

## MAC97A6/8

TRIACS

### LOGIC LEVEL TRIAC

#### DESCRIPTION

Logic level sensitive gate triac intended to be interfaced directly to microcontrollers, logic integrated circuits and other low power gate trigger circuits.

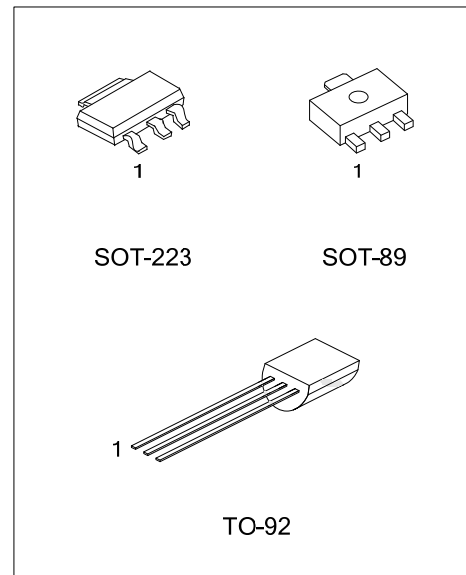
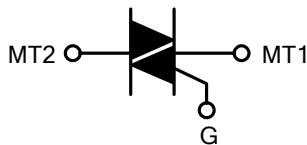
#### FEATURES

- \*Blocking voltage to 600 V (MAC97A8)
- \*RMS on-state current to 0.6 A
- \*Sensitive gate in all four quadrants

#### APPLICATIONS

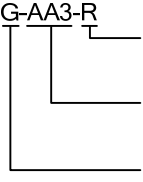
- \*General purpose bidirectional switching
- \*Phase control applications
- \*Solid state relays.

#### SYMBOL



#### ORDERING INFORMATION

Order Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
-	MAC97A6G-AA3-R	SOT-223	MT1	MT2	Gate	Tape Reel
-	MAC97A6G-AB3-R	SOT-89	MT1	MT2	Gate	Tape Reel
MAC97A6L-T92-B	MAC97A6G-T92-B	TO-92	MT1	Gate	MT2	Tape Box
MAC97A6L-T92-K	MAC97A6G-T92-K	TO-92	MT1	Gate	MT2	Bulk
-	MAC97A8G-AA3-R	SOT-223	MT1	MT2	Gate	Tape Reel
-	MAC97A8G-AB3-R	SOT-89	MT1	MT2	Gate	Tape Reel
MAC97A8L-T92-B	MAC97A8G-T92-B	TO-92	MT1	Gate	MT2	Tape Box
MAC97A8L-T92-K	MAC97A8G-T92-K	TO-92	MT1	Gate	MT2	Bulk

<p>MAC97A6G-AA3-R</p>  <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) B: Tape Box, K: Bulk, R: Tape Reel</p> <p>(2) AA3: SOT-223, AB3: SOT-89, T92: TO-92</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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■ MARKING INFORMATION

PACKAGE	MARKING	
	MAC97A6	MAC97A8
SOT-223		
SOT-89		
TO-92		

## ■ ABSOLUTE MAXIMUM RATINGS

CHARACTERISTIC		SYMBOL	RATINGS	UNIT
Repetitive Peak off-State Voltage ( $T_J=25 \sim 125^\circ\text{C}$ )	MAC97A6	$V_{\text{DRM}}$	400	V
	MAC97A8		600	V
RMS on-State Current (Full Sine Wave, $T_{\text{LEAD}} \leq 50^\circ\text{C}$ )		$I_{\text{T(RMS)}}$	0.6	A
Non-Repetitive Peak on-State Current (Full Sine Wave, $T_J=25^\circ\text{C}$ Prior to Surge)	$t=20\text{ms}$	$I_{\text{TSM}}$	8.0	A
	$t=16.7\text{ms}$		8.8	A
$I^2t$ for Fusing ( $t=10\text{ms}$ )		$I^2t$	0.32	$\text{A}^2\text{s}$
Repetitive Rate of Rise of on-State Current After Triggering ( $I_{\text{TM}}=1.0\text{A}$ , $I_{\text{G}}=0.2\text{A}$ , $dI_{\text{G}}/dt=0.2\text{A}/\mu\text{s}$ )	T2+G+	$dI_{\text{T}}/dt$	50	$\text{A}/\mu\text{s}$
	T2+G-		50	$\text{A}/\mu\text{s}$
	T2-G-		50	$\text{A}/\mu\text{s}$
	T2-G+		10	$\text{A}/\mu\text{s}$
Peak Gate Voltage [ $t=2\mu\text{s}$ (max) ]		$V_{\text{GM}}$	5	V
Peak Gate Current [ $t=2\mu\text{s}$ (max) ]		$I_{\text{GM}}$	1	A
Peak Gate Power [ $t=2\mu\text{s}$ (max) ]		$P_{\text{GM}}$	5	W
Average Gate Power [ $T_C=80^\circ\text{C}$ , $t=2\mu\text{s}$ (max) ]		$P_{\text{G(AV)}}$	0.1	W
Operating Junction Temperature		$T_J$	-40~+125	$^\circ\text{C}$
Storage Temperature		$T_{\text{STG}}$	-40~+150	$^\circ\text{C}$

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	TO-92	$\theta_{\text{JA}}$	150	$^\circ\text{C}/\text{W}$
	SOT-89		160	$^\circ\text{C}/\text{W}$
	SOT-223		165	$^\circ\text{C}/\text{W}$

## ■ STATIC CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

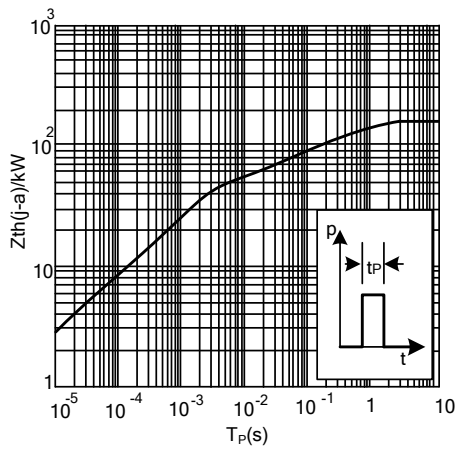
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Gate Trigger Current	$I_{\text{GT}}$	$V_{\text{D}}=12\text{V}$ , $I_{\text{T}}=0.1\text{A}$	T2+G+	1	5	mA
			T2+G-	2	5	mA
			T2-G-	2	5	mA
			T2-G+	4	7	mA
Latching Current	$I_{\text{L}}$	$V_{\text{D}}=12\text{V}$ , $I_{\text{GT}}=0.1\text{A}$	T2+G+	1	10	mA
			T2+G-	5	10	mA
			T2-G-	1	10	mA
			T2-G+	2	10	mA
Holding Current	$I_{\text{H}}$	$V_{\text{D}}=12\text{V}$ , $I_{\text{GT}}=0.1\text{A}$		1	10	mA
On-State Voltage	$V_{\text{T}}$	$I_{\text{T}}=0.85\text{A}$		1.4	1.9	V
Gate Trigger Voltage	$V_{\text{GT}}$	$V_{\text{D}}=12\text{V}$ , $I_{\text{T}}=0.1\text{A}$		0.9	2	V
		$V_{\text{D}}=V_{\text{DRM}}$ , $I_{\text{T}}=0.1\text{A}$ , $T_J=110^\circ\text{C}$	0.1	0.7		V
Off-State Leakage Current	$I_{\text{D}}$	$V_{\text{D}}=V_{\text{DRM(MAX)}}$ , $T_J=110^\circ\text{C}$		3	100	$\mu\text{A}$

## ■ DYNAMIC CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

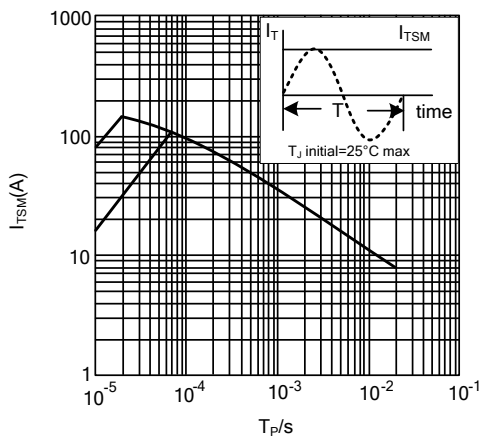
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Critical Rate of Rise of Off-State Voltage	$dV_{\text{D}}/dt$	$V_{\text{D}}=67\%$ of $V_{\text{DRM(MAX)}}$ , $T_C=110^\circ\text{C}$ , Exponential Waveform, Gate Open Circuit	30	45		$\text{V}/\mu\text{s}$
Critical Rate of Rise of Commutation Voltage	$dV_{\text{COM}}/dt$	$V_{\text{D}}=\text{Rated } V_{\text{DRM}}$ , $T_C=50^\circ\text{C}$ , $I_{\text{TM}}=0.84\text{A}$ , commutating $dI/dt=0.3\text{A}/\text{ms}$		5		$\text{V}/\mu\text{s}$
Gate Controlled Turn-On Time	$t_{\text{GT}}$	$I_{\text{TM}}=1.0\text{A}$ , $V_{\text{D}}=V_{\text{DRM(MAX)}}$ , $I_{\text{G}}=25\text{mA}$ , $dI_{\text{G}}/dt=5\text{A}/\mu\text{s}$		2		$\mu\text{s}$

## TYPICAL CHARACTERISTICS

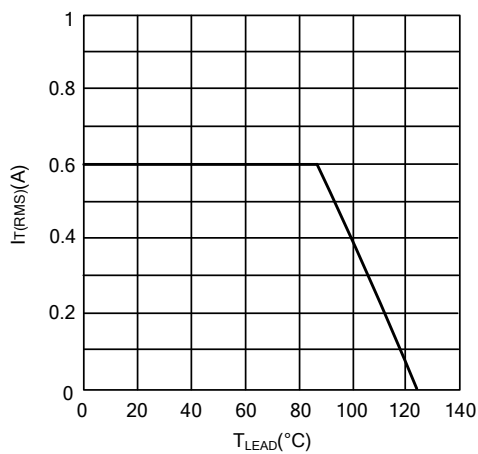
Transient Thermal Impedance From Junction to Ambient as a Function of Pulse Duration.



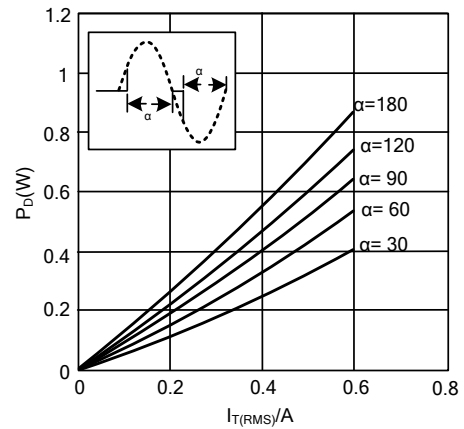
Maximum Permissible Non-Repetitive Peak on-State Current as a Function of Pulse Width for Sinusoidal Currents; Typical Values.  $t_p \leq 20\text{ms}$ .



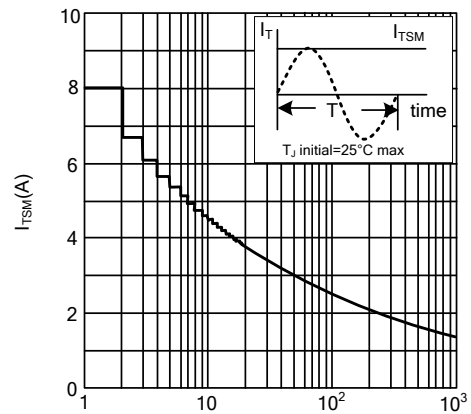
Maximum Permissible RMS Current as a Function of Lead Temperature; Typical Values.



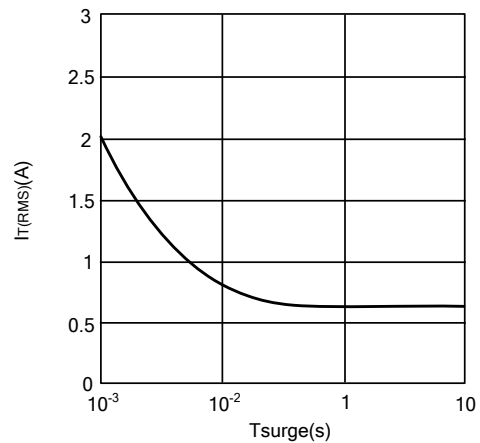
Maximum On-State Dissipation as a Function of RMS On-State Current; Typical Values.  $\alpha = \text{Conduction Angle}$ .



Maximum Permissible Non-Repetitive Peak On-State Current as a Function of Number of Cycles for Sinusoidal Currents; Typical Values.  $n = \text{Number of Cycles at } f = 50\text{Hz}$ .

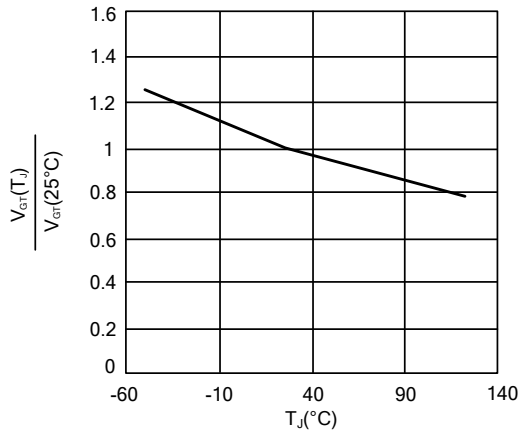


Maximum Permissible Repetitive RMS On-State Current as a Function of Surge Duration for Sinusoidal Currents; Typical Values.  $f = 50\text{Hz}$ ;  $T_{\text{LEAD}} \leq 50^\circ\text{C}$ .

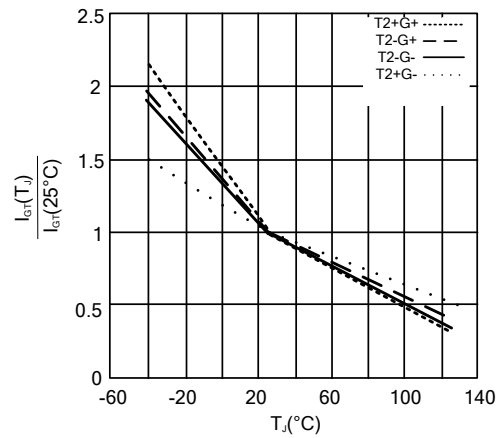


## ■ TYPICAL CHARACTERISTICS(Cont.)

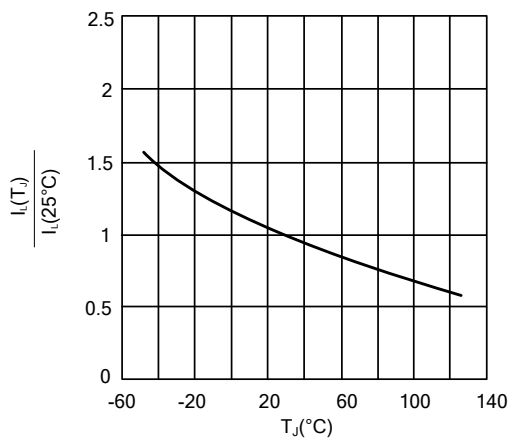
Normalized Gate Trigger Voltage as a Function of Junction Temperature; Typical Values.



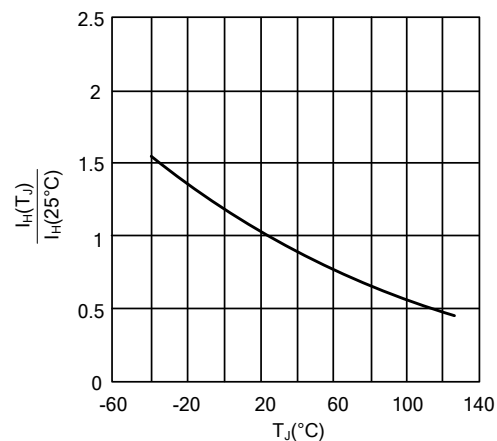
Normalized Gate Trigger Current as a Function of Junction Temperature; Typical Values.



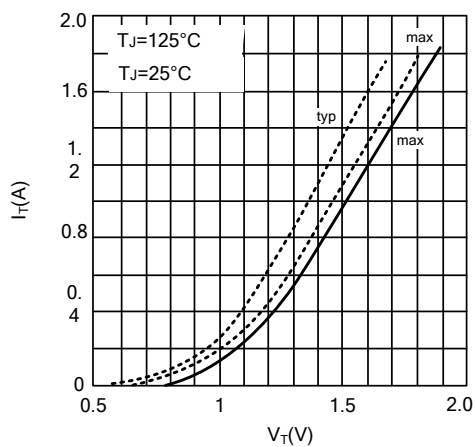
Normalized Latching Current as a Function of Junction Temperature; Typical Values.



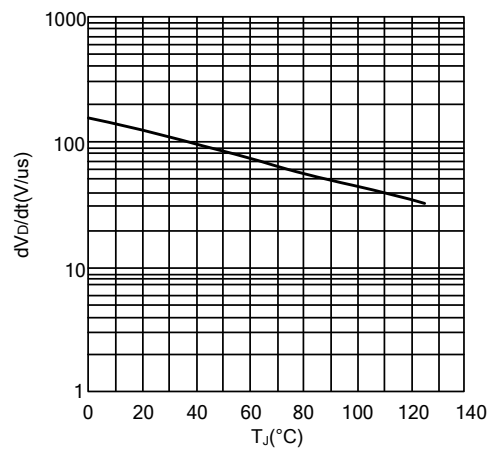
Normalized Holding Current as a Function of Junction Temperature; Typical Values.



On-State Current as a Function of On-State Voltage; Typical and Maximum Values.



Critical Rate of Rise of Off-State Voltage as a Function of Junction Temperature; Typical Values.



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