

# BD135, BD137, BD139

## Plastic Medium Power Silicon NPN Transistors

This series of plastic, medium-power silicon NPN transistors are designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

### Features

- DC Current Gain –  $h_{FE} = 40$  (Min) @  $I_C = 0.15$  Adc
- BD 135, 137, 139 are complementary with BD 136, 138, 140
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	BD135 BD137 BD139	$V_{CEO}$ 45 60 80	Vdc
Collector-Base Voltage	BD135 BD137 BD139	$V_{CBO}$ 45 60 100	Vdc
Emitter-Base Voltage		$V_{EBO}$ 5.0	Vdc
Collector Current		$I_C$ 1.5	Adc
Base Current		$I_B$ 0.5	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.25 10	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	12.5 100	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### 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	$^\circ\text{C}/\text{W}$

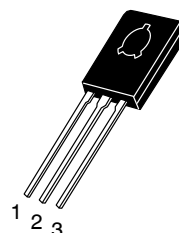
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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## 1.5 A POWER TRANSISTORS NPN SILICON 45, 60, 80 V, 12.5 W



TO-225  
CASE 77  
STYLE 1

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
xx = 35, 37, 39  
G = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping†
BD135G	TO-225AA (Pb-Free)	500 Units / Box
BD135TG	TO-225AA (Pb-Free)	50 Units / Rail
BD137G	TO-225AA (Pb-Free)	500 Units / Box
BD139G	TO-225AA (Pb-Free)	500 Units / Box

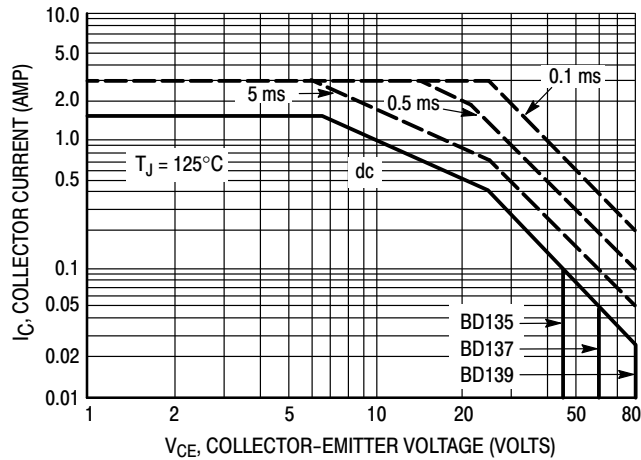
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# BD135, BD137, BD139

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

Characteristic	Symbol	Type	Min	Max	Unit
Collector–Emitter Sustaining Voltage* ( $I_C = 0.03\text{ A dc}$ , $I_B = 0$ )	$BV_{CE0}^*$	BD135 BD137 BD139	45 60 80	– – –	Vdc
Collector Cutoff Current ( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 30\text{ Vdc}$ , $I_E = 0$ , $T_C = 125^\circ\text{C}$ )	$I_{CBO}$		– –	0.1 10	$\mu\text{A dc}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$		–	10	$\mu\text{A dc}$
DC Current Gain ( $I_C = 0.005\text{ A}$ , $V_{CE} = 2\text{ V}$ ) ( $I_C = 0.15\text{ A}$ , $V_{CE} = 2\text{ V}$ ) ( $I_C = 0.5\text{ A}$ , $V_{CE} = 2\text{ V}$ )	$h_{FE}^*$		25 40 25	– 250 –	–
Collector–Emitter Saturation Voltage* ( $I_C = 0.5\text{ A dc}$ , $I_B = 0.05\text{ A dc}$ )	$V_{CE(sat)}^*$		–	0.5	Vdc
Base–Emitter On Voltage* ( $I_C = 0.5\text{ A dc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$V_{BE(on)}^*$		–	1	Vdc

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

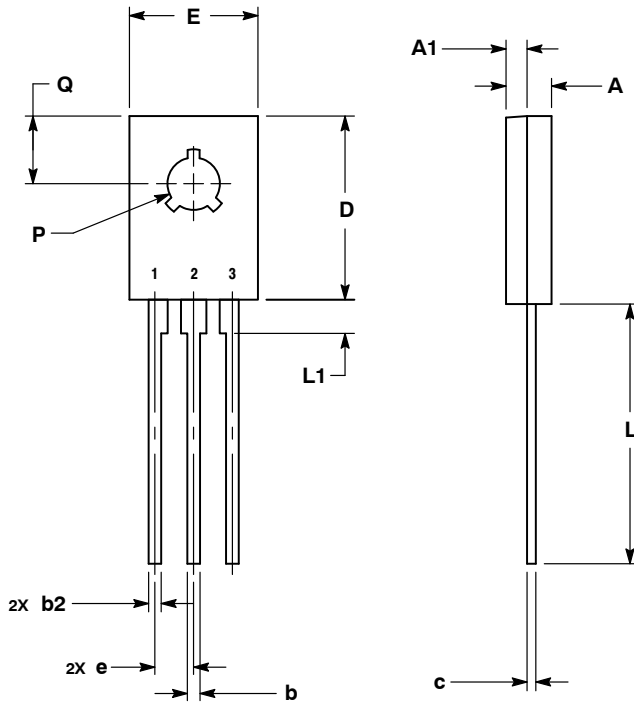


**Figure 1. Active–Region Safe Operating Area**

# BD135, BD137, BD139

## PACKAGE DIMENSIONS

TO-225  
CASE 77-09  
ISSUE AA



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

DIM	MILLIMETERS	
	MIN	MAX
A	2.40	3.00
A1	1.00	1.50
b	0.60	0.90
b2	0.51	0.88
c	0.39	0.63
D	10.60	11.10
E	7.40	7.80
e	2.04	2.54
L	14.50	16.63
L1	1.27	2.54
P	2.90	3.30
Q	3.80	4.20

**STYLE 1:**

- PIN 1. EMITTER
- COLLECTOR
- BASE

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