

NPN Silicon Power Transistors 1 kV Switchmode III 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
 - 50 ns Inductive Fall Time — 100°C (Typ)
 - 90 ns Inductive Crossover Time — 100°C (Typ)
 - 900 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	MJ16010A	MJH16010A	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	I_C	15		Adc
— Peak ⁽¹⁾	I_{CM}	20		
Base Current — Continuous	I_B	10		Adc
— Peak ⁽¹⁾	I_{BM}	15		
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_D	175	135	Watts
@ $T_C = 100^\circ\text{C}$		100	54	
Derate above $T_C = 25^\circ\text{C}$		1	1.09	W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to 200	-65 to 150	°C

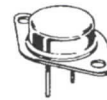
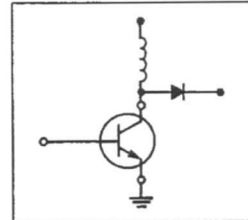
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max		Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1	0.92	°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%.

MJ16010A
MJH16010A

POWER TRANSISTORS
15 AMPERES
500 VOLTS
125 and 175 WATTS



TO-204AA
MJ16010A



TO-218AC
MJH16010A



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MJ16010A, MJH16010A

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 = 5 Adc, I _B = 1 Adc) (I _C = 10 Adc, I _B = 2 Adc) (I _C = 10 Adc, I _B = 2 Adc, T _C = 100°C)	V _{CE(sat)}	—	0.25 0.45 0.60	0.7 1 1.5	Vdc
Base-Emitter Saturation Voltage (I _C = 10 Adc, I _B = 2 Adc) (I _C = 10 Adc, I _B = 2 Adc, T _C = 100°C)	V _{BE(sat)}	—	1.2 1.2	1.5 1.5	Vdc
DC Current Gain (I _C = 15 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}	—	—	400	pF

SWITCHING CHARACTERISTICS

Inductive Load (Table 1)							
Storage Time	I _C = 10 Adc, I _{B1} = 1.3 Adc, V _{BE(off)} = 5 Vdc, V _{CE(pk)} = 400 Vdc	(T _J = 100°C)	t _{sv}	—	900	2000	ns
Fall Time			t _{fi}	—	50	250	
Crossover Time			t _c	—	90	300	
Storage Time		(T _J = 150°C)	t _{sv}	—	1100	—	
Fall Time			t _{fi}	—	70	—	
Crossover Time			t _c	—	120	—	
Resistive Load (Table 2)							
Delay Time	I _C = 10 Adc, V _{CC} = 250 Vdc, I _{B1} = 1.3 Adc, PW = 30 μs, Duty Cycle ≤ 2%	I _{B2} = 2.6 Adc, R _{B2} = 1.6 Ω	t _d	—	25	100	ns
Rise Time			t _r	—	325	600	
Storage Time			t _s	—	1300	3000	
Fall Time		t _f	—	175	400		
Storage Time		(V _{BE(off)} = 5 Vdc)	t _s	—	700	—	
Fall Time			t _f	—	80	—	

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