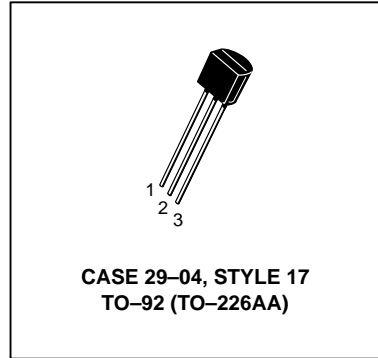
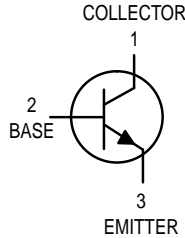


High Current Transistors

NPN Silicon

BC489,A,B



MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|-------------|------------------------------|
| Collector–Emitter Voltage | V_{CEO} | 80 | Vdc |
| Collector–Base Voltage | V_{CBO} | 80 | Vdc |
| Emitter–Base Voltage | V_{EBO} | 5.0 | Vdc |
| Collector Current — Continuous | I_C | 0.5 | Adc |
| Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 625 5.0 | mW mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.5 12 | Watt mW/ $^\circ\text{C}$ |
| 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 Ambient | $R_{\theta JA}$ | 200 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

OFF CHARACTERISTICS

| | | | | | |
|--|---------------|-----|---|-----|------|
| Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 10 \text{ mAdc}, I_B = 0$) | $V_{(BR)CEO}$ | 80 | — | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}, I_E = 0$) | $V_{(BR)CBO}$ | 80 | — | — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}, I_C = 0$) | $V_{(BR)EBO}$ | 5.0 | — | — | Vdc |
| Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}, I_E = 0$) | I_{CBO} | — | — | 100 | nAdc |

ON CHARACTERISTICS*

| | | | | | |
|--|----------|------------------------------|---------------------------|-----------------------------|---|
| DC Current Gain ($I_C = 10 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc}$) ($I_C = 100 \text{ mAdc}, V_{CE} = 2.0 \text{ Vdc}$) ($I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$)* | h_{FE} | 40 60 100 160 15 | — — 160 260 — | — 400 250 400 — | — |
| | BC489 | | | | |
| | BC489A | | | | |
| | BC489B | | | | |

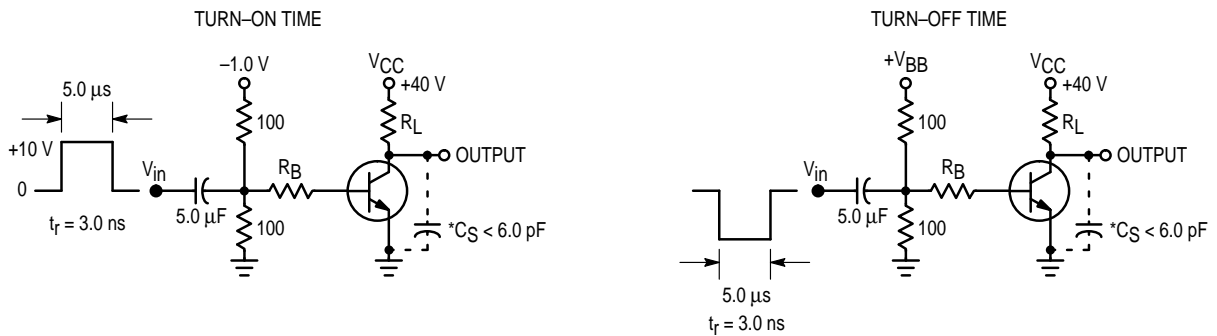
1. Pulse Test: Pulse Width = 300 μs , Duty Cycle 2%.

BC489,A,B

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------------------|-----|-------------|----------|-----------------|
| ON CHARACTERISTICS* (Continued) | | | | | |
| Collector–Emitter Saturation Voltage (I _C = 500 mA _{dc} , I _B = 50 mA _{dc}) (I _C = 1.0 A _{dc} , I _B = 100 mA _{dc}) | V _{CE(sat)} | — | 0.2 0.3 | 0.5 — | V _{dc} |
| Base–Emitter Saturation Voltage (I _C = 500 mA _{dc} , I _B = 50 mA _{dc}) (I _C = 1.0 A _{dc} , I _B = 100 mA _{dc}) ⁽¹⁾ | V _{BE(sat)} | — | 0.85 0.9 | 1.2 — | V _{dc} |
| DYNAMIC CHARACTERISTICS | | | | | |
| Current–Gain — Bandwidth Product (I _C = 50 mA _{dc} , V _{CE} = 2.0 V _{dc} , f = 100 MHz) | f _T | — | 200 | — | MHz |
| Output Capacitance (V _{CB} = 10 V _{dc} , I _E = 0, f = 1.0 MHz) | C _{ob} | — | 7.0 | — | pF |
| Input Capacitance (V _{EB} = 0.5 V _{dc} , I _C = 0, f = 1.0 MHz) | C _{ib} | — | 50 | — | pF |

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



* Total Shunt Capacitance of Test Jig and Connectors
For PNP Test Circuits, Reverse All Voltage Polarities

Figure 1. Switching Time Test Circuits

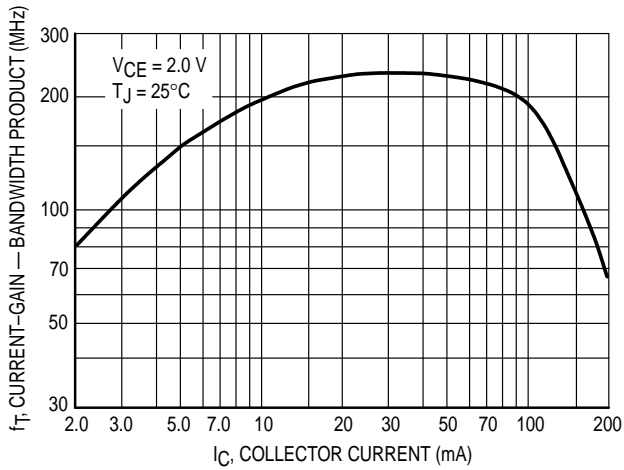


Figure 2. Current-Gain — Bandwidth Product

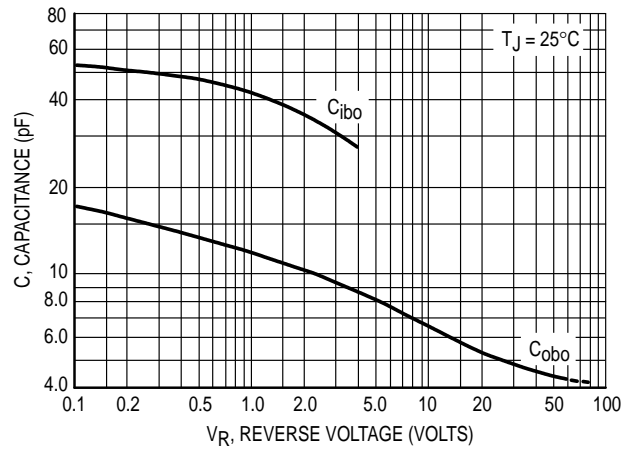


Figure 3. Capacitance

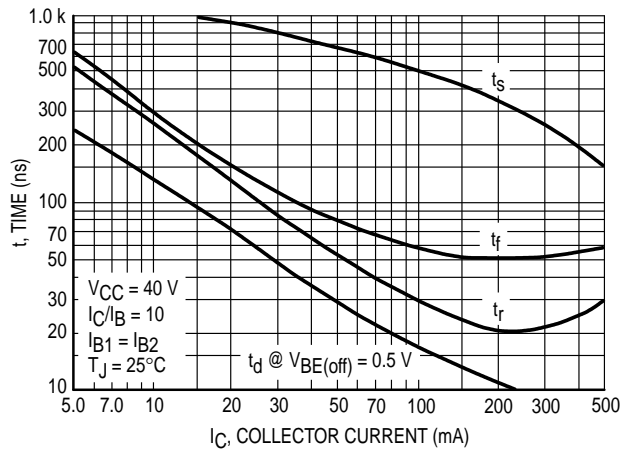


Figure 4. Switching Time

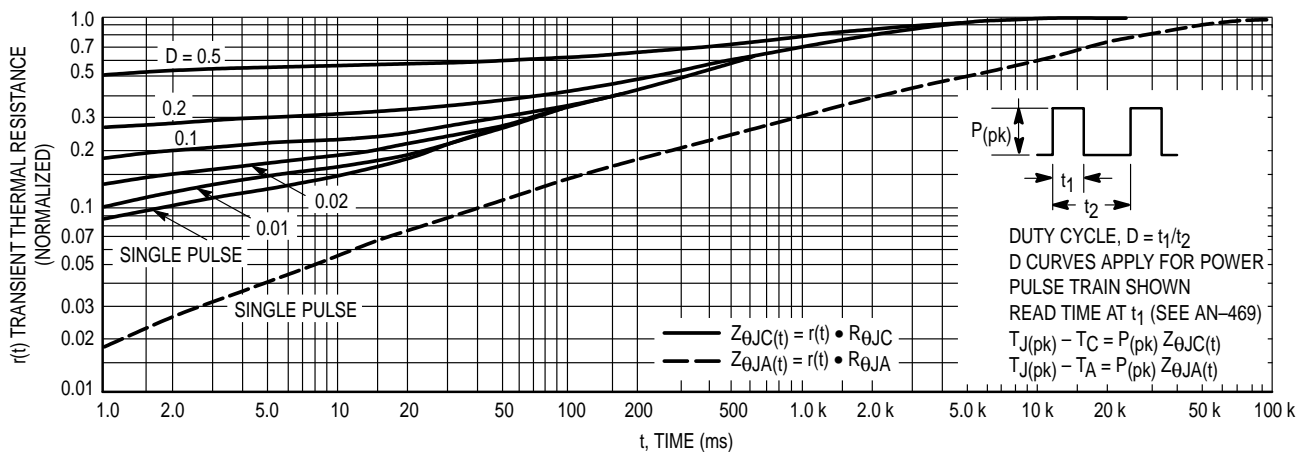


Figure 5. Thermal Response

BC489,A,B

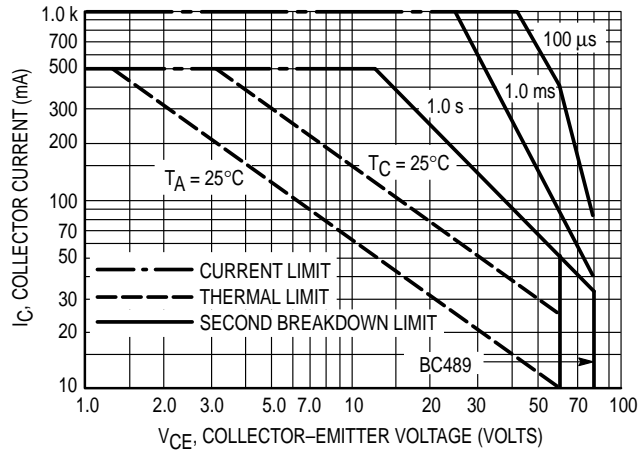


Figure 6. Active Region — Safe Operating Area

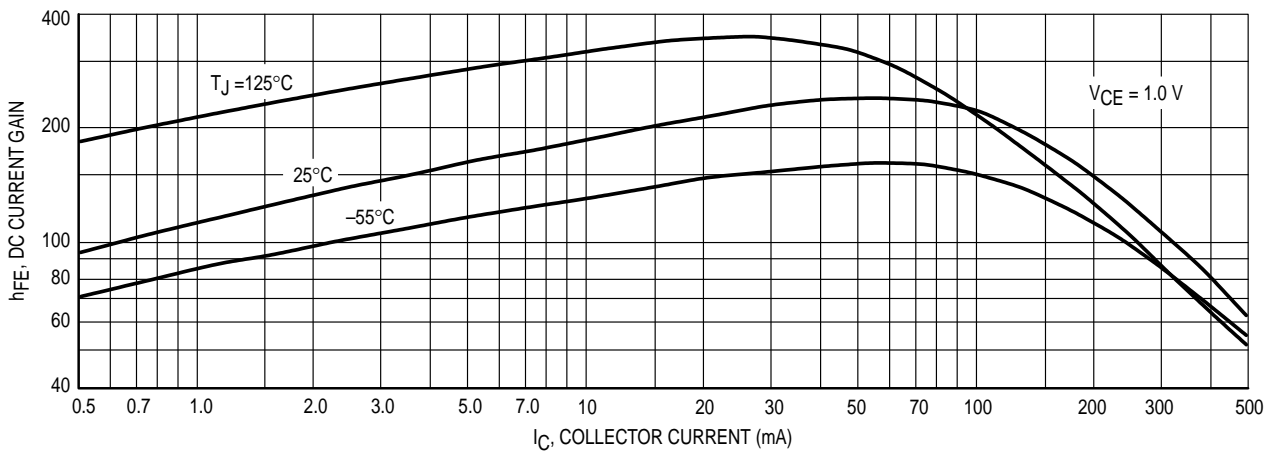


Figure 7. DC Current Gain

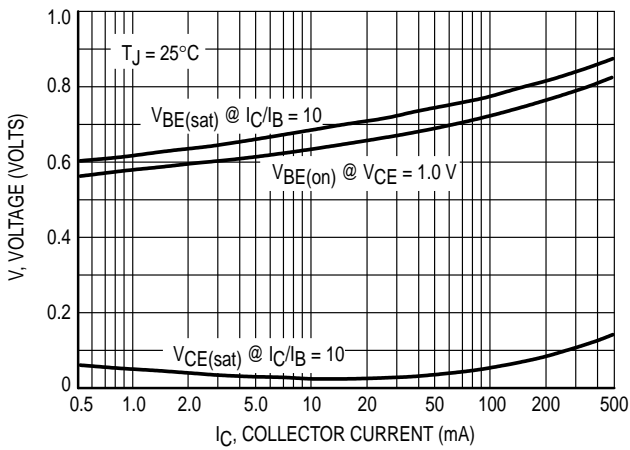


Figure 8. "On" Voltages

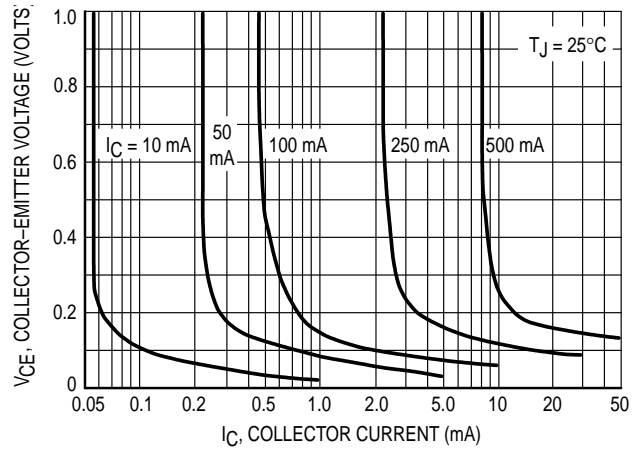


Figure 9. Collector Saturation Region

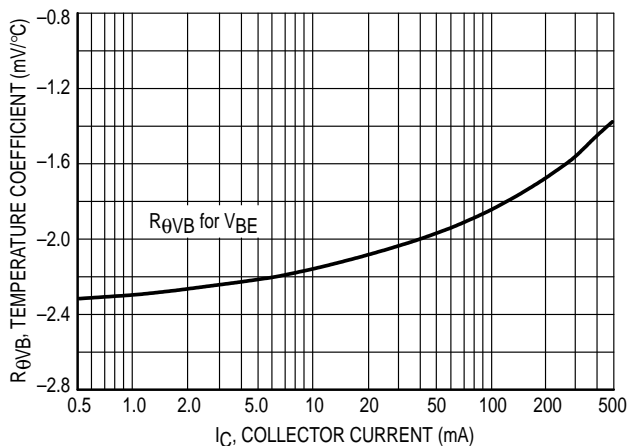


Figure 10. Base-Emitter Temperature Coefficient

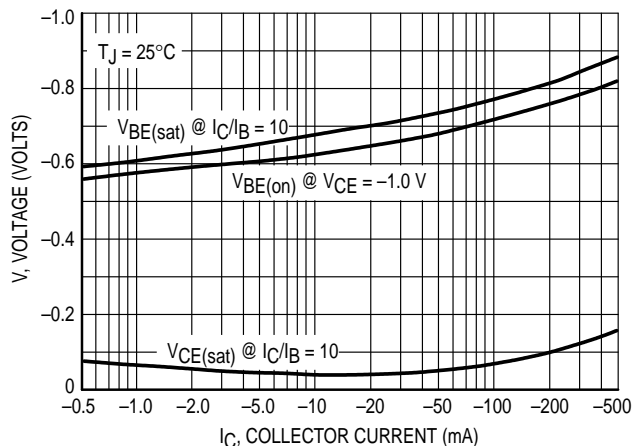


Figure 11. "On" Voltages

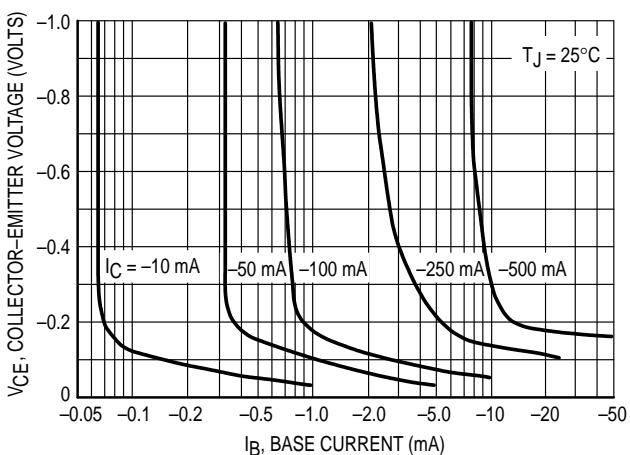


Figure 12. Collector Saturation Region

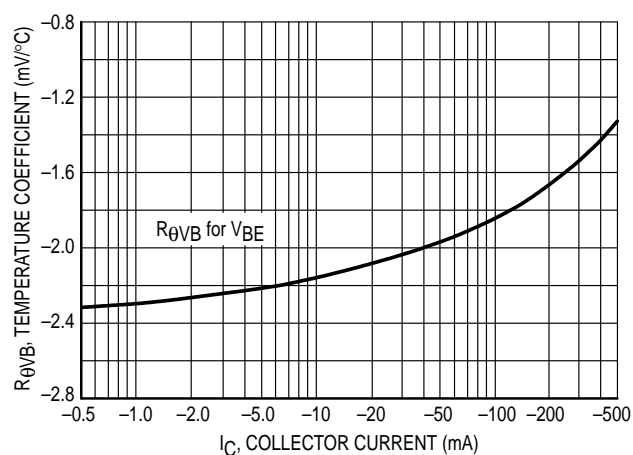
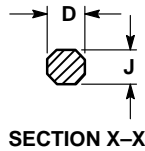
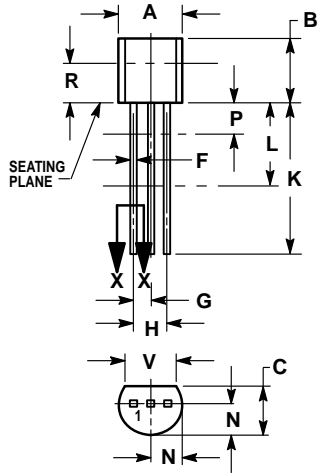


Figure 13. Base-Emitter Temperature Coefficient

PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
 4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | 0.175 | 0.205 | 4.45 | 5.20 |
| B | 0.170 | 0.210 | 4.32 | 5.33 |
| C | 0.125 | 0.165 | 3.18 | 4.19 |
| D | 0.016 | 0.022 | 0.41 | 0.55 |
| F | 0.016 | 0.019 | 0.41 | 0.48 |
| G | 0.045 | 0.055 | 1.15 | 1.39 |
| H | 0.095 | 0.105 | 2.42 | 2.66 |
| J | 0.015 | 0.020 | 0.39 | 0.50 |
| K | 0.500 | — | 12.70 | — |
| L | 0.250 | — | 6.35 | — |
| N | 0.080 | 0.105 | 2.04 | 2.66 |
| P | — | 0.100 | — | 2.54 |
| R | 0.115 | — | 2.93 | — |
| V | 0.135 | — | 3.43 | — |

CASE 029-04
(TO-226AA)
ISSUE AD

STYLE 17:
PIN 1. COLLECTOR
2. BASE
3. EMITTER

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