

# BD436, BD438, BD440, BD442



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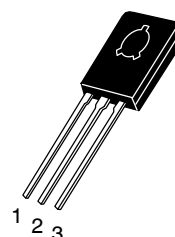
## Plastic Medium Power Silicon PNP Transistor

This series of plastic, medium-power silicon PNP transistors can be used for amplifier and switching applications. Complementary types are BD437 and BD441.

### Features

- These Devices are Pb-Free and are RoHS Compliant\*

### 4.0 AMP POWER TRANSISTORS PNP SILICON



TO-225  
CASE 77-09  
STYLE 1

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Collector-Emitter Voltage	BD436 BD438 BD440 BD442	$V_{CEO}$	32 45 60 80	Vdc
Collector-Base Voltage	BD436 BD438 BD440 BD442	$V_{CBO}$	32 45 60 80	Vdc
Emitter-Base Voltage		$V_{EBO}$	5.0	Vdc
Collector Current		$I_C$	4.0	Adc
Base Current		$I_B$	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$		$P_D$	36 288	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range		$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

### MARKING DIAGRAM



BD4xx = Device Code  
 xx = 36, 36T, 38, 38T, 40, 42  
 Y = Year  
 WW = Work Week  
 G = Pb-Free Package

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$\theta_{JC}$	3.5	$^\circ\text{C}/\text{W}$

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.

### ORDERING INFORMATION

Device	Package	Shipping
BD436G	TO-225AA (Pb-Free)	500 Units/Box
BD436TG	TO-225AA (Pb-Free)	50 Units/Rail
BD438G	TO-225AA (Pb-Free)	500 Units/Box
BD438TG	TO-225AA (Pb-Free)	50 Units/Rail
BD440G	TO-225AA (Pb-Free)	500 Units/Box
BD442G	TO-225AA (Pb-Free)	500 Units/Box

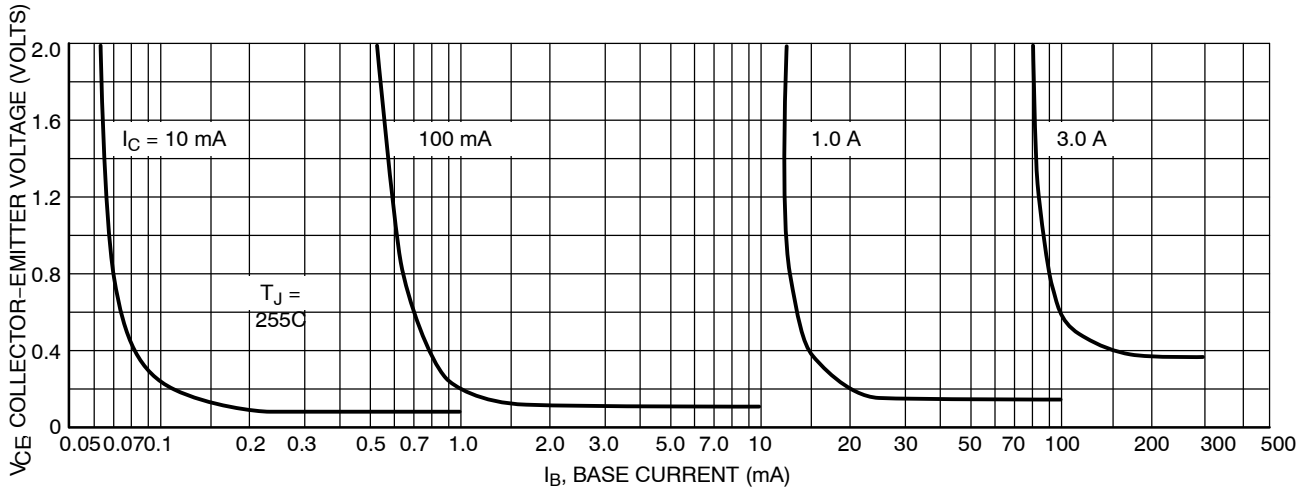
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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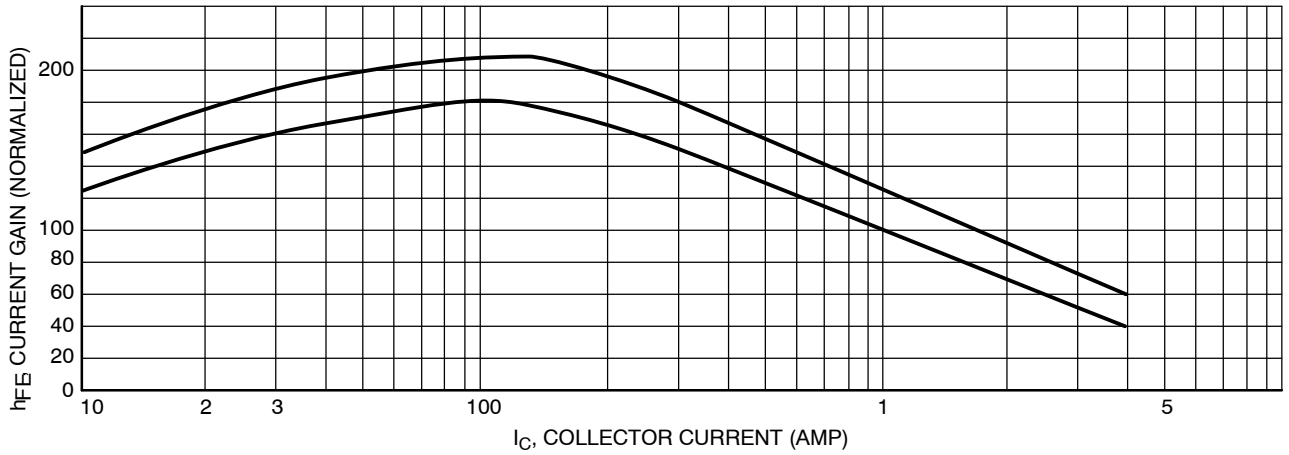
## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 0)	BD436 BD438 BD440 BD442	V <sub>(BR)CEO</sub>	32 45 60 80	– – – –	– – – –	Vdc
Collector–Base Breakdown Voltage (I <sub>C</sub> = 100 μA, I <sub>B</sub> = 0)	BD436 BD438 BD440 BD442	V <sub>(BR)CBO</sub>	32 45 60 80	– – – –	– – – –	Vdc
Emitter–Base Breakdown Voltage (I <sub>E</sub> = 100 μA, I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	5.0	–	–	Vdc
Collector Cutoff Current (V <sub>CB</sub> = 32 V, I <sub>E</sub> = 0) (V <sub>CB</sub> = 45 V, I <sub>E</sub> = 0) (V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0) (V <sub>CB</sub> = 80 V, I <sub>E</sub> = 0)	BD436 BD438 BD440 BD442	I <sub>CBO</sub>	– – – –	– – – –	0.1 0.1 0.1 0.1	mAdc
Emitter Cutoff Current (V <sub>EB</sub> = 5.0 V)		I <sub>EBO</sub>	–	–	1.0	mAdc
DC Current Gain (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V)	BD436 BD438 BD440 BD442	h <sub>FE</sub>	40 30 20 15	– – – –	– – – –	
DC Current Gain (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V)	BD436 BD438 BD440 BD442	h <sub>FE</sub>	85 85 40 40	– – – –	475 475 475 475	
DC Current Gain (I <sub>C</sub> = 2.0 A, V <sub>CE</sub> = 1.0 V)	BD436 BD438 BD440 BD442	h <sub>FE</sub>	50 40 25 15	– – – –	– – – –	
Collector Saturation Voltage (I <sub>C</sub> = 2.0 A, I <sub>B</sub> = 0.2 A) (I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 0.3 A)	BD436 BD438 BD440 BD442	V <sub>CE(sat)</sub>	– – – –	– – – –	0.5 0.7 0.8 0.8	Vdc
Base–Emitter On Voltage (I <sub>C</sub> = 2.0 A, V <sub>CE</sub> = 1.0 V)	BD436/BD438 BD440/BD442	V <sub>BE(ON)</sub>	– –	– –	1.1 1.5	Vdc
Current–Gain – Bandwidth Product (V <sub>CE</sub> = 1.0 V, I <sub>C</sub> = 250 mA, f = 1.0 MHz)		f <sub>T</sub>	3.0	–	–	MHz

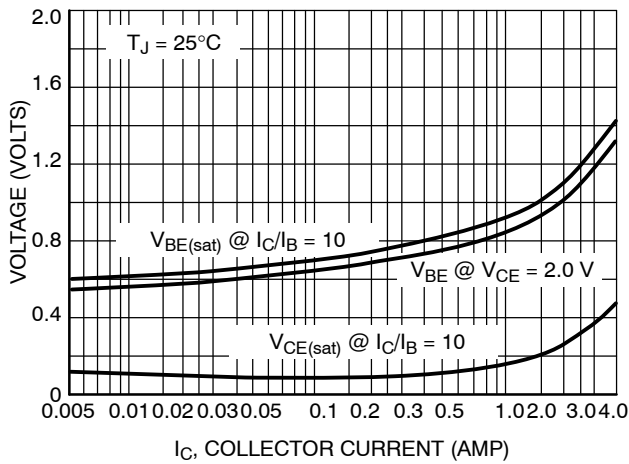
**BD436, BD438, BD440, BD442**



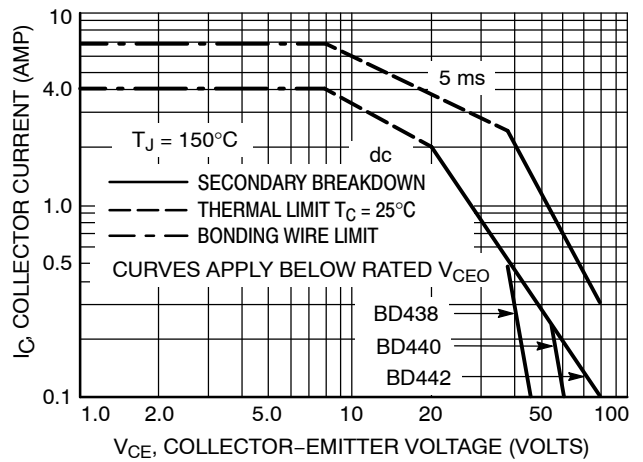
**Figure 1. Collector Saturation Region**



**Figure 2. Current Gain**



**Figure 3. "On" Voltage**

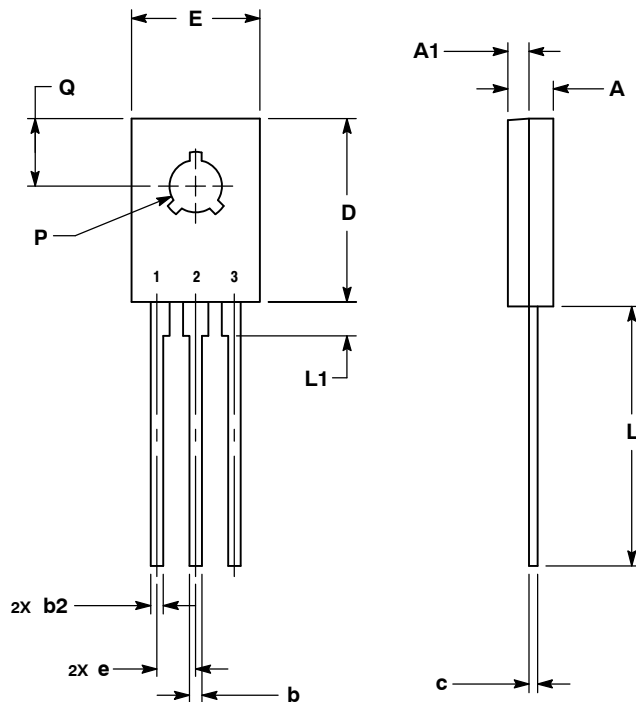


**Figure 4. Active Region Safe Operating Area**

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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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