

# BD237G (NPN), BD234G, BD238G (PNP)

## Plastic Medium Power Bipolar Transistors

Designed for use in 5.0 to 10 W audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

### Features

- High DC Current Gain
- Epoxy Meets UL 94 V0 @ 0.125 in
- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

| Rating                                                 | Symbol         | Value       | Unit             |
|--------------------------------------------------------|----------------|-------------|------------------|
| Collector-Emitter Voltage<br>BD234G<br>DB237G, BD238G  | $V_{CEO}$      | 45<br>80    | Vdc              |
| Collector-Base Voltage<br>BD234G<br>DB237G, BD238G     | $V_{CBO}$      | 60<br>100   | Vdc              |
| Emitter-Base Voltage                                   | $V_{EBO}$      | 5.0         | Vdc              |
| Collector Current                                      | $I_C$          | 2.0         | Adc              |
| Base Current                                           | $I_B$          | 1.0         | Adc              |
| Total Device Dissipation<br>@ $T_C = 25^\circ\text{C}$ | $P_D$          | 25          | W                |
| Operating and Storage Junction<br>Temperature Range    | $T_J, T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |
| ESD - Human Body Model                                 | HBM            | 3B          | V                |
| ESD - Machine Model                                    | MM             | C           | V                |

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

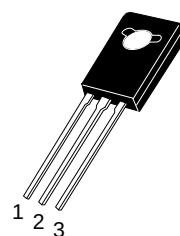
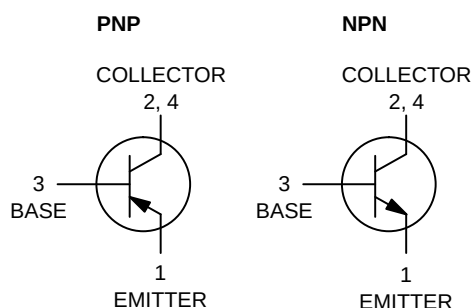
| Characteristic                       | Symbol          | Max | Unit               |
|--------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 5.0 | $^\circ\text{C/W}$ |



ON Semiconductor®

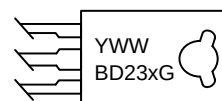
<http://onsemi.com>

## 2.0 AMPERES POWER TRANSISTORS 25 WATTS



TO-225  
CASE 77-09  
STYLE 1

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
BD23x = Device Code  
x = 4, 7 or 8  
G = Pb-Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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

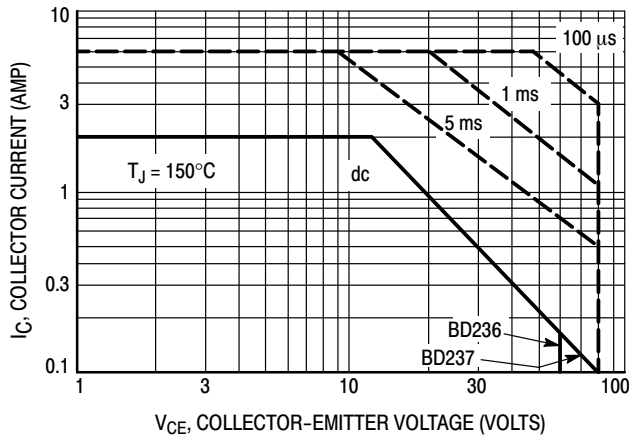
## BD237G (NPN), BD234G, BD238G (PNP)

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic                                                                                                                                | Symbol                 | Min      | Max        | Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------|------------|------|
| Collector-Emitter Sustaining Voltage (Note 1)<br>( $I_C = 0.1\text{ A}$ , $I_B = 0$ )<br>BD237G, BD238G<br>BD234G                             | $V_{(BR)CEO}$          | 80<br>45 | –<br>–     | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 100\text{ Vdc}$ , $I_E = 0$ )<br>BD237G, BD238G<br>( $V_{CB} = 60\text{ Vdc}$ , $I_E = 0$ )<br>BD234G | $I_{CBO}$              | –<br>–   | 0.1<br>0.1 | mAdc |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )                                                                           | $I_{EBO}$              | –        | 1.0        | mAdc |
| DC Current Gain<br>( $I_C = 0.15\text{ A}$ , $V_{CE} = 2.0\text{ V}$ )<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 2.0\text{ V}$ )                  | $h_{FE1}$<br>$h_{FE2}$ | 40<br>25 | –<br>–     | –    |
| Collector-Emitter Saturation Voltage (Note 1)<br>( $I_C = 1.0\text{ A}$ , $I_B = 0.1\text{ A}$ )                                              | $V_{CE(sat)}$          | –        | 0.6        | Vdc  |
| Base-Emitter On Voltage (Note 1)<br>( $I_C = 1.0\text{ A}$ , $V_{CE} = 2.0\text{ Vdc}$ )                                                      | $V_{BE(on)}$           | –        | 1.3        | Vdc  |
| Current-Gain – Bandwidth Product<br>( $I_C = 250\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ MHz}$ )                             | $f_T$                  | 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.

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



**Figure 1. Active Region Safe Operating Area**

The Safe Operating Area Curves indicate  $I_C$ - $V_{CE}$  limits below which the device will not enter secondary breakdown. Collector load lines for specific circuits must fall within the applicable Safe Area to avoid causing a catastrophic failure. To insure operation below the maximum  $T_J$ , power-temperature derating must be observed for both steady state and pulse power conditions.

# BD237G (NPN), BD234G, BD238G (PNP)

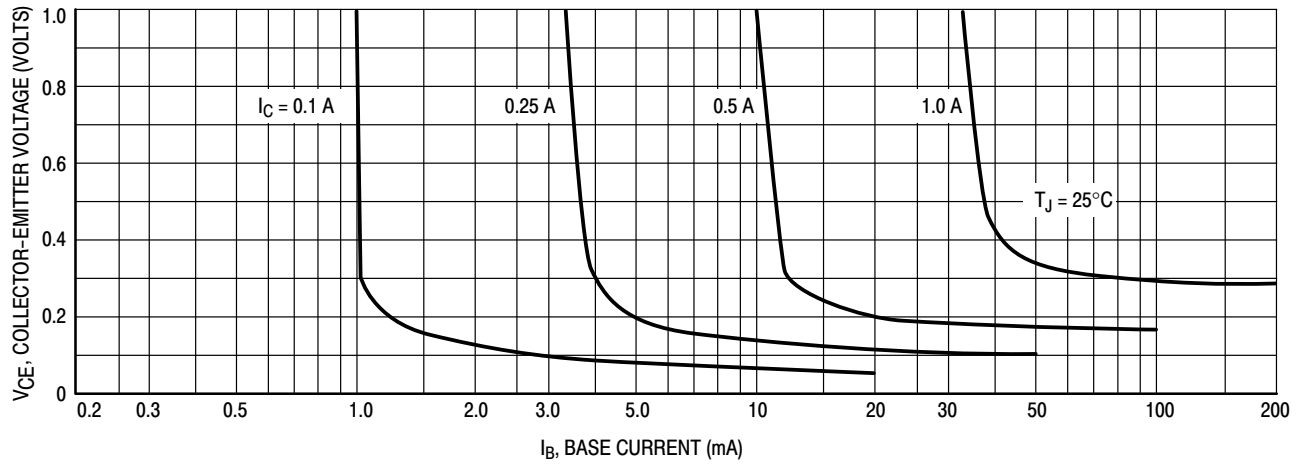


Figure 2. Collector Saturation Region

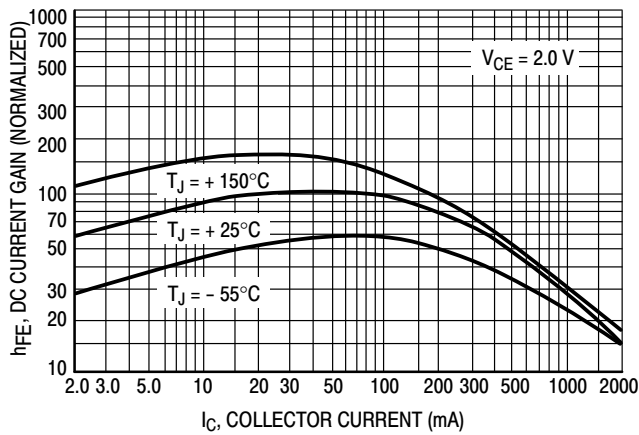


Figure 3. Current Gain

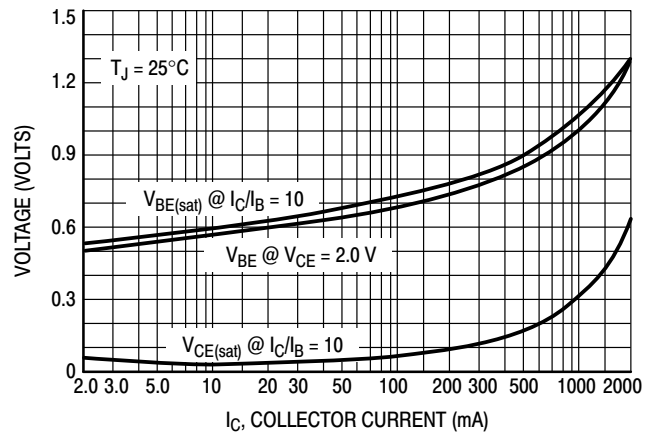


Figure 4. "On" Voltages

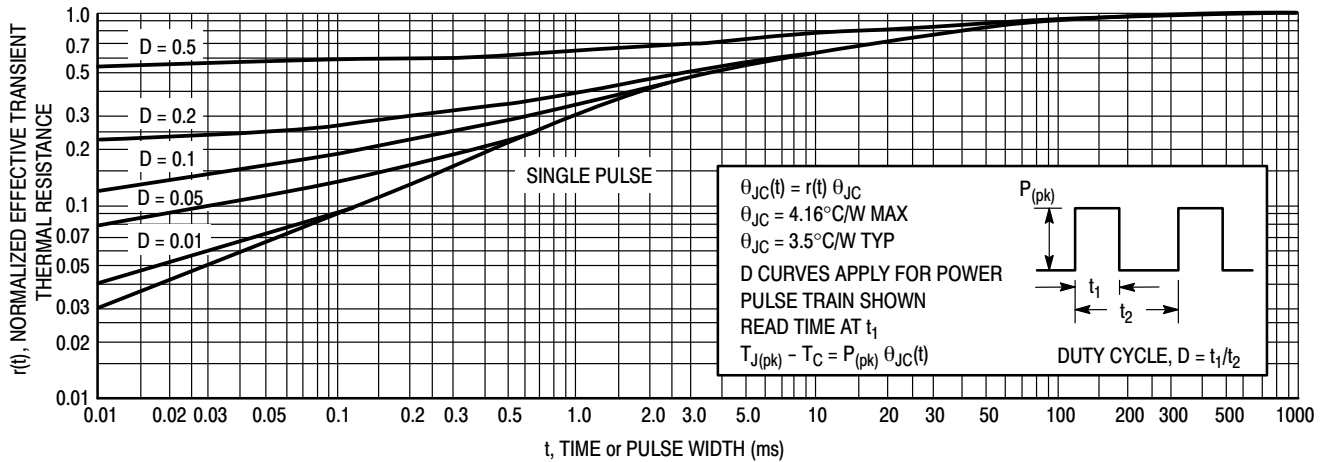


Figure 5. Thermal Response

## BD237G (NPN), BD234G, BD238G (PNP)

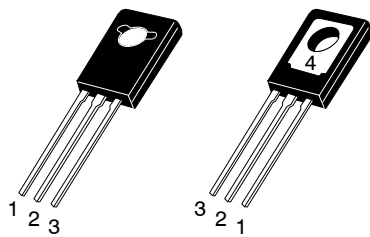
### ORDERING INFORMATION

| Device | Package             | Shipping        |
|--------|---------------------|-----------------|
| BD234G | TO-225<br>(Pb-Free) | 500 Units / Box |
| BD237G | TO-225<br>(Pb-Free) | 500 Units / Box |
| BD238G | TO-225<br>(Pb-Free) | 500 Units / Box |

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

ON Semiconductor®

ON



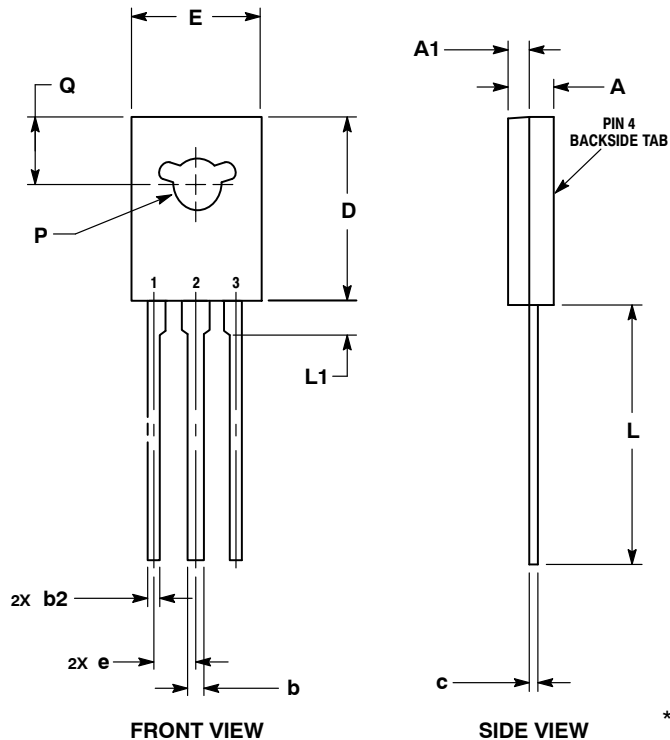
FRONT VIEW

BACK VIEW

SCALE 1:1

TO-225  
CASE 77-09  
ISSUE AD

DATE 25 MAR 2015

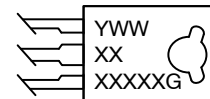


## NOTES:

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

| 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.

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

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor 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. ON Semiconductor 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.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Email Requests to: [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**onsemi Website:** [www.onsemi.com](http://www.onsemi.com)

### TECHNICAL SUPPORT

**North American Technical Support:**

Voice Mail: 1 800-282-9855 Toll Free USA/Canada

Phone: 011 421 33 790 2910

**Europe, Middle East and Africa Technical Support:**

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative