

# BD159G

## Plastic Medium-Power Silicon NPN Transistor

This device is designed for power output stages for television, radio, phonograph and other consumer product applications.

### Features

- Suitable for Transformerless, Line-Operated Equipment
- High Power Dissipation Rating for High Reliability
- These Devices are Pb-Free and are RoHS Compliant\*

### MAXIMUM RATINGS

| Rating   | Symbol         | Value       | Unit                      |
|--|----------------|-------------|---------------------------|
| Collector-Emitter Voltage  | $V_{CEO}$      | 350         | Vdc                       |
| Collector-Base Voltage   | $V_{CB}$       | 375         | Vdc                       |
| Emitter-Base Voltage   | $V_{EB}$       | 5.0         | Vdc                       |
| Collector Current – Continuous   | $I_C$          | 0.5         | Adc                       |
| Collector Current – Peak   | $I_{CM}$       | 1.0         | Adc                       |
| Base Current   | $I_B$          | 0.25        | Adc                       |
| Total Power Dissipation<br>@ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 20<br>0.16  | W<br>mW/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                      | $T_J, T_{stg}$ | -65 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 | $R_{\theta JC}$ | 6.25 | $^\circ\text{C/W}$ |

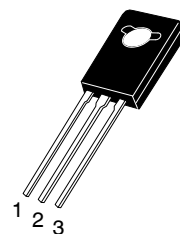
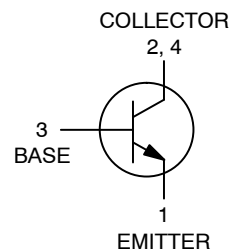
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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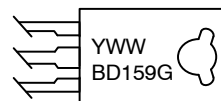
[www.onsemi.com](http://www.onsemi.com)

**0.5 AMPERE  
POWER TRANSISTOR  
NPN SILICON  
350 VOLTS, 20 WATTS**



**TO-225  
CASE 77-09  
STYLE 1**

### MARKING DIAGRAM



Y = Year  
WW = Work Week  
BD159 = Device Code  
G = Pb-Free Package

### ORDERING INFORMATION

| Device | Package             | Shipping      |
|--------|---------------------|---------------|
| BD159G | TO-225<br>(Pb-Free) | 500 Units/Box |

# BD159G

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

| Characteristic   | Symbol     | Min | Max | Unit            |
|--|------------|-----|-----|-----------------|
| <b>OFF CHARACTERISTICS</b>   |            |     |     |                 |
| Collector-Emitter Sustaining Voltage ( $I_C = 1.0\text{ mAdc}$ , $I_B = 0$ ) | $BV_{CEO}$ | 350 | –   | Vdc             |
| Collector Cutoff Current (at rated voltage)                                  | $I_{CBO}$  | –   | 100 | $\mu\text{Adc}$ |
| Emitter Cutoff Current ( $V_{EB} = 5.0\text{ Vdc}$ , $I_C = 0$ )             | $I_{EBO}$  | –   | 100 | $\mu\text{Adc}$ |

## ON CHARACTERISTICS

|   |          |    |     |   |
|---|----------|----|-----|---|
| DC Current Gain ( $I_C = 50\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ ) | $h_{FE}$ | 30 | 240 | – |
|---|----------|----|-----|---|

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.

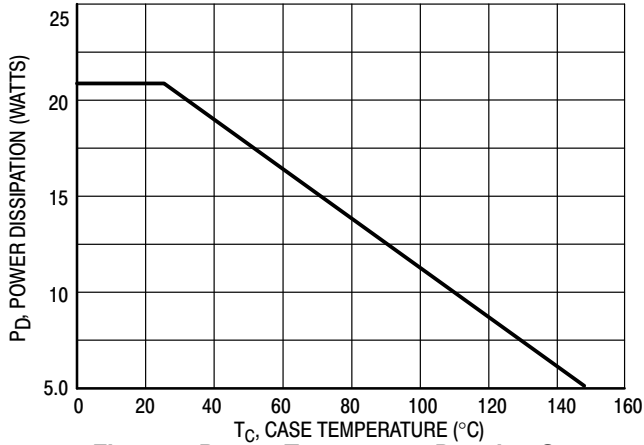


Figure 1. Power-Temperature Derating Curve

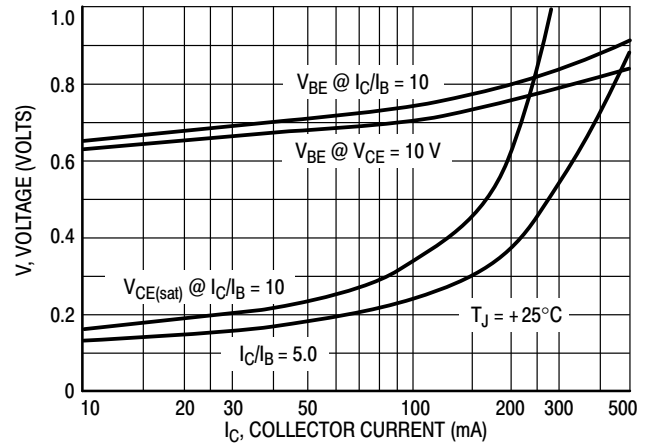


Figure 2. "On" Voltages

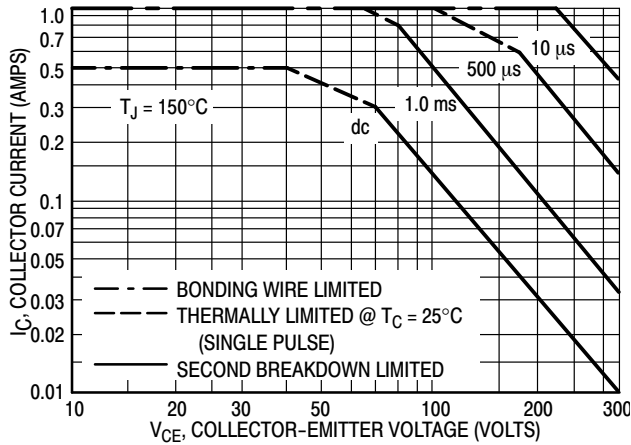


Figure 3. DC Safe Operating Area

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.

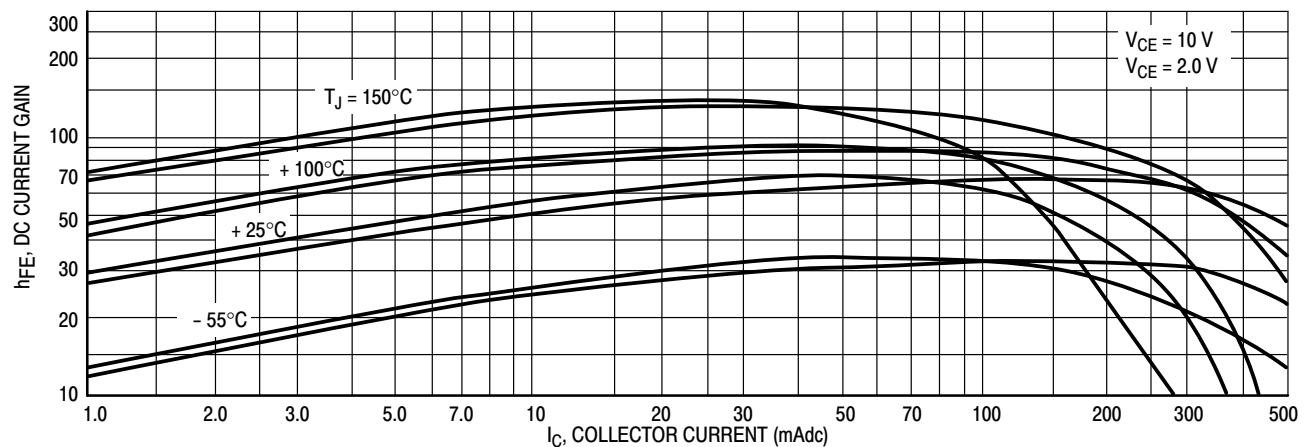
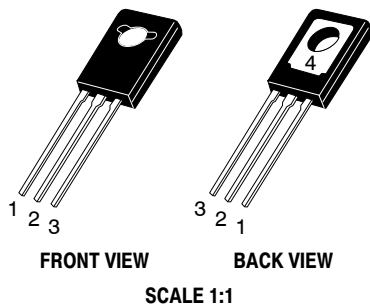
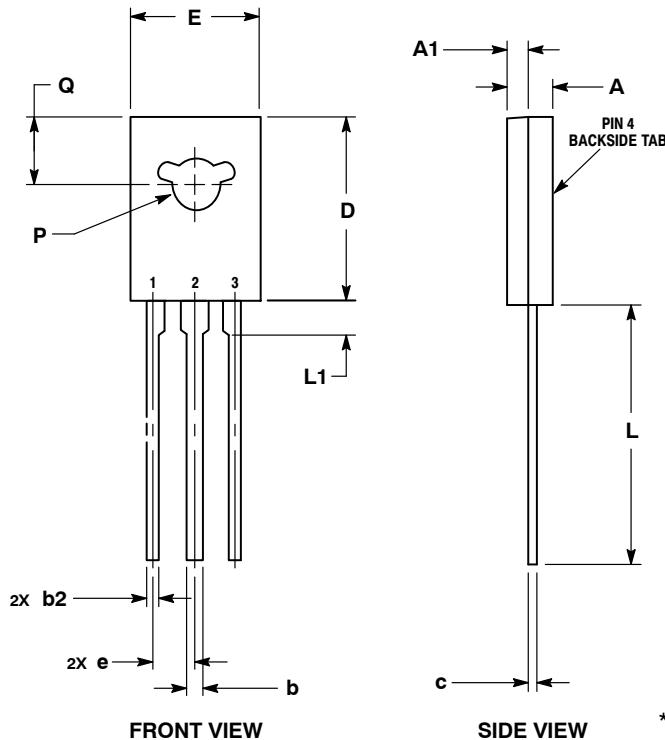


Figure 4. Current Gain



**TO-225**  
**CASE 77-09**  
**ISSUE AD**

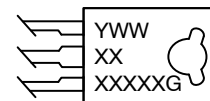
DATE 25 MAR 2015



- 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. Some products may not follow the Generic Marking.

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

|                         |                    |   |
|-------------------------|--------------------|---|
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| <b>DESCRIPTION:</b>     | <b>TO-225</b>      | <b>PAGE 1 OF 1</b>  |

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