

# BD435, BD437, BD439, BD441

## Plastic Medium-Power Silicon NPN Transistors

This series of plastic, medium-power silicon NPN transistors can be used for amplifier and switching applications.

### Features

- Complementary Types are BD438 and BD442
- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage BD435 BD437 BD439 BD441	$V_{CEO}$	32 45 60 80	Vdc
Collector-Base Voltage BD435 BD437 BD439 BD441	$V_{CBO}$	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	$^\circ\text{C}$

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	$R_{\theta JC}$	3.5	$^\circ\text{C}/\text{W}$

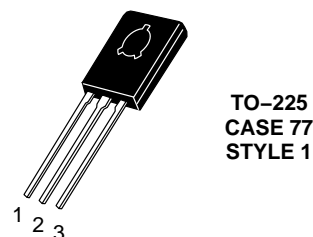
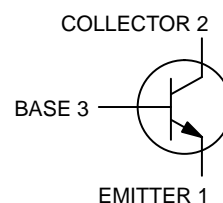
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



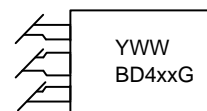
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## 4.0 AMPERES POWER TRANSISTORS NPN SILICON



### MARKING DIAGRAM



BD4xx = Device Code  
 xx = 35, 37, 37T, 39, 41  
 Y = Year  
 WW = Work Week  
 G = Pb-Free Package

### ORDERING INFORMATION

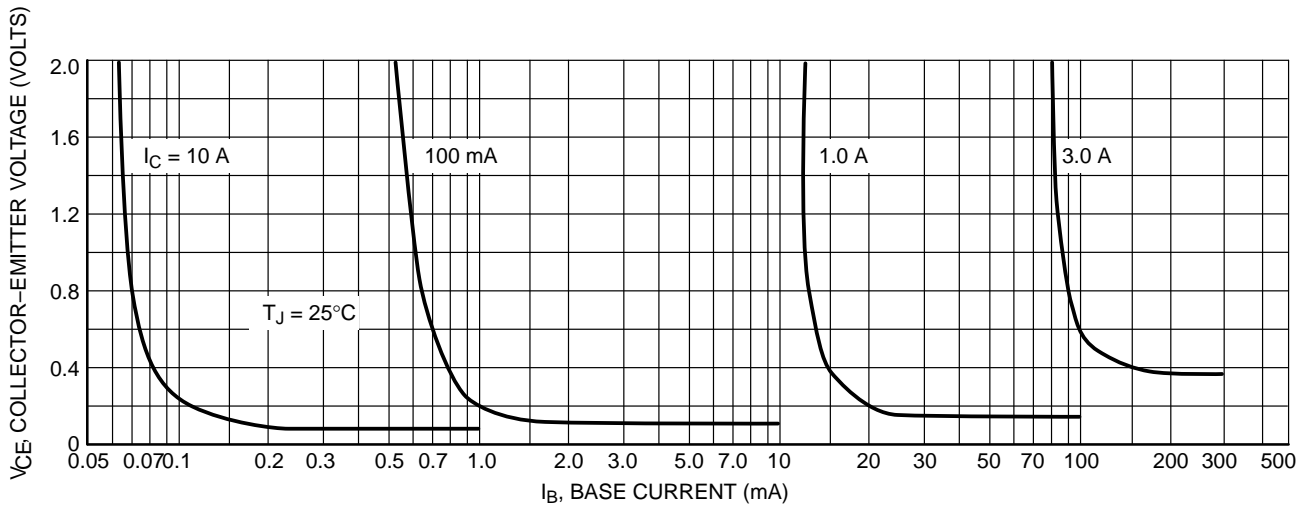
Device	Package	Shipping
BD435G	TO-225 (Pb-Free)	500 Units/Box
BD437G	TO-225 (Pb-Free)	500 Units/Box
BD437TG	TO-225 (Pb-Free)	50 Units/Rail
BD439G	TO-225 (Pb-Free)	500 Units/Box
BD441G	TO-225 (Pb-Free)	500 Units/Box

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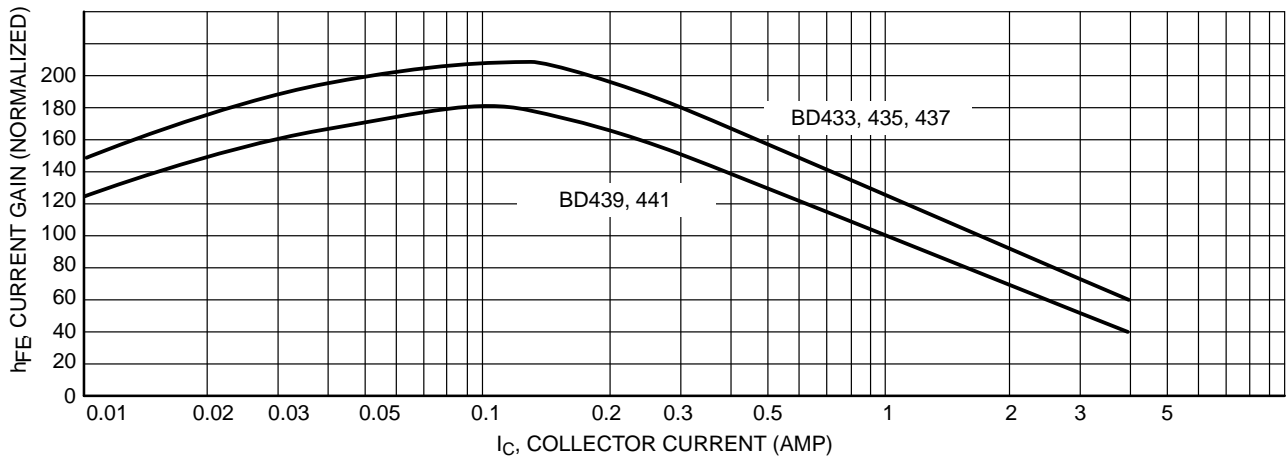
## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 0) BD435 BD437 BD439 BD441	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) BD435 BD437 BD439 BD441	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) BD435 (V <sub>CB</sub> = 45 V, I <sub>E</sub> = 0) BD437 (V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0) BD439 (V <sub>CB</sub> = 80 V, I <sub>E</sub> = 0) BD441	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) BD435 BD437 BD439 BD441	h <sub>FE</sub>	40 30 20 15	– – – –	– – – –	–
DC Current Gain (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V) BD435 BD437 BD439, BD441	h <sub>FE</sub>	85 85 40	– – –	475 375 475	–
DC Current Gain (I <sub>C</sub> = 2.0 A, V <sub>CE</sub> = 1.0 V) BD435 BD437 BD439 BD441	h <sub>FE</sub>	50 40 25 15	– – – –	– – – –	–
Collector Saturation Voltage (I <sub>C</sub> = 2.0 A, I <sub>B</sub> = 0.2 V) BD435 (I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 0.3 A) BD437, BD439, BD441	V <sub>CE(sat)</sub>	– –	– –	0.5 0.8	Vdc
Base–Emitter On Voltage (I <sub>C</sub> = 2.0 A, V <sub>CE</sub> = 1.0 V)	V <sub>BE(on)</sub>	–	–	1.1	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

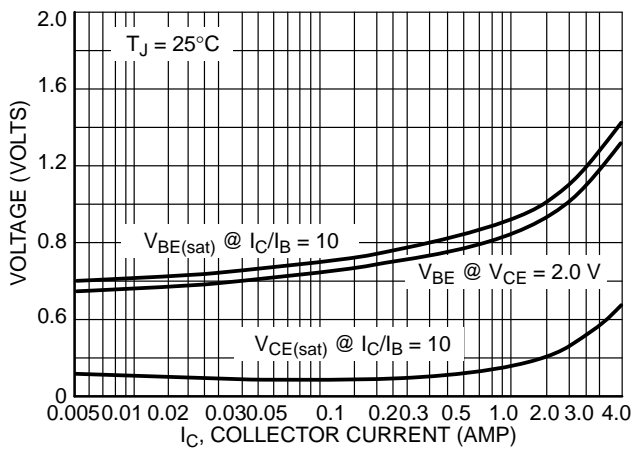
# BD435, BD437, BD439, BD441



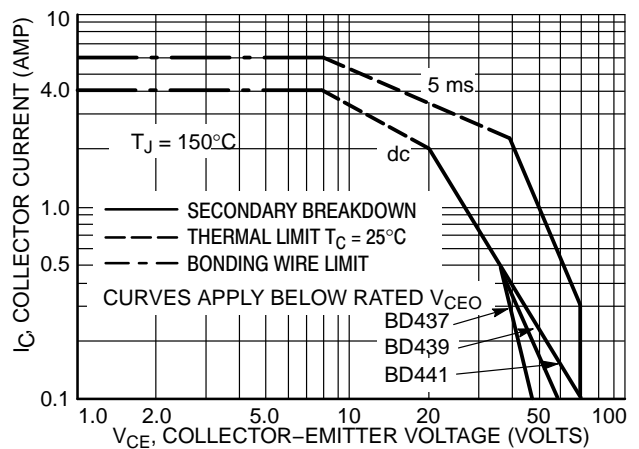
**Figure 1. Collector Saturation Region**



**Figure 2. Current Gain**



**Figure 3. "On" Voltage**

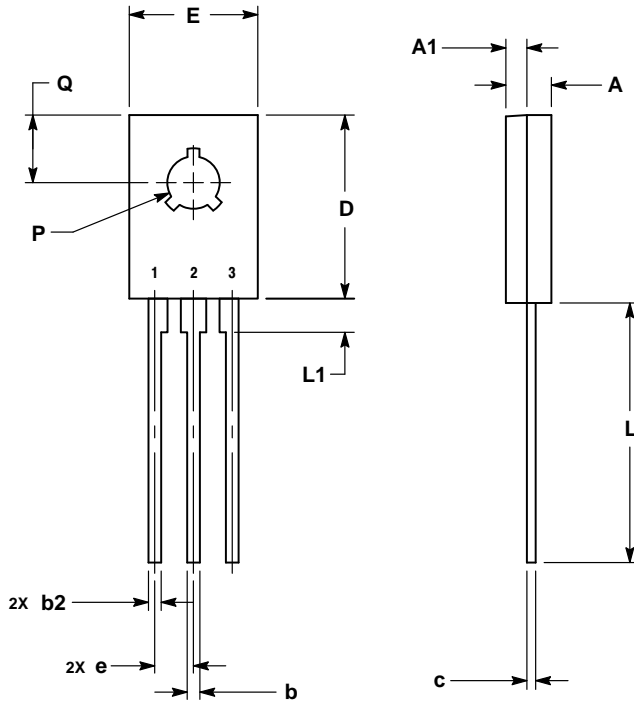


**Figure 4. Active Region Safe Operating Area**

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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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