Suntac ELECTRONIC CORP

MAC97 Series

Preferred Device

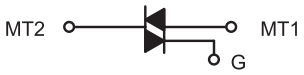
Sensitive Gate Triacs

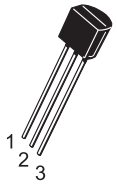
Silicon Bidirectional Thyristors

TRIACS
0.8 AMPERE RMS
200 thru 600 VOLTS

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 readly adaptable for use in automatic insertion equipment.

- One-piece,Injection-Molded Package
- Blocking Voltage to 600 Volts
- Sensitive Gate Triggering in Four Trigger Modes (Quadrants) for all possible Combinations of Trigger Sources, and especially for Circuits that Source Gate Drives
- All Diffused and Glassivated Junctions for Maximum Uniformity of Parameters and Reliability
- Device Marking: Device Type, e.g., MAC97A4, Date Code





TO-92(TO-226AA)
CASE 029
STYLE 12

PIN ASSIGNMENT	
1	Main Terminal 1
2	Gate
3	Main Terminal 2

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

Rating	Symbol	Value	Unit
Peak Repetitive Off-State Voltage (T_J=-40 to+100°C) (Note 1) Sine Wave 50 to 60 Hz, Gate Open MAC97A4 MAC97A6 MAC97-8, MAC97A8	V_{DRM}, V_{RRM}	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, Sine Wave 60 Hz (T_C = 110°C)	I_{TSM}	8.0	Amps
Circuit Fusing Considerations (t = 8.3 ms)	I^2t	0.26	A^2s
Peak Gate Voltage (t ≤ 2.0 s, T_C = +80°C)	V_{GM}	5.0	Volts
Peak Gate Power (t ≤ 2.0 s, T_C = +80°C)	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, T_C = +80°C)	I_{GM}	1.0	Amp
Operating Junction Temperature Range	T_J	-40 to + 100	°C
Storage Temperature Range	T_{stg}	-40 to + 150	°C

1. V_{DRM} and V_{RRM} 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.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

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
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	T_L	260	°C

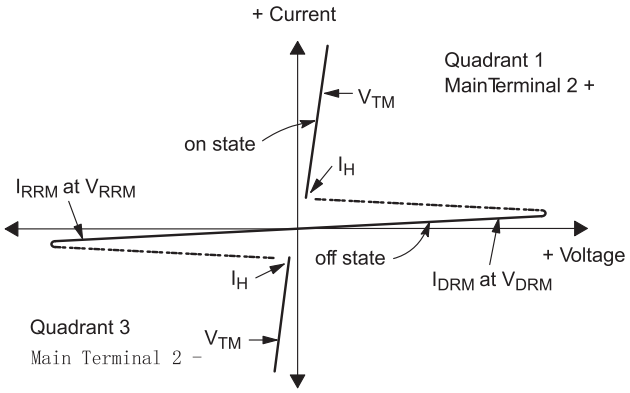
ELECTRICAL CHARACTERISTICS

(T_C = 25°C unless otherwise noted; Electricals apply in both directions)

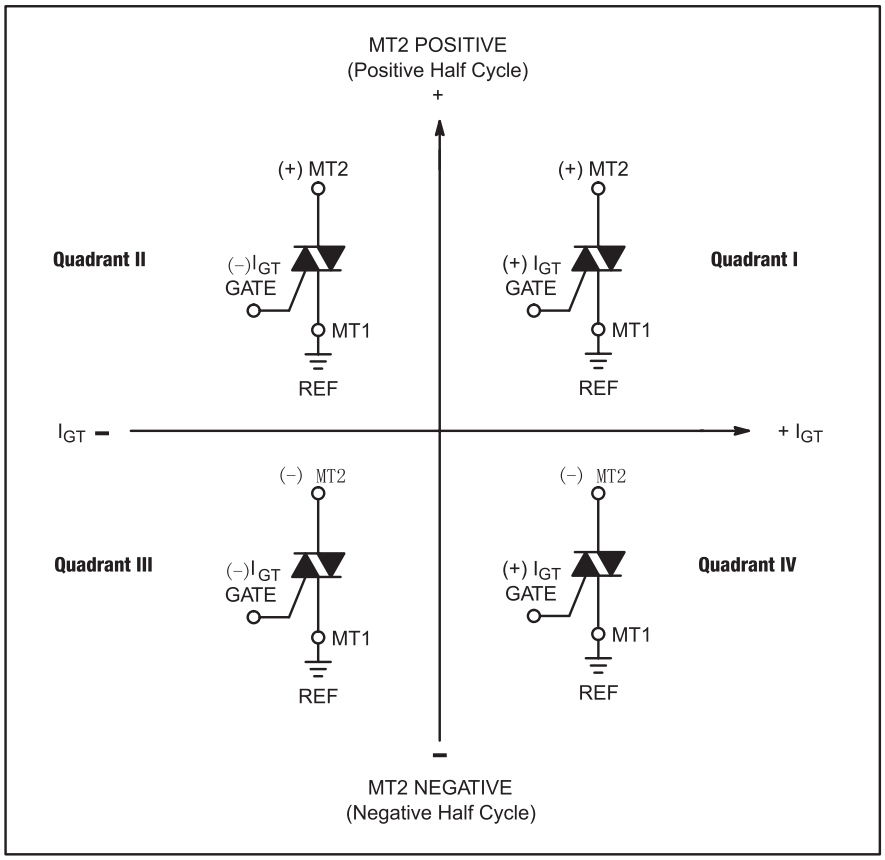
Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Peak Repetitive Blocking Current (V_D = Rated V_{DRM}, V_{RRM}; Gate Open) T_J = 25°C	I_{DRM}, I_{RRM}	–	–	10	μA
T_J = +110°C		–	–	100	μA
ON CHARACTERISTICS					
Peak On-State Voltage (I_{TM} = ± .85 A Peak; Pulse Width ≤ 2.0 ms, Duty Cycle ≤ 2.0%)	V_{TM}	–	–	1.9	Volts
Gate Trigger Current (Continuous dc) (V_D = 12 Vdc, R_L = 100 Ohms)	I_{GT}				mA
MT2(+),G(+) MAC97-8 Device		–	–	10	
MT2(+),G(-)		–	–	10	
MT2(-),G(-)		–	–	10	
MT2(-),G(+)		–	–	10	
MT2(+), G(+) MAC97A4,A6,A8 Devices		–	–	5.0	
MT2(+),G(-)		–	–	5.0	
MT2(-),G(-)		–	–	5.0	
MT2(-),G(+)		–	–	7.0	
Gate Trigger Voltage (Continuous dc) (V_D = 12 Vdc, R_L = 100 Ohms)	V_{GT}				Volts
MT2(+), G(+) All Types		–	.66	2.0	
MT2(+),G(-) All Types		–	.77	2.0	
MT2(-),G(-) All Types		–	.84	2.0	
MT2(-),G(+)All Types		–	.88	2.5	
Gate Non-Trigger Voltage (V_D = 12 V, R_L = 100 Ohms, T_J = 110 °C) All Four Quadrants	V_{GD}	0.1	–	–	Volts
Holding Current (V_D = 12 Vdc, Initiating Current = 200 mA, Gate Open)	I_H	–	1.5	10	mA
Turn-On Time (V_D = Rated V_{DRM}, I_{TM} = 1.0 A pk, I_G = 25 mA)	t_{gt}	–	2.0	–	μs
DYNAMIC CHARACTERISTICS					
Critical Rate-of-Rise of Commutation Voltage (V_D = Rated V_{DRM}, I_{TM} = .84 A, Commutating di/dt = .3 A/ms, Gate Unenergized, T_C = 50°C)	dV/dt(c)	–	5.0	–	V/μs
Critical Rate of Off-State voltage (V_D = Rated V_{DRM}, T_C = 110°C, Gate Open, Exponential Waveform	dv/dt	–	25	–	V/μs

Voltage Current Characteristic of Triacs (Bidirectional Device)

Symbol	Parameter
V_{DRM}	Peak Repetitive Forward Off State Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Reverse Off State Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Maximum On State Voltage
I_H	Holding Current



Quadrant Definitions for a Triac



All polarities are referenced to MT1.
With in-phase signals(using standard AC lines)quadrants Ⅰand Ⅲ are used

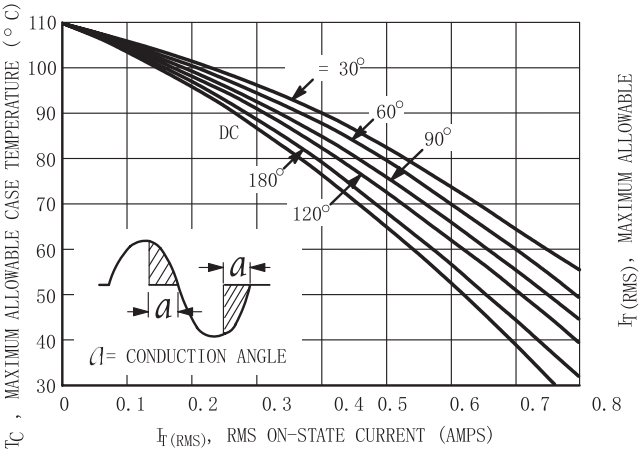


Figure 1. RMS Current Derating

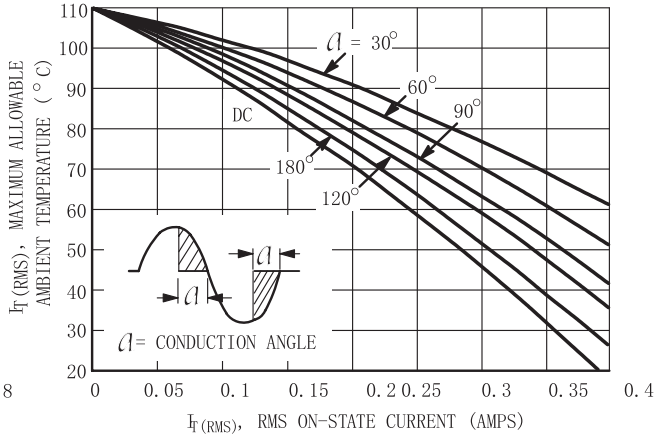


Figure 2. RMS Current Derating

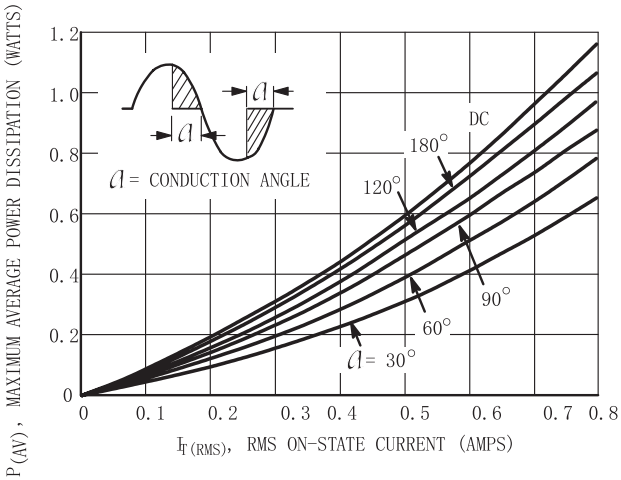


Figure 3. Power Dissipation

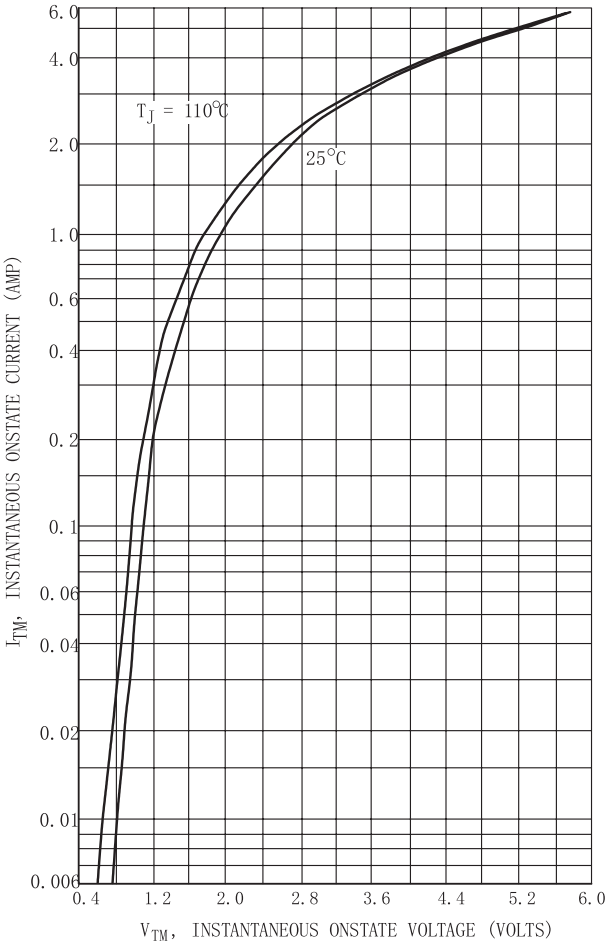


Figure 4. On-State Characteristics

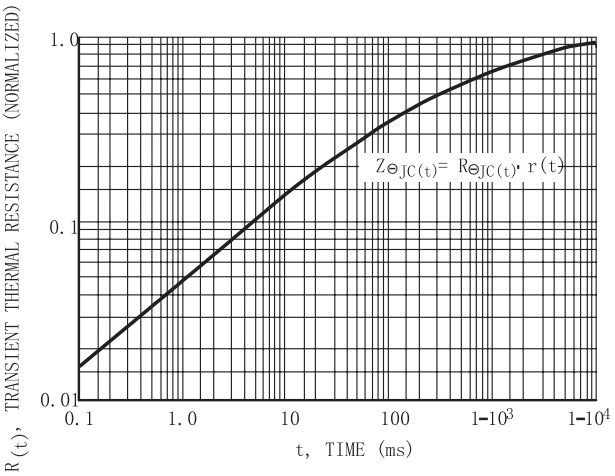


Figure 5. Transient Thermal Response

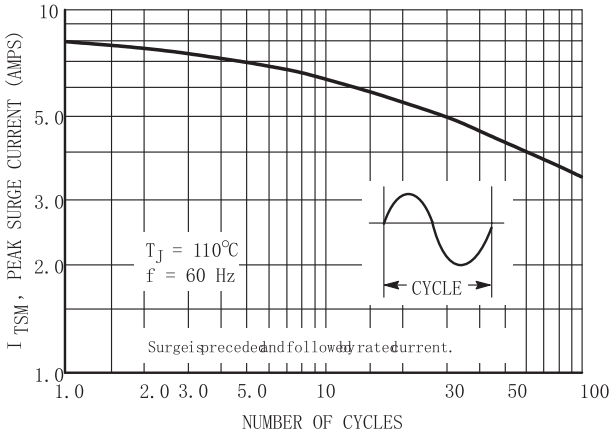


Figure 6. Maximum Allowable Surge Current

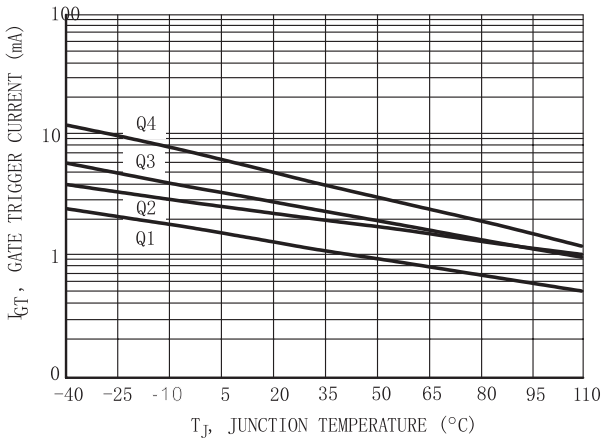


Figure 7. Typical Gate Trigger Current versus Junction Temperature

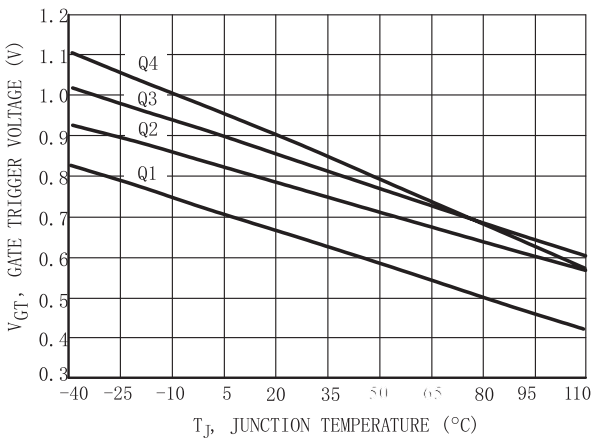


Figure 8. Typical Gate Trigger Voltage versus Junction Temperature

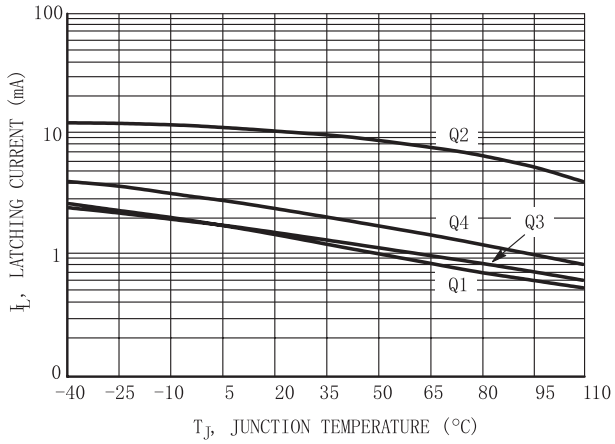


Figure 9. Typical Latching Current versus Junction Temperature

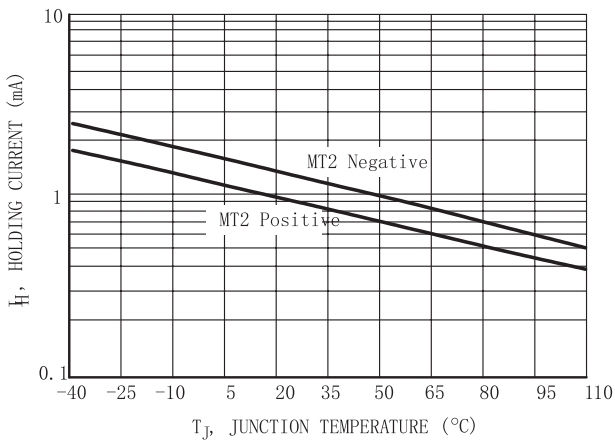
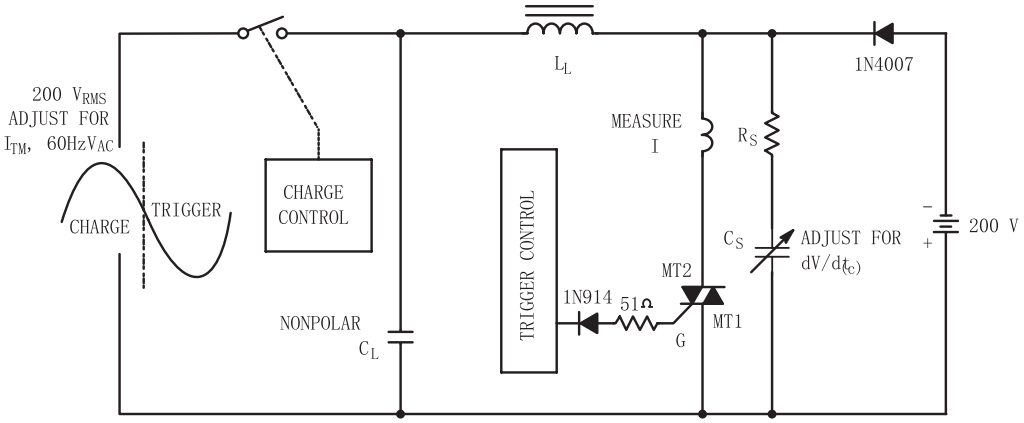


Figure 10. Typical Holding Current versus Junction Temperature



Note: Component values are for verification of rated $(dv/dt)_c$. See AN1048 for additional information.

Figure 11. Simplified Test Circuit to Measure the Critical Rate of Rise of Commutating Voltage $(dV/dt)_c$