

# BD237 (NPN), BD238 (PNP)

Preferred Devices

## Plastic Medium Power Silicon NPN Transistor

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

- DC Current Gain –  
 $h_{FE} = 40$  (Min) @  $I_C = 0.15$  Adc
- Epoxy Meets UL94, VO @ 1/8"
- ESD Ratings: Human Body Model, 3B; >8000 V  
Machine Model, C; >400 V

### MAXIMUM RATINGS

| Rating  | Symbol         | Value       | Unit             |
|---|----------------|-------------|------------------|
| Collector–Emitter Voltage                           | $V_{CEO}$      | 80          | Vdc              |
| Collector–Base Voltage                              | $V_{CBO}$      | 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          | Watts            |
| 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 | $^\circ\text{C/W}$ |

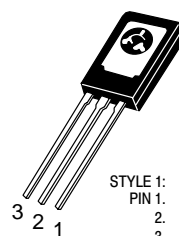
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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



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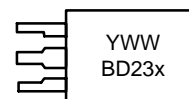
<http://onsemi.com>

2.0 AMPERES  
POWER TRANSISTORS  
NPN SILICON  
80 VOLTS  
25 WATTS



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

### MARKING DIAGRAM



CASE 77–09  
TO–225

x = 7 or 8  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

| Device | Package | Shipping      |
|--------|---------|---------------|
| BD237  | TO–225  | 500 Units/Box |
| BD238  | TO–225  | 500 Units/Box |

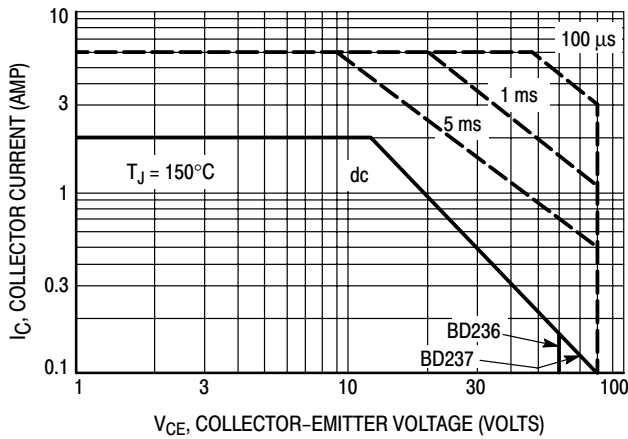
Preferred devices are recommended choices for future use and best overall value.

# BD237 (NPN), BD238 (PNP)

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

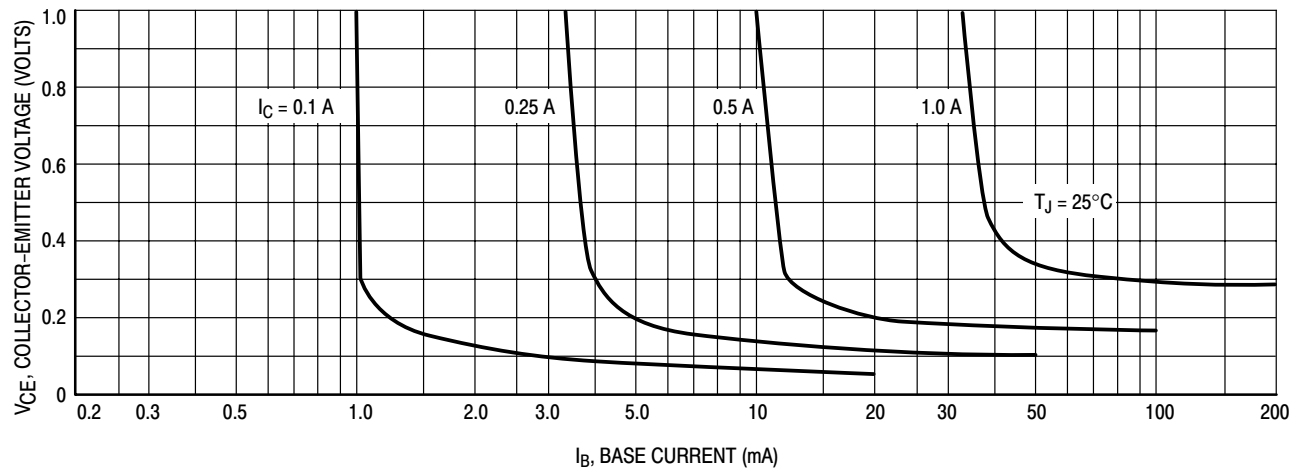
| Characteristic   | Symbol                 | Min      | Max    | Unit |
|--|------------------------|----------|--------|------|
| Collector–Emitter Sustaining Voltage*<br>( $I_C = 0.1 \text{ Adc}$ , $I_B = 0$ )   | $V_{(BR)CEO}$          | 80       | –      | Vdc  |
| Collector Cutoff Current<br>( $V_{CB} = 100 \text{ Vdc}$ , $I_E = 0$ )   | $I_{CBO}$              | –        | 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*<br>( $I_C = 1.0 \text{ Adc}$ , $I_B = 0.1 \text{ Adc}$ )                                   | $V_{CE(sat)}$          | –        | 0.6    | Vdc  |
| Base–Emitter On Voltage*<br>( $I_C = 1.0 \text{ Adc}$ , $V_{CE} = 2.0 \text{ Vdc}$ )   | $V_{BE(on)}$           | –        | 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  |

\*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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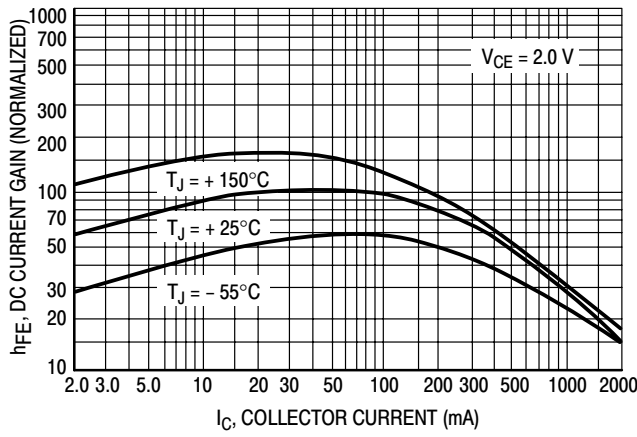


Figure 3. Current Gain

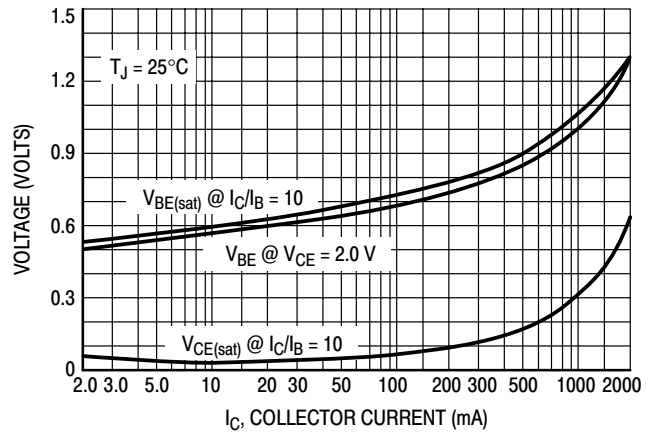


Figure 4. "On" Voltages

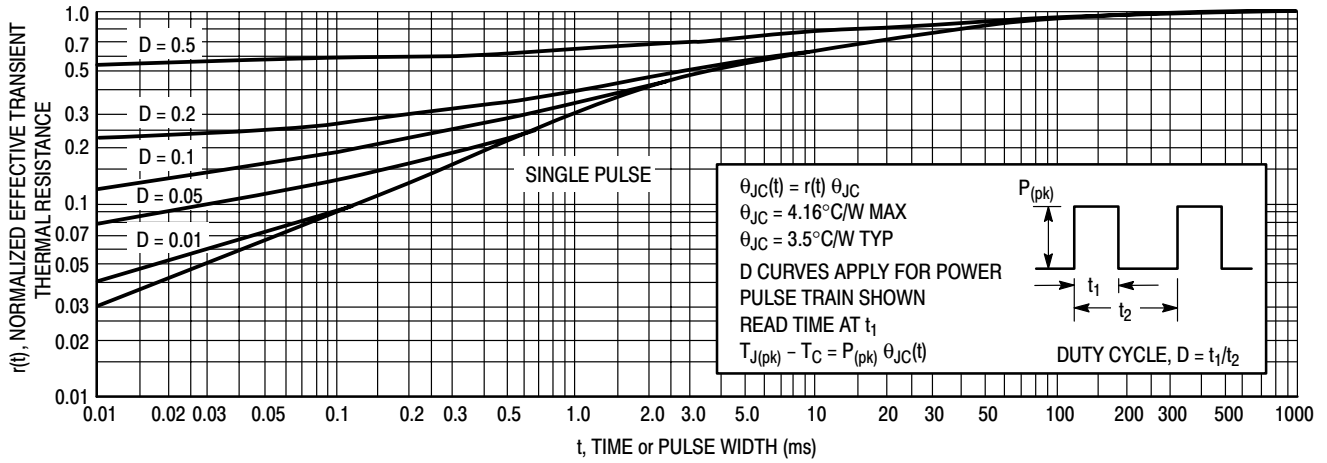
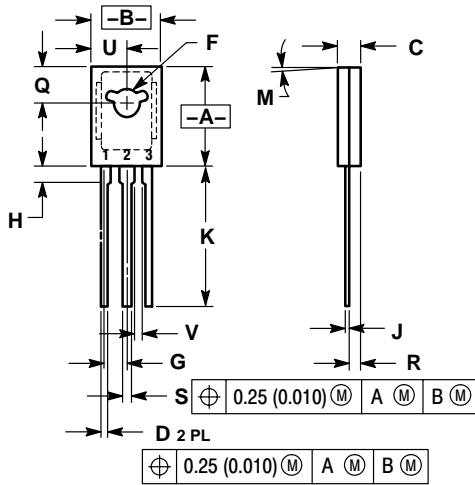


Figure 5. Thermal Response

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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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