# BD243B, BD243C (NPN), BD244B, BD244C (PNP)

# Complementary Silicon Plastic Power Transistors

These devices are designed for use in general purpose amplifier and switching applications.

### Features

- High Current Gain Bandwidth Product
- These Devices are Pb−Free and are RoHS Compliant*

### MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Collector−Emitter Voltage<br>BD243B, BD244B<br>BD243C, BD244C | $V_{CEO}$ | <br>80<br>100 | Vdc |
| Collector−Base Voltage<br>BD243B, BD244B<br>BD243C, BD244C | $V_{CB}$ | <br>80<br>100 | Vdc |
| Emitter−Base Voltage | $V_{EB}$ | 5.0 | Vdc |
| Collector Current − Continuous | $I_C$ | 6 | Adc |
| Collector Current − Peak | $I_{CM}$ | 10 | Adc |
| Base Current | $I_B$ | 2.0 | Adc |
| Total Device Dissipation<br>@ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | <br>65<br>0.52 | <br>W<br>W/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | −65 to +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### THERMAL CHARACTERISTICS

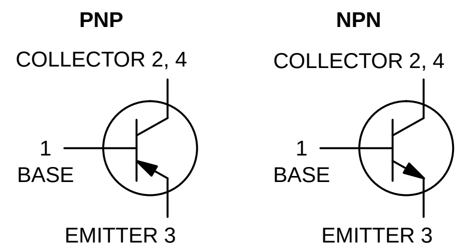
| Characteristics | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction−to−Case | $R_{\theta JC}$ | 1.92 | °C/W |

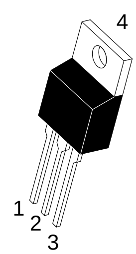
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**ON Semiconductor®**

**http://onsemi.com**

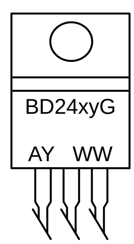
**6 AMPERE POWER TRANSISTORS COMPLEMENTARY SILICON 80−100 VOLTS 65 WATTS**




**TO−220
CASE 221A
STYLE 1**

### MARKING DIAGRAM




| | | |
|---|---|---|
| BD24xy | = | Device Code<br>x = 3 or 4<br>y = B or C |
| A | = | Assembly Location |
| Y | = | Year |
| WW | = | Work Week |
| G | = | Pb−Free Package |

### ORDERING INFORMATION

| Device | Package | Shipping |
|---|---|---|
| BD243BG | TO−220 (Pb−Free) | 50 Units / Rail |
| BD243CG | TO−220 (Pb−Free) | 50 Units / Rail |
| BD244BG | TO−220 (Pb−Free) | 50 Units / Rail |
| BD244CG | TO−220 (Pb−Free) | 50 Units / Rail |

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

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Collector−Emitter Sustaining Voltage (Note 1) ($I_C$ = 30 mAdc, $I_B$ = 0) BD243B, BD244B; BD243C, BD244C | $V_{CEO(sus)}$ | 80<br>100 | −<br>− | Vdc |
| Collector Cutoff Current ($V_{CE}$ = 60 Vdc, $I_B$ = 0) BD243B, BD243C, BD244B, BD244C | $I_{CEO}$ | − | 0.7 | mAdc |
| Collector Cutoff Current ($V_{CE}$ = 80 Vdc, $V_{EB}$ = 0) BD243B, BD244B; ($V_{CE}$ = 100 Vdc, $V_{EB}$ = 0) BD243C, BD244C | $I_{CES}$ | −<br>− | 400<br>400 | μAdc |
| Emitter Cutoff Current ($V_{BE}$ = 5.0 Vdc, $I_C$ = 0) | $I_{EBO}$ | − | 1.0 | mAdc |

**ON CHARACTERISTICS** (Note 1)

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| DC Current Gain ($I_C$ = 0.3 Adc, $V_{CE}$ = 4.0 Vdc); ($I_C$ = 3.0 Adc, $V_{CE}$ = 4.0 Vdc) | $h_{FE}$ | 30<br>15 | −<br>− | − |
| Collector−Emitter Saturation Voltage ($I_C$ = 6.0 Adc, $I_B$ = 1.0 Adc) | $V_{CE(sat)}$ | − | 1.5 | Vdc |
| Base−Emitter On Voltage ($I_C$ = 6.0 Adc, $V_{CE}$ = 4.0 Vdc) | $V_{BE(on)}$ | − | 2.0 | Vdc |

**DYNAMIC CHARACTERISTICS**

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Current−Gain − Bandwidth Product (Note 2) ($I_C$ = 500 mAdc, $V_{CE}$ = 10 Vdc, $f_{test}$ = 1.0 MHz) | $f_T$ | 3.0 | − | MHz |
| Small−Signal Current Gain ($I_C$ = 0.5 Adc, $V_{CE}$ = 10 Vdc, f = 1.0 kHz) | $h_{fe}$ | 20 | − | − |

1. Pulse Test: Pulsewidth ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. $f_T = h_{fe} \bullet f_{test}$

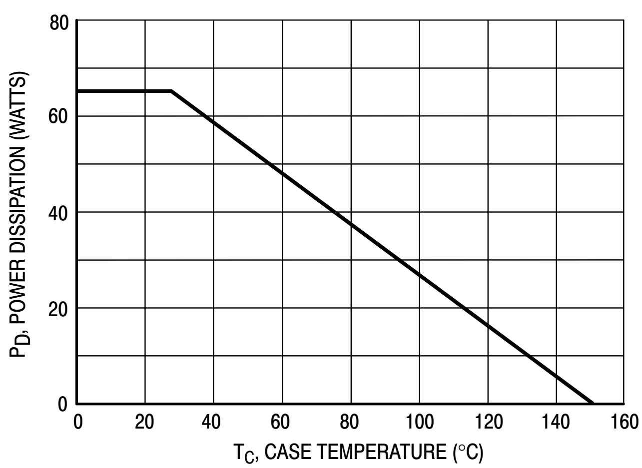



**Figure 1. Power Derating**

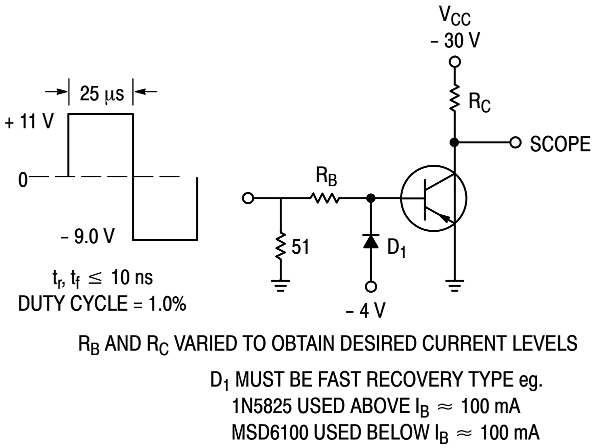



**Figure 2. Switching Time Test Circuit**

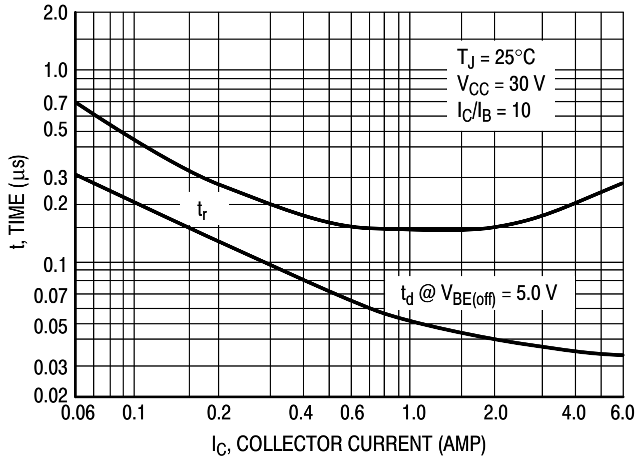



**Figure 3. Turn−On Time**

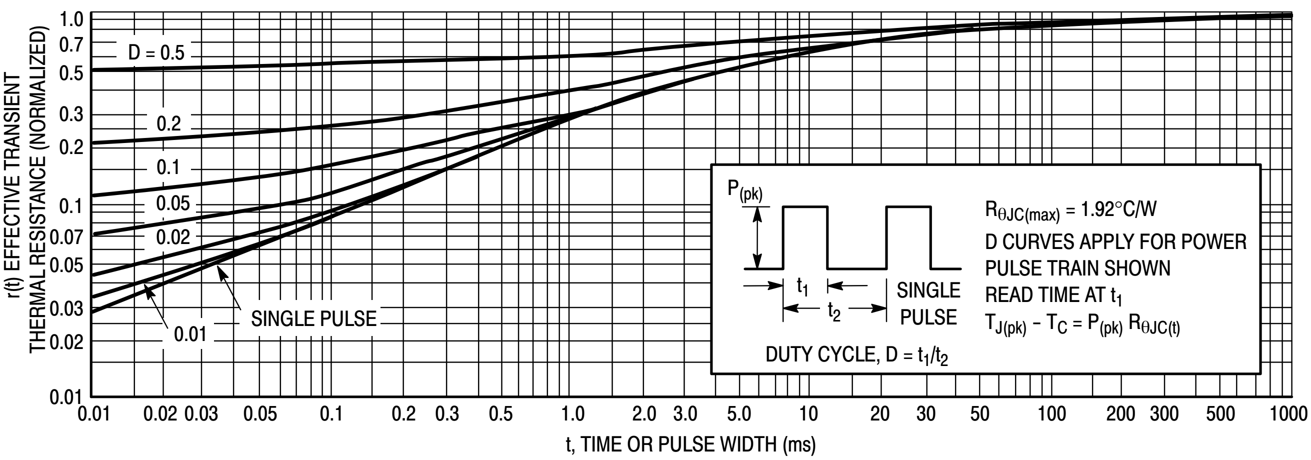



**Figure 4. Thermal Response**

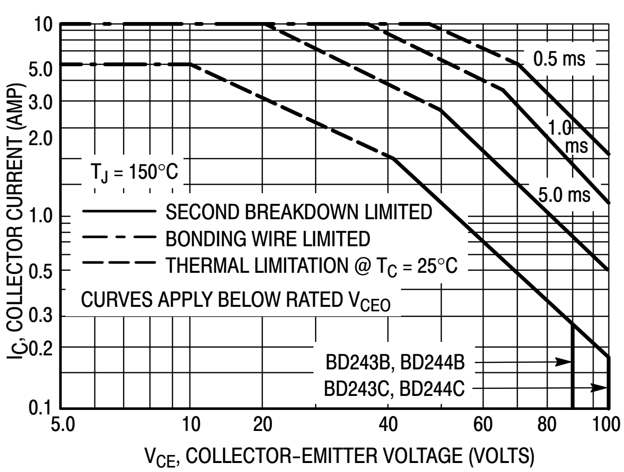



**Figure 5. Active Region Safe Operating Area**

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on $T_{J(pk)} = 150°C$: $T_C$ is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \le 150°C$, $T_{J(pk)}$ may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

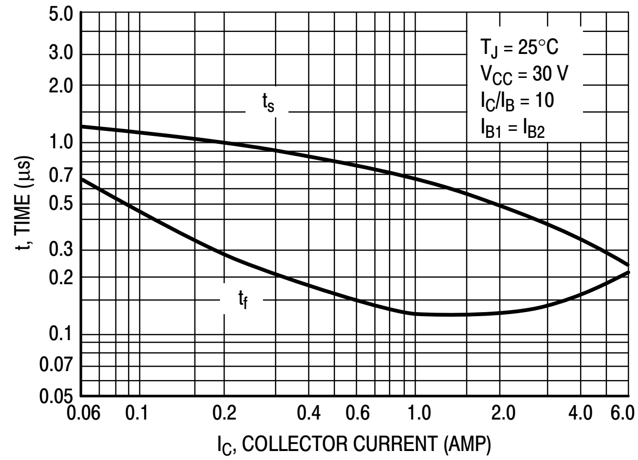



**Figure 6. Turn-Off Time**

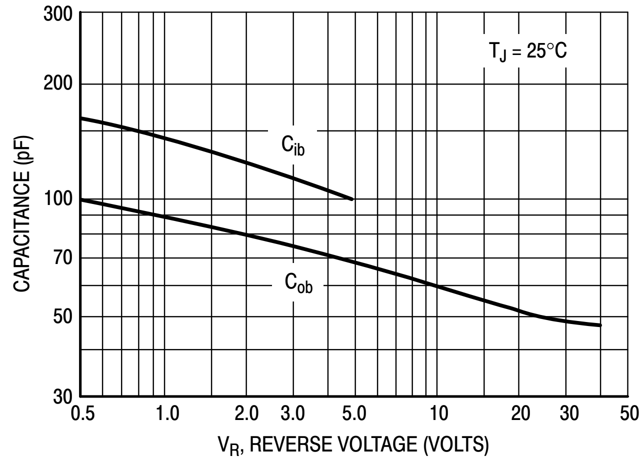



**Figure 7. Capacitance**

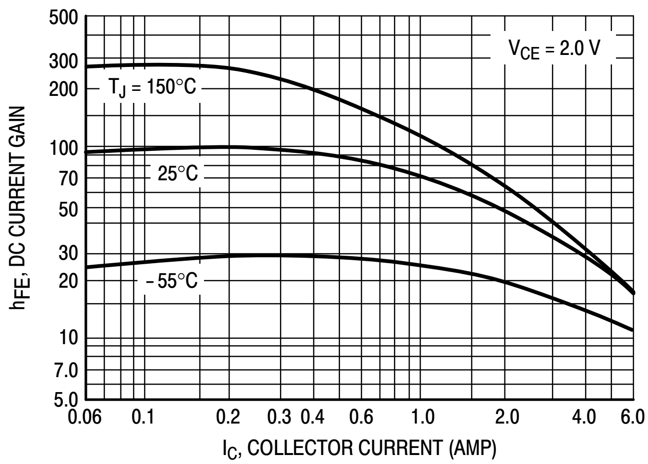



**Figure 8. DC Current Gain**

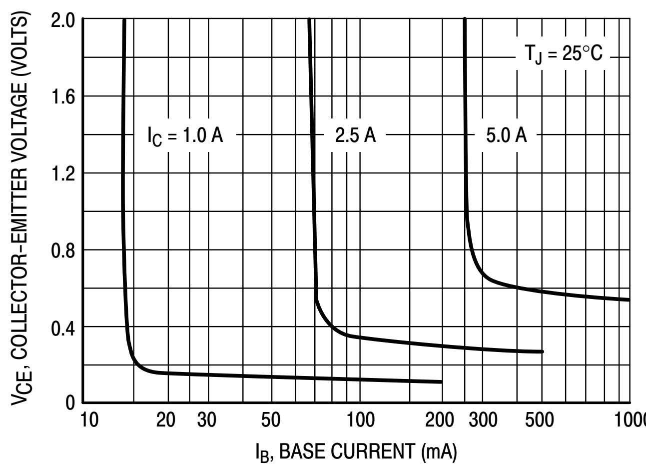



**Figure 9. Collector Saturation Region**

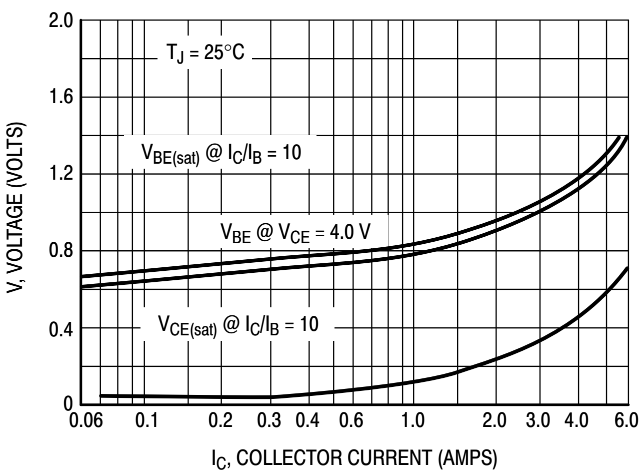



**Figure 10. “On” Voltages**

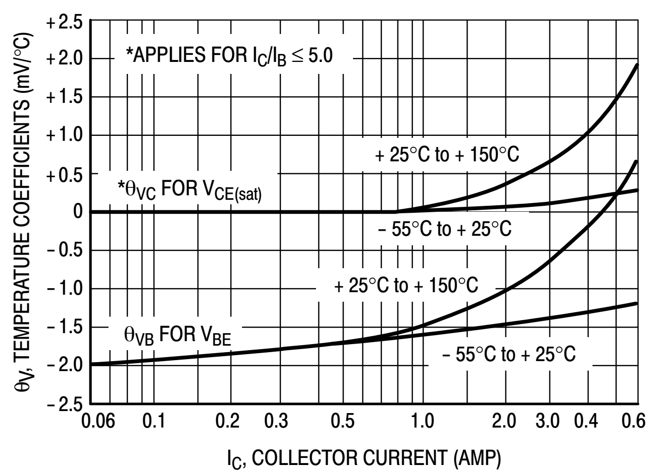



**Figure 11. Temperature Coefficients**

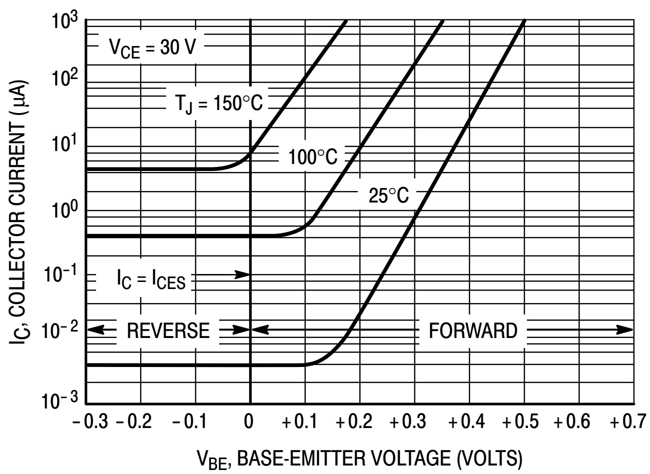



**Figure 12. Collector Cut-Off Region**

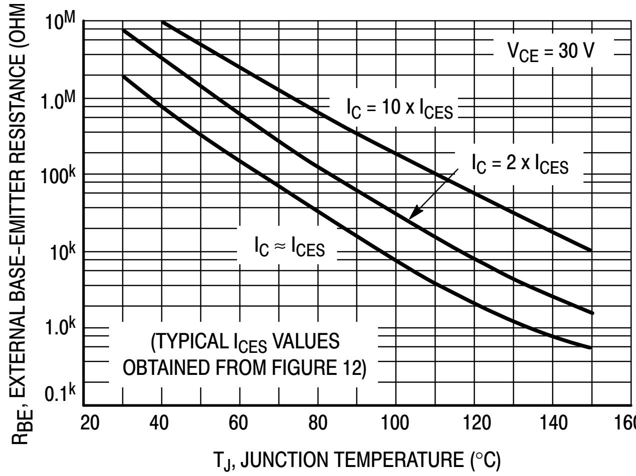
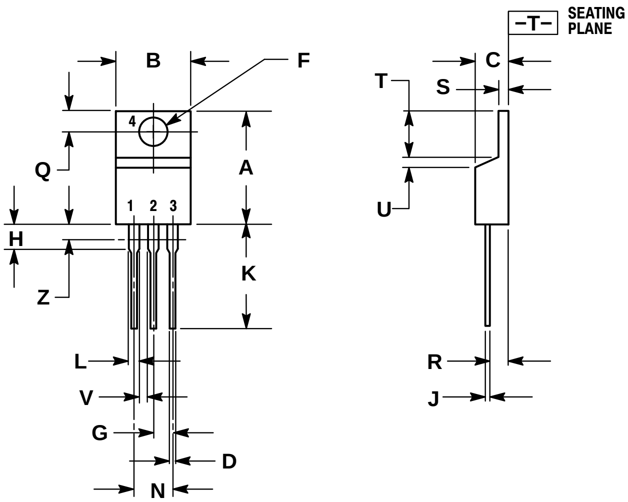



**Figure 13. Effects of Base−Emitter Resistance**

## PACKAGE DIMENSIONS

**TO−220**
CASE 221A−09
ISSUE AG




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| | INCHES | | MILLIMETERS | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.405 | 9.66 | 10.28 |
| C | 0.160 | 0.190 | 4.07 | 4.82 |
| D | 0.025 | 0.036 | 0.64 | 0.91 |
| F | 0.142 | 0.161 | 3.61 | 4.09 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.161 | 2.80 | 4.10 |
| J | 0.014 | 0.025 | 0.36 | 0.64 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| Z | --- | 0.080 | --- | 2.04 |

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

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