



**MJE13005**

## SILICON POWER TRANSISTORS

NPN power transistors in a TO-220 package. They are intended for high voltage, high speed power switching inductive circuits where fall time is critical. They are particularly suited for 115V and 220V SWITCHMODE applications such as switching regulator's, inverters, motor controls, solenoid/relay drivers and deflection circuits  
Compliance to RoHS.

### ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value	Unit
$V_{CEO}$	Collector-Emitter Voltage		400	V
$V_{CBO}$	Collector-Base Voltage		700	V
$V_{EBO}$	Emitter-Base Voltage		9	V
$I_C$	Collector Current		4	A
$I_{CM}$	Collector Peak Current (*)		8	A
$I_B$	Base Current		2	A
$I_{BM}$	Base Peak Current (*)		4	A
$I_E$	Emitter Current		6	A
$I_{EM}$	Emitter Peak Current (*)		12	A
$P_T$	Power Dissipation at Case Temperature	@ $T_{mb} < 25^\circ$	75	W
	Power Dissipation at free Air Temperature		2	
$t_J$	Junction Temperature		150	°C
$t_s$	Storage Temperature range		-65 to +150	

(\*)Pulse Width = 5ms, duty cycle <10%.

### THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
$R_{thJC}$	From Junction to Case Thermal Resistance	1.67	°C/W
$R_{thJA}$	From Junction to Free-Air Thermal Resistance	62.5	

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### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit	
$V_{CEO}$	Collector-Emitter Sustaining Voltage (*)	$I_C = 10 \text{ mA}, I_B = 0$	400	-	-	V	
$I_{CBO}$	Collector- Cutoff Current	$V_{CB} = 700 \text{ V}$	$T_C = 25^\circ\text{C}$	-	-	1	mA
		$I_B = 0$	$T_C = 100^\circ\text{C}$	-	-	5	
$I_{EBO}$	Emitter Cutoff Current	$V_{EB} = 9 \text{ V}, I_C = 0$	-	-	1	mA	
$V_{CE(SAT)}$	Collector-Emitter saturation Voltage (*)	$I_C = 1 \text{ A}, I_B = 200 \text{ mA}$	-	-	0.5	V	
		$I_C = 2 \text{ A}$	$T_C = 25^\circ\text{C}$	-	-		0.6
		$I_B = 500 \text{ mA}$	$T_C = 100^\circ\text{C}$	-	-		1
$V_{BE(SAT)}$	Base-Emitter Saturation Voltage (*)	$I_C = 1 \text{ A}, I_B = 200 \text{ mA}$	-	-	1.2	V	
		$I_C = 2 \text{ A}$	$T_C = 25^\circ\text{C}$	-	-		1.6
		$I_B = 500 \text{ mA}$	$T_C = 100^\circ\text{C}$	-	-		1.5
$h_{FE}$	Forward Current transfer ratio (*)	$V_{CE} = 5.0 \text{ V}, I_C = 1 \text{ A}$	10	-	60	-	
		$V_{CE} = 5.0 \text{ V}, I_C = 2 \text{ A}$	8	-	40		
$f_T$	Transition Frequency	$V_{CE} = 10 \text{ V}, I_C = 0.5 \text{ A}, f = 1 \text{ MHz}$	4	-	-	MHz	
$C_{OB}$	Output Capacitance	$I_E = 0; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$	-	65	-	pF	

(\*) Pulse Width  $\approx 300 \mu\text{s}$ , Duty Cycle  $\angle 2.0\%$

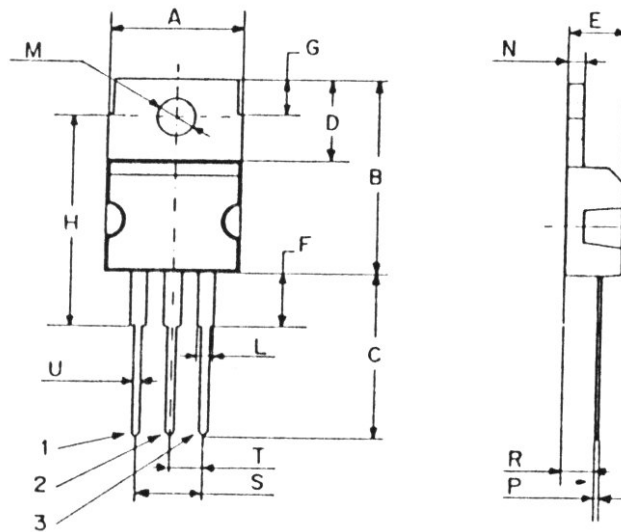
### SWITCHING TIMES.

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit
$t_d$	Delay Time	$V_{CC} = 125 \text{ V}; I_C = 2 \text{ A}$ $I_{B1} = -I_{B2} = 400 \text{ mA}$ $t_p = 25 \mu\text{s}$ , duty cycle $< 1\%$ .	-	-	0.1	$\mu\text{s}$
$t_r$	Rise time		-	-	0.7	
$t_s$	Storage Time		-	-	4	
$t_f$	Fall Time		-	-	0.9	

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## MECHANICAL DATA CASE TO-220

DIMENSIONS (mm)		
	Min.	Max.
A	9,90	10,30
B	15,65	15,90
C	13,20	13,40
D	6,45	6,65
E	4,30	4,50
F	2,70	3,15
G	2,60	3,00
H	15,75	17,15
L	1,15	1,40
M	3,50	3,70
N	-	1,37
P	0,46	0,55
R	2,50	2,70
S	4,98	5,08
T	2,49	2,54
U	0,70	0,90



Pin 1 :	Base
Pin 2 :	Collector
Pin 3 :	Emitter
Case :	Collector

Revised September 2012

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