# 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
- Thermopad™ Construction Provides 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°C<br>Derate above 25°C | $P_D$ | <br>20<br>0.16 | <br>W<br>mW/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −65 to +150 | °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

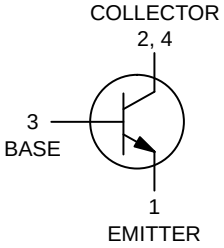
| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Case | $R_{\theta JC}$ | 6.25 | °C/W |

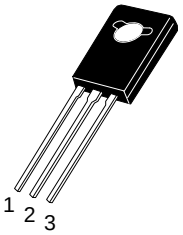
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**ON Semiconductor®**

**http://onsemi.com**

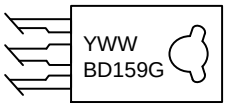
## 0.5 AMPERE POWER TRANSISTOR NPN SILICON 350 VOLTS, 20 WATTS




**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 |

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector−Emitter Sustaining Voltage ($I_C$ = 1.0 mAdc, $I_B$ = 0) | $BV_{CEO}$ | 350 | − | Vdc |
| Collector Cutoff Current (at rated voltage) | $I_{CBO}$ | − | 100 | μAdc |
| Emitter Cutoff Current ($V_{EB}$ = 5.0 Vdc, $I_C$ = 0) | $I_{EBO}$ | − | 100 | μAdc |
| **ON CHARACTERISTICS** | | | | |
| DC Current Gain ($I_C$ = 50 mAdc, $V_{CE}$ = 10 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.

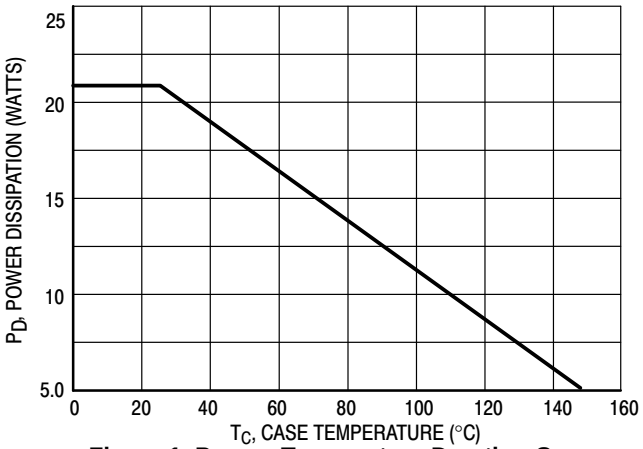



**Figure 1. Power−Temperature Derating Curve**

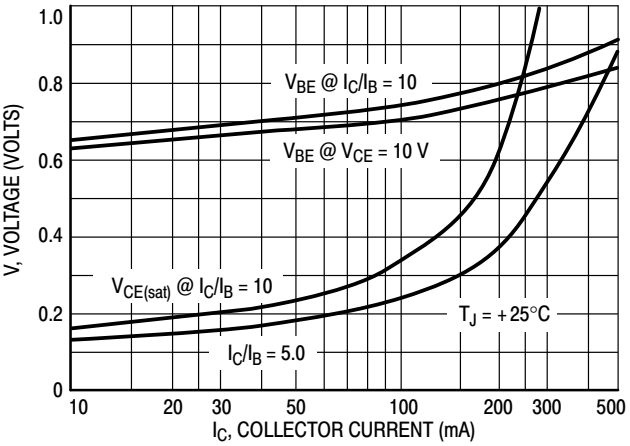



**Figure 2. "On" Voltages**

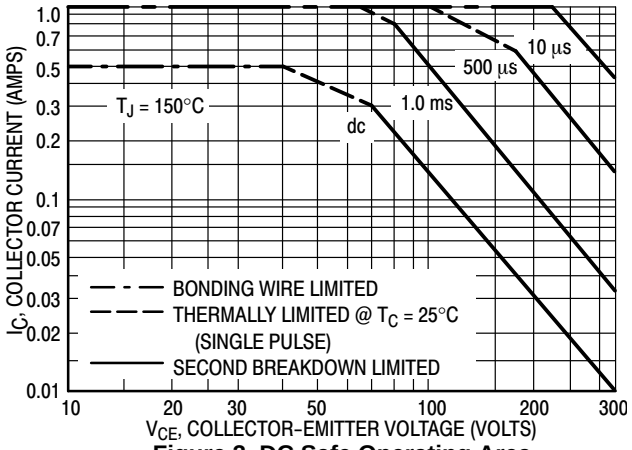



**Figure 3. DC Safe Operating Area**

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.

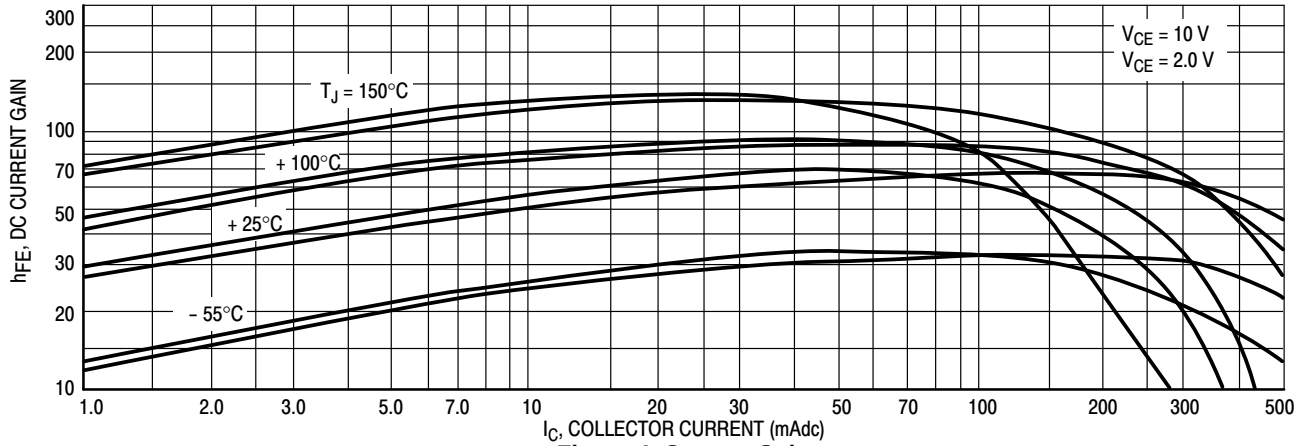
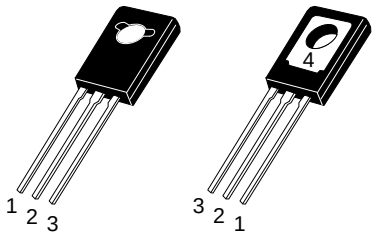


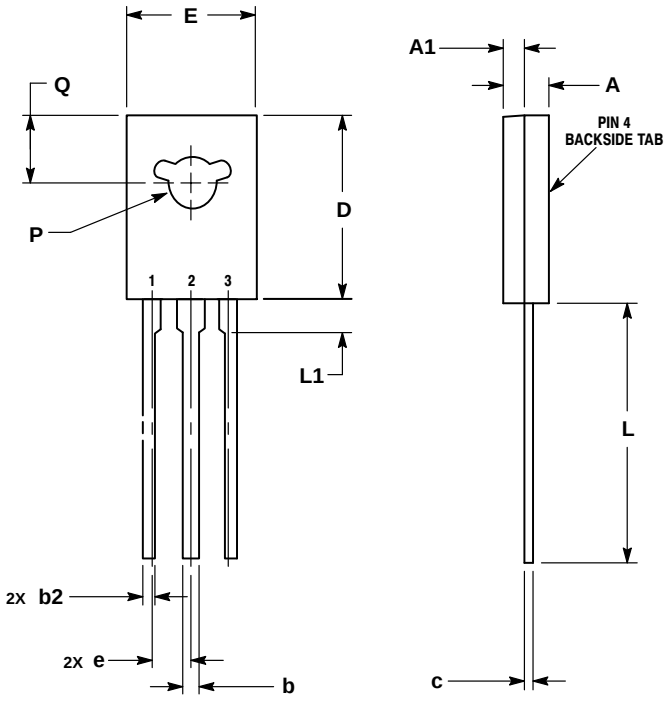

**Figure 4. Current Gain**

## PACKAGE DIMENSIONS

**TO−225**
CASE 77−09
ISSUE AC




**FRONT VIEW** **BACK VIEW**




**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 |

STYLE 1:
PIN 1. EMITTER
2., 4. COLLECTOR
3. BASE

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