

概述 Description

M305X 系列是 SOP4 封装的过零型可控硅光耦，产品由一个红外线发射二极管和光电可控硅芯片组成，可实现不同电路之间的电气隔离和信号传输，产品广泛应用于家电领域中。

M305X series are zero-cross photo triac in SOP4 package, consisting of an infrared emitting diode and photoelectric SCR chip ;The devices can realize electrical isolation and signal transmission between different circuits, Products are widely used in the field of home appliances;

特性 Features

输入-输出隔离电压：◇ $V_{ISO}=3750V_{rms}$)

High isolation voltage between input and output◇ $V_{ISO}=3750V_{rms}$)

DC 输入，过零可控硅输出

DC input with zero-cross photo triac output

峰值击穿电压

Peak breakdown voltage

600V: M305X;

爬电距离>5.0mm

Creepage distance > 5.2mm

工作温度最高可达+ 100 °C

Operating temperature up to +100°C

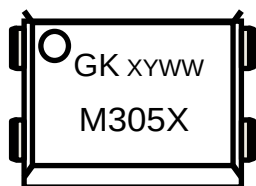
防潮等级 class1;

MSL class1

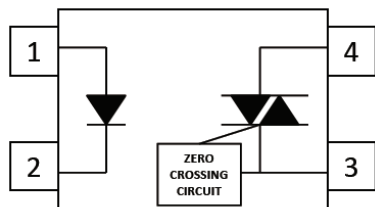
产品适用于海拔 5000 米及以下

Products are suitable for the elevation of 5000 meters and below
产品符合RoHS、REACH及HF等环保法规要求;

The products comply with RoHS, REACH and HF;



框架结构



Pin Configuration

- 1. Anode
- 2. Cathode
- 3. Terminal
- 4. Terminal

电性参数 Electrical Characteristics

最大绝对额定值 (常温=25°C)

Absolute Maximum Ratings (Temperature=25°C)

参数名称 Parameter		符号 Symbol	数值 Rating	单位 Unit
输入 Input	正向电流 Forward Current	I_F	60	mA
	反向电压 Reverse Voltage	V_R	6	V
	功耗 Power Dissipation	P_D	100	mW
输出 Output	断态输出端电压 Off-state Output Terminal Voltage	M305X V_{DRM}	600	V
	峰值重复浪涌电流 Peak Repetitive Surge Current PW=100 μ s, 120pps	I_{TSM}	1	A
	导通 RMS 电流 On-State RMS Current	$I_{T(RMS)}$	100	mA
	功耗 Power Dissipation	P_c	300	mW
总功率消耗 Total Power Dissipation		P_{tot}	400	mW
*1 隔离电压 *1 Isolation Voltage		V_{iso}	3750	Vrms
工作温度 Operating Temperature		T_{opr}	-55 ~ + 100	°C
贮存温度 Storage Temperature		T_{stg}	-55 ~ + 125	
*2 焊锡温度 *2 Soldering Temperature		T_{sol}	260	

* 注:

*1.交流测试, 时间 1 分钟, 湿度. =40~60%;

*1.AC For 1 Minute, R.H. = 40 ~ 60%;

隔离电压测试的方法如下:

Isolation voltage shall be measured using the following method:

(1) 将产品的两端短路;

(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side;

(2) 测试隔离电压时无电流通过;

(2) The isolation voltage tester with zero-cross circuit shall be used;

(3) 测试时加正弦波形电压。

(3) The waveform of applied voltage shall be a sine wave.

*2.锡焊时间为 10 秒

*2. Soldering time is 10 seconds

电性参数 (温度=25℃):

Electrical Characteristics (Temperature=25℃)

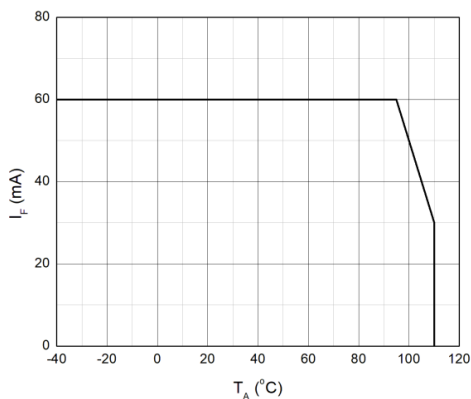
参数名称 Parameter		符号 Symbol	条件 Condition	最小值 Min.	典型值 Typ.	最大值 Max.	单位 Unit
输入 Input	正向电压 Forward Voltage	V_F	$I_F=20\text{mA}$	---	1.2	1.4	V
	反向电流 Reverse Current	I_R	$V_R=6\text{V}$	---	---	10	μA
	输入电容 Input Capacitance	C_{in}	$V=0, f=1\text{KHz}$	---	8.5	250	pF
输出 Output	*1 断态峰值电流 *1 Peak Off-state current	I_{DRM}	$V_{DRM}=\text{Rated } V_{DRM}$ $I_F=0$	---	---	500	nA
	峰值导通电压 Peak On-state Voltage	V_{TM}	$I_{TM}=100\text{mA}$	---	---	3.0	V
	断态电压临界上升率 Critical Rate of Rise of Off-state Voltage	dV/dt	$V_{PEAK}=\text{Rated } V_{DRM}$	1000	---	---	V/ μs
传输特性 transfer characteristic	LED 触发电流 LED Trigger Current	M3051	I_{FT}	Terminal Voltage = 3V $I_{TM}=100\text{mA}$		15	mA
		M3052				10	
		M3053				5	
	维持电流 Holding Current		I_H	---	---	280	μA
	绝缘电阻 Isolation resistance		R_{iso}	DC500V 40~60%R.H.	1×10^{12}	---	Ω
	浮动电容 Floating Capacitance		C_{IO}	$V=0, f=1\text{MHz}$	---	0.4	pF
过零特性 Zero-Crossing characteristic	抑制电压 Inhibit Voltage	V_{INH}	$I_F=\text{Rated } I_{FT}$	---	---	20	V
	抑制状态漏电流 Leakage in Inhibited State	I_{DRM2}	$I_F=\text{Rated } I_{FT}$ $V_{DRM}=\text{Rated } V_{DRM}$			500	μA

注: *1 测试电压必须在 dV/dt 额定值范围内。

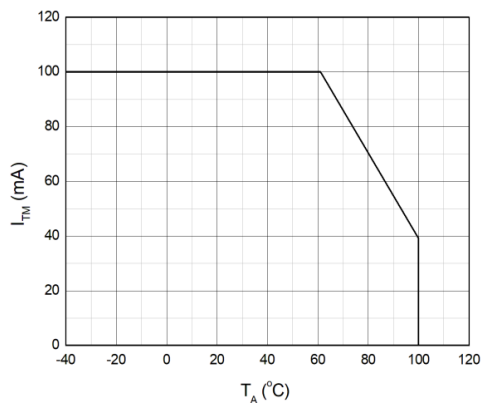
*1 Test voltage must be applied within dV/dt rating.

RATING AND CHARACTERISTIC CURVES

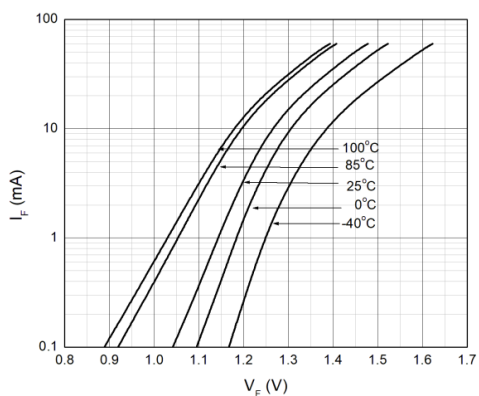
**Fig.1 Forward Current
vs. Ambient Temperature**



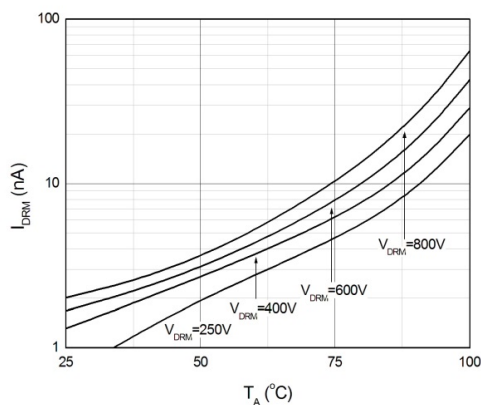
**Fig.2 On-state Terminal Current
vs. Ambient Temperature**



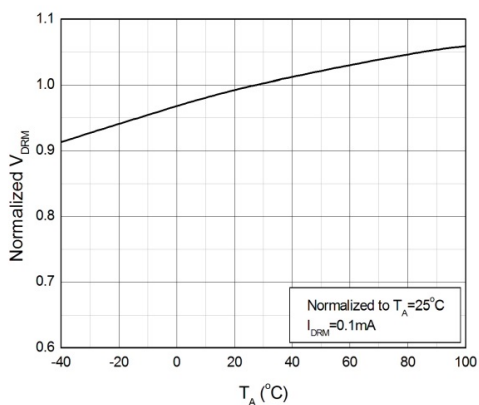
**Fig.3 Forward Current
vs. Forward Voltage**



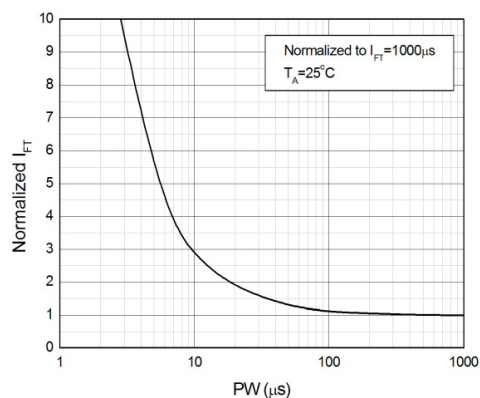
**Fig.4 Off-state Terminal Current
vs. Ambient Temperature**



**Fig.5 Normalized Off-state Terminal Voltage
vs. Ambient Temperature**

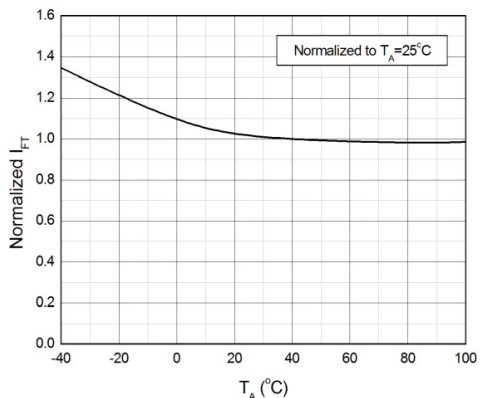


**Fig.6 Normalized Trigger Current
vs. LED Trigger Pulse Width**

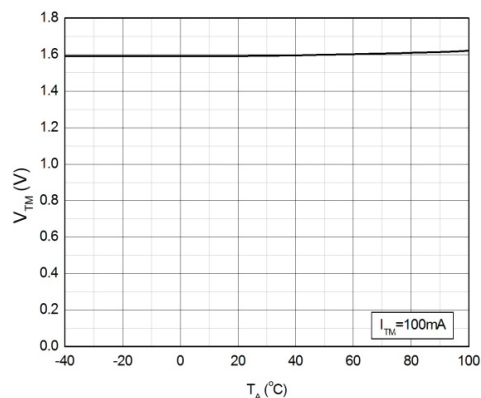


RATING AND CHARACTERISTIC CURVES

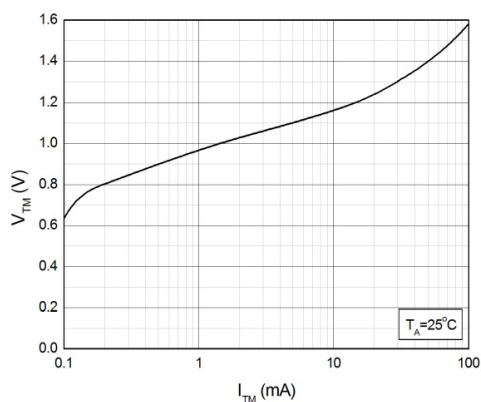
**Fig.7 Normalized Trigger Current
vs. Ambient Temperature**



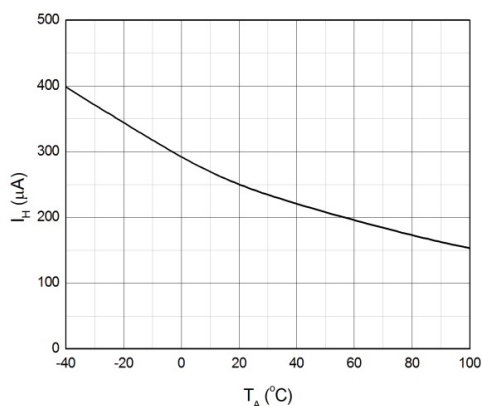
**Fig.8 On-state Terminal Voltage
vs. Ambient Temperature**



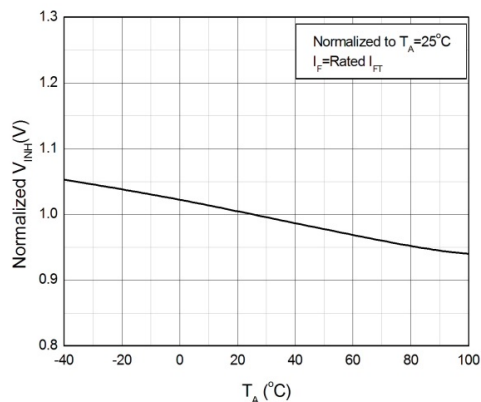
**Fig.9 On-state Terminal Voltage
vs. On state Terminal Current**



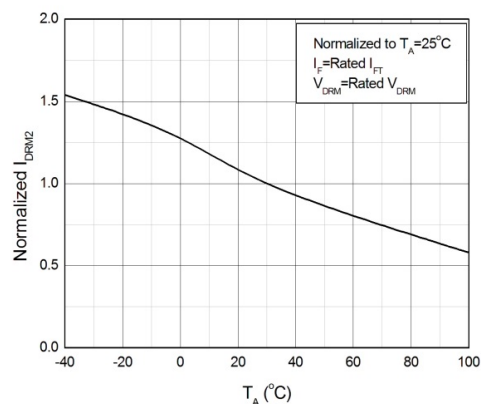
**Fig.10 Holding Current
Ambient Temperature**



**Fig.11 Normalized Inhibit Voltage
vs. Ambient Temperature**

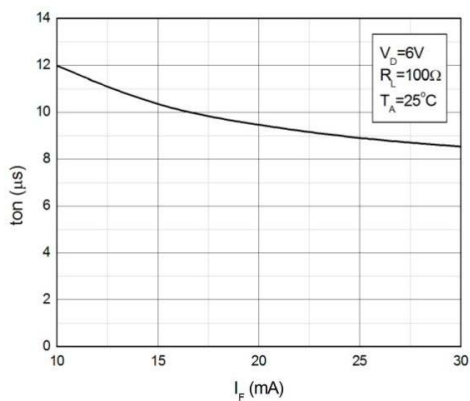


**Fig.12 Normalized Leakage in Inhibit State
Ambient Temperature**

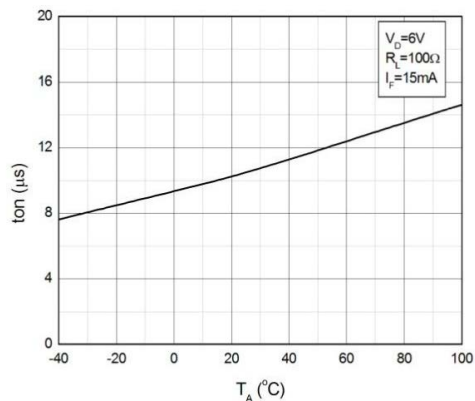


RATING AND CHARACTERISTIC CURVES

**Fig.13 Turn On Time
vs. Forward Current**



**Fig.14 Turn On Time
vs. Ambient Temperature**



TEST CIRCUITS

Fig.15 Test Circuits of Turn On Time

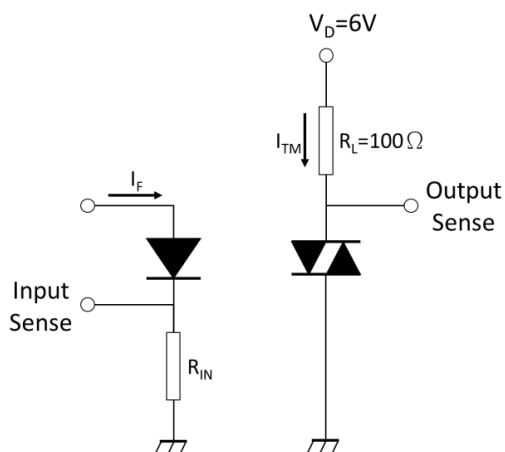


Fig.16 Waveforms of Turn On Time

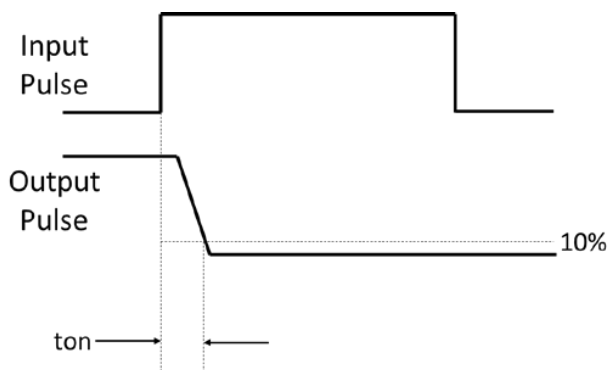


Fig.17 Test Circuits of dV/dt

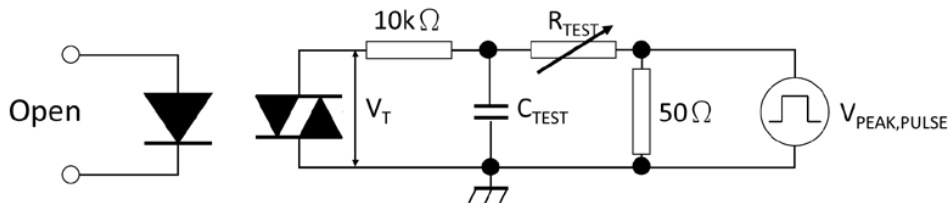
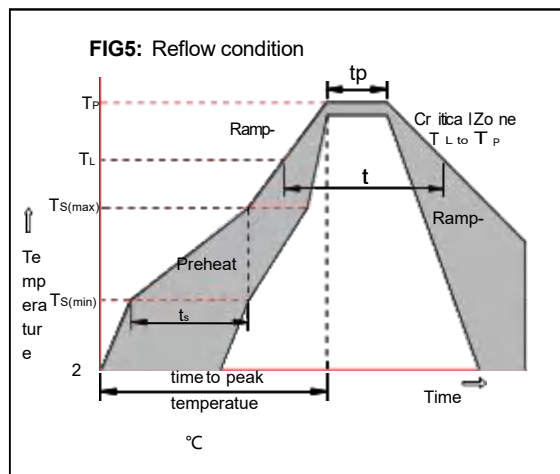


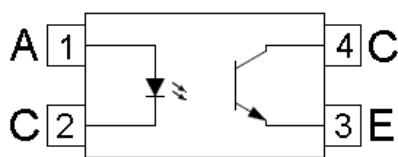
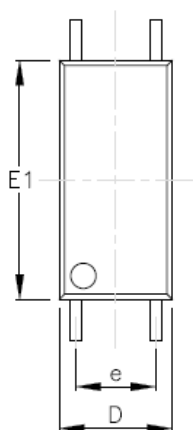
Fig.18 Waveforms of dV/dt

Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout



Symbol	Max	Min	Typ.
E1	7.92	7.32	7.62
D	3.90	3.30	3.60
E	10.50	9.90	10.20
H _E	8.95	8.35	8.65
A2	2.35	1.75	2.05
e	--	--	2.54
A1	0.20	0	0.10
b	0.50	0.30	0.40
C	0.30	0.10	0.20
L	--	0.4	--
aaa	0.10	0	--

