Sensitive Gate Triacs

Silicon Bidirectional 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.

Features

- 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
- These are Pb-Free Devices*

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

Rating	Symbol	Value	Unit
naung	Symbol	value	
Peak Repetitive Off-State Voltage ($T_J = -40$ to +110°C) (Note 1) Sine Wave 50 to 60 Hz, Gate Open	V _{DRM,} V _{RRM}		V
MAC97A4 MAC97A6		200 400	
MAC97A8		600	
On-State RMS Current Full Cycle Sine Wave 50 to 60 Hz $(T_C = +50^{\circ}C)$	I _{T(RMS)}	0.6	A
Peak Non-Repetitive Surge Current One Full Cycle, Sine Wave 60 Hz $(T_C = 110^{\circ}C)$	I _{TSM}	8.0	A
Circuit Fusing Considerations (t = 8.3 ms)	l ² t	0.26	A ² s
Peak Gate Voltage (t \leq 2.0 µs, T _C = +80°C)	V _{GM}	5.0	V
Peak Gate Power (t \leq 2.0 µs, T _C = +80°C)	Р _{GM}	5.0	W
Average Gate Power $(T_C = 80^{\circ}C, t \le 8.3 \text{ ms})$	P _{G(AV)}	0.1	W
Peak Gate Current (t \leq 2.0 µs, T _C = +80°C)	I _{GM}	1.0	А
Operating Junction Temperature Range	TJ	-40 to +110	°C
Storage Temperature Range	T _{stg}	-40 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

 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.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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TRIACS 0.8 AMPERE RMS 200 thru 600 VOLTS





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

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Мах	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	75	°C/W
Thermal Resistance, Junction-to-Ambient	R_{\thetaJA}	200	°C/W
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	ΤL	260	°C

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

Characteristic		Symbol	Min	Тур	Max	Unit
DFF CHARACTERISTICS						
Peak Repetitive Blocking Current (V_D = Rated V_{DRM} , V_{RRM} ; Gate Open)	T _J = 25°C T _J = +110°C	I _{DRM} , I _{RRM}			10 100	μΑ μΑ
ON CHARACTERISTICS						
Peak On–State Voltage ($I_{TM} = \pm .85$ A Peak; Pulse Width ≤ 2.0 ms, Duty Cycle $\leq 2.0\%$)		V_{TM}	-	-	1.9	V
Gate Trigger Current (Continuous dc) $(V_D = 12 \text{ Vdc}, R_L = 100 \Omega)$ MT2(+), G(+) MT2(+), G(-) MT2(-), G(-) MT2(-), G(+)		I _{GT}		- - -	5.0 5.0 5.0 7.0	mA
Gate Trigger Voltage (Continuous dc) $(V_D = 12 \text{ Vdc}, R_L = 100 \Omega)$ MT2(+), G(+) All Types MT2(+), G(-) All Types MT2(-), G(-) All Types MT2(-), G(+) All Types		V _{GT}	- - - -	.66 .77 .84 .88	2.0 2.0 2.0 2.5	V
Gate Non–Trigger Voltage (V_D = 12 V, R_L = 100 Ω , T_J = 110°C) All Four Quadrants		V _{GD}	0.1	_	-	V
Holding Current (V_D = 12 Vdc, Initiating Current = 200 mA, Gate Open)		Ι _Η	-	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 Rise 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 I and III are used.





0.04

0.02

0.01

0.006 Lu 0.4

2.0

1.2

3.6

VTM, INSTANTANEOUS ON-STATE VOLTAGE (VOLTS) Figure 4. On-State Characteristics

4.4

5.2

6.0

2.8









Figure 9. Typical Latching Current versus Junction Temperature

1.2 1.1 1.0 20



Figure 8. Typical Gate Trigger Voltage 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

U.S.	Europe Equivalent	Shipping	Description of TO92 Tape Orientation
	MAC97A6RL1G	Radial Tape & Reel (2K/Reel) (Pb-Free)	Flat side of TO92 & adhesive tape visible
MAC97A8RLRMG	MAC97A8RL1G	Radial Tape & Reel (2K/Reel) (Pb-Free)	Flat side of TO92 & adhesive tape visible
MAC97A4G		Bulk in Box (5K/Box) (Pb–Free)	N/A, Bulk
MAC97A6G		Bulk in Box (5K/Box) (Pb–Free)	N/A, Bulk
MAC97A8G		Bulk in Box (5K/Box) (Pb–Free)	N/A, Bulk
MAC97A4RLRFG		Radial Tape & Reel (2K/Reel) (Pb-Free)	Round side of TO92 & adhesive tape on reverse side
MAC97A4RLRPG		Radial Tape & Reel (2K/Reel) (Pb-Free)	Round side of TO92 & adhesive tape on reverse side
MAC97A6RLRFG		Radial Tape & Reel (2K/Reel) (Pb-Free)	Round side of TO92 & adhesive tape on reverse side
MAC97A6RLRPG		Radial Tape & Reel (2K/Reel) (Pb-Free)	Round side of TO92 & adhesive tape on reverse side
MAC97A8RLRPG		Radial Tape / Fan Fold Box (2K/Box) (Pb-Free)	Round side of TO92 & adhesive tape visible

ORDERING & SHIPPING INFORMATION

⁺For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

TO-92 EIA RADIAL TAPE IN FAN FOLD BOX OR ON REEL



Figure	12.	Device	Positioning	on	Таре
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			Specification		
		Inches			neter
Symbol	Item		Max	Min	Max
D	Tape Feedhole Diameter	0.1496	0.1653	3.8	4.2
D2	Component Lead Thickness Dimension	0.015	0.020	0.38	0.51
F1, F2	Component Lead Pitch	0.0945	0.110	2.4	2.8
Н	Bottom of Component to Seating Plane	.059	0.156	1.5	4.0
H1	Feedhole Location	0.3346	0.3741	8.5	9.5
H2A	Deflection Left or Right	0	0.039	0	1.0
H2B	Deflection Front or Rear	0	0.051	0	1.0
H4	Feedhole to Bottom of Component	0.7086	0.768	18	19.5
H5	Feedhole to Seating Plane	0.610	0.649	15.5	16.5
L	Defective Unit Clipped Dimension	0.3346	0.433	8.5	11
L1	Lead Wire Enclosure	0.09842	-	2.5	-
Р	Feedhole Pitch	0.4921	0.5079	12.5	12.9
P1	Feedhole Center to Center Lead	0.2342	0.2658	5.95	6.75
P2	First Lead Spacing Dimension	0.1397	0.1556	3.55	3.95
Т	Adhesive Tape Thickness	0.06	0.08	0.15	0.20
T1	Overall Taped Package Thickness	-	0.0567	-	1.44
T2	Carrier Strip Thickness	0.014	0.027	0.35	0.65
W	Carrier Strip Width	0.6889	0.7481	17.5	19
W1	Adhesive Tape Width	0.2165	0.2841	5.5	6.3
W2	Adhesive Tape Position	0.0059	0.01968	0.15	0.5

NOTES:

2. Maximum alignment deviation between leads not to be greater than 0.2 mm.

3. Defective components shall be clipped from the carrier tape such that the remaining protrusion (L) does not exceed a maximum of 11 mm.

4. Component lead to tape adhesion must meet the pull test requirements.

5. Maximum non-cumulative variation between tape feed holes shall not exceed 1 mm in 20 pitches.

6. Holddown tape not to extend beyond the edge(s) of carrier tape and there shall be no exposure of adhesive.

7. No more than 1 consecutive missing component is permitted.

8. A tape trailer and leader, having at least three feed holes is required before the first and after the last component.

9. Splices will not interfere with the sprocket feed holes.

PACKAGE DIMENSIONS

TO-92 (TO-226) CASE 29-11 ISSUE AM



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