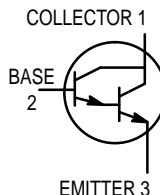
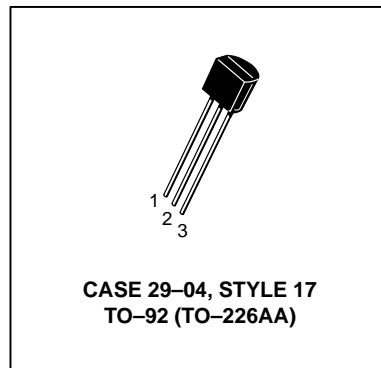
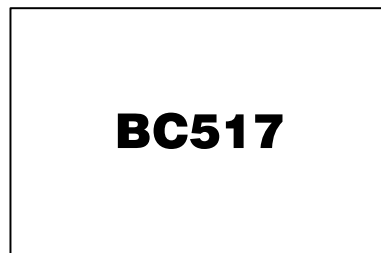


Darlington Transistors

NPN Silicon



MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|----------------|-------------|-------------------------------|
| Collector–Emitter Voltage | V_{CES} | 30 | Vdc |
| Collector–Base Voltage | V_{CB} | 40 | Vdc |
| Emitter–Base Voltage | V_{EB} | 10 | Vdc |
| Collector Current — Continuous | I_C | 1.0 | Adc |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C | P_D | 625 12 | mW mW/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 1.5 12 | Watts 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 ($I_C = 2.0 \text{ mAdc}, V_{BE} = 0$) | $V_{(BR)CES}$ | 30 | — | — | Vdc |
| Collector–Base Breakdown Voltage ($I_C = 10 \mu\text{Adc}, I_E = 0$) | $V_{(BR)CBO}$ | 40 | — | — | Vdc |
| Emitter–Base Breakdown Voltage ($I_E = 100 \text{ nAdc}, I_C = 0$) | $V_{(BR)EBO}$ | 10 | — | — | Vdc |
| Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}$) | I_{CES} | — | — | 500 | nAdc |
| Collector Cutoff Current ($V_{CB} = 30 \text{ Vdc}, I_E = 0$) | I_{CBO} | — | — | 100 | nAdc |
| Emitter Cutoff Current ($V_{EB} = 10 \text{ Vdc}, I_C = 0$) | I_{EBO} | — | — | 100 | nAdc |

BC517

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|----------------------|--------|-----|-----|-----------------|
| ON CHARACTERISTICS(1) | | | | | |
| DC Current Gain (I _C = 20 mA _{dc} , V _{CE} = 2.0 V _{dc}) | h _{FE} | 30,000 | — | — | — |
| Collector–Emitter Saturation Voltage (I _C = 100 mA _{dc} , I _B = 0.1 mA _{dc}) | V _{CE(sat)} | — | — | 1.0 | V _{dc} |
| Base–Emitter On Voltage (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc}) | V _{BE(on)} | — | — | 1.4 | V _{dc} |

SMALL–SIGNAL CHARACTERISTICS

| | | | | | |
|---|----------------|---|-----|---|-----|
| Current–Gain — Bandwidth Product ⁽²⁾ (I _C = 10 mA _{dc} , V _{CE} = 5.0 V _{dc} , f = 100 MHz) | f _T | — | 200 | — | MHz |
|---|----------------|---|-----|---|-----|

1. Pulse Test: Pulse Width ≤ 2.0%.
2. f_T = |h_{fe}| • f_{test}

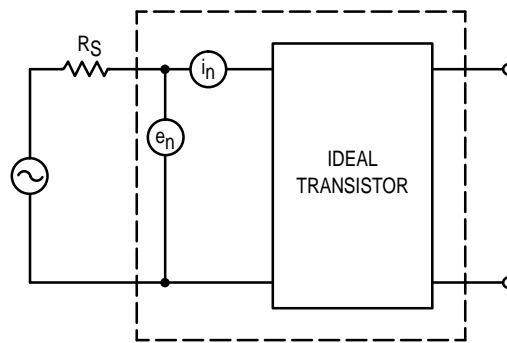


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

($V_{CE} = 5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$)

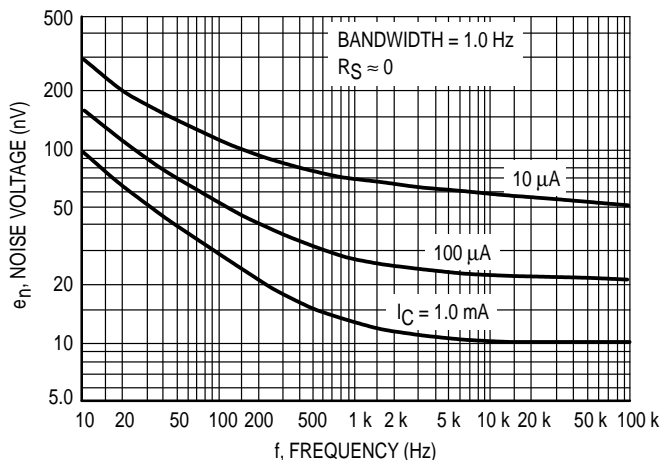


Figure 2. Noise Voltage

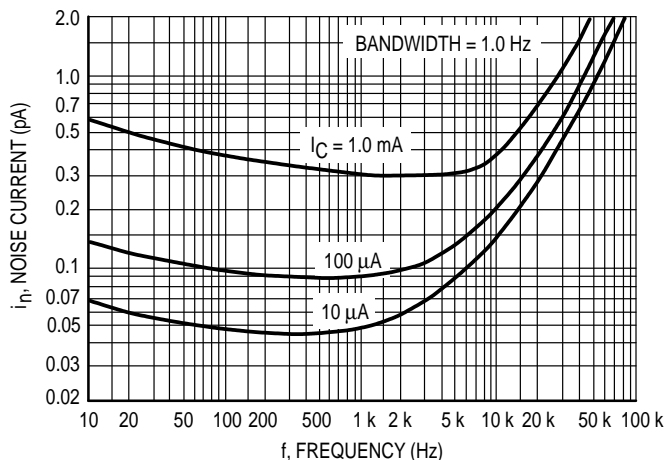


Figure 3. Noise Current

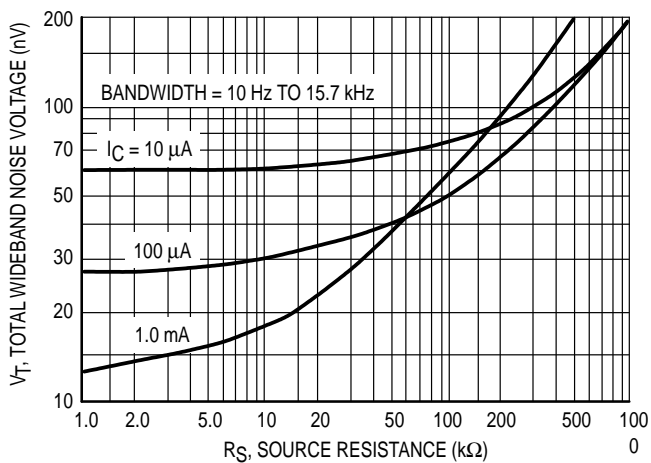


Figure 4. Total Wideband Noise Voltage

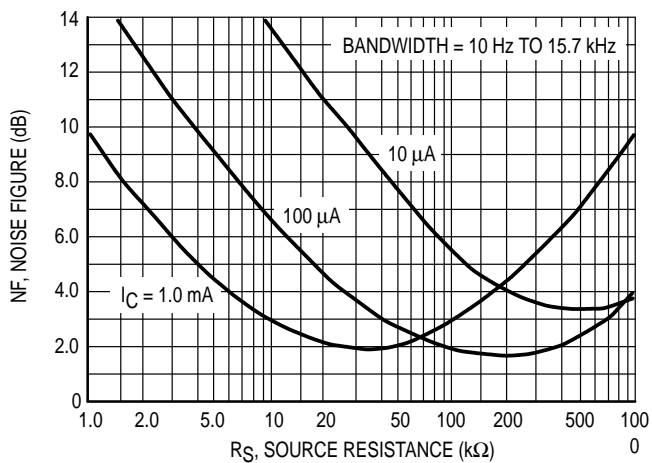


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

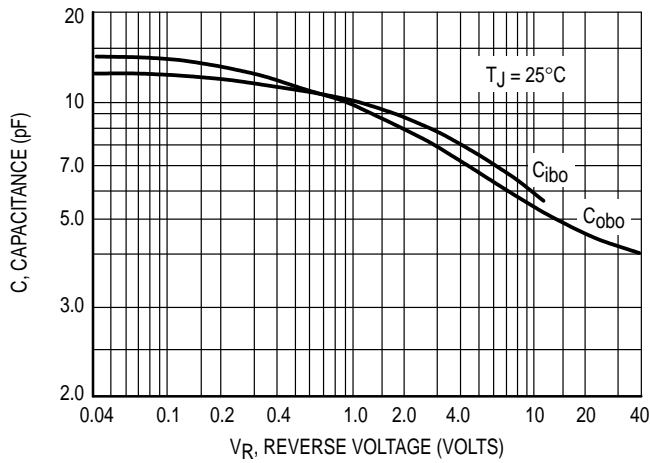


Figure 6. Capacitance

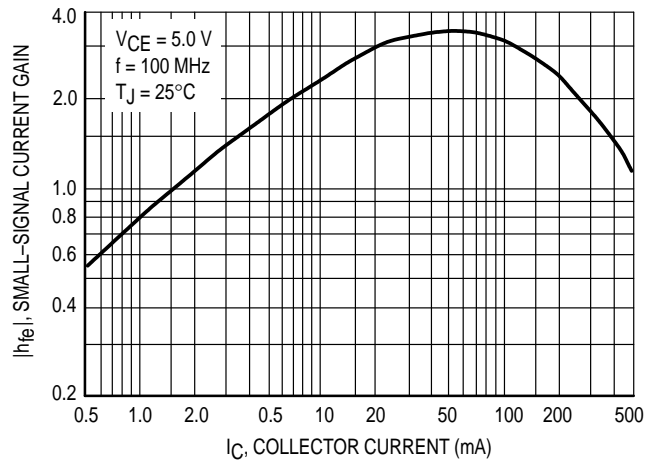


Figure 7. High Frequency Current Gain

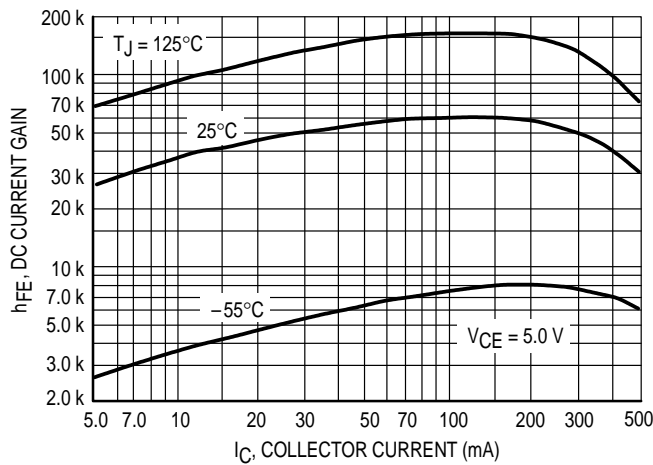


Figure 8. DC Current Gain

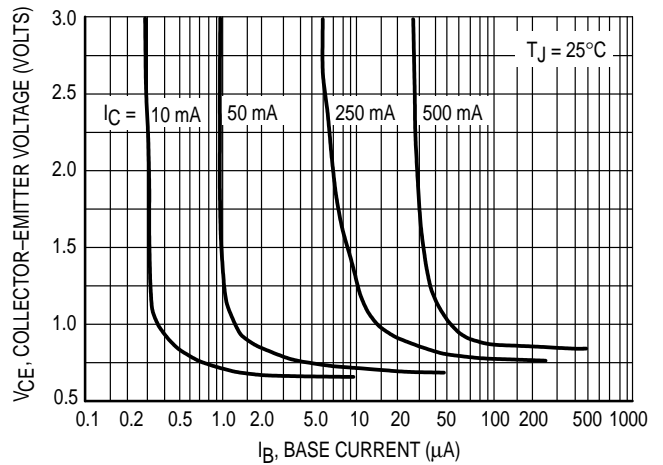


Figure 9. Collector Saturation Region

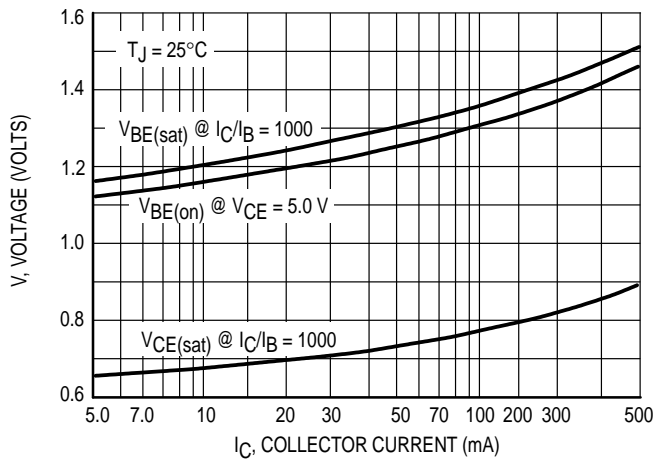


Figure 10. "On" Voltages

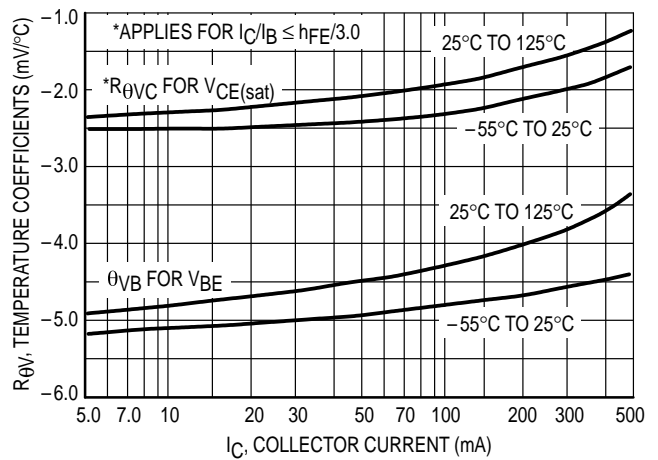


Figure 11. Temperature Coefficients

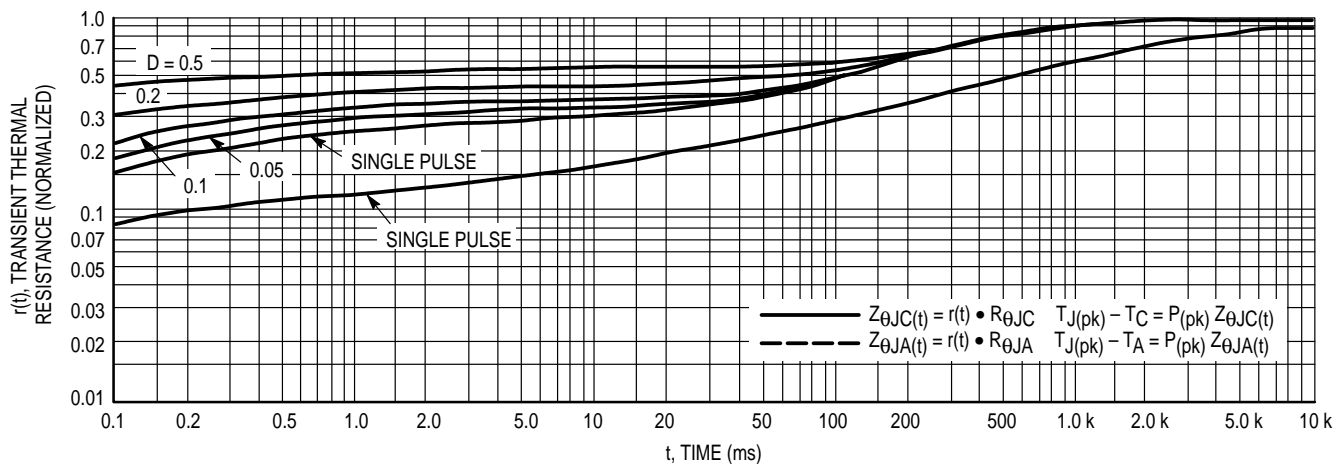


Figure 12. Thermal Response

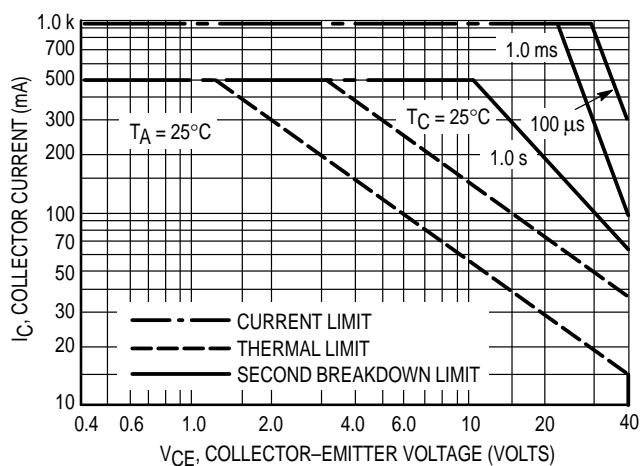
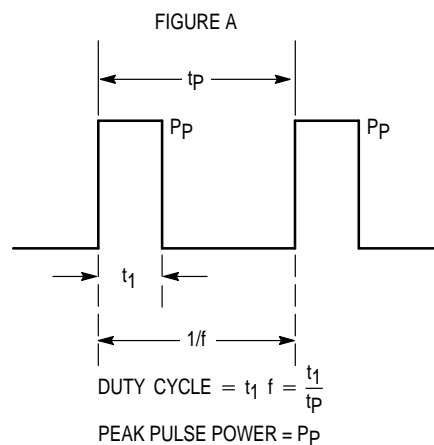
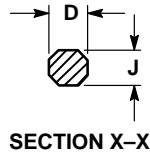
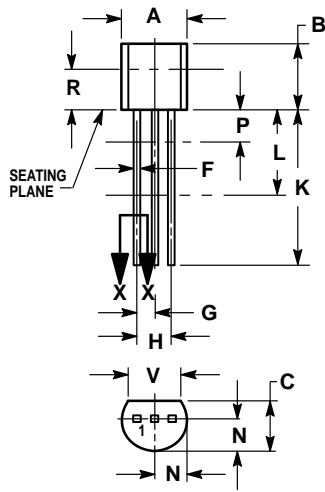


Figure 13. Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data

PACKAGE DIMENSIONS



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

- 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 | — |

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

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