



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-M305X

Customer: _____

Date: _____

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1. Features

- (1) High isolation voltage between input and output (Viso:3750 V rms)
- (2) 4pin non zero-cross optoisolators triac driver output
- (3) High repetitive peak off-state voltage VDRM : Min. 600V
- (4) High critical rate of rise of off-state voltage(dV/dt : MIN. 1000V / s)
- (5) Tape and reel packaging.
- (6) Operating temperature -40 °C to +110 °C



2. Description

The OR-M305X consists of a non zero crossing photo triac, optically coupled to a gallium arsenide infrared emitting diode. The OR-M305X is housed in the SOP-4 package and guarantees insulation thickness. Therefore, the OR-M305X meets the reinforced insulation class requirements of international safety standards.

3. Application Range

- AC Motor Drives
- AC Motor Starters
- Static power switch
- Lighting Controls
- Solenoid/Valve Controls
- Solid State Relays
- Temperature Controls

4. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rated Value	Unit
Input	Forward Current	I _F	50	mA
	Junction Temperature	T _J	125	°C
	Reverse Voltage	V _R	6	V
	Power Dissipation	P	100	mW
Output	Off-State Output Terminal Voltage	V _{DRM}	600	V
	Peak Repetitive Surge Current (PW=1ms, 120 pps)	I _{TSM}	1	A
	Junction Temperature	T _J	125	°C
	Collector Power Dissipation	P _C	300	mW
Total Power Dissipation		P _{tot}	330	mW
*1 Insulation Voltage		V _{iso}	5000	Vrms
Working Temperature		T _{opr}	-40 ~ + 110	°C
Deposit Temperature		T _{stg}	-55 ~ + 125	
*2 Soldering Temperature		T _{sol}	260	

Notes:

*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2&3 are shorted together, and pins 4, 6 are shorted together.

* 2 For 10 seconds

5. Electrical Optical Characteristics at Ta=25°C

Parameter		Symbol	Condition	Min	Typ.*	Max	Unit	
Input	Forward Voltage	V_F	$I_F=20mA$	---	1.2	1.6	V	
	Reverse Current	I_R	$V_R=6V$	---	---	5	μA	
Output	1.Peak Blocking Current, Either Direction	I_{DRM}	$V_{DRM} = 600V$	---	10	100	nA	
	Peak On-State Voltage, Either Direction	V_{TM}	$I_{TM}=100mA$ Peak	---	1.7	3.0	V	
	2.Critical rate of Rise of Off-State Voltage	dv/dt	$V_{in}=240V_{rms}$	1000	---	---	V/us	
Couple	3. Led Trigger Current, Current Required to Latch Output, Either Direction	OR-M3020	I_{FT}	Main Terminal Voltage = 3V	---	---	30	mA
		OR-M3021			---	---	15	
		OR-M3022			---	---	10	
		OR-M3023			---	---	5	
	Holding Current, Either Direction	I_H		---	200	---	μA	

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

*2. This is static dv/dt. Commutating dv/dt is a function of the load-driving thyristor(s) only.

*3. All devices are guaranteed to trigger at an I_F value less than or equal to max I_{FT} . Therefore, recommended operating I_F lies between max I_{FT} , 30 mA for OR-M3050, 15 mA for OR-M3051, 10 mA for OR-M3052, 5 mA for OR-M3053, and absolute max I_F (50mA).



6. Order Information

Part Number

OR-M305X-Z

Note

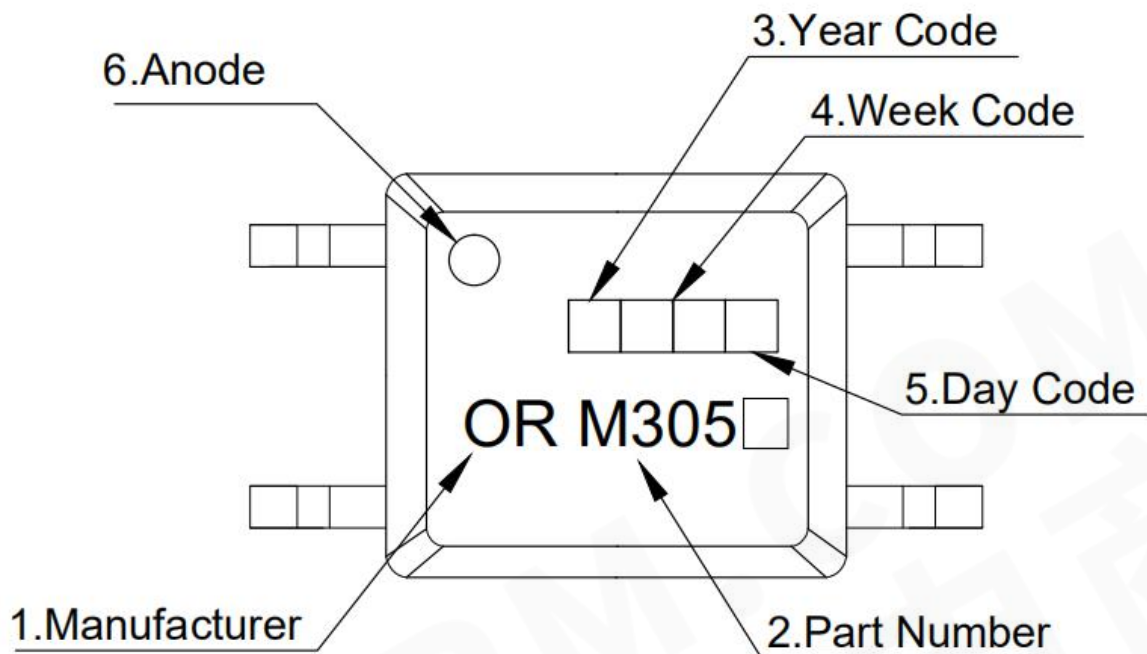
X = IFT Rank (0 , 1 , 2 , 3).
Z = Tape and reel option (TP or TP1).

* Halogen Free can be selected.

* VDE Code can be selected.

Option	Description	Packing quantity
TP	Surface mount lead form (low profile) + TP tape & reel option	3000 units per reel
TP1	Surface mount lead form (low profile) + TP1 tape & reel option	3000 units per reel

7. Naming Rule



NOTE:

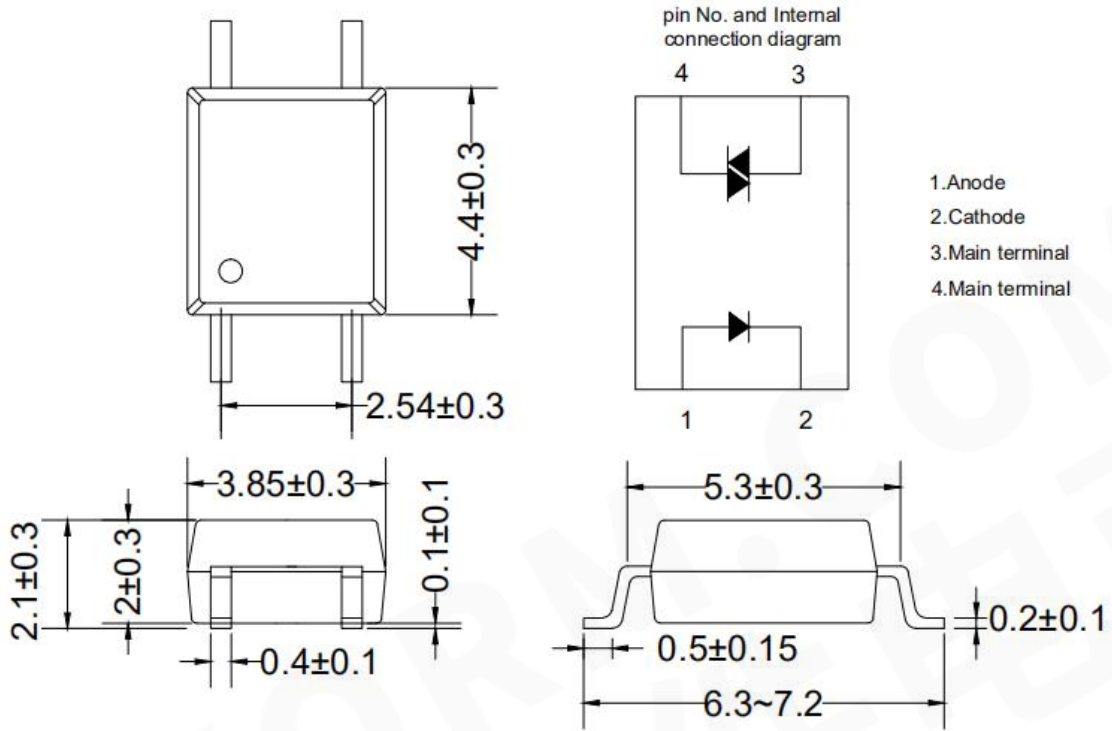
- (1) ORIENT .
- (2) 305□ denotes Part Number.
- (3) □ denotes Year Code.
- (4) □□ denotes Week Code.
- (5) □ denotes Day Code.
- (6) Anode.

* If the photo coupler is Free from Halogen, there will be a ' G ' mark in the upper left corner.

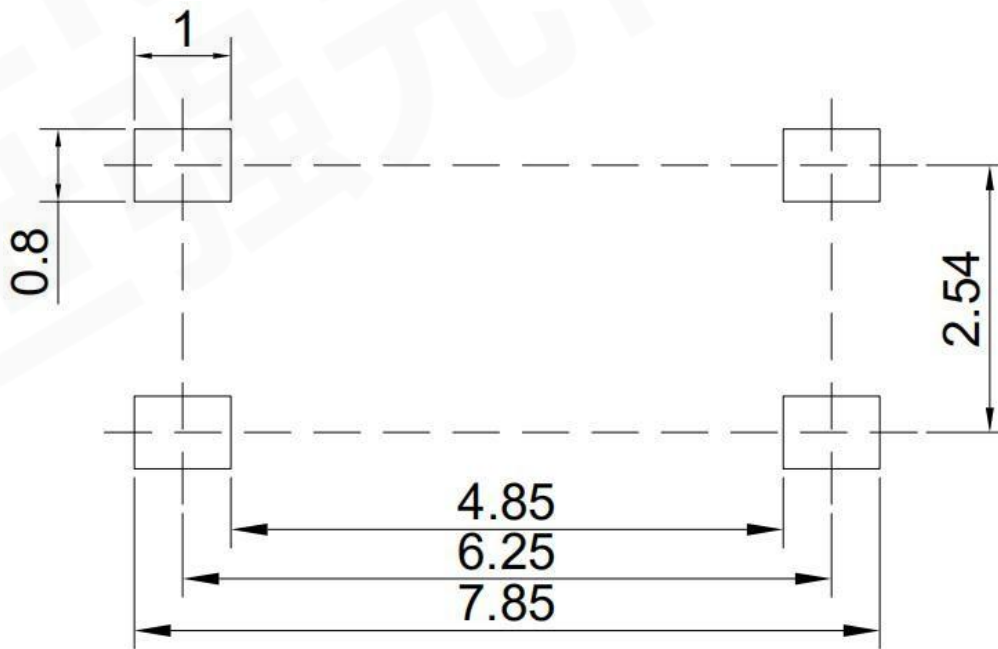
* VDE Code can be selected.

8. Package Dimension

OR-M305X



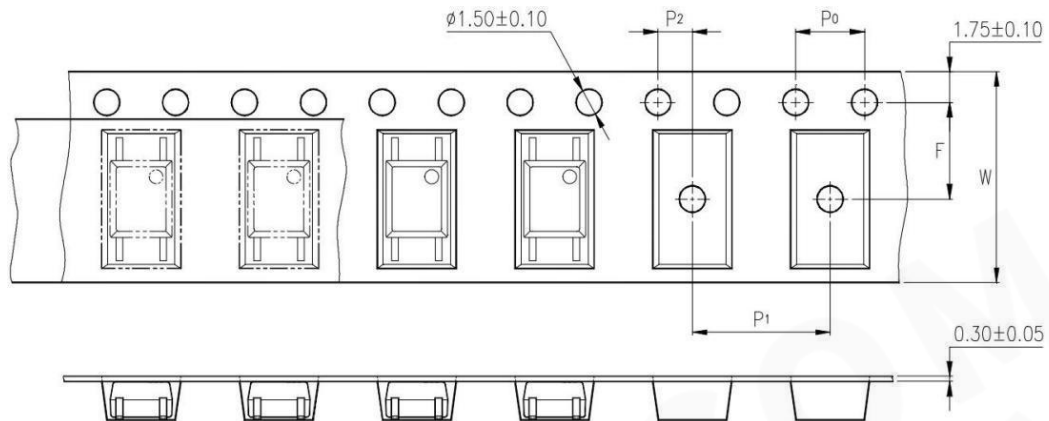
9. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



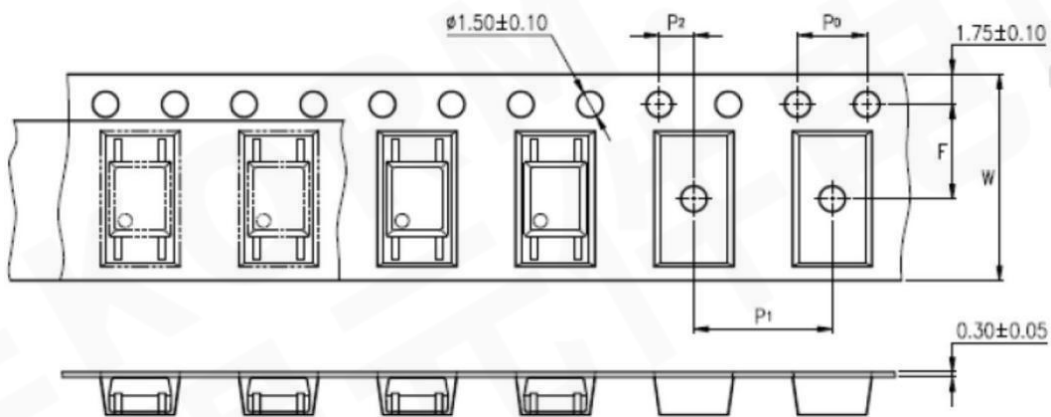
Unit : mm

10. Taping Dimensions

(1) OR-M305X-TP



(2) OR-M305X-TP1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	12±0.3 (0.472)
Pitch of sprocket holes	P0	4±0.1 (0.157)
Distance of compartment	F	5.5±0.1 (0.217)
	P2	2±0.1 (0.079)
Distance of compartment to compartment	P1	8±0.1 (0.315)

Package Type	TP/TP1
Quantities(pcs)	3000

11.Package Dimension

(1) package dimension

Packing Information

Packing Information	
Packing type	Reel type
Tape Width	12mm
Qty per Reel	3,000
Small box (inner) Dimension	345*345*45mm
Max qty per small box	6,000
Large box (Outer) Dimension	480x360x360mm
Max qty per large box	60,000

(2)Packing Label Sample



1. MTL NO:Contents with "Order Information" in the specification.
2. LOT NO:The production cycle of the product.
3. BATCH:The CTR RANK of the product.
4. Quantity:Product packaging quantity.
5. Product Data: The data when product be made.

12. Reliability Test

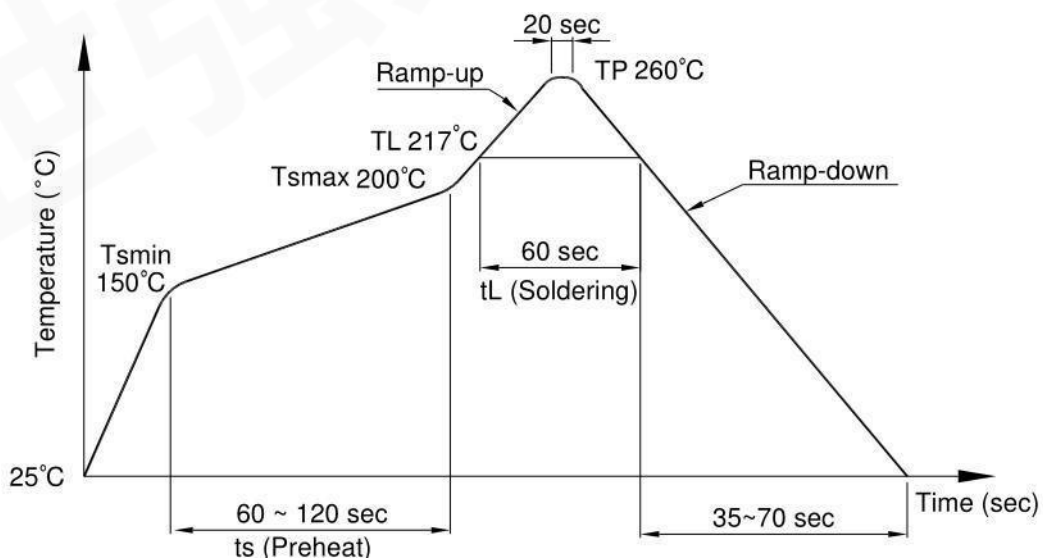
N0.	Item	Condition	Quantity	Cycle	Reference Standards
1	RSH, Resistance to Solder Heat	260±5℃, 10s/cycle	22	3cycles	JESC22A-106
2	SD, Solderability	260±5℃, 2-3s/cycle	22	1cycle	JESD22-B102
3	TC, Temperature Cycle	H: 125℃ 15min ∫ 5min L: -55℃ 15min	77	300cycles	JESC22A-104
4	TS, Thermal Shock	H:100℃ 5min ∫ 15s L:-10℃ 5min	77	300cycles	JESC22A-106
5	LTSL, Low Temperature Storage	T:-55℃	77	1000h	JESD22-A119
6	HTSL, High Temperature Storage	T:125℃	77	1000h	JESC22A-103
7	THB, High Temperature High Humidity	T:85℃ RH: 85%	77	1000h	JESC22A-101
8	HTOL DC Operating Life	T: 110℃ IF=10mA VCC=5V	77	1000h	MIL-STD-750 Method 1037
9	ESD-HBM Human Body Model ESD	Ta=25° C, Reference JESD22-A114	6	1cycle	JESD22-A114

13. Temperature Profile Of Soldering

(1).IR Reflow soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

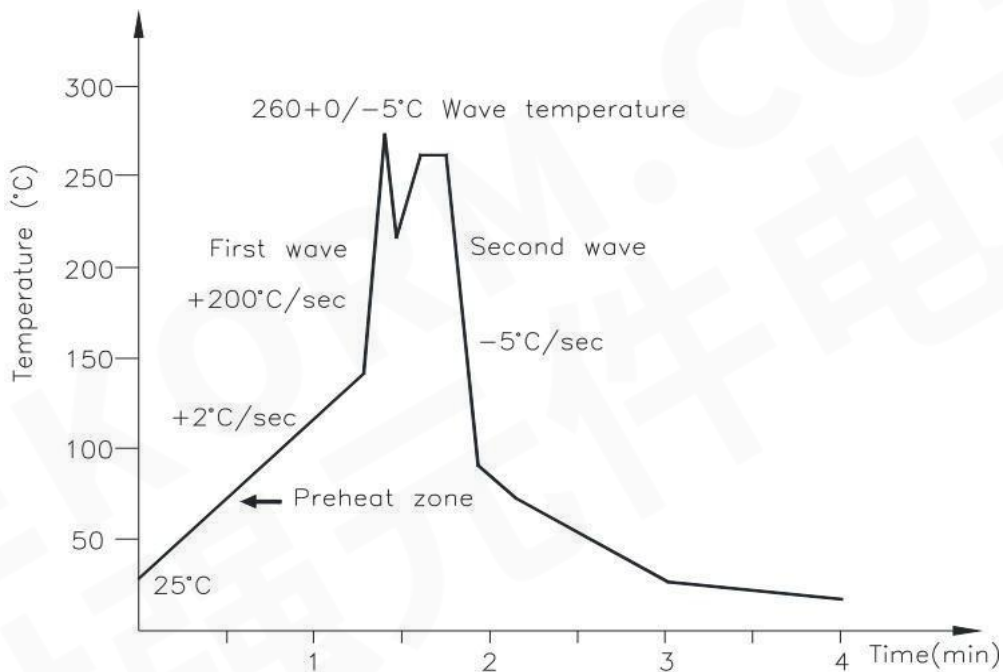
Profile item	Conditions
Preheat	
- Temperature Min (T_{smin})	150°C
- Temperature Max (T_{smax})	200°C
- Time (min to max) (t_s)	90±30 sec
Soldering zone	
- Temperature (T_L)	217°C
- Time (t_L)	60 sec
Peak Temperature(T_P)	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec



(3) .Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature	260+0/-5°C
Time	10 sec
Preheat temperature	5 to 140°C
Preheat time	30 to 80 sec



(3).Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

Temperature	380+0/-5°C
Time	3 sec max

14.CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

Fig.1 Forward current vs Ambient temperature

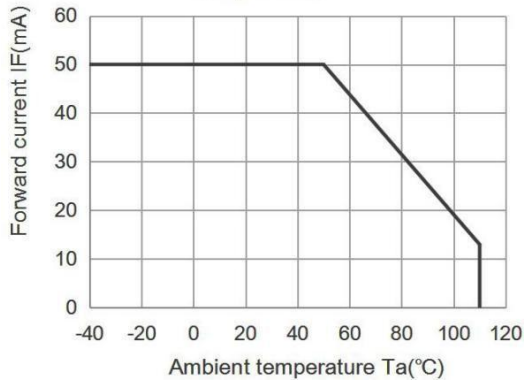


Fig.2 On-state current vs. Ambient temperature

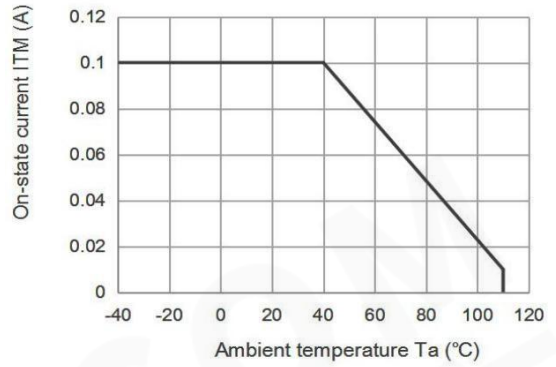


Fig.3 Minimum Trigger Current vs. Ambient temperature

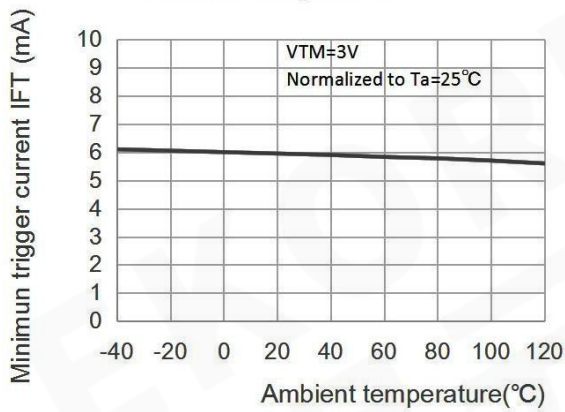


Fig.4 Forward current vs. Forward voltage

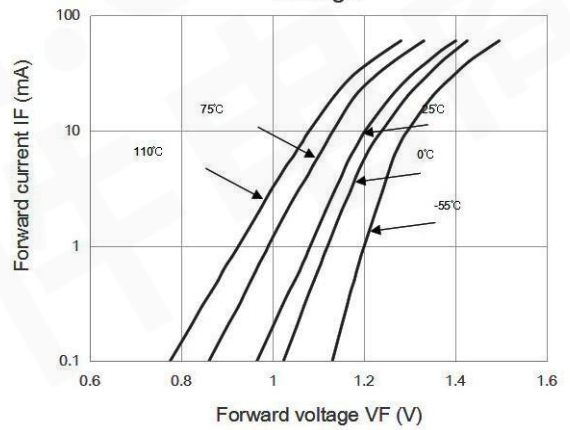


Fig.5 On-state voltage vs. Ambientn temperature

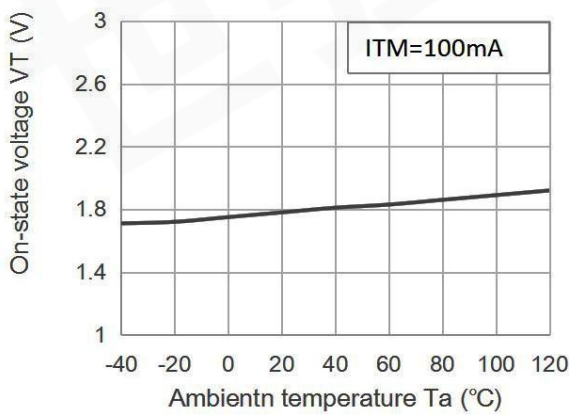


Fig.6 Holding current vs. Ambient temperature

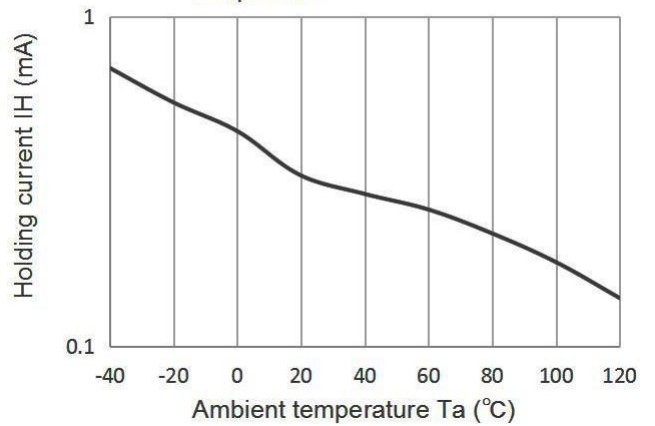


Fig.7 Repetitive peak off-state current vs. Temperature

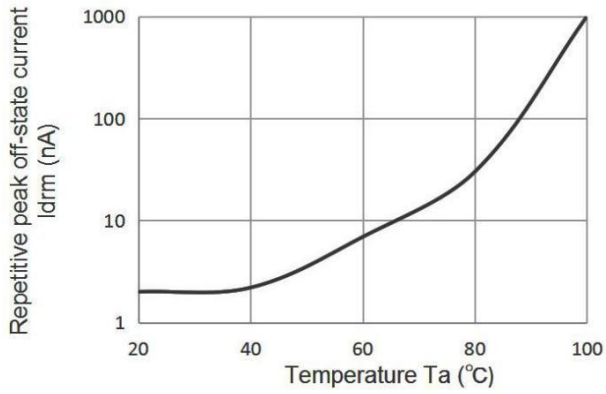
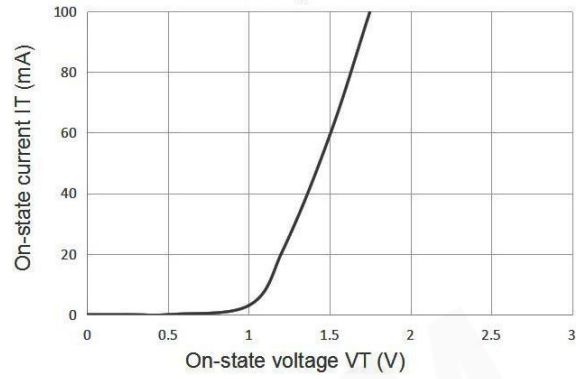
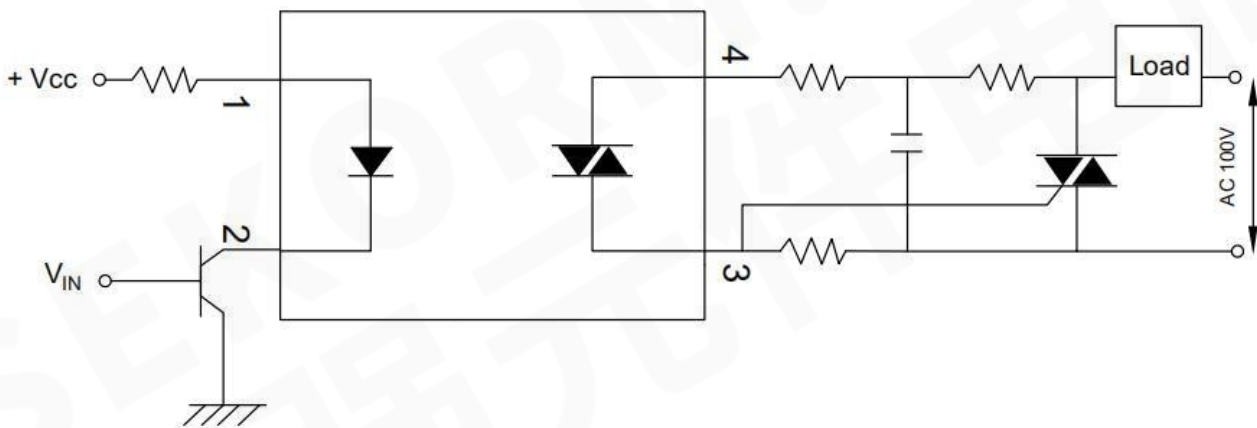


Fig.8 On-state current vs. On-state voltage



Basic Operation Circuit Medium/High Power Triac Drive Circuit



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