

Description:

Switch mode Series NPN Power Transistors are designed for use in high-voltage, high-speed, power switching in inductive circuits, they are particularly suited for 115 and 220V switch mode applications such as switching regulator's, inverters, DC-DC converters, Motor controls, solenoid/relay drivers and deflection circuits.

Features:

- Collector-Emitter Sustaining Voltage -
 $V_{CEO(sus)} = 400V$
- Collector-Emitter Saturation Voltage -
 $V_{CE(sat)} = 1V$ (Max.) at $I_C = 4A$, $I_B = 1A$
- Switching Time- $t_f = 0.9\mu s$ (Max.) at $I_C = 2A$

Maximum Ratings

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CEO}	400	V
Collector-Emitter Voltage	V_{CEV}	700	
Emitter-Base Voltage	V_{EBO}	9	
Collector Current-Continuous -Peak	I_C I_{CM}	4 8	A
Base Current	I_B	2	
Total Power Dissipation at $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	75 0.6	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ C$

Thermal Characteristics

Characteristic	Symbol	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.67	$^\circ C/W$

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min.	Max.	Unit
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Off Characteristics

Collector-Emitter Sustaining Voltage $I_C = 10\text{mA}, I_B = 0$	$V_{CEO(sus)}$	400	-	V
Collector Cut off Current $V_{CE} = \text{Rated Value}, V_{BE(off)} = 1.5\text{V}$ $V_{CE} = \text{Rated Value}, V_{BE(off)} = 1.5\text{V}, T_C = 100^\circ\text{C}$	I_{CEV}	-	1 5	mA
Emitter Cut off Current $V_{EB} = 9\text{V}, I_C = 0$	I_{EBO}	-	1	

On Characteristics (1)

DC Current Gain $I_C = 1\text{A}, V_{CE} = 5\text{V}$ $I_C = 2\text{A}, V_{CE} = 5\text{V}$	hFE	10 8	60 40	-
Collector-Emitter Saturation Voltage $I_C = 1\text{A}, I_B = 200\text{mA}$ $I_C = 2\text{A}, I_B = 500\text{mA}$ $I_C = 4\text{A}, I_B = 1\text{A}$	$V_{CE(sat)}$	-	0.5 0.6 1	V
Base-Emitter Saturation Voltage $I_C = 1\text{A}, I_B = 200\text{mA}$ $I_C = 2\text{A}, I_B = 500\text{mA}$	$V_{BE(sat)}$	-	1.2 1.6	

Dynamic Characteristics

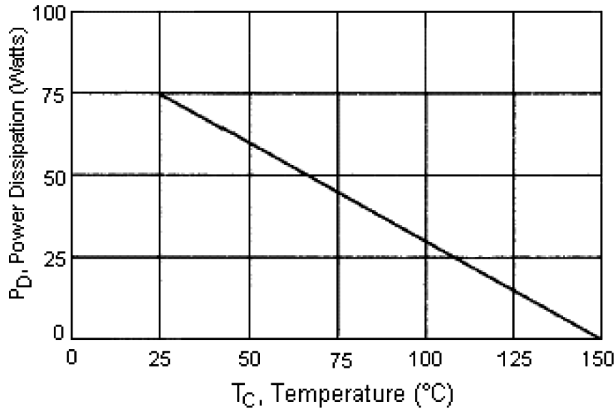
Current Gain-Bandwidth Product $I_C = 500\text{mA}, V_{CE} = 10\text{V}, f = 1\text{MHz}$	f_T	4	-	MHz
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Switching Characteristics

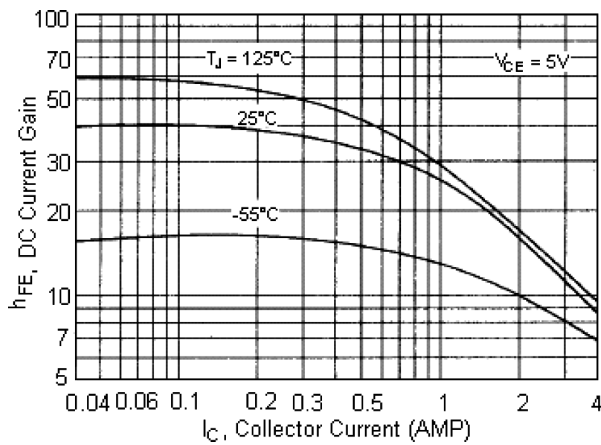
Delay Time	$V_{CC} = 125\text{V}, I_C = 2\text{A}$ $I_{B1} = -I_{B2} = 0.4\text{A}$ $t_p = 25\mu\text{s}$ Duty Cycle $\leq 1\%$	t_d	-	0.1	μs
Rise Time		t_r	-	0.7	
Storage Time		t_s	-	4	
Fall Time		t_f	-	0.9	

(1) Pulse Test: Pulse Width = $300\mu\text{s}$, Duty Cycle $\leq 2\%$

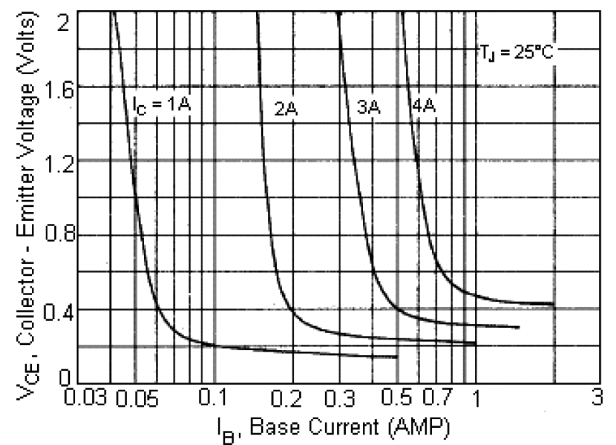
Figure - 1 Power Derating



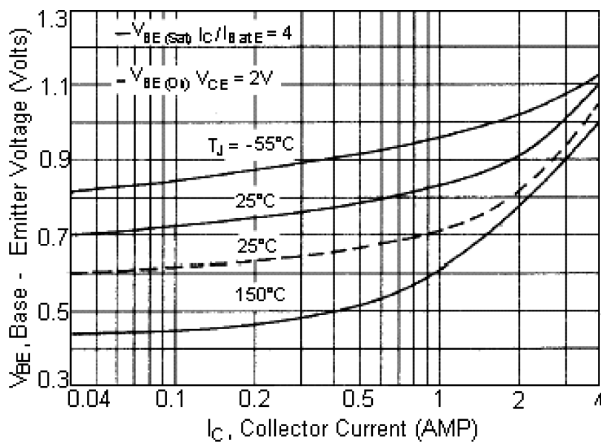
DC Current Gain



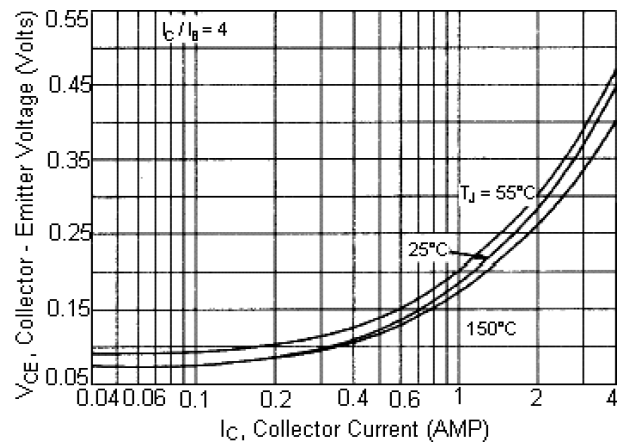
Collector Saturation Region



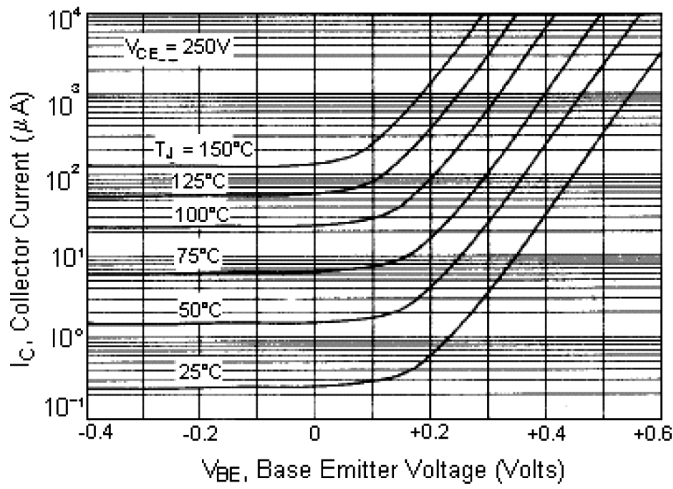
Base-Emitter Voltage



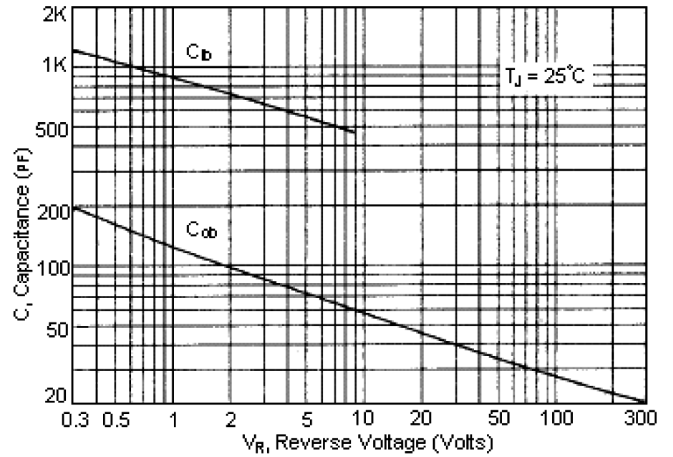
Collector-Emitter Saturation Voltage



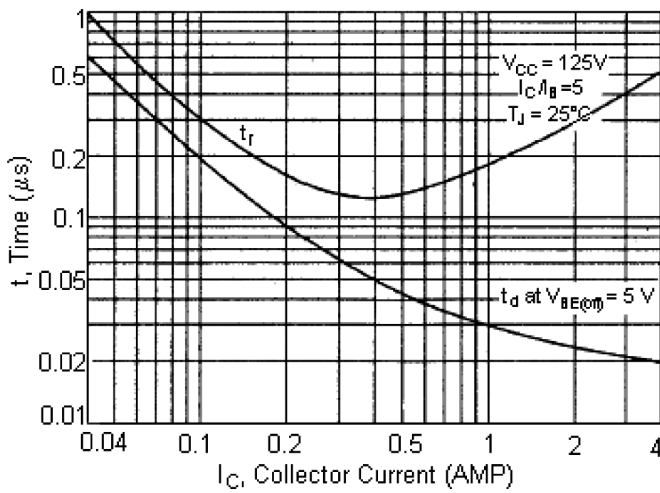
Collector Cut-Off Region



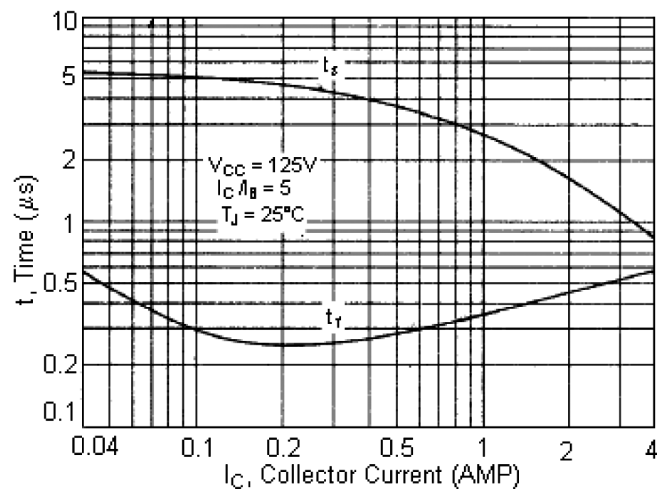
Capacitance



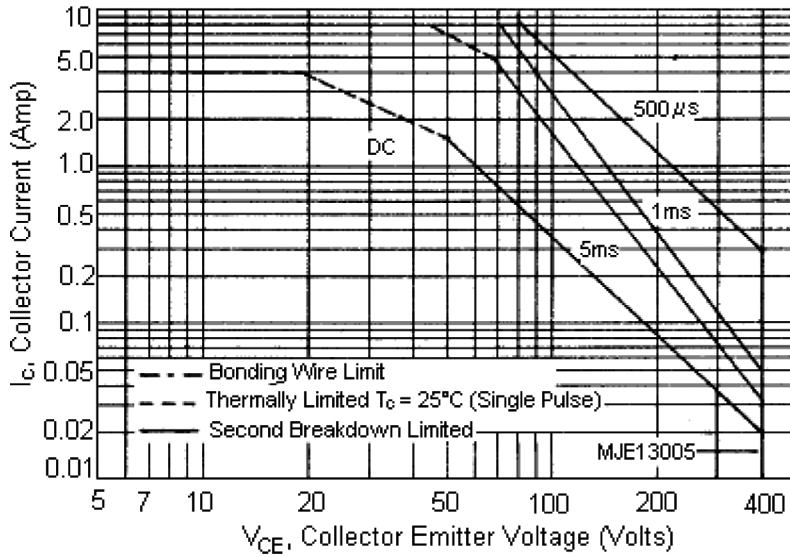
Turn-On Time



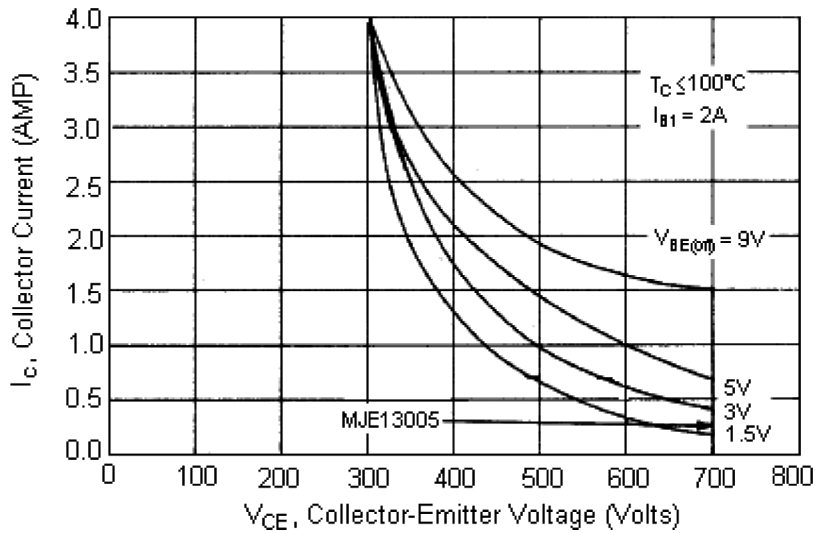
Turn-Off Time

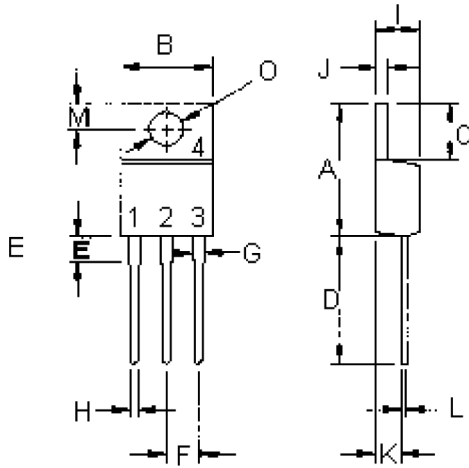


Active Region Safe Operating Area



Reverse Bias Switching Safe Operating Area





Pin Configuration:

- 1. Base
- 2. Collector
- 3. Emitter
- 4. Collector(Case)

Dimensions	Min.	Max.
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.2	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.9

Dimensions : Millimetres

Part Number Table

Description	Part Number
Transistor, NPN, TO-220	MJE13005

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