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MJH16006A

POWER TRANSISTORS
8 AMPERES
500 VOLTS
150 WATTS

Designer's™ Data Sheet

NPN Silicon Power Transistor

1 kV SWITCHMODE Series

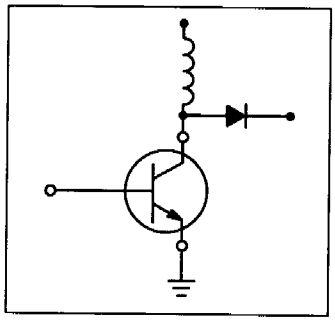
These transistors are designed for high–voltage, high–speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line–operated switchmode applications.

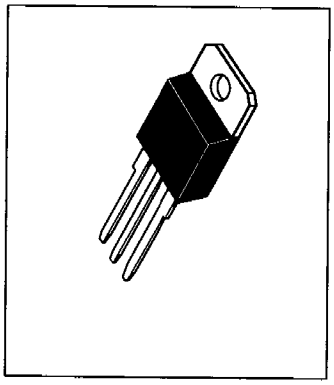
Typical Applications:

- Switching Regulators
- Inverters
- Solenoids
- Relay Drivers
- Motor Controls
- Deflection Circuits

Features:

- Collector–Emitter Voltage — V_{CEV} = 1000 Vdc
- Fast Turn–Off Times
  - 80 ns Inductive Fall Time — 100°C (Typ)
  - 120 ns Inductive Crossover Time — 100°C (Typ)
  - 800 ns Inductive Storage Time — 100°C (Typ)
- 100°C Performance Specified for:
  - Reverse–Biased SOA with Inductive Load
  - Switching Times with Inductive Loads
  - Saturation Voltages
  - Leakage Currents
- Extended FBSOA Rating Using Ultra–fast Rectifiers
- Extremely High RBSOA Capability





MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	500	Vdc
Collector–Emitter Voltage	V_{CEV}	1000	Vdc
Emitter–Base Voltage	V_{EB}	6	Vdc
Collector Current — Continuous — Peak(1)	I_C I_{CM}	8 16	Adc
Base Current — Continuous — Peak(1)	I_B I_{BM}	6 12	Adc
Total Power Dissipation @ T_C = 25°C @ T_C = 100°C Derate above T_C = 25°C	P_D	125 50 1	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to 150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1	°C/W
Lead Temperature for Soldering Purposes: 1/8″ from Case for 5 Seconds	T_L	275	°C

(1) Pulse Test: Pulse Width = 5 ms, Duty Cycle ≤ 10%.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS(1)					
Collector–Emitter Sustaining Voltage (Table 1) (I_C = 100 mA, I_B = 0)	$V_{CEO(sus)}$	500	—	—	Vdc
Collector Cutoff Current (V_{CEV} = 1000 Vdc, $V_{BE(off)}$ = 1.5 Vdc) (V_{CEV} = 1000 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 100°C)	I_{CEV}	 — —	 0.003 0.020	 0.15 1.0	mAdc
Collector Cutoff Current (V_{CE} = 1000 Vdc, R_{BE} = 50 Ω, T_C = 100°C)	I_{CER}	—	0.020	1.0	mAdc
Emitter Cutoff Current (V_{EB} = 6 Vdc, I_C = 0)	I_{EBO}	—	0.005	0.15	mAdc
SECOND BREAKDOWN					
Second Breakdown Collector Current with Base Forward Biased	$I_{S/b}$	See Figure 14a or 14b			
Clamped Inductive SOA with Base Reverse Biased	RBSOA	See Figure 15			
ON CHARACTERISTICS(1)					
Collector–Emitter Saturation Voltage (I_C = 3 Adc, I_B = 0.6 Adc) (I_C = 5 Adc, I_B = 1 Adc) (I_C = 5 Adc, I_B = 1 Adc, T_C = 100°C)	$V_{CE(sat)}$	 — — —	 0.35 0.50 0.60	 0.7 1 1.5	Vdc
Base–Emitter Saturation Voltage (I_C = 5 Adc, I_B = 1 Adc) (I_C = 5 Adc, I_B = 1 Adc, T_C = 100°C)	$V_{BE(sat)}$	 — —	 1 1	 1.5 1.5	Vdc
DC Current Gain (I_C = 8 Adc, V_{CE} = 5 Vdc)	h_{FE}	5	8	—	—
DYNAMIC CHARACTERISTICS					
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f_{test} = 1 kHz)	C_{ob}	—	—	350	pF
SWITCHING CHARACTERISTICS					
Inductive Load (Table 1)					
Storage Time	(I_C = 5 Adc, I_{B1} = 0.66 Adc, $V_{BE(off)}$ = 5 Vdc, $V_{CE(pk)}$ = 400 Vdc) (T_J = 100°C)	t_{sv}	—	800	2000	ns
Fall Time		t_{fi}	—	80	200	
Crossover Time		t_c	—	120	300	
Storage Time	(T_J = 150°C)	t_{sv}	—	1000	—	
Fall Time		t_{fi}	—	90	—	
Crossover Time		t_c	—	150	—	
Resistive Load (Table 2)						
Delay Time	(I_C = 5 Adc, V_{CC} = 250 Vdc, I_{B1} = 0.66 Adc, PW = 30 µs, Duty Cycle ≤ 2%) (I_{B2} = 1.3 Adc, R_{B1} = R_{B2} = 4 Ω)	t_d	—	25	100	ns
Rise Time		t_r	—	400	700	
Storage Time		t_s	—	1400	3000	
Fall Time		t_f	—	175	400	
Storage Time	($V_{BE(off)}$ = 5 Vdc)	t_s	—	475	—	
Fall Time		t_f	—	100	—	

(1) Pulse Test: PW = 300 µs, Duty Cycle ≤ 2%.