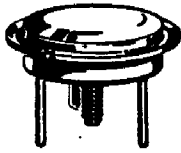


2N4048



PNP germanium power transistors designed for high-current applications requiring high gain and extremely low saturation voltage.

Collector connected to case

MAXIMUM RATINGS

| Rating | Symbol | | Unit |
|--|----------------|--------------------|------------------------|
| Collector-Emitter Voltage | V_{CEO} | 30 | Vdc |
| Collector-Emitter Voltage | V_{CES} | 45 | Vdc |
| Collector-Base Voltage | V_{CB} | 45 | Vdc |
| Emitter-Base Voltage | V_{EB} | 25 | Vdc |
| Collector Current - Continuous | I_C^* | ← 60 → | A dc |
| Total Device Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$ | P_D | ← 170 → ← 2.0 → | Watts W/ $^\circ C$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to - +110 | $^\circ C$ |

ELECTRICAL CHARACTERISTICS ($T_c = 25^\circ C$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|--|--------------------|----|------------|-------|
| Collector-Emitter Breakdown Voltage† ($I_C = 1.0$ A dc, $I_E = 0$) | BV_{CEO}^\dagger | 30 | - | Vdc |
| Collector-Emitter Breakdown Voltage ($I_C = 300$ mA dc, $V_{BE} = 0$) | BV_{CES} | 45 | - | Vdc |
| Floating Potential ($V_{CB} = 45$ Vdc, $I_E = 0$) | V_{EBF} | - | 0.5 | Vdc |
| Collector Cutoff Current ($V_{CE} = 30$ Vdc, $V_{BE(off)} = 2.0$ Vdc, $T_C = +71^\circ C$) | I_{CEX} | - | 15 | mA dc |
| Collector Cutoff Current ($V_{CB} = 2.0$ Vdc, $I_E = 0$) ($V_{CB} = 45$ Vdc, $I_E = 0$) | I_{CBO} | - | 0.2 4.0 | mA dc |
| Emitter Cutoff Current ($V_{BE} = 25$ Vdc, $I_C = 0$) ($V_{BE} = 25$ Vdc, $I_C = 0$, $T_C = +71^\circ C$) | I_{EBO} | - | 4.0 15 | mA dc |

ON CHARACTERISTICS

| | | | | |
|---|-----------------------|----------|-------------|-----|
| DC Current Gain† ($I_C = 15$ A dc, $V_{CE} = 2.0$ Vdc) ($I_C = 60$ A dc, $V_{CE} = 2.0$ Vdc) | h_{FE}^\dagger | 60 15 | 100 - | - |
| Collector-Emitter Saturation Voltage† ($I_C = 15$ A dc, $I_B = 1.0$ A dc) ($I_C = 60$ A dc, $I_B = 6.0$ A dc) | $V_{CE(sat)}^\dagger$ | - | 0.15 0.3 | Vdc |
| Base-Emitter Saturation Voltage† ($I_C = 15$ A dc, $I_B = 1.0$ A dc) ($I_C = 60$ A dc, $I_B = 6.0$ A dc) | $V_{BE(sat)}^\dagger$ | - | 0.6 1.0 | Vdc |

SMALL SIGNAL CHARACTERISTICS

| | | | | |
|---|----------|-----|---|-----|
| Common-Emitter Cutoff Frequency ($I_C = 15$ A dc, $V_{CE} = 2.0$ Vdc) | f_{ce} | 2.0 | - | kHz |
|---|----------|-----|---|-----|

† To avoid excessive heating of the collector junction, perform test with pulse method.