

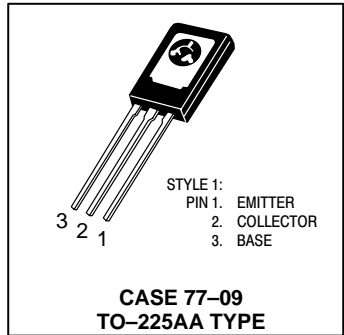
# Plastic Medium Power Silicon NPN Transistor

...designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

- DC Current Gain —  
 $h_{FE} = 40$  (Min) @  $I_C = 0.15$  Adc
- BD 135, 137, 139 are complementary with BD 136, 138, 140

**BD135  
BD137  
BD139**

**1.5 AMPERE  
POWER TRANSISTORS  
NPN SILICON  
45, 60, 80 VOLTS  
10 WATTS**



## MAXIMUM RATINGS

| Rating   | Symbol         | Type                       | Value           | Unit                          |
|--|----------------|----------------------------|-----------------|-------------------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | BD 135<br>BD 137<br>BD 139 | 45<br>60<br>80  | Vdc                           |
| Collector-Base Voltage   | $V_{CBO}$      | BD 135<br>BD 137<br>BD 139 | 45<br>60<br>100 | Vdc                           |
| Emitter-Base Voltage   | $V_{EBO}$      |                            | 5               | Vdc                           |
| Collector Current  | $I_C$          |                            | 1.5             | Adc                           |
| Base Current   | $I_B$          |                            | 0.5             | Adc                           |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          |                            | 1.25<br>10      | Watts<br>mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          |                            | 12.5<br>100     | Watt<br>mW/ $^\circ\text{C}$  |
| Operating and Storage Junction<br>Temperature Range                                    | $T_J, T_{stg}$ |                            | -55 to +150     | $^\circ\text{C}$              |

# BD135 BD137 BD139

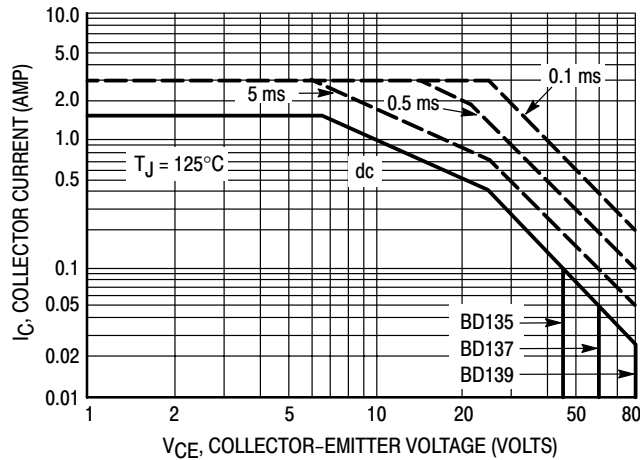
## THERMAL CHARACTERISTICS

| Characteristic                          | Symbol        | Max | Unit                        |
|---|---------------|-----|-----------------------------|
| Thermal Resistance, Junction to Case    | $\theta_{JC}$ | 10  | $^{\circ}\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Ambient | $\theta_{JA}$ | 100 | $^{\circ}\text{C}/\text{W}$ |

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

| Characteristic   | Symbol          | Type                       | Min            | Max           | Unit             |
|--|-----------------|----------------------------|----------------|---------------|------------------|
| Collector–Emitter Sustaining Voltage*<br>( $I_C = 0.03 \text{ A dc}$ , $I_B = 0$ )   | $BV_{CEO}^*$    | BD 135<br>BD 137<br>BD 139 | 45<br>60<br>80 | —<br>—<br>—   | Vdc              |
| Collector Cutoff Current<br>( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ )<br>( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ , $T_C = 125^{\circ}\text{C}$ )                                     | $I_{CBO}$       |                            | —<br>—         | 0.1<br>10     | $\mu\text{A dc}$ |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0 \text{ Vdc}$ , $I_C = 0$ )   | $I_{EBO}$       |                            | —              | 10            | $\mu\text{A dc}$ |
| DC Current Gain<br>( $I_C = 0.005 \text{ A}$ , $V_{CE} = 2 \text{ V}$ )<br>( $I_C = 0.15 \text{ A}$ , $V_{CE} = 2 \text{ V}$ )<br>( $I_C = 0.5 \text{ A}$ , $V_{CE} = 2 \text{ V}$ ) | $h_{FE}^*$      |                            | 25<br>40<br>25 | —<br>250<br>— | —                |
| Collector–Emitter Saturation Voltage*<br>( $I_C = 0.5 \text{ A dc}$ , $I_B = 0.05 \text{ A dc}$ )  | $V_{CE(sat)}^*$ |                            | —              | 0.5           | Vdc              |
| Base–Emitter On Voltage*<br>( $I_C = 0.5 \text{ A dc}$ , $V_{CE} = 2.0 \text{ Vdc}$ )  | $V_{BE(on)}^*$  |                            | —              | 1             | Vdc              |

\*Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

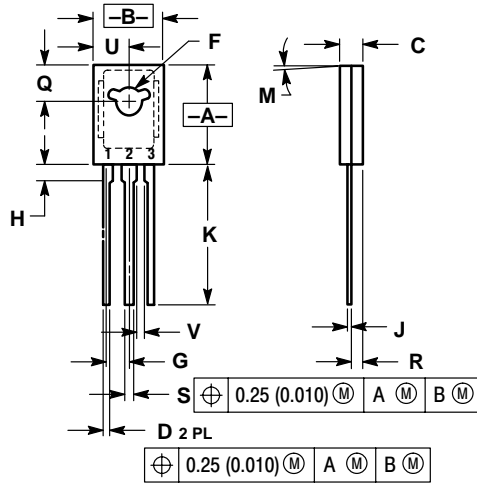


**Figure 1. Active–Region Safe Operating Area**

# BD135 BD137 BD139

## PACKAGE DIMENSIONS

TO-225AA  
CASE 77-09  
ISSUE W




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 0.425     | 0.435 | 10.80       | 11.04 |
| B   | 0.295     | 0.305 | 7.50        | 7.74  |
| C   | 0.095     | 0.105 | 2.42        | 2.66  |
| D   | 0.020     | 0.026 | 0.51        | 0.66  |
| F   | 0.115     | 0.130 | 2.93        | 3.30  |
| G   | 0.094 BSC |       | 2.39 BSC    |       |
| H   | 0.050     | 0.095 | 1.27        | 2.41  |
| J   | 0.015     | 0.025 | 0.39        | 0.63  |
| K   | 0.575     | 0.655 | 14.61       | 16.63 |
| M   | 5° TYP    |       | 5° TYP      |       |
| Q   | 0.148     | 0.158 | 3.76        | 4.01  |
| R   | 0.045     | 0.065 | 1.15        | 1.65  |
| S   | 0.025     | 0.035 | 0.64        | 0.88  |
| U   | 0.145     | 0.155 | 3.69        | 3.93  |
| V   | 0.040     | ---   | 1.02        | ---   |

STYLE 1:

- PIN 1. EMITTER
- COLLECTOR
- BASE

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