Switchmode Power Transistor

MJE13005

Technical Data

Typical Applications : These devices are designed for high voltage , high speed power switching inductive circuits where fall time is critical . They are particularly suited for 115 V and 220 V SWITCHMODE applications such as Switching Regulator's , Inverters , Motor Controls , Solenoid / Relay drivers and Deflection circuits.

Specification Fetaures :

- ☞ Switchmode series NPN Silicon Power Transistor
- ☞ 4 Amp / 400 V device in TO-220AB package
- ☞ 75 Watts device
- ☞ VCEO (sus) 400 V
- ☞ 700 V Blocking capability

Symbol	Parameters / Conditions	Ratings
Maximum Ratings :		
$V_{CEO(SUS)}$	Collector- Emitter Voltage	400 Vdc
V_{CEV}	Collector- Emitter Voltage	700 Vdc
V_{EBO}	Emitter Base Voltage	9 Vdc
I_C I_{CM}	Collector Current – Continuos Peak : Pulse width = 5 ms , Duty Cycle 10 %	4 Adc 8 Adc
I_B I_{BM}	Base Current – Continuos Peak : Pulse width = 5 ms , Duty Cycle 10 %	2 Adc 4 Adc
I_E I_{EM}	Emitter Current – Continuos Peak : Pulse width = 5 ms , Duty Cycle 10 %	6 Adc 12 Adc

Thermal Characteristics :		
R_{thjc}	Thermal resistance junction to case	1.67 °C/W
R_{thjA}	Thermal resistance junction to ambient	62.5 °C/W
T_L	Maximum Lead Temperature for Soldering Purpose : 1/8" from Case for 5 sec	275 °C
P_D	Total Power Dissipation @ Ta = 25 °C Derate above 25 °C	2 Watta 16 mW /°C
P_D	Total Power Dissipation @ Tc = 25 °C Derate above 25 °C	75 Watta 600 mW /°C
Tj & T_{Stg}	Operating and Storage Junction Temperature Range	-65 °C ….+ 150 °C

ELECTRICAL CHARACTERISTICS :

[Tc = 25 °C unless otherwise noted]

Characteristic	Symbol	Min	Typ	Max	Unit
Off Characteristics : [Pulse Test : Pulse width = 300 μs , Duty Cycle = 2 %]					
Collector – Emitter Sustaining Voltage [Ic = 10 mA , I_B = 0]	$V_{CEO(sus)}$	400			Vdc
Collector Cutoff Current [V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5 Vdc] [V_{CEV} = Rated Value, $V_{BE(off)}$ = 1.5 Vdc , Tc = 100 °C]	I_{CEV}			1 5	mAdc
Emitter Cutoff Current [V_{EB} = 9 Vdc , Ic = 0]	I_{EBO}			1	mAdc
On Characteristics : [Pulse Test : Pulse width = 300 μs , Duty Cycle = 2 %]					
DC Current Gain [Ic = 1 Adc , V_{CE} = 5 Vdc] [Ic = 2 Adc , V_{CE} = 5 Vdc]	h_{FE}	 10 8		 60 40	
Collector-Emitter Saturation Voltage [Ic = 1 Adc , I_B = 0.2 Adc] [Ic = 2 Adc , I_B = 0.5 Adc]	$V_{CE(sat)}$			 0.5 0.6	Vdc

[Ic = 4 Adc , I_B = 1.0 Adc] [Ic = 2 Adc , I_B = 0.5 Adc , Tc = 100 °C]				1 1	
Base-Emitter Saturation Voltage [Ic = 1 Adc , I_B = 0.2 Adc] [Ic = 2 Adc , I_B = 0.5 Adc] [Ic = 2 Adc , I_B = 0.5 Adc , Tc = 100 °C]	$V_{BE(sat)}$			 1.2 1.6 1.5	Vdc
Dynamic Characteristics :					
Current Gain – Bandwidth Product [Ic = 500 mAdc , V_{CE}=10 Vdc , f=1 MHz]	f_T	4			MHz
Output Capacitance [V_{CB}= 10 Vdc , I_E = 0 , f = 0.1 MHz]	C_{ob}		65		pF

Switching Characteristics :			
Resistive Load :		Typ	Max
Delay Time ; t_d	(V_{CC} =125 V dc , Ic=2A , I_{B1} = I_{B2} = 0.4 A , tp=25 µs , Duty Cycle 1 %)	0.025 µs	0.1 µs
Rise Time ; t_r		0.3 µs	0.7 µs
Storage Time ; t_s		1.7 µs	4.0 µs
Fall Time ; t_f		0.4 µs	0.9 µs
Inductive Load ; Clamped :		Typ	Max
Voltage Storage Time ; t_{sv}	(Vclamp =300 V dc , Ic=2A , I_{B1} = 0.4 A , $V_{BE(off)}$ = 5 V dc , Tc = 100 °C)	0.9 µs	4.0 µs
Crossover Time ; t_c		0.32 µs	0.9 µs
Fall Time ; t_{fi}		0.16 µs	--