

# BD135, BD137, BD139

## Plastic Medium Power Silicon NPN Transistor

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

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

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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

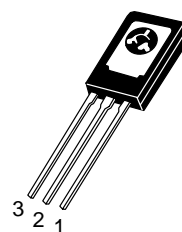
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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



TO-225AA  
CASE 77  
STYLE 1

### MARKING DIAGRAM



xx = 35, 37, 39  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

Device	Package	Shipping†
BD135	TO-225AA	500 Units/Box
BD135G	TO-225AA (Pb-Free)	500 Units/Box
BD137	TO-225AA	500 Units/Box
BD137G	TO-225AA (Pb-Free)	500 Units/Box
BD139	TO-225AA	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* ( $I_C = 0.03 \text{ A dc}$ , $I_B = 0$ )	$BV_{CE0}^*$	BD 135 BD 137 BD 139	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  $\leq 2.0\%$ .

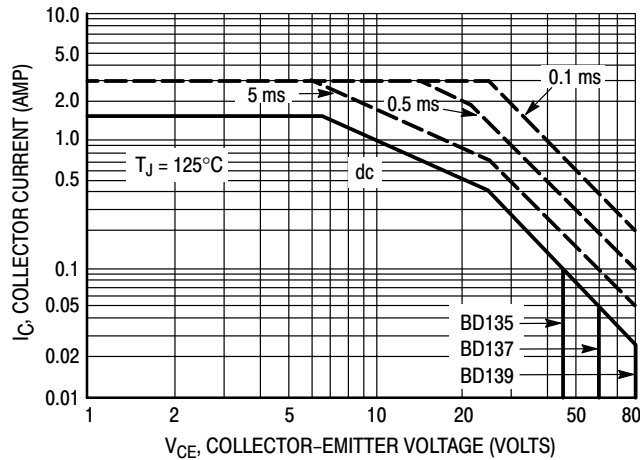
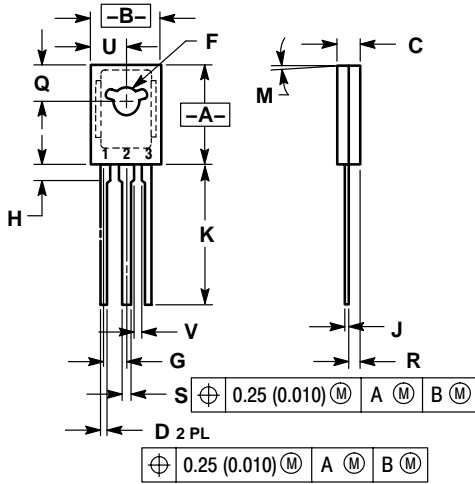


Figure 1. Active–Region Safe Operating Area

# BD135, BD137, BD139

## PACKAGE DIMENSIONS

TO-225AA  
CASE 77-09  
ISSUE Z



NOTES:


1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

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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