

Complementary Silicon Plastic Power Transistors

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

- Collector-Emitter Saturation Voltage —
 $V_{CE} = 1.2 \text{ Vdc (Max) @ } I_C = 3.0 \text{ Adc}$
- Collector-Emitter Sustaining Voltage —
 $V_{CEO(sus)} = 80 \text{ Vdc (Min.) BD241B, BD242B}$
 $= 100 \text{ Vdc (Min.) BD241C, BD242C}$
- 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 | BD241B BD242B | BD241C BD242C | Unit |
|----------------------------------------------------------------------------------------|----------------|------------------|------------------|------------------------------|
| Collector-Emitter Voltage | V_{CEO} | 80 | 100 | Vdc |
| Collector-Emitter Voltage | V_{CES} | 90 | 115 | Vdc |
| Emitter-Base Voltage | V_{EB} | 5.0 | | Vdc |
| Collector Current — Continuous Peak | I_C | 3.0 5.0 | | Adc Adc |
| Base Current | I_B | 1.0 | | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 40 0.32 | | 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 Ambient | $R_{\theta JA}$ | 62.5 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 3.125 | $^\circ\text{C/W}$ |

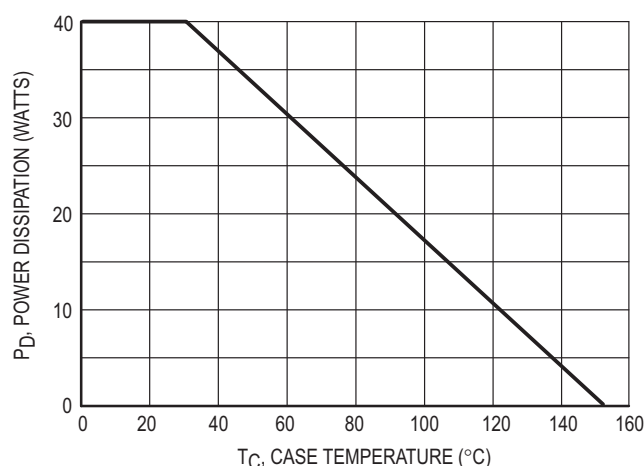


Figure 1. Power Derating

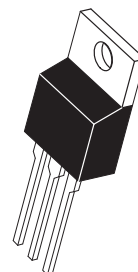
Preferred devices are Motorola recommended choices for future use and best overall value.

REV 7

NPN
BD241B
BD241C*
PNP
BD242B
BD242C*

*Motorola Preferred Device

3 AMPERE
POWER TRANSISTORS
COMPLEMENTARY
SILICON
80, 100 VOLTS
40 WATTS



CASE 221A-06
TO-220AB



MOTOROLA

BD241B BD241C BD242B BD242C

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

| Characteristic | Symbol | Min. | Max. | Unit |
|---------------------------------------------------------------------------------------------------------------------------------|------------------|-----------|------------|------|
| OFF CHARACTERISTICS | | | | |
| Collector–Emitter Sustaining Voltage ¹ (I _C = 30 mAdc, I _B = 0) | V _{CEO} | 80 100 | | Vdc |
| Collector Cutoff Current (V _{CE} = 60 Vdc, I _B = 0) | I _{CEO} | | 0.3 | mAdc |
| Collector Cutoff Current (V _{CE} = 80 Vdc, V _{EB} = 0) (V _{CE} = 100 Vdc, V _{EB} = 0) | I _{CES} | | 200 200 | μAdc |
| Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0) | I _{EBO} | | 1.0 | mAdc |

ON CHARACTERISTICS¹

| | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------|----------|-----|-----|
| DC Current Gain (I _C = 1.0 Adc, V _{CE} = 4.0 Vdc) (I _C = 3.0 Adc, V _{CE} = 4.0 Vdc) | h _{FE} | 25 10 | | |
| Collector–Emitter Saturation Voltage (I _C = 3.0 Adc, I _B = 600 Adc) | V _{CE(sat)} | | 1.2 | Vdc |
| Base–Emitter On Voltage (I _C = 3.0 Adc, V _{CE} = 4.0 Vdc) | V _{BE(on)} | | 1.8 | Vdc |

DYNAMIC CHARACTERISTICS

| | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------|-----|--|-----|
| Current Gain – Bandwidth Product ² (I _C = 500 mAdc, V _{CE} = 10 Vdc, f _{test} = 1 MHz) | f _T | 3.0 | | MHz |
| Small–Signal Current Gain (I _C = 0.5 Adc, V _{CE} = 10 Vdc, f = 1 kHz) | h _{fe} | 20 | | |

¹ Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

² f_T = |h_{fe}| • f_{test}.

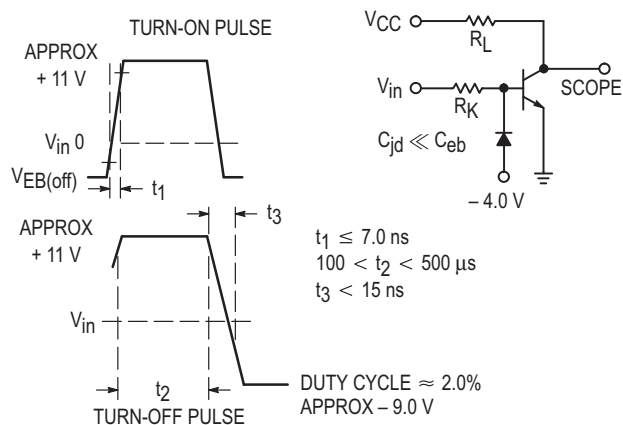


Figure 2. Switching Time Equivalent Circuit

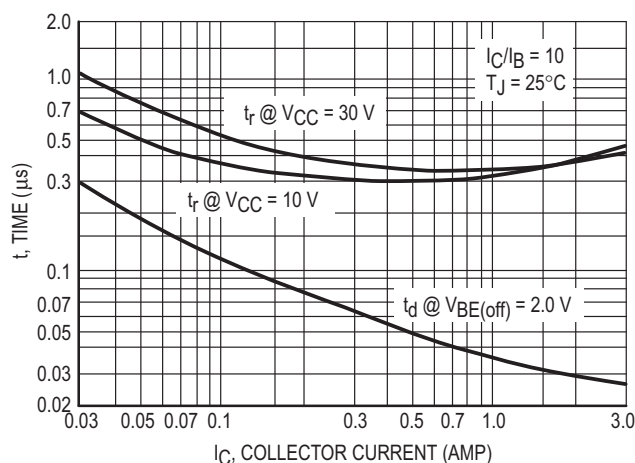


Figure 3. Turn-On Time

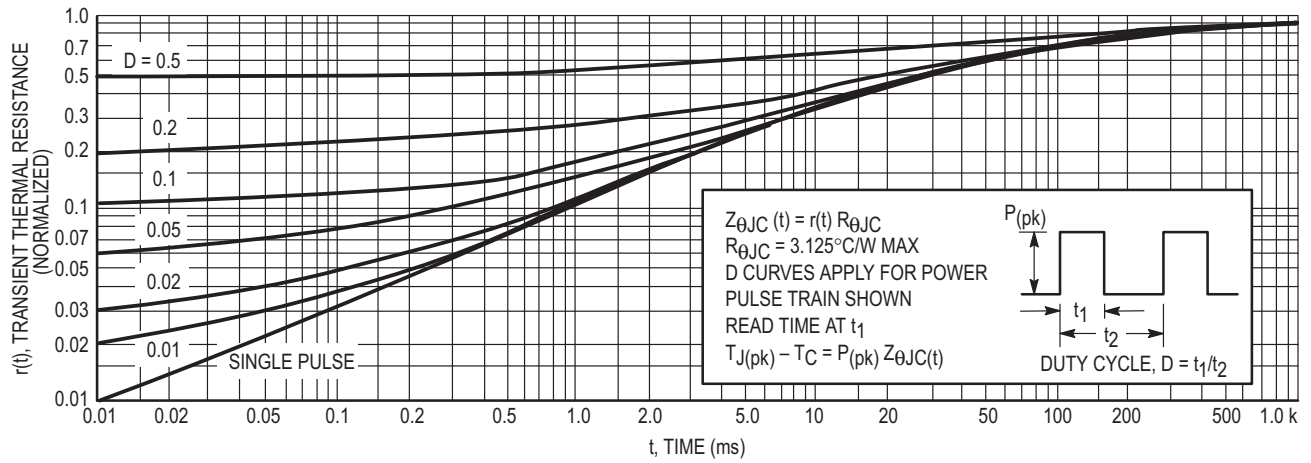


Figure 4. Thermal Response

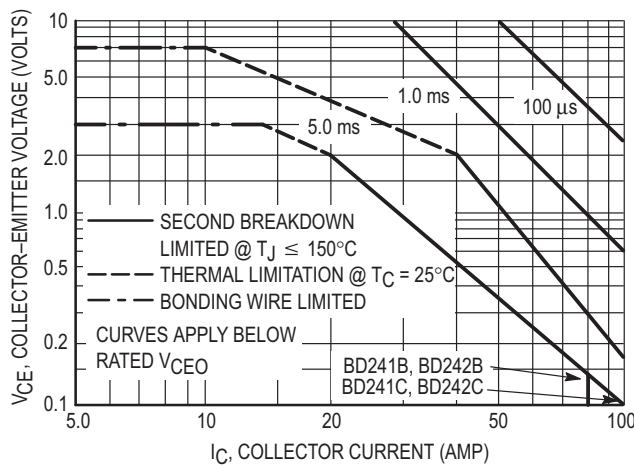


Figure 5. Active Region Safe Operating Area

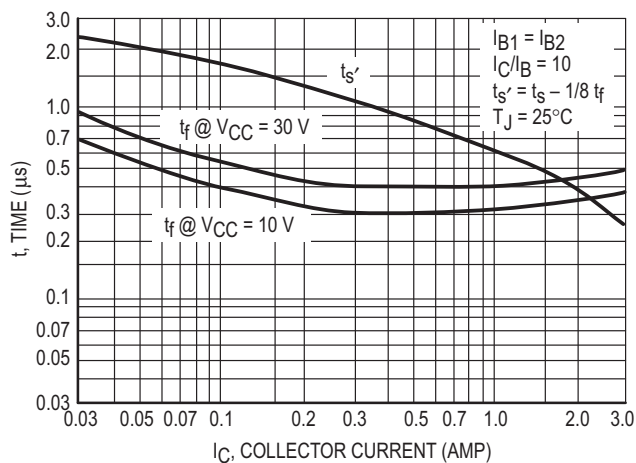


Figure 6. Turn-Off Time

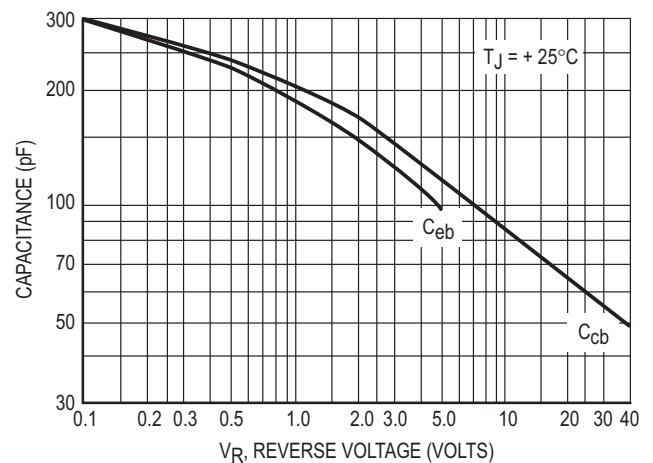


Figure 7. Capacitance

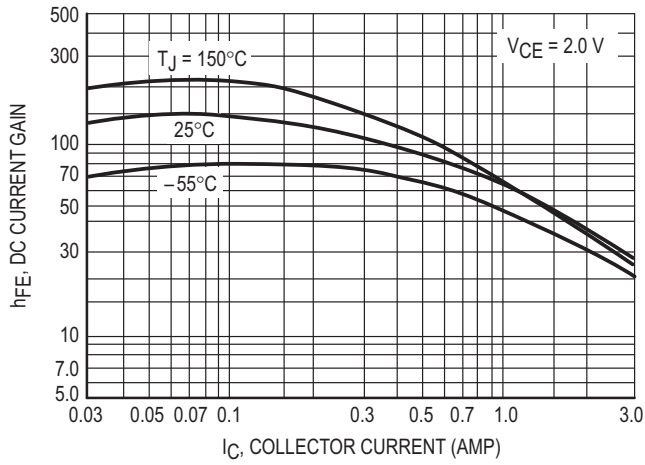


Figure 8. DC Current Gain

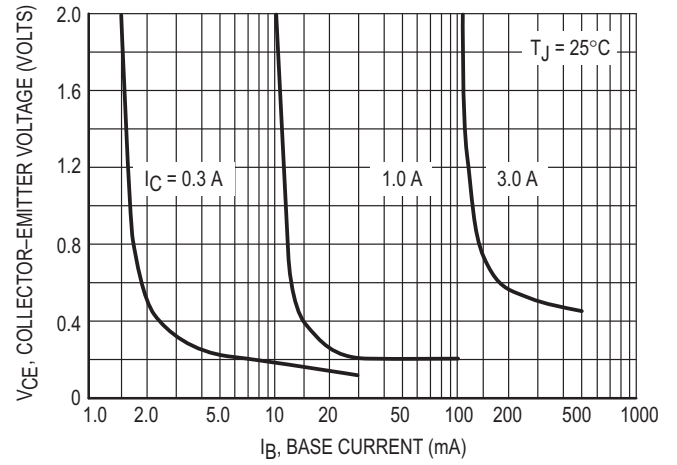


Figure 9. Collector Saturation Region

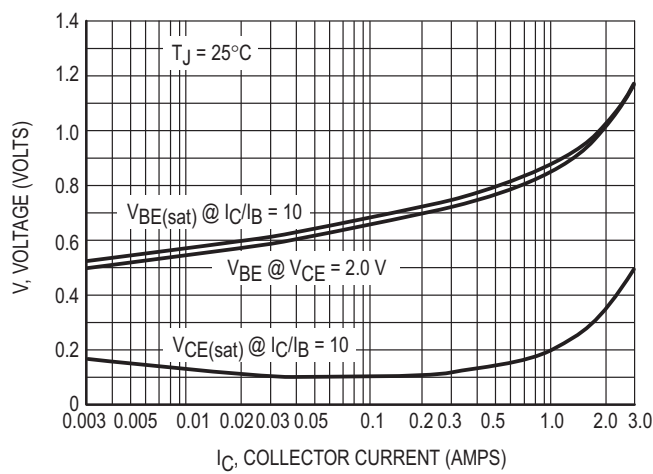


Figure 10. "On" Voltages

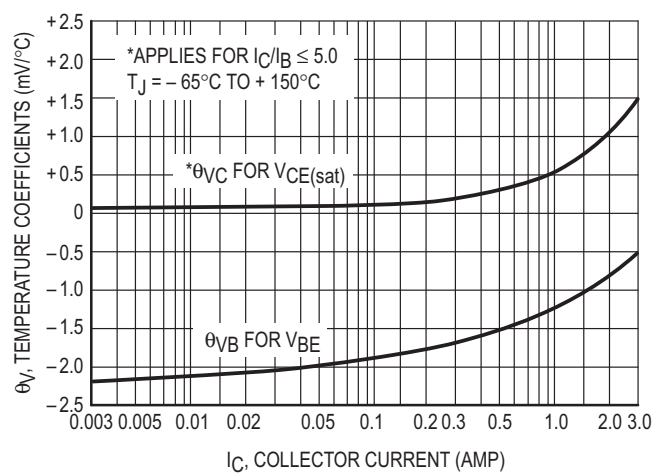


Figure 11. Temperature Coefficients

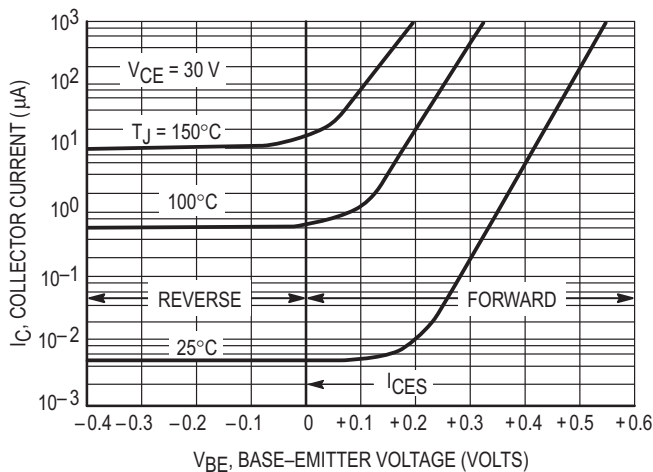


Figure 12. Collector Cut-Off Region

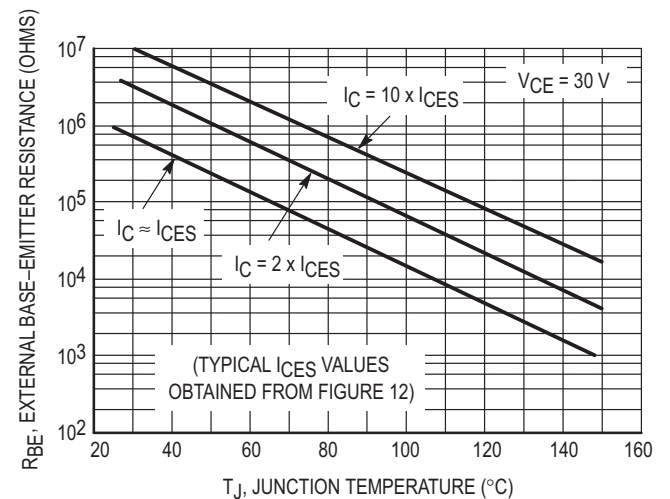
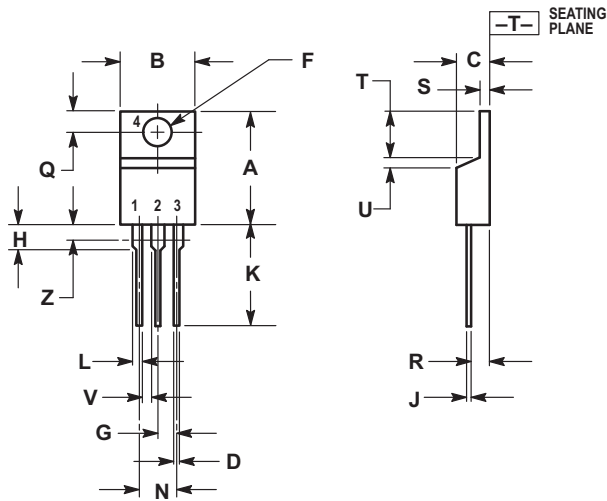


Figure 13. Effects of Base-Emitter Resistance

PACKAGE DIMENSIONS



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 |

STYLE 1:

- PIN 1. BASE
- COLLECTOR
- EMITTER
- COLLECTOR

CASE 221A-06
TO-220AB
ISSUE Y