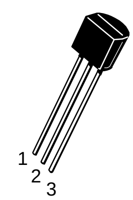
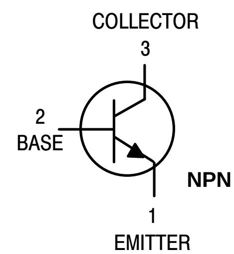
High Voltage Transistors

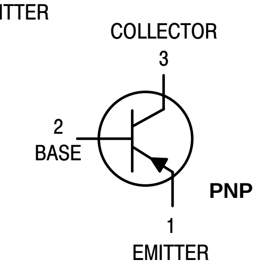
NPN
2N6515
2N6517
PNP
2N6520

Voltage and current are negative for PNP transistors



CASE 29–04, STYLE 1
TO–92 (TO–226AA)





MAXIMUM RATINGS

Rating	Symbol	2N6515	2N6517 2N6520	Unit
Collector–Emitter Voltage	V_{CEO}	250	350	Vdc
Collector–Base Voltage	V_{CBO}	250	350	Vdc
Emitter–Base Voltage 2N6515, 2N6516, 2N6517 2N6519, 2N6520	V_{EBO}	 6.0 5.0		Vdc
Base Current	I_B	250		mAdc
Collector Current – Continuous	I_C	500		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		Watts 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

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage(1) (I_C = 1.0 mAdc, I_B = 0)	 2N6515 2N6517, 2N6520	$V_{(BR)CEO}$	 250 350	 – –	Vdc
Collector–Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	 2N6515 2N6517, 2N6520	$V_{(BR)CBO}$	 250 350	 – –	Vdc
Emitter–Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)	 2N6515, 2N6517 2N6520	$V_{(BR)EBO}$	 6.0 5.0	 – –	Vdc

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS (Continued)					
Collector Cutoff Current		I_{CBO}			nAdc
(V_{CB} = 150 Vdc, I_E = 0)	2N6515		–	50	
(V_{CB} = 250 Vdc, I_E = 0)	2N6517, 2N6520		–	50	
Emitter Cutoff Current		I_{EBO}			nAdc
(V_{EB} = 5.0 Vdc, I_C = 0)	2N6515, 2N6517		–	50	
(V_{EB} = 4.0 Vdc, I_C = 0)	2N6520		–	50	
ON CHARACTERISTICS(1)					
DC Current Gain		h_{FE}			–
(I_C = 1.0 mAdc, V_{CE} = 10 Vdc)	2N6515		35	–	
	2N6517, 2N6520		20	–	
(I_C = 10 mAdc, V_{CE} = 10 Vdc)	2N6515		50	–	
	2N6517, 2N6520		30	–	
(I_C = 30 mAdc, V_{CE} = 10 Vdc)	2N6515		50	300	
	2N6517, 2N6520		30	200	
(I_C = 50 mAdc, V_{CE} = 10 Vdc)	2N6515		45	220	
	2N6517, 2N6520		20	200	
(I_C = 100 mAdc, V_{CE} = 10 Vdc)	2N6515		25	–	
	2N6517, 2N6520		15	–	
Collector–Emitter Saturation Voltage		$V_{CE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc)			–	0.30	
(I_C = 20 mAdc, I_B = 2.0 mAdc)			–	0.35	
(I_C = 30 mAdc, I_B = 3.0 mAdc)			–	0.50	
(I_C = 50 mAdc, I_B = 5.0 mAdc)			–	1.0	
Base–Emitter Saturation Voltage		$V_{BE(sat)}$			Vdc
(I_C = 10 mAdc, I_B = 1.0 mAdc)			–	0.75	
(I_C = 20 mAdc, I_B = 2.0 mAdc)			–	0.85	
(I_C = 30 mAdc, I_B = 3.0 mAdc)			–	0.90	
Base–Emitter On Voltage (I_C = 100 mAdc, V_{CE} = 10 Vdc)		$V_{BE(on)}$	–	2.0	Vdc
SMALL–SIGNAL CHARACTERISTICS					
Current–Gain – Bandwidth Product(1) (I_C = 10 mAdc, V_{CE} = 20 Vdc, f = 20 MHz)		f_T	40	200	MHz
Collector–Base Capacitance (V_{CB} = 20 Vdc, I_E = 0, f = 1.0 MHz)		C_{cb}	–	6.0	pF
Emitter–Base Capacitance		C_{eb}			pF
(V_{EB} = 0.5 Vdc, I_C = 0, f = 1.0 MHz)	2N6515, 2N6517		–	80	
	2N6520		–	100	
SWITCHING CHARACTERISTICS					
Turn–On Time (V_{CC} = 100 Vdc, $V_{BE(off)}$ = 2.0 Vdc, I_C = 50 mAdc, I_{B1} = 10 mAdc)		t_{on}	–	200	μs
Turn–Off Time (V_{CC} = 100 Vdc, I_C = 50 mAdc, I_{B1} = I_{B2} = 10 mAdc)		t_{off}	–	3.5	μs

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

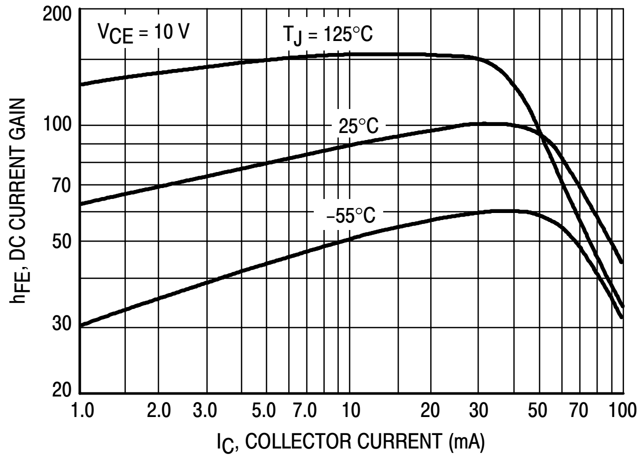


Figure 1. DC Current Gain – NPN 2N6515

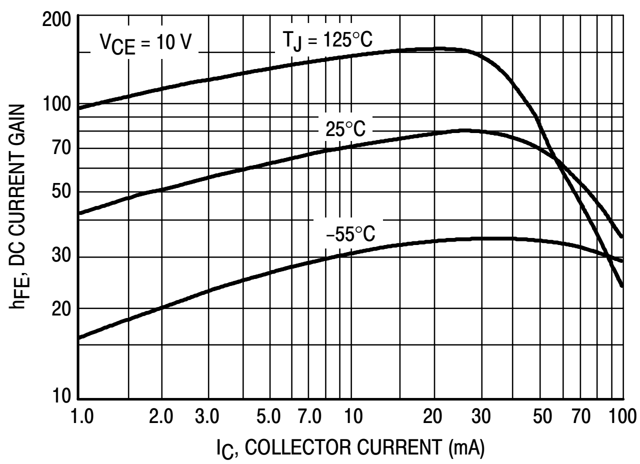


Figure 2. DC Current Gain – NPN 2N6517

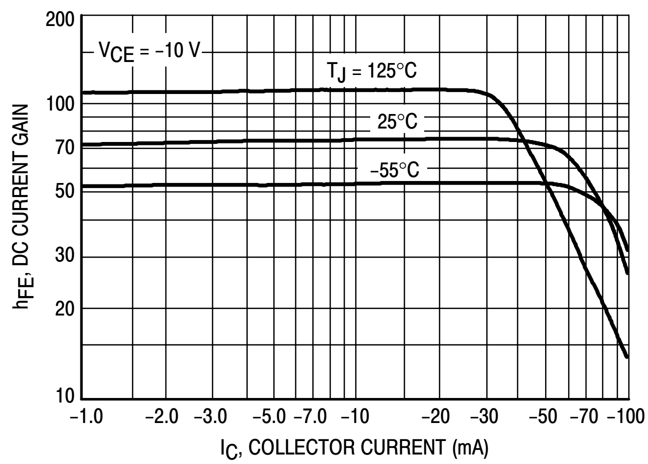


Figure 3. DC Current Gain – PNP 2N6520

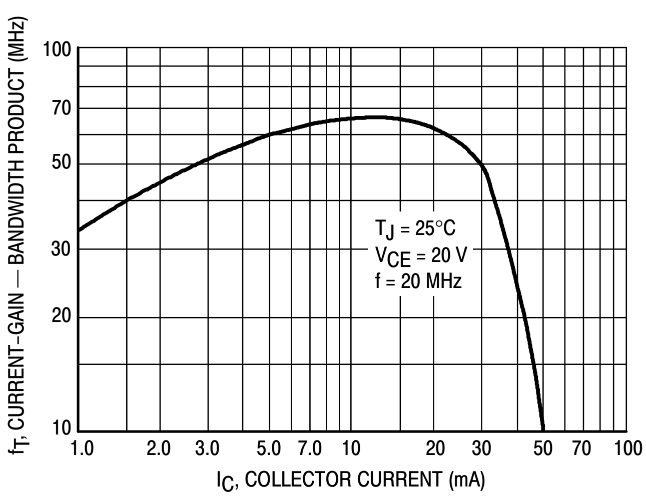


Figure 4. Current−Gain – Bandwidth Product – NPN 2N6515, 2N6517

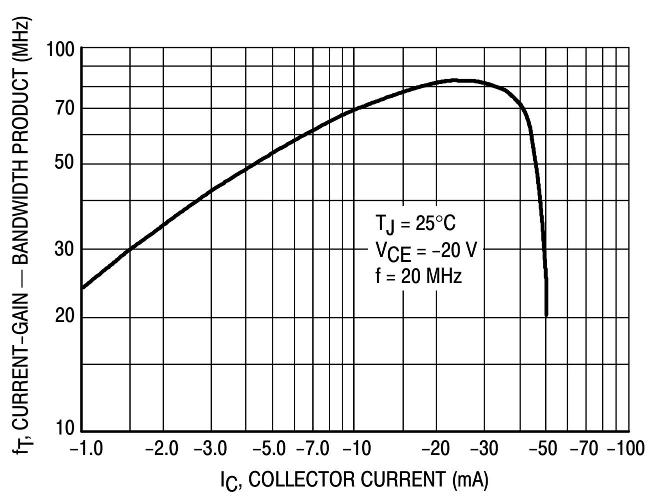


Figure 5. Current−Gain – Bandwidth Product – PNP 2N6520

NPN

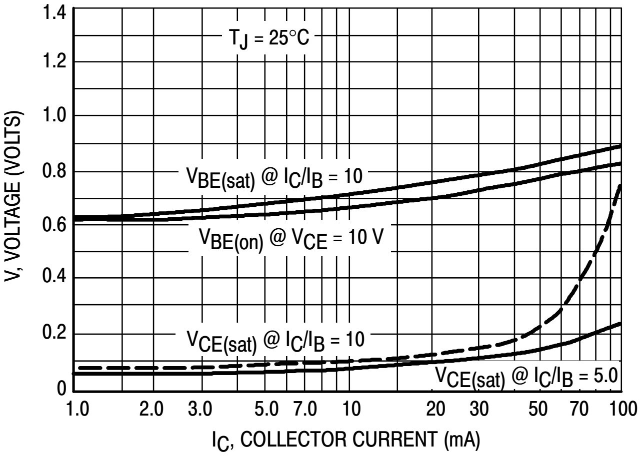


Figure 6. "On" Voltages – NPN 2N6515, 2N6517

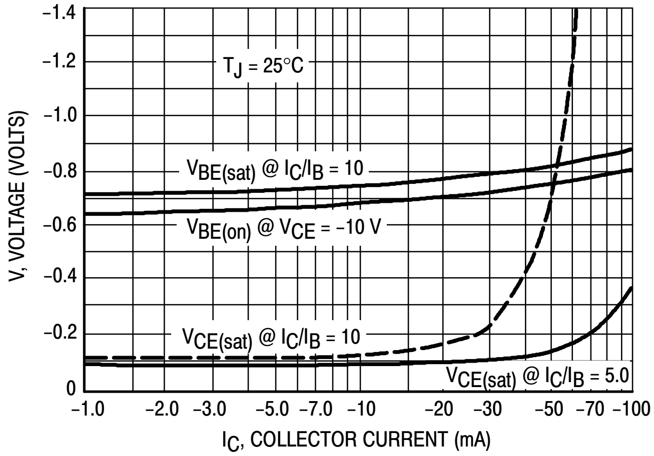


Figure 7. "On" Voltages – PNP 2N6520

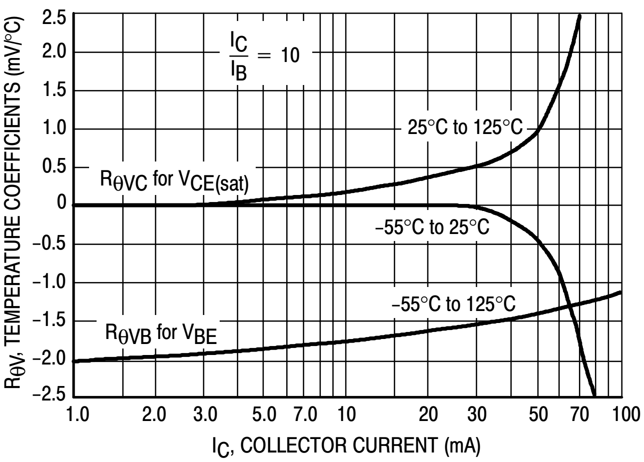


Figure 8. Temperature Coefficients – NPN 2N6515, 2N6517

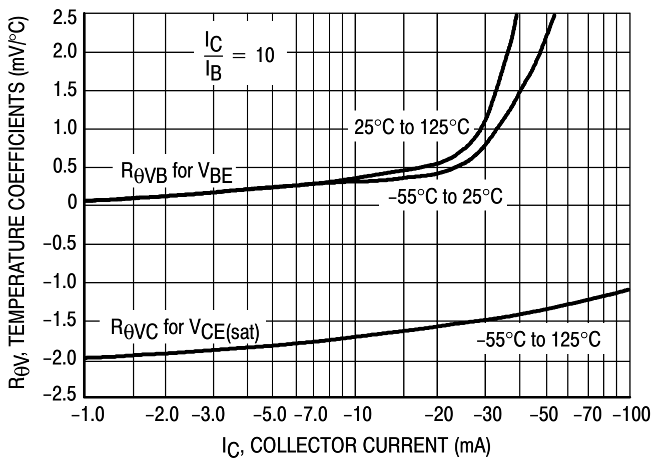


Figure 9. Temperature Coefficients – PNP 2N6520

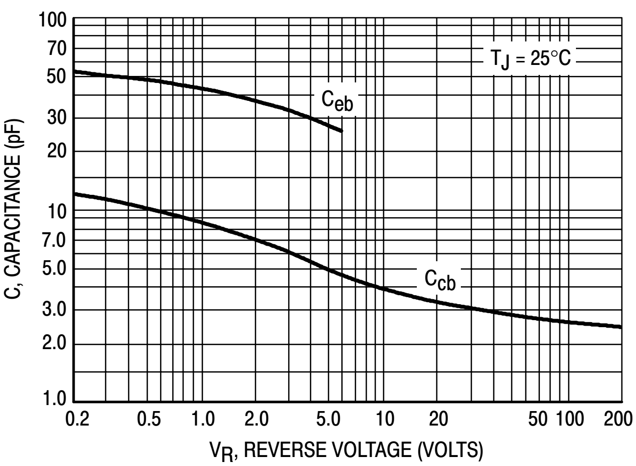


Figure 10. Capacitance – NPN 2N6515, 2N6517

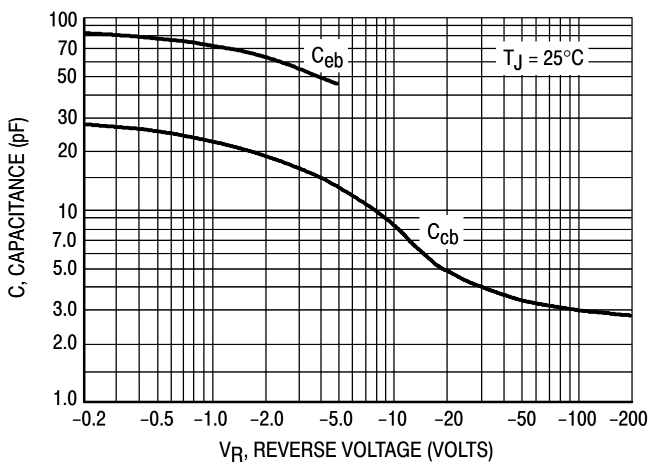


Figure 11. Capacitance – PNP 2N6520

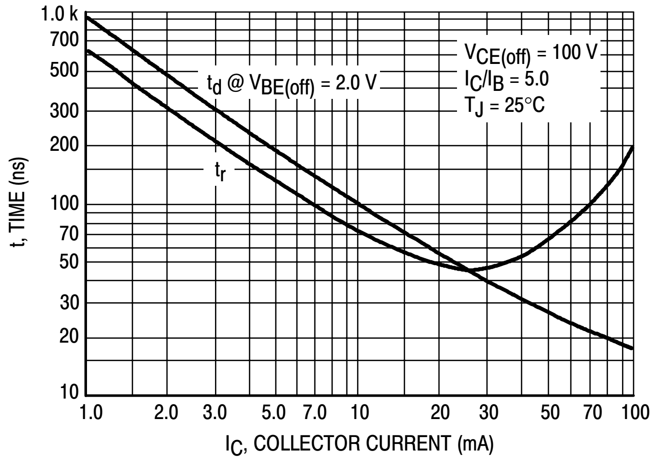


Figure 12. Turn–On Time – NPN 2N6515, 2N6517

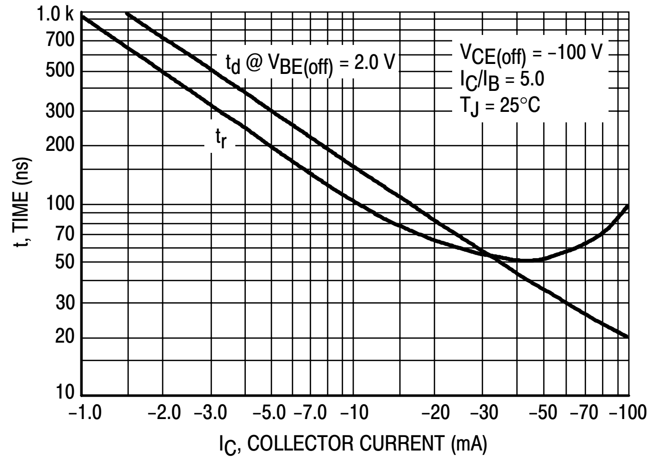


Figure 13. Turn–On Time – PNP 2N6520

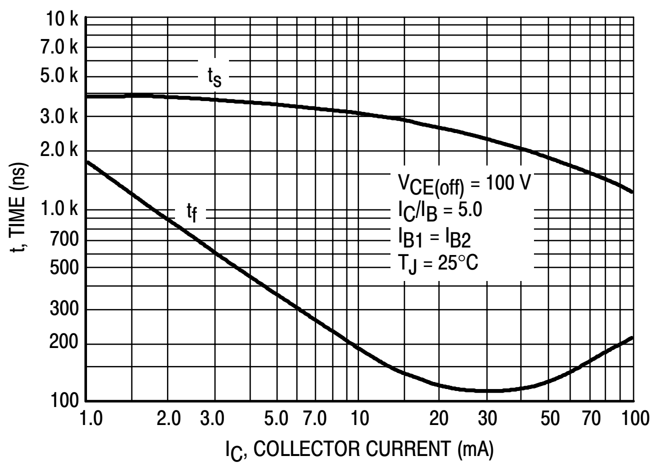


Figure 14. Turn–Off Time – NPN 2N6515, 2N6517

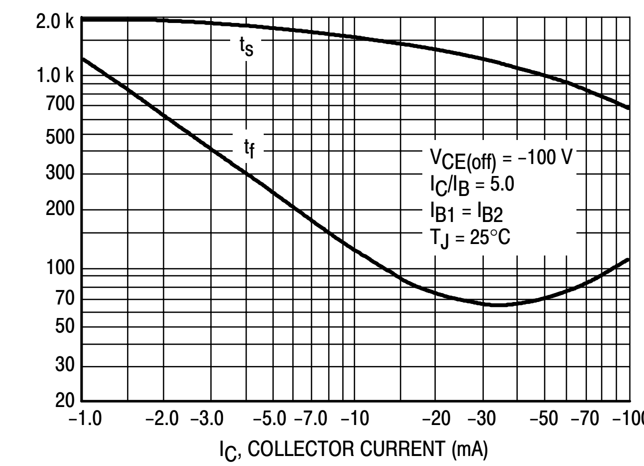


Figure 15. Turn–Off Time – PNP 2N6520

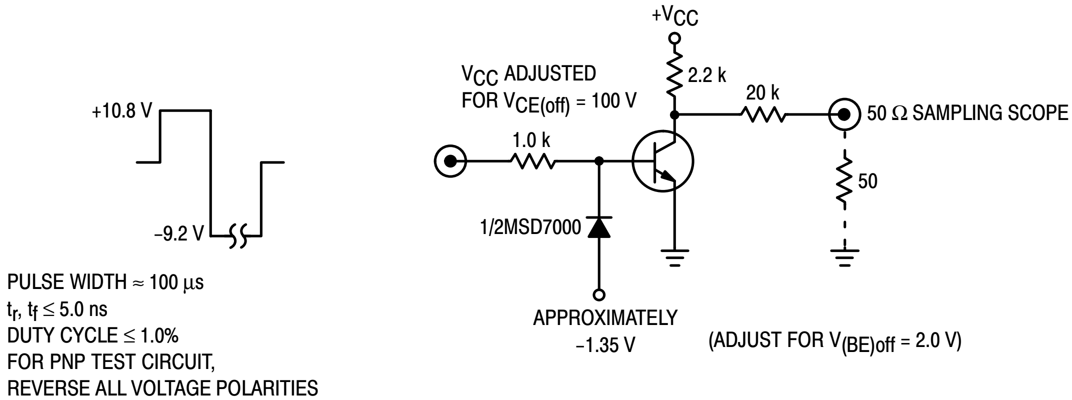


Figure 16. Switching Time Test Circuit

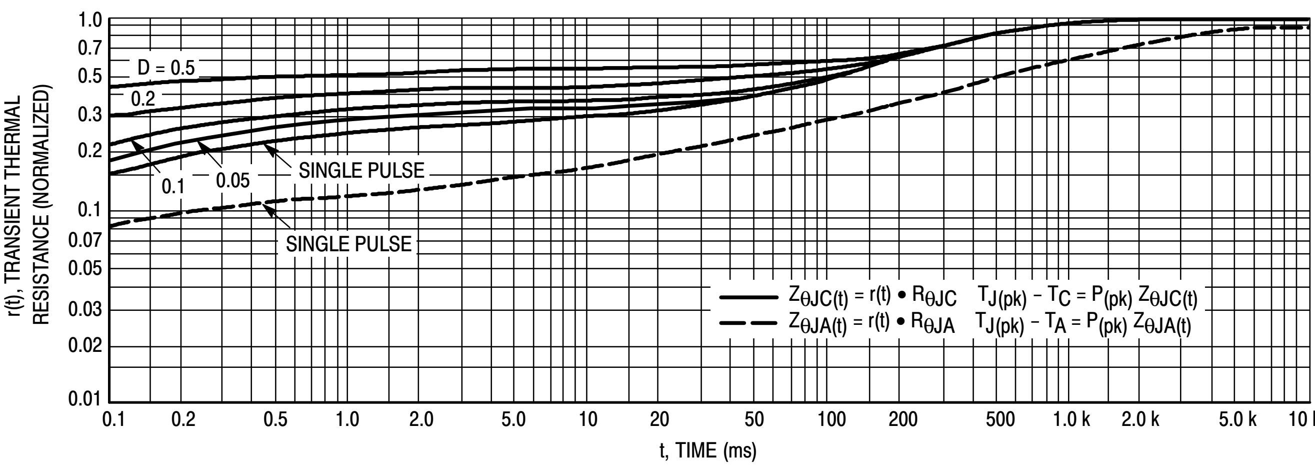


Figure 17. Thermal Response

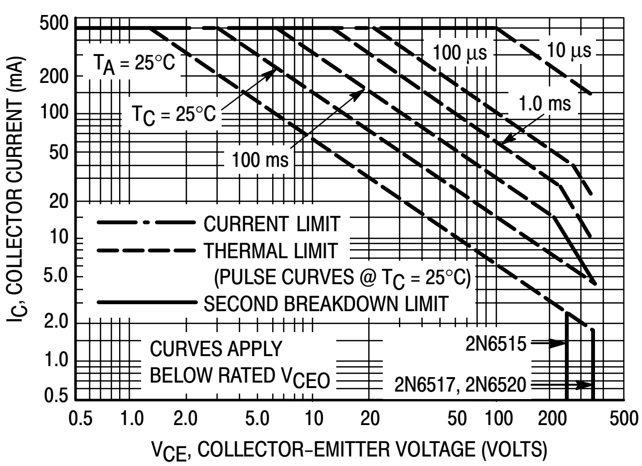
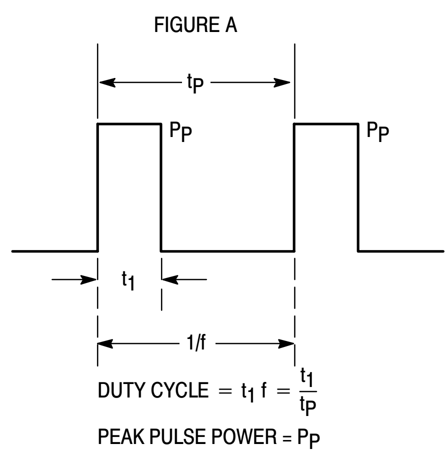


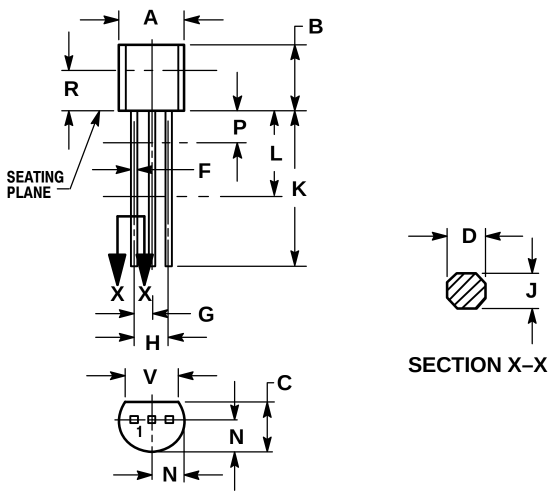
Figure 18. Active Region Safe Operating Area



Design Note: Use of Transient Thermal Resistance Data

PACKAGE DIMENSIONS

CASE 029–04
(TO–226AA)
ISSUE AD



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. 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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303–675–2175 or 800–344–3860 Toll Free USA/Canada
Fax: 303–675–2176 or 800–344–3867 Toll Free USA/Canada
Email: ONlit@hibbertco.com

N. American Technical Support: 800–282–9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center
4–32–1 Nishi–Gotanda, Shinagawa–ku, Tokyo, Japan 141–0031
Phone: 81–3–5740–2700
Email: r14525@onsemi.com

ON Semiconductor Website: http://onsemi.com

For additional information, please contact your local
Sales Representative.