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BC517

Darlington Transistors

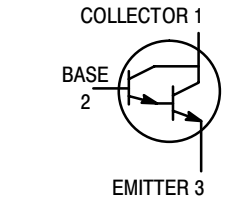
NPN Silicon

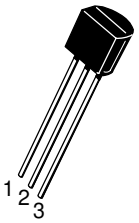
ON Semiconductor®

http://onsemi.com

Features

- Pb−Free Packages are Available*





TO−92
CASE 29
STYLE 17

MAXIMUM RATINGS

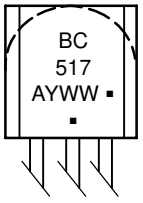
Rating	Symbol	Value	Unit
Collector − Emitter Voltage	V_{CES}	30	Vdc
Collector − Base Voltage	V_{CB}	40	Vdc
Collector − Emitter Voltage	V_{EB}	10	Vdc
Collector Current − Continuous	I_C	1.0	Adc
Total Power Dissipation @ T_A = 25°C Derate above T_A = 25°C	P_D	625 12	mW mW/°C
Total Power Dissipation @ T_A = 25°C Derate above T_A = 25°C	P_D	1.5 12	W mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

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

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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†
BC517	TO−92	5000 Units / Bulk
BC517G	TO−92 (Pb−Free)	5000 Units / Bulk
BC517RL1	TO−92	2000 / Tape & Reel
BC517RL1G	TO−92 (Pb−Free)	2000 / Tape & Reel
BC517ZL1	TO−92	2000 / Ammo Pack
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.

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

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector – Emitter Breakdown Voltage (I_C = 2.0 mAdc, I_{BE} = 0)	$V_{(BR)CES}$	30	–	–	Vdc
Collector – Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	$V_{(BR)CBO}$	40	–	–	Vdc
Emitter – Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)	$V_{(BR)EBO}$	10	–	–	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc)	I_{CES}	–	–	500	nAdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0)	I_{CBO}	–	–	100	nAdc
Emitter Cutoff Current (V_{CB} = 10 Vdc, I_C = 0)	I_{EBO}	–	–	100	nAdc
ON CHARACTERISTICS (Note 1)					
DC Current Gain (I_C = 20 mAdc, V_{CE} = 2.0 Vdc)	h_{FE}	30,000	–	–	–
Collector – Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 0.1 mAdc)	$V_{CE(sat)}$	–	–	1.0	Vdc
Collector – Emitter Saturation Voltage (I_C = 10 mAdc, V_{CE} = 5.0 Vdc)	$V_{BE(on)}$	–	–	1.4	Vdc
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain – Bandwidth Product (Note 2) (I_C = 10 mAdc, V_{CE} = 5.0 Vdc, f = 100 MHz)	f_T	–	200	–	MHz

1. Pulse Test: Pulse Width = 300 μs, Duty Cycle 2.0%.
2. $f_T = |h_{fe}| \bullet f_{test}$

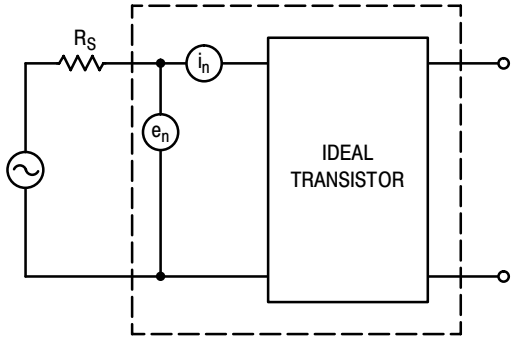


Figure 1. Transistor Noise Model

NOISE CHARACTERISTICS

(V_{CE} = 5.0 Vdc, T_A = 25°C)

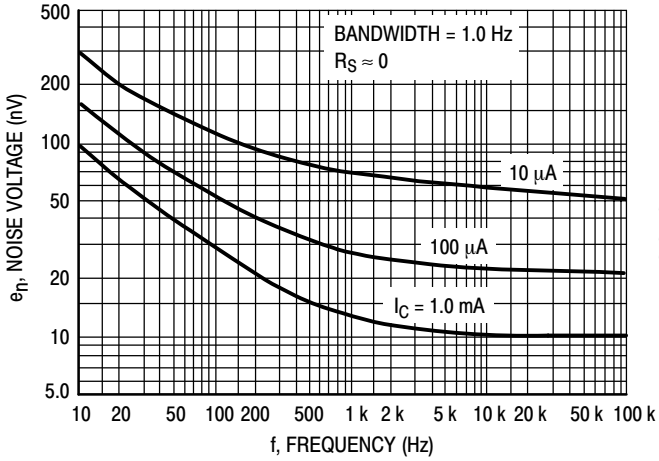


Figure 2. Noise Voltage

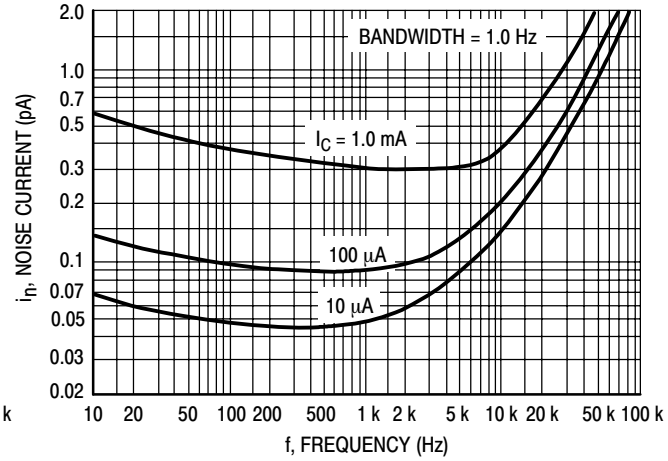


Figure 3. Noise Current

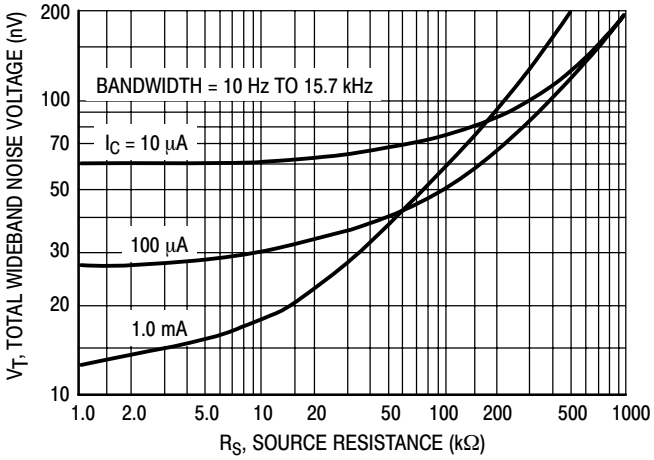


Figure 4. Total Wideband Noise Voltage

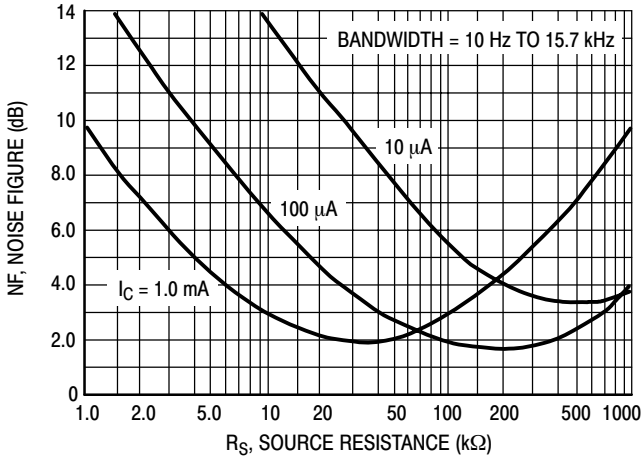


Figure 5. Wideband Noise Figure

SMALL–SIGNAL CHARACTERISTICS

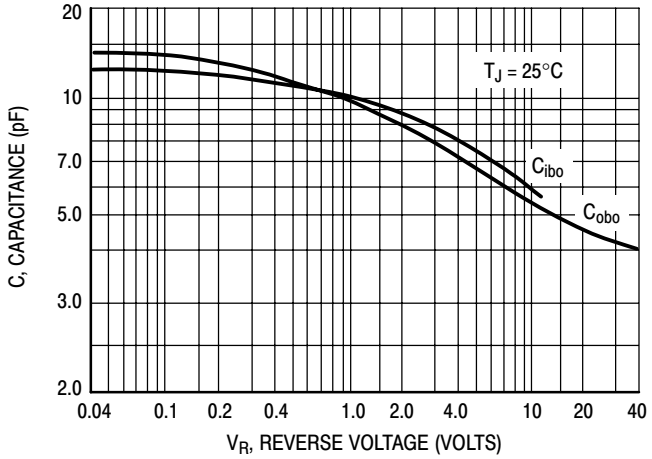


Figure 6. Capacitance

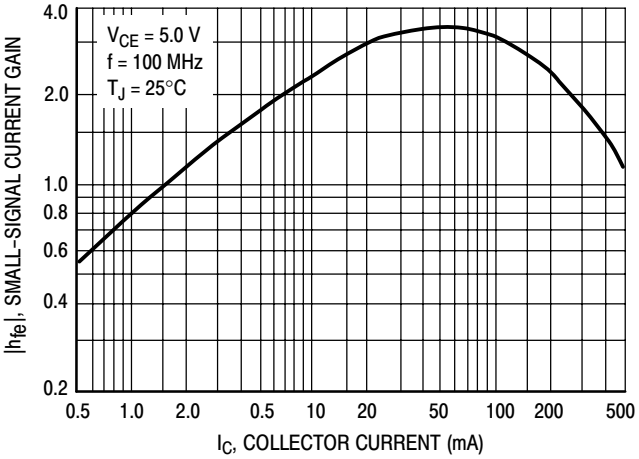


Figure 7. High Frequency Current Gain

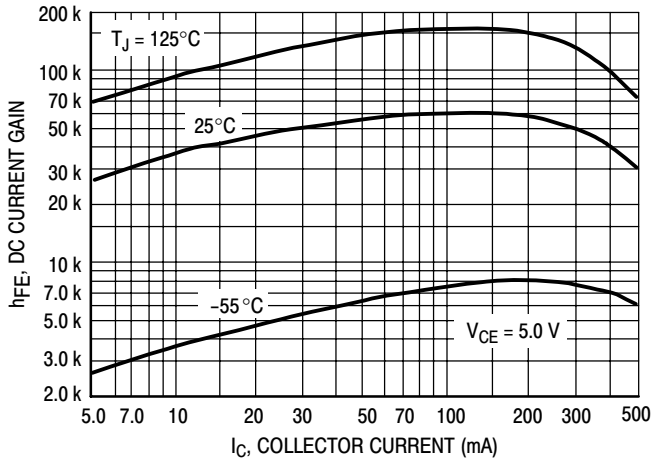


Figure 8. DC Current Gain

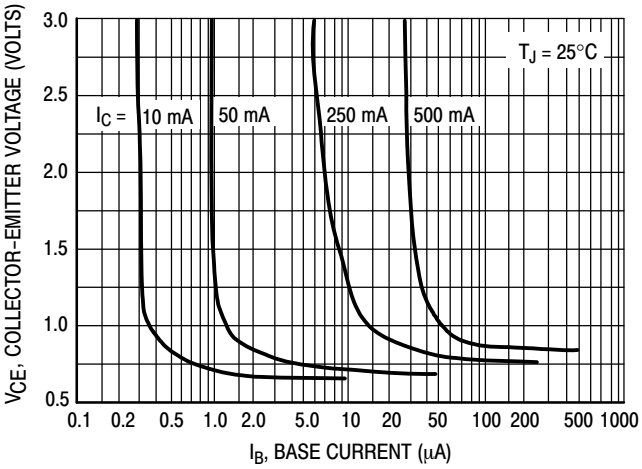


Figure 9. Collector Saturation Region

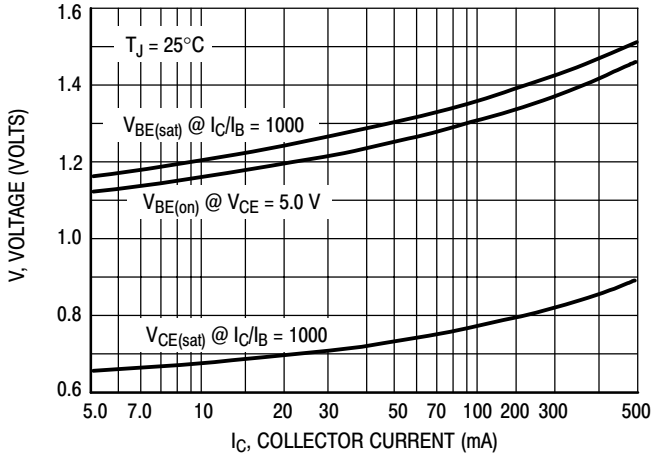


Figure 10. “On” Voltages

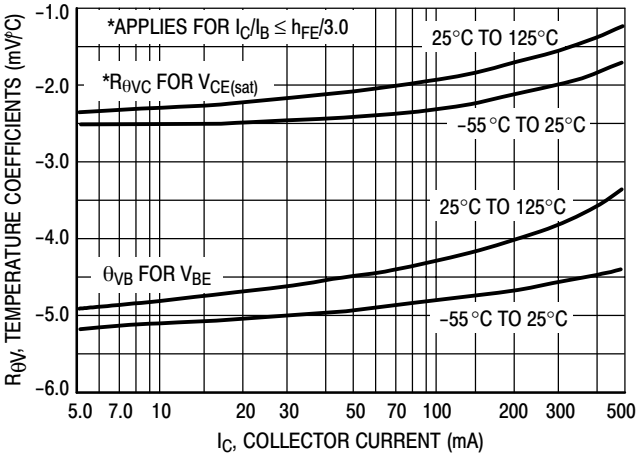


Figure 11. Temperature Coefficients

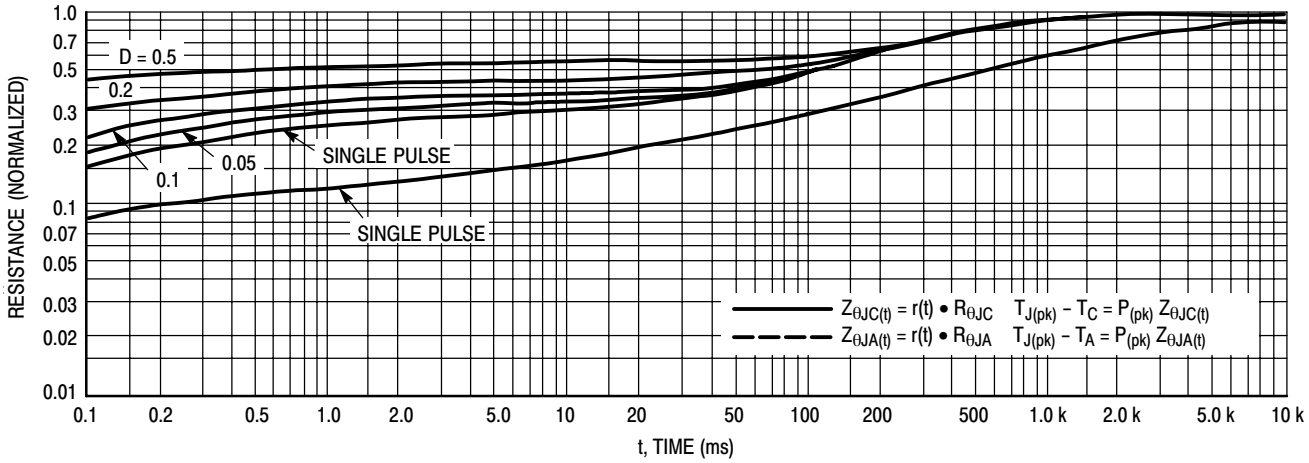


Figure 12. Thermal Response

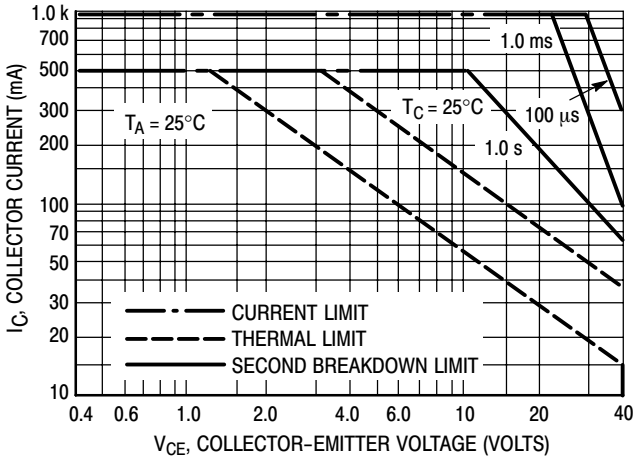
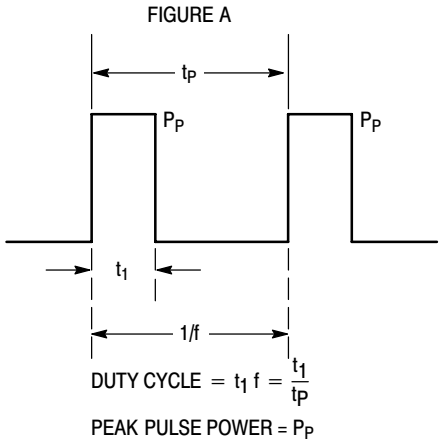


Figure 13. Active Region Safe Operating Area

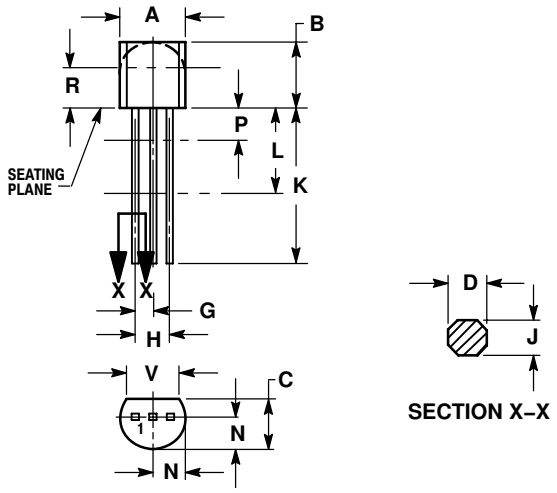


Design Note: Use of Transient Thermal Resistance Data

BC517

PACKAGE DIMENSIONS

TO–92 (TO–226)
CASE 29–11
ISSUE 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.

	INCHES		MILLIMETERS	
DIM	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	---

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

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