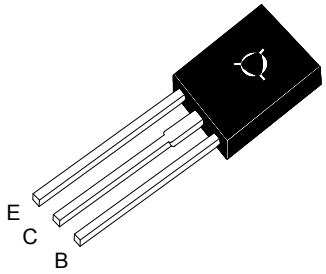
13002T / 13003T

NPN Silicon Power Transistors



TO-126 Plastic Package

Absolute Maximum Ratings (T_a = 25 °C)

Parameter		Symbol	Value	Unit
Collector Emitter Voltage	13002T 13003T	$V_{CEO(sus)}$	300 400	V
Collector Emitter Voltage	13002T 13003T	V_{CEV}	600 700	V
Emitter Base Voltage		V_{EBO}	9	V
Collector Current		I_C	1.5	A
Peak Collector Current at t = 5 ms		I_{CM}	3	A
Base Current		I_B	0.75	A
Peak Base Current at t = 5 ms		I_{BM}	1.5	A
Emitter Curren		I_E	2.25	A
Peak Emitter Current at t = 5 ms		I_{EM}	4.5	A
Total Power Dissipation at T_A = 25 °C Derate above 25 °C		P_{tot}	1.4 11.2	W mW/°C
Total Power Dissipation at T_C = 25 °C Derate above 25 °C		P_{tot}	40 320	W mW/°C
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	89	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	3.12	°C/W
Operating and Storage Junction Temperature Range		T_j, T_{stg}	- 65 to + 150	°C

Characteristics at T_a = 25 °C

Parameter		Symbol	Min.	Typ.	Max.	Unit
DC Current Gain						
at V_{CE} = 2 V, I_C = 0.5 A		h_{FE}	8	-	40	-
at V_{CE} = 2 V, I_C = 1 A		h_{FE}	5	-	25	-
Collector Cutoff Current at V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5 V		I_{CEV}	-	-	1	mA
Emitter Cutoff Current at V_{EB} = 9 V		I_{EBO}	-	-	1	mA
Collector Emitter Sustaining Voltage						
at I_C = 10 mA	13002T	$V_{CEO(sus)}$	300	-	-	V
at I_C=10mA	13003T	$V_{CEO(sus)}$	400	-	-	V
Collector Emitter Saturation Voltage						
at I_C = 0.5 A, I_B = 0.1 A		$V_{CE(sat)}$	-	-	0.5	V
at I_C = 1 A, I_B = 0.25 A		$V_{CE(sat)}$	-	-	1	V
at I_C = 1.5 A, I_B = 0.5 A		$V_{CE(sat)}$	-	-	3	V
Base Emitter Saturation Voltage						
at I_C = 0.5 A, I_B = 0.1 A		$V_{BE(sat)}$	-	-	1	V
at I_C = 1 A, I_B = 0.25 A		$V_{BE(sat)}$	-	-	1.2	V
Current Gain Bandwidth Product at V_{CE} = 10 V, I_C = 100 mA, f = 1 MHz		f_T	4	10	-	MHz
Output Capacitance at V_{CB} = 10 V, f = 0.1 MHz		C_{ob}	-	21	-	pF
Delay Time at V_{CC} = 125 V, I_C = 1 A, I_{B1} = -I_{B2} = 0.2 A		t_d	-	-	0.1	µs
Rise Time at V_{CC} = 125 V, I_C = 1 A, I_{B1} = -I_{B2} = 0.2 A		t_r	-	-	1	µs
Storage Time at V_{CC} = 125 V, I_C = 1 A, I_{B1} = -I_{B2} = 0.2 A		t_s	-	-	4	µs
Fall Time at V_{CC} = 125 V, I_C = 1 A, I_{B1} = -I_{B2} = 0.2 A		t_f	-	-	0.7	µs
Storage Time at I_C = 1 A, V_{clamp} = 300 V, I_{B1} = 0.2 A, $V_{BE(off)}$ = 5 V		t_{sv}	-	-	4	µs
Crossover Time at I_C = 1 A, V_{clamp} = 300 V, I_{B1} = 0.2 A, $V_{BE(off)}$ = 5 V		t_c	-	-	0.75	µs
Fall Time at I_C = 1 A, V_{clamp} = 300 V, I_{B1} = 0.2 A, $V_{BE(off)}$ = 5 V		t_{fi}	-	0.15	-	µs

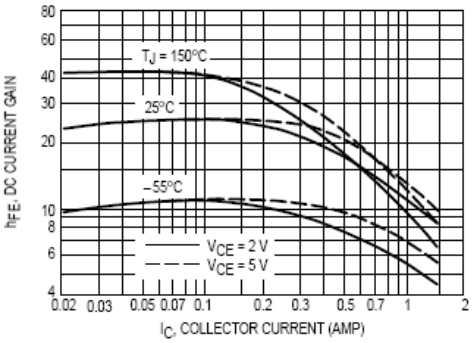


Figure 1. DC Current Gain

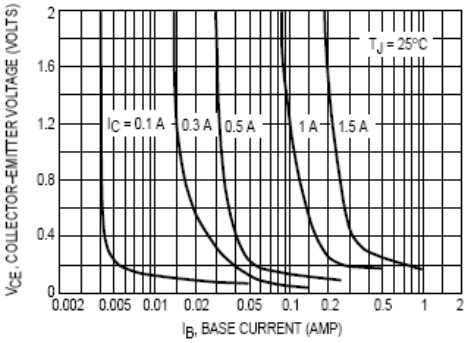


Figure 2. Collector Saturation Region

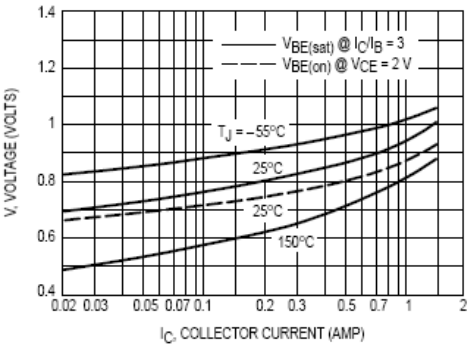


Figure 3. Base−Emitter Voltage

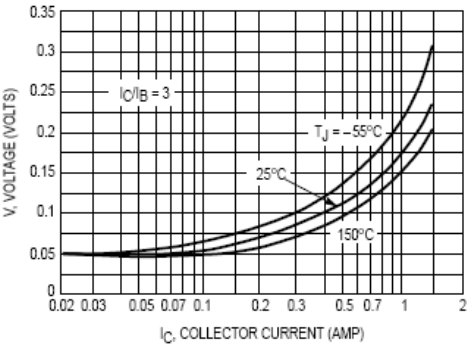


Figure 4. Collector−Emitter Saturation Region

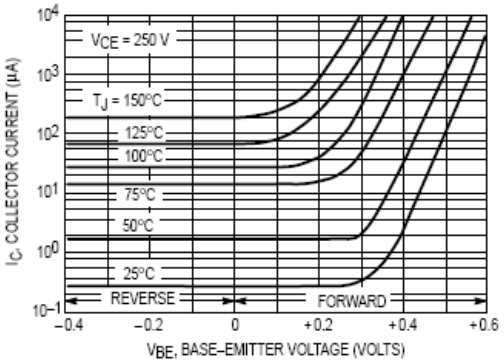


Figure 5. Collector Cutoff Region

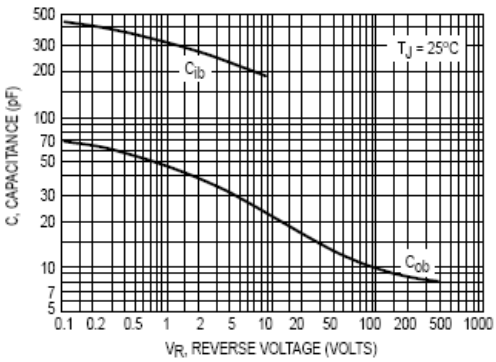


Figure 6. Capacitance

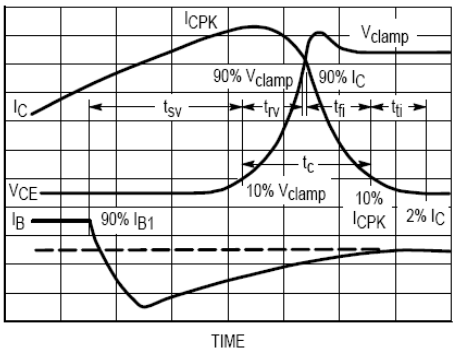


Figure 7. Inductive Switching Measurements

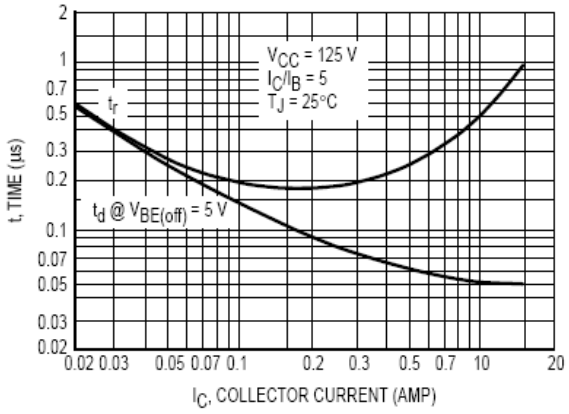


Figure 8. Turn–On Time

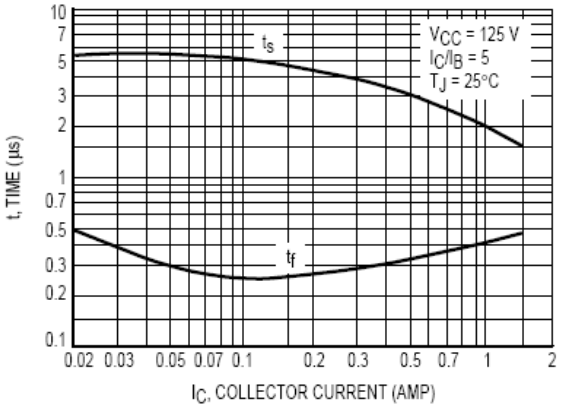


Figure 9. Turn–Off Time

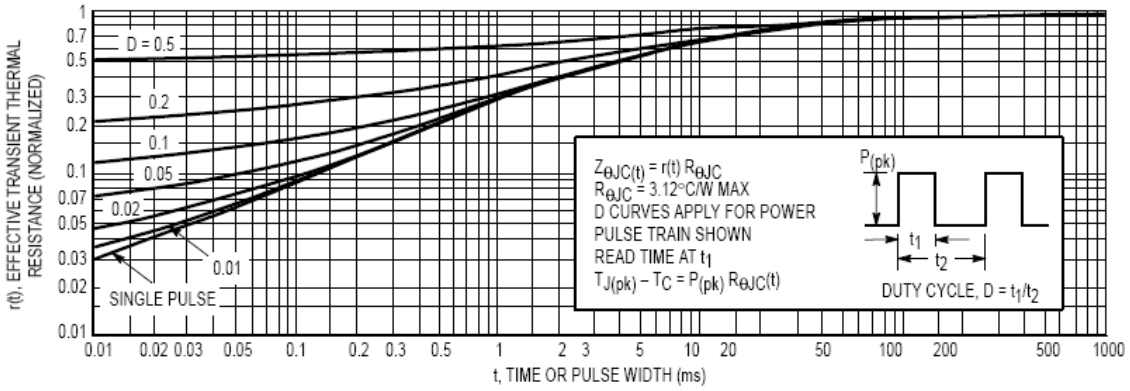


Figure 10. Thermal Response

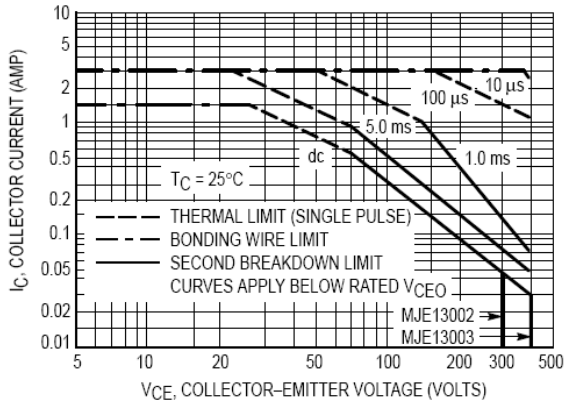


Figure 11. Active Region Safe Operating Area

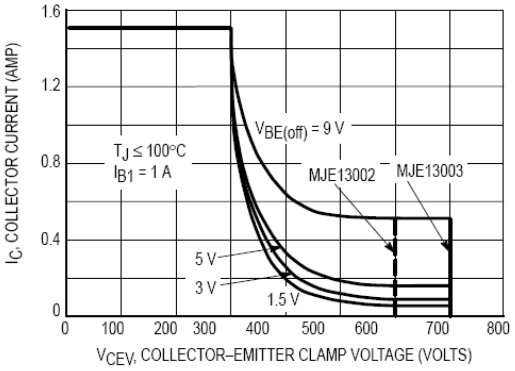


Figure 12. Reverse Bias Safe Operating Area

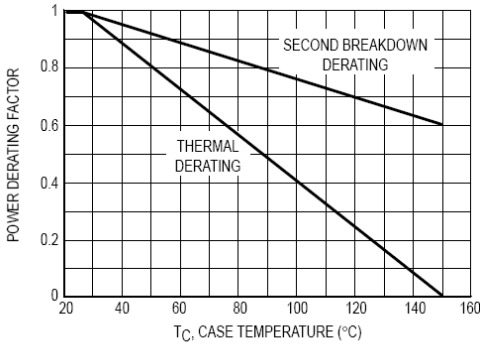


Figure 13. Forward Bias Power Derating