

NPN MJE13005
SILICON PLASTIC POWER TRANSISTOR

...suited for 115 and 220 V switch-mode applications such as
 Switching Regulators, Inverters, Motor Controls, Solenoid/Relay
 drivers and Deflection circuits.

400VOLTS/75WATTS

TO-220

MAXIMUM RATINGS

Rating	Symbol	<i>MJE13005</i>	Unit
Collector-Emitter Voltage	$V_{CEO(SUS)}$	400	Vdc
Collector-Emitter Voltage	V_{CEV}	700	Vdc
Emitter-Base Voltage	V_{EB}	9	Vdc
Collector Current-Continuous	I_C	4	Adc
Peak		8	
Base Current	I_B	2	Adc
--Peak(1)	I_{BM}	4	
Total Power Dissipation @ $T_C=25^\circ C$	P_D	75	Watts
Derate above $25^\circ C$		0.6	W/ $^\circ C$
Operating & Storage Junction Temperature Range	T_j, T_{stg}	-65 to +150	$^\circ C$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R_{JC}	1.67	$^\circ C/W$

ELECTRICAL CHARACTERISTICS ($T_C=25^\circ C$ unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage ($I_C=10mA, I_B=0$)	$V_{CEO(SUS)}$	400	—	Vdc
Collector Cutoff Current ($V_{CEV}=\text{Rated Value}, V_{BE(off)}=1.5Vdc$)	I_{CEV}	—	1	mAdc
Emitter Cutoff Current ($V_{BE}=9Vdc, I_C=0$)	I_{EBO}	—	1	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C=1Adc, V_{CE}=5Vdc$) ($I_C=2Adc, V_{CE}=5Vdc$)	h_{FE}	10 8	60 40	—
Collector-Emitter Saturation Voltage ($I_C=2Adc, I_B=500mAdc$) ($I_C=4Adc, I_B=1Adc$)	$V_{CE(sat)}$	—	0.6 1	Vdc
Base-Emitter Saturation Voltage ($I_C=2Adc, I_B=500mAdc$) ($I_C=1Adc, I_B=0.2Adc$)	$V_{BE(sat)}$	—	1.6 1.2	Vdc



DYNAMIC CHARACTERISTICS

Current Gain-Bandwidth Product ($I_C=0.5\text{A dc}$, $V_{CE}=10\text{V dc}$, $f_{\text{test}}=1\text{MHz}$)	f_T	4.0	—	MHz
Small-Signal Current Gain ($I_C=500\text{mA dc}$, $V_{CE}=10\text{V dc}$, $f=1\text{KHz}$)	Cob	--	65 Typ	pF

SWITCHING CHARACTERISTICS

Resistive Load						
Delay Time	$(V_{CC}=125\text{V dc}$, $I_C=2\text{A}$, $I_{B1}=I_{B2}=0.4\text{A}$, $t_p=25\mu\text{s}$, Duty Cycle < 1%)	t_d	--	0.025	0.1	μs
Rise Time		t_r	--	0.3	0.7	
Storage Time		t_s	--	1.7	4.0	
Fall Time		t_f	--	0.4	0.9	
Inductive Load						
Clamped						
Voltage Storage Time	$(I_C=2\text{A}$, $V_{\text{clamp}}=300\text{V dc}$, $I_{B1}=0.4\text{A}$, $V_{BE(\text{off})}=5\text{V dc}$, $T_C=100^\circ\text{C}$)	t_{sv}	--	0.9	4.0	μs
Crossover Time		t_c	--	0.32	0.9	
Fall Time		t_f	--	0.16	---	

* Pulse Test : Pulse Width 300 μs , Duty cycle = 2%

FOR MJE13007**SWITCHING CHARACTERISTICS**

Resistive Load						
Delay Time	$(V_{CC}=125\text{V dc}$, $I_C=2\text{A}$, $I_{B1}=I_{B2}=0.4\text{A}$, $t_p=25\mu\text{s}$, Duty Cycle < 1%)	t_d	--	0.05	0.1	μs
Rise Time		t_r	--	0.8	1.5	
Storage Time		t_s	--	1.0	3	
Fall Time		t_f	--	0.15	0.7	
Inductive Load						
Clamped						
Voltage Storage Time	$(I_C=2\text{A}$, $V_{\text{clamp}}=300\text{V dc}$, $I_{B1}=0.4\text{A}$, $V_{BE(\text{off})}=5\text{V dc}$, $T_C=100^\circ\text{C}$)	t_{sv}	--	0.86	2.3	μs
Crossover Time		t_c	--	0.14	0.7	

* Pulse Test : Pulse Width 300 μs , Duty cycle = 2%