

# BD436, BD438, BD440, BD442

## 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

- Pb-Free Packages are Available\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Collector-Emitter Voltage	BD436 BD438 BD440 BD442	$V_{CE0}$	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	$^\circ\text{C}$

### THERMAL CHARACTERISTICS

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

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.

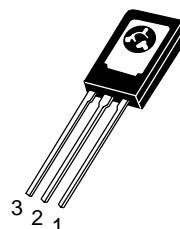
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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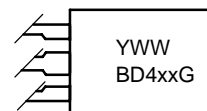
<http://onsemi.com>

## 4.0 AMP POWER TRANSISTORS PNP SILICON



TO-225AA  
CASE 77  
STYLE 1

### MARKING DIAGRAM



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

### ORDERING INFORMATION

Device	Package	Shipping
BD436	TO-225AA	500 Units/Box
BD436G	TO-225AA (Pb-Free)	500 Units/Box
BD436T	TO-225AA	50 Units/Rail
BD436TG	TO-225AA (Pb-Free)	50 Units/Rail
BD438	TO-225AA	500 Units/Box
BD438G	TO-225AA (Pb-Free)	500 Units/Box
BD440	TO-225AA	500 Units/Box
BD440G	TO-225AA (Pb-Free)	500 Units/Box
BD442	TO-225AA	500 Units/Box
BD442G	TO-225AA (Pb-Free)	500 Units/Box

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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

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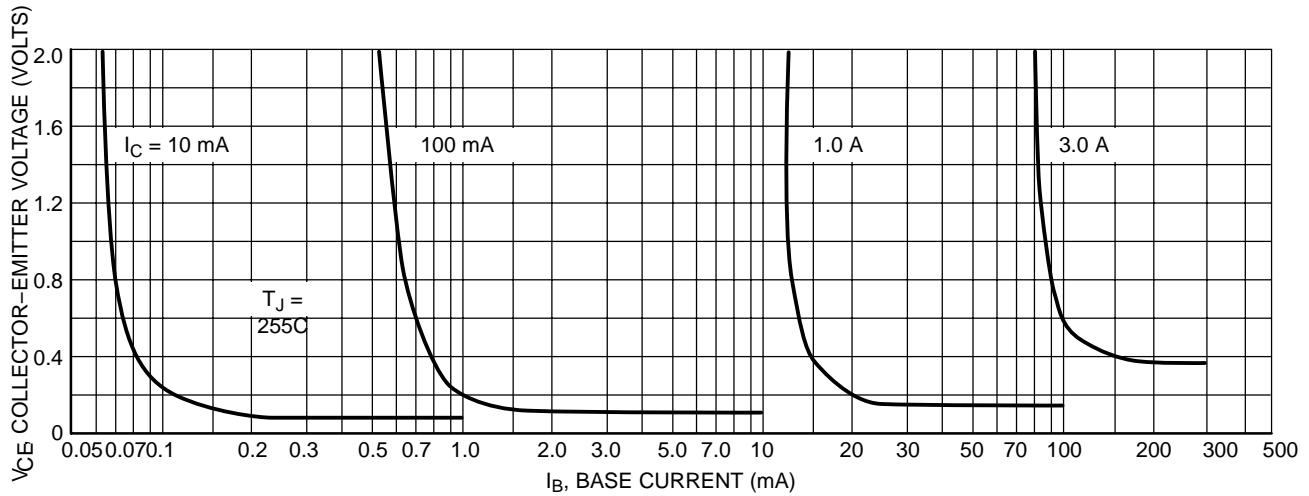


Figure 1. Collector Saturation Region

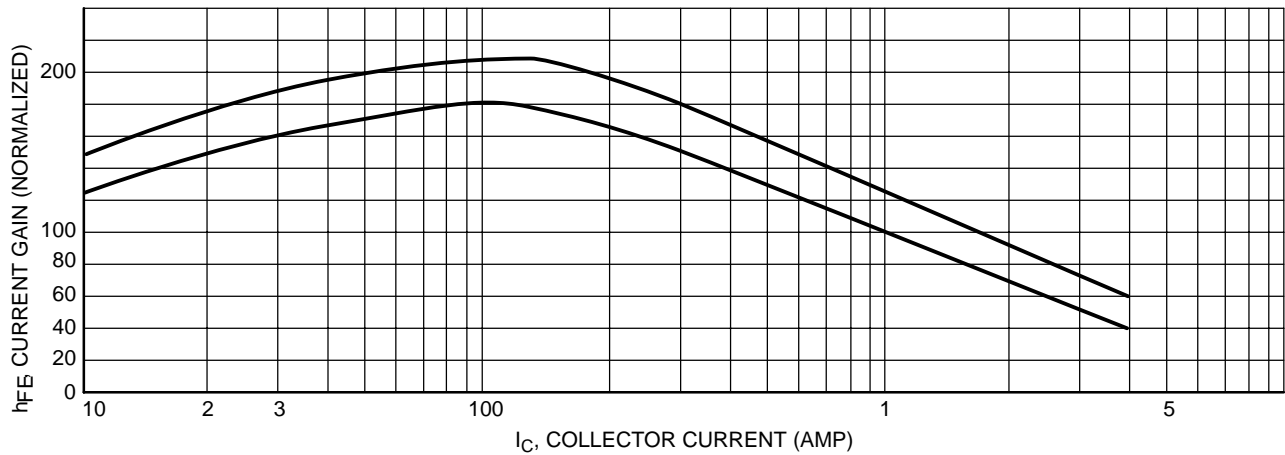


Figure 2. Current Gain

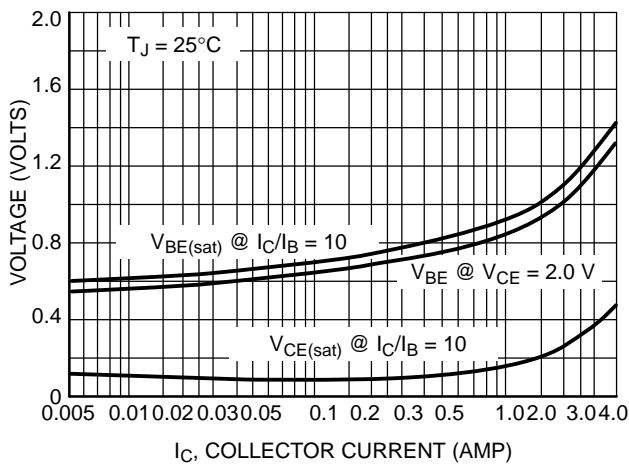


Figure 3. "On" Voltage

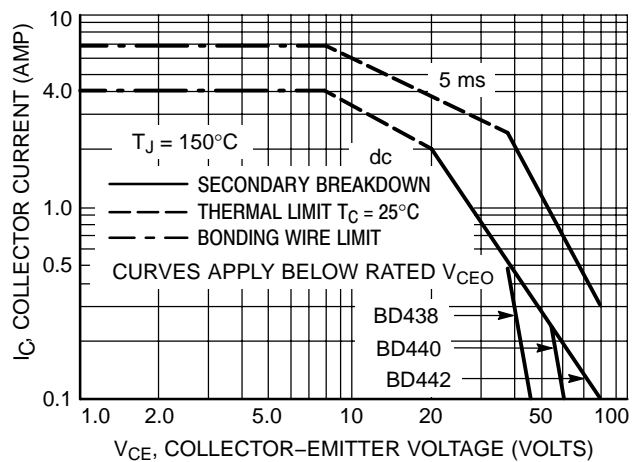
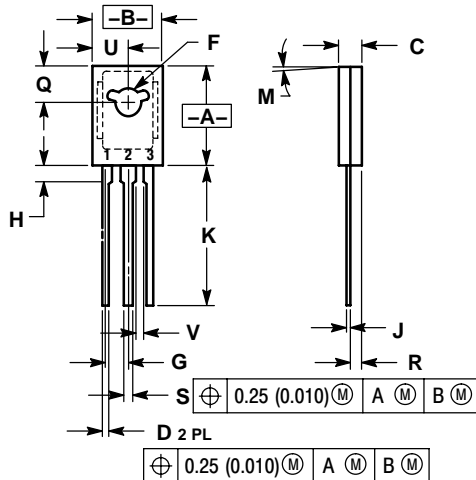


Figure 4. Active Region Safe Operating Area

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## PACKAGE DIMENSIONS

TO-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	0.004 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:

1. EMITTER
2. COLLECTOR
3. BASE

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