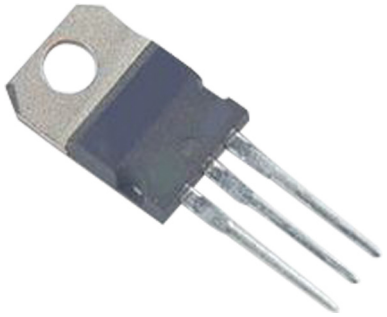
Power Transistor



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
  $V_{CE(sat)}$ = 0.6 (Max.) at I_C = 2A
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

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°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	Max.	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.67	°C/W
Thermal Resistance, Junction to Ambient	$R_{th\ j\text{-}a}$	62.5	

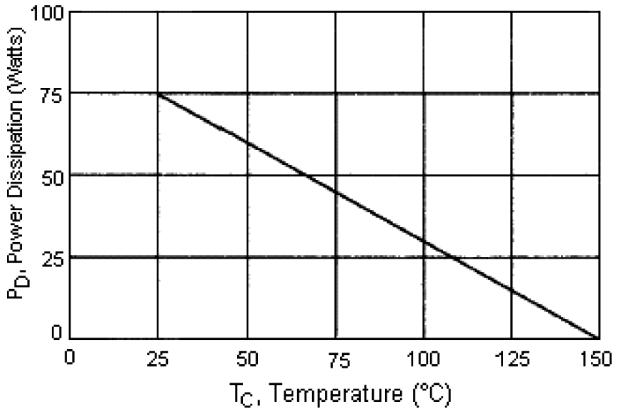
Electrical Characteristics (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min.	Max.	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	I_{CEV}	-	1	mA
Emitter Cut off Current V_{EB} = 9V, I_C = 0	I_{EBO}	-	1	mA
On Characteristics (1)				
DC Current Gain I_C = 1A, V_{CE} = 5V I_C = 2A, V_{CE} = 5V	hFE	10 8	60 40	-
Collector-Emitter Saturation Voltage I_C = 1A, I_B = 200mA I_C = 2A, I_B = 500mA I_C = 4A, I_B = 1A	$V_{CE\ (sat)}$	-	0.5 0.6 1	V
Base-Emitter Saturation Voltage I_C = 1A, I_B = 200mA I_C = 2A, I_B = 500mA	$V_{BE\ (sat)}$	-	1.2 1.6	V
Dynamic Characteristics				
Current Gain-Bandwidth Product I_C = 500mA, V_{CE} = 10V, f = 1MHz	f_T	4	-	MHz
Switching Characteristics				
Delay Time	t_d	-	0.1	µs
Rise Time	t_r	-	0.7	µs
Storage Time	t_s	-	4	µs
Fall Time	t_f	-	0.9	µs

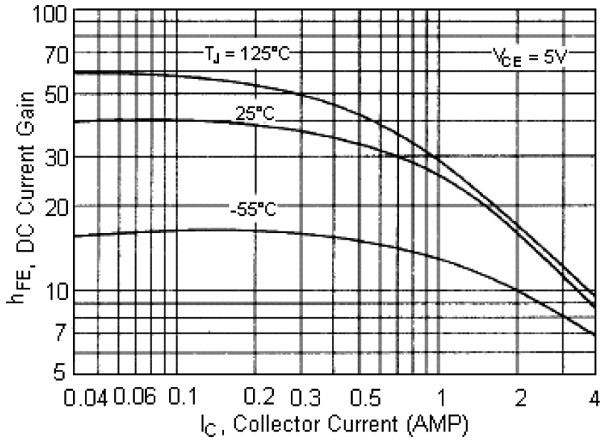
V_{CC} = 125V, I_C = 2A
I_{B1} = -I_{B2} = 0.4A
tp = 25µs
Duty Cycle ≤1%

(1) Pulse Test: Pulse Width = 300µs, Duty Cycle ≤2%

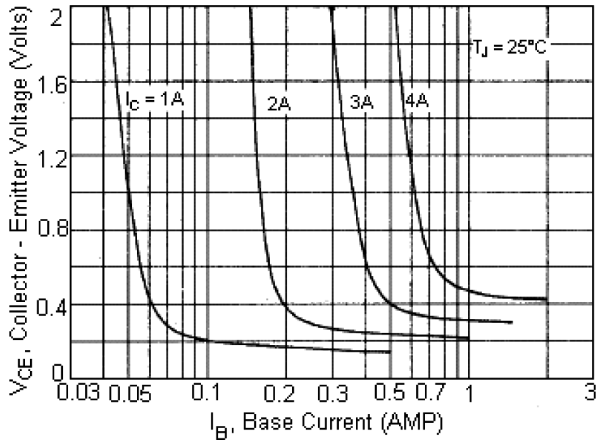
Figure - 1 Power Derating



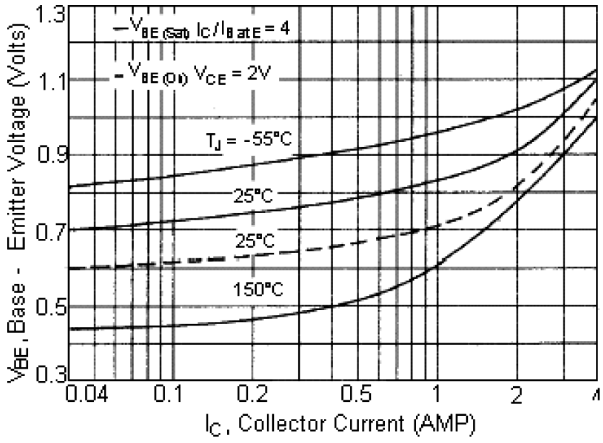
DC Current Gain



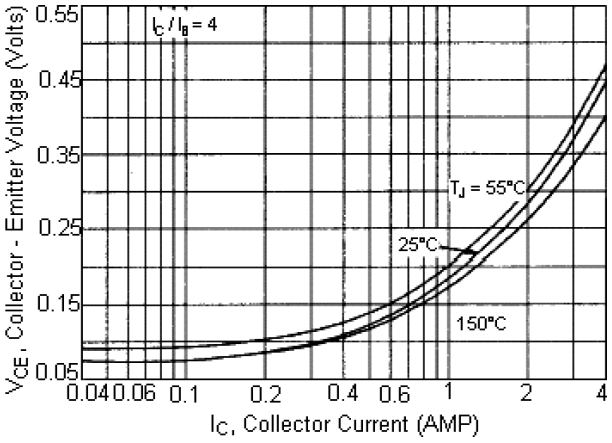
Collector Saturation Region



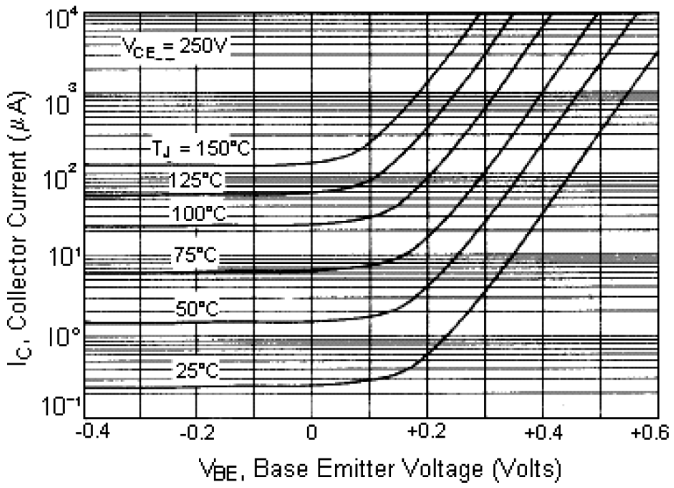
Base-Emitter Voltage



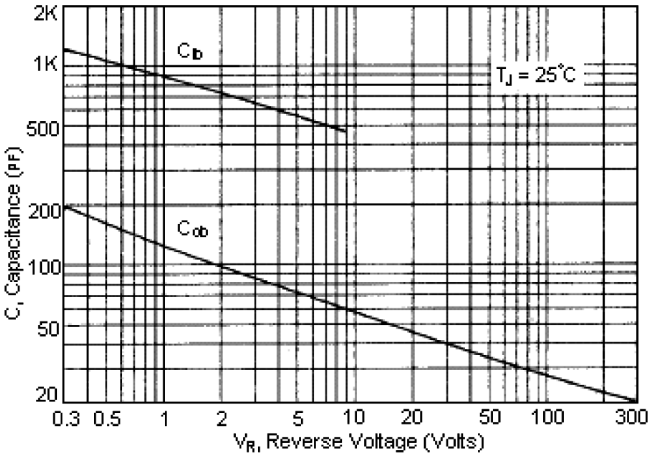
Collector-Emitter Saturation Voltage



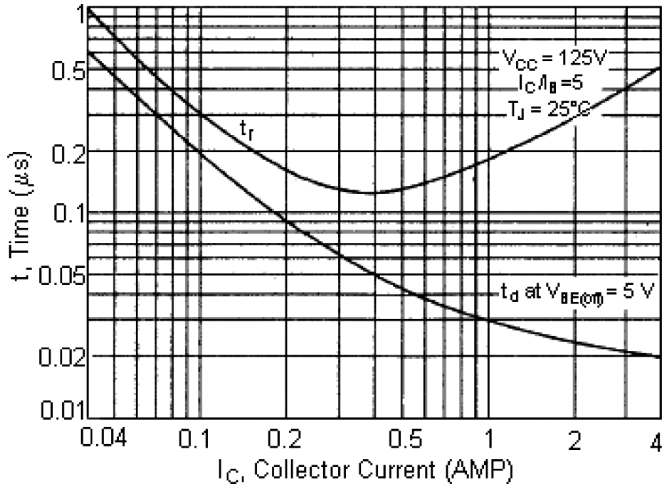
Collector Cut-Off Region



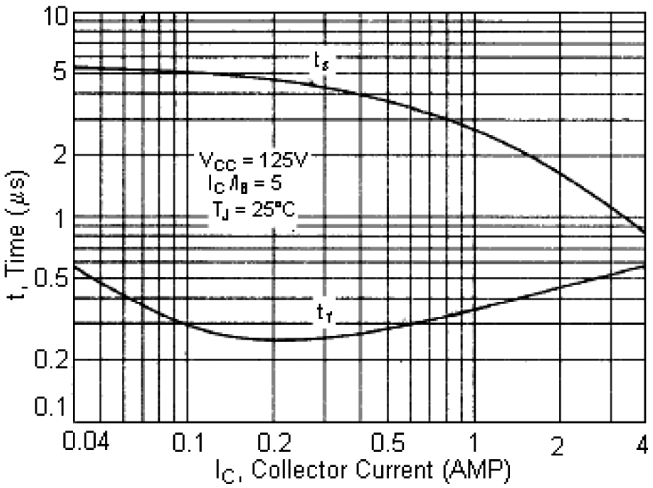
Capacitance



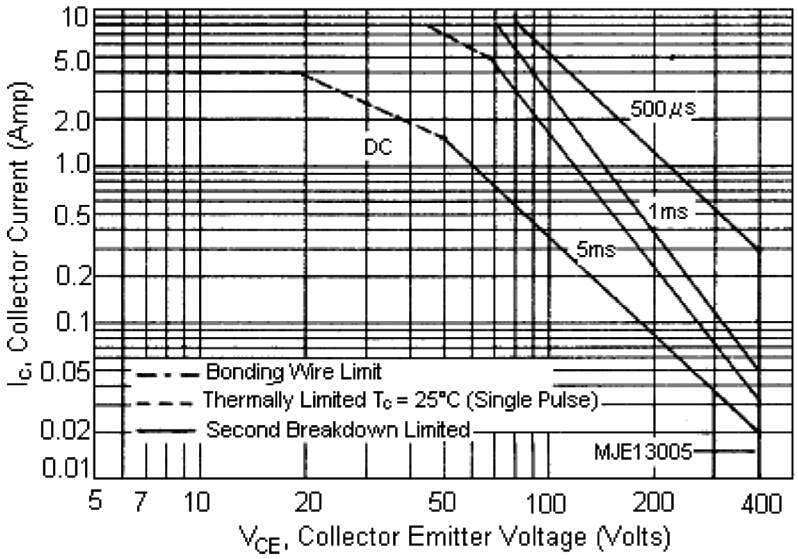
Turn-On Time



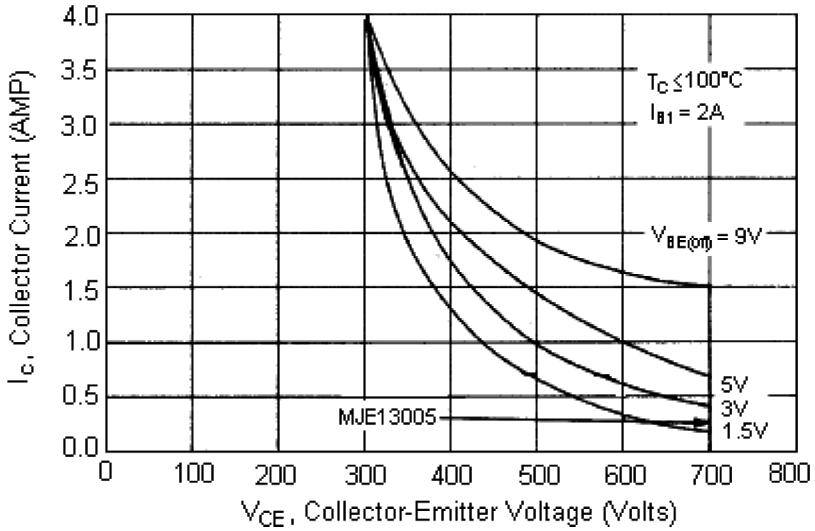
Turn-Off Time



Active Region Safe Operating Area



Reverse Bias Switching Safe Operating Area



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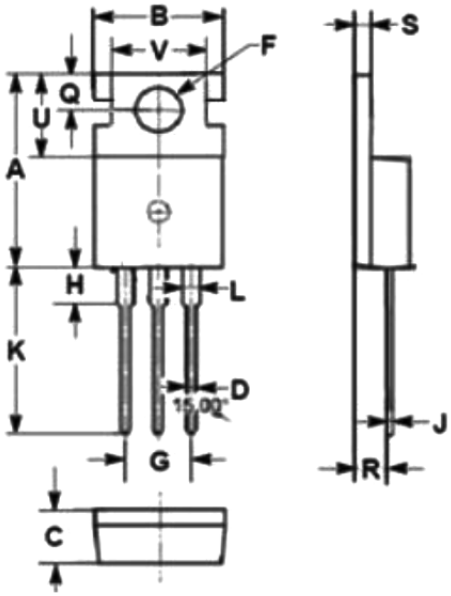

Pin Configuration:

1. Base
2. Collector
3. Emitter

Dimensions	Min.	Max.
A	15.5	15.9
B	9.8	10.2
C	4.2	4.5
D	0.7	0.9
F	3.4	3.7
G	4.98	5.18
H	2.68	2.9
J	0.44	0.6
K	12.8	13.4
L	1.2	1.45
O	2.7	2.9
R	2.3	2.7
S	1.29	1.35
U	6.45	6.65
V	8.66	8.86

Dimensions : Millimetres

Part Number Table

Description	Part Number
Transistor, NPN, TO-220	MJE13005