
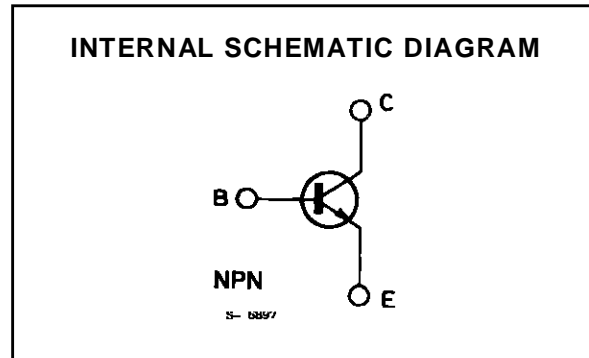
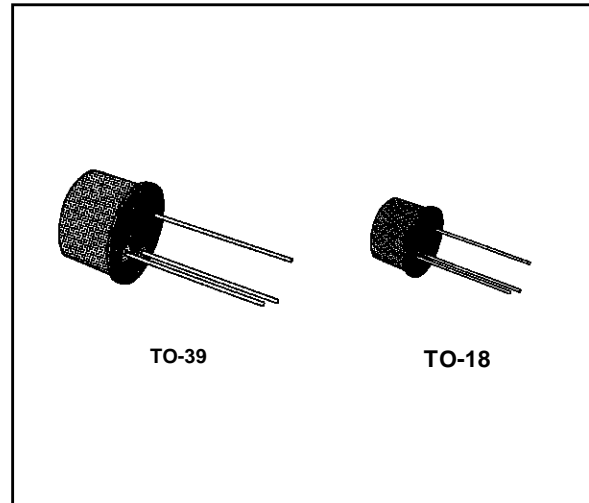


HIGH-SPEED SWITCHES

DESCRIPTION

The 2N2218, 2N2219, 2N2221 and 2N2222 are silicon planar epitaxial NPN transistors in Jedec TO-39 (for 2N2218 and 2N2219) and in Jedec TO-18 (for 2N2221 and 2N2222) metal cases. They are designed for high-speed switching applications at collector currents up to 500 mA, and feature useful current gain over a wide range of collector current, low leakage currents and low saturation voltages.

 2N2218/2N2219 approved to CECC 50002-100, 2N2221/2N2222 approved to CECC 50002-101 available on request.



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-----------|---|-------------|------------------|
| V_{CBO} | Collector-base Voltage ($I_E = 0$) | 60 | V |
| V_{CEO} | Collector-emitter Voltage ($I_B = 0$) | 30 | V |
| V_{EBO} | Emitter-base Voltage ($I_C = 0$) | 5 | V |
| I_C | Collector Current | 0.8 | A |
| P_{tot} | Total Power Dissipation at $T_{amb} \leq 25\text{ }^\circ\text{C}$ for 2N2218 and 2N2219 for 2N2221 and 2N2222 at $T_{case} \leq 25\text{ }^\circ\text{C}$ for 2N2218 and 2N2219 for 2N2221 and 2N2222 | 0.8 | W |
| | | 0.5 | W |
| | | 3 | W |
| | | 1.8 | W |
| T_{stg} | Storage Temperature | - 65 to 200 | $^\circ\text{C}$ |
| T_j | Junction Temperature | 175 | $^\circ\text{C}$ |

2N2218-2N2219-2N2221-2N2222

THERMAL DATA

| | | | 2N2218 2N2219 | 2N2221 2N2222 |
|------------------------|-------------------------------------|-----|------------------|------------------|
| R _{th j-case} | Thermal Resistance Junction-case | Max | 50 °C/W | 83.3 °C/W |
| R _{th j-amb} | Thermal Resistance Junction-ambient | Max | 187.5 °C/W | 300 °C/W |

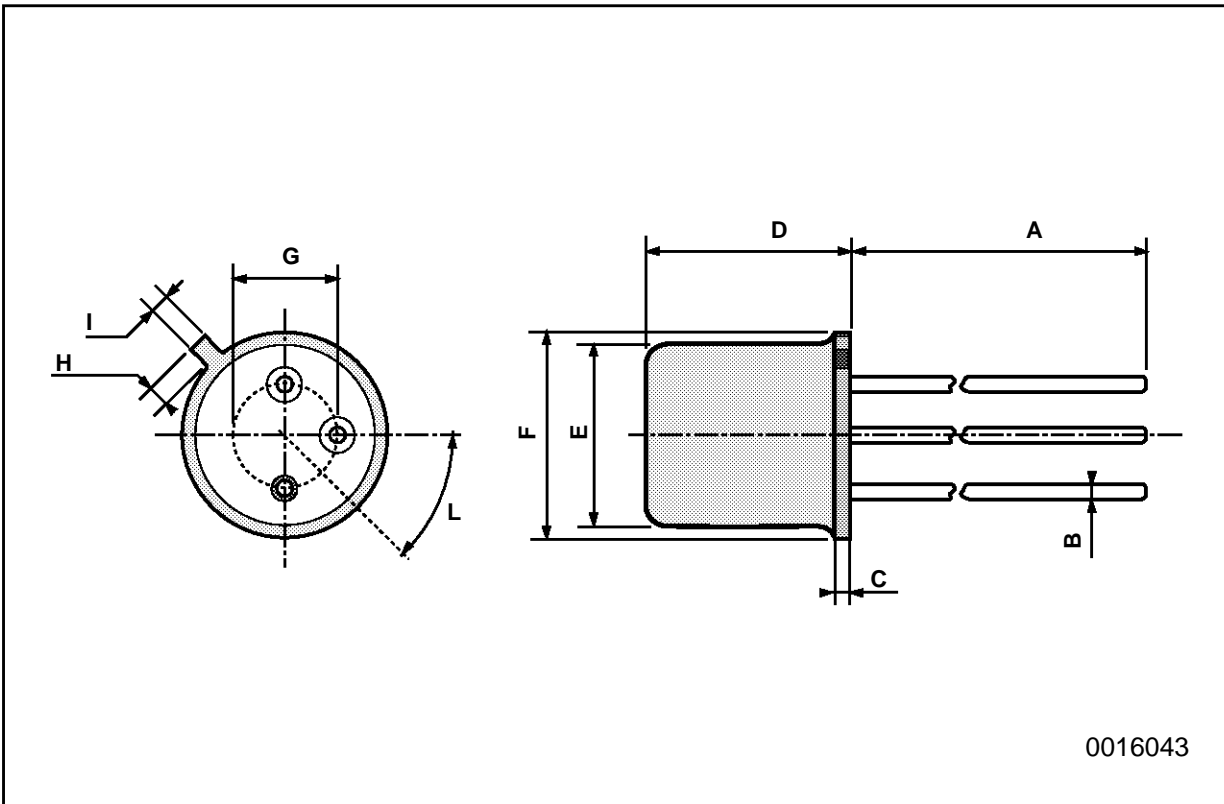
ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit | |
|---|---|---|------|------|------|------|--|
| I _{CBO} | Collector Cutoff Current (I _E = 0) | V _{CB} = 50 V | | | 10 | nA | |
| | | V _{CB} = 50 V T _{amb} = 150 °C | | | 10 | μA | |
| I _{EBO} | Emitter Cutoff Current (I _C = 0) | V _{EB} = 3 V | | | 10 | nA | |
| V _{(BR) CBO} | Collector-base Breakdown Voltage (I _E = 0) | I _C = 10 μA | 60 | | | V | |
| V _{(BR) CEO} * | Collector-emitter Breakdown Voltage (I _B = 0) | I _C = 10 mA | 30 | | | V | |
| V _{(BR) EBO} | Emitter-base Breakdown Voltage (I _C = 0) | I _E = 10 μA | 5 | | | V | |
| V _{CE (sat)} * | Collector-emitter Saturation Voltage | I _C = 150 mA I _B = 15 mA | | | 0.4 | V | |
| | | I _C = 500 mA I _B = 50 mA | | | 1.6 | V | |
| V _{BE (sat)} * | Base-emitter Saturation Voltage | I _C = 150 mA I _B = 15 mA | | | 1.3 | V | |
| | | I _C = 500 mA I _B = 50 mA | | | 2.6 | V | |
| h _{FE} * | DC Current Gain | for 2N2218 and 2N2221 | | | | | |
| | | I _C = 0.1 mA V _{CE} = 10 V | 20 | | | | |
| | | I _C = 1 mA V _{CE} = 10 V | 25 | | | | |
| | | I _C = 10 mA V _{CE} = 10 V | 35 | | | | |
| | | I _C = 150 mA V _{CE} = 10 V | 40 | | 120 | | |
| | | I _C = 500 mA V _{CE} = 10 V | 20 | | | | |
| | | I _C = 150 mA V _{CE} = 1 V | 20 | | | | |
| | | for 2N2219 and 2N2222 | | | | | |
| | | I _C = 0.1 mA V _{CE} = 10 V | 35 | | | | |
| | | I _C = 1 mA V _{CE} = 10 V | 50 | | | | |
| | | I _C = 10 mA V _{CE} = 10 V | 75 | | | | |
| | | I _C = 150 mA V _{CE} = 10 V | 100 | | 300 | | |
| I _C = 500 mA V _{CE} = 10 V | 30 | | | | | | |
| I _C = 150 mA V _{CE} = 1 V | 50 | | | | | | |
| f _T | Transition Frequency | I _C = 20 mA V _{CE} = 20 V f = 100 MHz | 250 | | | MHz | |
| C _{CBO} | Collector-base Capacitance | I _E = 0 f = 100 kHz V _{CB} = 10 V | | | 8 | pF | |
| R _{e(hie)} | Real Part of Input Impedance | I _C = 20 mA V _{CE} = 20 V f = 300 MHz | | | 60 | Ω | |

* Pulsed : pulse duration = 300 μs, duty cycle = 1 %.

TO-18 MECHANICAL DATA

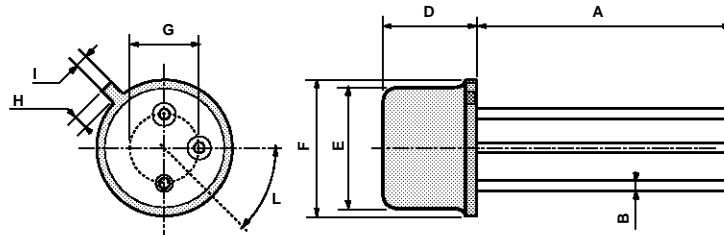
| DIM. | mm | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | 12.7 | | | 0.500 | |
| B | | | 0.49 | | | 0.019 |
| D | | | 5.3 | | | 0.208 |
| E | | | 4.9 | | | 0.193 |
| F | | | 5.8 | | | 0.228 |
| G | 2.54 | | | 0.100 | | |
| H | | | 1.2 | | | 0.047 |
| I | | | 1.16 | | | 0.045 |
| L | 45° | | | 45° | | |



0016043

TO39 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------------|------|------|-------|------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 12.7 | | | 0.500 | | |
| B | | | 0.49 | | | 0.019 |
| D | | | 6.6 | | | 0.260 |
| E | | | 8.5 | | | 0.334 |
| F | | | 9.4 | | | 0.370 |
| G | 5.08 | | | 0.200 | | |
| H | | | 1.2 | | | 0.047 |
| I | | | 0.9 | | | 0.035 |
| L | 45° (typ.) | | | | | |



P008B

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