

# MJE13005

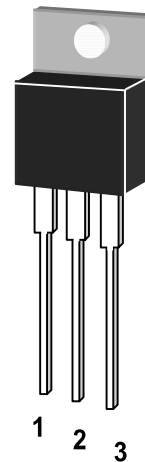
## NPN Silicon Power Transistors

These devices are designed for high-voltage, high-speed power switching inductive circuits where fall time is critical.

They are particularly suited for 115 and 220V SWITCHMODE applications such as Switching Regulator's, Inverters, Motor Controls, Solenoid / Relay drivers and Deflection circuits.

### SPECIFICATION FEATURES:

- $V_{CEO}$  400V
- Reverse Bias SOA with Inductive Loads @ $T_C=100^\circ\text{C}$
- Inductive Switching Matrix 2 to 4 Amp, 25 and  $100^\circ\text{C}$   
 $t_c$  @ 3A,  $100^\circ\text{C}$  is 180 ns (Typ).
- SOA and Switching Applications Information.



1. Base 2. Collector 3. Emitter

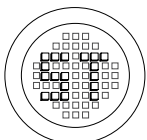
TO-220 Plastic Package

### Absolute Maximum Ratings ( $T_a=25^\circ\text{C}$ )

	Symbol	Value	Unit
Collector Emitter Voltage	$V_{CEO}$	400	Vdc
Collector Base Voltage	$V_{CBO}$	700	Vdc
Emitter Base Voltage	$V_{EBO}$	9	Vdc
Collector Current - Continuous	$I_C$	4	Adc
- Peak <sup>1)</sup>	$I_{CM}$	8	
Base Current - Continuous	$I_B$	2	Adc
- Peak <sup>1)</sup>	$I_{BM}$	4	
Emitter Current - Continuous	$I_E$	6	Adc
- Peak <sup>1)</sup>	$I_{EM}$	12	
Total Power Dissipation @ $T_A=25^\circ\text{C}$	$P_D$	2	Watts
Derate above $25^\circ\text{C}$		16	mW/ $^\circ\text{C}$
Total Power Dissipation @ $T_C=25^\circ\text{C}$	$P_D$	75	Watts
Derate above $25^\circ\text{C}$		600	mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_s$	-65 to +150	$^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{YJA}$	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case	$R_{YJC}$	1.67	$^\circ\text{C}/\text{W}$
Maximum Lead Temperature for Soldering Purposes: 1/8" from Case for 5 Seconds	$T_L$	275	$^\circ\text{C}$

1) Pulse Test: Pulse Width=5ms, Duty Cycle $\leq$ 10%.

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Тел.: (495) 795-0805  
 Факс: (495) 234-1603  
 Эл. почта: info@rct.ru  
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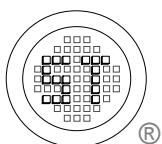
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## Characteristics at Ta=25 °C

	Symbol	Min.	Typ.	Max.	Unit	
DC Current Gain						
at V <sub>CE</sub> =5Vdc, I <sub>C</sub> =1Adc	h <sub>FE</sub>	10	-	60	-	
at V <sub>CE</sub> =5Vdc, I <sub>C</sub> =2Adc	h <sub>FE</sub>	8	-	40	-	
Collector Emitter Sustaining Voltage						
at I <sub>C</sub> =10mA	V <sub>CEO</sub>	400	-	-	Vdc	
Collector Cutoff Current						
at V <sub>CBO</sub> =Rated Value, V <sub>BE(off)</sub> =1.5Vdc	I <sub>CBO</sub>	-	-	1	mAdc	
at V <sub>CBO</sub> =Rated Value, V <sub>BE(off)</sub> =1.5Vdc, T <sub>C</sub> =100°C	I <sub>CBO</sub>	-	-	5	mAdc	
Emitter Cutoff Current						
at V <sub>EB</sub> =9Vdc	I <sub>EBO</sub>	-	-	1	mAdc	
Collector Emitter Saturation Voltage						
at I <sub>C</sub> =1Adc, I <sub>B</sub> =0.2Adc	V <sub>CE(sat)</sub>	-	-	0.5	Vdc	
at I <sub>C</sub> =2Adc, I <sub>B</sub> =0.5Adc	V <sub>CE(sat)</sub>	-	-	0.6	Vdc	
at I <sub>C</sub> =4Adc, I <sub>B</sub> =1Adc	V <sub>CE(sat)</sub>	-	-	1	Vdc	
at I <sub>C</sub> =2Adc, I <sub>B</sub> =0.5Adc, T <sub>C</sub> =100°C	V <sub>CE(sat)</sub>	-	-	1	Vdc	
Base Emitter Saturation Voltage						
at I <sub>C</sub> =1Adc, I <sub>B</sub> =0.2Adc	V <sub>BE(sat)</sub>	-	-	1.2	Vdc	
at I <sub>C</sub> =2Adc, I <sub>B</sub> =0.5Adc	V <sub>BE(sat)</sub>	-	-	1.6	Vdc	
at I <sub>C</sub> =2Adc, I <sub>B</sub> =0.5Adc, T <sub>C</sub> =100°C	V <sub>BE(sat)</sub>	-	-	1.5	Vdc	
Current Gain Bandwidth Product						
at V <sub>CE</sub> =10Vdc, I <sub>C</sub> =500mAdc, f=1MHz	f <sub>T</sub>	4	-	-	MHz	
Output Capacitance						
at V <sub>CB</sub> =10Vdc, f=0.1MHz	C <sub>ob</sub>	-	65	-	pF	
Delay Time	(V <sub>CE</sub> =125Vdc, I <sub>C</sub> =2A, I <sub>B1</sub> =I <sub>B2</sub> =0.4A, t <sub>p</sub> =25μs, Duty Cycle≤1%)	t <sub>d</sub>	-	0.025	0.1	μs
Rise Time		t <sub>r</sub>	-	0.3	0.7	μs
Storage Time		t <sub>s</sub>	-	1.7	4	μs
Fall Time		t <sub>f</sub>	-	0.4	0.9	μs
Voltage Storage Time		t <sub>sv</sub>	-	0.9	4	μs
Crossover Time		t <sub>c</sub>	-	0.32	0.9	μs
Fall Time		t <sub>fi</sub>	-	0.16	-	μs

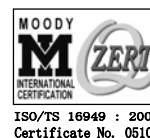
Pulse Test: Pulse Width=300μs, Duty Cycle=2%.

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