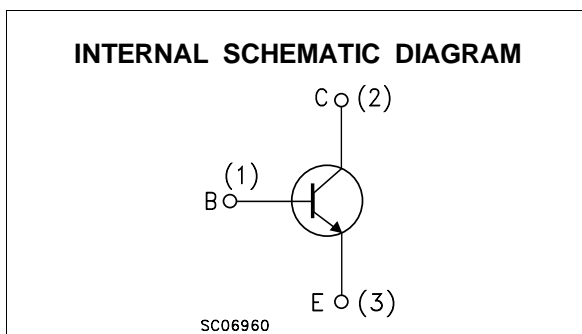
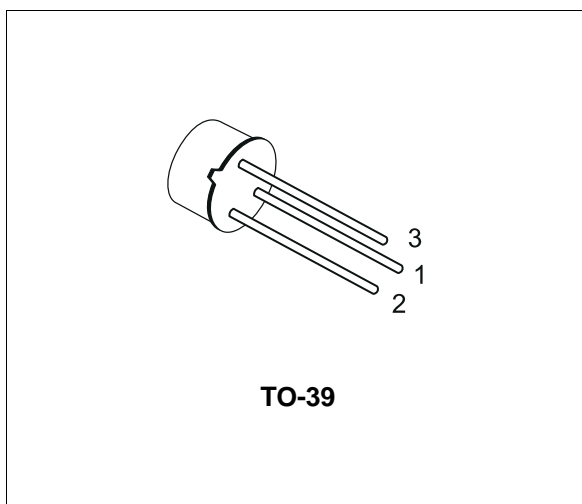


**HIGH CURRENT, HIGH FREQUENCY AMPLIFIERS**

**DESCRIPTION**

The 2N3019 is a silicon planar epitaxial NPN transistors in Jedec TO-39 metal case, designed for high-current, high frequency amplifier application. It feature high gain and low saturation voltage.



**ABSOLUTE MAXIMUM RATINGS**

| Symbol    | Parameter   | Value      | Unit             |
|-----------|---|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )  | 140        | V                |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )   | 80         | V                |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )  | 7          | V                |
| $I_C$     | Collector Current   | 1          | A                |
| $P_{tot}$ | Total Dissipation at $T_{amb} \leq 25\text{ }^\circ\text{C}$<br>at $T_{case} \leq 25\text{ }^\circ\text{C}$ | 0.8        | W                |
|           |   | 5          | W                |
| $T_{stg}$ | Storage Temperature   | -65 to 200 | $^\circ\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature   | 200        | $^\circ\text{C}$ |

## THERMAL DATA

|                |                                     |     |     |               |
|----------------|-------------------------------------|-----|-----|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-Case    | Max | 35  | $^{\circ}C/W$ |
| $R_{thj-amb}$  | Thermal Resistance Junction-Ambient | Max | 219 | $^{\circ}C/W$ |

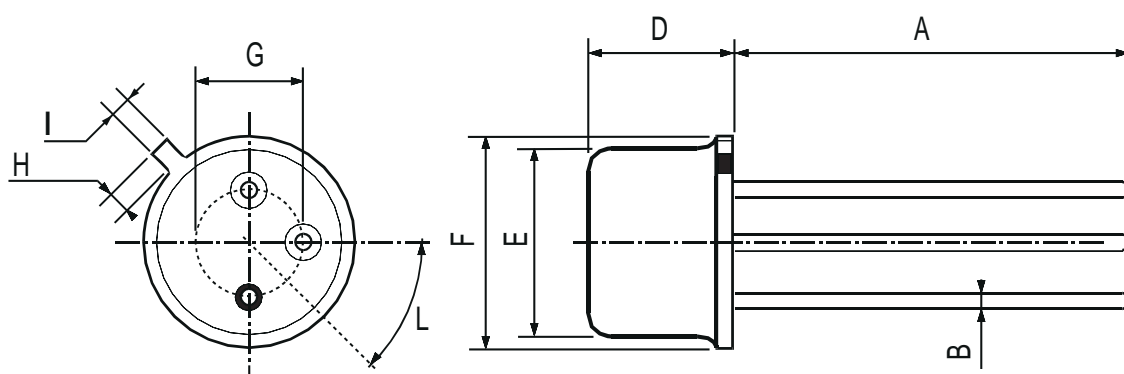
ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$  unless otherwise specified)

| Symbol               | Parameter   | Test Conditions  | Min.                              | Typ. | Max.       | Unit          |
|----------------------|---|--|-----------------------------------|------|------------|---------------|
| $I_{CBO}$            | Collector Cut-off Current ( $I_E = 0$ )           | $V_{CB} = 90 V$<br>$V_{CB} = 90 V$ $T_{case} = 150^{\circ}C$   |                                   |      | 10<br>10   | nA<br>$\mu A$ |
| $I_{EBO}$            | Emitter Cut-off Current ( $I_C = 0$ )             | $V_{EB} = 5 V$   |                                   |      | 10         | nA            |
| $V_{(BR)CBO}$        | Collector-Base Breakdown Voltage ( $I_E = 0$ )    | $I_C = 100 \mu A$  | 140                               |      |            | V             |
| $V_{(BR)CEO}^*$      | Collector-Emitter Breakdown Voltage ( $I_B = 0$ ) | $I_C = 10 mA$  | 80                                |      |            | V             |
| $V_{(BR)EBO}$        | Emitter-Base Breakdown Voltage ( $I_C = 0$ )      | $I_E = 100 \mu A$  | 7                                 |      |            | V             |
| $V_{CE(sat)}^*$      | Collector-Emitter Saturation Voltage              | $I_C = 150 mA$ $I_B = 15 mA$<br>$I_C = 500 mA$ $I_B = 50 mA$   |                                   |      | 0.2<br>0.5 | V<br>V        |
| $V_{BE(sat)}^*$      | Base-Emitter Saturation Voltage                   | $I_C = 150 mA$ $I_B = 15 mA$   |                                   |      | 1.1        | V             |
| $h_{FE}^*$           | DC Current Gain                                   | $I_C = 0.1 mA$ $V_{CE} = 10 V$<br>$I_C = 10 mA$ $V_{CE} = 10 V$<br>$I_C = 150 mA$ $V_{CE} = 10 V$<br>$I_C = 500 mA$ $V_{CE} = 10 V$<br>$I_C = 1 A$ $V_{CE} = 10 V$<br>$I_C = 150 mA$ $V_{CE} = 10 V$<br>$T_{amb} = -55^{\circ}C$ | 50<br>90<br>100<br>50<br>15<br>40 |      | 300        |               |
| $h_{fe}^*$           | Small Signal Current Gain                         | $I_C = 1 mA$ $V_{CE} = 5 V$ $f = 1 KHz$  | 80                                |      | 400        |               |
| $f_T$                | Transition Frequency                              | $I_C = 50 mA$ $V_{CE} = 10 V$ $f = 20 MHz$   | 100                               |      |            | MHz           |
| $C_{CBO}$            | Collector Base Capacitance                        | $I_E = 0$ $V_{CB} = 10 V$ $f = 1 MHz$  |                                   |      | 12         | pF            |
| $C_{EBO}$            | Emitter Base Capacitance                          | $I_C = 0$ $V_{EB} = 0.5 V$ $f = 1 MHz$   |                                   |      | 60         | pF            |
| NF                   | Noise Figure                                      | $I_C = 0.1 mA$ $V_{CE} = 10 V$<br>$f = 1 KHz$ $R_g = 1 K\Omega$  |                                   |      | 4          | dB            |
| $r_{bb}$ , $C_{b'c}$ | Feedback Time Constant                            | $I_C = 10 mA$ $V_{CE} = 10 V$ $f = 4 MHz$  |                                   |      | 400        | ps            |

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle  $\leq 1\%$

## TO-39 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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