

BD237 (NPN), BD234 (PNP), BD238 (PNP)

Preferred Devices

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

- DC Current Gain –
 $h_{FE} = 40$ (Min) @ $I_C = 0.15$ Adc
- Epoxy Meets UL 94 V0 @ 0.125 in
- ESD Ratings: Human Body Model, 3B; >8000 V
Machine Model, C; >400 V
- Pb-Free Packages are Available*

MAXIMUM RATINGS

| Rating | Symbol | BD234 | BD237 BD238 | Unit |
|--|----------------|-------------|----------------|------------------|
| Collector–Emitter Voltage | V_{CEO} | 45 | 80 | Vdc |
| Collector–Base Voltage | V_{CBO} | 60 | 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 @ $T_C = 25^\circ\text{C}$ | P_D | 25 | | W |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | –55 to +150 | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

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

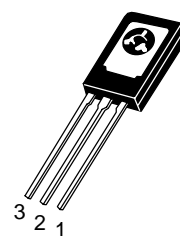
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.



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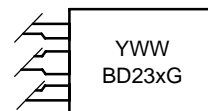
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**2.0 AMPERES
POWER TRANSISTORS
25 WATTS**



TO-225
CASE 77
STYLE 1

MARKING DIAGRAM



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

ORDERING INFORMATION

| Device | Package | Shipping |
|--------|---------------------|-----------------|
| BD234 | TO–225 | 500 Units / Box |
| BD234G | TO–225 (Pb-Free) | 500 Units / Box |
| BD237 | TO–225 | 500 Units / Box |
| BD237G | TO–225 (Pb-Free) | 500 Units / Box |
| BD238 | TO–225 | 500 Units / Box |
| BD238G | TO–225 (Pb-Free) | 500 Units / Box |

Preferred devices are recommended choices for future use and best overall value.

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

| Characteristic | Symbol | Type | Min | Max | Unit |
|--|------------------------|-----------------------|----------|------------|------|
| Collector–Emitter Sustaining Voltage (Note 1) ($I_C = 0.1 \text{ Adc}$, $I_B = 0$) | $V_{(BR)CEO}$ | BD237, BD238 BD234 | 80 45 | – – | Vdc |
| Collector Cutoff Current ($V_{CB} = 100 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$) | I_{CBO} | BD237, BD238 BD234 | – – | 0.1 0.1 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}$, $I_C = 0$) | I_{EBO} | – | – | 1.0 | mAdc |
| DC Current Gain ($I_C = 0.15 \text{ A}$, $V_{CE} = 2.0 \text{ V}$) ($I_C = 1.0 \text{ A}$, $V_{CE} = 2.0 \text{ V}$) | h_{FE1} h_{FE2} | – – | 40 25 | – – | – |
| Collector–Emitter Saturation Voltage (Note 1) ($I_C = 1.0 \text{ Adc}$, $I_B = 0.1 \text{ Adc}$) | $V_{CE(sat)}$ | – | – | 0.6 | Vdc |
| Base–Emitter On Voltage (Note 1) ($I_C = 1.0 \text{ Adc}$, $V_{CE} = 2.0 \text{ Vdc}$) | $V_{BE(on)}$ | – | – | 1.3 | Vdc |
| Current–Gain – Bandwidth Product ($I_C = 250 \text{ mAdc}$, $V_{CE} = 10 \text{ Vdc}$, $f = 1.0 \text{ MHz}$) | f_T | – | 3.0 | – | MHz |

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

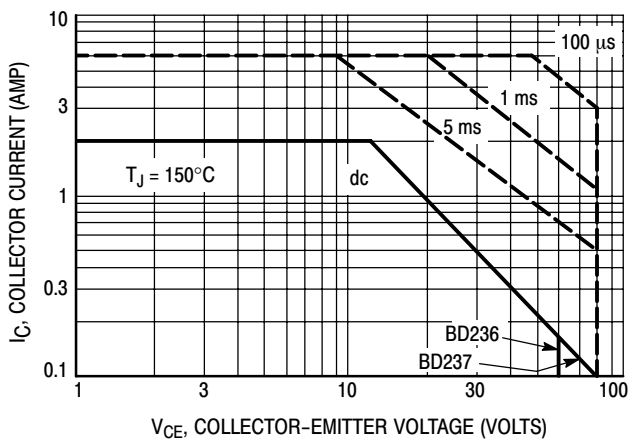


Figure 1. Active Region Safe Operating Area

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.

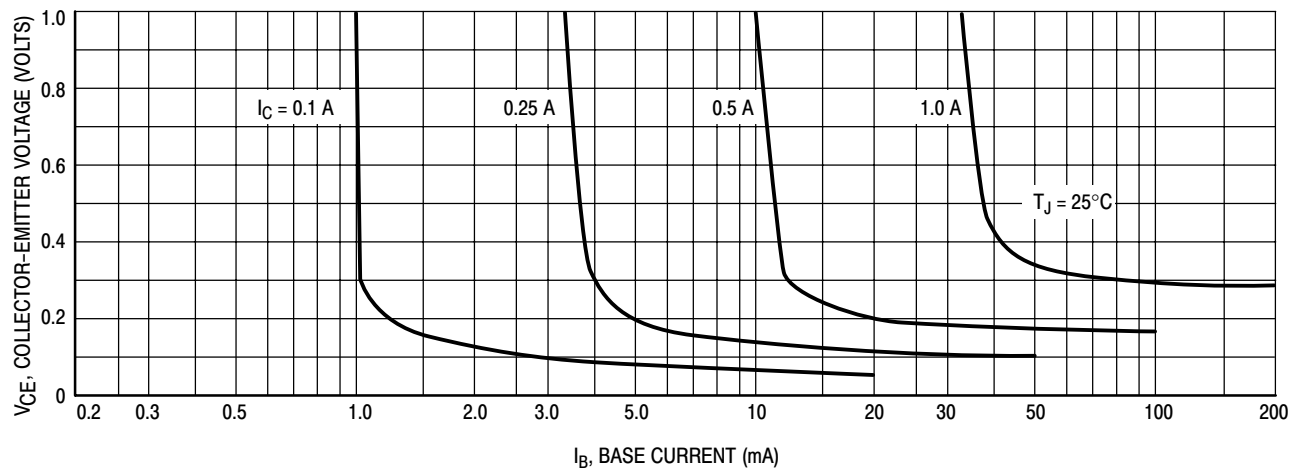


Figure 2. Collector Saturation Region

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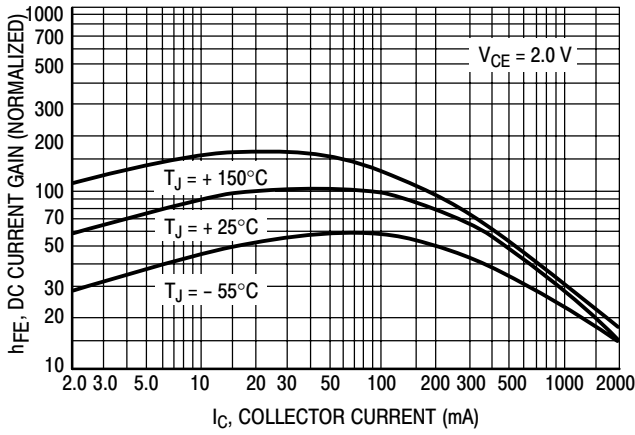


Figure 3. Current Gain

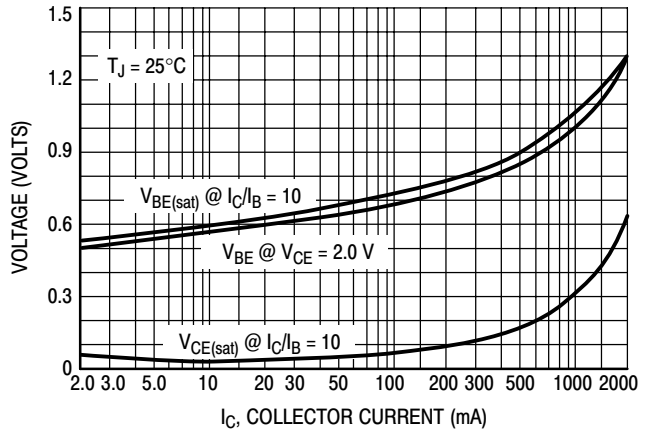


Figure 4. "On" Voltages

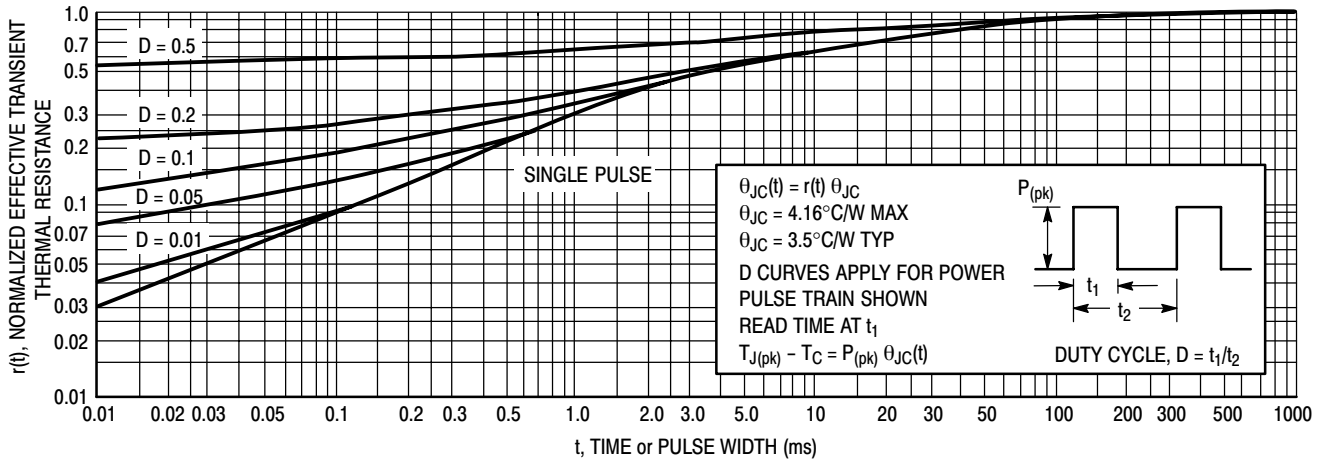
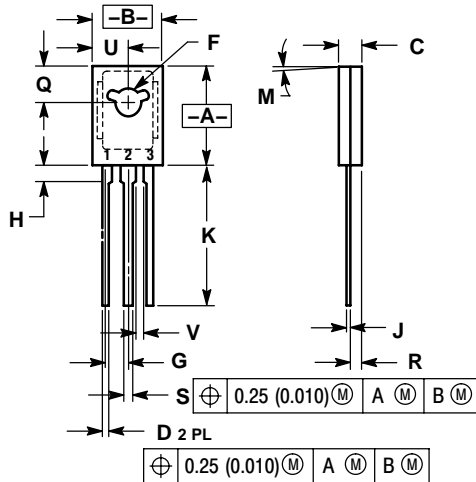


Figure 5. Thermal Response

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PACKAGE DIMENSIONS

TO-225
CASE 77-09
ISSUE Z



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 077-01 THRU -08 OBSOLETE, NEW STANDARD 077-09.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.425 | 0.435 | 10.80 | 11.04 |
| B | 0.295 | 0.305 | 7.50 | 7.74 |
| C | 0.095 | 0.105 | 2.42 | 2.66 |
| D | 0.020 | 0.026 | 0.51 | 0.66 |
| F | 0.115 | 0.130 | 2.93 | 3.30 |
| G | 0.094 BSC | | 2.39 BSC | |
| H | 0.050 | 0.095 | 1.27 | 2.41 |
| J | 0.015 | 0.025 | 0.39 | 0.63 |
| K | 0.575 | 0.655 | 14.61 | 16.63 |
| M | 5° TYP | | 5° TYP | |
| Q | 0.148 | 0.158 | 3.76 | 4.01 |
| R | 0.045 | 0.065 | 1.15 | 1.65 |
| S | 0.025 | 0.035 | 0.64 | 0.88 |
| U | 0.145 | 0.155 | 3.69 | 3.93 |
| V | 0.040 | --- | 1.02 | --- |

STYLE 1:

1. EMITTER
2. COLLECTOR
3. BASE

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