

# Darlington Transistors

## NPN Silicon

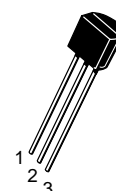
# BC517

### MAXIMUM RATINGS

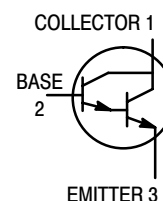
Rating	Symbol	Value	Unit
Collector–Emitter Voltage	$V_{CES}$	30	Vdc
Collector–Base Voltage	$V_{CB}$	40	Vdc
Emitter–Base Voltage	$V_{EB}$	10	Vdc
Collector Current — Continuous	$I_C$	1.0	Adc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 12	mW mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	$^\circ\text{C/W}$



CASE 29–11, STYLE 17  
TO–92 (TO–226AA)



### 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 ( $I_C = 2.0$ mAdc, $V_{BE} = 0$ )	$V_{(BR)CES}$	30	—	—	Vdc
Collector–Base Breakdown Voltage ( $I_C = 10$ $\mu$ Adc, $I_E = 0$ )	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter–Base Breakdown Voltage ( $I_E = 100$ nAdc, $I_C = 0$ )	$V_{(BR)EBO}$	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 ( $V_{EB} = 10$ 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
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### ON CHARACTERISTICS<sup>(1)</sup>

DC Current Gain ( $I_C = 20\text{ mAdc}$ , $V_{CE} = 2.0\text{ Vdc}$ )	$h_{FE}$	30,000	—	—	—
Collector–Emitter Saturation Voltage ( $I_C = 100\text{ mAdc}$ , $I_B = 0.1\text{ mAdc}$ )	$V_{CE(sat)}$	—	—	1.0	Vdc
Base–Emitter On Voltage ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ )	$V_{BE(on)}$	—	—	1.4	Vdc

### SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product <sup>(2)</sup> ( $I_C = 10\text{ mAdc}$ , $V_{CE} = 5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	$f_T$	—	200	—	MHz
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1. Pulse Test: Pulse Width  $\leq 2.0\%$ .

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

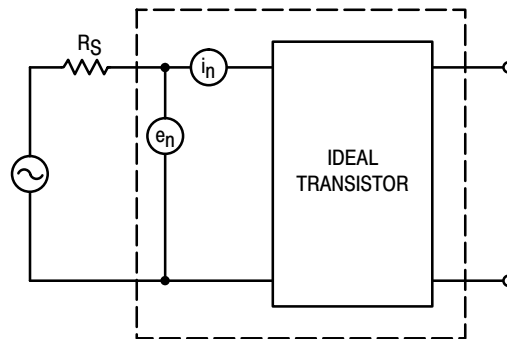


Figure 1. Transistor Noise Model

## NOISE CHARACTERISTICS

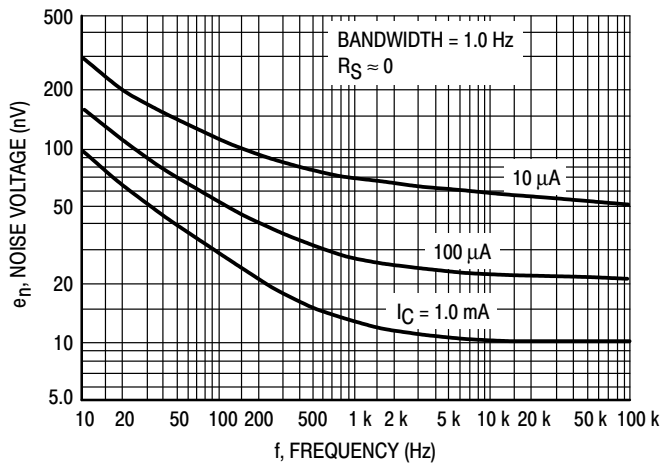
 $(V_{CE} = 5.0 \text{ Vdc}, T_A = 25^\circ\text{C})$ 

Figure 2. Noise Voltage

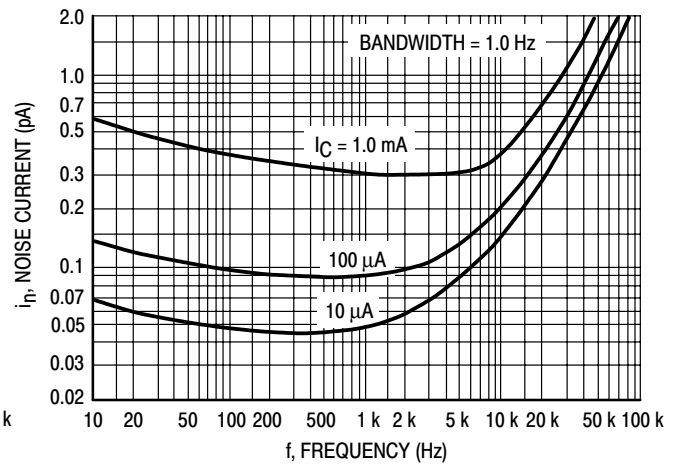


Figure 3. Noise Current

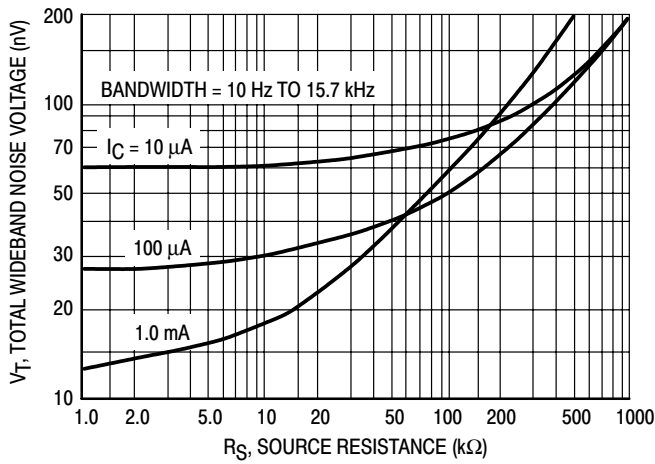


Figure 4. Total Wideband Noise Voltage

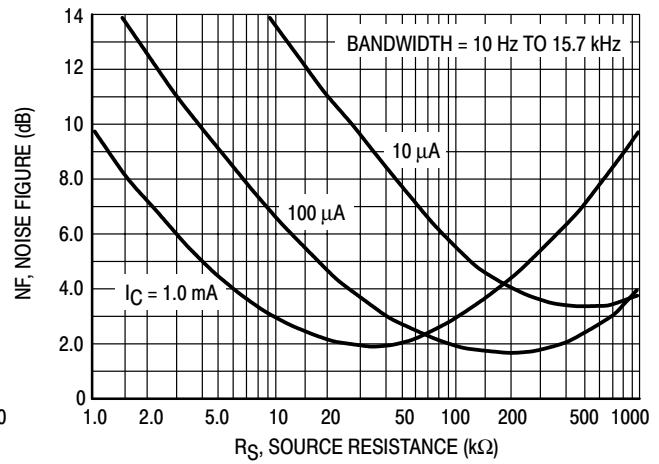


Figure 5. Wideband Noise Figure

## SMALL-SIGNAL CHARACTERISTICS

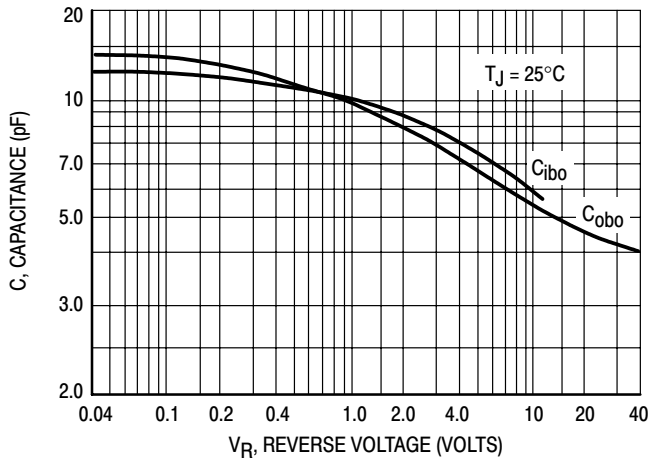


Figure 6. Capacitance

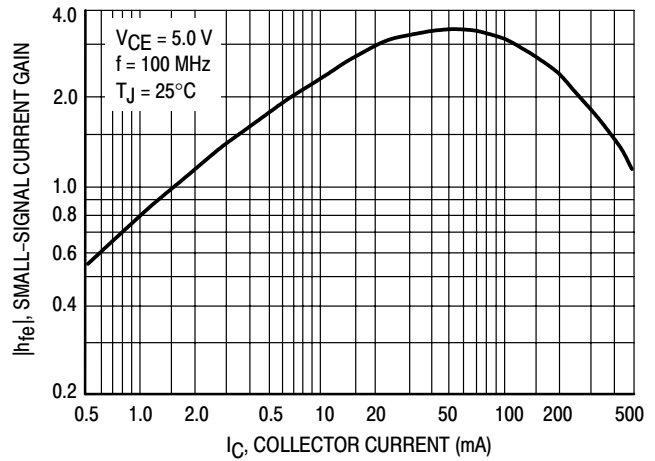


Figure 7. High Frequency Current Gain

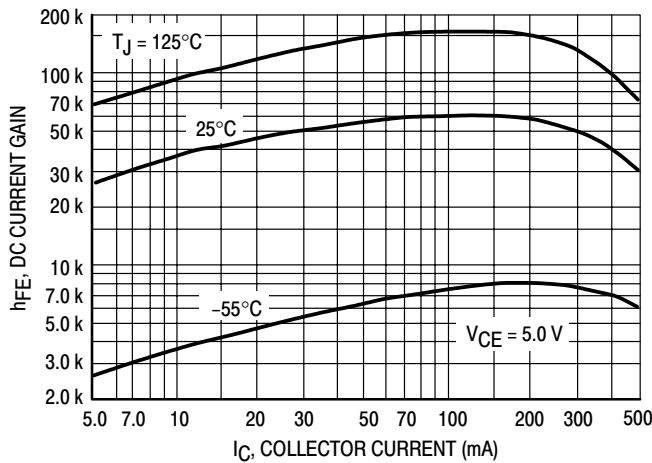


Figure 8. DC Current Gain

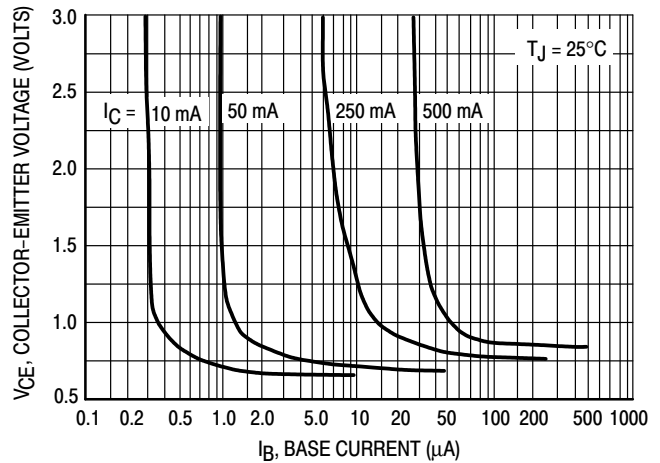


Figure 9. Collector Saturation Region

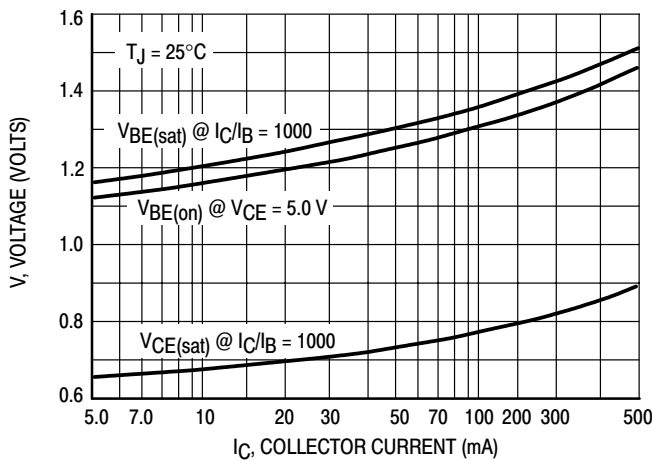


Figure 10. "On" Voltages

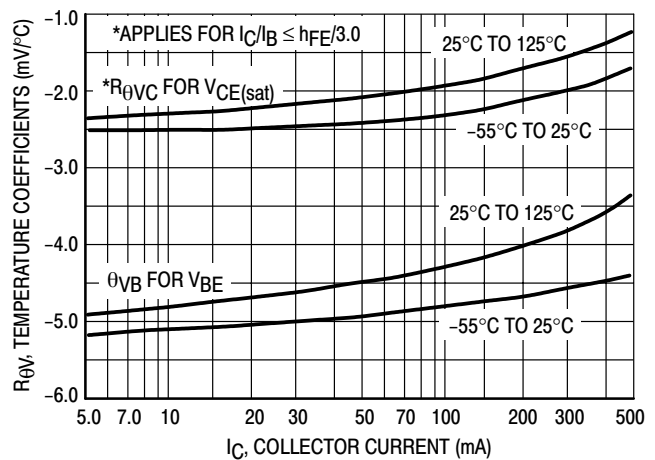


Figure 11. Temperature Coefficients

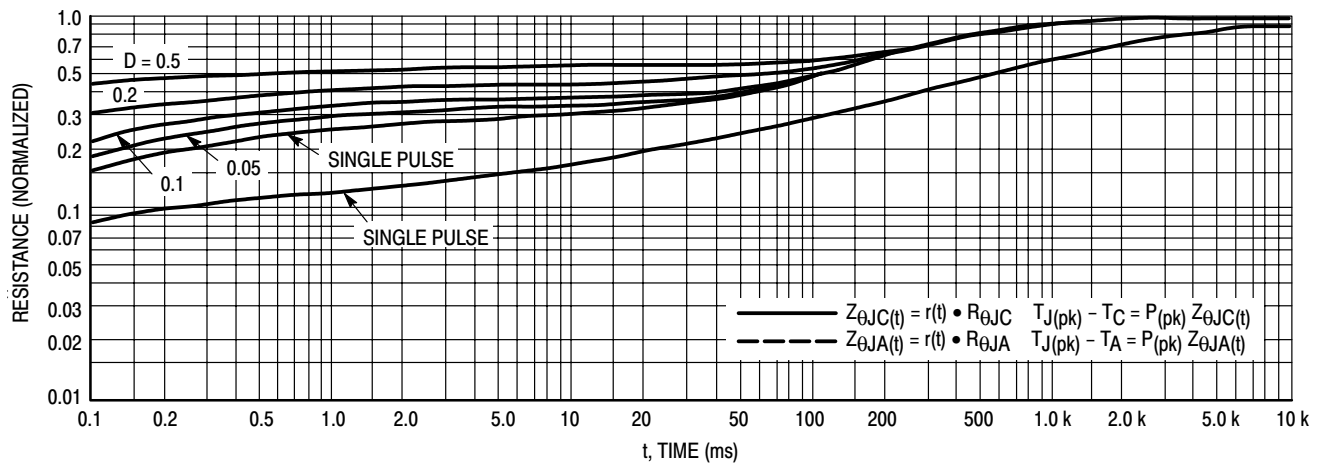


Figure 12. Thermal Response

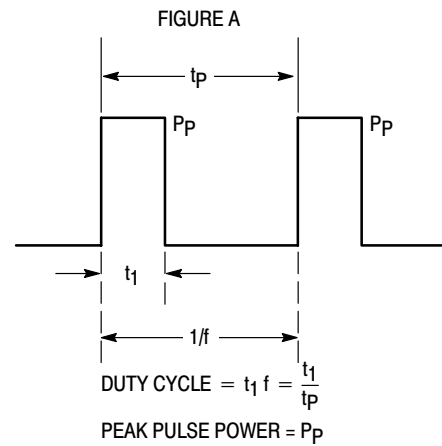
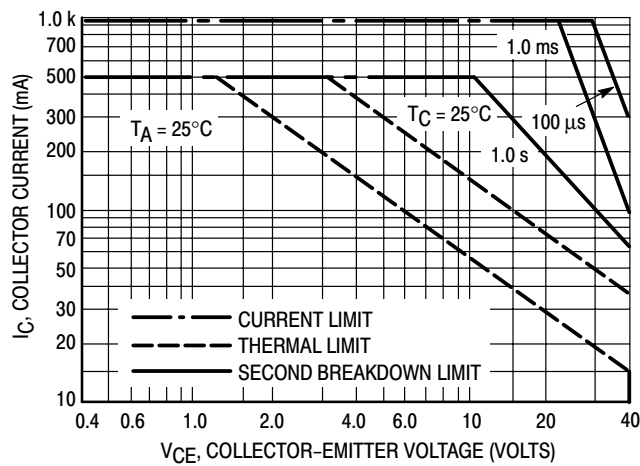
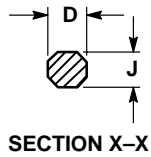
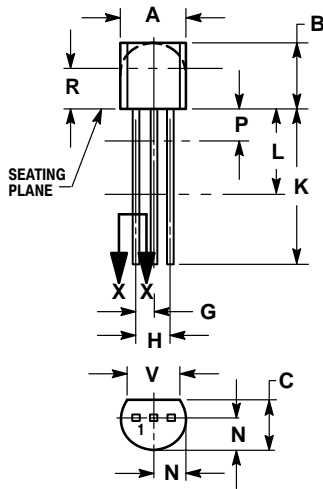


Figure 13. Active Region Safe Operating Area      Design Note: Use of Transient Thermal Resistance Data

# 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	---

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