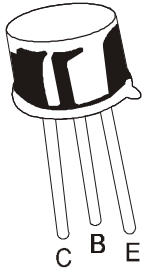


NPN SILICON PLANAR TRANSISTOR

2N3019 / 2N3020



TO-39
Metal Can Package

General Transistor

ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION | SYMBOL | VALUE | UNIT |
|--|----------------|--------------|---------------------------|
| Collector Emitter Voltage | V_{CEO} | 80 | V |
| Collector Base Voltage | V_{CBO} | 140 | V |
| Emitter Base Voltage | V_{EBO} | 7.0 | V |
| Collector Current Continuous | I_C | 1.0 | A |
| Power Dissipation at $T_a=25^\circ\text{C}$ Derate Above 25°C | P_D | 0.8 4.6 | W mW/ $^\circ\text{C}$ |
| Power Dissipation at $T_c=25^\circ\text{C}$ Derate Above 25°C | P_D | 5.0 28.6 | W mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_j, T_{stg} | - 65 to +200 | $^\circ\text{C}$ |

THERMAL RESISTANCE

| | | | |
|---------------------------------|---------------|------|--------------------|
| Junction to Case | $R_{th(j-c)}$ | 16.5 | $^\circ\text{C/W}$ |
| Junction to Ambient in free air | $R_{th(j-a)}$ | 89.5 | $^\circ\text{C/W}$ |

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

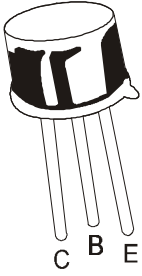
| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|--------------------------------------|----------------|--|------------|------------|---------------|---------------|
| Collector Emitter Voltage | V_{CEO} | $I_C=1\text{mA}, I_B=0$ | 80 | | | V |
| Collector Base Voltage | V_{CBO} | $I_C=100\mu\text{A}, I_E=0$ | 140 | | | V |
| Emitter Base Voltage | V_{EBO} | $I_E=100\mu\text{A}, I_C=0$ | 7.0 | | | V |
| Collector Cut Off Current | I_{CBO} | $V_{CB}=90\text{V}, I_E=0$ | | | 10 | nA |
| | | $V_{CB}=90\text{V}, I_E=0, T_a=150^\circ\text{C}$ | | | 10 | μA |
| Emitter Cut Off Current | I_{EBO} | $V_{EB}=5\text{V}, I_C=0$ | | | 10 | nA |
| DC Current Gain | h_{FE} | $I_C=0.1\text{mA}, V_{CE}=10\text{V}$ | >50 | | 30 - 100 | |
| | | $I_C=10\text{mA}, V_{CE}=10\text{V}$ | >90 | | 40 - 120 | |
| | | $I_C=150\text{mA}, V_{CE}=10\text{V}$ | 100 - 300 | | 40 - 120 | |
| | | $I_C=150\text{mA}, V_{CE}=10\text{V}, T_c=-55^\circ\text{C}$ | >40 | | - | |
| | | $I_C=500\text{mA}, V_{CE}=10\text{V}$ | >50 | | 30 - 100 | |
| | | $I_C=1\text{A}, V_{CE}=10\text{V}$ | >15 | | >1 ϵ | |
| | | | MIN | TYP | MAX | UNIT |
| Collector Emitter Saturation Voltage | $*V_{CE(sat)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$ | | | 0.2 | V |
| | | $I_C=500\text{mA}, I_B=50\text{mA}$ | | | 0.5 | V |
| Base Emitter Saturation Voltage | $*V_{BE(sat)}$ | $I_C=150\text{mA}, I_B=15\text{mA}$ | | | 1.1 | V |

*Pulse Test: Pulse Width $\leq 300\text{ms}$, Duty Cycle $\leq 1\%$

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NPN SILICON PLANAR TRANSISTOR

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TO-39
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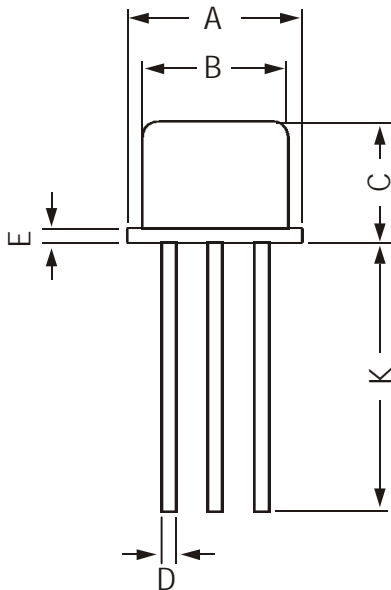
ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$ unless specified otherwise)

SMALL SIGNAL CHARACTERISTICS

| DESCRIPTION | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|------------------------------|-----------|---|----------|-----|------------|------|
| Output Capacitance | C_{ob} | $V_{CB}=10\text{V}$, $I_E=0$, $f=1\text{MHz}$ | | | 12 | pF |
| Input Capacitance | C_{ib} | $V_{EB}=0.5\text{V}$, $I_C=0$, $f=1\text{MHz}$ | | | 60 | pF |
| Small Signal Current Gain | h_{fe} | $I_C=1\text{mA}$, $V_{CE}=5\text{V}$, $f=1\text{KHz}$ 2N3019 2N3020 | 80 30 | | 400 200 | |
| Collector Rise Time Constant | $r_b'C_C$ | $I_E=10\text{mA}$, $V_{CB}=10\text{V}$, $f=79.8\text{MHz}$ | | | 400 | ps |
| Noise Figure | NF | $I_C=100\mu\text{A}$, $V_{CE}=10\text{V}$, $R_S=1\text{K}\Omega$, $f=1.0\text{KHz}$ 2N3019 | | | 4.0 | dB |

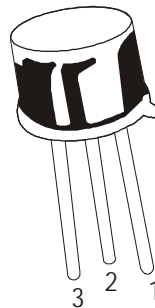
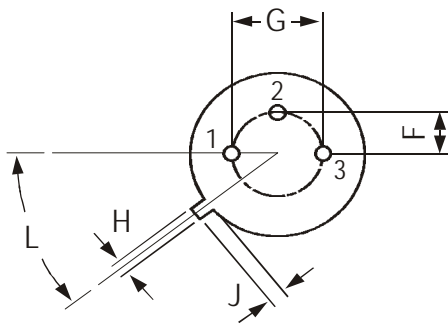
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TO-39 Metal Can Package



All dimensions are in mm

| DIM | MIN | MAX |
|-----|--------|--------|
| A | 8.50 | 9.39 |
| B | 7.74 | 8.50 |
| C | 6.09 | 6.60 |
| D | 0.40 | 0.53 |
| E | — | 0.88 |
| F | 2.41 | 2.66 |
| G | 4.82 | 5.33 |
| H | 0.71 | 0.86 |
| J | 0.73 | 1.02 |
| K | 12.70 | — |
| L | 42 DEG | 48 DEG |



PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

Packing Detail

| PACKAGE | STANDARD PACK | | INNER CARTON BOX | | OUTER CARTON BOX | | |
|---------|-----------------|----------------|------------------|-----|-------------------|-----|--------|
| | Details | Net Weight/Qty | Size | Qty | Size | Qty | Gr Wt |
| TO-39 | 500 pcs/polybag | 540 gm/500 pcs | 3" x 7.5" x 7.5" | 20K | 17" x 15" x 13.5" | 32K | 40 kgs |

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

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