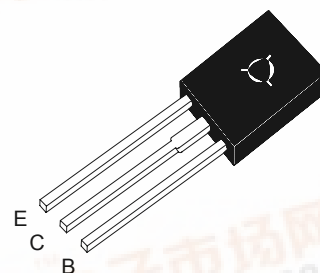


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NPN Silicon Power Transistors



TO-18 Plastic Package

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit	
Collector Emitter Voltage	$V_{CEO(sus)}$	13002T	300	V
		13003T	400	V
Collector Emitter Voltage	V_{CEV}	13002T	600	V
		13003T	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 Current	I_E	2.25	A	
Peak Emitter Current at $t = 5$ ms	I_{EM}	4.5	A	
Total Power Dissipation at $T_A = 25^\circ\text{C}$ Derate above 25°C	P_{tot}	1.4	W	
		11.2	mW/°C	
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above 25°C	P_{tot}	40	W	
		320	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	

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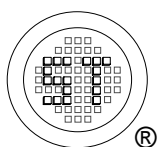
Dated : 24/05/2010 Rev:01

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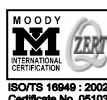
Characteristics at $T_a = 25\text{ }^\circ\text{C}$

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



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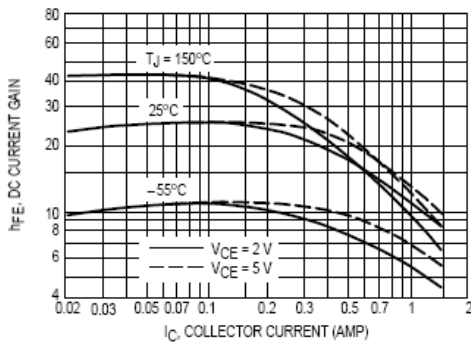


Figure 1. DC Current Gain

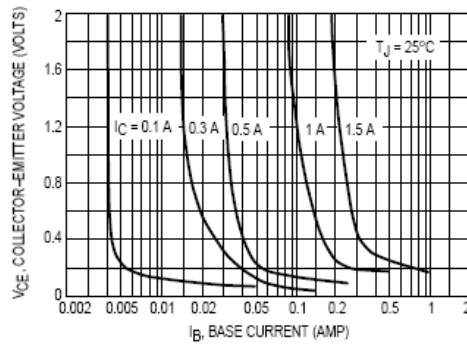


Figure 2. Collector Saturation Region

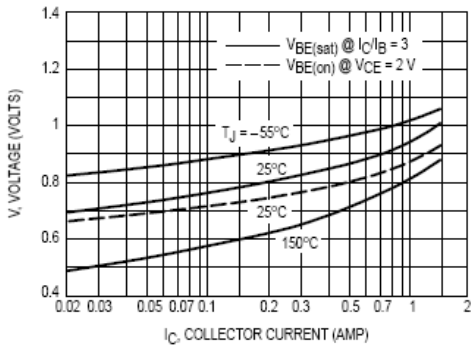


Figure 3. Base-Emitter Voltage

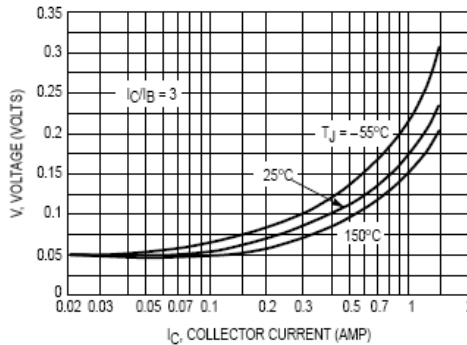


Figure 4. Collector-Emitter Saturation Region

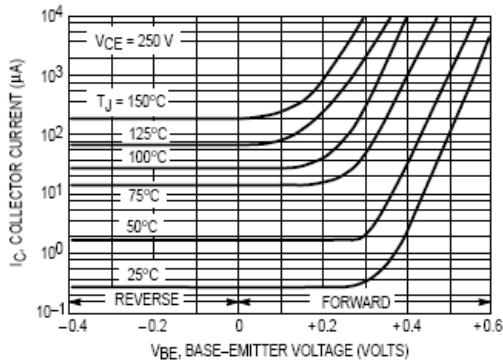


Figure 5. Collector Cutoff Region

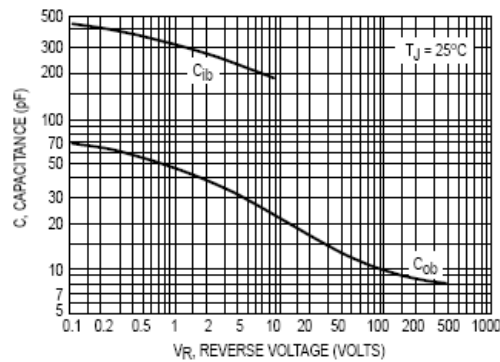


Figure 6. Capacitance

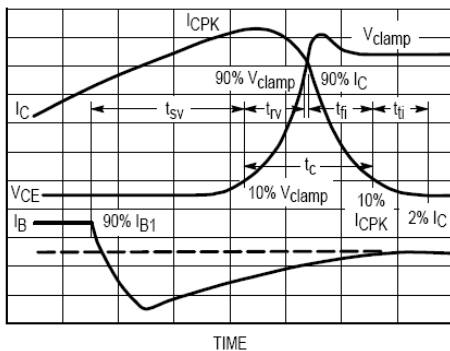
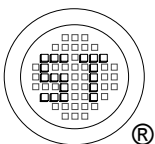
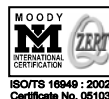


Figure 7. Inductive Switching Measurements



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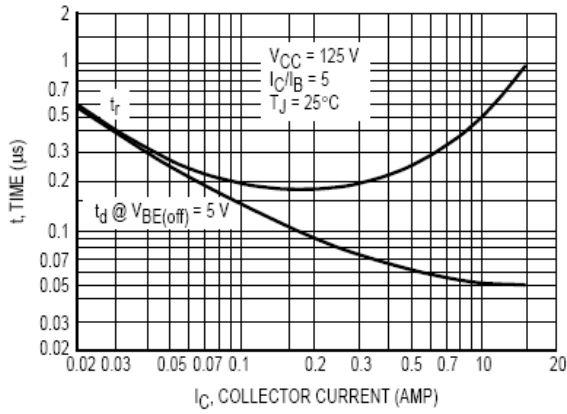


Figure 8. Turn-On Time

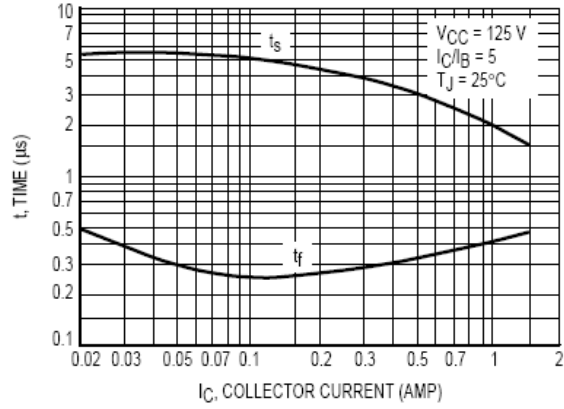


Figure 9. Turn-Off Time

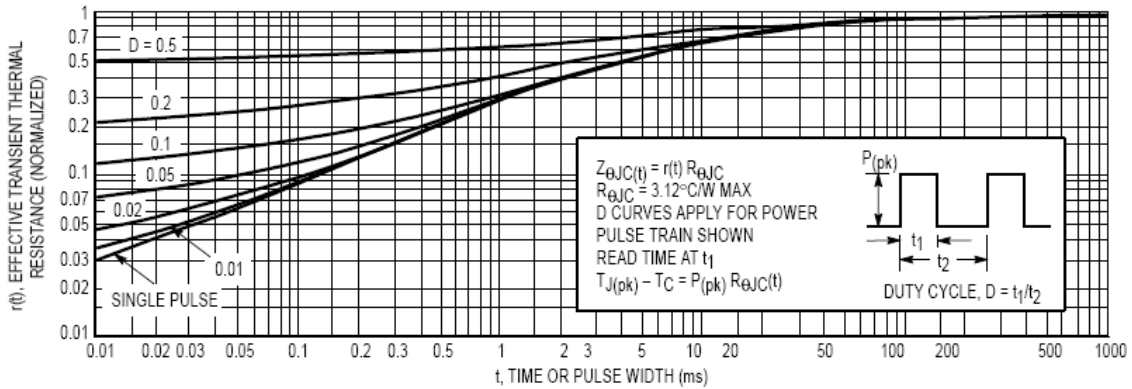


Figure 10. Thermal Response

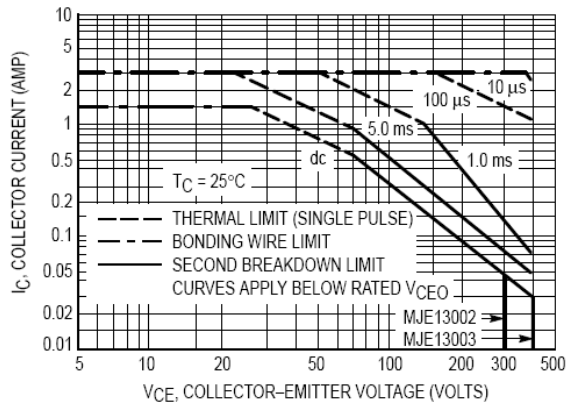


Figure 11. Active Region Safe Operating Area

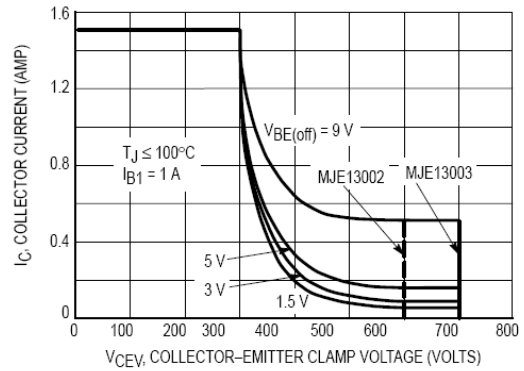


Figure 12. Reverse Bias Safe Operating Area

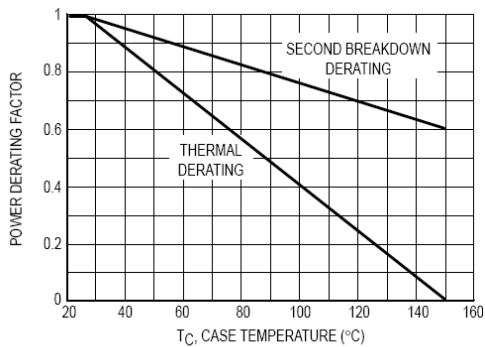
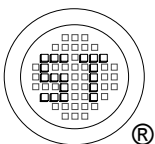


Figure 13. Forward Bias Power Derating



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