

RoHS  
Compliant



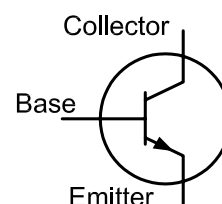
## Description:

This TO-3 NPN Transistor is designed for high voltage, high speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line operated switchmode applications.

## Features:

- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- Motor Controls
- Deflection Circuits

NPN



## Absolute Maximum Ratings:

Characteristic	Symbol	Rating
Collector - Emitter Voltage	$V_{CEV}$	700V
Collector - Emitter Voltage	$V_{CEO}$	400V
Emitter - Base Voltage	$V_{EBO}$	6V
Continuous Collector Current	$I_C$	20A
Base Current	$I_B$	10A
Total Device Dissipation ( $T_C = +25^\circ\text{C}$ ) Derate above $25^\circ\text{C}$	$P_D$	175W 1W/ $^\circ\text{C}$
Operating Junction Temperature Range	$T_J$	$-65^\circ\text{C}$ to $+200^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	$-65^\circ\text{C}$ to $+200^\circ\text{C}$

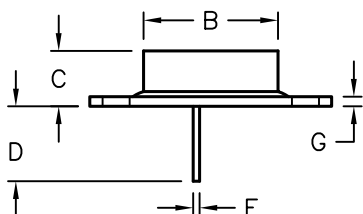
## Electrical Characteristics ( $T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
<b>OFF Characteristics</b>					
Collector - Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 100\text{mA}, I_B = 0$	400	-	V
Collector Cut-off Current	$I_{CEV}$	$V_{CE} = 700\text{V}, V_{EB(off)} = 1.5\text{V}$	-	0.25	mA
	$I_{CER}$	$V_{CE} = 700\text{V}, R_{BE} = 50\Omega, T_C = +100^\circ\text{C}$	-	5	mA
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 6\text{V}, I_C = 0$	-	1	mA
<b>ON Characteristics (Note 1)</b>					
DC Current Gain	$h_{FE}$	$V_{CE} 5\text{V}, I_C = 5\text{A}$	10	60	-
Collector - Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{A}, I_B = 2\text{A}$	-	1.8	V
		$I_C = 20\text{A}, I_B = 6.7\text{A}$	-	0.5	
Base - Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{A}, I_B = 2\text{A}$	-	1.8	

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Parameter	Symbol	Test Conditions	Min.	Max.	Unit
<b>Small-Signal Characteristics</b>					
Output Capacitance	$C_{OBO}$	$V_{CB} = 10V, I_E = 0, f = 1kHz$	125	500	pF
<b>Switching Characteristics</b>					
Delay Time	$t_d$	$V_{CC} = 250V, I_C = 10A, V_{BE(off)} = 5V, I_{B1} = 2A$	-	0.1	μs
Rise Time	$t_r$		-	0.7	
Storage Time	$t_s$	$V_{CC} = 250V, I_C = 10A, V_{BE(off)} = 5V, I_{B1} = 2A$	-	4	
Fall Time	$t_f$		-	0.7	

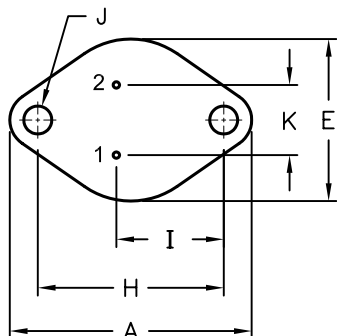
**Note 1:** Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$



Pin 1 = Base  
Pin 2 = Emitter  
Collector (Case)

Dim.	Min.	Max.
A	38.75	39.96
B	19.28	22.23
C	7.96	9.23
D	11.18	12.19
E	25.2	26.67
F	0.92	1.09
G	1.38	1.62
H	29.9	30.4
I	16.64	17.3
J	3.88	4.36
K	10.67	11.18

Dimensions : Millimetres



## Part Number Table

Description	Part Number
Transistor, Power Switching, High Voltage, Bipolar, TO-3, NPN, 20A, 400V	MJ13333

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