

Complementary Silicon Plastic Power Transistors

... designed for use in general purpose amplifier and switching applications.

- 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
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Compact TO–220 AB Package

MAXIMUM RATINGS

| Rating | Symbol | BD243B BD244B | BD243C BD244C | Unit |
|---|----------------|------------------|------------------|------------------------------|
| Collector–Emitter Voltage | V_{CEO} | 80 | 100 | Vdc |
| Collector–Base Voltage | 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 | | Watts W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | –65 to +150 | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

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

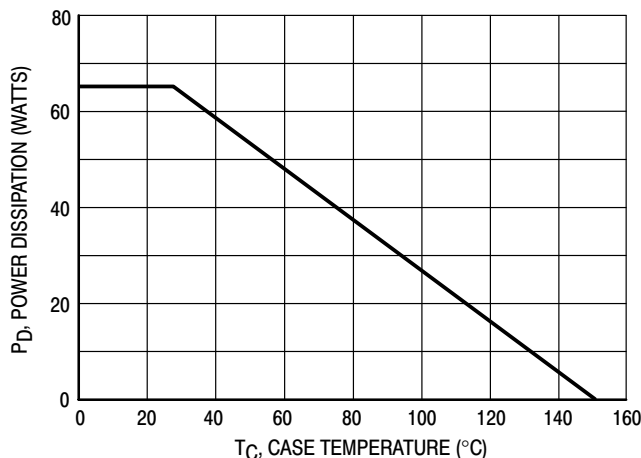


Figure 1. Power Derating

NPN
BD243B

BD243C*
PNP
BD244B

BD244C*

*ON Semiconductor Preferred Device

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

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

CASE 221A–06
TO–220AB

BD243B BD243C BD244B BD244C

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

| Characteristic | Symbol | Min | Max | Unit |
|---|---------------|-----------|------------|-----------------|
| Collector–Emitter Sustaining Voltage (1) ($I_C = 30\text{ mAdc}$, $I_B = 0$) | $V_{CE(sus)}$ | 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 (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 (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) $f_T = h_{fe} \cdot f_{test}$

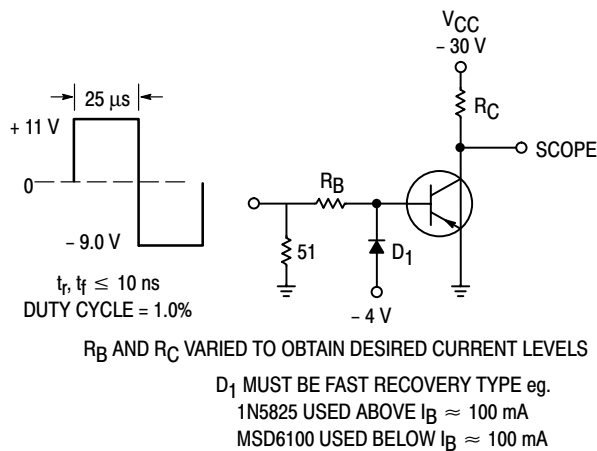


Figure 2. Switching Time Test Circuit

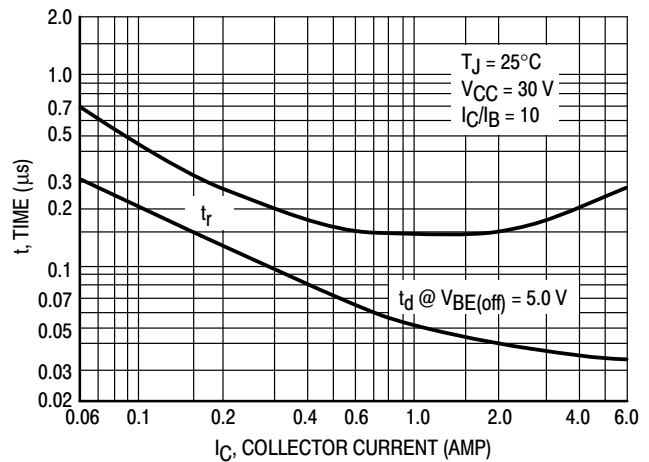


Figure 3. Turn–On Time

BD243B BD243C BD244B BD244C

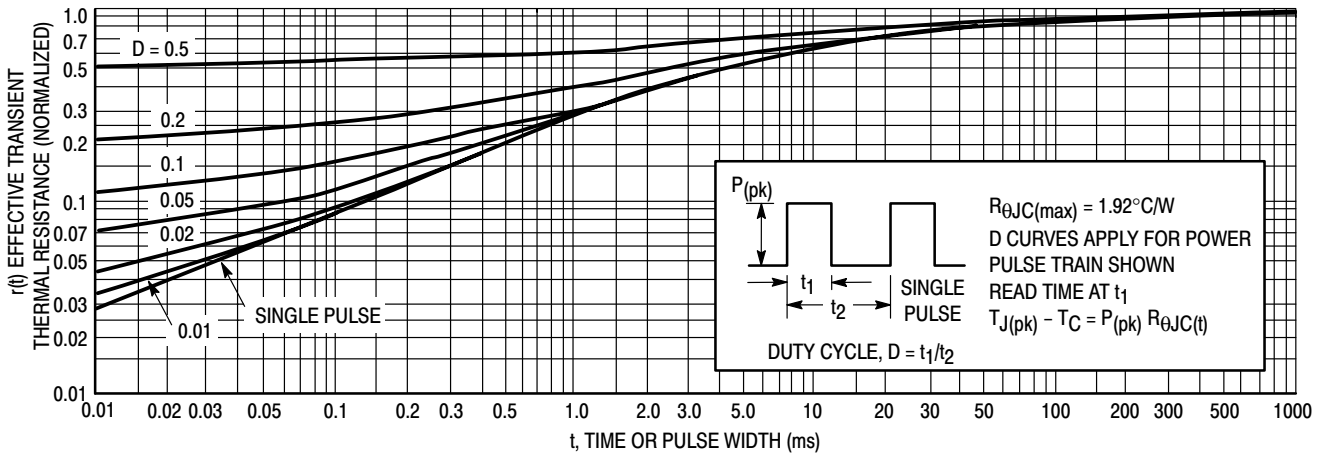


Figure 4. Thermal Response

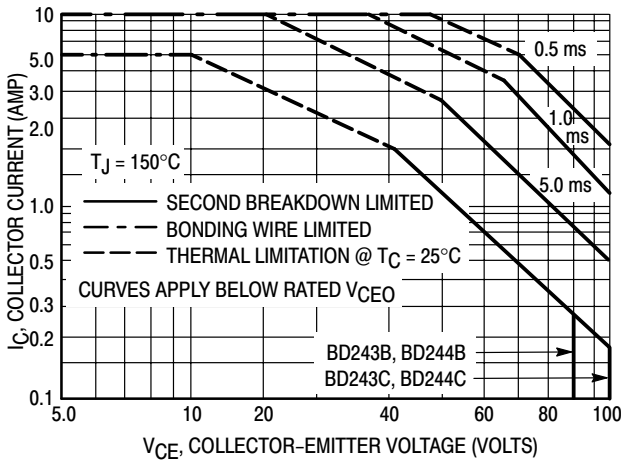


Figure 5. Active Region Safe Operating Area

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

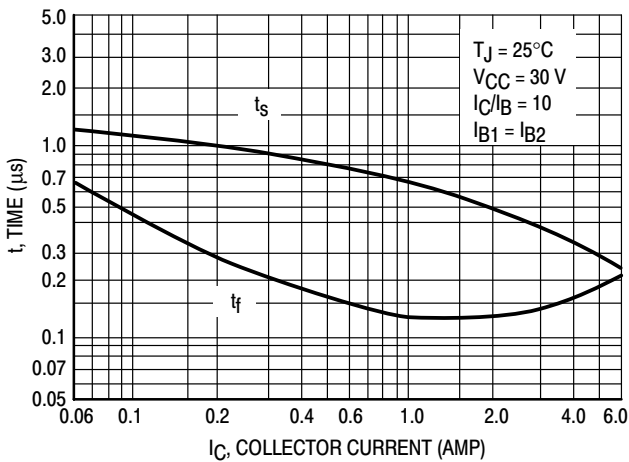


Figure 6. Turn-Off Time

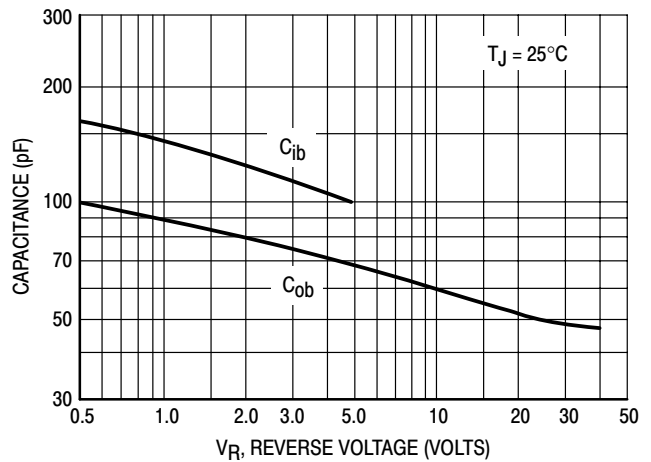


Figure 7. Capacitance

BD243B BD243C BD244B BD244C

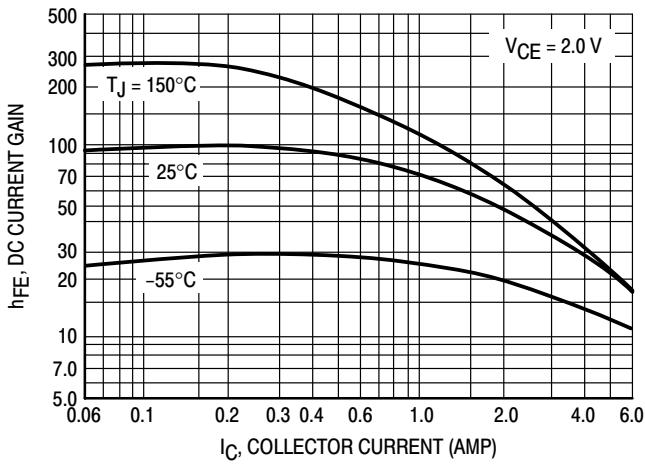


Figure 8. DC Current Gain

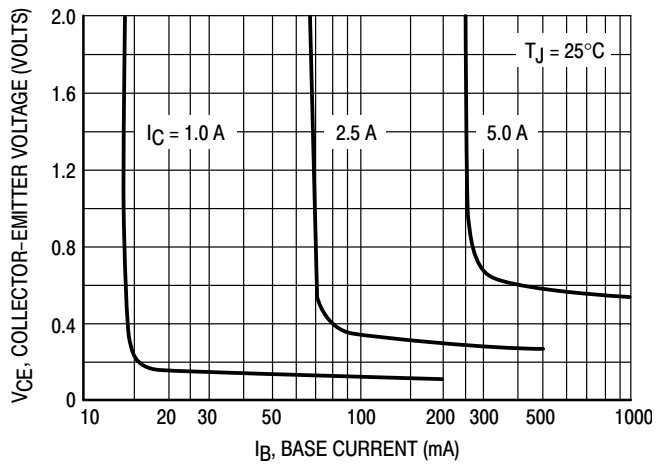


Figure 9. Collector Saturation Region

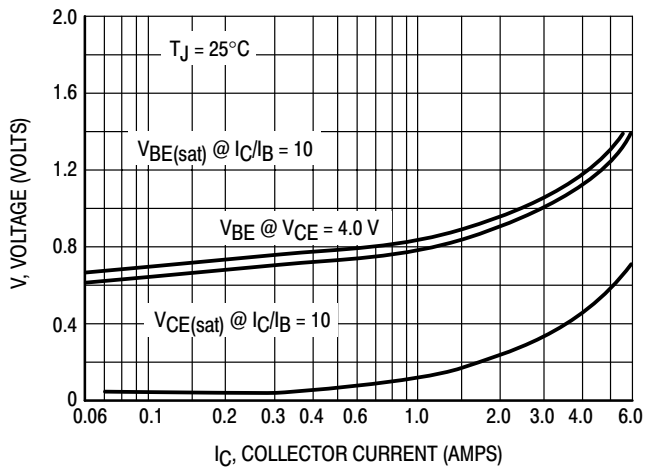


Figure 10. "On" Voltages

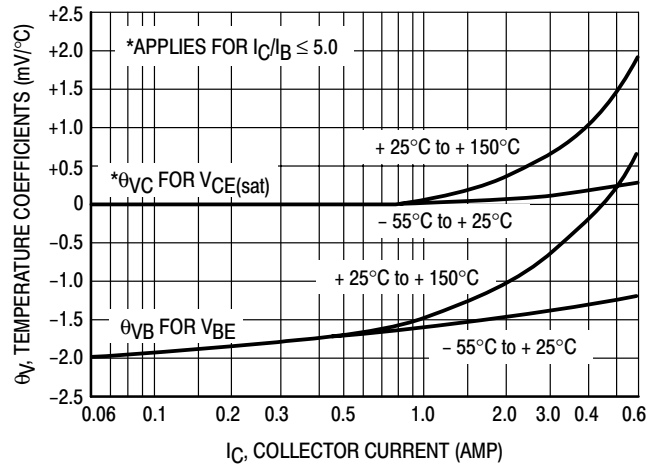


Figure 11. Temperature Coefficients

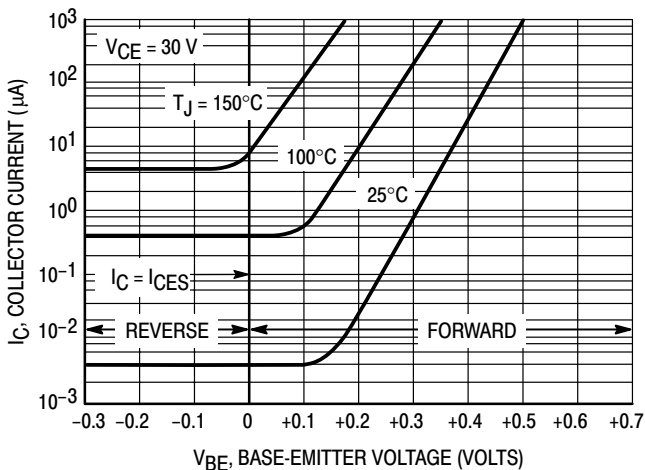


Figure 12. Collector Cut-Off Region

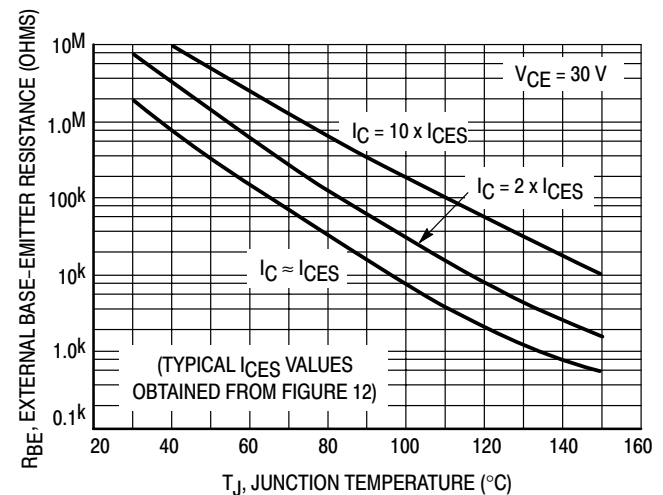
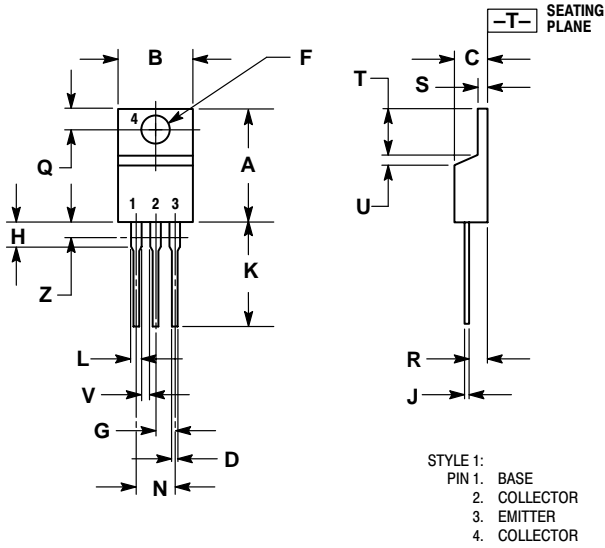


Figure 13. Effects of Base-Emitter Resistance

BD243B BD243C BD244B BD244C

PACKAGE DIMENSIONS

TO-220 CASE 221A-09 ISSUE AA



- 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 | 0.035 | 0.64 | 0.88 |
| F | 0.142 | 0.147 | 3.61 | 3.73 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.155 | 2.80 | 3.93 |
| J | 0.018 | 0.025 | 0.46 | 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 |

Notes

Notes

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