Silicon Bidirectional Triode Thyristors

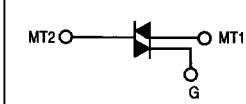
. . . designed for use in solid state relays, MPU interface, TTL logic and any other light industrial or consumer application. Supplied in an inexpensive TO-92 package which is readily adaptable for use in automatic insertion equipment.

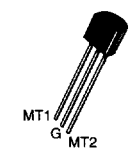
- One-Piece, Injection-Molded Unibloc Package
- Sensitive Gate Triggering in Four Trigger Modes for all possible Combinations of Trigger Sources, and Especially Suitable for Circuits that Source Gate Drives.
- All Diffused and Glassivated Junctions for Maximum Uniformity of Parameters and Reliability

MAC97*A*B Series

*Motorola preferred devices

TRIACs
0.6 AMPERE RMS
200–600 VOLTS





CASE 29-04
TO-226AA, STYLE 12
(TO-92)

3

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Repetitive Peak Off-State Voltage (Gate Open, T_J = −40 to +110°C) Note 1 1/2 Sine Wave 50 to 60 Hz, Gate Open MAC97-4, MAC97A4, MAC97B4 MAC97-6, MAC97A6, MAC97B6 MAC97-8, MAC97A8, MAC97B8	V_{DRM}	200 400 600	Volts
On-State RMS Current Full Cycle Sine Wave 50 to 60 Hz (T_C = +50°C)	$I_{T(RMS)}$	0.6	Amp
Peak Non-Repetitive Surge Current (One Full Cycle, 60 Hz, T_A = 110°C)	I_{TSM}	8.0	Amps
Circuit Fusing Considerations (T_J = −40 to +110°C, t = 8.3 ms)	I^2t	0.26	A^2s
Peak Gate Voltage (t ≤ 2.0 μs)	V_{GM}	5.0	Volts
Peak Gate Power (t ≤ 2.0 μs)	P_{GM}	5.0	Watts
Average Gate Power (T_C = 80°C, t ≤ 8.3 ms)	$P_{G(AV)}$	0.1	Watt
Peak Gate Current (t ≤ 2.0 μs)	I_{GM}	1.0	Amp
Operating Junction Temperature Range	T_J	−40 to +110	°C
Storage Temperature Range	T_{stg}	−40 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	75	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	200	°C/W

Note 1. V_{DRM} for all types can be applied on a continuous basis. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

ELECTRICAL CHARACTERISTICS (T_C = 25°C, and Either Polarity of MT2 to MT1 Voltage unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Peak Blocking Current (Note 1) (V_D = Rated V_{DRM}, T_J = 110°C, Gate Open)	I_{DRM}	—	—	0.1	mA
Peak On-State Voltage (Either Direction) (I_{TM} = 0.85 A Peak; Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2.0%)	V_{TM}	—	—	1.9	Volts
Gate Trigger Current, Continuous dc (V_D = 12 Vdc, R_L = 100 Ohms)	I_{GT}	See Table 1			mA
Gate Trigger Voltage, Continuous dc (V_D = 12 Vdc, R_L = 100 Ohms)	V_{GT}				Volts
MT2(+), G(+) All Types		—	—	2.0	
MT2(+), G(−) All Types		—	—	2.0	
MT2(−), G(−) All Types		—	—	2.0	
MT2(−), G(+) All Types		—	—	2.5	
(V_D = Rated V_{DRM}, R_L = 10 k ohms, T_J = 110°C) MT2(+), G(+); MT2(−), G(−); MT2(+), G(−) All Types		0.1	—	—	
MT2(−), G(+) All Types		0.1	—	—	
Holding Current (V_D = 12 Vdc, I_{TM} = 200 mA, Gate Open)	I_H	—	—	10	mA
Gate Controlled Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 1.0 A pk, I_G = 25 mA)	t_{gt}	—	2.0	—	μs
Critical Rate of Rise of Commutation Voltage (V_D = Rated V_{DRM}, I_{TM} = 0.84 A, Commutating di/dt = 0.3 A/ms, Gate Unenergized, T_C = 50°C)	dv/dt(c)	—	5.0	—	V/μs
Critical Rate of Rise of Off-State Voltage (V_D = Rated V_{DRM} Exponential Waveform, T_C = 110°C)	dv/dt	—	25	—	V/μs

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QUADRANT DEFINITIONS

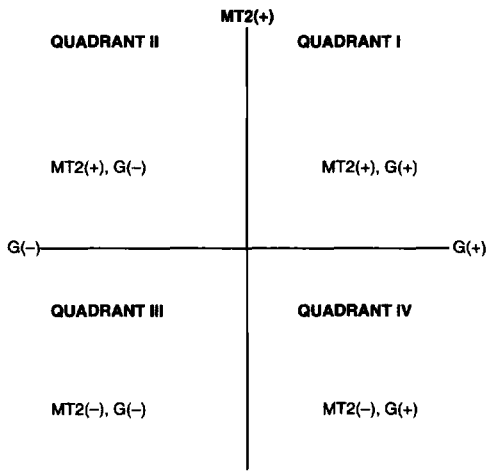

Table 1. Maximum Gate Trigger Currents (V_D = 12 V, R_L = 100 Ω)

Quadrant and Polarity	MAC Series			Unit
	97	97A	97B	
I MT2(+), G(+)	10	5.0	3.0	mA
II MT2(+), G(−)	10	5.0	3.0	mA
III MT2(−), G(−)	10	5.0	3.0	mA
IV MT2(−), G(+)	10	7.0	5.0	mA

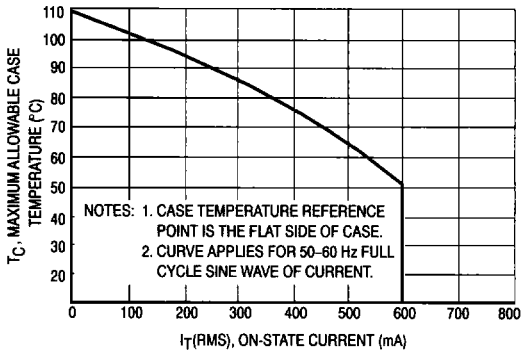

Figure 1. RMS Current Derating (Reference: Case Temperature)

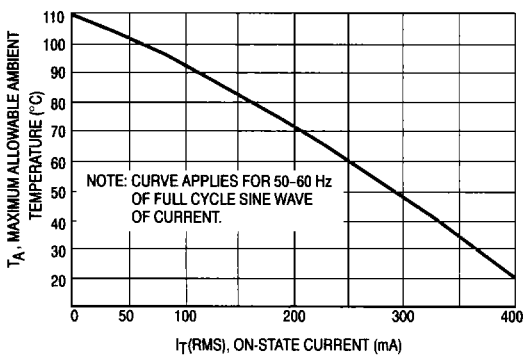

Figure 3. RMS Current Derating (Reference: Ambient Temperature)

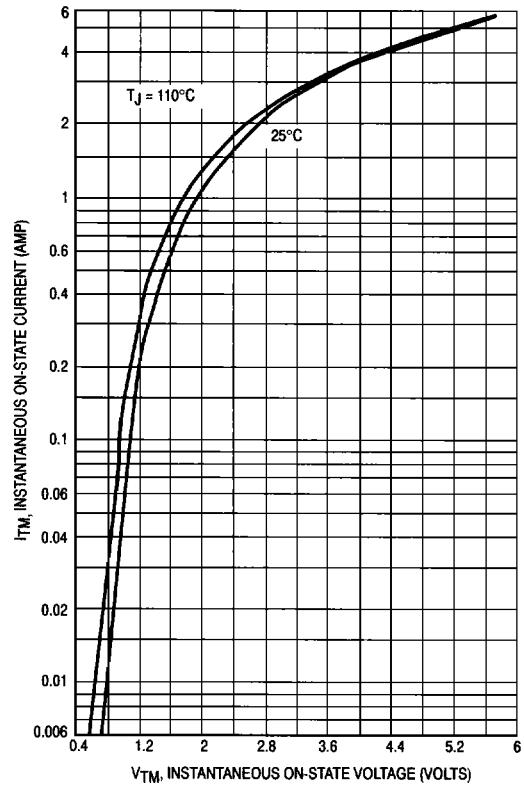

Figure 2. On-State Characteristics

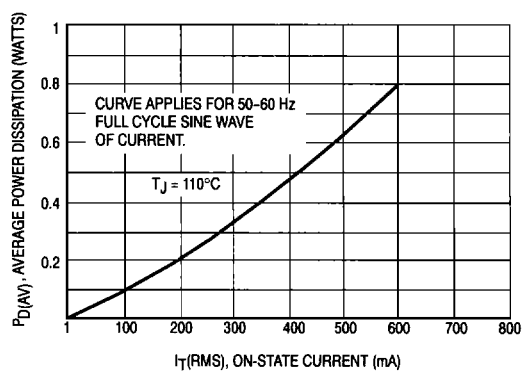

Figure 4. On-State Power Dissipation

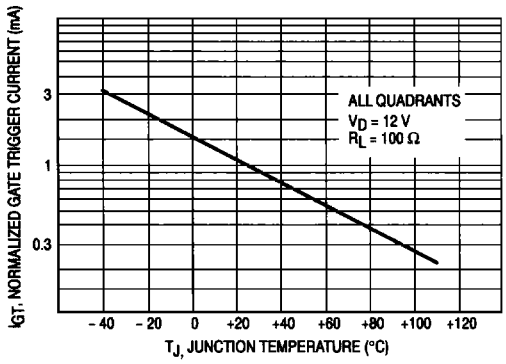

Figure 5. Normalized Gate Trigger Current

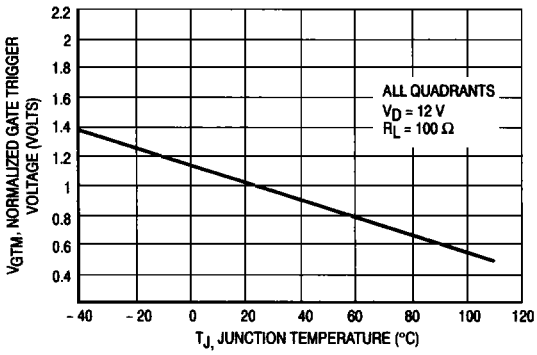

Figure 6. Normalized Gate Trigger Voltage

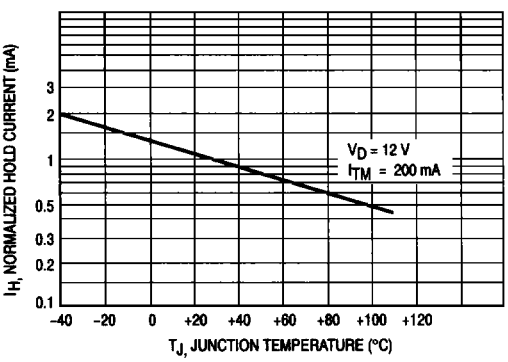

Figure 7. Normalized Hold Current

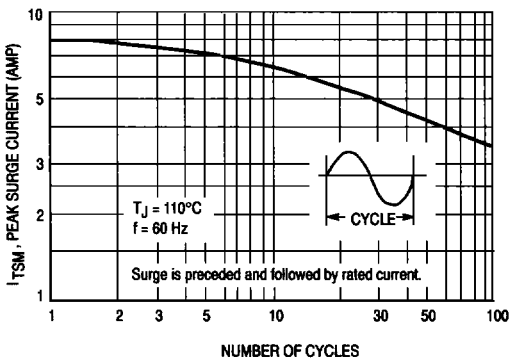

Figure 8. Maximum Allowable Surge Current

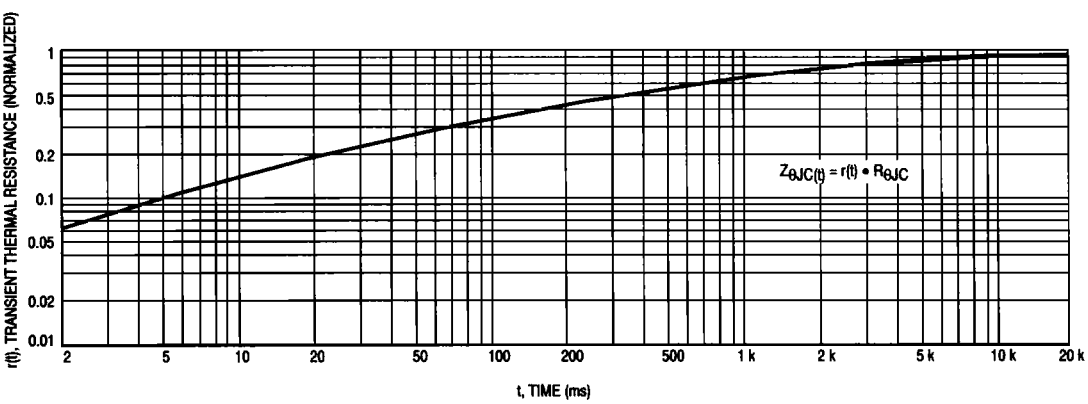

Figure 9. Thermal Response