



Continental Device India Limited

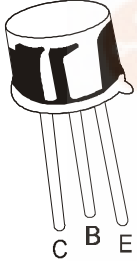
An ISO/TS16949 and ISO 9001 Certified Company



## NPN SILICON PLANAR EPITAXIAL TRANSISTORS

2N3019

2N3020



TO-39

Metal Can Package

Designed for use in General Purpose Amplifier and High Speed Switching Applications  
These Transistors are also Suitable for High Current Amplifier Applications

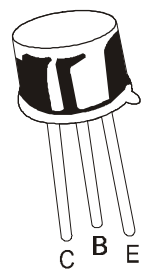
### ABSOLUTE MAXIMUM RATINGS (Ta=25°C unless specified otherwise)

| DESCRIPTION                  | SYMBOL        | VALUE       | UNITS |
|------------------------------|---------------|-------------|-------|
| Collector Emitter Voltage    | $V_{CEO}$     | 80          | V     |
| Collector Base Voltage       | $V_{CBO}$     | 140         | V     |
| Emitter Base Voltage         | $V_{EBO}$     | 7           | V     |
| Collector Current            | $I_{CM}$      | 1           | A     |
| Power Dissipation @ Ta=25° C | $P_D$         | 800         | mW    |
| Power Dissipation@ Tc=25°C   |               | 5           | W     |
| Junction Temperature         | $T_j$         | +200        | °C    |
| Storage Temperature          | $T_{stg}$     | -65 to +200 | °C    |
| <b>THERMAL RESISTANCE</b>    |               |             |       |
| Junction to Ambient          | $R_{th(j-a)}$ | 218.7       | °C/W  |
| Junction to Case             | $R_{th(j-c)}$ | 35          | °C/W  |

### ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)

| DESCRIPTION                          | SYMBOL          | TEST CONDITION                       | MIN | MAX | UNITS   |
|--------------------------------------|-----------------|--------------------------------------|-----|-----|---------|
| Collector Emitter Breakdown Voltage  | $BV_{CEO}^*$    | $I_C=30mA, I_B=0$                    | 80  |     | V       |
| Collector Base Breakdown Voltage     | $BV_{CBO}$      | $I_C=100\mu A, I_E=0$                | 140 |     | V       |
| Emitter Base Breakdown Voltage       | $BV_{EBO}$      | $I_E=100\mu A, I_C=0$                | 7   |     | V       |
| Collector Leakage Current            | $I_{CBO}$       | $V_{CB}=90V, I_E=0$                  |     | 10  | nA      |
|                                      |                 | $V_{CB}=90V, I_E=0, T_a=150^\circ C$ |     | 10  | $\mu A$ |
| Emitter Leakage Current              | $I_{EBO}$       | $V_{EB}=5V, I_C=0$                   |     | 10  | nA      |
| Collector Emitter Saturation Voltage | $V_{CE(sat)}^*$ | $I_C=150mA, I_B=15mA$                |     | 0.2 | V       |
|                                      |                 | $I_C=500mA, I_B=50mA$                |     | 0.5 | V       |
| Base Emitter Saturation Voltage      | $V_{BE(sat)}^*$ | $I_C=150mA, I_B=15mA$                |     | 1.1 | V       |

NPN SILICON PLANAR EPITAXIAL TRANSISTORS



2N3019  
2N3020

TO-39  
Metal Can Package

ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)

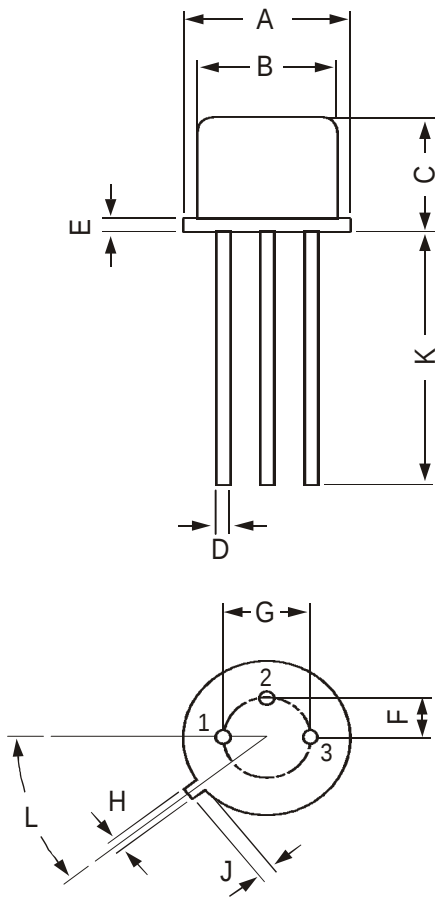
| DESCRIPTION                  | SYMBOL        | TEST CONDITION                 | MIN | MAX | UNITS |
|------------------------------|---------------|--------------------------------|-----|-----|-------|
| DC Current Gain              | $h_{FE}^*$    | $I_C=0.1mA, V_{CE}=10V$        |     |     |       |
| 2N3019                       |               |                                | 50  |     |       |
| 2N3020                       |               |                                | 30  | 100 |       |
|                              | $h_{FE}^*$    | $I_C=10mA, V_{CE}=10V$         |     |     |       |
| 2N3019                       |               |                                | 90  |     |       |
| 2N3020                       |               |                                | 40  | 120 |       |
|                              | $h_{FE}^*$    | $I_C=150mA, V_{CE}=10V$        |     |     |       |
| 2N3019                       |               |                                | 100 | 300 |       |
| 2N3020                       |               |                                | 40  | 120 |       |
|                              | $h_{FE}^*$    | $I_C=500mA, V_{CE}=10V$        |     |     |       |
| 2N3019                       |               |                                | 50  |     |       |
| 2N3020                       |               |                                | 30  | 100 |       |
|                              | $h_{FE}^*$    | $I_C=1A, V_{CE}=10V$           |     |     |       |
| 2N3019                       |               |                                | 15  |     |       |
| 2N3020                       |               |                                | 15  |     |       |
|                              | $h_{FE}^*$    | $I_C=150mA, V_{CE}=10V$        |     |     |       |
| 2N3019                       |               | $T_C= -55^{\circ}C$            | 40  |     |       |
| SMALL SIGNAL CHARACTERISTICS |               |                                |     |     |       |
| Small Signal Current Gain    | $ h_{fe} $    | $I_C=1mA, V_{CE}=5V, f=1KHz$   |     |     |       |
| 2N3019                       |               |                                | 80  | 400 |       |
| 2N3020                       |               |                                | 30  | 200 |       |
| Transition Frequency         | $f_T$         | $I_C=50mA, V_{CE}=10V$         |     |     |       |
| 2N3019                       |               | $f=20MHz$                      | 100 |     | MHz   |
| 2N3020                       |               |                                | 80  |     | MHz   |
| Output Capacitance           | $C_{ob}$      | $V_{CB}=10V, I_E=0, f=1MHz$    |     | 12  | pF    |
| Input Capacitance            | $C_{ib}$      | $V_{EB}=0.5V, I_C=0, f=1MHz$   |     | 60  | pF    |
| Noise Figure                 | NF            | $I_C=100\mu A, V_{CE}=10V$     |     |     |       |
| 2N3019                       |               | $R_s=1K\Omega, f=1KHz$         |     | 4   | dB    |
| Collector Base Time Constant | $r_{bb'}cb'c$ | $I_C=10mA, V_{CB}=10V, f=4MHz$ |     | 400 | ps    |
|                              |               | $f=1MHz$                       |     |     |       |

\*Pulse Test: Pulse Width ≤300ms, Duty Cycle ≤1.0%

2N3019  
2N3020

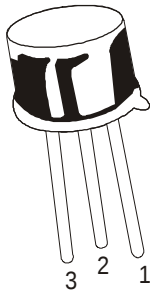
TO-39  
Metal Can Package

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 |

## Notes

**2N3019**  
**2N3020**

**TO-39**  
**Metal Can Package**

### Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Discrete Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Datasheet and on the CDIL Web Site/CD is believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Discrete Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



CDIL is a registered Trademark of

**Continental Device India Limited**

C-120 Naraina Industrial Area, New Delhi 110 028, India.

Telephone + 91-11-2579 6150, 5141 1112 Fax + 91-11-2579 5290, 5141 1119

email@cdil.com

www.cdilsemi.com