



ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-MOC302X

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO., LTD

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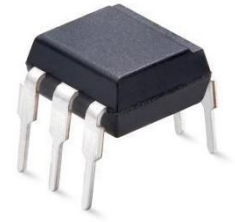
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1. Features

- (1) Isolation voltage between input and output V_{iso} : 5,000V rms
- (2) 6pin non zero-cross optoisolators triac driver output
- (3) High repetitive peak off-state voltage V_{DRM} : Min. 400V
- (4) High critical rate of rise of off-state voltage(dV/dt : MIN. 1000V / s)
- (5) Dual-in-line package : OR-MOC3020, OR-MOC3021, OR-MOC3022, OR-MOC3023
- (6) Wide lead spacing package : OR-MOC3020M, OR-MOC3021M, OR-MOC3022M,OR-MOC3023M
- (7) Surface mounting package : OR-MOC3020S, OR-MOC3021S, OR-MOC3022S, OR-MOC3023S
- (8) Tape and reel packaging :OR- MOC3020S-TA, OR- MOC3021S-TA, OR- MOC3022S-TA, OR- MOC3023S-TA,OR- MOC3020S-TA1, OR- MOC3021S-TA1, OR- MOC3022S-TA1, OR- MOC3023S-TA1



2. Description

The OR-MOC302X consists of a non zero crossing photo triac, optically coupled to a gallium arsenide infrared emitting diode. The OR-MOC302X is housed in the DIP6 package and guarantees insulation thickness. Therefore, the OR-MOC302X 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}	400	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	V_{rms}
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	$I_F=20\text{mA}$	---	1.2	1.6	V	
	Reverse Current	I_R	$V_R=5\text{V}$	---	---	5	μA	
Output	1.Peak Blocking Current, Either Direction	I_{DRM}	$V_{DRM} = 400\text{V}$	---	10	100	nA	
	Peak On-State Voltage, Either Direction	V_{TM}	$I_{TM}=100\text{mA Peak}$	---	1.7	3.0	V	
	2.Critical rate of Rise of Off-State Voltage	dv/dt	$V_{in}=240\text{Vrms}$	1000	---	---	V/us	
Couple	3.Led Trigger Current, Current Required to Latch Output, Either Direction	OR-MOC3020	I_{FT}	Main Terminal Voltage = 3V	---	---	30	mA
		OR-MOC3021			---	---	15	
		OR-MOC3022			---	---	10	
		OR-MOC3023			---	---	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-MOC3020, 15 mA for OR-MOC3021, 10 mA for OR-MOC3022, 5 mA for OR-MOC3023, and absolute max I_F (50mA).



6. Order Information

Part Number

OR-MOC302XY-Z

Note

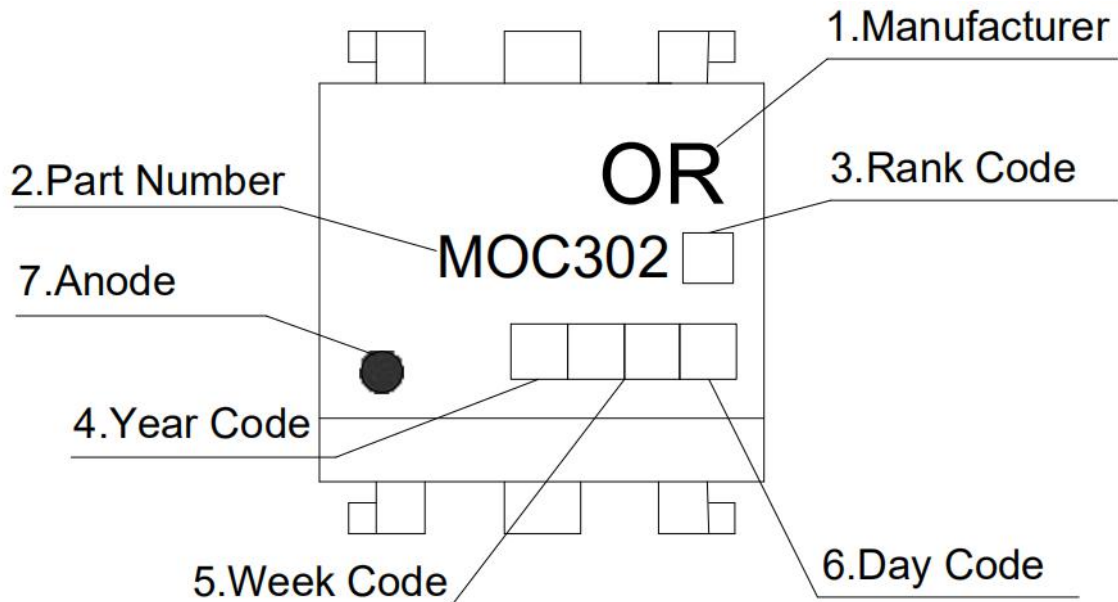
X = IFT Rank (0, 1, 2, 3 or none)
Y = Lead form option (S, M or None)
Z = Tape and reel option (TA,TA1 or none).

* Halogen Free can be selected.

* VDE Code can be selected.

Option	Description	Packing quantity
None	Standard DIP-6	66 units per tube
M	Wide lead bend (0.4 inch spacing)	66 units per tube
S(TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S(TA1)	Surface mount lead form (low profile) + TA1 tape & reel option	1000 units per reel

7. Naming Rule



NOTE:

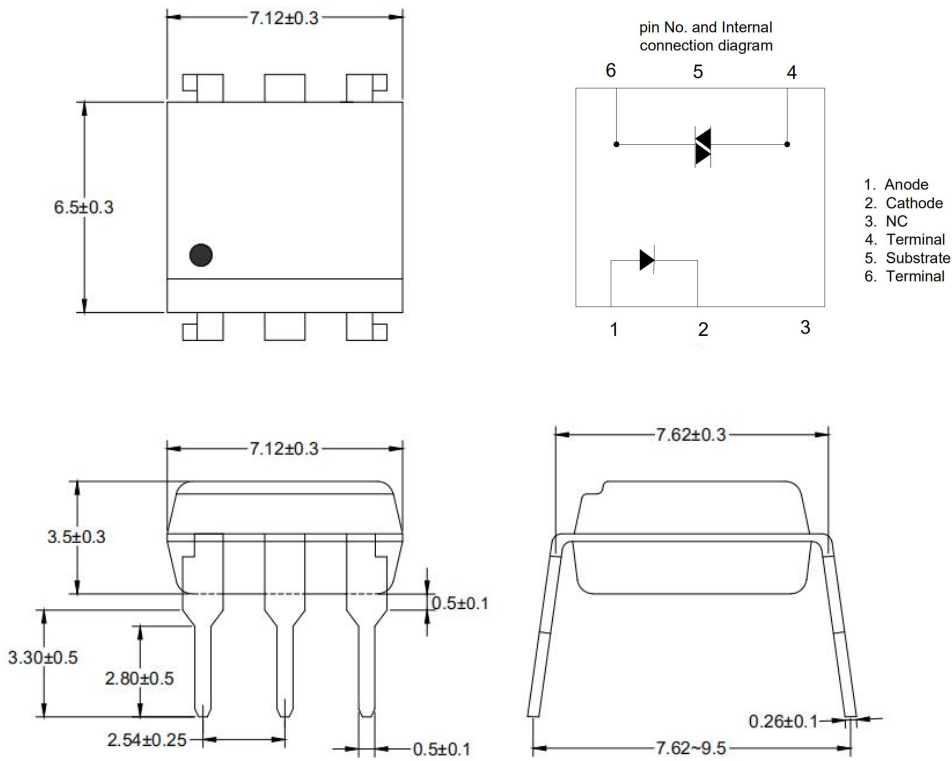
- (1) ORIENT.
- (2) MOC302□□ denotes Device Part Number .
- (3) □ denotes IFT Rank Code ,0=MOC3020; 1=MOC3021; 2=MOC3022; 3=MOC3023.
- (4) □ denotes Year code.
- (5) □□ denotes Week code.
- (6) □ denotes Day code.
- (7) ● denotes Anode

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

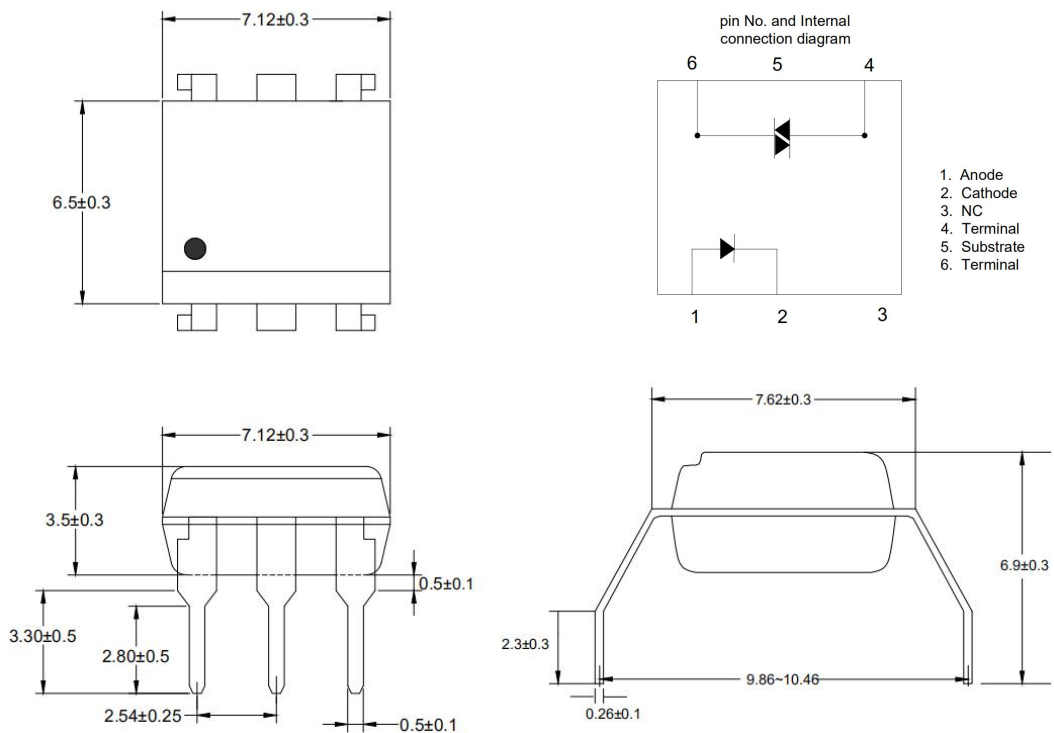
* VDE Code can be selected.

8. Package Dimension

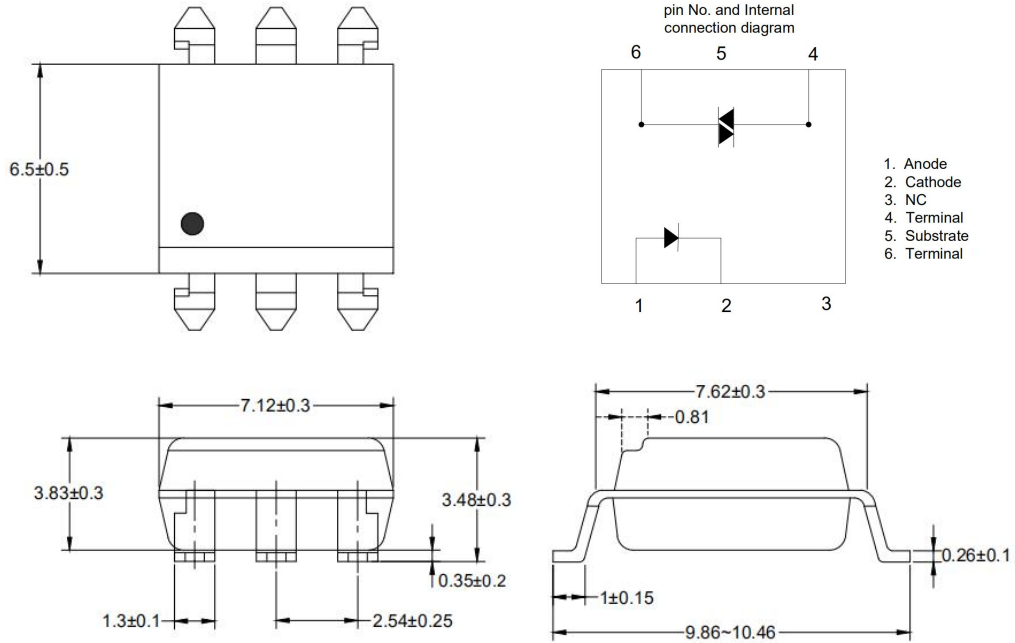
(1).OR-MOC302X



(2).OR-MOC302XM

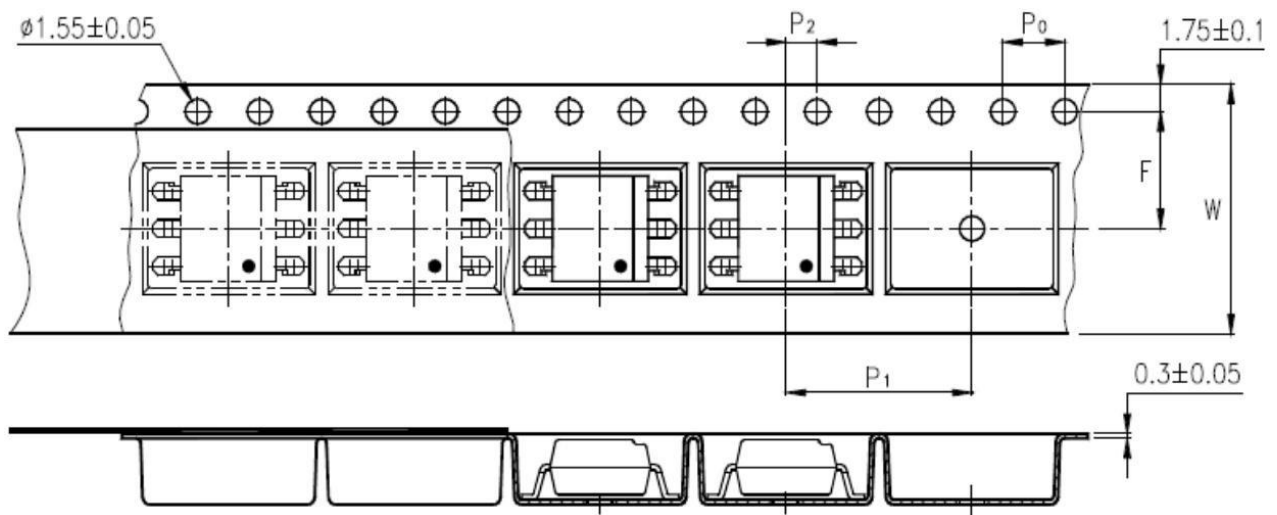


(3). OR-MOC302XS

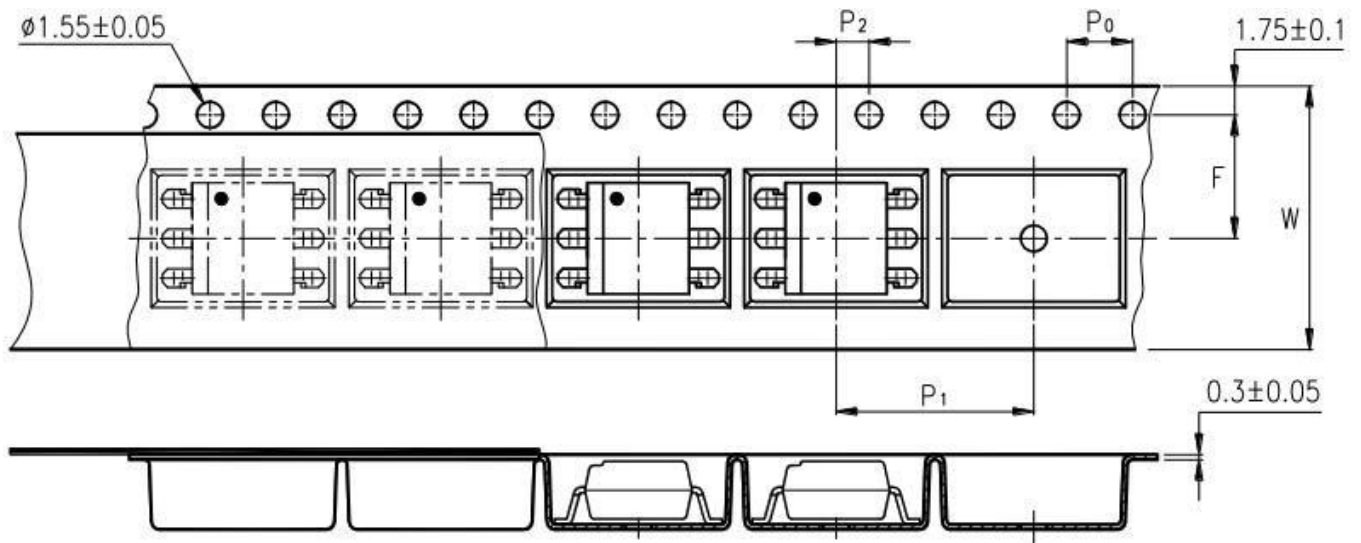


9. Taping Dimensions

(1). OR-MOC302XS-TA



(2). OR-MOC302XS-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16 ± 0.3 (0.63)
Pitch of sprocket holes	P_0	4 ± 0.1 (0.15)
Distance of compartment	F	7.5 ± 0.1 (0.295)
	P_2	2 ± 0.1 (0.079)
Distance of compartment to compartment	P_1	12 ± 0.1 (0.472)

Package Type	OR-MOC302XS series(TA/TA1)
Quantities(pcs)	1000

10.Package Dimension

(1) package dimension

DIP/M type

Packing Information	
Packing type	Tube(Plug)
Qty per Tube	66
Small box (inner) Dimenaion	525*132*60mm
Max qty per small box	3300
Large box (Outer) Dimenaion	530*290*335mm
Max qty per large box	26400

SOP type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	1000
Small box (inner) Dimenaion	345*345*60mm
Max qty per small box	2000
Large box (Outer) Dimenaion	620x360x360mm
Max qty per large box	20000

(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.

11. Reliability Test

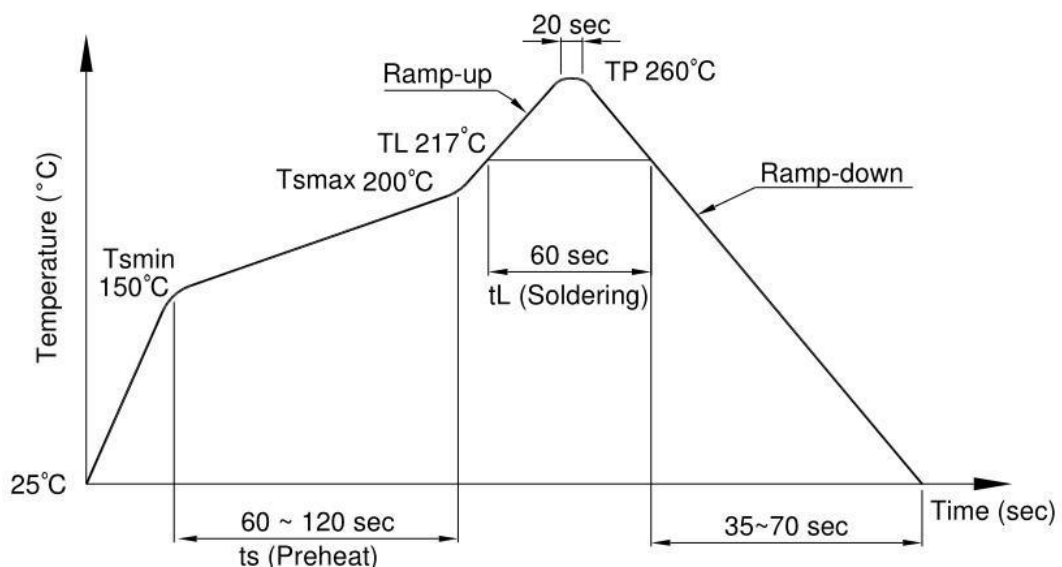
N0.	Item	Condition	Quantity	Cycle	Reference Standards
1	RSH, Resistance to Solder Heat	260±5°C, 10s/cycle	22	3cycles	JESC22A-106
2	SD, Solderability	260±5°C, 2-3s/cycle	22	1cycle	JESD22-B102
3	TC, Temperature Cycle	H: 125°C 15min ∫ 5min L: -55°C 15min	77	300cycles	JESC22A-104
4	TS, Thermal Shock	H:100°C 5min ∫ 15s L:-10°C 5min	77	300cycles	JESC22A-106
5	LTSL, Low Temperature Storage	T:-55°C	77	1000h	JESD22-A119
6	HTSL, High Temperature Storage	T:125°C	77	1000h	JESC22A-103
7	THB, High Temperature High Humidity	T:85°C RH: 85%	77	1000h	JESC22A-101
8	HTOL DC Operating Life	T: 110°C 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

12. 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.

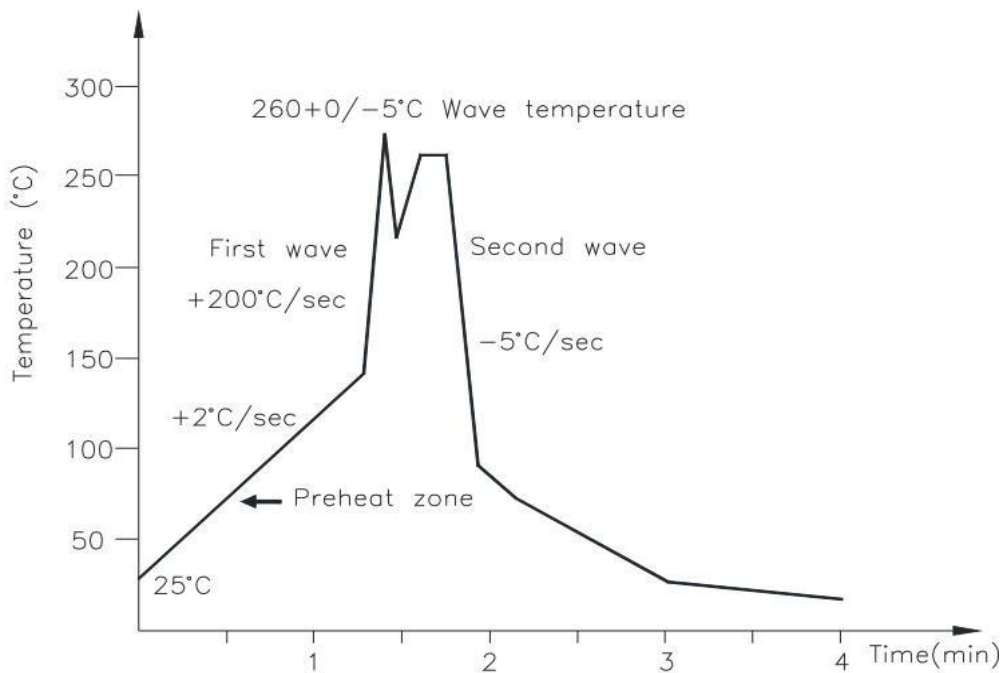
Profile item	Conditions
Preheat	
- Temperature Min (T_{Smin})	150°C
- Temperature Max (T_{Smax})	200°C
- Time (min to max) (t_s)	90±30 sec
Soldering zone	
- Temperature (T_L)	217°C
- Time (t_L)	60 sec
Peak Temperature(T_P)	260°C
Ramp-up rate	3°C / sec max.
Ramp-down rate	3~6°C / sec



(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



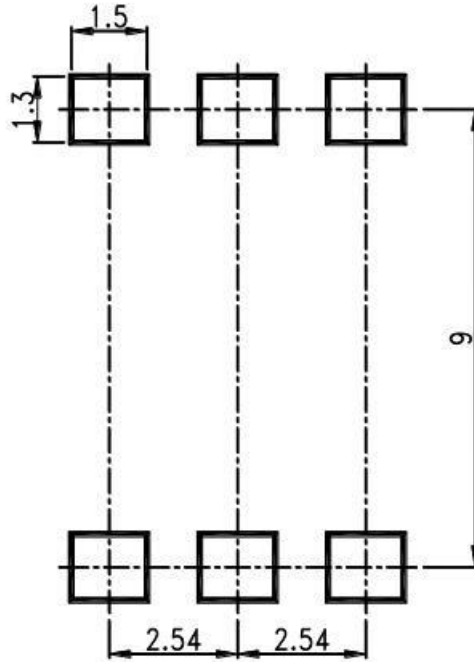
(3).Hand soldering by soldering iron

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

Temperature	380+0/-5°C
Time	3 sec max

13. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

Unit: mm



14.CHARACTERISTICS CURVES (TYPICAL PERFORMANCE)

Fig.1 Forward current vs Ambient temperature

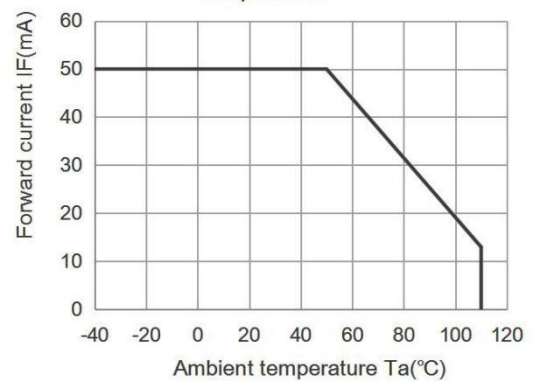


Fig.2 On-state current vs. Ambient temperature

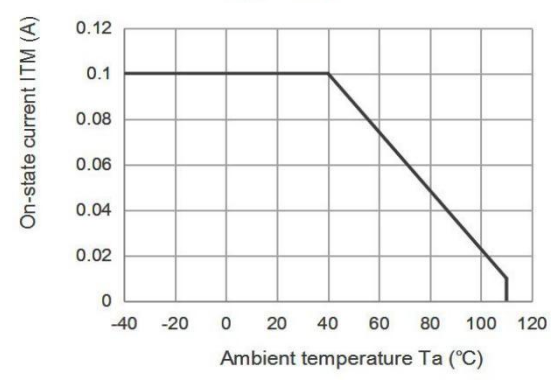


Fig.3 Minimum Trigger Current vs. Ambient temperature

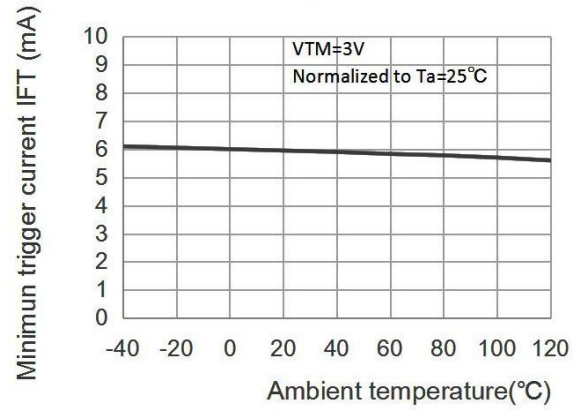


Fig.4 Forward current vs. Forward voltage

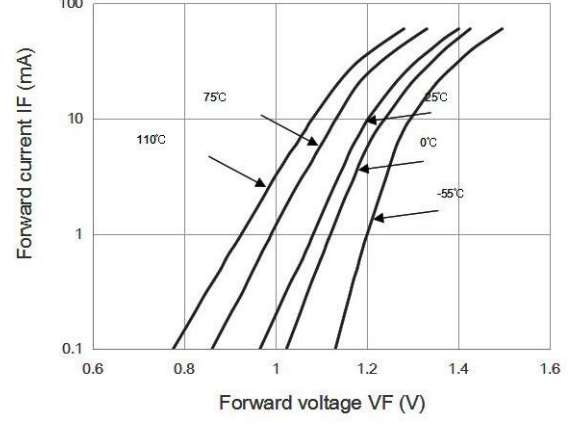


Fig.5 On-state voltage vs. Ambient temperature

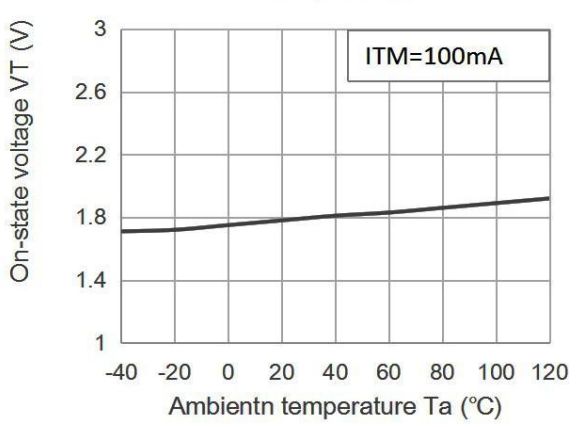


Fig.6 Holding current vs. Ambient temperature

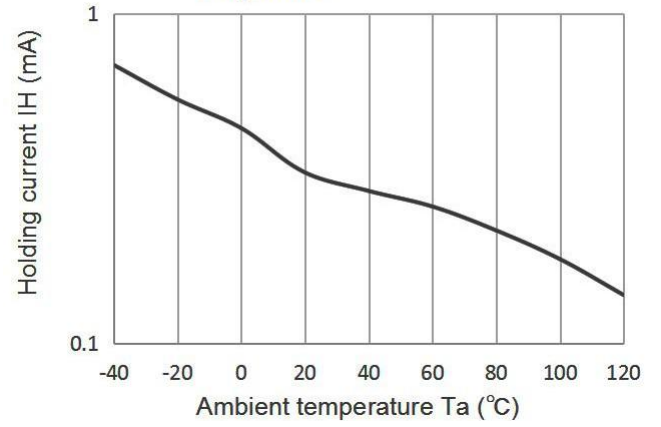


Fig.7 Repetitive peak off-state current vs. Temperature

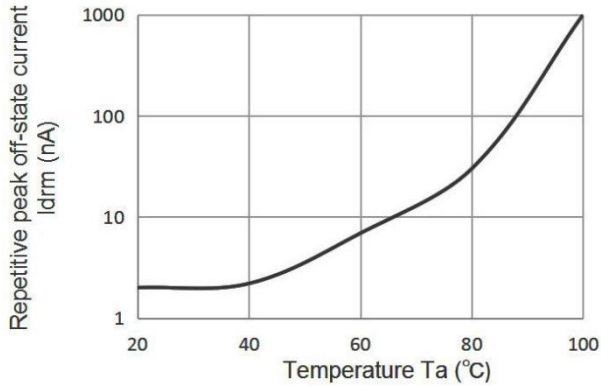
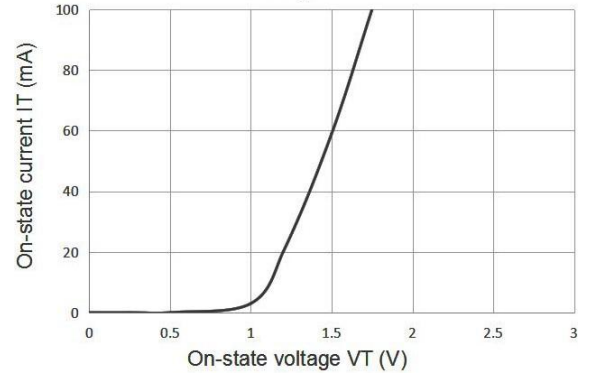


Fig.8 On-state current vs. On-state voltage



Basic Operation Circuit Medium/High Power Triac Drive Circuit

