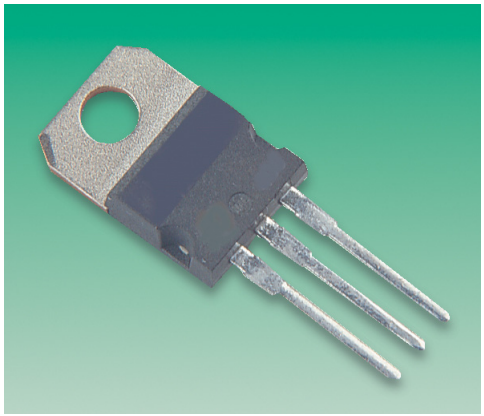
MJE13005

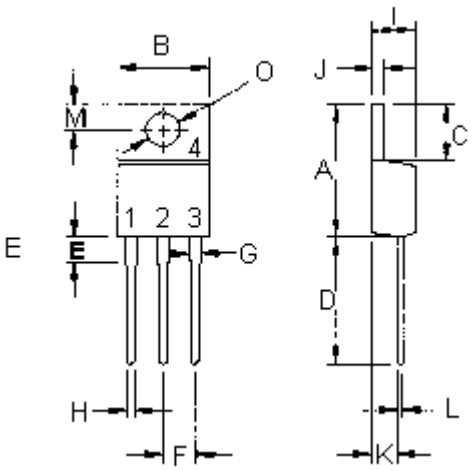
Power Transistor



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

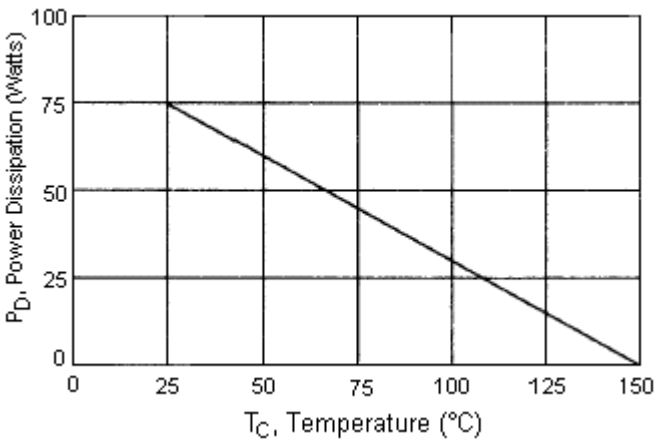
Maximum Ratings

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°C Derate above 25°C	P_D	75 0.6	W W/°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	°C

Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	Rθjc	1.67	°C/W

Figure - 1 Power Derating



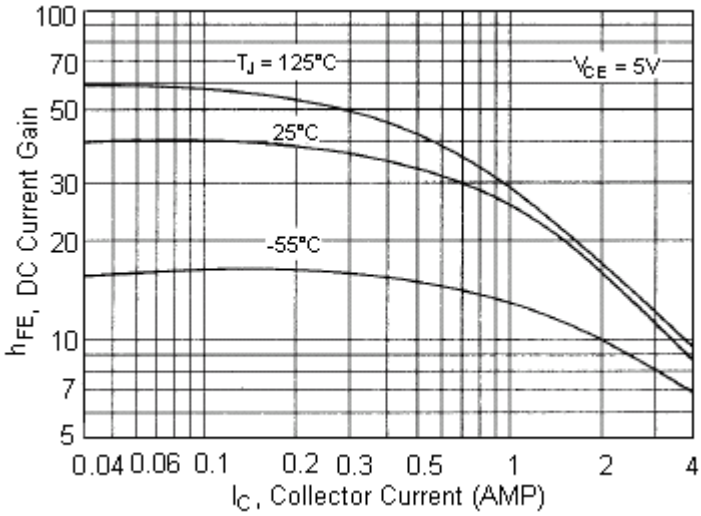
Electrical Characteristics (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector-Emitter Sustaining Voltage (I_C = 10mA, I_B = 0)	$V_{CEO(sus)}$	400	-	V
Collector Cut off Current (V_{CE} = Rated Value, $V_{BE(off)}$ = 1.5V) (V_{CE} = Rated Value, $V_{BE(off)}$ = 1.5V, T_C = 100°C)	I_{CEV}	-	1.0 5.0	mA
Emitter Cut off Current (V_{EB} = 9.0V, I_C = 0)	I_{EBO}	-	1.0	
ON Characteristics (1)				
DC Current Gain (I_C = 1.0A, V_{CE} = 5.0V) (I_C = 2.0A, V_{CE} = 5.0V)	h_{FE}	10 8.0	60 40	-
Collector-Emitter Saturation Voltage (I_C = 1.0A, I_B = 200mA) (I_C = 2.0A, I_B = 500mA) (I_C = 4.0A, I_B = 1.0A)	$V_{CE(sat)}$	-	0.5 0.6 1.0	V
Base-Emitter Saturation Voltage (I_C = 1.0A, I_B = 200mA) (I_C = 2.0A, I_B = 500mA)	$V_{BE(sat)}$	-	1.2 1.6	
Dynamic Characteristics				
Current Gain-Bandwidth Product (I_C = 500mA, V_{CE} = 10V, f = 1.0MHz)	f_T	4.0	-	MHz

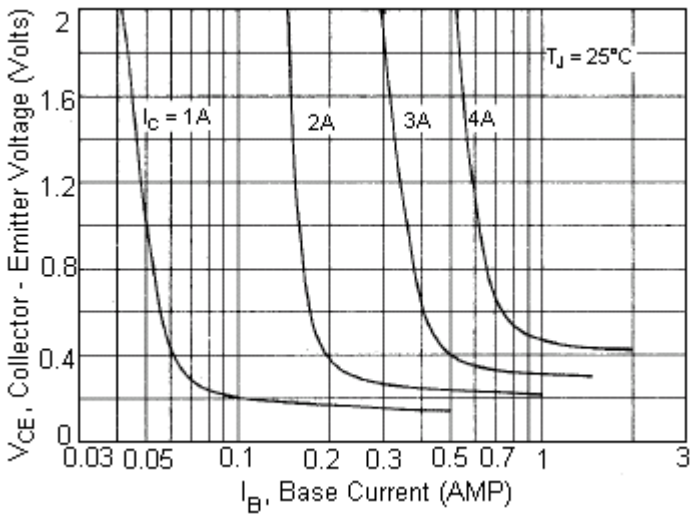
Switching Characteristics					
Delay Time	V_{CC} = 125V, I_C = 2.0A, I_{B1} = -I_{B2} = 0.4A tp = 25µs, Duty Cycle ≤1.0%	t_d	-	0.1	µs
Rise Time		t_r	-	0.7	
Storage Time		t_s	-	4.0	
Fall Time		t_f	-	0.9	

(1) Pulse Test: Pulse Width = 300µs, Duty Cycle ≤2.0%

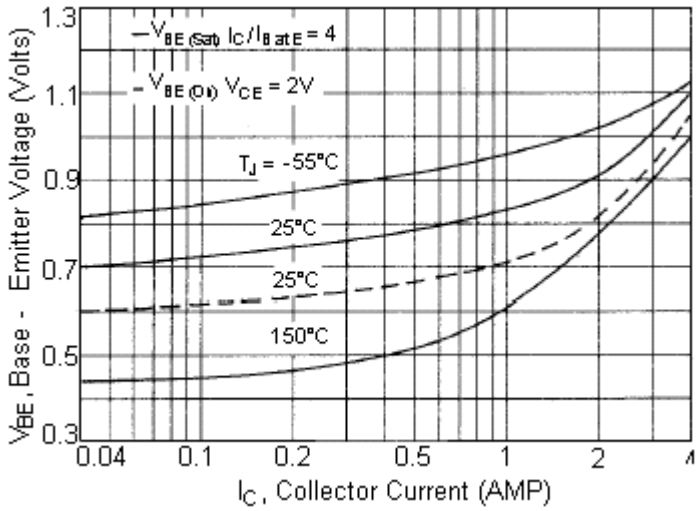
DC Current Gain



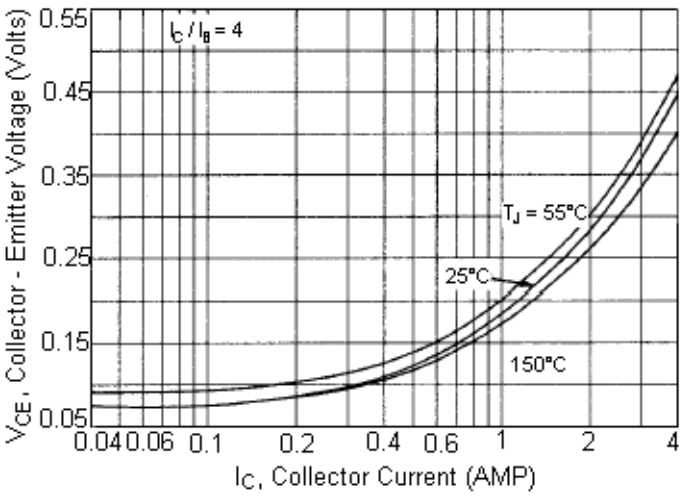
Collector Saturation Region



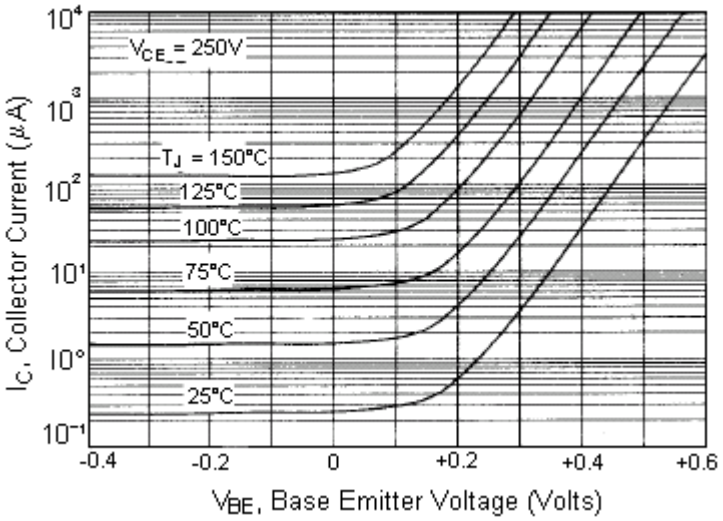
Base-Emitter Voltage



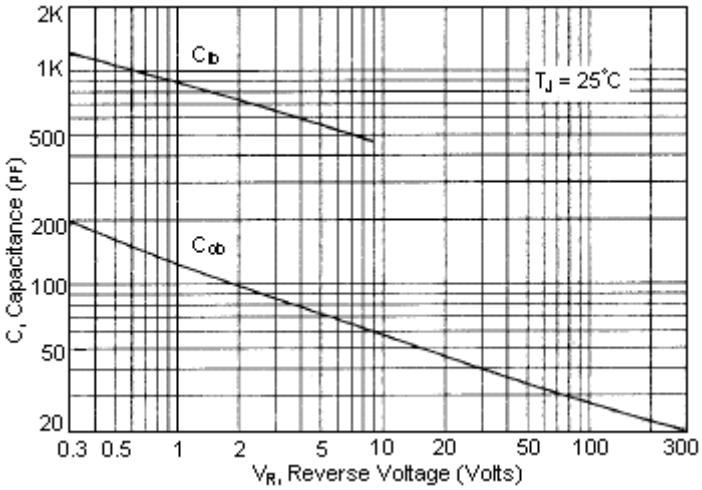
Collector-Emitter Saturation Voltage



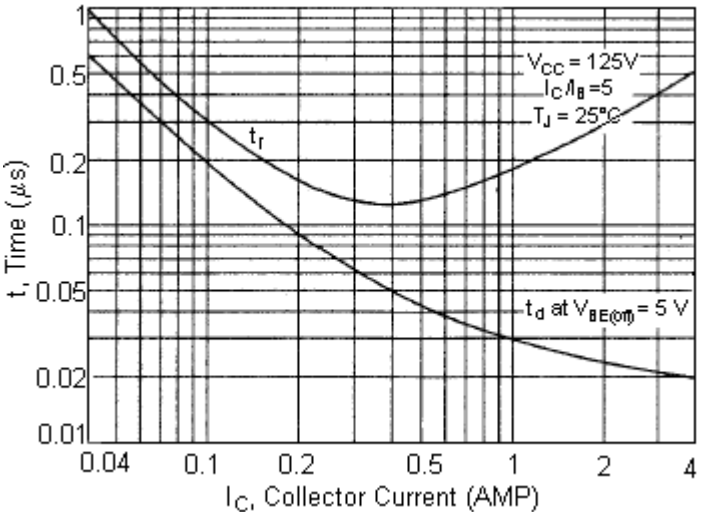
Collector Cut-Off Region



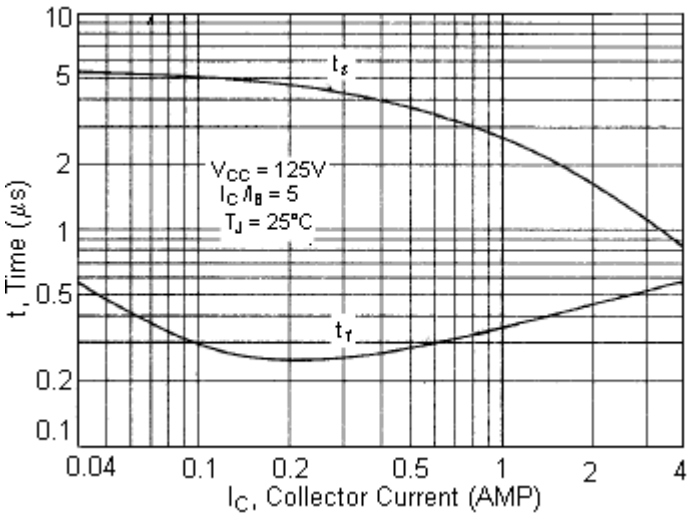
Capacitance



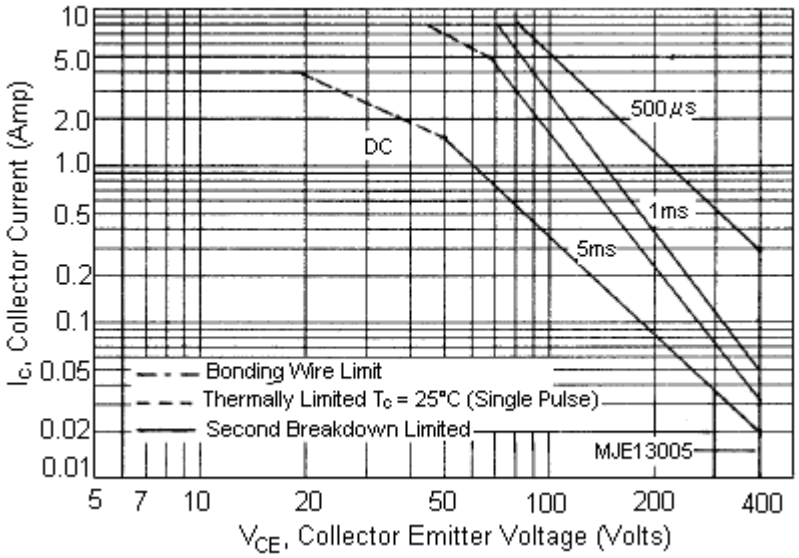
Turn-On Time



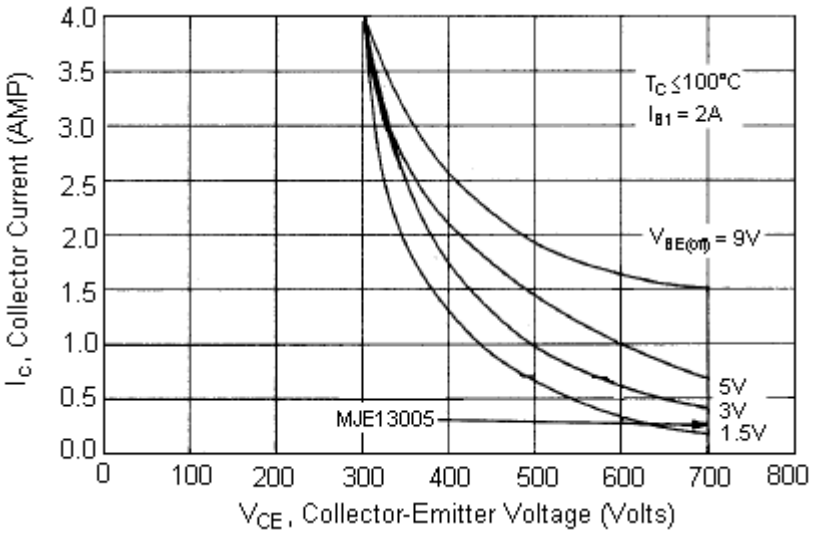
Turn-Off Time



Active Region Safe Operating Area



Reverse Bias Switching Safe Operating Area



Specifications

$I_{C(av)}$ maximum (A)	V_{CEO} 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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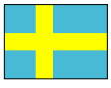

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