

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



ON Semiconductor®

<http://onsemi.com>

Complementary Silicon Plastic Power Transistors

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

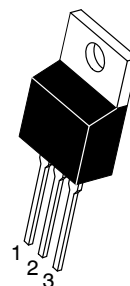
Features

- Collector – Emitter Saturation Voltage –
 $V_{CE(sat)} = 1.5 \text{ Vdc (Max) @ } I_C = 6.0 \text{ Adc}$
- Collector Emitter Sustaining Voltage –
 $V_{CEO(sus)} = 80 \text{ Vdc (Min) – BD243B, BD244B}$
 $= 100 \text{ Vdc (Min) – BD243C, BD244C}$
- High Current Gain Bandwidth Product
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Pb-Free Packages are Available*

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

MAXIMUM RATINGS

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



TO-220AB
CASE 221A-09
STYLE 1

MARKING DIAGRAM



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

THERMAL CHARACTERISTICS

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

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.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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

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

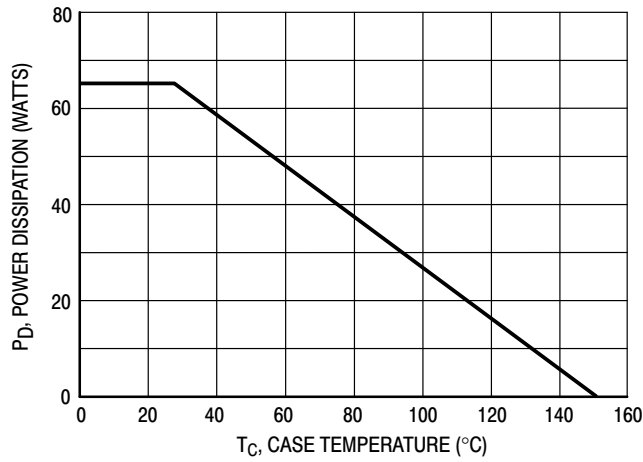


Figure 1. Power Derating

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

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

ON CHARACTERISTICS (Note 1)

| | | | | |
|---|---------------|----------|--------|-----|
| DC Current Gain ($I_C = 0.3 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) ($I_C = 3.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) | h_{FE} | 30 15 | - - | - |
| Collector-Emitter Saturation Voltage ($I_C = 6.0 \text{ Adc}$, $I_B = 1.0 \text{ Adc}$) | $V_{CE(sat)}$ | - | 1.5 | Vdc |
| Base-Emitter On Voltage ($I_C = 6.0 \text{ Adc}$, $V_{CE} = 4.0 \text{ Vdc}$) | $V_{BE(on)}$ | - | 2.0 | Vdc |

DYNAMIC CHARACTERISTICS

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

1. Pulse Test: Pulsewidth $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.
2. $f_T = h_{fe} \cdot f_{test}$

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

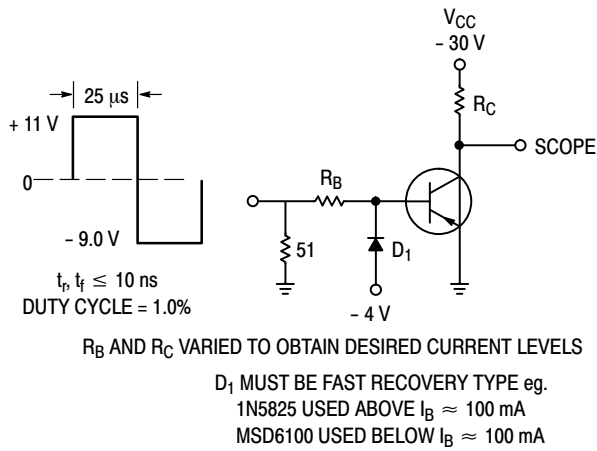


Figure 2. Switching Time Test Circuit

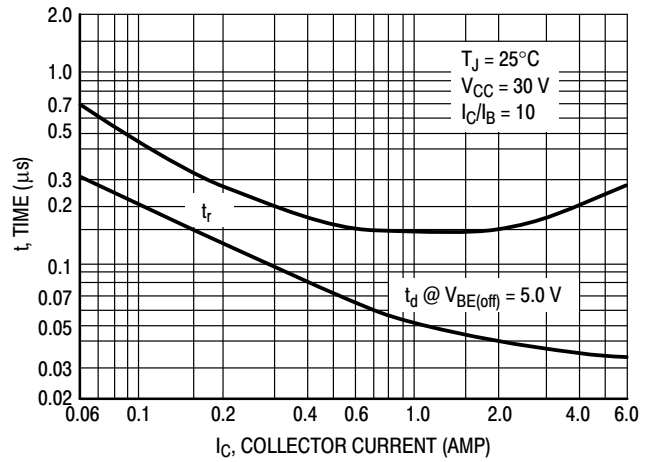


Figure 3. Turn-On Time

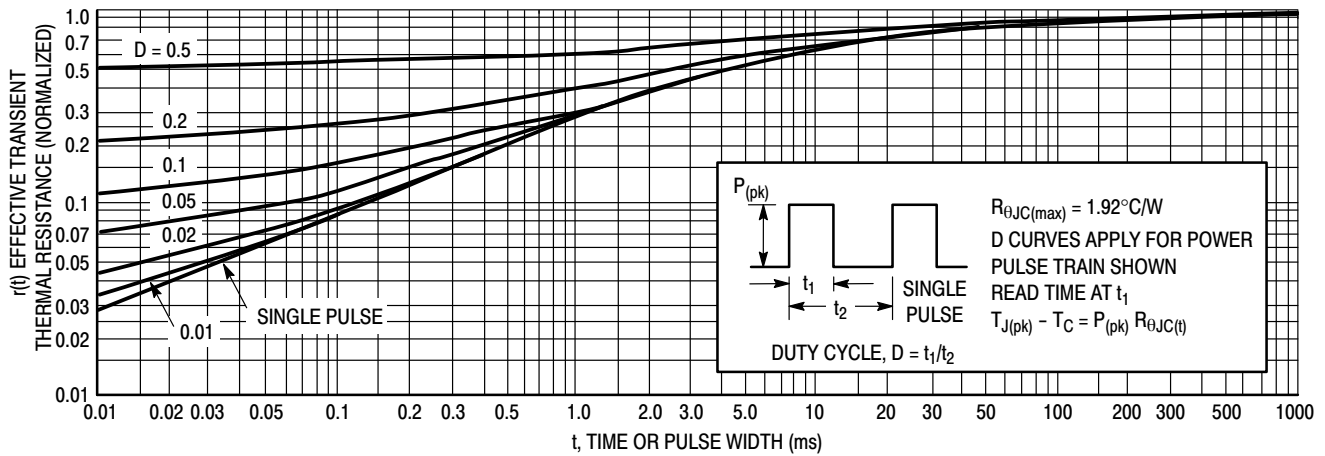


Figure 4. Thermal Response

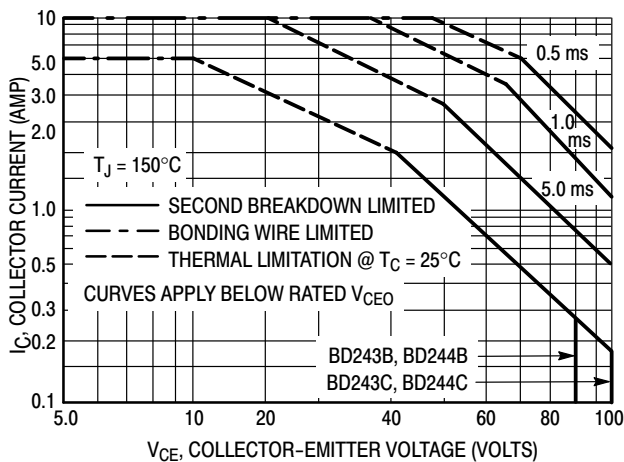


Figure 5. Active Region Safe Operating Area

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 $T_{J(pk)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150^\circ\text{C}$, $T_{J(pk)}$ 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.

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

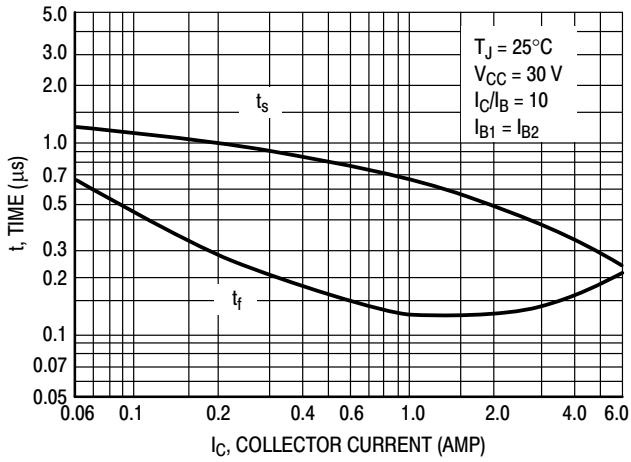


Figure 6. Turn-Off Time

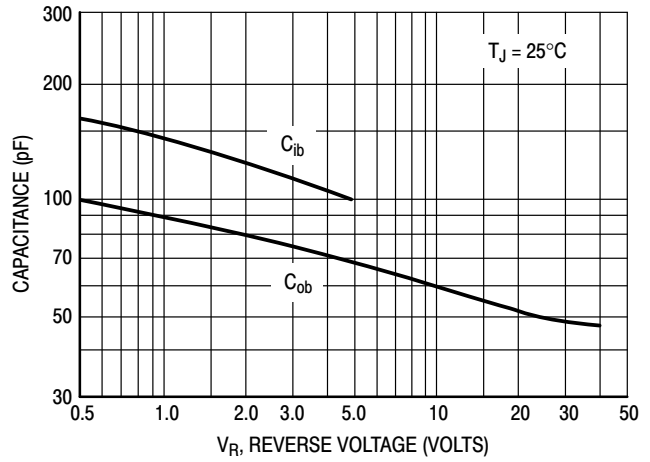


Figure 7. Capacitance

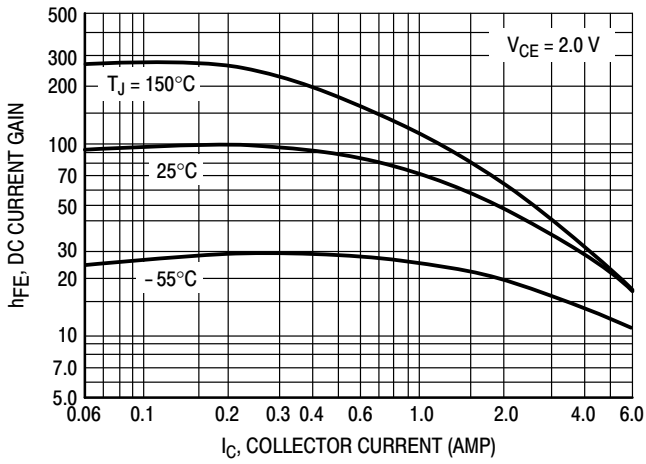


Figure 8. DC Current Gain

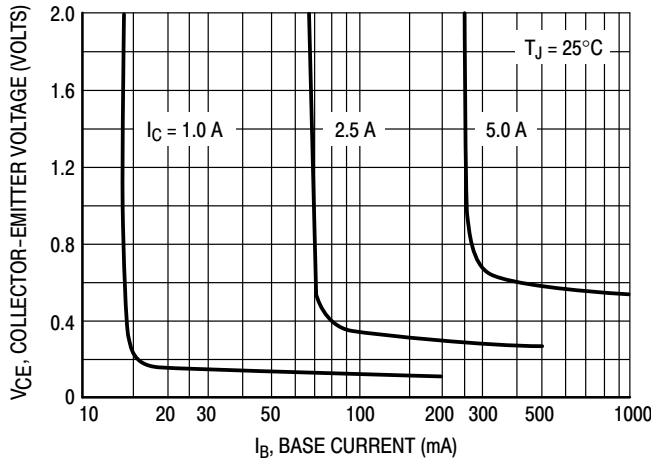


Figure 9. Collector Saturation Region

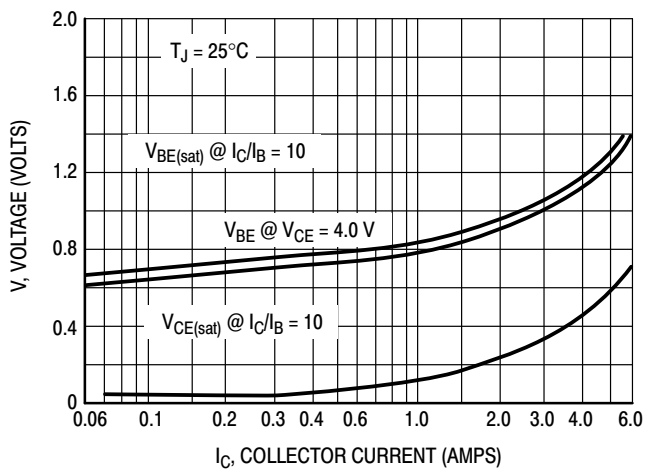


Figure 10. "On" Voltages

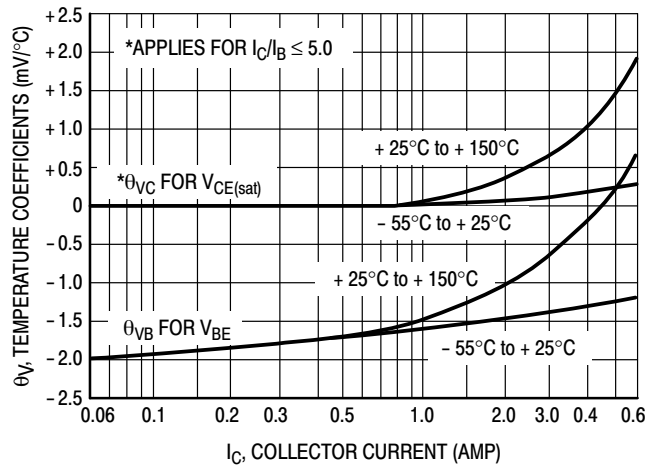


Figure 11. Temperature Coefficients

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

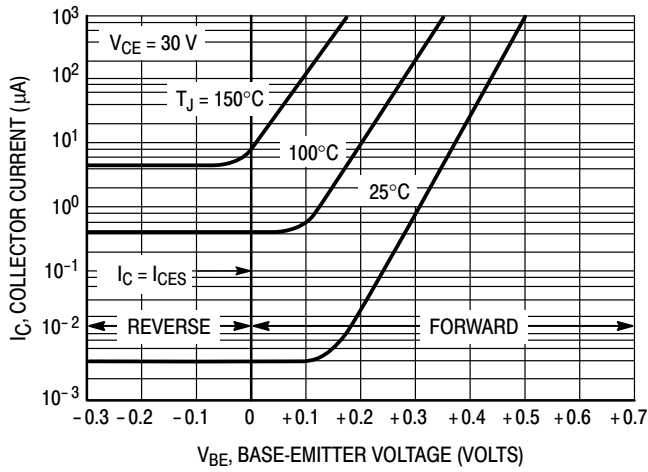


Figure 12. Collector Cut-Off Region

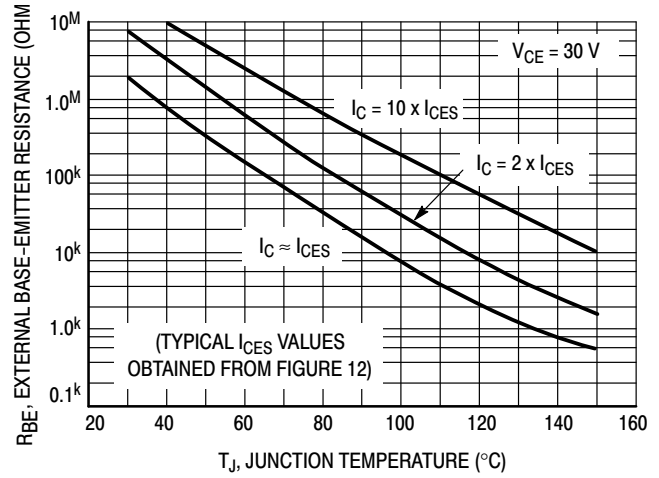


Figure 13. Effects of Base-Emitter Resistance

ORDERING INFORMATION

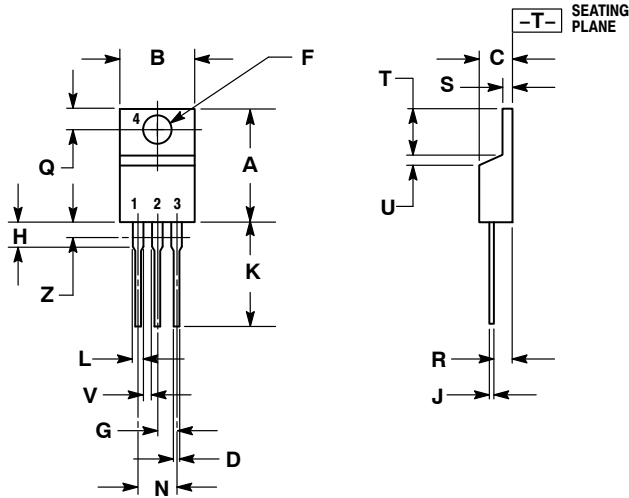
| Device | Package | Shipping† |
|---------|---------------------|-----------------|
| BD243B | TO-220 | 50 Units / Rail |
| BD243BG | TO-220 (Pb-Free) | |
| BD243C | TO-220 | 50 Units / Rail |
| BD243CG | TO-220 (Pb-Free) | |
| BD244B | TO-220 | 50 Units / Rail |
| BD244BG | TO-220 (Pb-Free) | |
| BD244C | TO-220 | 50 Units / Rail |
| BD244CG | TO-220 (Pb-Free) | |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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

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.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | 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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