

## MAXIMUM RATINGS

| Rating                                                                                 | Symbol         | BC 140        | BC 141 | Unit                         |
|----------------------------------------------------------------------------------------|----------------|---------------|--------|------------------------------|
| Collector-Emitter Voltage                                                              | $V_{CE0}$      | 40            | 60     | Vdc                          |
| Collector-Base Voltage                                                                 | $V_{CB0}$      | 80            | 100    | Vdc                          |
| Emitter-Base Voltage                                                                   | $V_{EB0}$      | 7             |        | Vdc                          |
| Collector Current – Continuous                                                         | $I_C$          | 1             |        | Adc                          |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 0.8<br>4.6    |        | Watt<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 3.7<br>20     |        | Watt<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range                                       | $T_J, T_{stg}$ | - 65 to + 200 |        | $^\circ\text{C}$             |

## THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max | Unit               |
|-----------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 35  | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 200 | $^\circ\text{C/W}$ |

# BC140 BC141

CASE 79, STYLE 1  
TO-39 (TO-205AD)

AMPLIFIER TRANSISTOR

NPN SILICON

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Refer to 2N3019 for graphs.

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

| Characteristic                                                                         | Symbol        | Min       | Max        | Unit                |
|----------------------------------------------------------------------------------------|---------------|-----------|------------|---------------------|
| <b>OFF CHARACTERISTICS</b>                                                             |               |           |            |                     |
| Collector Cutoff Current<br>( $I_E = 0, V_{CE} = 60\text{ V}$ )                        | $I_{CES}$     |           | 100<br>100 | nA<br>$\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage<br>( $I_{CES} = 100\text{ }\mu\text{A}, I_E = 0$ ) | $V_{(BR)CES}$ | 80<br>100 |            | V                   |
| Collector-Emitter Breakdown Voltage(1)<br>( $I_C = 30\text{ mA}, I_B = 0$ )            | $V_{(BR)CEO}$ | 40<br>60  |            | V                   |
| Emitter-Base Breakdown Voltage<br>( $I_E = 100\text{ }\mu\text{A}, I_C = 0$ )          | $V_{(BR)EBO}$ | 7         |            | V                   |

## ON CHARACTERISTICS

|                                                                                                                                                                        |               |                       |                          |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------|--------------------------|---|
| DC Current Gain(1)<br>( $I_C = 100\text{ mA}, V_{CE} = 1\text{ V}$ )<br>for BC140, 141<br>for BC140, 141 Group 6<br>for BC140, 141 Group 10<br>for BC140, 141 Group 16 | $h_{FE}$      | 40<br>40<br>63<br>100 | 400<br>100<br>160<br>250 |   |
| Collector-Emitter Saturation Voltage(1)<br>( $I_C = 1\text{ A}, I_B = 0.1\text{ A}$ )                                                                                  | $V_{CE(sat)}$ |                       | 1                        | V |
| Base-Emitter Voltage(1)<br>( $I_C = 1\text{ A}, V_{CE} = 1\text{ V}$ )                                                                                                 | $V_{BE(on)}$  |                       | 2                        | V |

## SMALL SIGNAL CHARACTERISTICS

|                                                                                             |           |    |     |     |
|---------------------------------------------------------------------------------------------|-----------|----|-----|-----|
| Gain Bandwidth Product<br>( $I_C = 50\text{ mA}, V_{CE} = 10\text{ V}, f = 20\text{ MHz}$ ) | $f_T$     | 50 |     | MHz |
| Input Capacitance<br>( $V_{EB} = 0.5\text{ V}, I_C = 0, f = 1\text{ MHz}$ )                 | $C_{ib}$  |    | 80  | pF  |
| Capacitance<br>( $I_E = 0, V_{CB} = 10\text{ V}, f = 1\text{ MHz}$ )                        | $C_{ob}$  |    | 25  | pF  |
| Turn On Time<br>( $I_C = 150\text{ mA}, I_{B1} = 7.5\text{ mA}$ )                           | $t_{on}$  |    | 250 | ns  |
| Turn Off Time<br>( $I_C = 150\text{ mA}, I_{B1} = I_{B2} = 7.5\text{ mA}$ )                 | $t_{off}$ |    | 850 | ns  |

(1) Pulsed: Pulse Duration = 300  $\mu\text{s}$ , Duty Cycle = 1%.