

# Plastic Medium Power Silicon PNP Transistor

## BD436G, BD438G, BD440G, BD442G

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\*

### MAXIMUM RATINGS

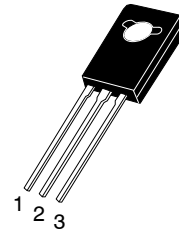
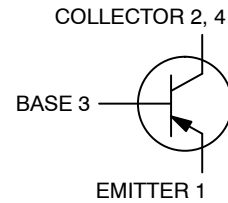
Rating	Symbol	Value	Unit
Collector-Emitter Voltage BD436G BD438G BD440G BD442G	$V_{CEO}$	32 45 60 80	Vdc
Collector-Base Voltage BD436G BD438G BD440G BD442G	$V_{CBO}$	32 45 60 80	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current	$I_C$	4.0	Adc
Base Current	$I_B$	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ 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 those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

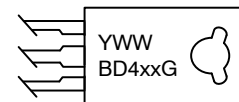
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	$^\circ\text{C}/\text{W}$

## 4.0 AMP POWER TRANSISTORS PNP SILICON



TO-225  
CASE 77-09  
STYLE 1

### MARKING DIAGRAM



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

### ORDERING INFORMATION

Device	Package	Shipping
BD442G	TO-225 (Pb-Free)	500 Units/Box

### DISCONTINUED (Note 1)

BD436G	TO-225 (Pb-Free)	500 Units/Box
BD436TG		50 Units/Rail
BD438G		500 Units/Box
BD438TG		50 Units/Rail
BD440G		500 Units/Box

1. **DISCONTINUED:** These devices are not recommended for new design. Please contact your onsemi representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

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

# BD436G, BD438G, BD440G, BD442G

## 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) BD436G BD438G BD440G BD442G	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) BD436G BD438G BD440G BD442G	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) BD436G (V <sub>CB</sub> = 45 V, I <sub>E</sub> = 0) BD438G (V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0) BD440G (V <sub>CB</sub> = 80 V, I <sub>E</sub> = 0) BD442G	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) BD436G BD438G BD440G BD442G	h <sub>FE</sub>	40 30 20 15	– – – –	– – – –	–
DC Current Gain (I <sub>C</sub> = 500 mA, V <sub>CE</sub> = 1.0 V) BD436G BD438G BD440G BD442G	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) BD436G BD438G BD440G BD442G	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) BD436G (I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 0.3 A) BD438G BD440G BD442G	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) BD436G/BD438G BD440G/BD442G	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

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

BD436G, BD438G, BD440G, BD442G

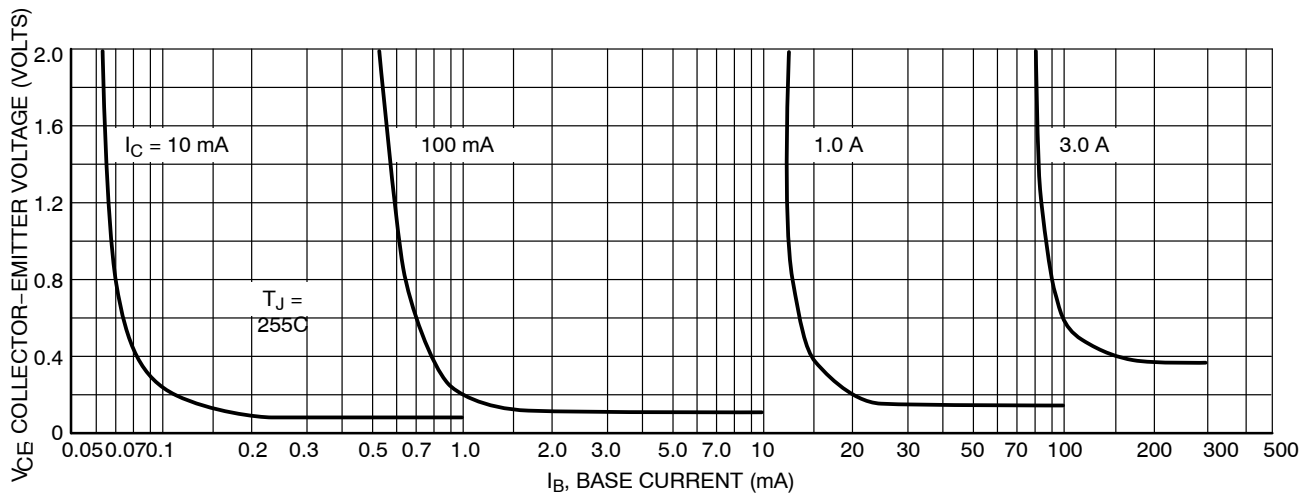


Figure 1. Collector Saturation Region

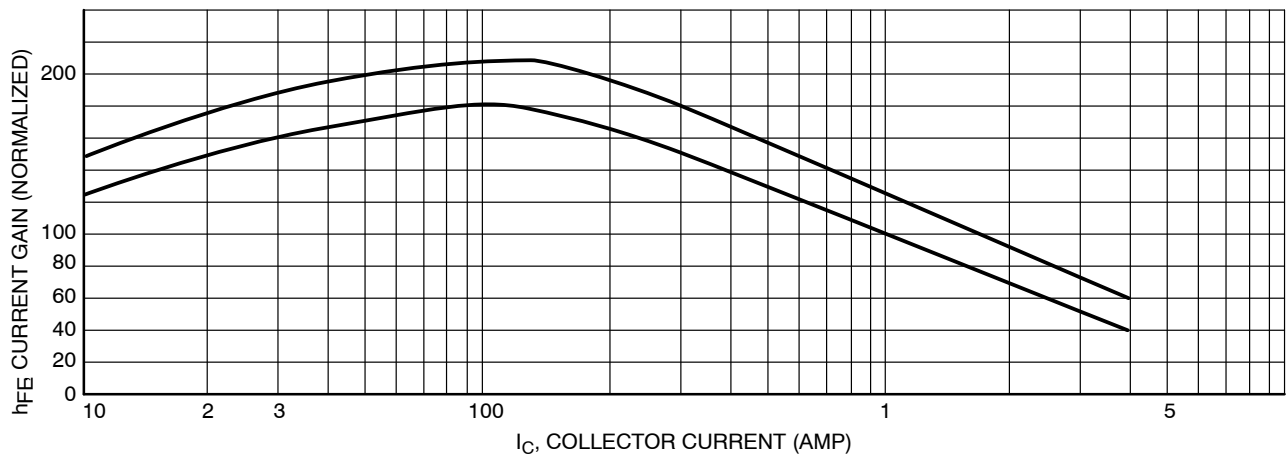


Figure 2. Current Gain

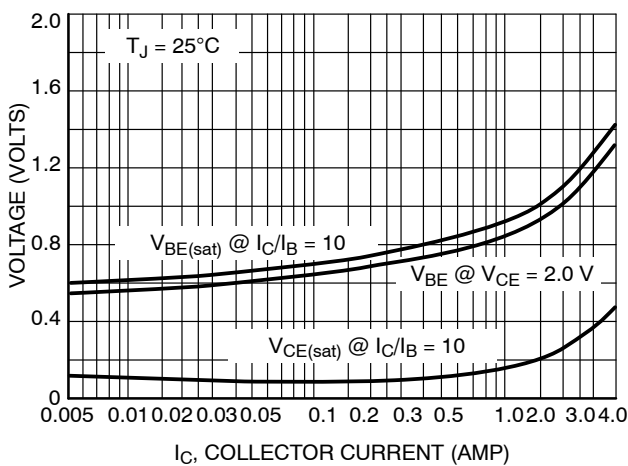


Figure 3. "On" Voltage

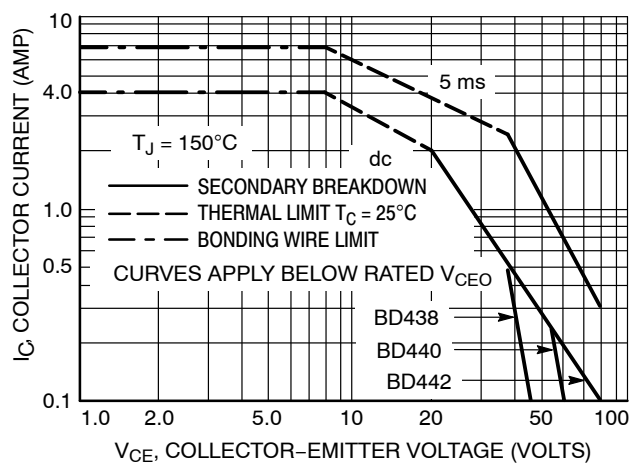
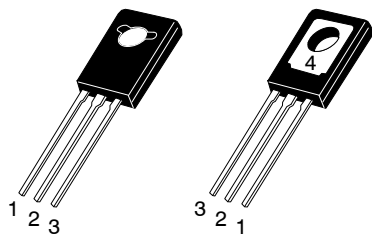
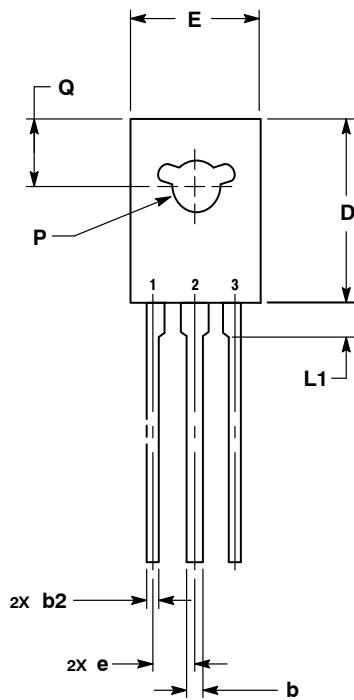


Figure 4. Active Region Safe Operating Area

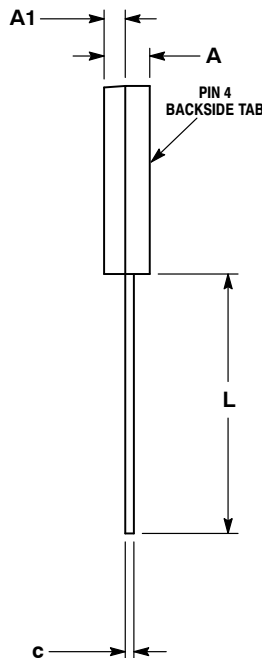


FRONT VIEW BACK VIEW

SCALE 1:1



FRONT VIEW



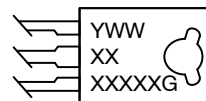
SIDE VIEW

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. NUMBER AND SHAPE OF LUGS OPTIONAL.

MILLIMETERS		
DIM	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

GENERIC MARKING DIAGRAM\*



- Y = Year
- WW = Work Week
- XXXXX = Device Code
- G = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

STYLE 1: PIN 1. EMITTER 2., 4. COLLECTOR 3. BASE	STYLE 2: PIN 1. CATHODE 2., 4. ANODE 3. GATE	STYLE 3: PIN 1. BASE 2., 4. COLLECTOR 3. EMITTER	STYLE 4: PIN 1. ANODE 1 2., 4. ANODE 2 3. GATE	STYLE 5: PIN 1. MT 1 2., 4. MT 2 3. GATE
STYLE 6: PIN 1. CATHODE 2., 4. GATE 3. ANODE	STYLE 7: PIN 1. MT 1 2., 4. GATE 3. MT 2	STYLE 8: PIN 1. SOURCE 2., 4. GATE 3. DRAIN	STYLE 9: PIN 1. GATE 2., 4. DRAIN 3. SOURCE	STYLE 10: PIN 1. SOURCE 2., 4. DRAIN 3. GATE

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