



SOLID STATE INC.

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SWITCHMODE SERIES NPN SILICON TRANSISTORS

...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 such as:

- * Switching Regulators
- * Inverters
- * Solenoid and relay drivers
- * Motor Controls
- * Deflection Circuits

Fast Turn-off Times

400ns Inductive Fall Time -25°C (Typ)
 2.5 us Inductive Storage Time -25°C (Typ)

Operating Temperature Range -65°C to $+200^{\circ}\text{C}$

100°C performance Specified for:

- Reversed Biased SOA with Inductive Loads
- Switching Times with Inductive Loads
- Leakage Currents

NPN
MJ13332
MJ13333
MJ13334
MJ13335

20 AMPERES
POWER TRANSISTOR
NPN SILICON
350-500 VOLTS
175 WATTS

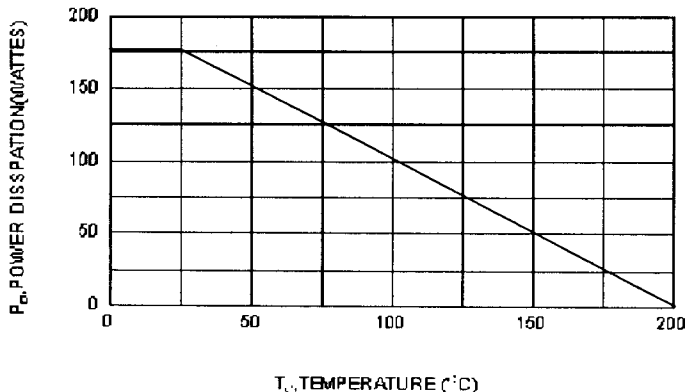
MAXIMUM RATINGS

Rating	Symbol	MJ13332	MJ13333	MJ13334	MJ13335	Unit
Collector-Emitter Voltage	V_{CEV}	650	700	750	800	V
Collector-Emitter Voltage	V_{CEO}	350	400	450	500	V
Emitter-Base Voltage	V_{EB}	6.0				V
Collector Current-Continuous Peak	I_C	20				A
	I_{CM}	30				
Base Current	I_B	10				A
Total Device Dissipation @ $T_c=25^{\circ}\text{C}$ Derate above 25°C	P_D	275				Watts
		1.0				W°C
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +200				$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance to Case	$R_{\theta JC}$	1.0	$^{\circ}\text{C/W}$

FIGURE -1 POWER DERATING



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

Characteristic	Symbol	Min.	Typ.	Max	Unit	
OFF CHARACTERISTICS						
Collector-Emitter Sustaining Voltage (I _c = 100 mA _{dc} , I _B = 0)	MJ13332 MJ13333 MJ13334 MJ13335	V _{CEO(sus)}	350 400 450 500	— — — —	— — — —	V
Collector Current (V _{CE} = Rated V _{CEV} , V _{BE(off)} = 1.5V)		I _{CEV}	—	—	5.0	mA _{dc}
Emitter Cutoff Current (V _{BE} = 6.0 V _{dc} , I _c = 0)		I _{EBO}	—	—	1.0	mA _{dc}

ON CHARACTERISTICS(1)

DC current gain (I _c = 5.0 A _{dc} , V _{CE} = 5.0 V _{dc})	h _{FE}	10	—	60	
Collector-Emitter Saturation Voltage (I _c = 10 A _{dc} , I _B = 2.0 A _{dc}) (I _c = 20 A _{dc} , I _B = 6.7 A _{dc})	V _{CE(sat)}	— —	— —	1.8 5.0	V _{dc}
Base-Emitter Saturation Voltage (I _c = 10 A _{dc} , I _B = 2.0 A _{dc})	V _{BE(sat)}	—	—	1.8	V _{dc}

DYNAMIC CHARACTERISTICS

Output Capacitance (V _{CB} = 10 V _{dc} , I _E = 0 , f=1.0 KHz)	C _{ob}	125	—	500	pF
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SWITCHING CHARACTERISTICS

Delay time	V _{cc} =250V, I _c =10A I _{B1} =2.0A, V _{BE} =5.0V, t _p =10us Duty Cycle ≤ 2.0%	t _d	—	—	0.1	μs
Rise Time		t _r	—	—	0.7	μs
Storage Time		t _s	—	—	4.0	μs
Fall Time		t _f	—	—	0.7	μs

(1) Pulse test: Pulse Width=300 s, Duty Cycle ≤ 2.0%

TO-3 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	11.00		13.10	0.433		0.516
B	0.97		1.15	0.038		0.045
C	1.50		1.65	0.059		0.065
D	8.32		8.92	0.327		0.351
E	19.00		20.00	0.748		0.787
G	10.70		11.10	0.421		0.437
N	16.50		17.20	0.649		0.677
P	25.00		26.00	0.984		1.023
R	4.00		4.09	0.157		0.161
U	38.50		39.30	1.515		1.547
V	30.00		30.30	1.187		1.193

