

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

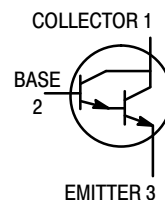
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$

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.

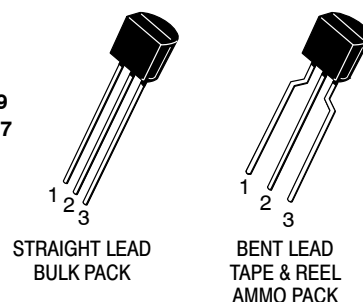


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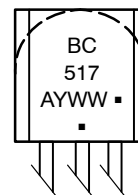
TO-92
CASE 29
STYLE 17



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

†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.

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 ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	40	–	–	Vdc
Emitter – Base Breakdown Voltage ($I_E = 100\text{ }\mu\text{A}$, $I_C = 0$)	$V_{(BR)EBO}$	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
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1. Pulse Test: Pulse Width = $300\text{ }\mu\text{s}$, Duty Cycle 2.0%.
2. $f_T = |h_{fe}| \cdot f_{test}$

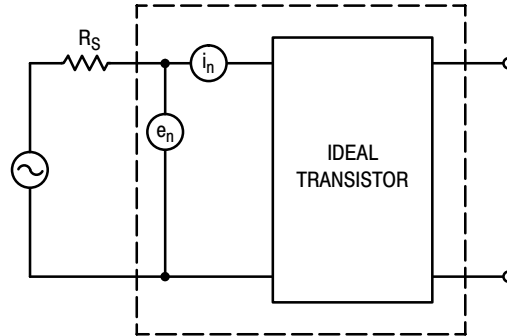


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

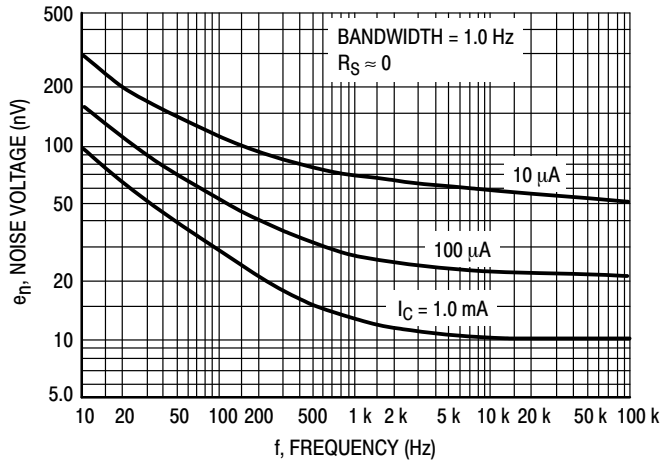
 $(V_{CE} = 5.0 \text{ Vdc}, T_A = 25^\circ\text{C})$ 

Figure 2. Noise Voltage

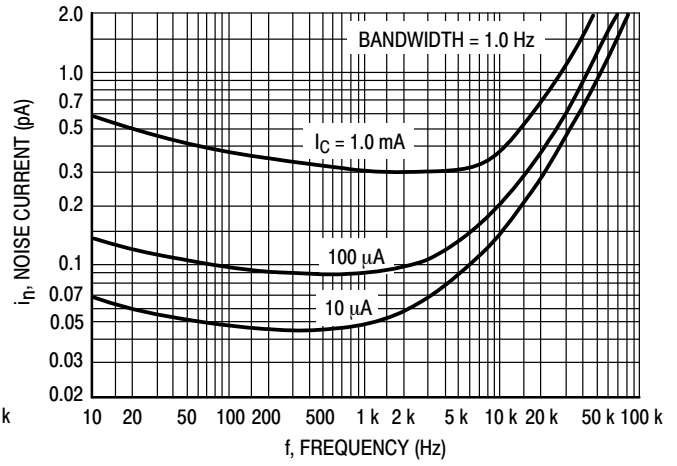


Figure 3. Noise Current

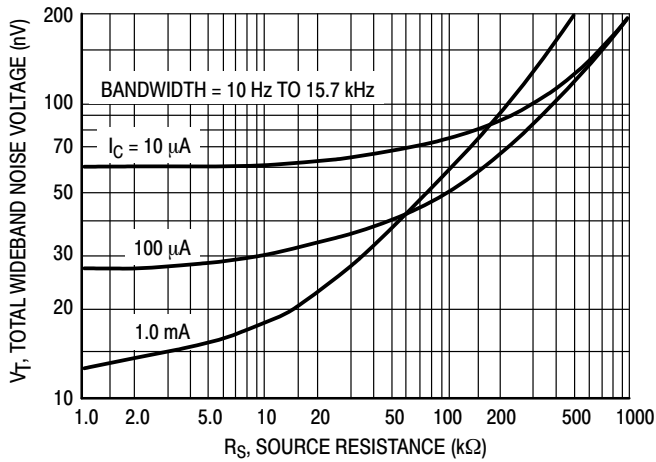


Figure 4. Total Wideband Noise Voltage

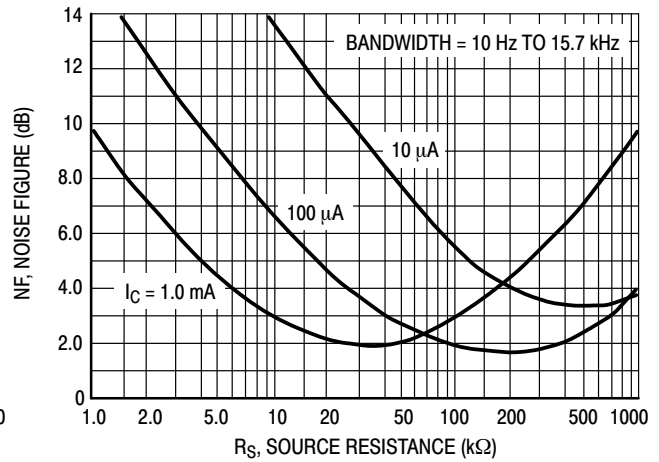


Figure 5. Wideband Noise Figure

SMALL-SIGNAL CHARACTERISTICS

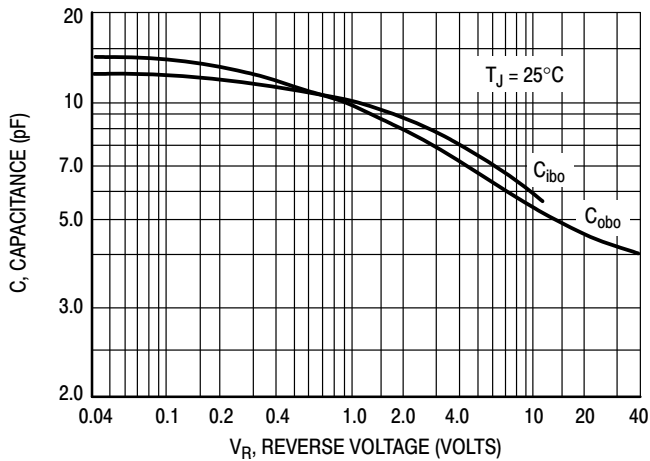


Figure 6. Capacitance

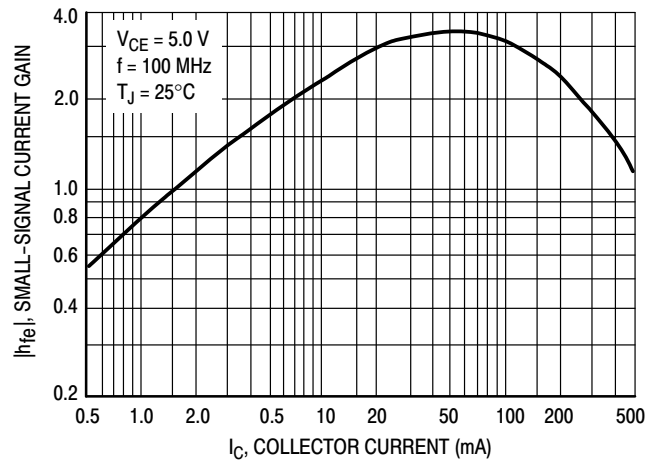


Figure 7. High Frequency Current Gain

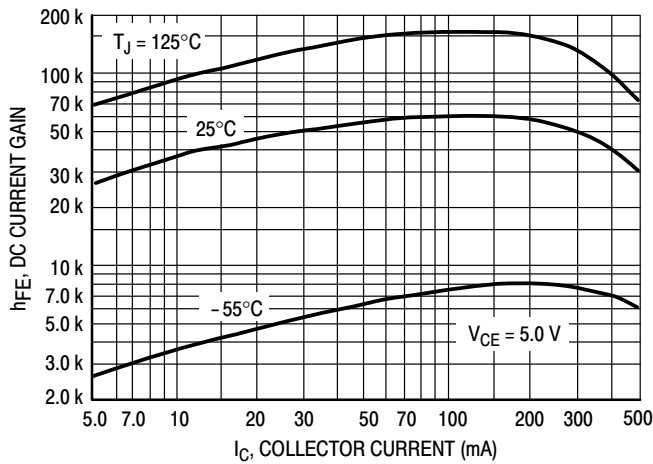


Figure 8. DC Current Gain

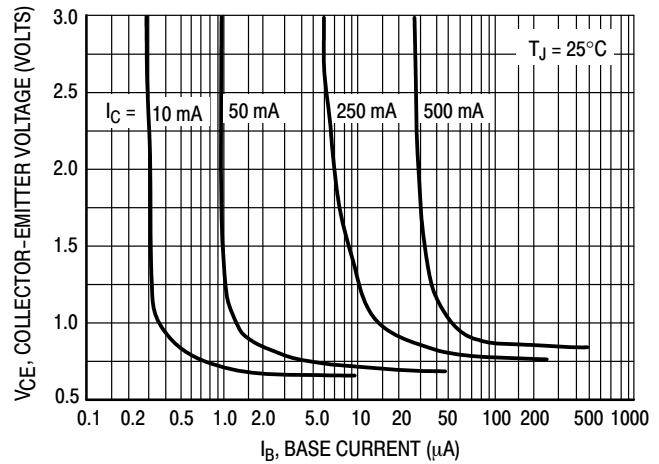


Figure 9. Collector Saturation Region

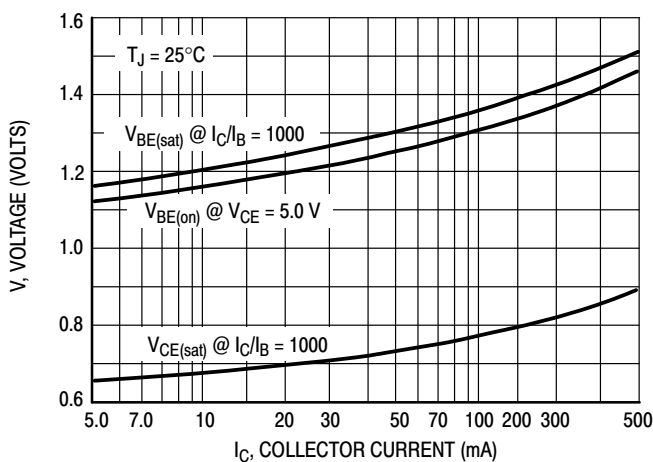


Figure 10. "On" Voltages

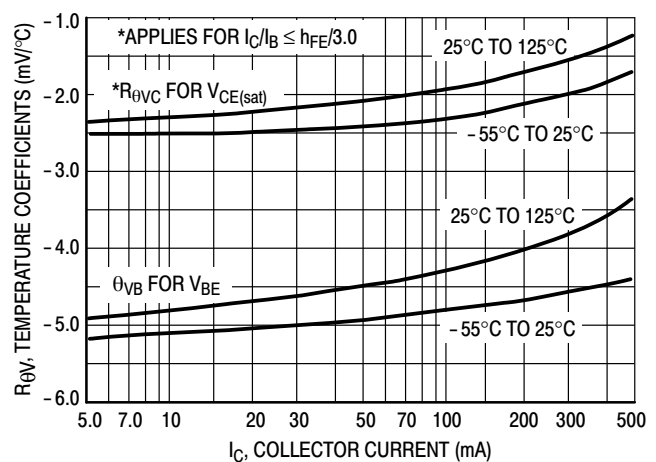


Figure 11. Temperature Coefficients

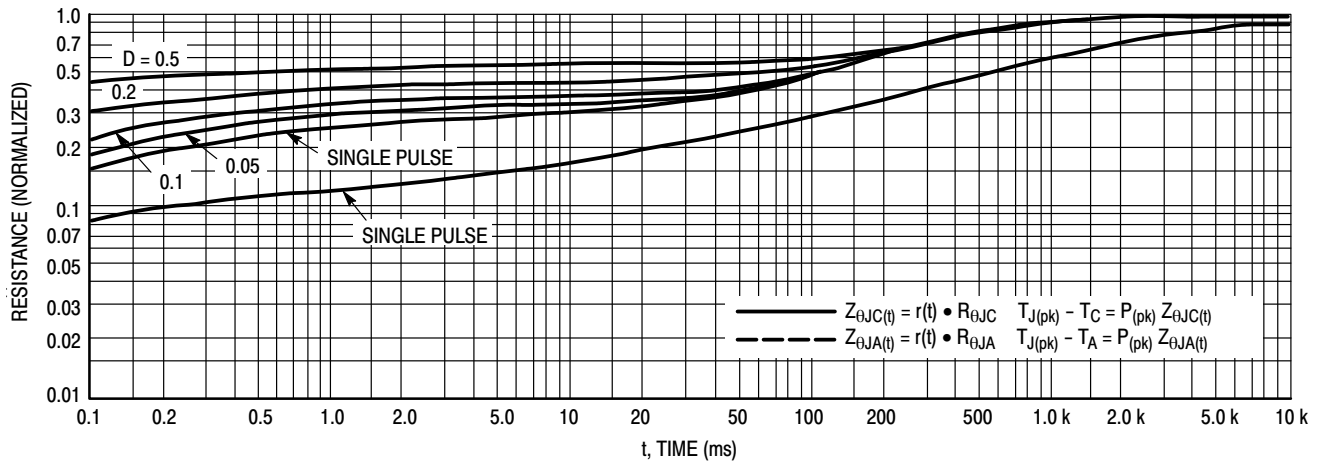


Figure 12. Thermal Response

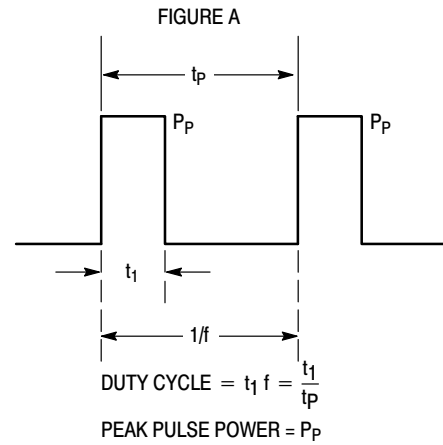
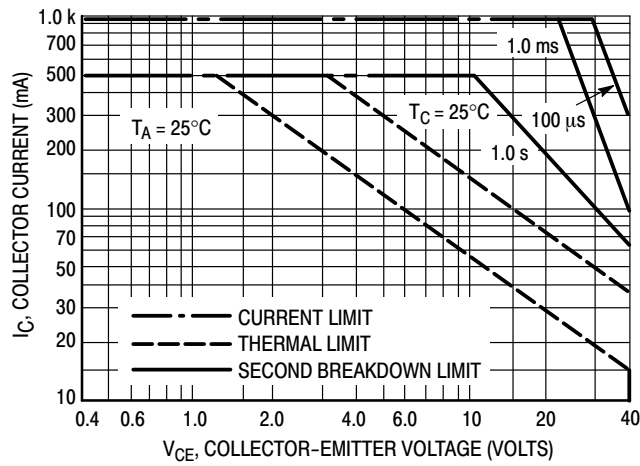
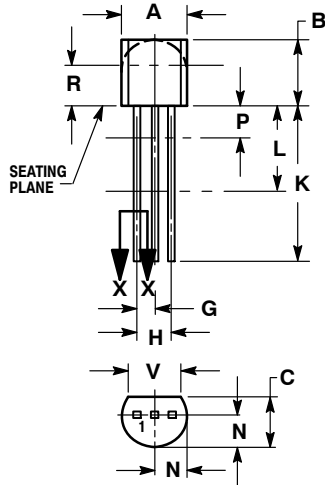


Figure 13. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data

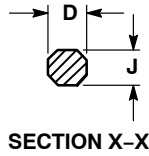
BC517

PACKAGE DIMENSIONS

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



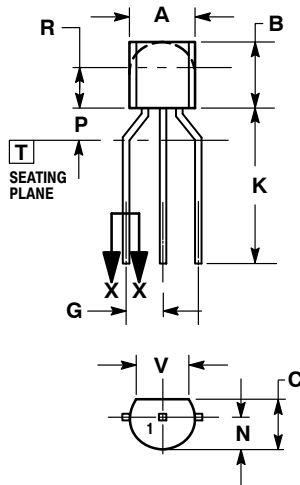
STRAIGHT LEAD
BULK PACK



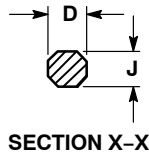
NOTES:

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




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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