

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
----------------	--------	------	------	------

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

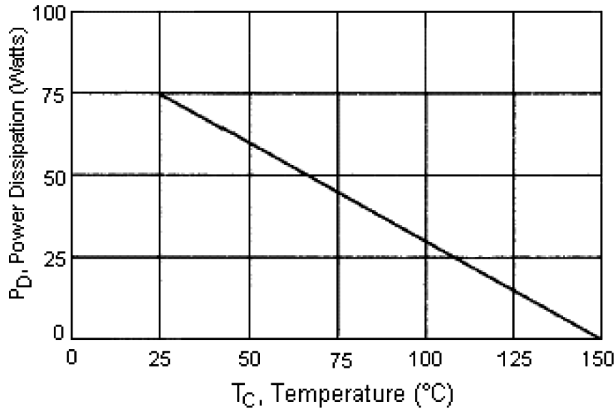
Current Gain-Bandwidth Product $I_C = 500\text{mA}, V_{CE} = 10\text{V}, f = 1\text{MHz}$	f_T	4	-	MHz
--	-------	---	---	-----

Switching Characteristics

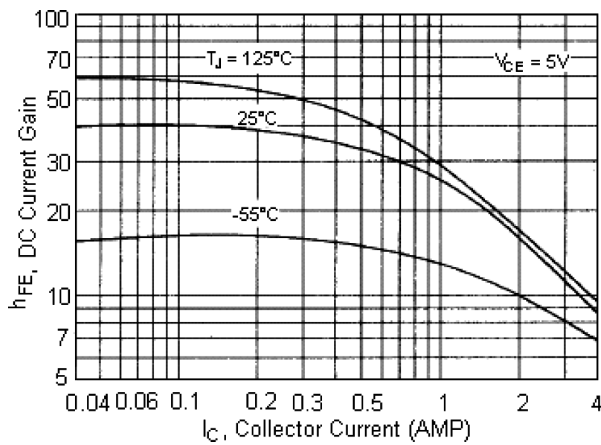
Delay Time	$V_{CC} = 125\text{V}, I_C = 2\text{A}$ $I_{B1} = -I_{B2} = 0.4\text{A}$ $t_p = 25\mu\text{s}$ Duty Cycle $\leq 1\%$	t_d	-	0.1	μs
Rise Time		t_r	-	0.7	
Storage Time		t_s	-	4	
Fall Time		t_f	-	0.9	

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

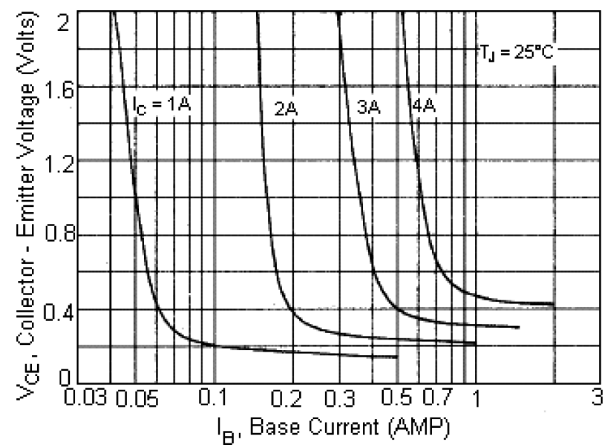
Figure - 1 Power Derating



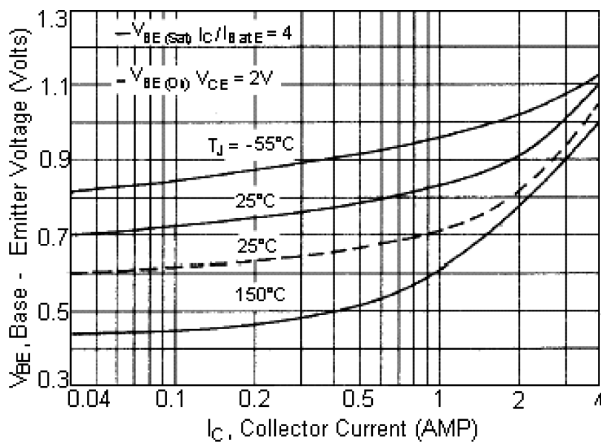
DC Current Gain



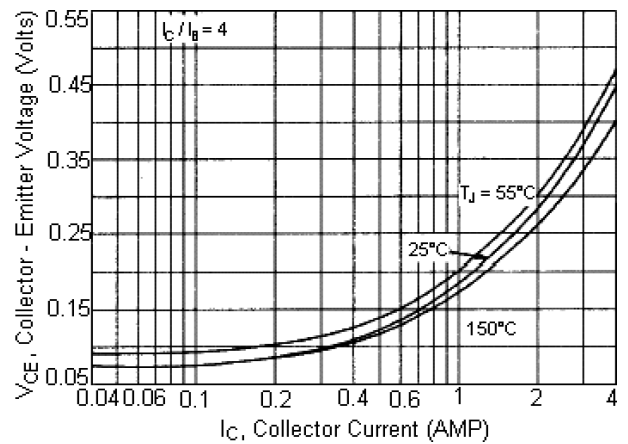
Collector Saturation Region



Base-Emitter Voltage



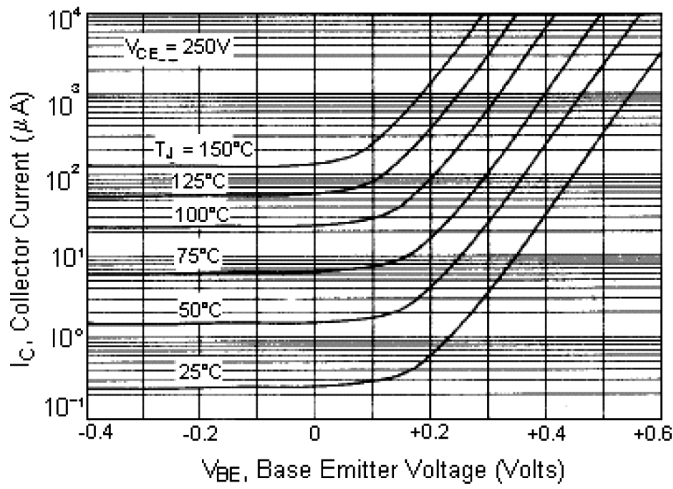
Collector-Emitter Saturation Voltage



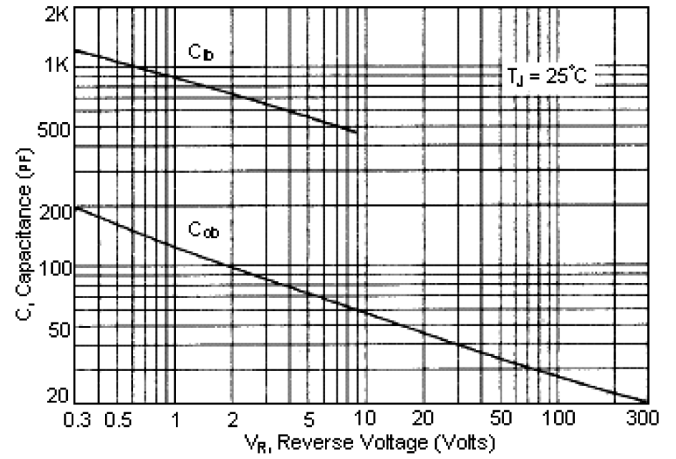
Power Transistor



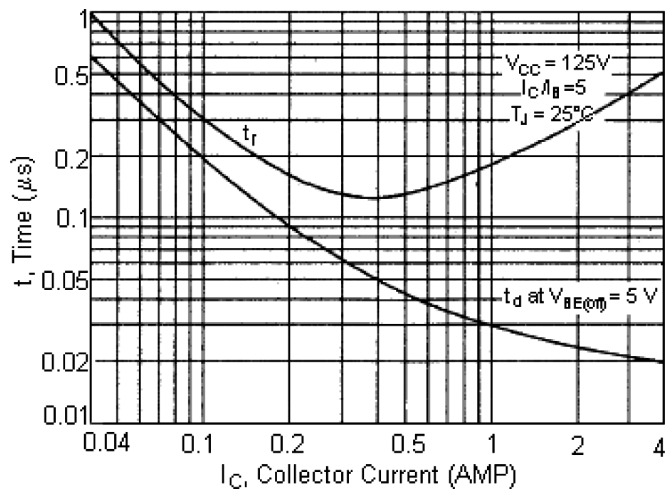
Collector Cut-Off Region



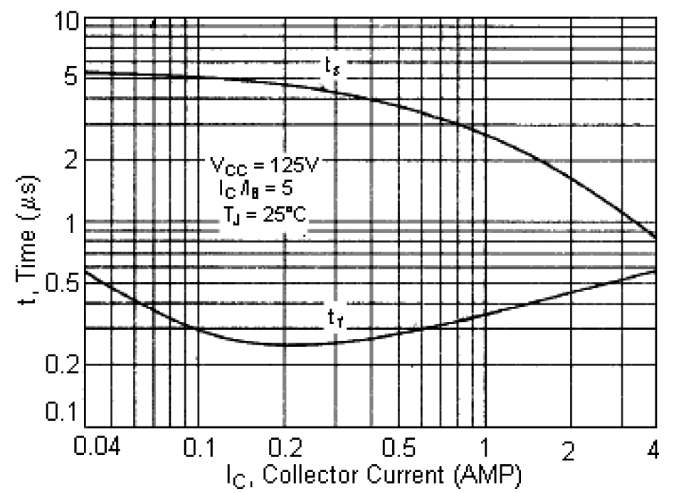
Capacitance



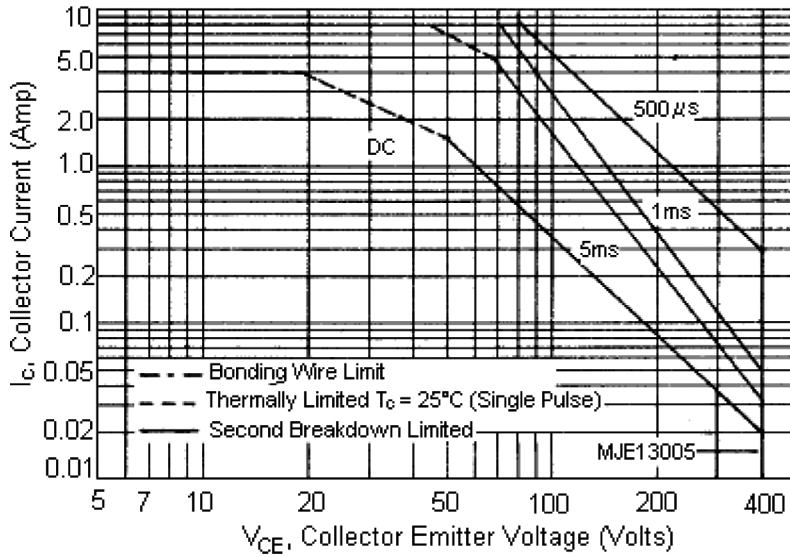
Turn-On Time



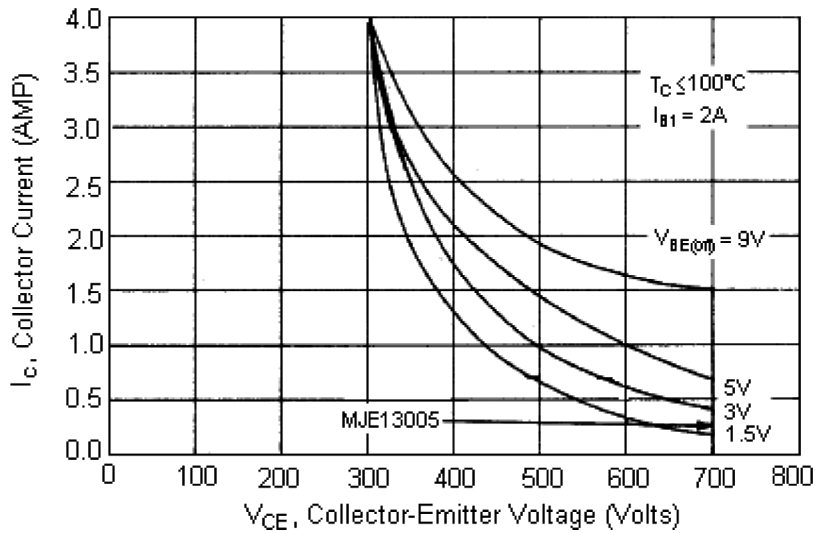
Turn-Off Time



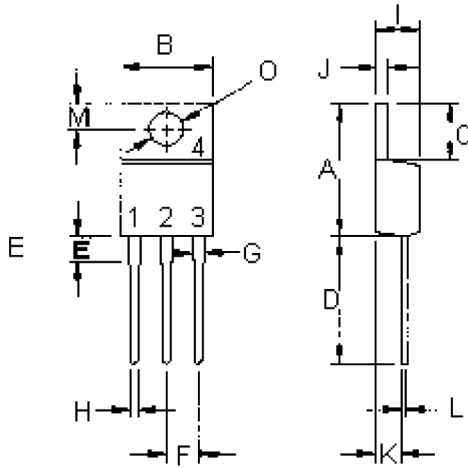
Active Region Safe Operating Area



Reverse Bias Switching Safe Operating Area



Power Transistor



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

Important Notice : This data sheet and its contents (the "Information") belong to the members of the Premier Farnell group of companies (the "Group") or are licensed to it. No licence is granted for the use of it other than for information purposes in connection with the products to which it relates. No licence of any intellectual property rights is granted. The Information is subject to change without notice and replaces all data sheets previously supplied. The Information supplied is believed to be accurate but the Group assumes no responsibility for its accuracy or completeness, any error in or omission from it or for any use made of it. Users of this data sheet should check for themselves the Information and the suitability of the products for their purpose and not make any assumptions based on information included or omitted. Liability for loss or damage resulting from any reliance on the Information or use of it (including liability resulting from negligence or where the Group was aware of the possibility of such loss or damage arising) is excluded. This will not operate to limit or restrict the Group's liability for death or personal injury resulting from its negligence. Multicomp is the registered trademark of the Group. © Premier Farnell plc 2012.

