

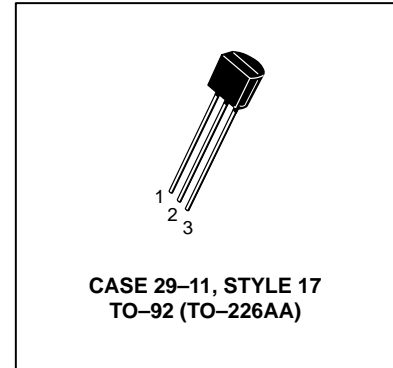
Darlington Transistors

NPN Silicon

BC517

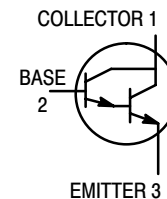
MAXIMUM RATINGS

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|---------------|--------|-----|-----|------|
| ON CHARACTERISTICS(1) | | | | | |
| DC Current Gain ($I_C = 20\text{ mA}$, $V_{CE} = 2.0\text{ Vdc}$) | h_{FE} | 30,000 | — | — | — |
| Collector–Emitter Saturation Voltage ($I_C = 100\text{ mA}$, $I_B = 0.1\text{ mA}$) | $V_{CE(sat)}$ | — | — | 1.0 | Vdc |
| Base–Emitter On Voltage ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$) | $V_{BE(on)}$ | — | — | 1.4 | Vdc |
| SMALL–SIGNAL CHARACTERISTICS | | | | | |
| Current–Gain — Bandwidth Product(2) ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 100\text{ MHz}$) | f_T | — | 200 | — | MHz |

1. Pulse Test: Pulse Width $\leq 2.0\%$.

2. $f_T = |h_{fe}| \cdot f_{test}$

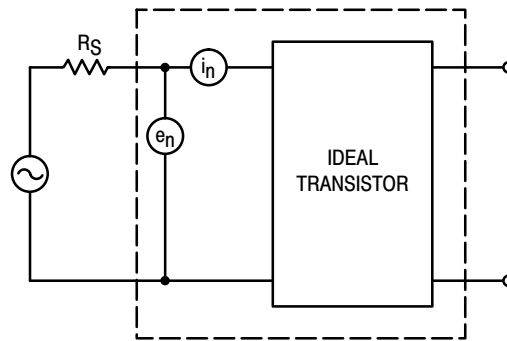


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

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

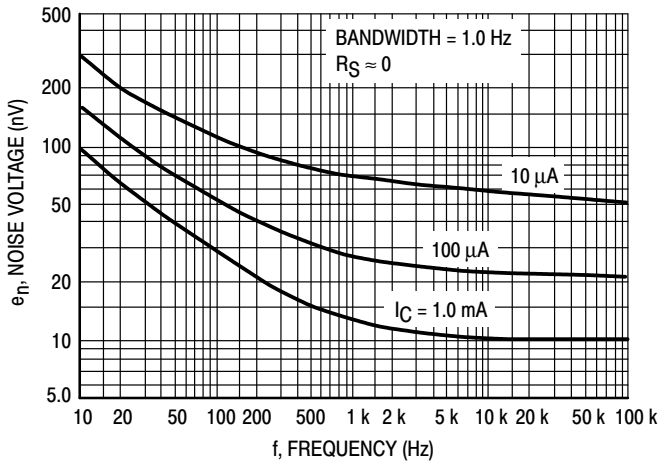


Figure 2. Noise Voltage

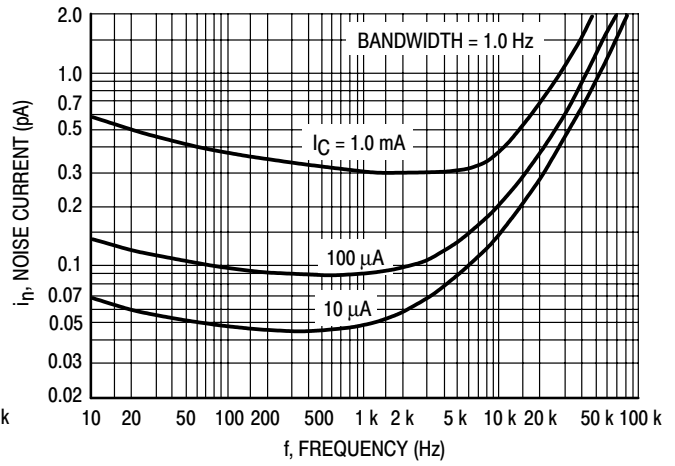


Figure 3. Noise Current

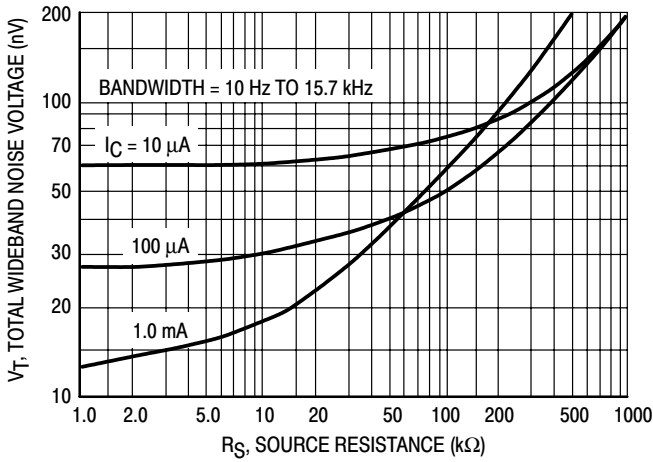


Figure 4. Total Wideband Noise Voltage

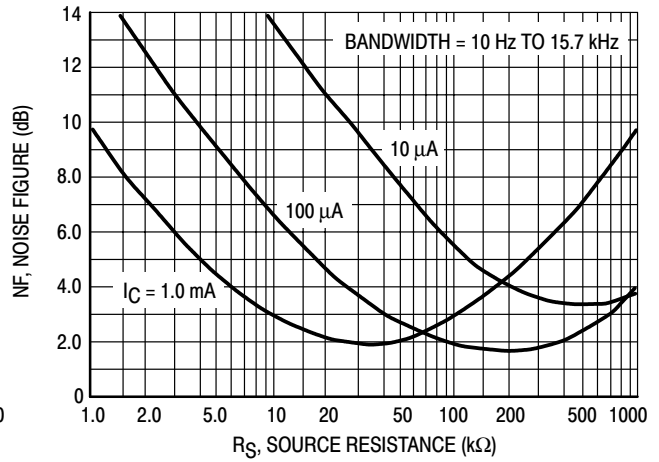


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

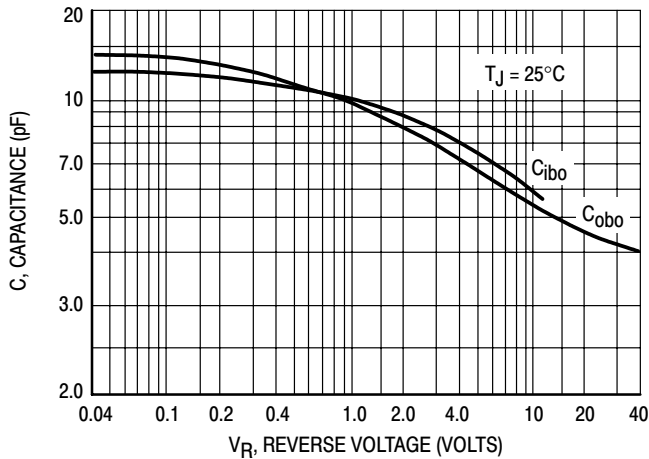


Figure 6. Capacitance

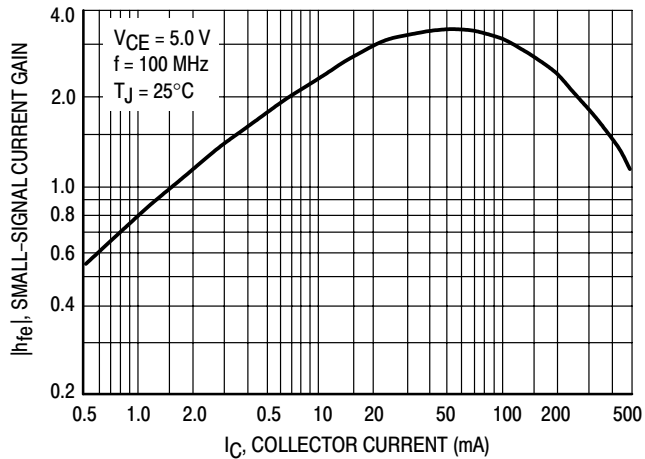


Figure 7. High Frequency Current Gain

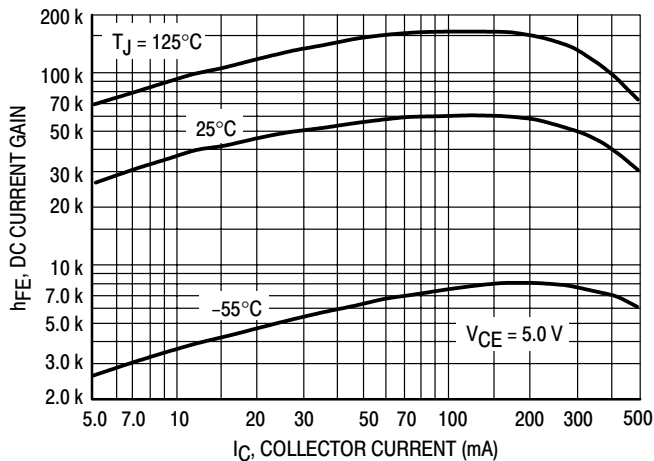


Figure 8. DC Current Gain

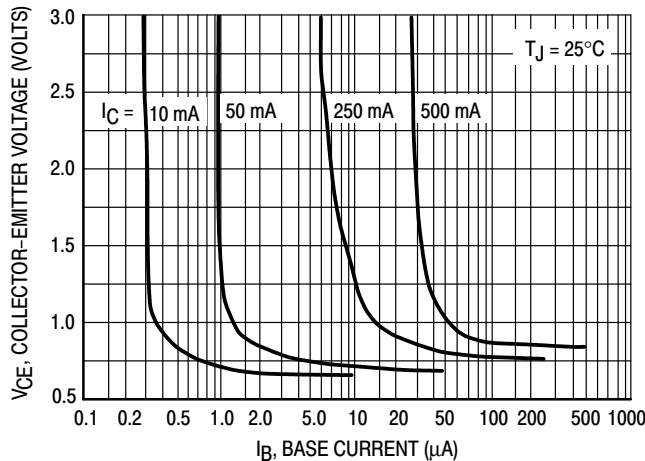


Figure 9. Collector Saturation Region

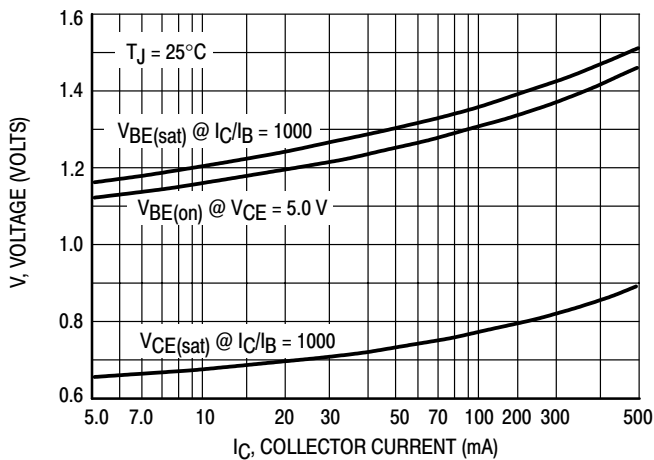


Figure 10. "On" Voltages

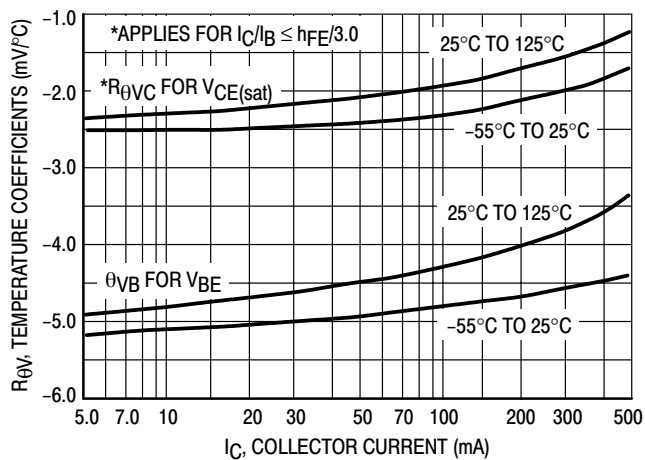


Figure 11. Temperature Coefficients

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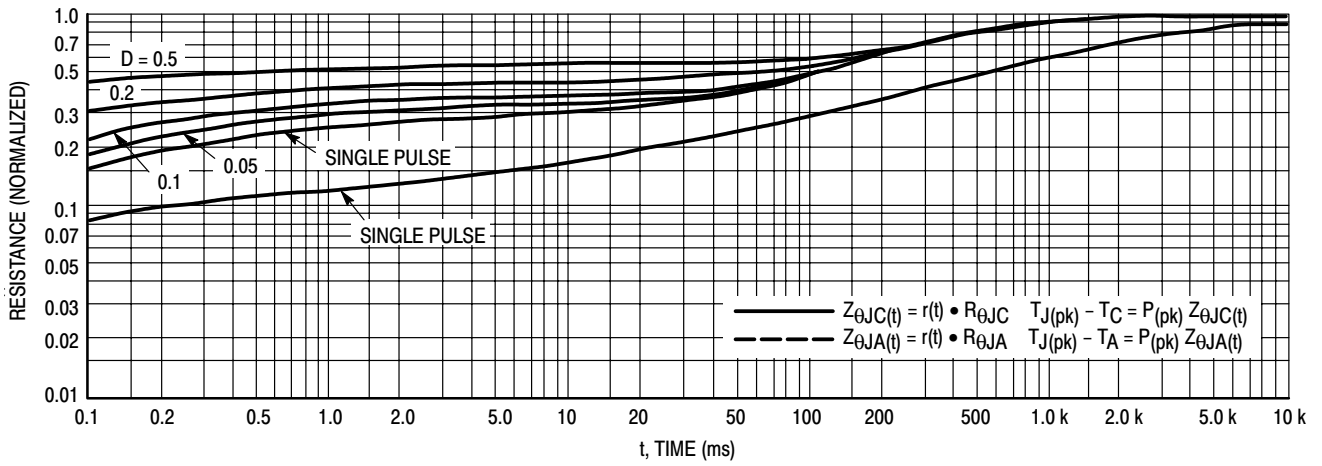


Figure 12. Thermal Response

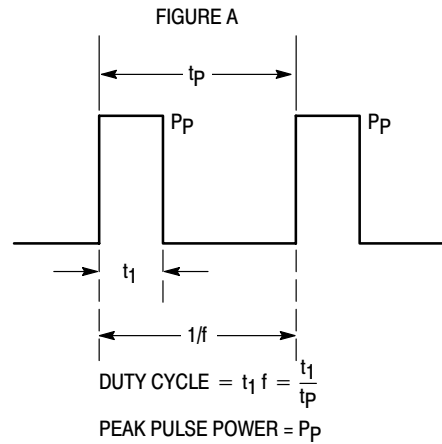
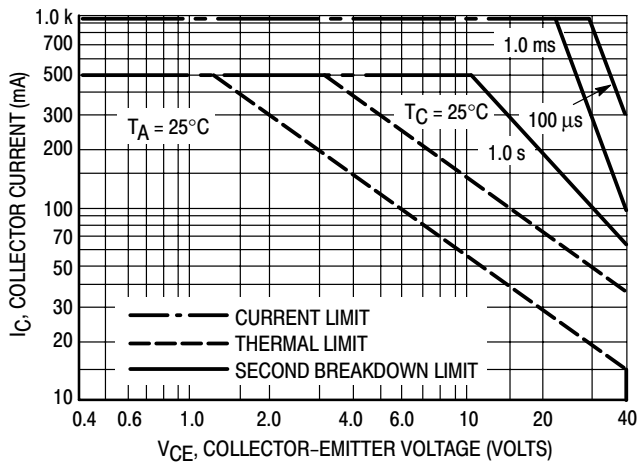
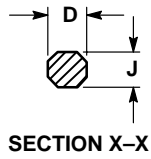
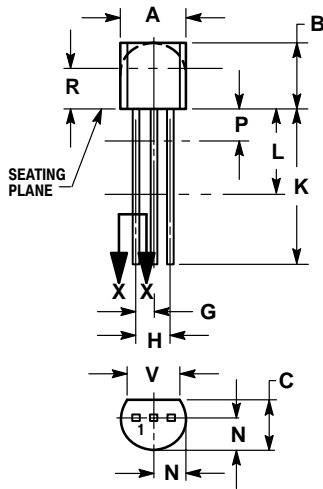


Figure 13. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data

BC517

PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-11
ISSUE AL



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. 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 | 0.021 | 0.407 | 0.533 |
| 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 | --- |

Notes

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