



# ORIENT

## Photo coupler

### Product Data Sheet

Part Number: OR-MOC302X(A)/305X(A)

Customer: \_\_\_\_\_

Date: \_\_\_\_\_

**SHENZHEN ORIENT COMPONENTS CO., LTD**

Block A 3rd Floor No.4 Building, Tian'an Cyber Park, Huangge Rd, LongGang Dist, Shenzhen, GD

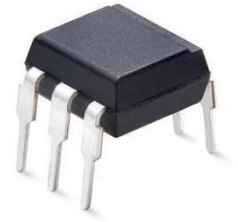
TEL: 0755-29681816

FAX: 0755-29681200

[www.orient-opto.com](http://www.orient-opto.com)

**1. Features**

- (1) High isolation voltage between input and output (Viso:5000 V rms )
- (2) 6pin non-zero-cross optoisolators triac driver output
- (3) High repetitive peak off-state voltage VDRM :  
MOC302X(A): Min. 400V;OMOC305X(A): Min. 600V
- (4) On state RMS current : 300mA.
- (5) High critical rate of rise of off-state voltage( dV/dt : TYP. 800V / μs )
- (6) Have Dual-in-line package;Wide lead spacing package and Surface mounting package .
- (7) Operating temperature -40 °C to +85 °C
- (8) Safety approval



- UL approved(No.E323844)
- VDE approved(No.40029733)
- CQC approved (No.CQC19001231480)

- (9) In compliance with RoHS, REACH standards
- (10) MSL Level 1

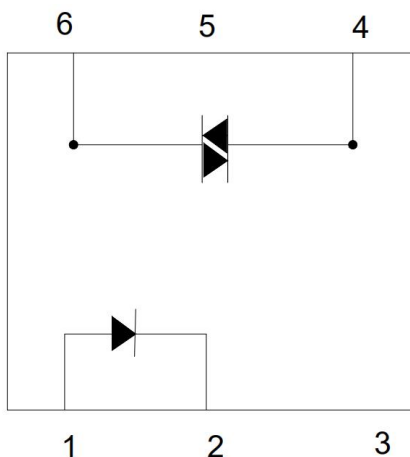
**2. Description**

The OR-MOC302X(A)/OR-MOC305X(A) series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon non zero voltage crossing photo triac.They are designed for use with a discrete power triac in the interface of logic systems , such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.

**3. Application Range**

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

**4. Functional Diagram**



- 1. Anode
- 2. Cathode
- 3. NC
- 4. Terminal
- 5. Substrate
- 6. Terminal

**5. Absolute Maximum Ratings (Ta=25°C)**

Parameter		Symbol	Rateing	Unit	
Input	Forward Current	$I_F$	50	mA	
	Junction Temperature	$T_J$	125	°C	
	Reverse Voltage	$V_R$	6	V	
	Power Dissipation	P	120	mW	
Output	Off-State Output Terminal Voltage	OR-MOC302X(A)	$V_{DRM}$	400	V
		OR-MOC305X(A)		600	
	On-State RMS Current	$I_{T(RMS)}$	300	mA	
	Peak Repetitive Surge Current (PW=1ms, 120 pps)	$I_{TSM}$	3	A	
	Junction Temperature	$T_J$	125	°C	
	Collector Power Dissipation	$P_C$	150	mW	
	Total Power Dissipation	$P_{tot}$	270	mW	
*Insulation Voltage		$V_{iso}$	5000	Vrms	
Working Temperature		$T_{opr}$	-40 ~ + 85	°C	
Deposit Temperature		$T_{stg}$	-55 ~ + 125		
*2 Soldering Temperature		$T_{sol}$	260		

\*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 second

**6. Electrical Optical Characteristics at Ta=25°C**

Parameter		Symbol	Min	Typ.	Max	Unit	Condition	
Input	Forward Voltage	$V_F$	---	1.2	1.6	V	$I_F=20mA$	
	Reverse Current	$I_R$	---	---	5	$\mu A$	$V_R=6V$	
Output	1.Peak Blocking Current, Either Direction	$I_{DRM}$	---	---	1000	nA	$V_{DRM} =$ Rated $V_{DRM}$	
	Peak On-State Voltage, Either Direction	$V_{TM}$	---	---	3.0	V	$I_{TM}=300mA$ Peak	
	2.Critical rate of Rise of Off-State Voltage	dv/dt	---	800	---	V/ $\mu s$	$V_{in}=240V_{rms}$	
Couple	3.Led Trigger Current,Current Required to Latch Output, Either Direction	OR-MOC3020(A) OR-MOC3050(A)	---	---	30	mA	Main Terminal Voltage = 3V	
		OR-MOC3021(A) OR-MOC3051(A)	---	---	15			
		OR-MOC3022(A) OR-MOC3052(A)	$I_{FT}$	---	---			10
		OR-MOC3023(A) OR-MOC3053(A)	---	---	5			
		OR-MOC3024(A) OR-MOC3054(A)	---	---	3			
	Holding Current, Either Direction	$I_H$	---	200	---	$\mu A$		

\*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, OR-MOC3050 and OR-MOC3070, 15 mA for OR-MOC3021, OR-MOC3051 and OR-MOC3071, 10 mA for OR-MOC3022, OR-MOC3052 and OR-MOC3072, 5 mA for OR-MOC3023, OR-MOC3053 and OR-MOC3073, 3 mA for OR-MOC3024, OR-MOC3054 and OR-MOC3074, and absolute max  $I_F$  (50mA).



7. Order Information

Part Number

OR-MOC302X(A)V-W-Y
or OR-MOC305X(A)V-W-Y

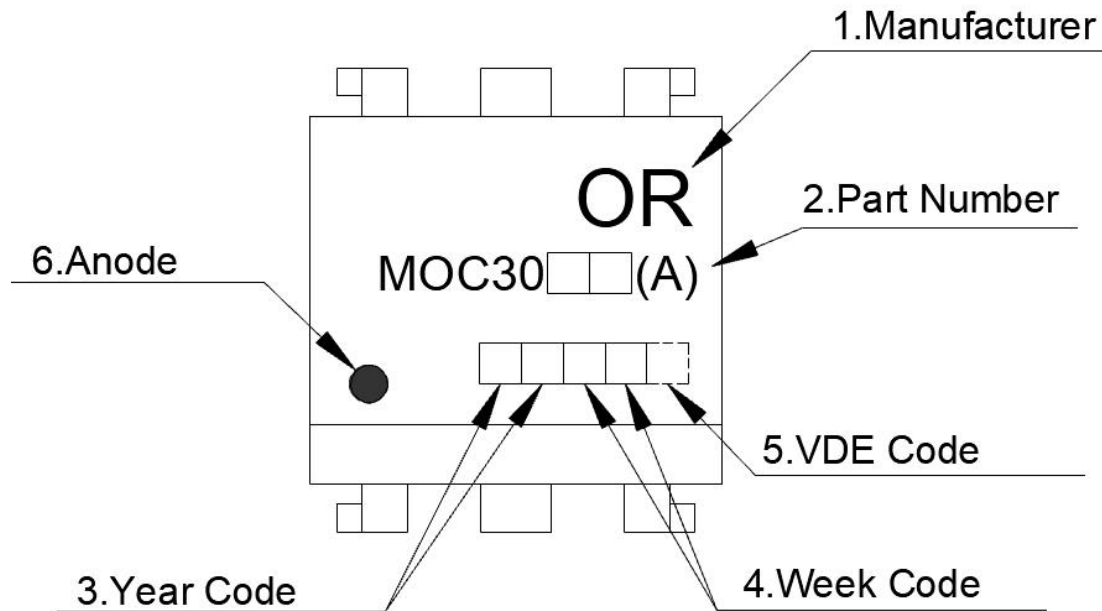
Note

- MOC302/5(A) = Part number.
X = IFT Rank ( 0,1, 2, 3,or 4).
V = Lead form option (S, M or None).
W = Tape and reel option (TA,TA1 or none).
Y = 'V' code for VDE safety (This options is not necessary).

\* VDE Code can be selected.

Table with 3 columns: Option, Description, Packing quantity. Rows include: None (Standard DIP-6, 66 units per tube), M (Wide lead bend, 66 units per tube), S(TA) (Surface mount lead form + TA tape & reel option, 1000 units per reel), S(TA1) (Surface mount lead form + TA1 tape & reel option, 1000 units per reel).

## 8. Naming Rule

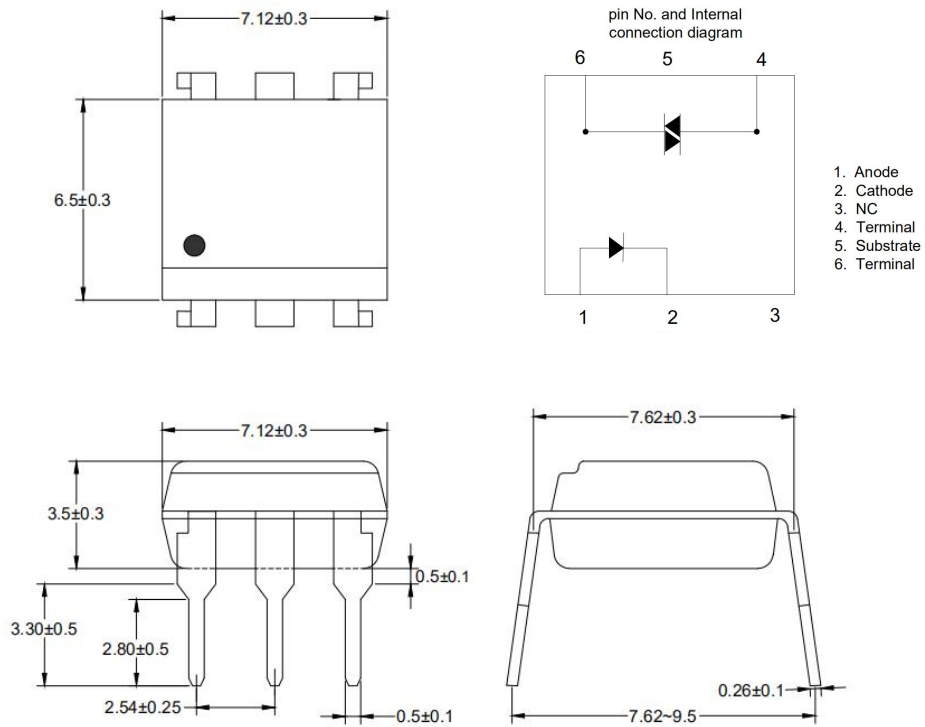


1. Manufacturer : ORIENT.
2. Part Number : MOC30  (A).
3. Year Code  : '21' means '2021' and so on.
4. Week Code : 01 means the first week, 02 means the second week and so on.
5. VDE Code . (Optional)
6. Anode.

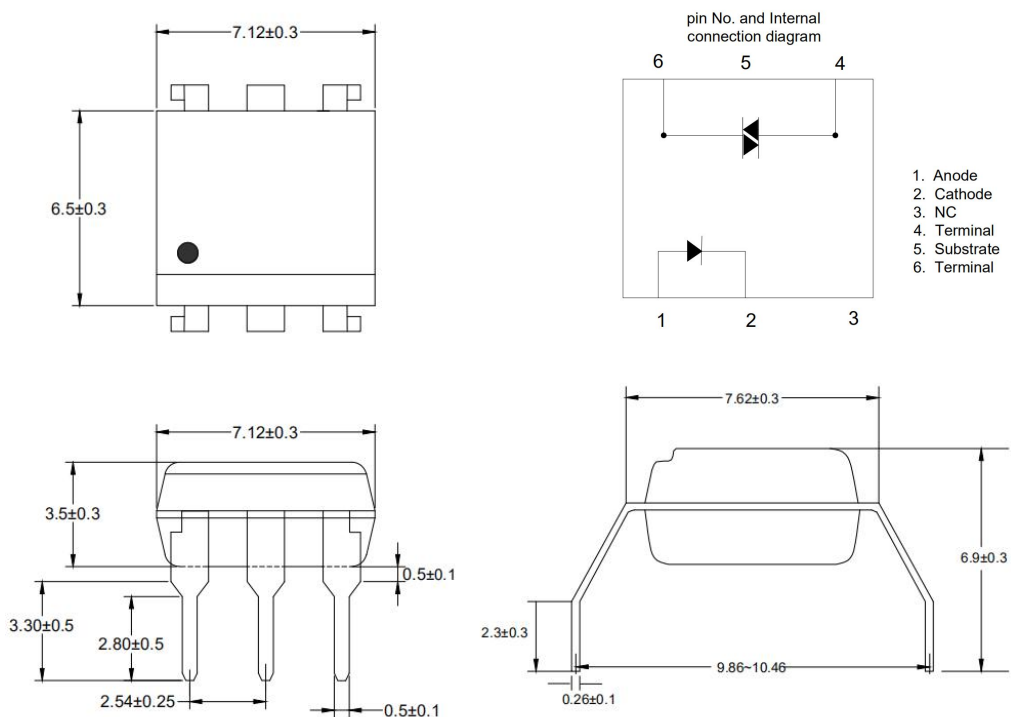
\* VDE Code can be selected.

### 9. Package Dimension

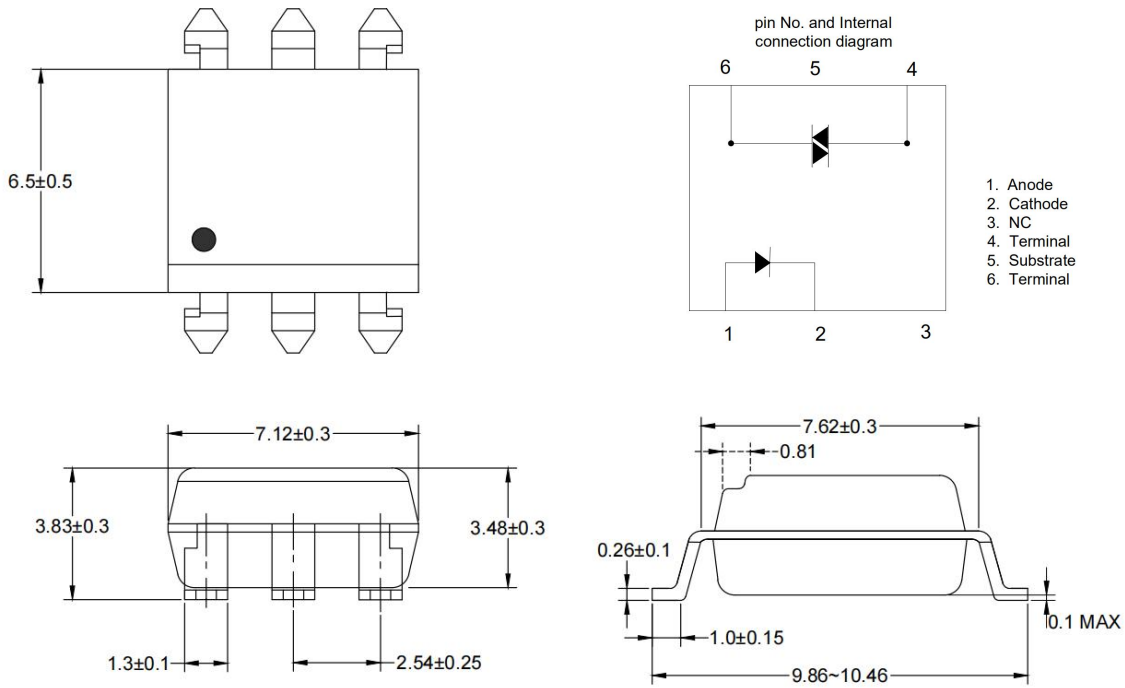
#### (1).MOC30XX(A)



#### (2).MOC30XX M(A)

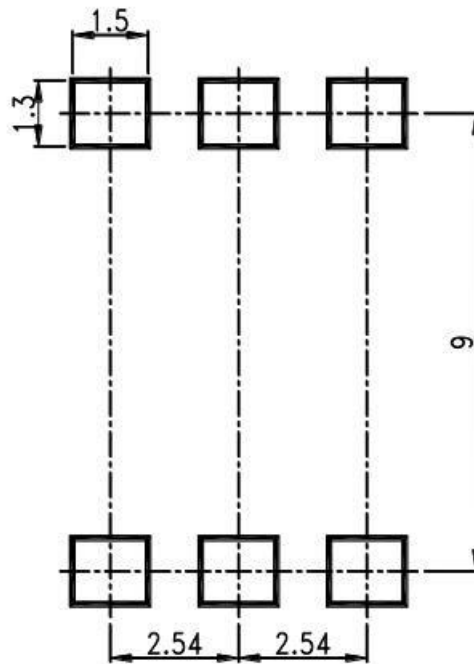


(3).MOC30XX S(A)



10. RRECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)

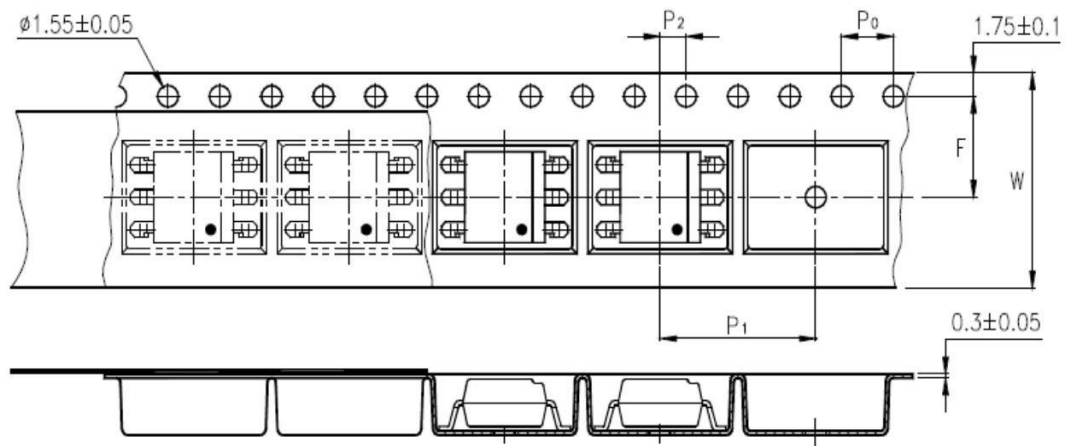
Unit: mm



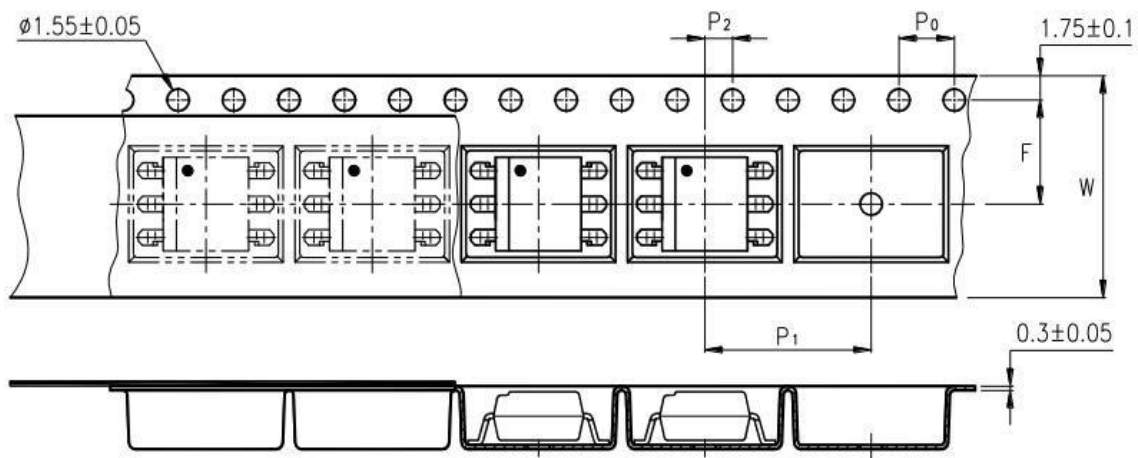


### 11. Taping Dimensions

#### (1)OR-MOC30XXS(A)-TA



#### (2)OR-MOC30XXS(A)-TA1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (0.63)
Pitch of sprocket holes	P <sub>0</sub>	4±0.1 (0.15)
Distance of compartment	F	7.5±0.1 (0.295)
	P <sub>2</sub>	2±0.1 (0.079)
Distance of compartment to compartment	P <sub>1</sub>	12±0.1 (0.472)

Package Type	TA/TA1
Quantities(pcs)	1000

## 12. Package Dimension

### (1) package dimension





DIP Type

Packing Information	
Packing type	Tube
Qty per Tube	66pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	3,300pcs
The Amount per Outer Box	33,000pcs

SOP Type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	1,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	2,000pcs
Max qty per large box	20,000pcs

### (2)Packing Label Sample

 <p>Material Code : 120PCXXXXXX          P/N : OR-XXXXXX          Lot No. : XXXXXX-XXXXX-TX-X          D/C : XXXX          Qty : XXXX PCS</p>	  
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 40%;">内箱码</div> <div style="border: 1px solid black; padding: 5px; width: 40%;">外箱码</div> </div> <p>“XXXXXXXXXXXXXXXXXX” (一体机序列码)  <b>Made in China</b></p>	

**Note:**

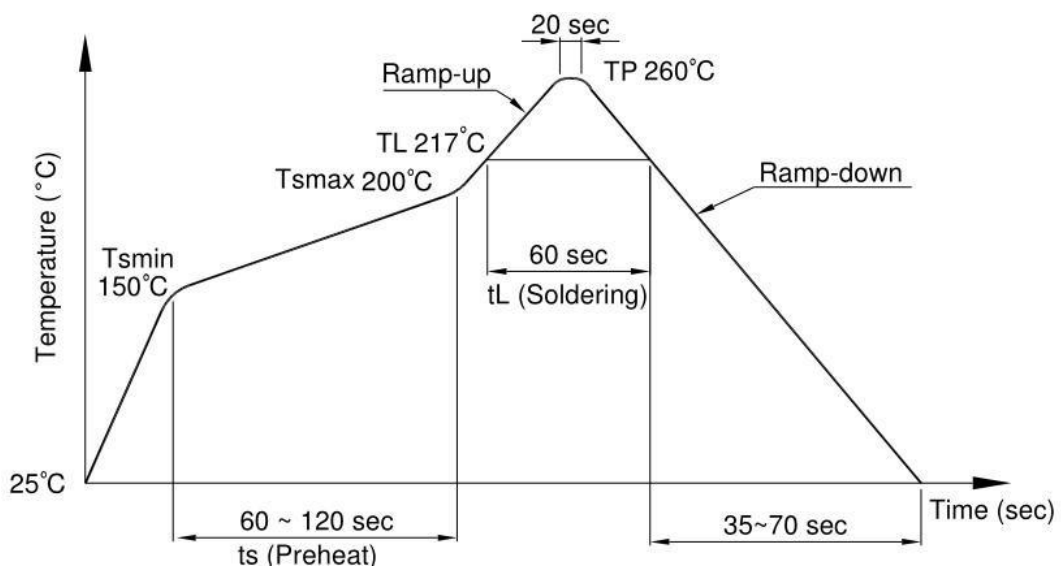
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

### 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.

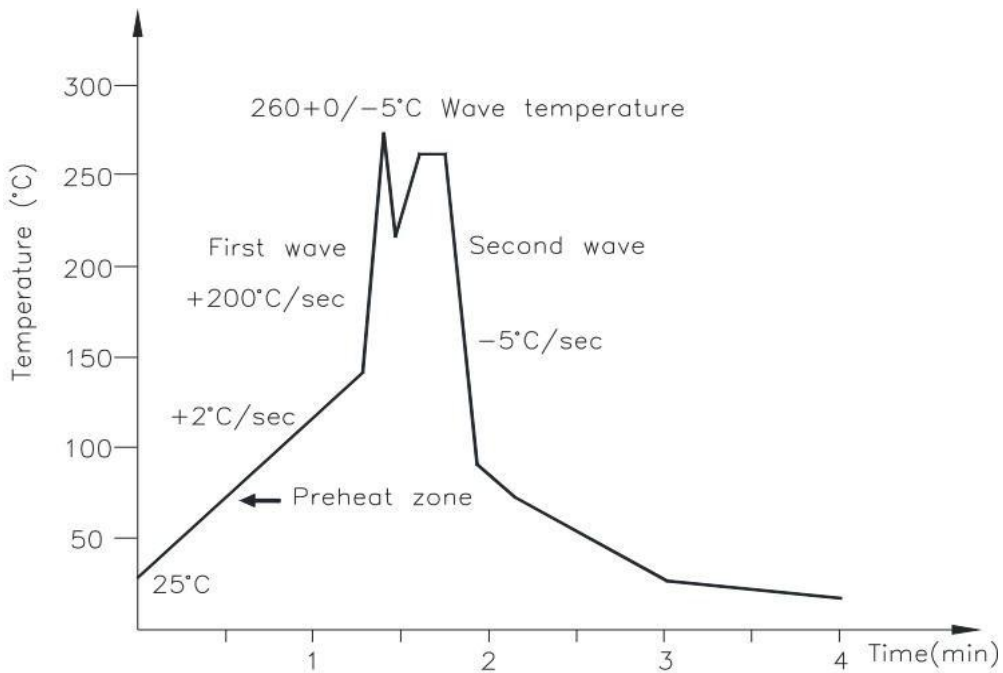
Profile item	Conditions
Preheat	
- Temperature Min (T Smin )	150°C
- Temperature Max (T Smax )	200°C
- Time (min to max) (ts)	90±30 sec
Soldering zone	
- Temperature (TL )	217°C
- Time (t L )	60 sec
Peak Temperature	260°C
Peak Temperature time	20 sec
Ramp-up rate	3°C / sec max.
Ramp-down rate from peak temperature	3~6°C / sec
Reflow times	≤3



**(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

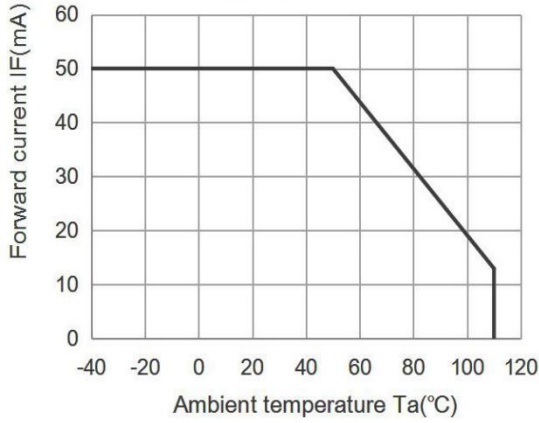


Fig.2 On-state current ITM (A) vs. Ambient temperature

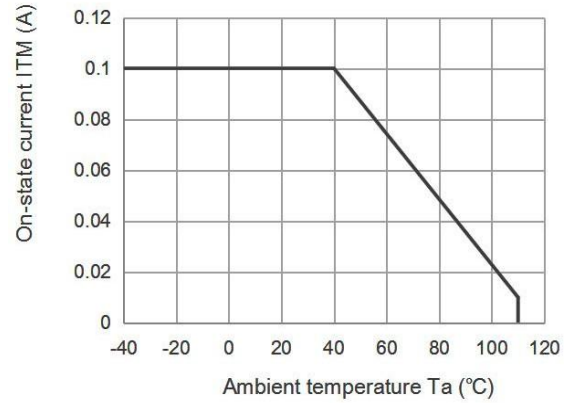


Fig.3 Minimum Trigger Current vs. Ambient temperature

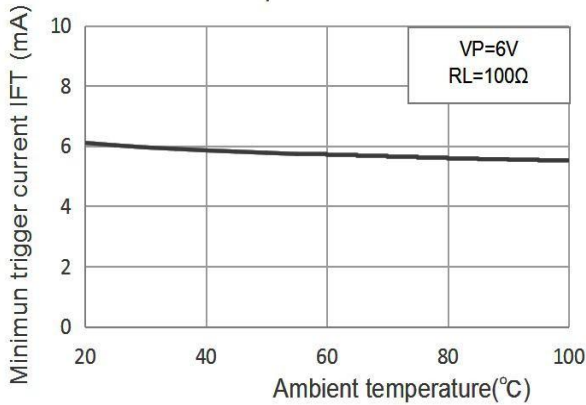


Fig.4 Forward current vs. Forward voltage

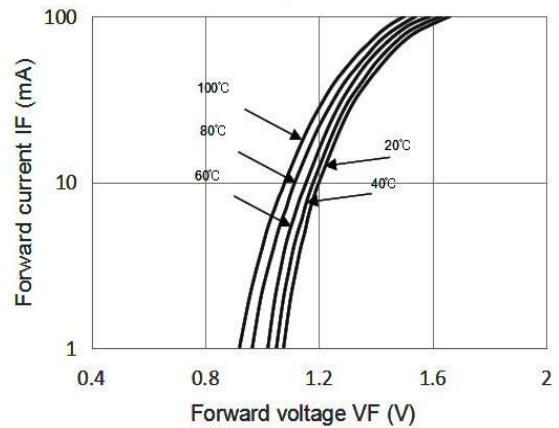


Fig.5 On-state voltage vs. Ambient temperature

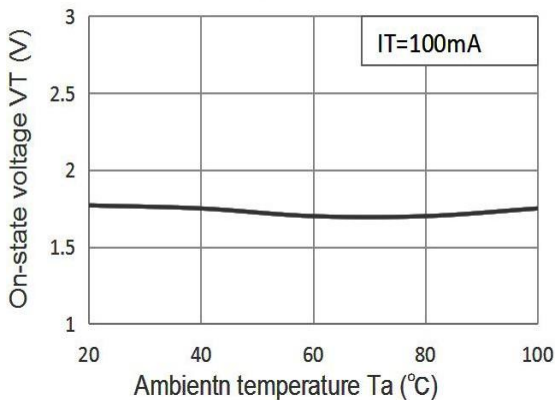


Fig.6 Holding current vs. Ambient temperature

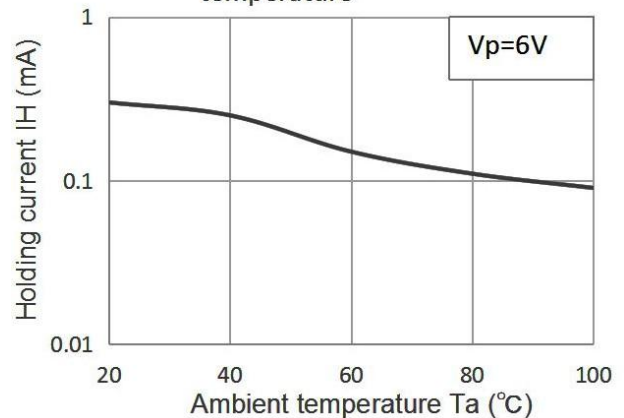


Fig.7 Repetitive peak off-state current vs. Temperature

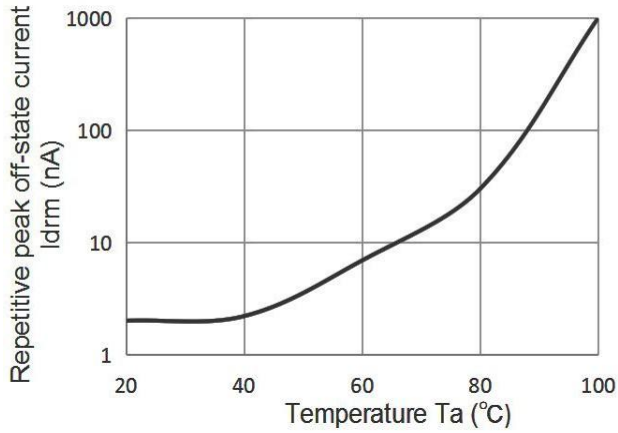
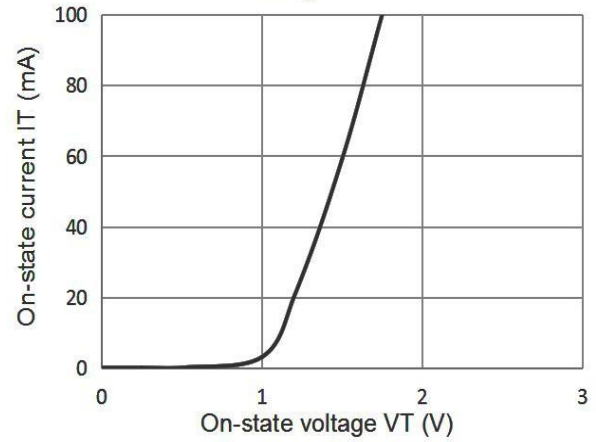


Fig.8 On-state current vs. On-state voltage



### Basic Operation Circuit

### Medium/High Power Triac Drive Circuit

