

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 | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 170 2.0 | Watts W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -65 to +110 | $^\circ\text{C}$ |

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

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

OFF CHARACTERISTICS

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

ON CHARACTERISTICS

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

SMALL SIGNAL CHARACTERISTICS

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

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