

# 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

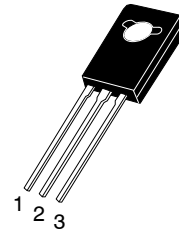
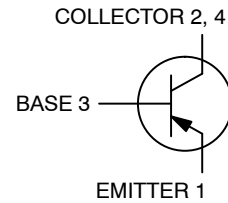
Rating	Symbol	Value	Unit
Collector-Emitter Voltage BD436G BD438G BD440G BD442G	$V_{CEO}$	32 45 60 80	Vdc
Collector-Base Voltage BD436G BD438G BD440G BD442G	$V_{CBO}$	32 45 60 80	Vdc
Emitter-Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current	$I_C$	4.0	Adc
Base Current	$I_B$	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ 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

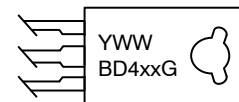
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.5	$^\circ\text{C}/\text{W}$

## 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

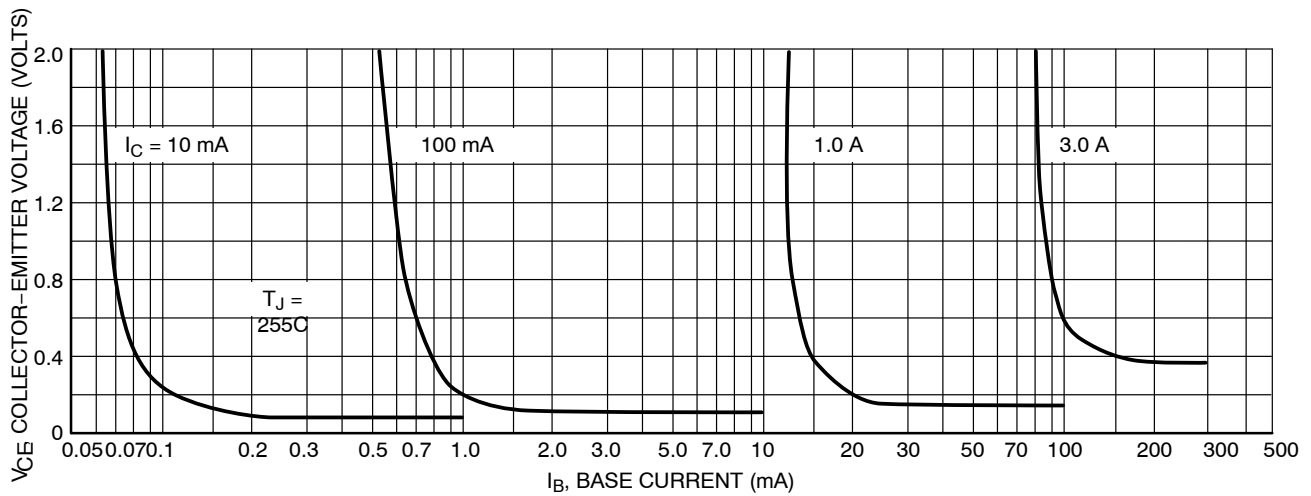


Figure 1. Collector Saturation Region

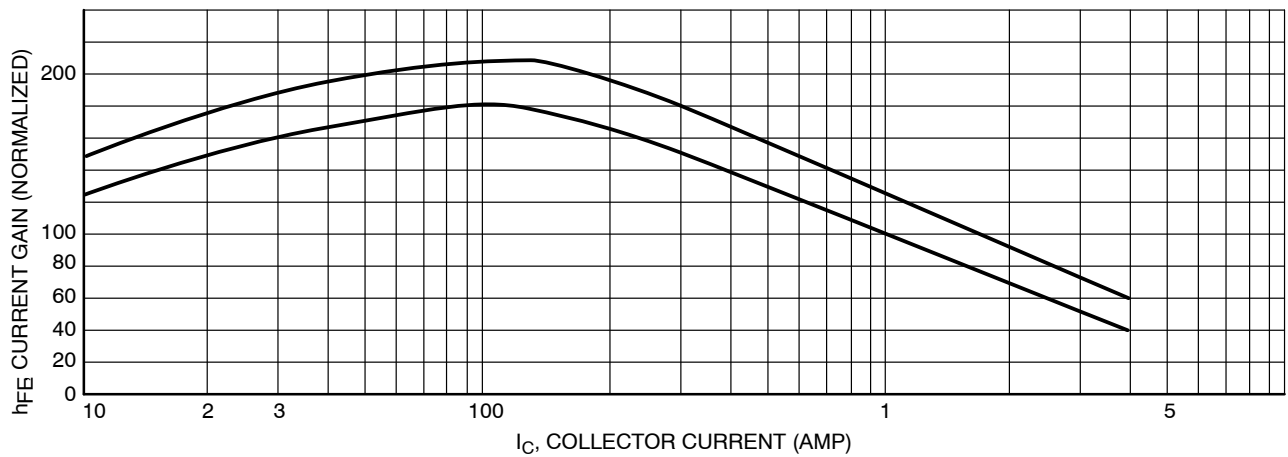


Figure 2. Current Gain

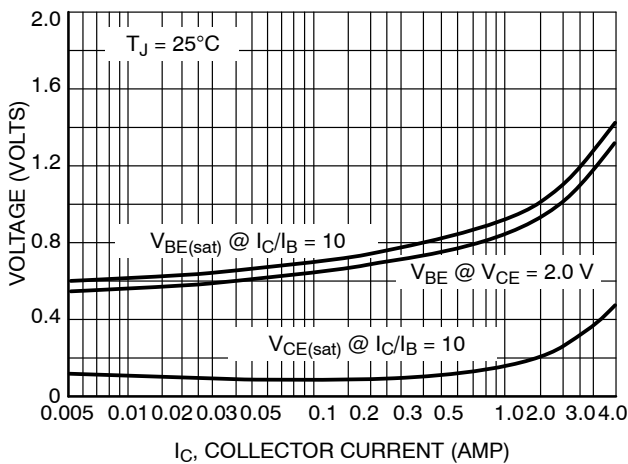


Figure 3. "On" Voltage

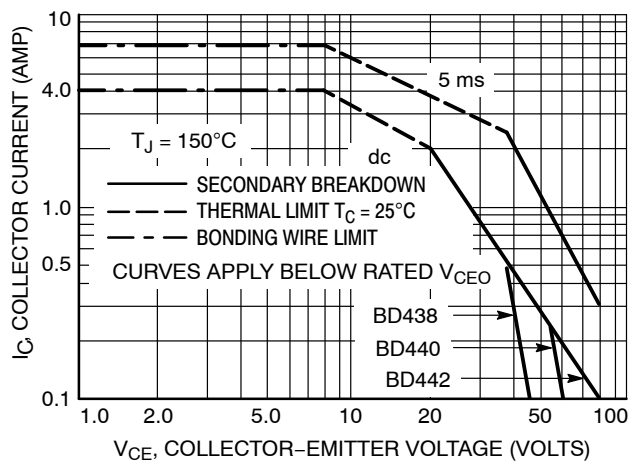
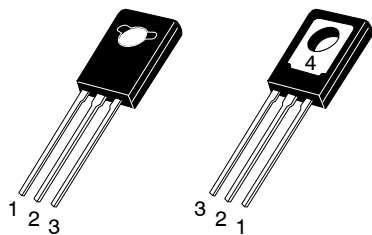
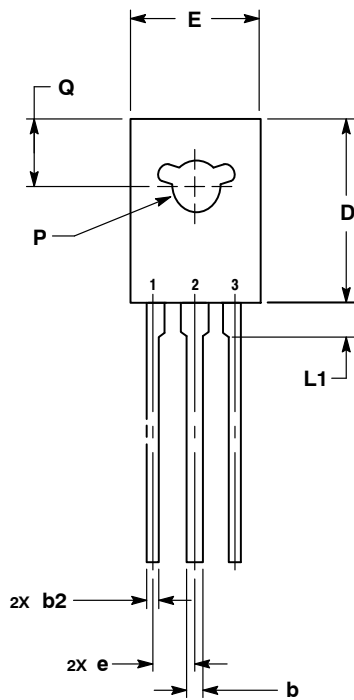


Figure 4. Active Region Safe Operating Area

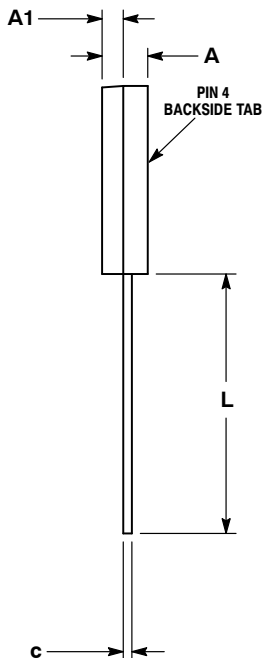


FRONT VIEW BACK VIEW

SCALE 1:1



FRONT VIEW



SIDE VIEW

TO-225  
CASE 77-09  
ISSUE AD

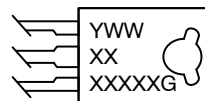
DATE 25 MAR 2015

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

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 "μ", 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

DOCUMENT NUMBER:	98ASB42049B	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TO-225	PAGE 1 OF 1

onsemi and ONsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)

