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## NPN SILICON POWER SWITCHING TRANSISTORS

BC140, BC141



TO-39  
Metal Can Package

### Medium Power Amplifier and Switching Applications

### Complementary BC160 and BC161

#### ABSOLUTE MAXIMUM RATINGS

| DESCRIPTION                                                                  | SYMBOL         | BC140        | BC141 | UNITS                     |
|------------------------------------------------------------------------------|----------------|--------------|-------|---------------------------|
| Collector Emitter Voltage                                                    | $V_{CEO}$      | 40           | 60    | V                         |
| Collector Base Voltage                                                       | $V_{CBO}$      | 80           | 100   | V                         |
| Emitter Base Voltage                                                         | $V_{EBO}$      | 7.0          |       | V                         |
| Collector Current - Continuous                                               | $I_C$          | 1.0          |       | A                         |
| Power Dissipation@ $T_a=25^\circ\text{C}$<br>Derate Above $25^\circ\text{C}$ | $P_D$          | 0.8<br>4.57  |       | W<br>mW/ $^\circ\text{C}$ |
| Power Dissipation@ $T_c=25^\circ\text{C}$<br>Derate Above $25^\circ\text{C}$ | $P_D$          | 4.0<br>22.73 |       | W<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range                             | $T_j, T_{stg}$ | - 65 to +200 |       | $^\circ\text{C}$          |

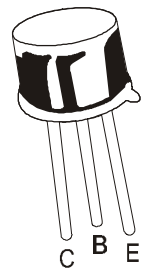
#### THERMAL CHARACTERISTICS

|                                 |               |     |                    |
|---------------------------------|---------------|-----|--------------------|
| Junction to Ambient in free air | $R_{th(j-a)}$ | 219 | $^\circ\text{C/W}$ |
| Junction to Case                | $R_{th(j-c)}$ | 44  | $^\circ\text{C/W}$ |

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

| DESCRIPTION               | SYMBOL     | TEST CONDITION                                                                                                                                                                                                                                | MIN                   | TYP                  | MAX                      | UNITS               |
|---------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------|--------------------------|---------------------|
| Collector Emitter Voltage | $V_{CES}$  | $I_C=100\mu\text{A}, V_{BE}=0$<br><b>BC140</b><br><b>BC141</b>                                                                                                                                                                                | 80<br>100             |                      |                          | V<br>V              |
| Collector Emitter Voltage | $*V_{CEO}$ | $I_C=30\text{mA}, I_B=0$<br><b>BC140</b><br><b>BC141</b>                                                                                                                                                                                      | 40<br>60              |                      |                          | V<br>V              |
| Emitter Base Voltage      | $V_{EBO}$  | $I_E=100\mu\text{A}, I_C=0$                                                                                                                                                                                                                   | 7                     |                      |                          | V                   |
| Collector Cut off Current | $I_{CES}$  | $V_{CE}=60\text{V}, V_{BE}=0$<br>$V_{CE}=60\text{V}, V_{BE}=0, T_a=150^\circ\text{C}$                                                                                                                                                         |                       |                      | 100<br>100               | nA<br>$\mu\text{A}$ |
| DC Current Gain           | $*h_{FE}$  | $I_C=100\text{mA}, V_{CE}=1\text{V}$<br><b>BC140 / BC141</b><br><b>Group-6</b><br><b>Group-10</b><br><b>Group-16</b><br><br>$I_C=1\text{A}, V_{CE}=1\text{V}$<br><b>BC140 / BC141</b><br><b>Group-6</b><br><b>Group-10</b><br><b>Group-16</b> | 40<br>40<br>63<br>100 |                      | 400<br>100<br>160<br>250 |                     |
|                           |            |                                                                                                                                                                                                                                               |                       | 26<br>15<br>20<br>30 |                          |                     |

\*Pulsed: Pulse duration  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 1\%$



TO-39  
Metal Can Package

ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless specified otherwise)

| DESCRIPTION                          | SYMBOL                 | TEST CONDITION                           | MIN | TYP | MAX | UNITS |
|--------------------------------------|------------------------|------------------------------------------|-----|-----|-----|-------|
| Collector Emitter Saturation Voltage | *V <sub>CE (sat)</sub> | I <sub>C</sub> =1A, I <sub>B</sub> =0.1A |     |     | 1.0 | V     |
| Base Emitter on Voltage              | *V <sub>BE (on)</sub>  | I <sub>C</sub> =1A, V <sub>CE</sub> =1V  |     |     | 2.0 | V     |

DYNAMIC CHARACTERISTICS

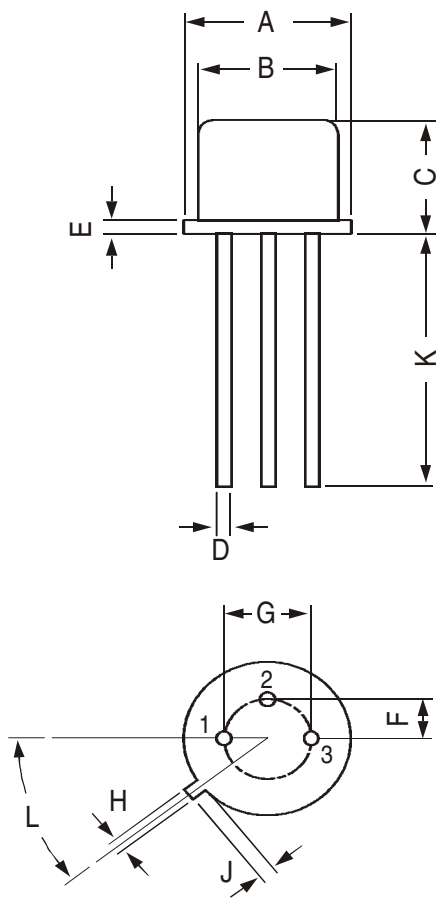
|                      |                 |                                                     |    |  |    |     |
|----------------------|-----------------|-----------------------------------------------------|----|--|----|-----|
| Transition Frequency | f <sub>T</sub>  | I <sub>C</sub> =50mA, V <sub>CE</sub> =10V, f=20MHz | 50 |  |    | MHz |
| Output Capacitance   | C <sub>ob</sub> | V <sub>CB</sub> =10V, I <sub>E</sub> =0, f=1MHz     |    |  | 25 | pF  |
| Input Capacitance    | C <sub>ib</sub> | V <sub>EB</sub> =0.5V, I <sub>C</sub> =0, f=1MHz    |    |  | 80 | pF  |

SWITCHING CHARACTERISTICS

|               |                  |                                                                |  |  |     |    |
|---------------|------------------|----------------------------------------------------------------|--|--|-----|----|
| Turn on time  | t <sub>on</sub>  | I <sub>C</sub> =150mA, I <sub>B1</sub> =7.5mA                  |  |  | 250 | ns |
| Turn off time | t <sub>off</sub> | I <sub>C</sub> =150mA, I <sub>B1</sub> =I <sub>B2</sub> =7.5mA |  |  | 850 | ns |

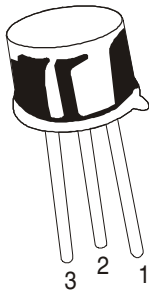
\*Pulsed: Pulse duration ≤300μs, Duty cycle ≤ 1%

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 Details

| 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 |

### **Disclaimer**

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