

High Voltage Transistors

MAXIMUM RATINGS

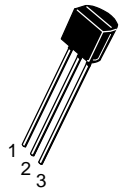
Rating	Symbol	2N6515	2N6519	2N6517 2N6520	Unit
Collector–Emitter Voltage	V_{CEO}	250	300	350	Vdc
Collector–Base Voltage	V_{CBO}	250	300	350	Vdc
Emitter–Base Voltage 2N6515, 2N6516, 2N6517 2N6519, 2N6520	V_{EBO}	6.0 5.0			Vdc
Base Current	I_B	250			mAdc
Collector Current — Continuous	I_C	500			mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0			mW mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ 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

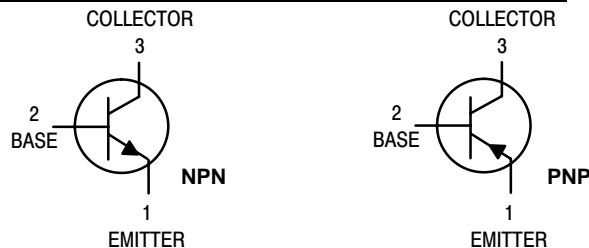
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W

NPN
2N6515
2N6517
PNP
2N6519
2N6520

Voltage and current are negative
for PNP transistors



CASE 29–04, STYLE 1
TO–92 (TO–226AA)



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 1.0 \text{ mAdc}$, $I_B = 0$)	$V_{(BR)CEO}$	250 300 350	— — —	Vdc
Collector–Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $I_E = 0$)	$V_{(BR)CBO}$	250 300 350	— — —	Vdc
Emitter–Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}$, $I_C = 0$)	$V_{(BR)EBO}$	6.0 5.0	— —	Vdc

1. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

NPN 2N6515 2N6517 PNP 2N6519 2N6520

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS (Continued)				
Collector Cutoff Current (V _{CB} = 150 Vdc, I _E = 0) (V _{CB} = 200 Vdc, I _E = 0) (V _{CB} = 250 Vdc, I _E = 0)	I _{CBO}	—	50	nAdc
			50	
			50	
Emitter Cutoff Current (V _{EB} = 5.0 Vdc, I _C = 0) (V _{EB} = 4.0 Vdc, I _C = 0)	I _{EBO}	—	50	nAdc
			50	

ON CHARACTERISTICS⁽¹⁾

DC Current Gain (I _C = 1.0 mAdc, V _{CE} = 10 Vdc)	h _{FE}	35	—	—
		30	—	
		20	—	
(I _C = 10 mAdc, V _{CE} = 10 Vdc)		50	—	
		45	—	
		30	—	
(I _C = 30 mAdc, V _{CE} = 10 Vdc)		50	300	
		45	270	
		30	200	
(I _C = 50 mAdc, V _{CE} = 10 Vdc)		45	220	
		40	200	
		20	200	
(I _C = 100 mAdc, V _{CE} = 10 Vdc)		25	—	
		20	—	
		15	—	
Collector–Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 1.0 mAdc) (I _C = 20 mAdc, I _B = 2.0 mAdc) (I _C = 30 mAdc, I _B = 3.0 mAdc) (I _C = 50 mAdc, I _B = 5.0 mAdc)	V _{CE(sat)}	—	0.30	Vdc
			0.35	
			0.50	
			1.0	
Base–Emitter Saturation Voltage (I _C = 10 mAdc, I _B = 1.0 mAdc) (I _C = 20 mAdc, I _B = 2.0 mAdc) (I _C = 30 mAdc, I _B = 3.0 mAdc)	V _{BE(sat)}	—	0.75	Vdc
			0.85	
			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 (V _{EB} = 0.5 Vdc, I _C = 0, f = 1.0 MHz)	C _{eb}	—	80	pF
			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%.

NPN 2N6515 2N6517 PNP 2N6519 2N6520

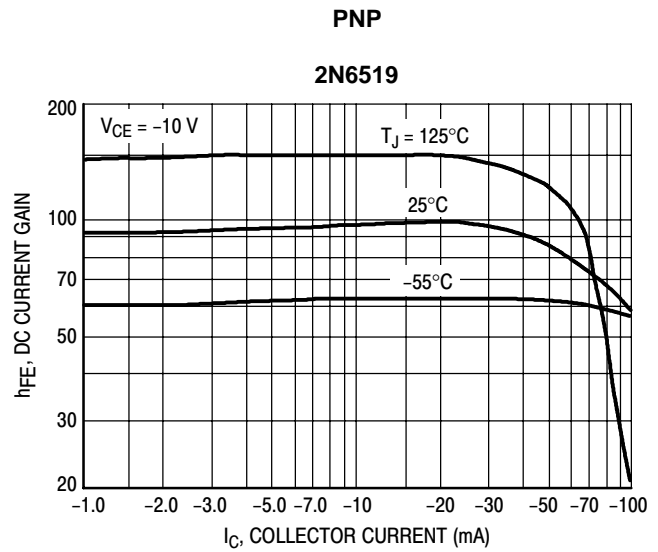
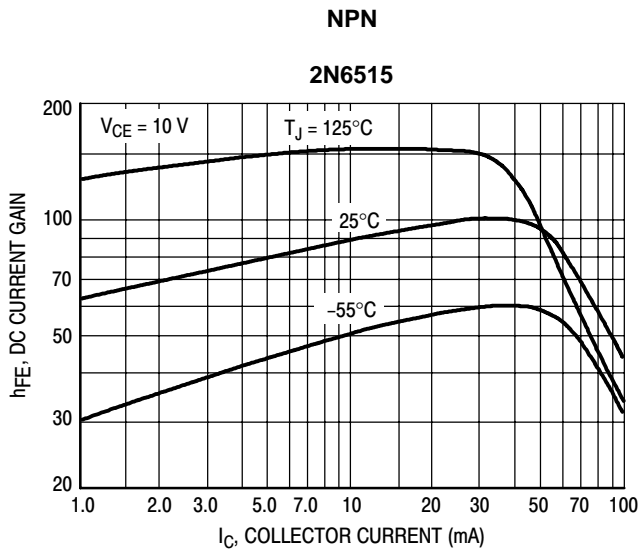


Figure 1. DC Current Gain

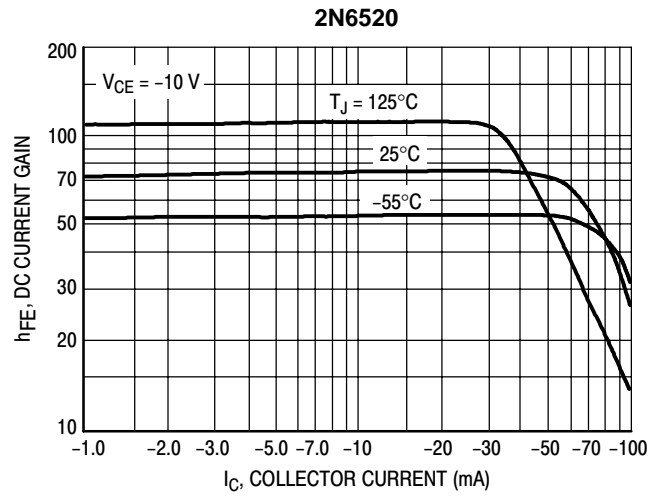
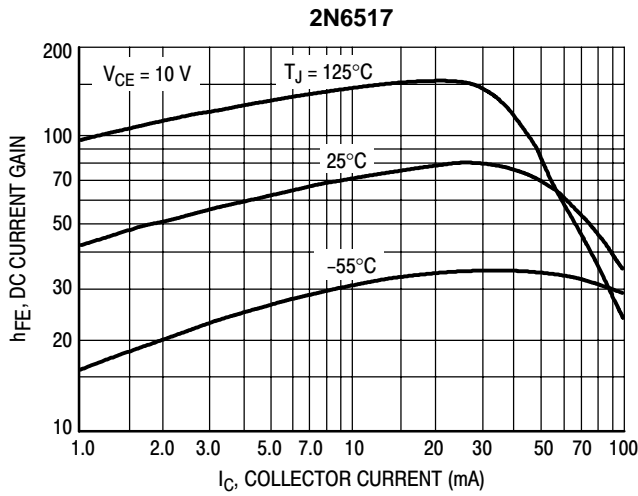


Figure 2. DC Current Gain

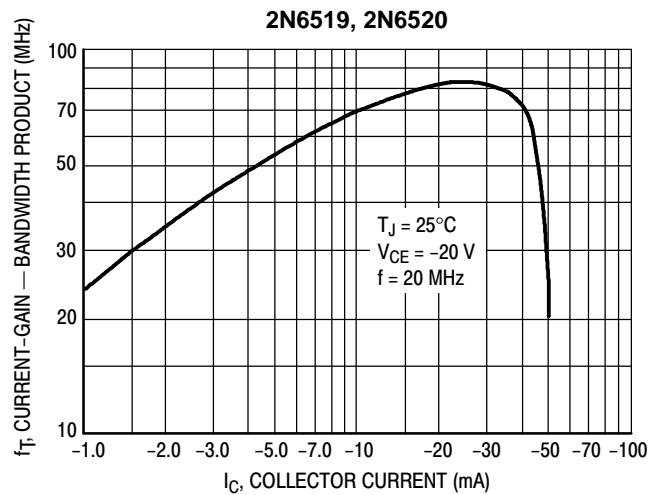
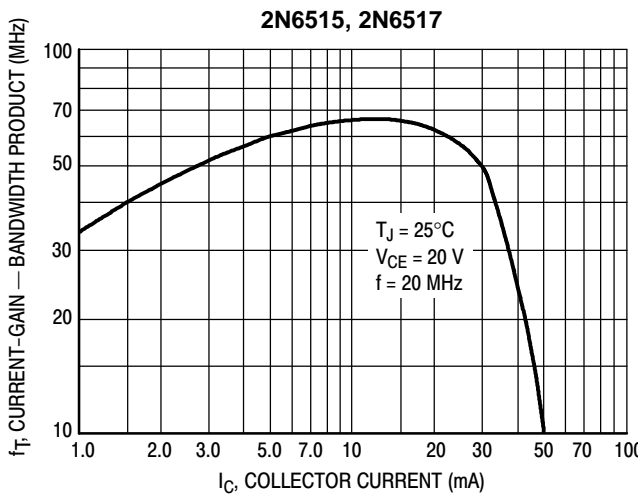


Figure 3. Current-Gain — Bandwidth Product

NPN 2N6515 2N6517 PNP 2N6519 2N6520

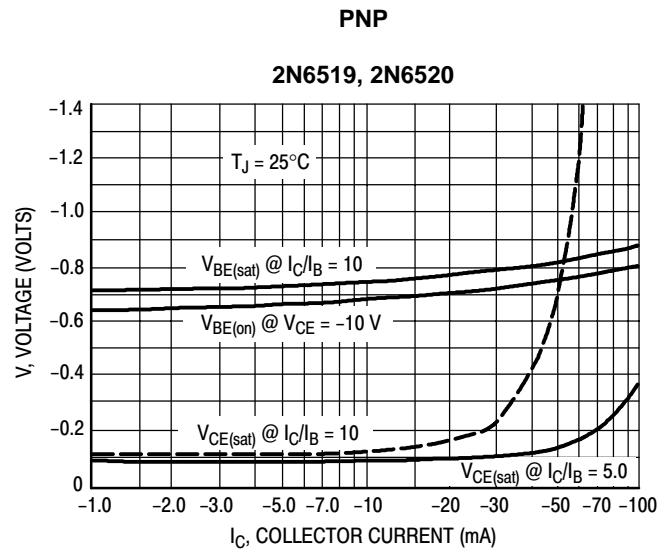
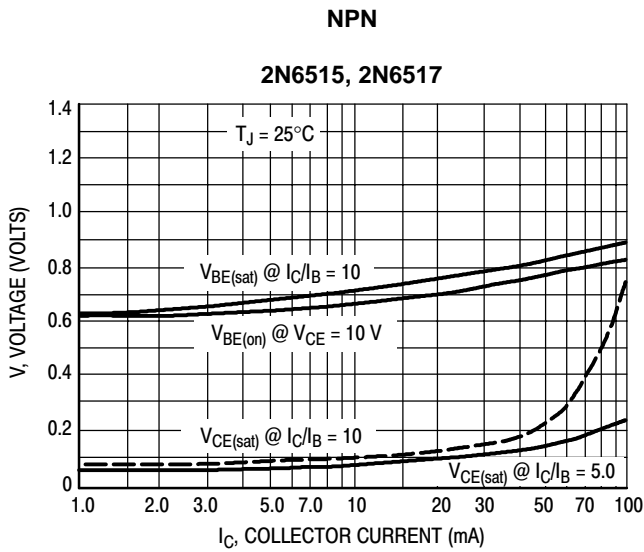


Figure 4. "On" Voltages

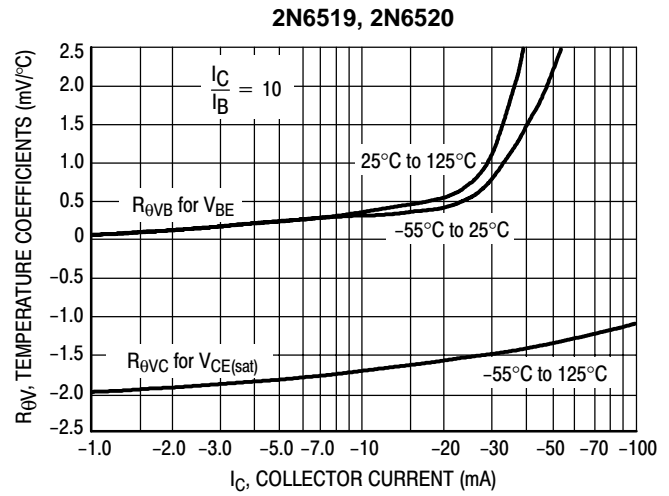
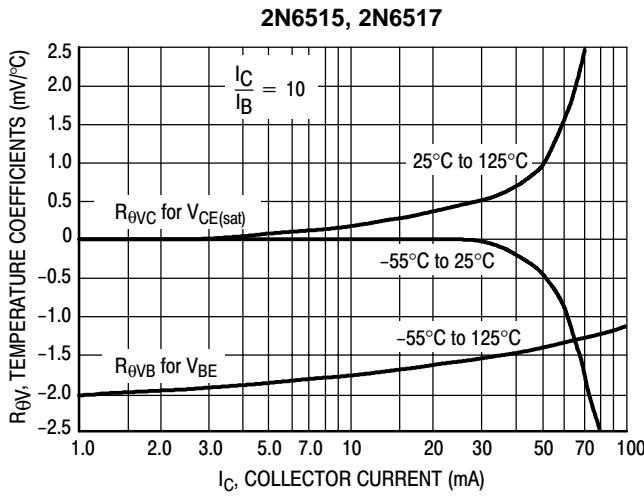


Figure 5. Temperature Coefficients

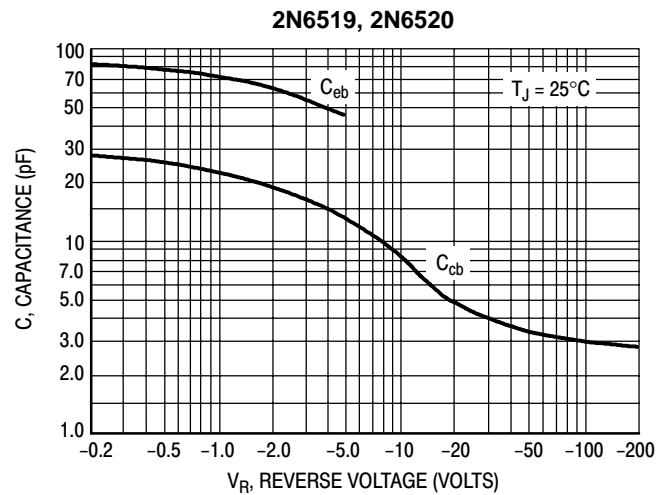
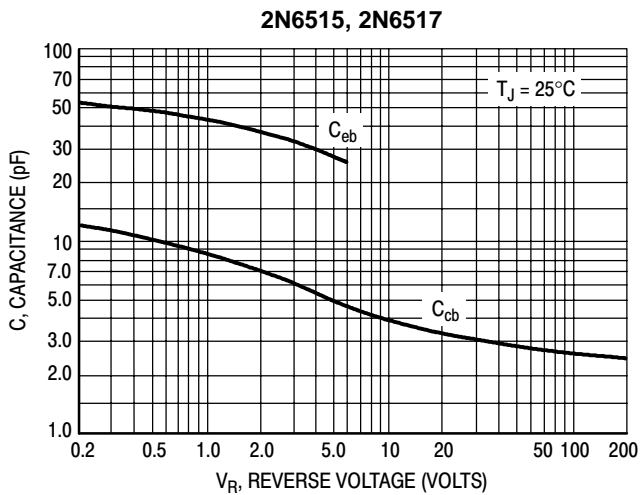


Figure 6. Capacitance

NPN 2N6515 2N6517 PNP 2N6519 2N6520

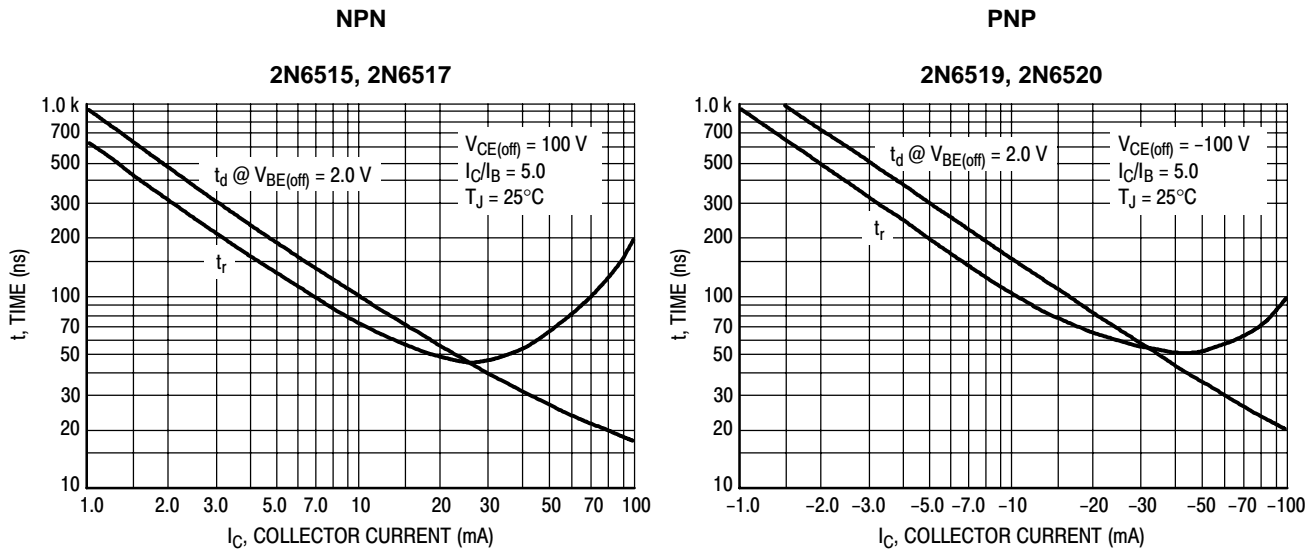


Figure 7. Turn-On Time

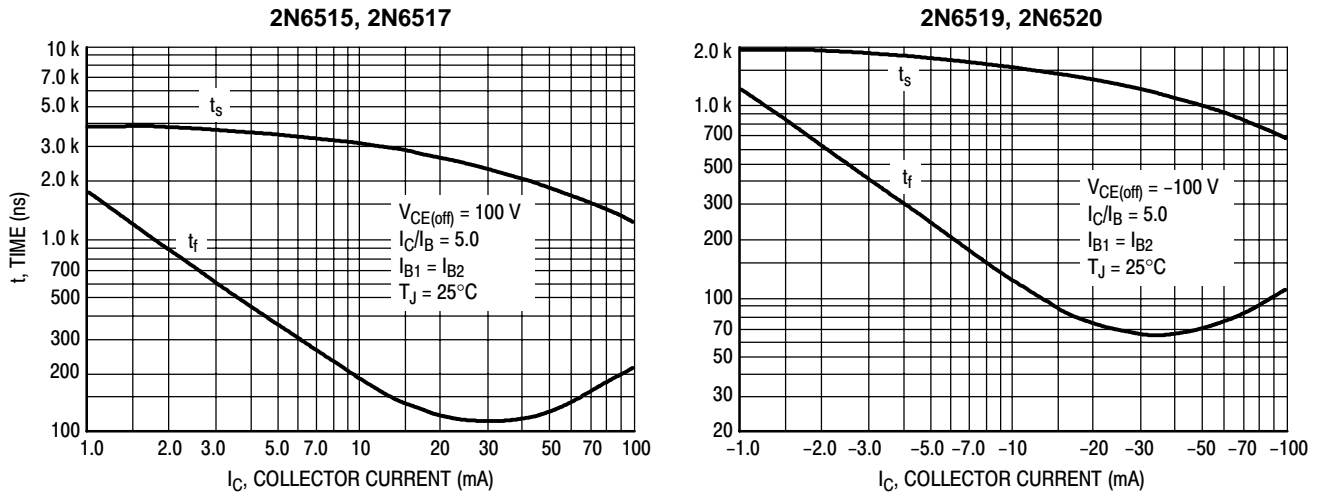


Figure 8. Turn-Off Time

NPN 2N6515 2N6517 PNP 2N6519 2N6520

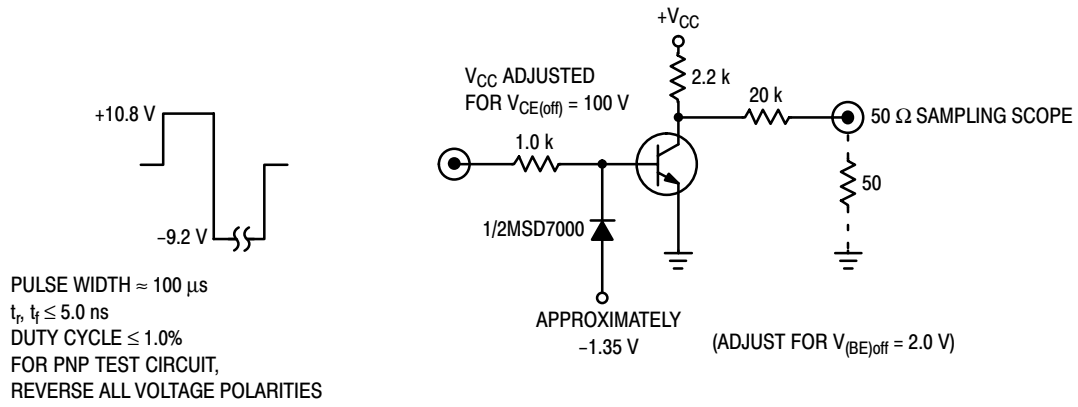


Figure 9. Switching Time Test Circuit

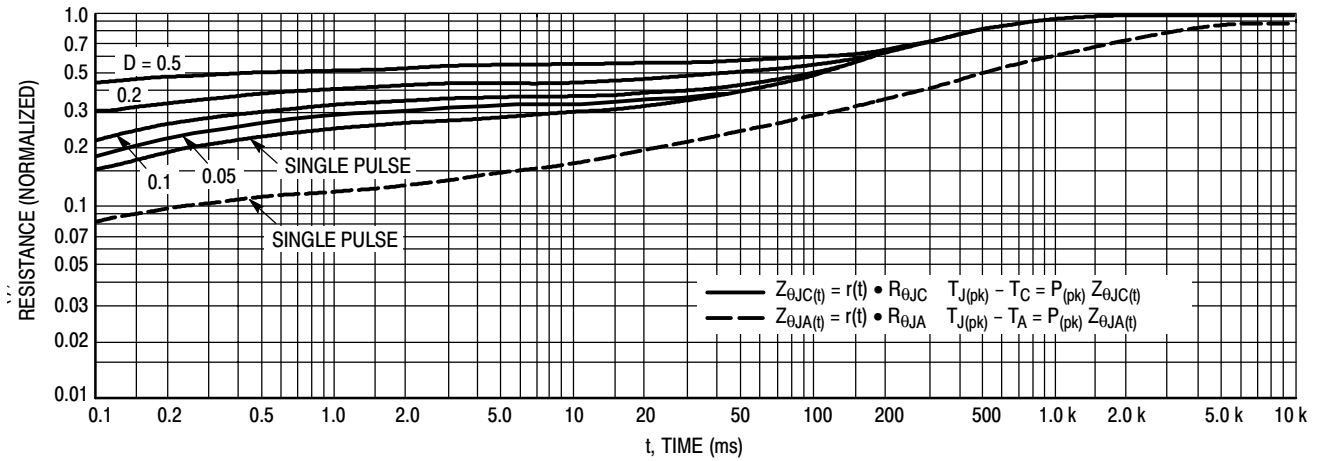


Figure 10. Thermal Response

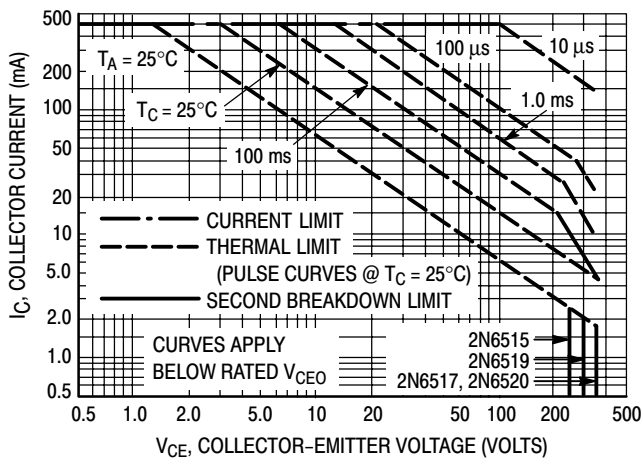
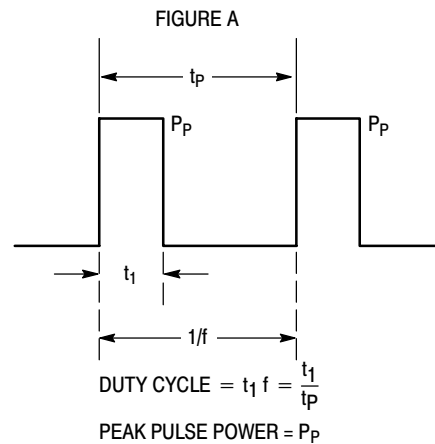


Figure 11. Active Region Safe Operating Area

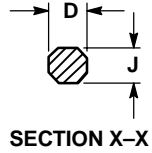
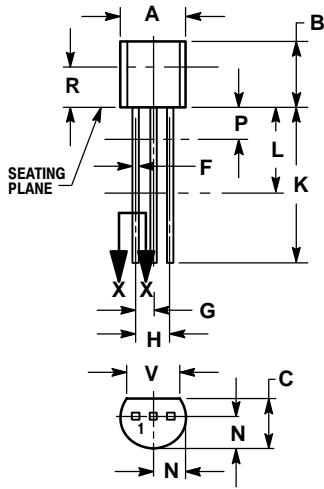
Design Note: Use of Transient Thermal Resistance Data



PACKAGE DIMENSIONS

NPN 2N6515 2N6517 PNP 2N6519 2N6520

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.

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	0.022	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

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