 0.1[a] | | 40[b] | – | 60[b] | – | 80[b] | – | V |
| $V_{CER(sus)}$ $R_{BE}$=100 Ω | | | 0.1[a] | | 45[b] | – | 65[b] | – | 85[b] | – | V |
| $V_{CEX(sus)}$ $R_{BE}$=100 Ω | | −1.5 | 0.1[a] | | 50[b] | – | 70[b] | – | 90[b] | – | V |
| • $V_{BE}$ All types | 4 | | 3[a] | | – | 2 | – | – | – | – | V |
| All types | 4 | | 2.5[a] | | – | – | – | 2 | – | – | |
| All types | 4 | | 2[a] | | – | – | – | – | – | 2 | |
| 2N6372-2N6374 | 4 | | 6[a] | | – | 3 | – | 3 | – | 3 | |
| • $V_{CE(sat)}$ | | | 3[a] | 0.3 | – | 1 | – | – | – | – | V |
| | | | 2.5[a] | 0.25 | – | – | – | 1 | – | – | |
| | | | 2[a] | 0.2 | – | – | – | – | – | 1 | |
| • $\|h_{fe}\|$ f=1 MHz | | | | | | | | | | | |
| 2N6372-2N6374 | 4 | | 1 | | 4 | – | 4 | – | 4 | – | |
| 2N5954-56,40829-31 | −4 | | −1 | | 5 | – | 5 | – | 5 | – | |
| • $h_{fe}$ f=1 kHz | 4 | | 0.5 | | 25 | – | 25 | – | 25 | – | |
| $R_{\theta JC}$ 2N5954-56, 2N6372-74 | | | | | – | 4.3 | – | 4.3 | – | 4.3 | °C/W |
| $R_{\theta JA}$ 40829-40831 | | | | | – | 30 | – | 30 | – | 30 | °C/W |

**ELECTRICAL CHARACTERISTICS,** *At Case Temperature ($T_C$) = 25°C unless otherwise specified*

| CHARACTERISTIC | TEST CONDITIONS | | | | LIMITS | | | | UNITS |
|---|---|---|---|---|---|---|---|---|---|
| | VOLTAGE V dc | | CURRENT A dc | | 2N6465 2N6467♦ | | 2N6486 2N6468♦ | | |
| | $V_{CE}$ | $V_{BE}$ | $I_C$ | $I_B$ | Min. | Max. | Min. | Max. | |
| $I_{CER}$ $R_{BE}$ = 100 Ω | 95<br>100 | | | | –<br>– | 100<br>– | –<br>– | –<br>100 | μA |
| * $I_{CEX}$ $R_{BE}$ = 100 Ω | 100<br>120 | −1.5<br>−1.5 | | | –<br>– | 100<br>– | –<br>– | –<br>100 | μA |
| $R_{BE}$ = 100 Ω, $T_C$ = 150°C | 100<br>120 | −1.5<br>−1.5 | | | –<br>– | 2<br>– | –<br>– | –<br>2 | mA |
| * $I_{CEO}$ | 50<br>60 | | | | –<br>– | 1<br>– | –<br>– | –<br>1 | mA |
| * $I_{EBO}$ | | −5 | | | – | 0.1 | – | 0.1 | mA |
| * $h_{FE}$ | 4<br>4 | | 1.5[a]<br>4[a] | | 15<br>5 | 150<br>– | 15<br>5 | 150<br>– | |
| * $V_{CEO}(sus)$ | | | 0.1[a] | | 100[b] | – | 120[b] | – | V |
| $V_{CER}(sus)$ $R_{BE}$ = 100 Ω | | | 0.1[a] | | 105[b] | – | 125[b] | – | |
| * $V_{CEX}(sus)$ $R_{BE}$ = 100 Ω | | −1.5 | 0.1[a] | | 110[b] | – | 130[b] | – | |
| * $V_{BE}$ | 4<br>4 | | 1.5[a]<br>4[a] | | –<br>– | 2<br>3.5 | –<br>– | 2<br>3.5 | V |
| $V_{CE}(sat)$ All types | | | 1.5[a] | 0.15 | – | 1.2 | – | 1.2 | V |
| $V_{CE}(sat)$ 2N6465–2N6466 | | | 4[a] | 0.8 | | 3* | – | 3* | |
| $V_{CE}(sat)$ 2N6467–2N6468 | | | −4[a] | −0.8 | – | −4* | – | −4* | |
| * $\lvert h_{fe} \rvert$ f = 1 MHz | 4 | | 1 | | 5 | – | 5 | – | |
| * $h_{fe}$ f = 1 kHz | 4 | | 0.5 | | 25 | – | 25 | – | |
| $R_{\theta JC}$ | | | | | – | 4.3 | – | 4.3 | °C/W |

* In accordance with JEDEC registration data format JS-6 RDF-2.

♦ For p-n-p devices, voltage and current values are negative.

[a] Pulsed, pulse duration = 300 μs, duty factor = 1.8%

[b] *CAUTION: Sustaining voltages $V_{CEO}(sus)$, $V_{CER}(sus)$, and $V_{CEX}(sus)$ MUST NOT be measured on a curve tracer.*