

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°C	P_D	1.25 10	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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	θ_{JC}	10	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient	θ_{JA}	100	$^\circ\text{C}/\text{W}$

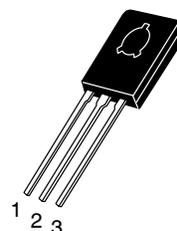
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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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 $\leq 2.0\%$.

TYPICAL CHARACTERISTICS

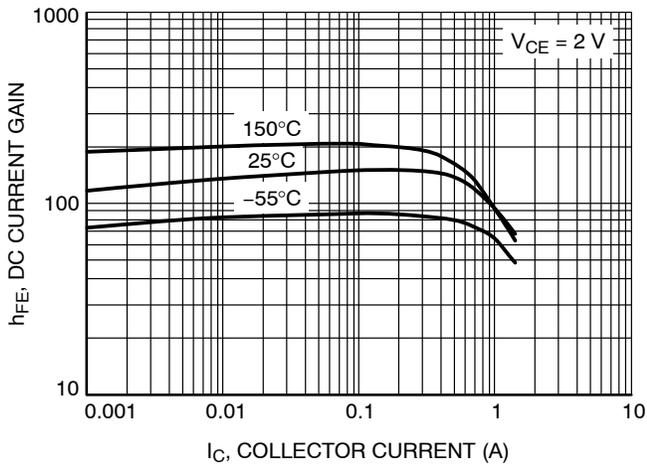


Figure 1. DC Current Gain

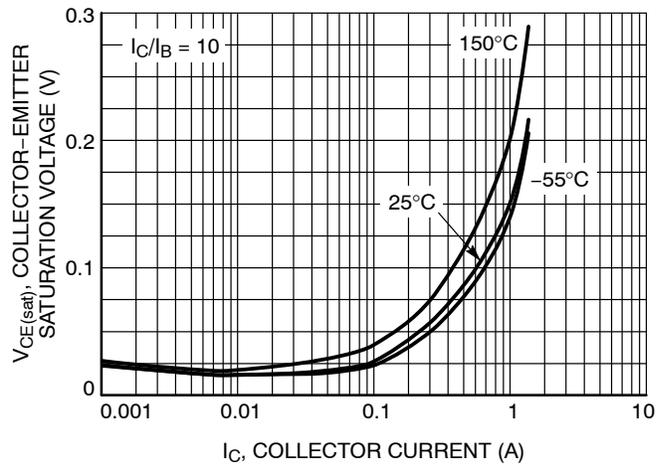


Figure 2. Collector–Emitter Saturation Voltage

BD135, BD137, BD139

TYPICAL CHARACTERISTICS

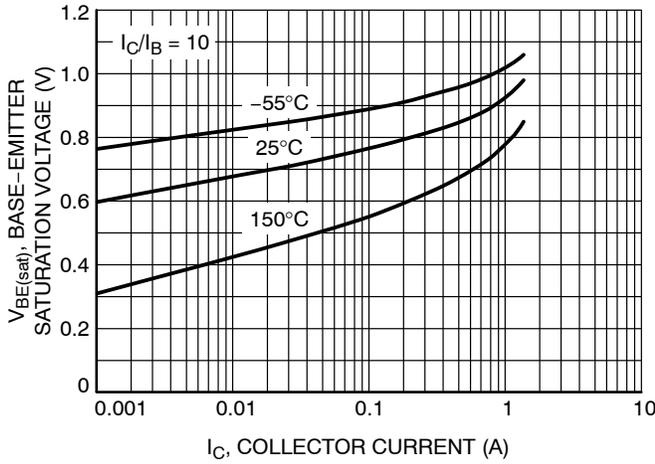


Figure 3. Base-Emitter Saturation Voltage

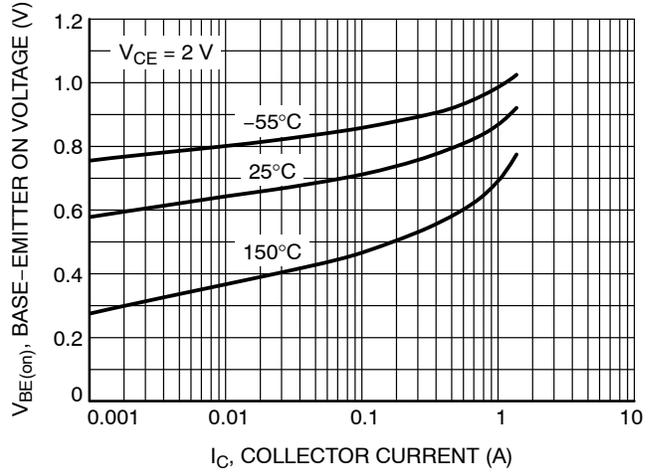


Figure 4. Base-Emitter On Voltage

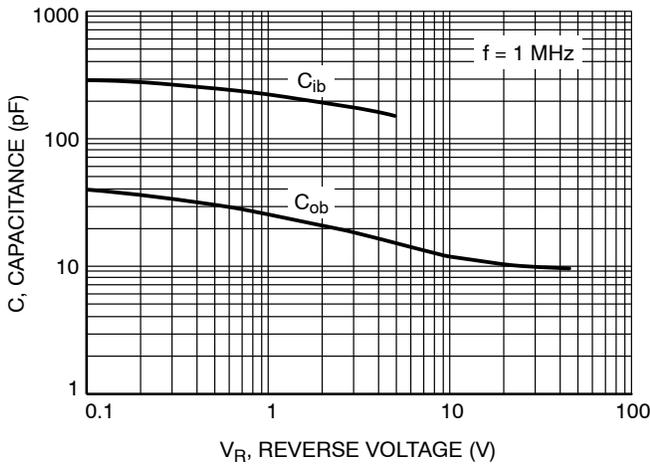


Figure 5. Capacitance

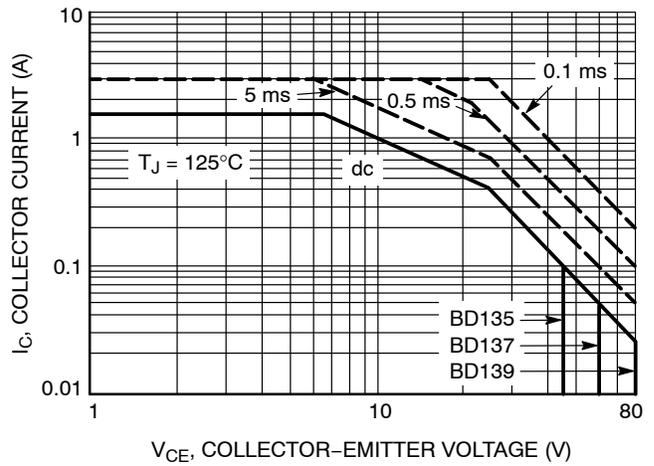


Figure 6. Active-Region Safe Operating Area

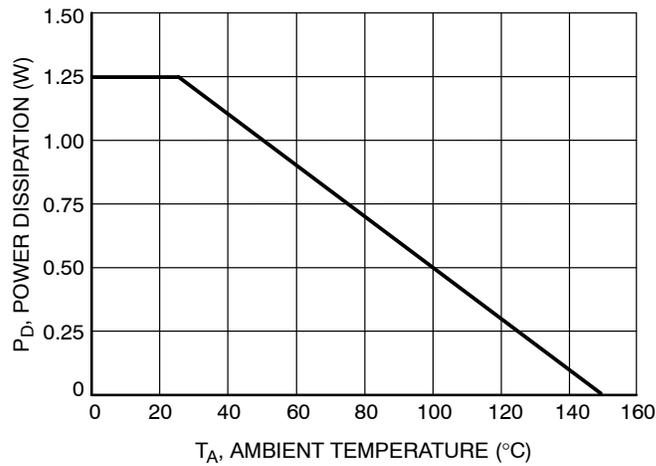
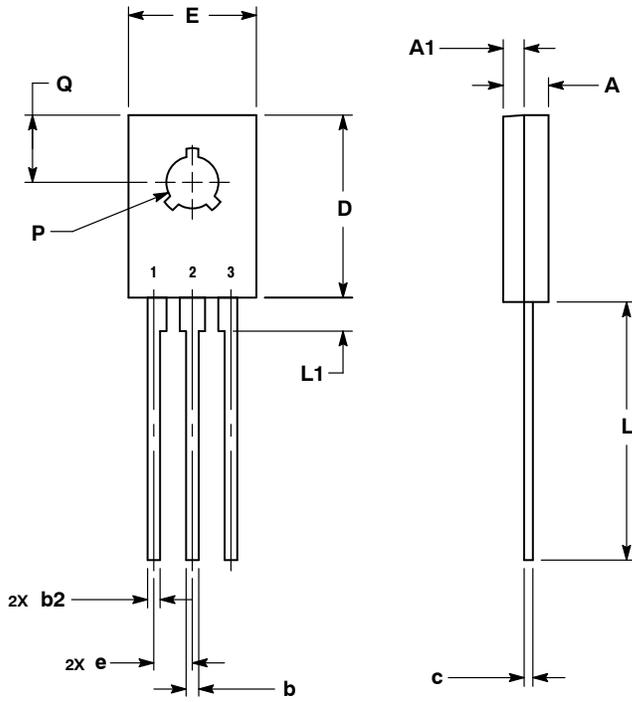


Figure 7. Power Derating

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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