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MJE13006
Silicon NPN Transistor
High Voltage, High Speed Switch
TO–220 Type Package

Description:

The MJE13006 is a silicon NPN transistor in a TO–220 type package designed for high–voltage, high–speed power switching inductive circuits where fall time is critical. This device is particularly suited for 115V and 220V switch–mode applications such as switching regulators, inverters, motor controls, solenoid/relay drivers, and deflection circuits.

Absolute Maximum Ratings:

Collector–Emitter Voltage, $V_{CEO(sus)}$ 300V
Collector–Emitter Voltage, V_{CEV} 600V
Emitter–Base Voltage, V_{EBO} 9V
Collector Current, I_C
  Continuous 8A
  Peak 16A
Continuous Base Current, I_B 4A
Total Power Dissipation (T_C = +25°C), P_D 80W
  Derate Above 25°C . . . . . 640mW/°C
Operating Junction Temperature Range, T_J . . . . . –65° to +150°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C
Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 1.56°C/W

Electrical Characteristics: (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	I_C = 10mA, I_B = 0	300	–	–	V
Collector Cutoff Current	I_{CEV}	V_{CEV} = 600V, $V_{BE(off)}$ = 1.5V	–	–	1	mA
		V_{CEV} = 600V, $V_{BE(off)}$ = 1.5V, T_C = +100°C	–	–	5	mA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 9V, I_c = 0	–	–	1	mA

Electrical Characteristics (Cont'd): (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics (Note 1)						
DC Current Gain	h_{FE}	I_C = 2A, V_{CE} = 5V	8	–	60	
		I_C = 5A, V_{CE} = 5V	5	–	30	
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 2A, I_B = 0.4A	–	–	1	V
		I_C = 5A, I_B = 1A	–	–	2	V
		I_C = 8A, I_B = 2A	–	–	3	V
Base−Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 2A, I_B = 0.4A	–	–	1.2	V
		I_C = 5A, I_B = 1A	–	–	1.6	V
Dynamic Characteristics						
Current−Gain Bandwidth Product	f_T	I_C = 500mA, V_{CE} = 10V, f = 1MHz	4	–	–	MHz
Output Capacitance	C_{ob}	V_{CB} = 10V, I_E = 0, f = 0.1MHz	–	110	–	pF
Switching Characteristics						
Delay Time	t_d	V_{CC} = 125V, I_C = 5A, I_{B1} = −I_{B2} = 1A, t_p = 25μs, Duty Cycle ≤ 1%	–	–	0.1	μs
Rise Time	t_r		–	–	1.5	μs
Storage Time	t_s		–	–	3.0	μs
Fall Time	t_f		–	–	0.7	μs

Note 1. Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2%.