

# BD136, BD138, BD140

## Plastic Medium Power Silicon PNP Transistor

This series of plastic, medium-power silicon PNP 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 136, 138, 140 are complementary with BD 135, 137, 139
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	BD136 BD138 BD140	$V_{CEO}$ 45 60 80	Vdc
Collector-Base Voltage	BD136 BD138 BD140	$V_{CBO}$ 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	$^\circ\text{C}/\text{W}$

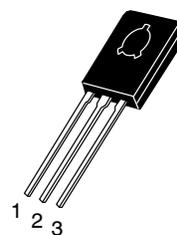
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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



TO-225  
CASE 77  
STYLE 1

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
xx = 36, 38, 40  
G = Pb-Free Package

### ORDERING INFORMATION

Device	Package	Shipping†
BD136G	TO-225AA (Pb-Free)	500 Units/Box
BD138G	TO-225AA (Pb-Free)	500 Units/Box
BD140G	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.

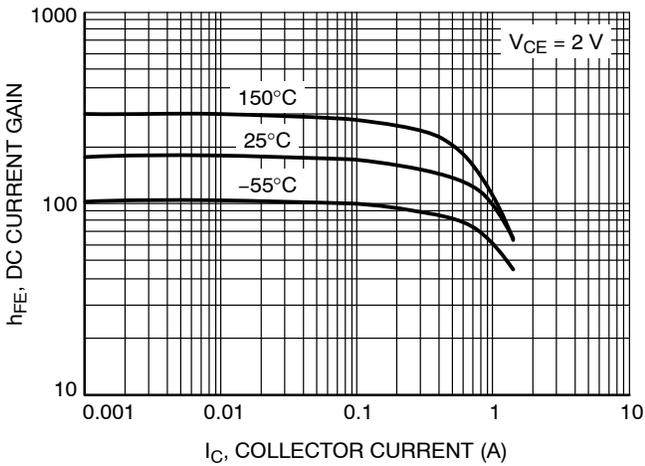
# BD136, BD138, BD140

## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

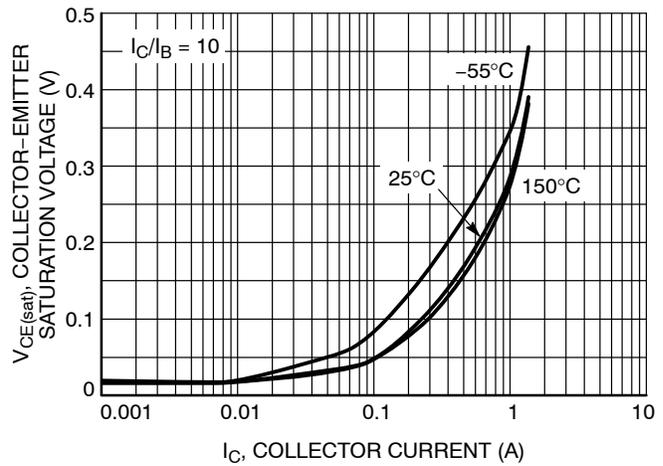
Characteristic	Symbol	Type	Min	Max	Unit
Collector–Emitter Sustaining Voltage* (I <sub>C</sub> = 0.03 Adc, I <sub>B</sub> = 0)	BV <sub>CEO</sub>	BD 136 BD 138 BD 140	45 60 80	– – –	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0) (V <sub>CB</sub> = 30 Vdc, I <sub>E</sub> = 0, T <sub>C</sub> = 125 °C)	I <sub>CBO</sub>		– –	0.1 10	μAdc
Emitter Cutoff Current (V <sub>BE</sub> = 5.0 Vdc, I <sub>C</sub> = 0)	I <sub>EBO</sub>		–	10	μAdc
DC Current Gain (I <sub>C</sub> = 0.005 A, V <sub>CE</sub> = 2 V) (I <sub>C</sub> = 0.15 A, V <sub>CE</sub> = 2 V) (I <sub>C</sub> = 0.5 A, V <sub>CE</sub> = 2 V)	h <sub>FE</sub> *		25 40 25	– 250 –	–
Collector–Emitter Saturation Voltage* (I <sub>C</sub> = 0.5 Adc, I <sub>B</sub> = 0.05 Adc)	V <sub>CE(sat)</sub> *		–	0.5	Vdc
Base–Emitter On Voltage* (I <sub>C</sub> = 0.5 Adc, V <sub>CE</sub> = 2.0 Vdc)	V <sub>BE(on)</sub> *		–	1	Vdc

\*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

## TYPICAL CHARACTERISTICS



**Figure 1. DC Current Gain**



**Figure 2. Collector–Emitter Saturation Voltage**

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## TYPICAL CHARACTERISTICS

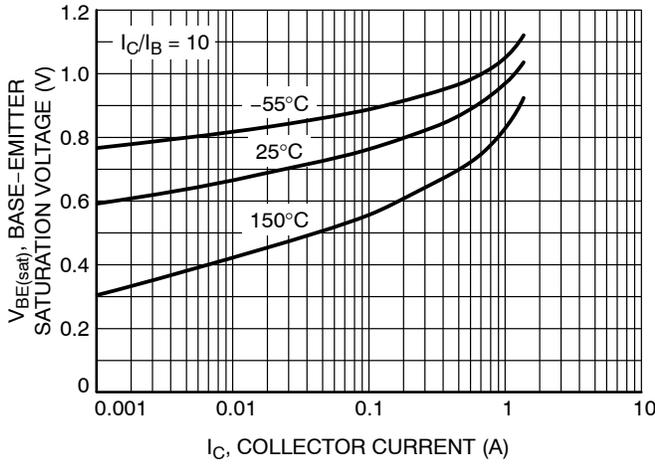


Figure 3. Base-Emitter Saturation Voltage

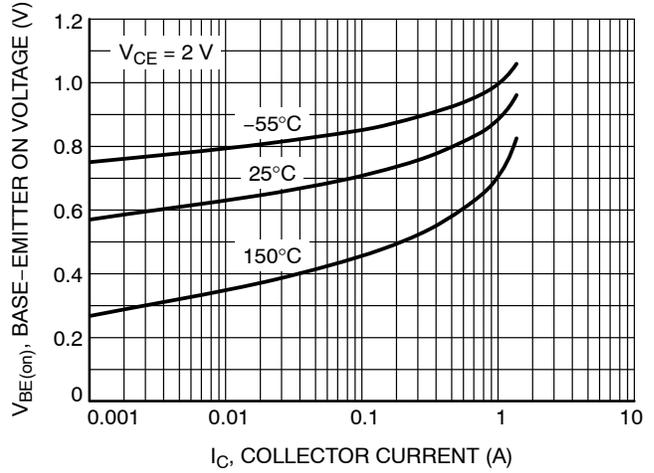


Figure 4. Base-Emitter On Voltage

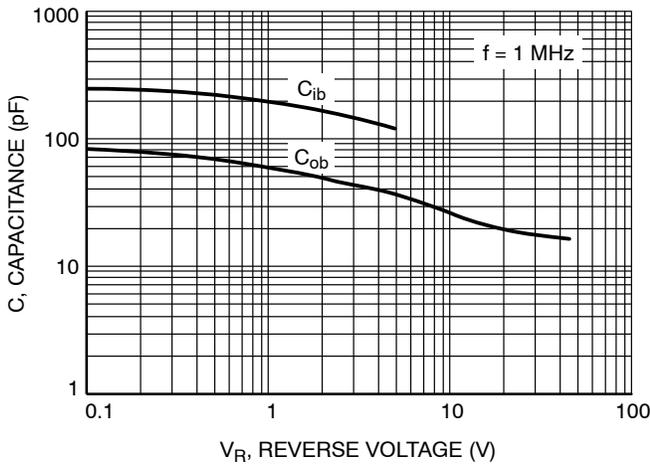


Figure 5. Capacitance

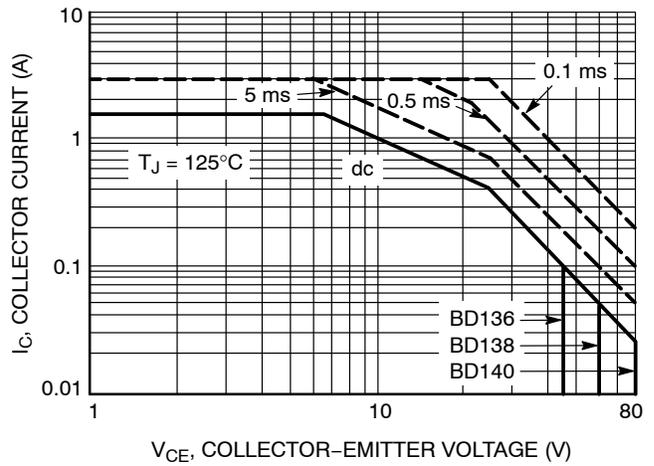


Figure 6. Active-Region Safe Operating Area

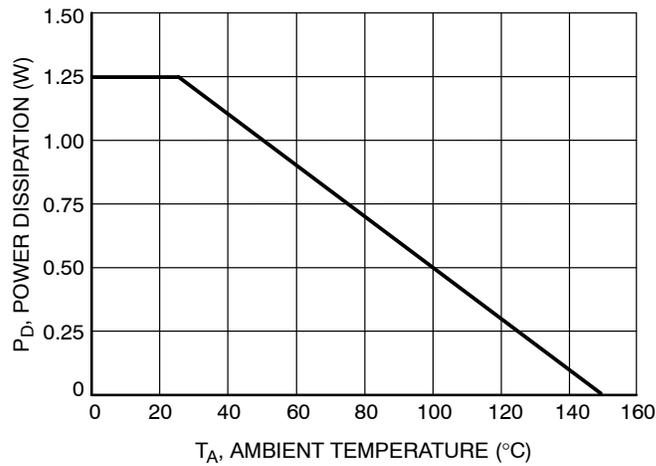
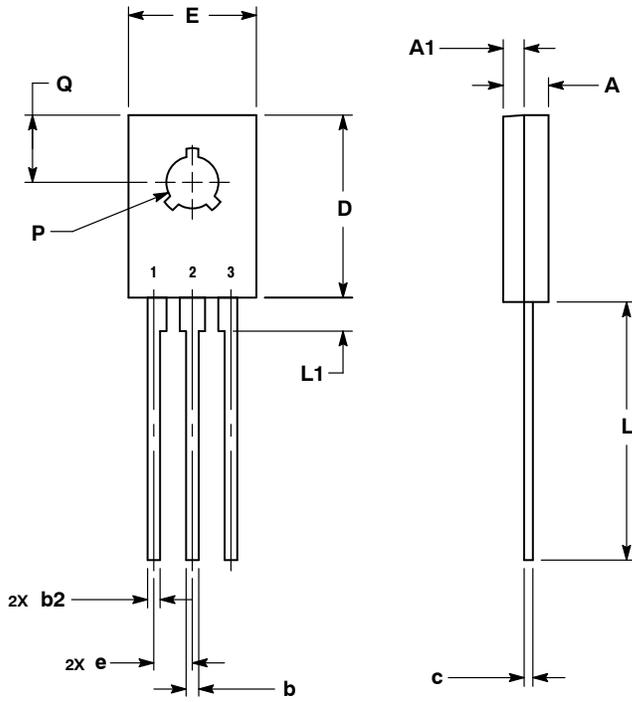


Figure 7. Power Derating

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## 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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