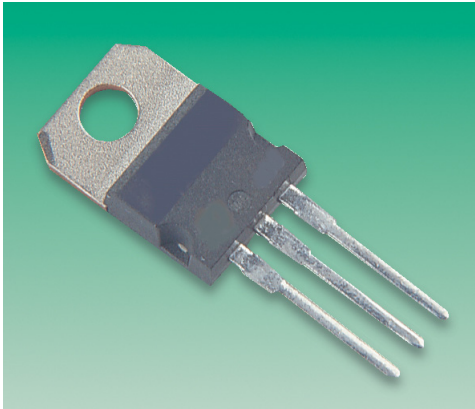


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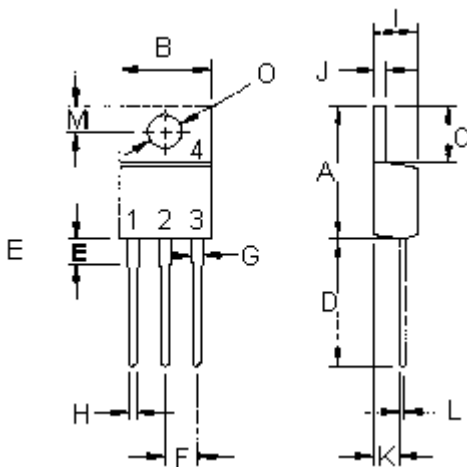
Power Transistor



Switchmode 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 switchmode applications such as switching regulator's, inverters, DC-DC converters, Motor controls, solenoid/relay drivers and deflection circuits.

Features:

- Collector-Emitter Sustaining Voltage -
 $V_{CE(sus)} = 400V$.
- Collector-Emitter Saturation Voltage -
 $V_{CE(sat)} = 1.0V$ (Maximum) at $I_C = 4.0A$, $I_B = 1.0A$.
- Switching Time- $t_f = 0.9\mu s$ (Maximum) at $I_C = 2.0A$.



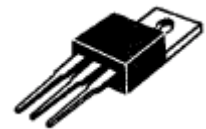
- Pin 1. Base
2. Collector
3. Emitter
4. Collector(Case).

Dimensions	Minimum	Maximum
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	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

Dimensions : Millimetres

NPN
MJE13005

4 Ampere
Power
Transistors
400 Volts
75 Watts



TO-220

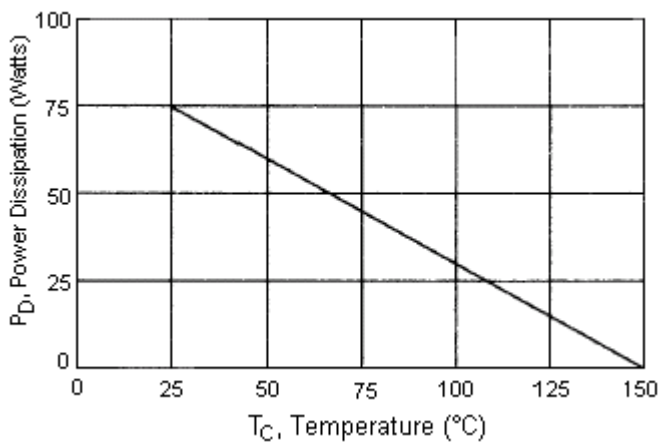
Maximum Ratings

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CEO}	400	V
Collector-Emitter Voltage	V_{CEV}	700	
Emitter-Base Voltage	V_{EBO}	9.0	
Collector Current-Continuous -Peak	I_C I_{CM}	4.0 8.0	A
Base Current	I_B	2.0	
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	75 0.6	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ\text{C}$

Thermal Characteristics

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

Figure - 1 Power Derating



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

Characteristic	Symbol	Minimum	Maximum	Unit
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}	-	1.0 5.0	mA
Emitter Cut off Current ($V_{EB} = 9.0\text{V}$, $I_C = 0$)	I_{EBO}	-	1.0	

ON Characteristics (1)				
DC Current Gain ($I_C = 1.0\text{A}$, $V_{CE} = 5.0\text{V}$) ($I_C = 2.0\text{A}$, $V_{CE} = 5.0\text{V}$)	h_{FE}	10 8.0	60 40	-
Collector-Emitter Saturation Voltage ($I_C = 1.0\text{A}$, $I_B = 200\text{mA}$) ($I_C = 2.0\text{A}$, $I_B = 500\text{mA}$) ($I_C = 4.0\text{A}$, $I_B = 1.0\text{A}$)	$V_{CE(sat)}$	-	0.5 0.6 1.0	V
Base-Emitter Saturation Voltage ($I_C = 1.0\text{A}$, $I_B = 200\text{mA}$) ($I_C = 2.0\text{A}$, $I_B = 500\text{mA}$)	$V_{BE(sat)}$	-	1.2 1.6	
Dynamic Characteristics				
Current Gain-Bandwidth Product ($I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$, $f = 1.0\text{MHz}$)	f_T	4.0	-	MHz

Switching Characteristics					
Delay Time	$V_{CC} = 125\text{V}$, $I_C = 2.0\text{A}$, $I_{B1} = -I_{B2} = 0.4\text{A}$ $t_p = 25\mu\text{s}$, Duty Cycle $\leq 1.0\%$	t_d	-	0.1	μs
Rise Time		t_r	-	0.7	
Storage Time		t_s	-	4.0	
Fall Time		t_f	-	0.9	

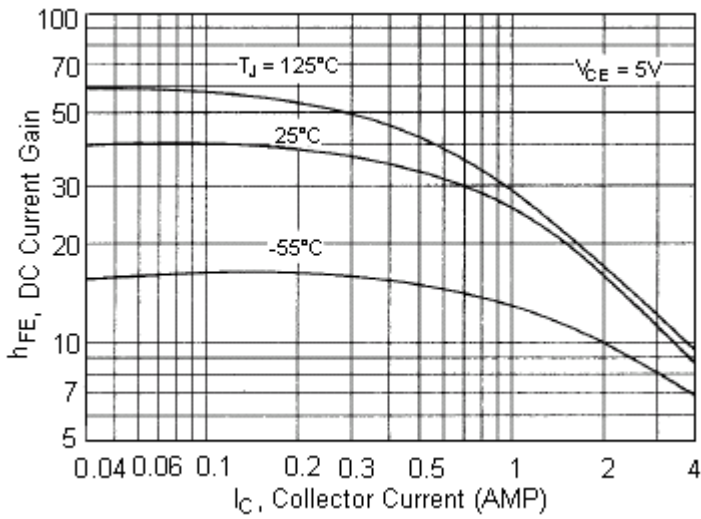
(1) Pulse Test: Pulse Width = $300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

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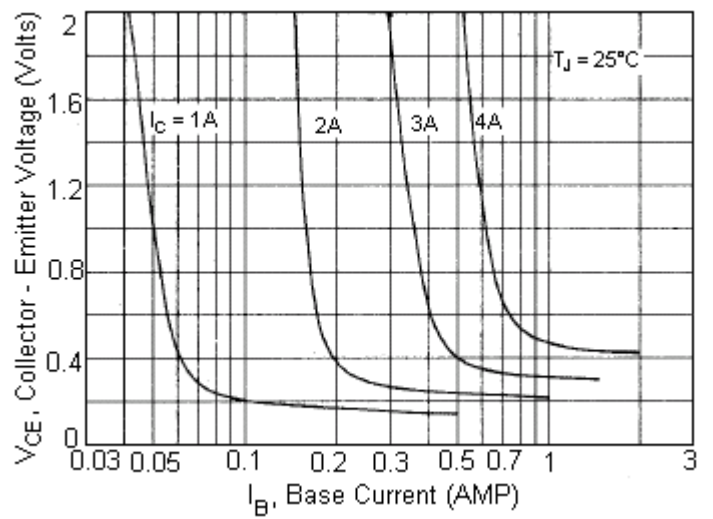
Power Transistor



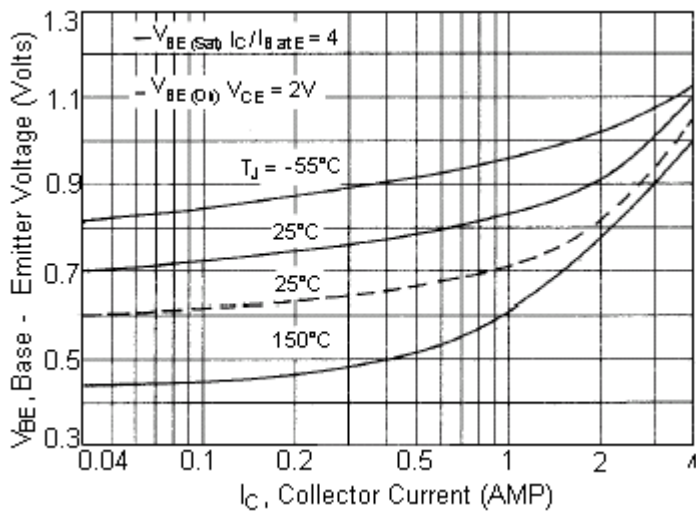
DC Current Gain



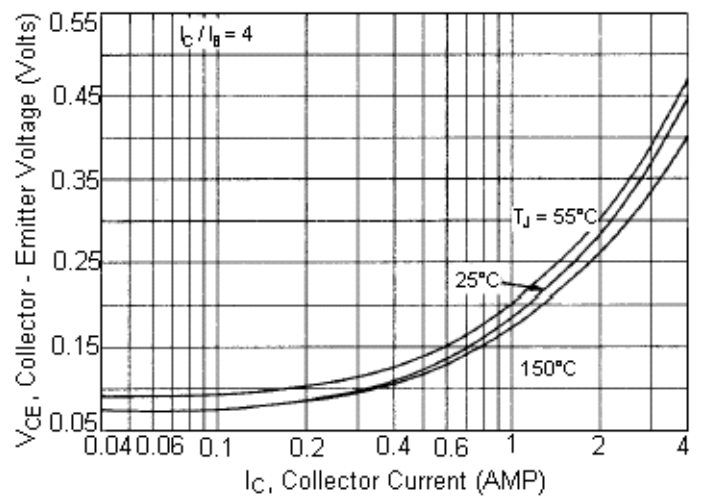
Collector Saturation Region



Base-Emmitter Voltage



Collector-Emmitter Saturation Voltage

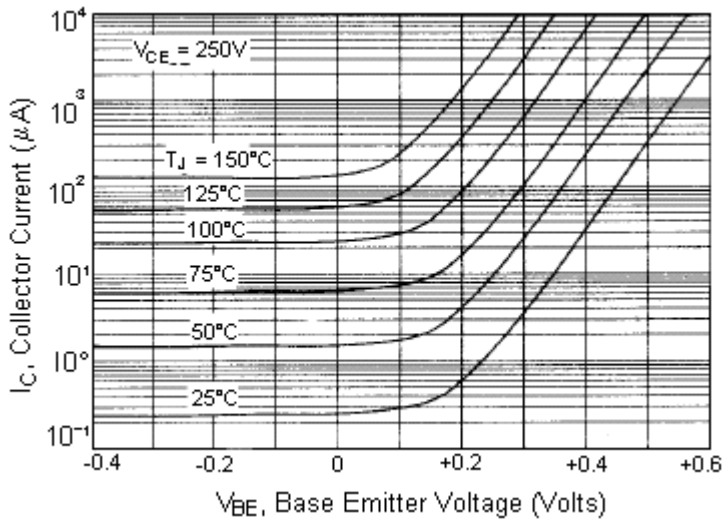


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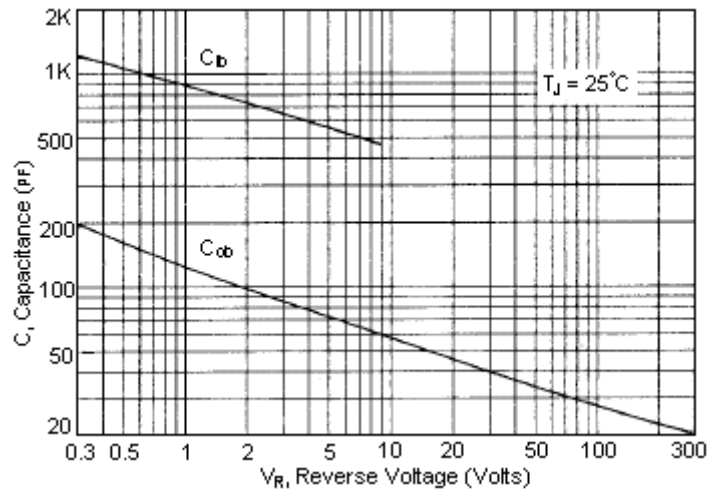
Power Transistor



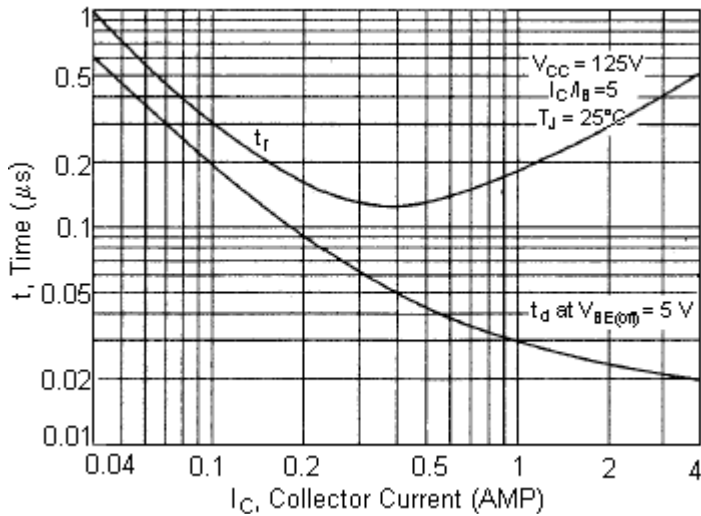
Collector Cut-Off Region



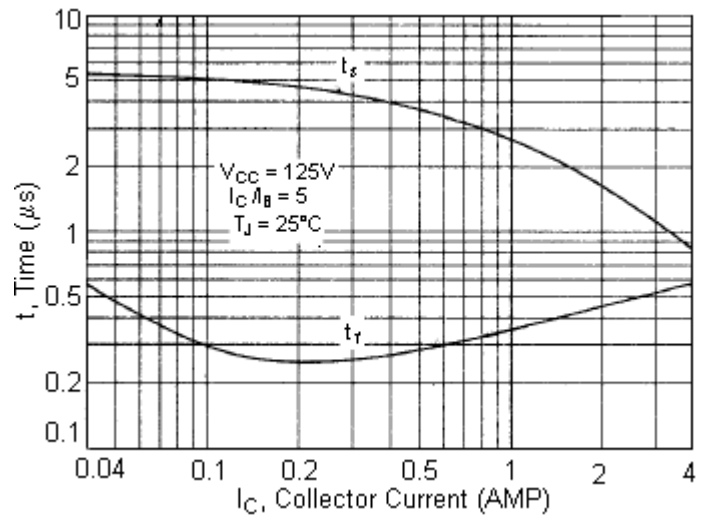
Capacitance



Turn-On Time



Turn-Off Time

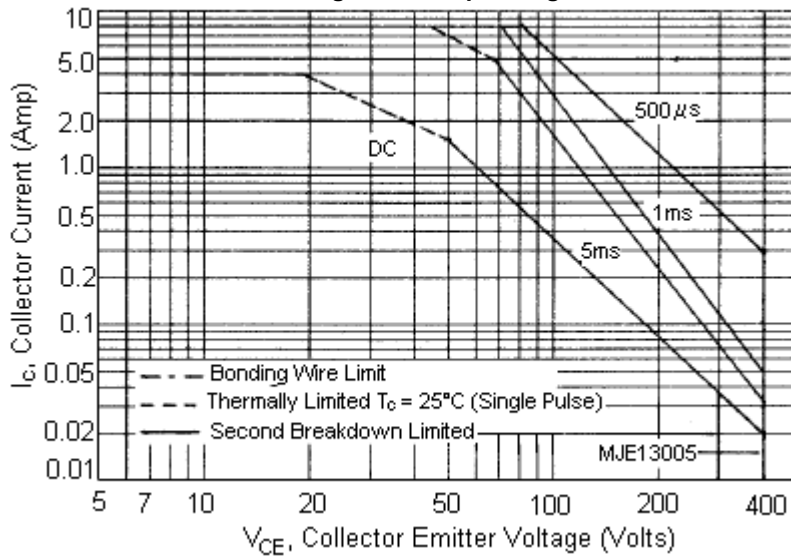


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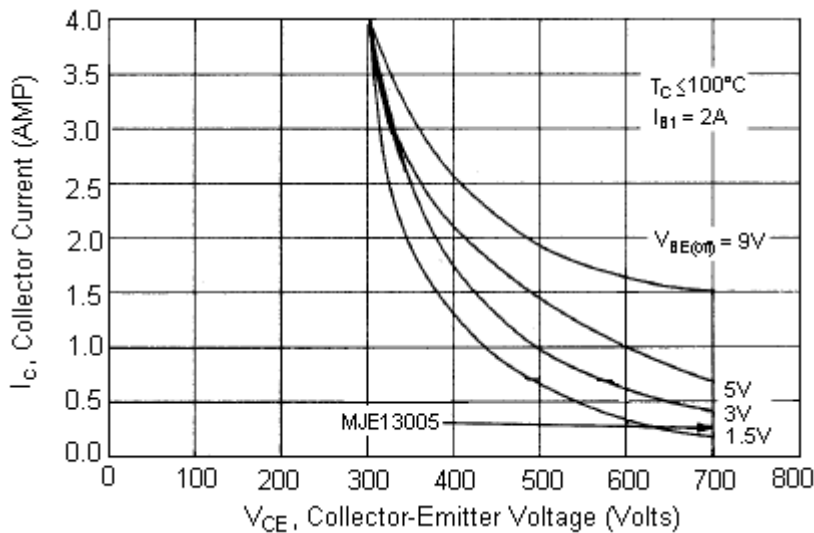
Power Transistor



Active Region Safe Operating Area



Reverse Bias Switching Safe Operating Area



Specifications

$I_{C(av)}$ maximum (A)	V_{CE0} maximum (V)	V_{CBO} maximum (V)	$V_{CE(Sat)}$ (V) at $I_C = 4A$	t_f maximum (μs)	P_{tot} at 25°C (W)	Package	Type	Part Number
4	400	700	1	0.9	75	TO-220	NPN	MJE13005



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