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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# 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

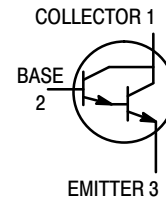
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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.

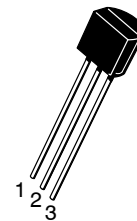


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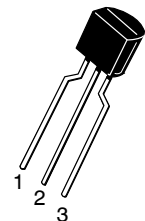
<http://onsemi.com>



TO-92  
CASE 29  
STYLE 17

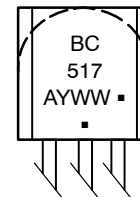


STRAIGHT LEAD  
BULK PACK



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
<b>OFF CHARACTERISTICS</b>					
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
<b>ON CHARACTERISTICS (Note 1)</b>					
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
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
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  $\mu\text{s}$ , Duty Cycle 2.0%.

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

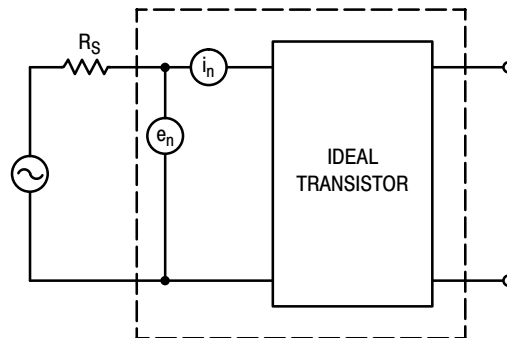


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

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

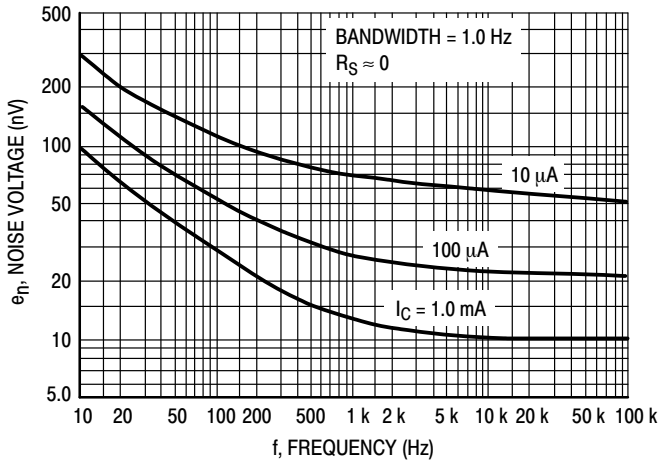


Figure 2. Noise Voltage

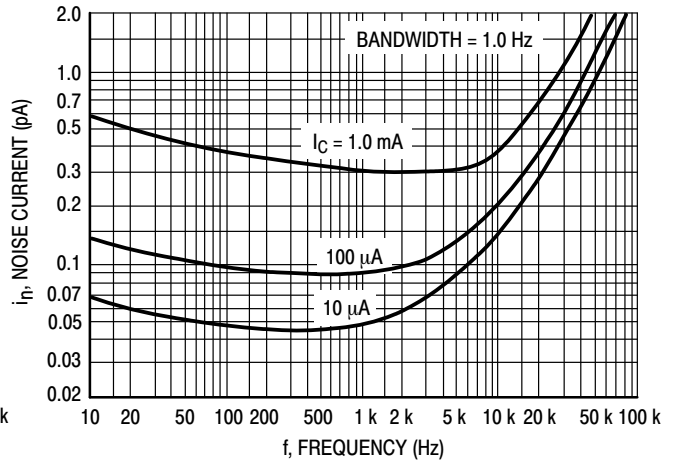


Figure 3. Noise Current

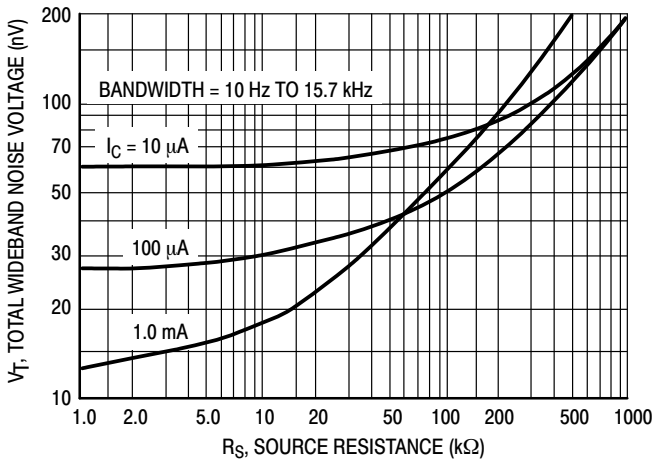


Figure 4. Total Wideband Noise Voltage

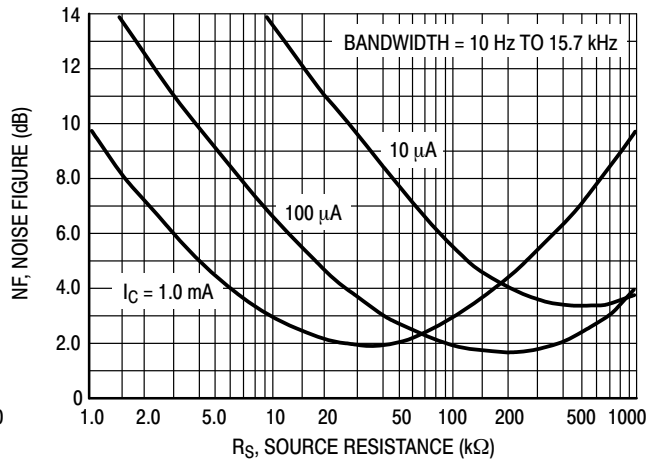


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

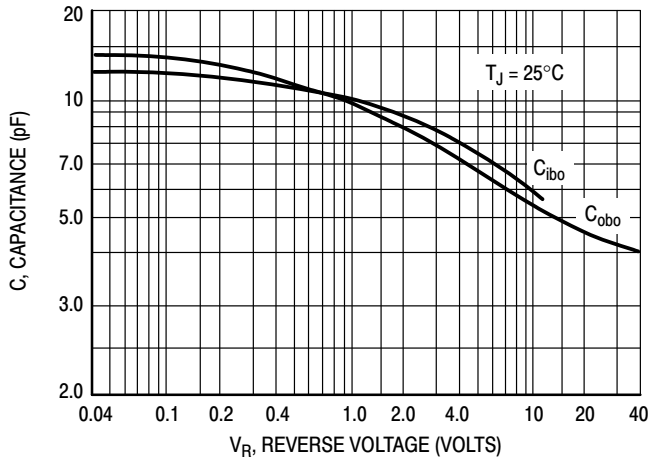


Figure 6. Capacitance

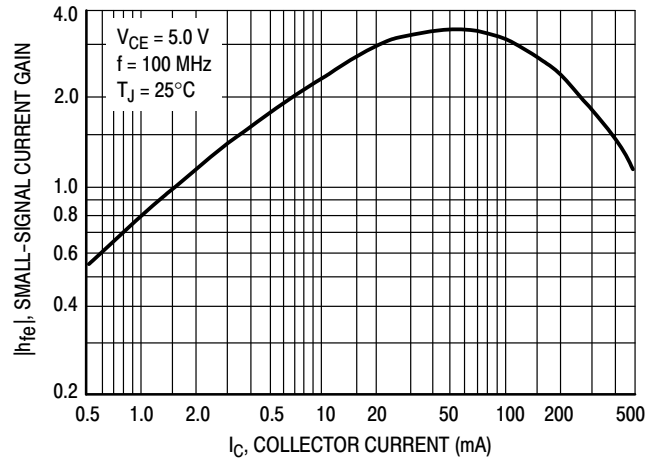


Figure 7. High Frequency Current Gain

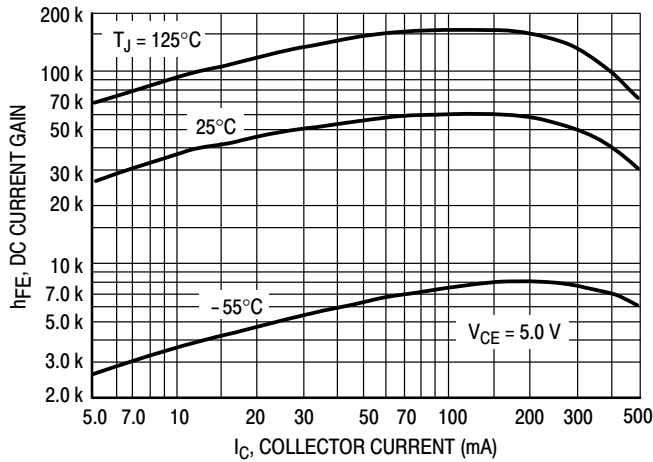


Figure 8. DC Current Gain

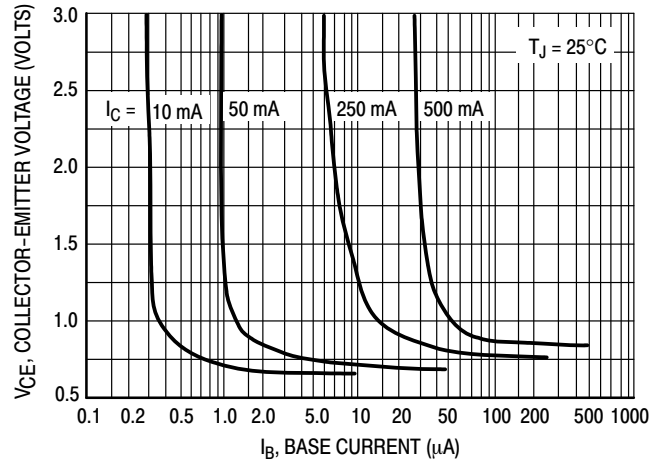


Figure 9. Collector Saturation Region

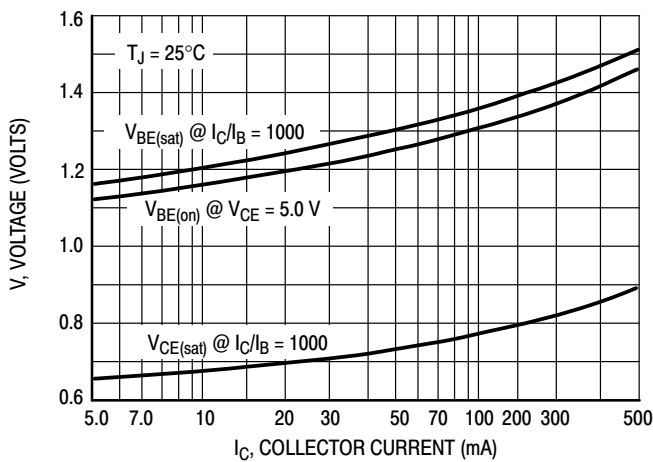


Figure 10. "On" Voltages

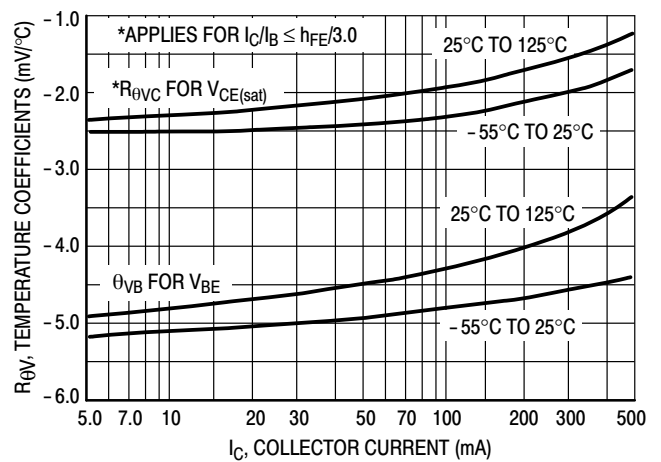


Figure 11. Temperature Coefficients

# BC517

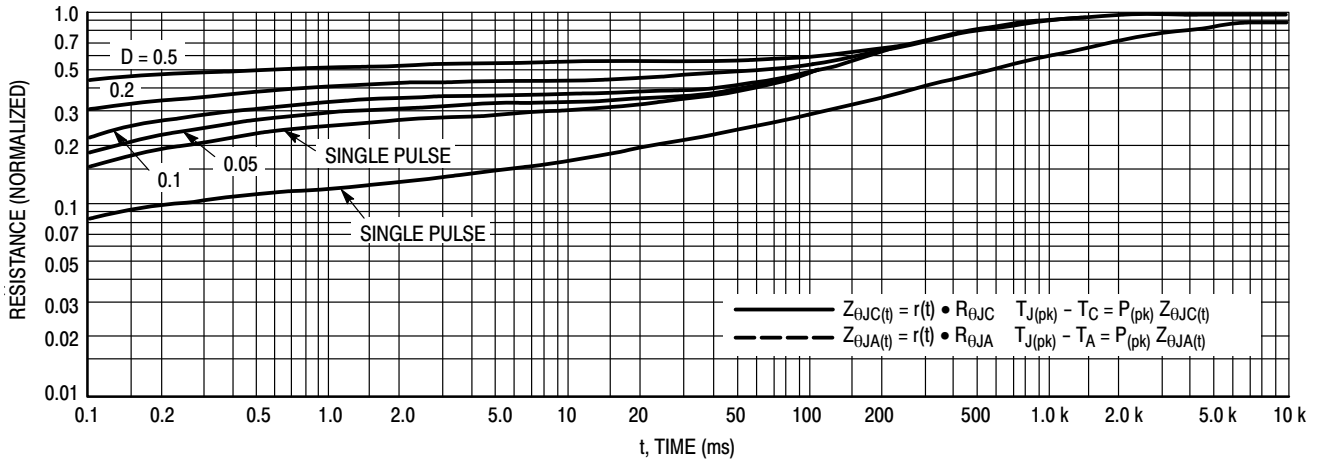


Figure 12. Thermal Response

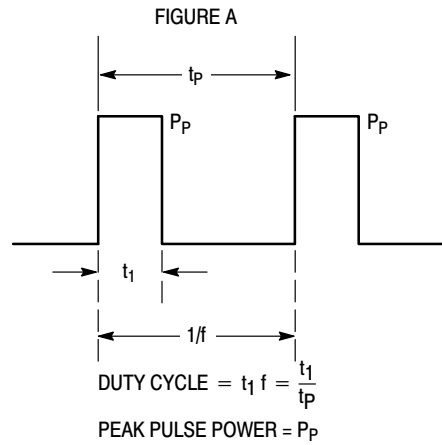
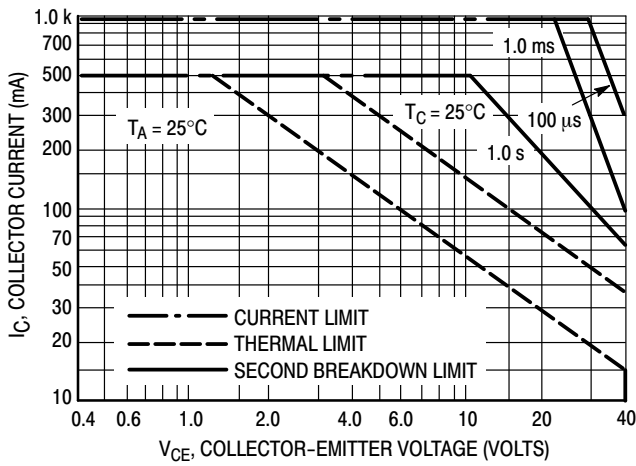
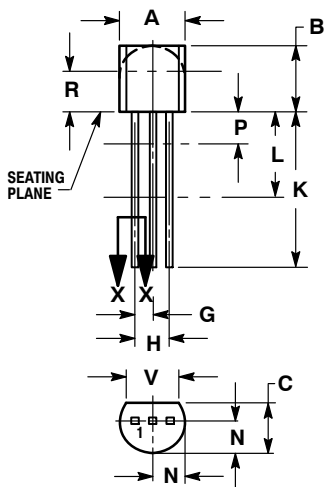


Figure 13. Active Region Safe Operating Area    Design Note: Use of Transient Thermal Resistance Data

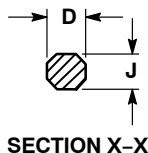
# BC517

## PACKAGE DIMENSIONS

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



STRAIGHT LEAD  
BULK PACK

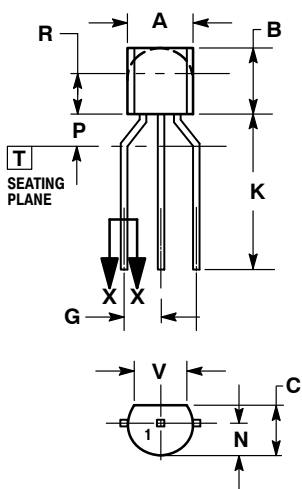


SECTION X-X

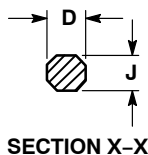
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1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

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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