

BD135G, BD137G, BD139G

Plastic Medium-Power Silicon NPN Transistors

This series of plastic, medium-power silicon NPN transistors are designed for use as audio amplifiers and drivers utilizing complementary or quasi complementary circuits.

Features

- High DC Current Gain
- BD 135, 137, 139 are complementary with BD 136, 138, 140
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant*

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|-----------------|-------------------------------|
| Collector-Emitter Voltage BD135G BD137G BD139G | V_{CEO} | 45 60 80 | Vdc |
| Collector-Base Voltage BD135G BD137G BD139G | V_{CBO} | 45 60 100 | Vdc |
| Emitter-Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current | I_C | 1.5 | Adc |
| Base Current | I_B | 0.5 | Adc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.25 10 | Watts mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 12.5 100 | Watts mW/ $^\circ\text{C}$ |
| 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

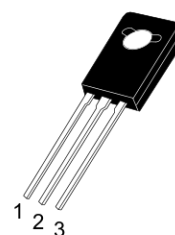
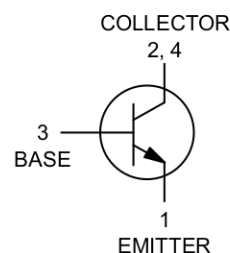
| Characteristic | Symbol | Max | Unit |
|---|-----------------|-----|--------------------|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 10 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 100 | $^\circ\text{C/W}$ |

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



<http://onsemi.com>

1.5 A POWER TRANSISTORS NPN SILICON 45, 60, 80 V, 12.5 W



TO-225
CASE 77-09
STYLE 1

MARKING DIAGRAM



Y = Year
 WW = Work Week
 BD1xx = Device Code
 xx = 35, 37, 39
 G = Pb-Free Package

ORDERING INFORMATION

| Device | Package | Shipping |
|---------|---------------------|-----------------|
| BD135G | TO-225 (Pb-Free) | 500 Units / Box |
| BD135TG | TO-225 (Pb-Free) | 50 Units / Rail |
| BD137G | TO-225 (Pb-Free) | 500 Units / Box |
| BD139G | TO-225 (Pb-Free) | 500 Units / Box |

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

| Characteristic | Symbol | Min | Max | Unit |
|--|-----------------|----------------|---------------|------------------|
| Collector-Emitter Sustaining Voltage* ($I_C = 0.03 \text{ A dc}$, $I_B = 0$) BD135G BD137G BD139G | V_{CEO}^* | 45 60 80 | - - - | Vdc |
| Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 30 \text{ Vdc}$, $I_E = 0$, $T_C = 125^\circ\text{C}$) | I_{CBO} | - - | 0.1 10 | $\mu\text{A dc}$ |
| Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$) | I_{EBO} | - | 10 | $\mu\text{A dc}$ |
| DC Current Gain ($I_C = 0.005 \text{ A}$, $V_{CE} = 2 \text{ V}$) ($I_C = 0.15 \text{ A}$, $V_{CE} = 2 \text{ V}$) ($I_C = 0.5 \text{ A}$, $V_{CE} = 2 \text{ V}$) | h_{FE}^* | 25 40 25 | - 250 - | - |
| Collector-Emitter Saturation Voltage* ($I_C = 0.5 \text{ A dc}$, $I_B = 0.05 \text{ A dc}$) | $V_{CE(sat)}^*$ | - | 0.5 | Vdc |
| Base-Emitter On Voltage* ($I_C = 0.5 \text{ A dc}$, $V_{CE} = 2.0 \text{ Vdc}$) | $V_{BE(on)}^*$ | - | 1 | Vdc |

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.

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

TYPICAL CHARACTERISTICS

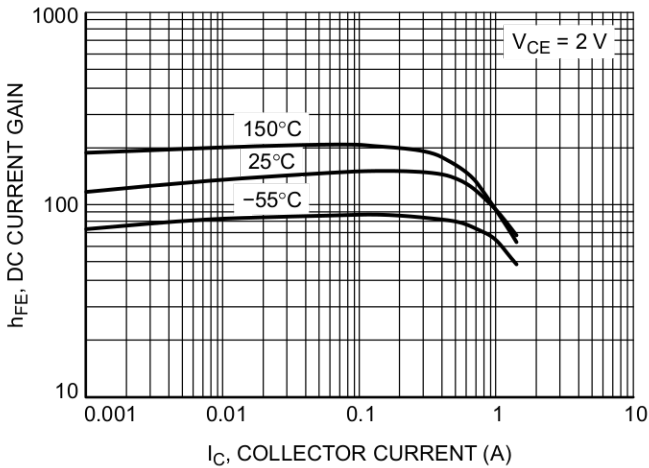


Figure 1. DC Current Gain

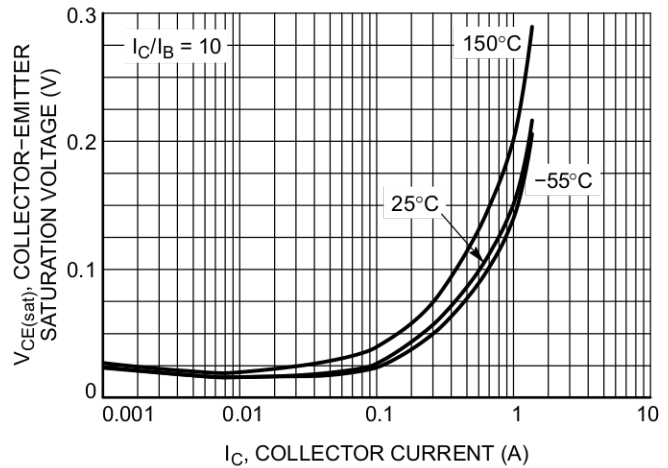


Figure 2. Collector-Emitter Saturation Voltage

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TYPICAL CHARACTERISTICS

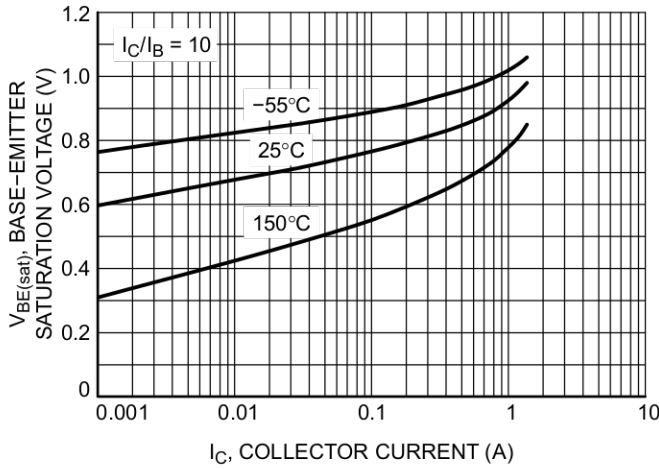


Figure 3. Base-Emitter Saturation Voltage

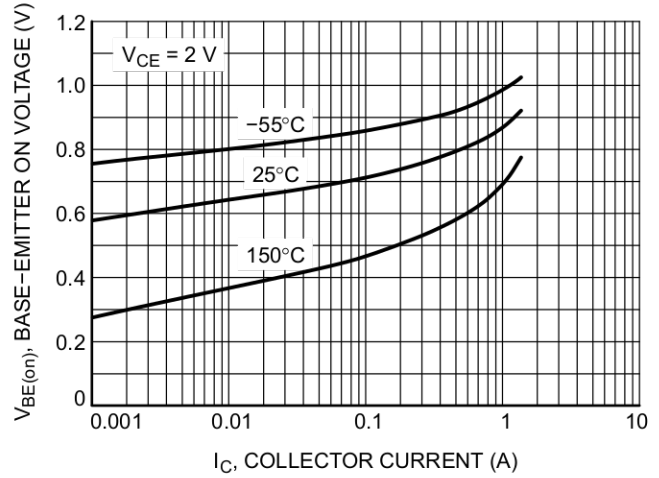


Figure 4. Base-Emitter On Voltage

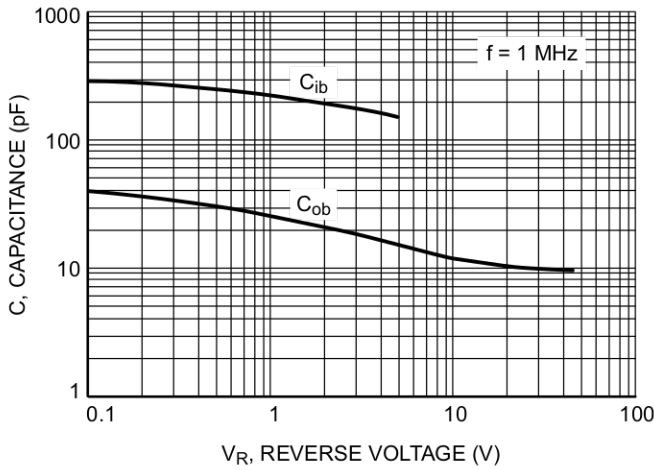


Figure 5. Capacitance

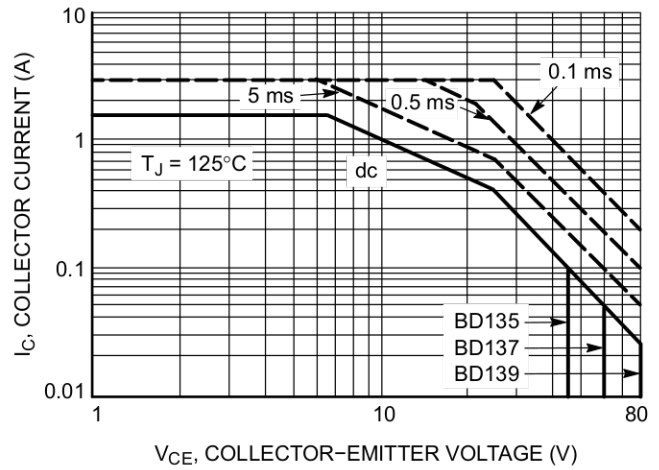


Figure 6. Active-Region Safe Operating Area

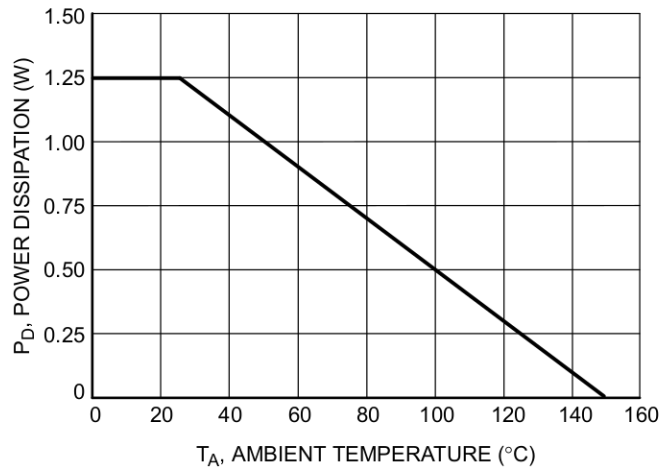
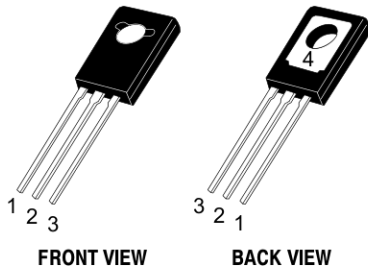


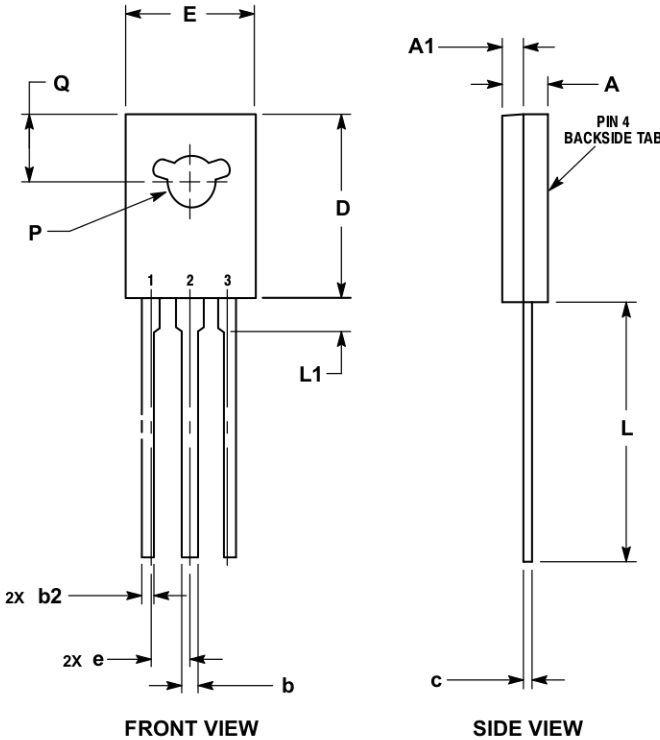
Figure 7. Power Derating

BD135G, BD137G, BD139G

PACKAGE DIMENSIONS



TO-225
CASE 77-09
ISSUE AC



- 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 |

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

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