

■ Product Model Reference & Naming 【型号命名及型号列表】 4-Quadrants TRIACs 四象限-塑封 双向可控硅

0.8A	产品型号列表、型号对应封装、型号对照电压值					型号字母对应 触发电流 I_{GT} $I_{GT1\sim3}$ 象限
封装形式	封装标识	200V	400V	600V	800V	"A"≤5mA
TO-92	A	MAC97A4A	MAC97A6A	MAC97A8A	MAC97A10A	
SOT-23-3L	MM	MMAC97A4	MMAC97A6	MMAC97A8	MMAC97A10	
SOT-89	M	MAC97A4M	MAC97A6M	MAC97A8M	MAC97A10M	
SO-223	S	MAC97A4S	MAC97A6S	MAC97A8S	MAC97A10S	
		低压品种	常规品种	高压品种	暂无量产	

<u>H</u>	<u>MAC</u>	<u>97</u>	<u>A</u>	<u>6</u> - <u>A</u>	
↓	↓	↓	↓	↓	↓
HAOHAI ELECTRONICS CO.,LTD.	M: semiconductor A: Alternating Current C: AC-semiconductor Switch MAC: 交流半导体开关 前缀 MMAC: SOT-23	电流表示 0.8A	觸發電流表示: 第一象限 至 第四象限: I_{GT1} 、 I_{GT2} 、 I_{GT3} 、 I_{GT4} $I_{GT I}$ 、 $I_{GT II}$ 、 $I_{GT III}$ 、 $I_{GT IV}$ A: 5、5、5、10 mA B: 3、3、3、7 mA 除非另有說明	電壓值表示: 2: 50V 3: 100V 4: 200V 5: 300V 6: 400V 8: 600V 10: 800V	A:TO-92 或无后缀 前缀MM: SOT-23-3L M:SOT-89 S:SOT-223

■ PINNING: Insulated Package

TO-92、SOT-23、SOT-89、SOT-223 Pin Polarity Circuit Diagram

Pin	Symbol	Description	Description				
1	T1	Main terminal 1	第一阳极				
2	G	Gate	门-控制极				
3	T2	Main terminal 2	第二阳极				
4	----	Tab	散热片端				

■ ABSOLUTE MAXIMUM RATINGS

SYMBOL	Signification in Symbol		Value	Unit
$I_{T(RMS)}$	RMS on-state current	TO-92, TO-92编带, $T_C=51^{\circ}\text{C}$	0.8	A
		SOT-23-3L SOT-89, SOT-223, $T_C=70^{\circ}\text{C}$		
I_{TSM}	Non repetitive surge peak on-state current	$t_p=10\text{ms}$	8	
I_{GM}	Peak gate current ($t \leq 2.0\mu\text{s}$)	$T_C=80^{\circ}\text{C}$	1	
V_{DRM}	Repetitive peak off-state voltage ($T_J=25^{\circ}\text{C}$)	见产品 型号列表	200~800	V
V_{RRM}	Repetitive peak reverse voltage ($T_J=25^{\circ}\text{C}$)		200~800	
V_{DSM}	Non repetitive surge peak Off-state voltage		$V_{DRM}+100$	
V_{RSM}	Non repetitive peak reverse voltage		$V_{RRM}+100$	
I^2t	I^2t value for fusing	$t_p=10\text{ms}$	1.28	A^2S
di/dt	Critical rate of rise of on-state current	$I_G=2 \times I_{GT}$	10	$\text{A}/\mu\text{S}$
$P_{G(AV)}$	Average gate power dissipation ($t \leq 8.3\mu\text{s}$)	$T_C=80^{\circ}\text{C}$	0.1	W
P_{GM}	Peak gate power ($t \leq 2.0\mu\text{s}$)	$T_C=80^{\circ}\text{C}$	5	
T_{STG}	Storage junction temperature range		-40~+150	$^{\circ}\text{C}$
T_J	Operating junction temperature range		-40~+125	
T_L	Maximum Lead Temperature for Soldering Purposes for 10 Seconds		260	

■ THERMAL CHARACTERISTICS

Symbol	Characteristic		Max	Unit
$R_{th(j-c)}$	Thermal Resistance, Junction to Case	TO-92, TO-92编带	60	$^{\circ}\text{C}/\text{W}$
		SOT-23-3L, SOT-89, SOT-223	23	

■ ELECTRICAL CHARACTERISTICS ($T_C=25^{\circ}\text{C}$ unless otherwise noted; Electricals apply in both directions)

Symbol	Characteristic	Min	Typ	Max	Unit
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■ OFF CHARACTERISTICS

I_{DRM} I_{RRM}	Peak Repetitive Blocking Current ($V_D=\text{Rated } V_{\text{DRM}}, V_{\text{RRM}}, \text{ Gate Open}$)	$T_J=25^{\circ}\text{C}$	--	--	10	μA
		$T_J=110^{\circ}\text{C}$	--	--	100	

■ ON CHARACTERISTICS

I_{GT}	Gate Trigger Current (Continuous dc) ($V_D=12\text{Vdc}, R_L=100\Omega$)	MT2(+), G(+)	--	--	5	mA
		MT2(+), G(-)	--	--	5	
		MT2(-), G(-)	--	--	5	
		MT2(-), G(+)	--	--	7	
I_{H}	Holding Current ($V_D=12\text{Vdc}$, Initiating Current=200mA, Gate Open)		--	1.5	10	mA
V_{GT}	Gate Trigger Voltage (Continuous dc) ($V_D=12\text{Vdc}, R_L=100\Omega$)	MT2(+), G(+)	--	0.66	2	V
		MT2(+), G(-)	--	0.77	2	
		MT2(-), G(-)	--	0.84	2	
		MT2(-), G(+)	--	0.88	2.5	
V_{TM}	Peak OnState Voltage ($I_{\text{TM}}=\pm 0.85\text{A Peak}$; Pulse Width $\leq 2.0\text{ms}$, Duty Cycle $\leq 2\%$)		--	--	1.9	V
V_{GD}	Gate NonTrigger Voltage ($V_D=12\text{V}$, $R_L=100\Omega$, $T_J=110^{\circ}\text{C}$)		0.1	--	--	
t_{gt}	Turn-On Time ($V_D=\text{Rated } V_{\text{DRM}}, I_{\text{TM}}=1\text{A pk}, I_{\text{G}}=25\text{mA}$)		--	2.0	--	μS

■ DYNAMIC CHARACTERISTICS

$dV/dt(c)$	Critical Rate of Rise of Commutation Voltage ($V_D=\text{Rated } V_{\text{DRM}}, I_{\text{TM}}=0.84\text{A}$, Commutating $di/dt=0.3\text{A/ms}$, Gate Unenergized, $T_C=50^{\circ}\text{C}$)	--	5	--	$\text{V}/\mu\text{S}$
dv/dt	Critical Rate of Rise of Off-State Voltage ($V_D=\text{Rated } V_{\text{DRM}}, T_C=110^{\circ}\text{C}$, Gate Open, Exponential Waveform)	--	25	--	

Electrical characteristics & Typical characteristics (电气特性与典型特征)

FIG.1 Maximum power dissipation versus RMS on-state current

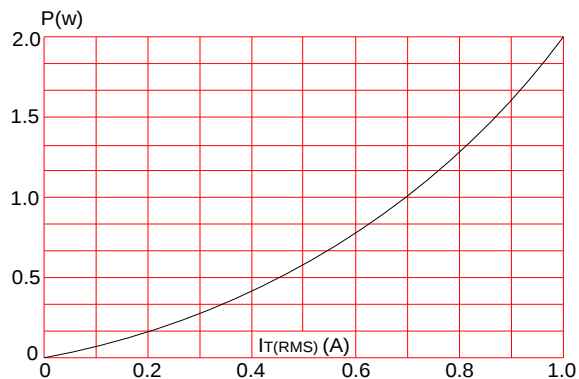


FIG.2: RMS on-state current versus case temperature

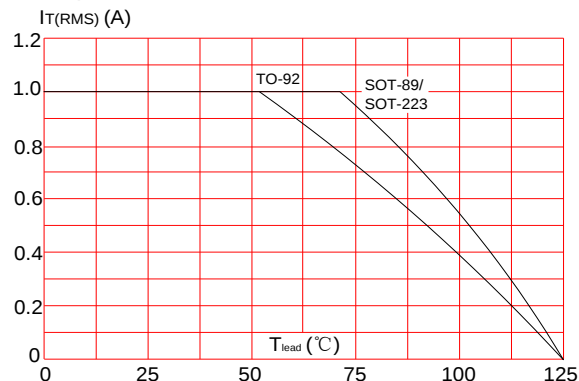


FIG.3: Surge peak on-state current versus number of cycles

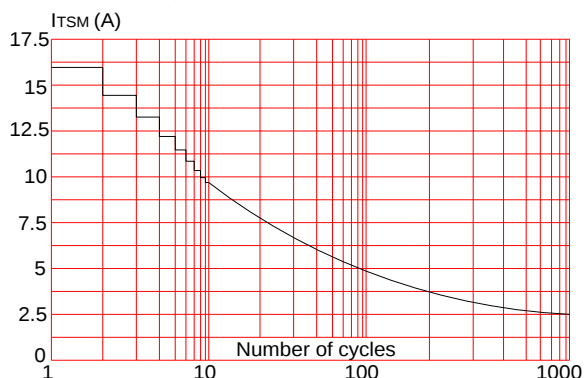


FIG.4: On-state characteristics (maximum values)

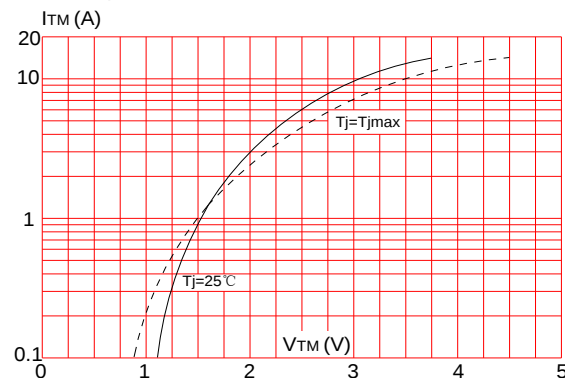


FIG.5: Non-repetitive surge peak on-state current for a sinusoidal pulse with width $t_p < 10ms$ and corresponding value of $I^2 t$ ($di/dt < 10A/\mu s$)

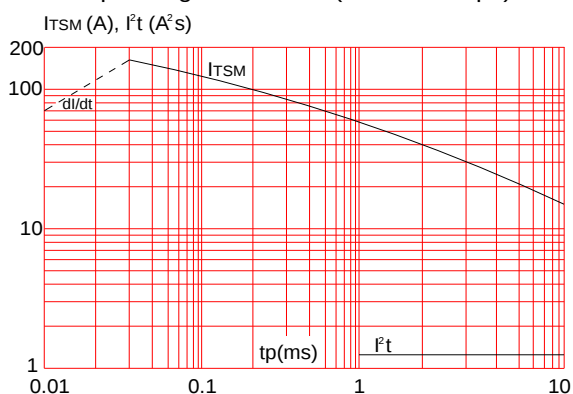
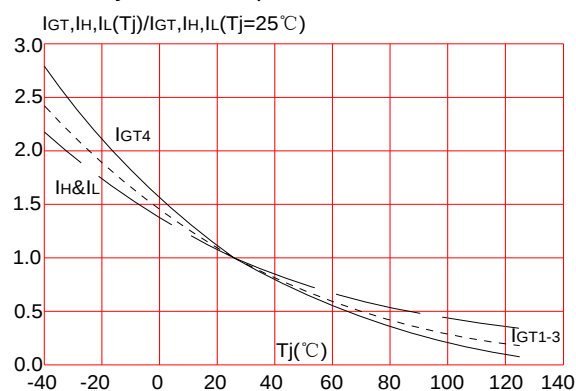


FIG.6: Relative variations of gate trigger current, holding current and latching current versus junction temperature

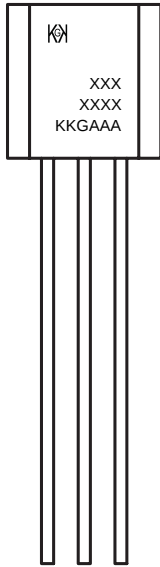


TO-92 (TO-226AA) PACKAGE DIMENSIONS 封装尺寸数据

PACKAGE MECHANICAL DATA (mm & inch) (毫米与英寸对照)

REF	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.45	5.20	0.175	0.205
B	4.32	5.33	0.170	0.210
C	3.18	4.19	0.125	0.165
D	0.407	0.533	0.016	0.021
G	1.15	1.39	0.045	0.055
H	2.42	2.66	0.095	0.105
J	0.39	0.50	0.015	0.020
K	12.70		0.500	
N	2.04	2.66	0.080	0.105
P		2.54		0.100
V	3.43		0.135	

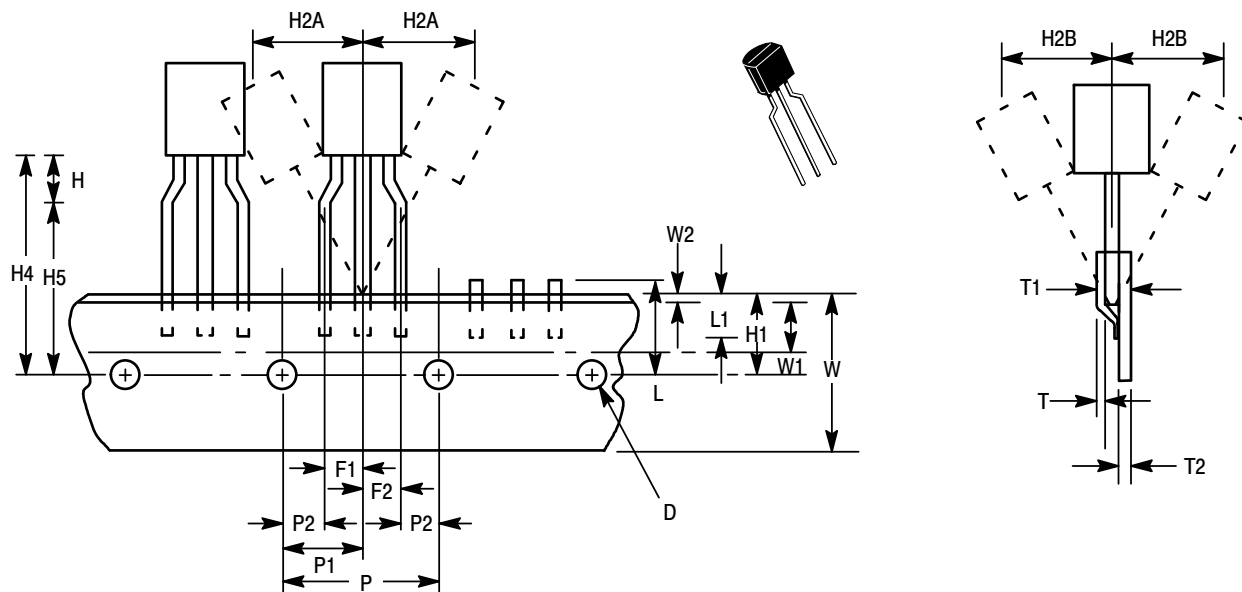
打印标识

Marking
 XXX: Part Number KKG: Registered trademark AAA: Chip Code LOGO in The upper left corner mark XXX 产品型号 KKG: 注册商标 AAA: 芯片代码 左上角为公司LOGO

■ 包装规格 Packaging Specifications

封装	明细			Bag/袋	BOX/盒	Carton/箱
TO-92 TO-226AA Bulk Packing	QTY / 数量	Pcs	1	1,000	10,000	100,000
	Size / 尺寸	mm	--	--	240×160×90	500×350×250
	G.W. / 重量(铁脚)	g	--	175.5	1842	1915
	G.W. / 重量(铜脚)	g	--	193	2029	2105

TO-92成型脚位编带 (TO-92-3L Tape and Reel Taping) 封装尺寸数据 (mm & inch) (毫米与英寸对照)



Specification-1

Symbol	Inches		Millimeter	
	Min	Max	Min	Max
D	0.1496	0.1653	3.80	4.20
D2	0.0150	0.0200	0.38	0.51
F1,F2	0.0945	0.1100	2.40	2.80
H	0.0590	0.1560	1.50	4.00
H1	0.3346	0.3741	8.50	9.50
H2A	0	0.0390	0	1.00
H2B	0	0.0510	0	1.00
H4	0.7086	0.7680	18	19.5
H5	0.6100	0.6490	15.5	16.5
L	0.3346	0.4330	8.50	11

Specification-2

Symbol	Inches		Millimeter	
	Min	Max	Min	Max
L1	0.0984	--	2.50	--
P	0.4921	0.5079	12.5	12.9
P1	0.2342	0.2658	5.95	6.75
P2	0.1397	0.1558	3.55	3.95
T	0.0600	0.0800	0.15	0.20
T1	--	0.0567	--	1.44
T2	0.0140	0.0270	0.35	0.65
W	0.6889	0.7481	17.5	19.0
W1	0.2165	0.2841	5.50	6.30
W2	0.0059	0.0196	0.15	0.50

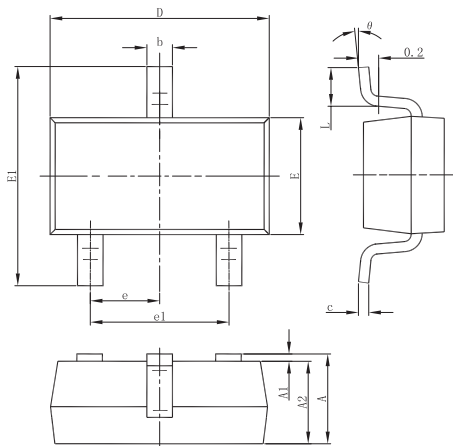
■ 包装规格 Packaging Specifications

封装	明细			Bag/袋	BOX/盒	Carton/箱
TO-92 TO-92-3L TO-226AA TAPE & REEL AMMO PACK	QTY / 数量	Pcs	1	--	2,000	20,000
	Size / 尺寸	mm	--	--	335×155×43	350×330×250
	G.W. / 重量(铜脚)	g	--	--	602	6550

SOT-23-3L Tape & Reel Packing Dimension 封装尺寸数据

PACKAGE MECHANICAL DATA (mm & inch) (毫米与英寸对照)

REF	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0	0.100	0	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



SOT23-3L
Package Code: MM

打印标识

Marking
XXX: Part Number KKG: Registered trademark LOGO in The upper left corner mark XXX: 产品型号 KKG: 注册商标 左上角为公司LOGO

■ 包装规格 Packaging Specifications

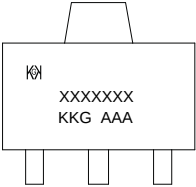
封装	明细			Reel/卷盘	BOX/盒	Carton/箱
SOT23-3L Tape & Reel Packing	QTY / 数量	Pcs	1	3,000	45,000	180,000
	Size / 尺寸	mm	--	Φ7"	220×220×200	440×440×230
	G.W. / 重量	g	--	113	1932	8639

SOT-89 (SOT89-3L Tape & Reel Packing Dimension) 封装尺寸数据

PACKAGE MECHANICAL DATA (mm & inch) (毫米与英寸对照)

REF	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.173	0.181
B	2.40	2.60	0.094	0.102
C	1.40	1.60	0.055	0.063
D	0.37	0.57	0.015	0.022
E	0.32	0.52	0.013	0.020
F	1.50	1.83	0.059	0.072
G	1.50 BSC		0.059 BSC	
H	3.00 BSC		0.118 BSC	
J	0.30	0.50	0.012	0.020
K	0.80	--	0.031	--
L	--	4.25	--	0.167

打印标识

Marking
 XXXXXXX KKG AAA
XXX: Part Number KKG: Registered trademark LOGO in The upper left corner mark XXX: 产品型号 KKG: 注册商标 左上角为公司LOGO

■ 包装规格 Packaging Specifications

封装	明细			Reel/卷盘	BOX/盒	Carton/箱
SOT-89 SOT89-3L Tape & Reel Packing	QTY` / 数量	Pcs	1	1,000	10,000	40,000
	Size / 尺寸	mm	--	Φ7"	210×210×220	450×450×240
	G.W. / 重量	g	--	158	1723	7800

SOT-223 (SOT-223-3L Tape & Reel Packing Dimension) 封装尺寸数据

PACKAGE MECHANICAL DATA (mm & inch) (毫米与英寸对照)

REF	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.50	1.80	0.059	0.071
A1	0.01	0.10	0.001	0.004
B	2.90	3.10	0.114	0.122
B1	0.60	0.80	0.024	0.031
C	0.22	0.32	0.009	0.013
D	6.30	6.70	0.248	0.264
E	3.30	3.70	0.130	0.146
F	4.60 TYP.		0.181 TYP.	
F1	2.30 TYP.		0.091 TYP.	
G	0.70	1.10	0.028	0.043
H	1.50	2.00	0.059	0.079
J	6.70	7.30	0.264	0.287
K	0.90 TYP.		0.035 TYP.	

打印标识

Marking

H: HAOHAI XXXXXX: Part Number KKG: Registered trademark LOGO in The upper left corner mark XXXXXX: 产品型号 KKG: 注册商标 左上角为公司LOGO

■ 包装规格 Packaging Specifications

封装	明细			Reel/卷盘	BOX/盒	Carton/箱
SOT-223 SOT223-3L Tape & Reel Packing	QTY / 数量	Pcs	1	25,00	5,000	40,000
	Size / 尺寸	mm	--	Φ13"	336×336×46	440×440×600
	G.W. / 重量	g	--	647.5	1471.5	11775

*Manufacturers version information*2006-09-19 , KKG [™] Product Data-1.02010-09-19 , KKG [™] Product Data-1.12014-09-19 , KKG [™] Product Data-1.22023-10-23 , KKG [™] Product Data-1.3

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