

BC517

Darlington Transistors

NPN Silicon

Features

- These are Pb-Free Devices*

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 $T_A = 25^\circ\text{C}$ | P_D | 625 12 | mW mW/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $T_C = 25^\circ\text{C}$ | P_D | 1.5 12 | W mW/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

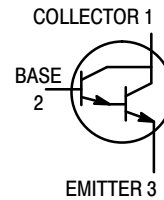
| Characteristic | Symbol | Max | Unit |
|---|-----------------|------|---------------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 200 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 83.3 | $^\circ\text{C}/\text{W}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

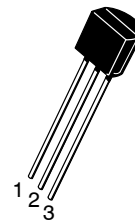


ON Semiconductor®

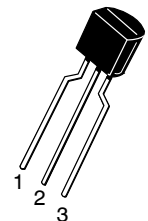
<http://onsemi.com>



TO-92
CASE 29
STYLE 17

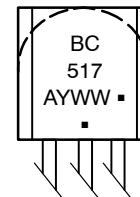


STRAIGHT LEAD
BULK PACK



BENT LEAD
TAPE & REEL
AMMO PACK

MARKING DIAGRAM



- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------|--------------------|--------------------|
| BC517G | TO-92 (Pb-Free) | 5000 Units / Bulk |
| BC517RL1G | TO-92 (Pb-Free) | 2000 / Tape & Reel |
| BC517ZL1G | TO-92 (Pb-Free) | 2000 / Ammo Pack |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

BC517

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---------------|--------|-----|-----|------|
| OFF CHARACTERISTICS | | | | | |
| Collector - Emitter Breakdown Voltage ($I_C = 2.0 \text{ mA}$, $I_{BE} = 0$) | $V_{(BR)CES}$ | 30 | - | - | Vdc |
| Collector - Base Breakdown Voltage ($I_C = 10 \mu\text{A}$, $I_E = 0$) | $V_{(BR)CBO}$ | 40 | - | - | Vdc |
| Emitter - Base Breakdown Voltage ($I_E = 100 \mu\text{A}$, $I_C = 0$) | $V_{(BR)EBO}$ | 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 ($V_{CB} = 10 \text{ Vdc}$, $I_C = 0$) | I_{EBO} | - | - | 100 | nAdc |
| ON CHARACTERISTICS (Note 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 |
| Collector - Emitter Saturation 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 (Note 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 = 300 μs , Duty Cycle 2.0%.

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

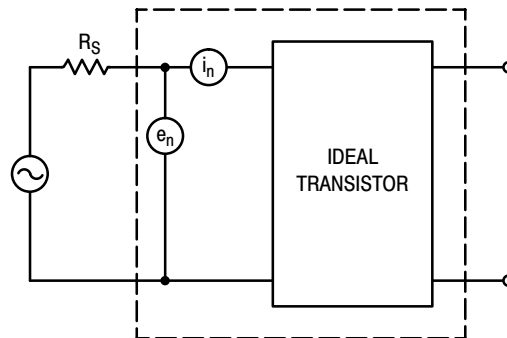


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

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

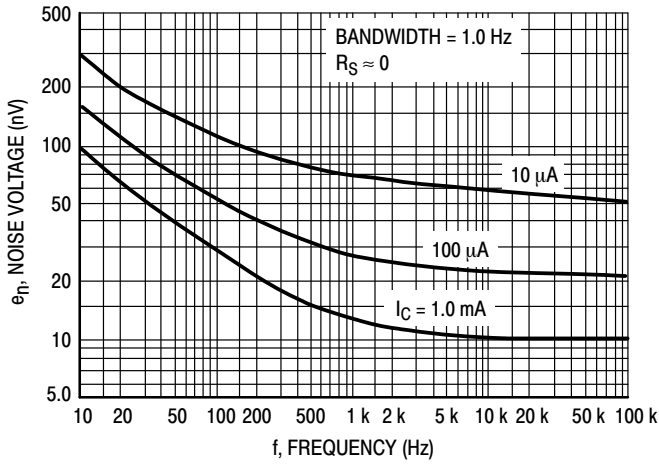


Figure 2. Noise Voltage

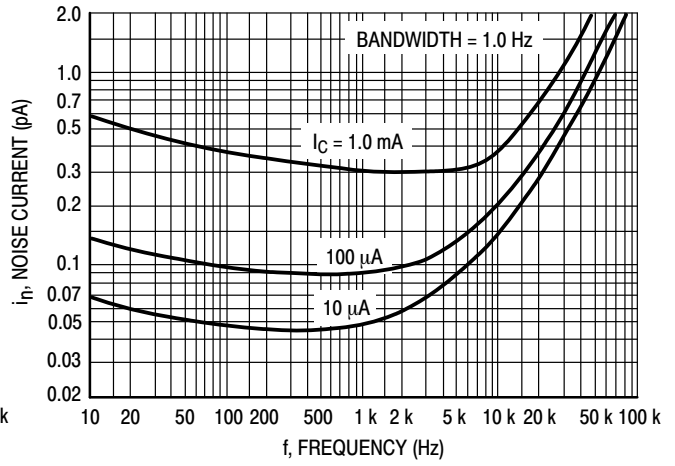


Figure 3. Noise Current

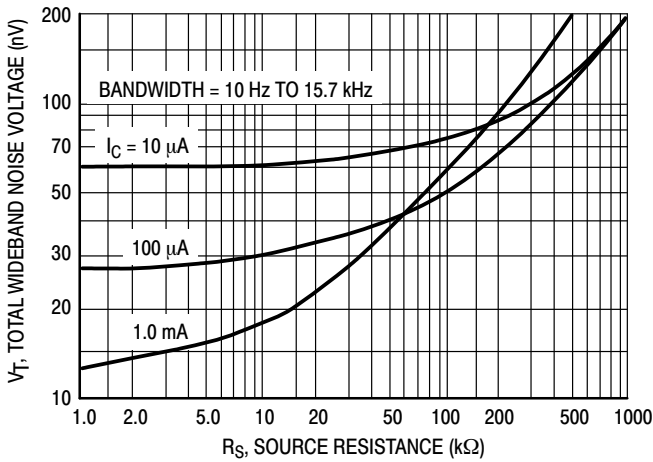


Figure 4. Total Wideband Noise Voltage

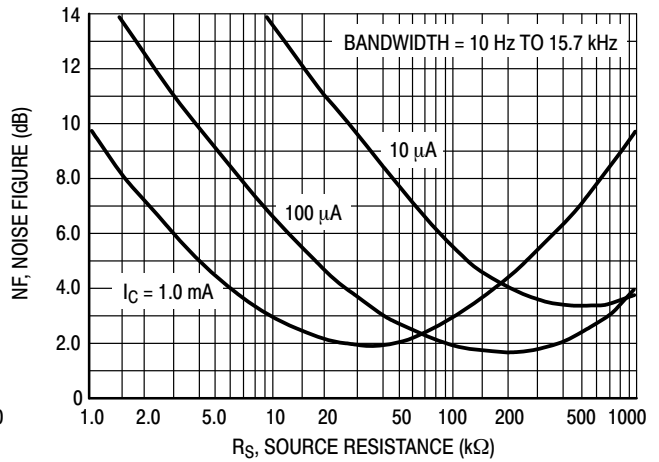


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

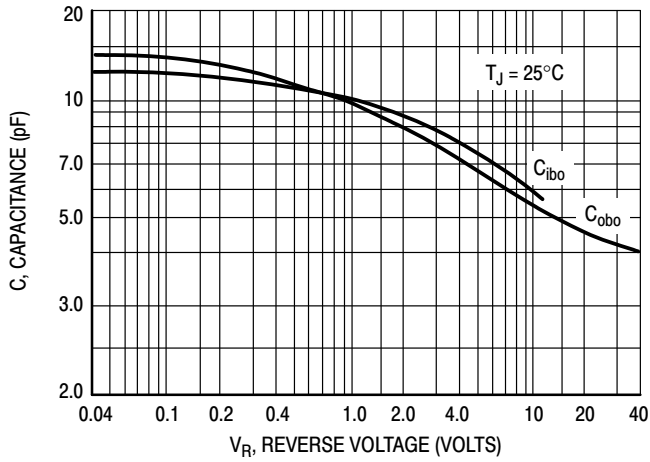


Figure 6. Capacitance

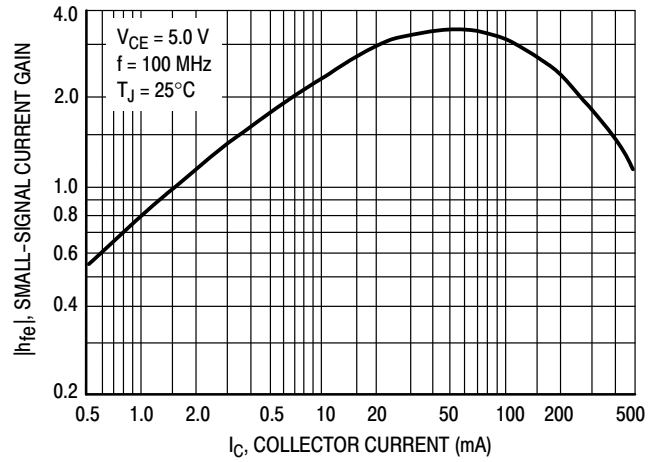


Figure 7. High Frequency Current Gain

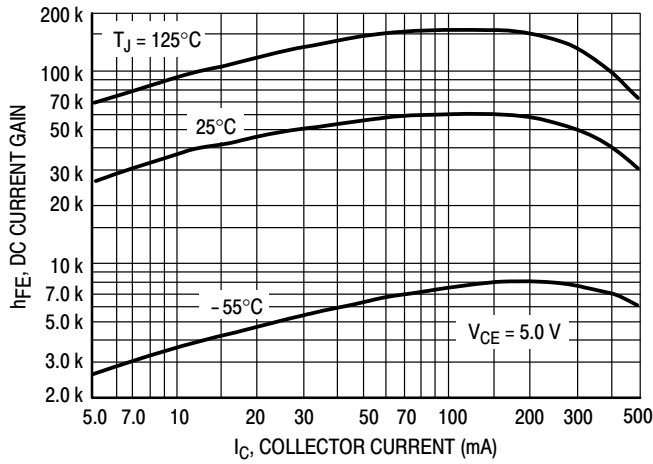


Figure 8. DC Current Gain

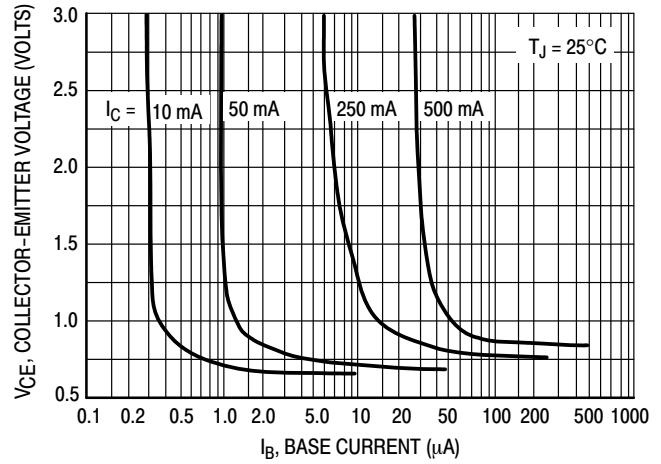


Figure 9. Collector Saturation Region

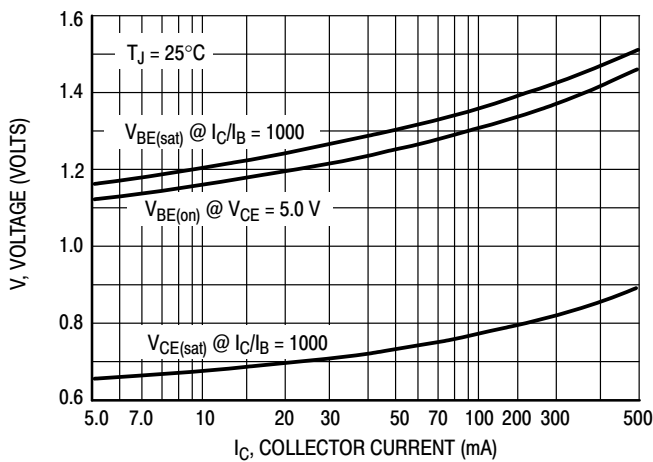


Figure 10. "On" Voltages

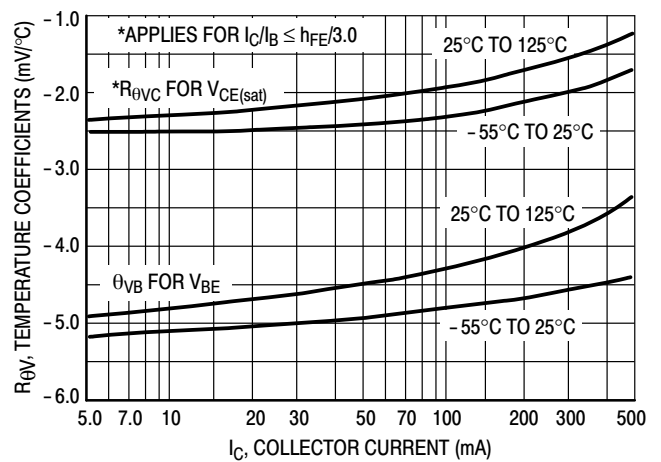


Figure 11. Temperature Coefficients

BC517

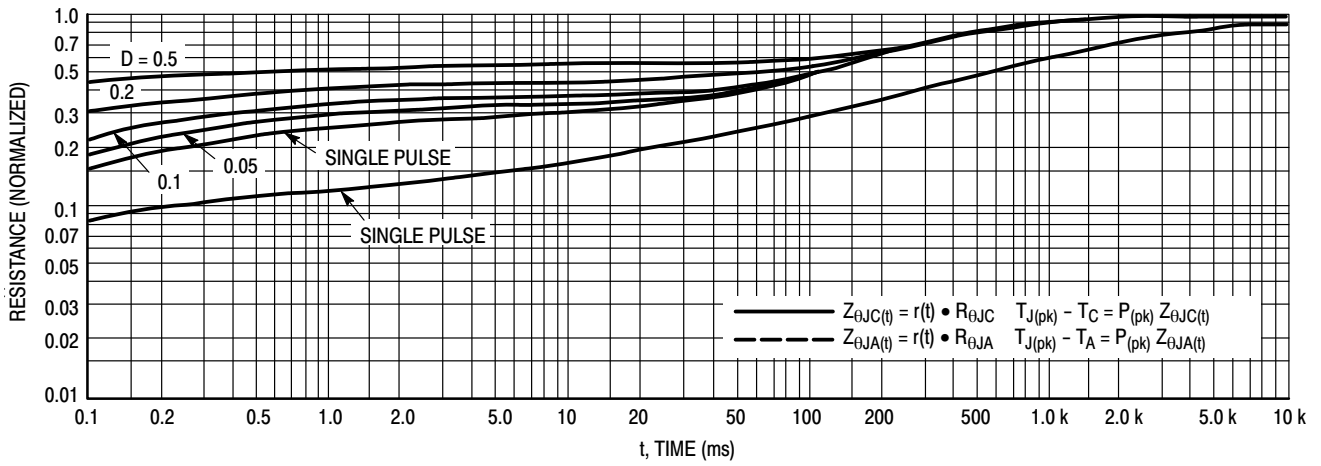


Figure 12. Thermal Response

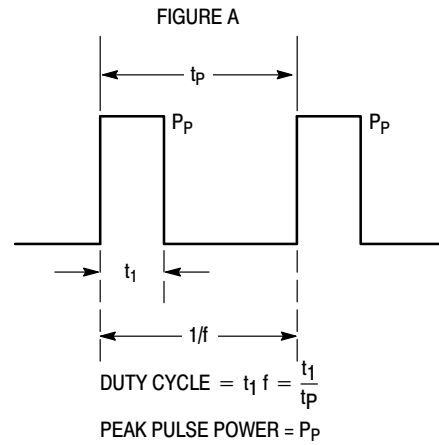
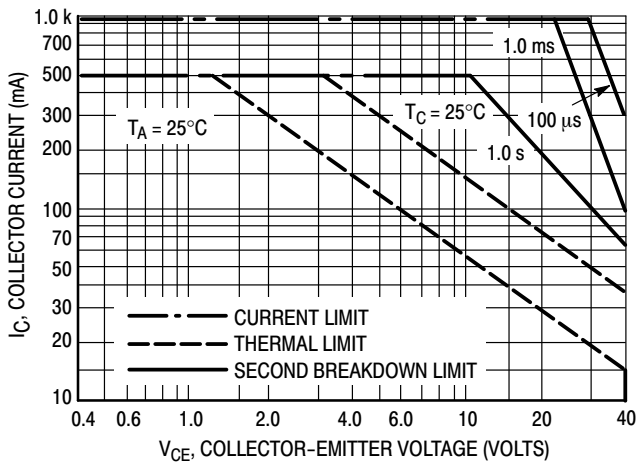


Figure 13. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data

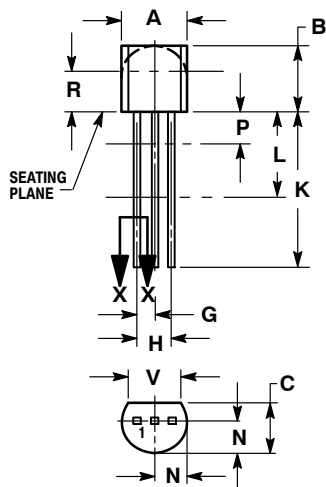
BC517

PACKAGE DIMENSIONS

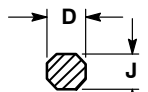
TO-92 (TO-226)

CASE 29-11

ISSUE AM



STRAIGHT LEAD
BULK PACK

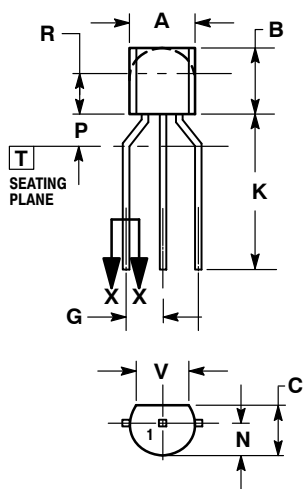


SECTION X-X

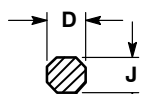
NOTES:

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 | --- |



BENT LEAD
TAPE & REEL
AMMO PACK



SECTION X-X


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

| DIM | MILLIMETERS | |
|-----|-------------|------|
| | MIN | MAX |
| A | 4.45 | 5.20 |
| B | 4.32 | 5.33 |
| C | 3.18 | 4.19 |
| D | 0.40 | 0.54 |
| G | 2.40 | 2.80 |
| J | 0.39 | 0.50 |
| K | 12.70 | --- |
| N | 2.04 | 2.66 |
| P | 1.50 | 4.00 |
| R | 2.93 | --- |
| V | 3.43 | --- |

STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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