ORIENT

Photo coupler

Product Data Sheet

Part Number: OR-T302X_OR-T305X

Customer: _____

Date: _____

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1. Features



(1) High isolation voltage between input and output (Viso:5000 V rms)
(2) 4pin non-zero-cross optoisolators triac driver output
(3) High repetitive peak off-state voltage V_{DRM} :
OR-T302X: Min. 400V;OR-T305X: Min. 600V
(4) High critical rate of rise of off-state voltage(dV/dt : TYP. 800V /s)
(5) Dual-in-line package;Wide lead spacing package; Surface mounting package.
(6) Operating temperature -40 ℃ to +110 ℃
(7) Safety approval

UL	approved (No.E323844)
VDE	approved(No.40029733)
CQC	approved (No.CQC09001029446)

(8) In compliance with RoHS, REACH standards
(9) MSL Class I

2. Description

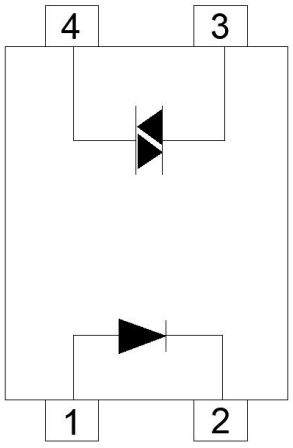
The OR-T302X/305X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon random phase photo Triac.

They are designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 115 to 240 VAC operations.

3. Applications

- Solenoid/valve controls
- Lamp ballasts
- Static AC power switch
- Incandescent lamp dimmers
- Temperature controls
- Motor controls
- Interfacing microprocessors to 115 to 240Vac peripherals

4. Functional Diagram



pin No. and Internal connection diagram

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

5. Absolute Maximum Ratings at Ta=25℃

Parameter			Symbol	Rated Value	Unit
Input	Forward Current		I_F	50	mA
	Junction Temperature		T_J	125	℃
	Reverse Voltage		V_R	6	V
	Power Dissipation		P	100	mW
Output	Off-State Output Terminal Voltage	OR-T302X	V_{DRM}	400	V
		OR-T305X		600	
	On state RMS current		$I_{T(RMS)}$	100	mA(RMS)
	Peak Repetitive Surge Current (PW=1ms，120 pps)		I_{TSM}	1	A
	Junction Temperature		T_J	125	℃
	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	℃
Deposit Temperature			T_{stg}	-55 ~ + 125	
*2 Soldering Temperature			T_{sol}	260	

(1) *1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 & 2 are shorted together, and pins 3 & 4 are shorted together.
(2) *2 For 10 seconds

6. Electro-Optical Characteristics (Ta=25℃ unless specified otherwise)

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	μA	V_R=6V
Output	Peak Blocking Current, Either Direction		I_{DRM}	---	---	500	nA	V_{DRM} = Rated V_{DRM}
	Peak On-State Voltage, Either Direction		V_{TM}	---	---	3.0	V	ITM=100mA Peak
	Critical rate of Rise of Off-State Voltage		dv/dt	---	100	---	V/μs	V_{PEAK} =Rated V_{DRM},
				---	800	---		V_{PEAK}=400Vrms
Couple	3.Led Trigger Current,Current Required to Latch Output, Either Direction	OR-T3020 OR-T3050	I_{FT}	---	---	30	mA	Main Terminal Voltage = 3V
		OR-T3021 OR-T3051		---	---	15		
		OR-T3022 OR-T3052		---	---	10		
		OR-T3023 OR-T3053		---	---	5		
		OR-T3024 OR-T3054		---	---	3		
	Holding Current, Either Direction		I_H	---	200	---	μA	

* Typical values at T_a = 25℃

7. Order Information

Part Number

OR-T302XU-W-Y-Z
OR-T305XU-W-Y-Z

Note

T302X/305X = Part number(X = 0,1,2,3 or 4)

U = Lead form option (S, M or none)

W = Tape and reel option (TP,TP1 or none).

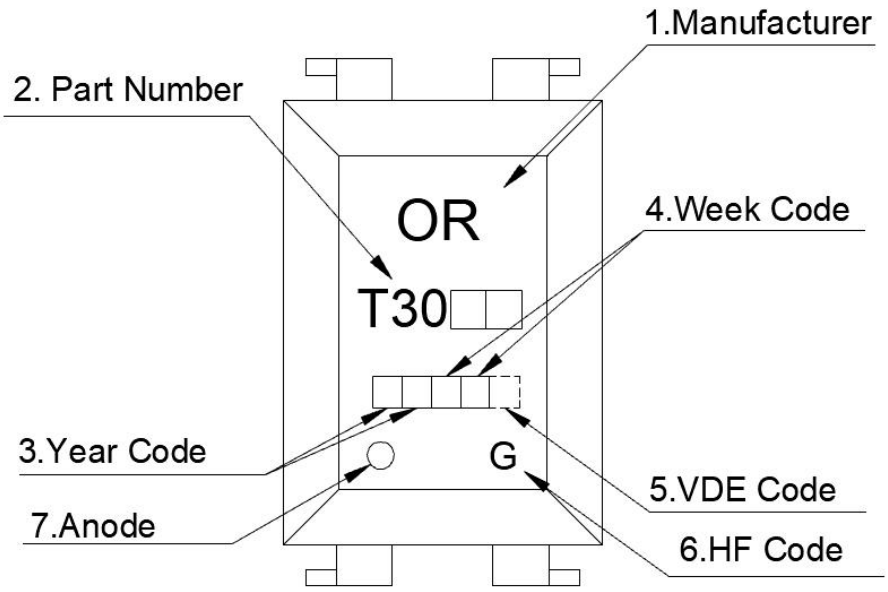
Y = VDE code. (This options is not necessary)

Z = 'G' code for Halogen free.

* VDE code can be selected.

Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S(TP)	Surface mount lead form (low profile) + TP tape & reel option	2000 units per reel
S(TP1)	Surface mount lead form (low profile) + TP1 tape & reel option	2000 units per reel

8. Naming Rule

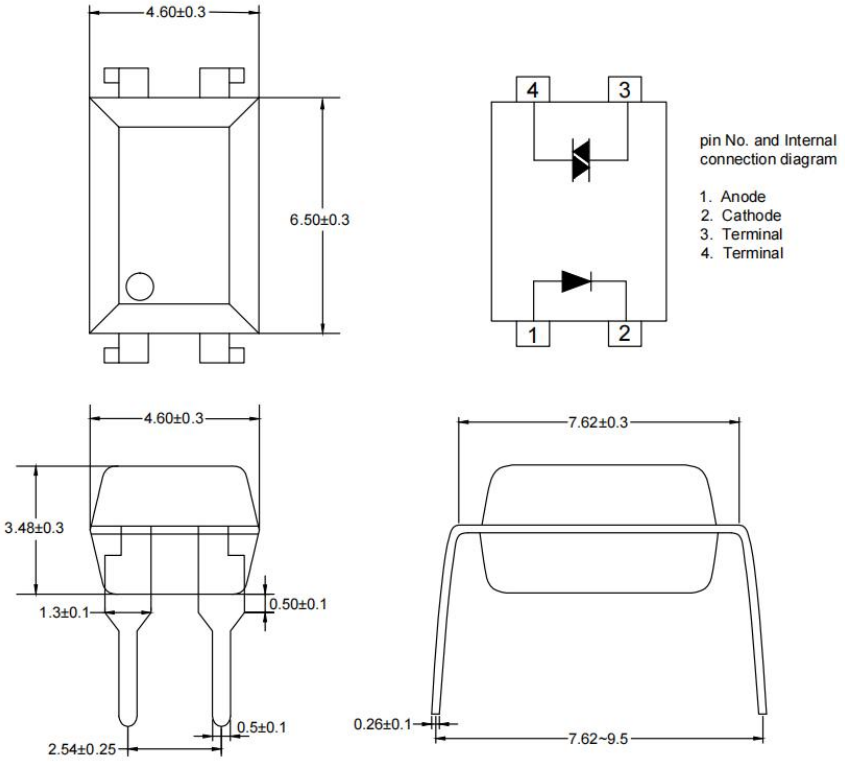


1. Manufacturer.
2. Part Number : T30□□.
3. Year Code □ ： '1' means '2021' and so on.
4. Week Code □□： 01 means the first week, 02 means the second week and so on.
5. VDE Code ⬚. (Optional)
6. HF Code G : Halogen Free.
7. Anode.

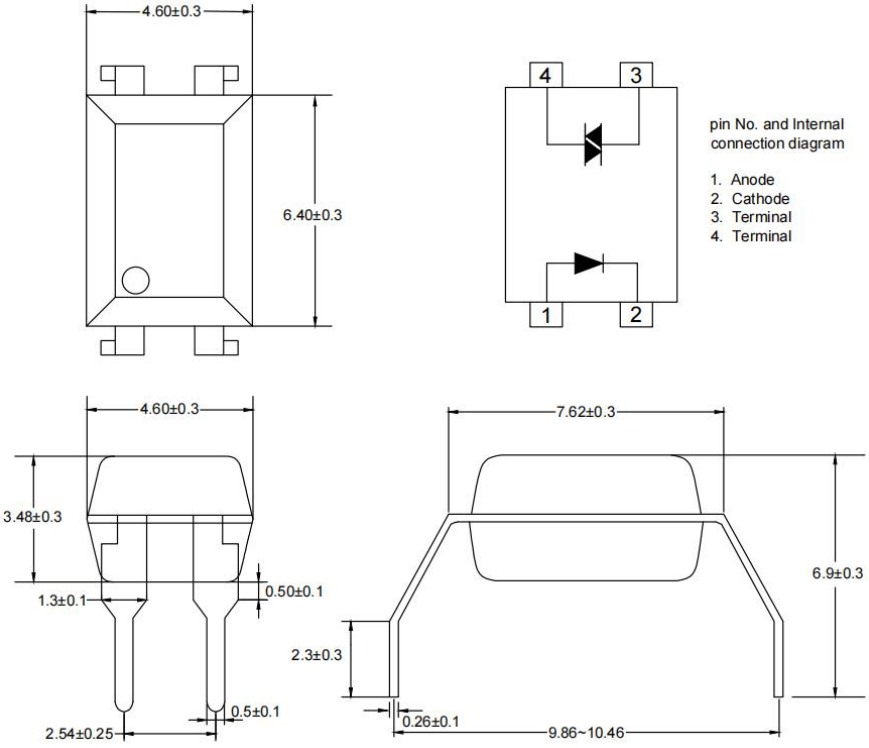
* VDE Code can be selected.

9. Package Dimension (Unit：mm）

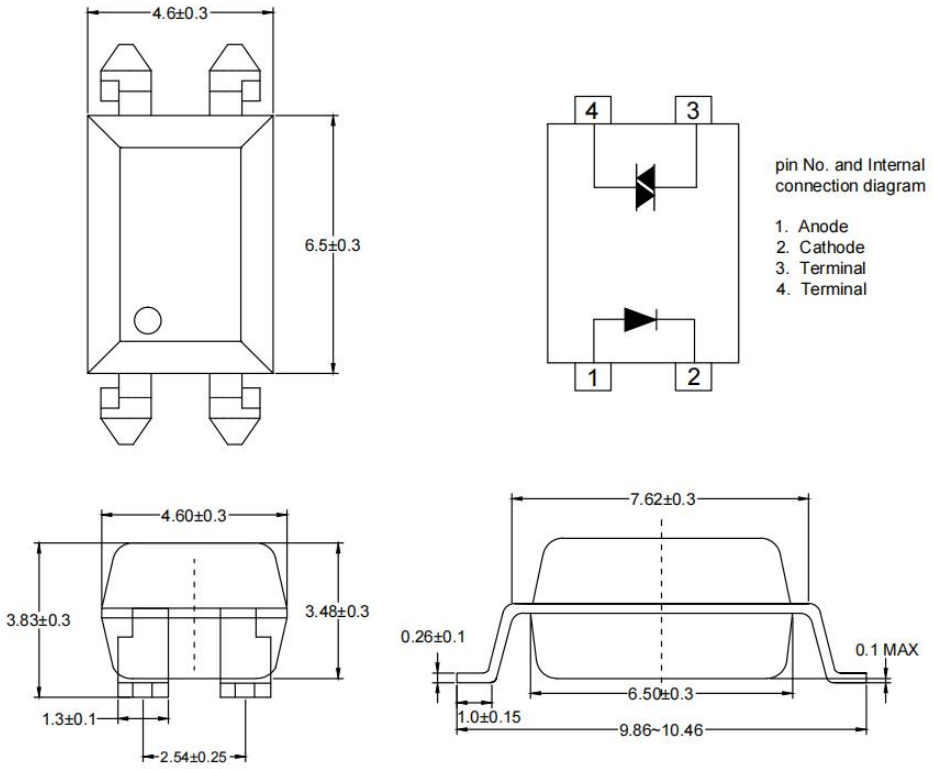
(1) OR-T30XX



(2) OR-T30XXM

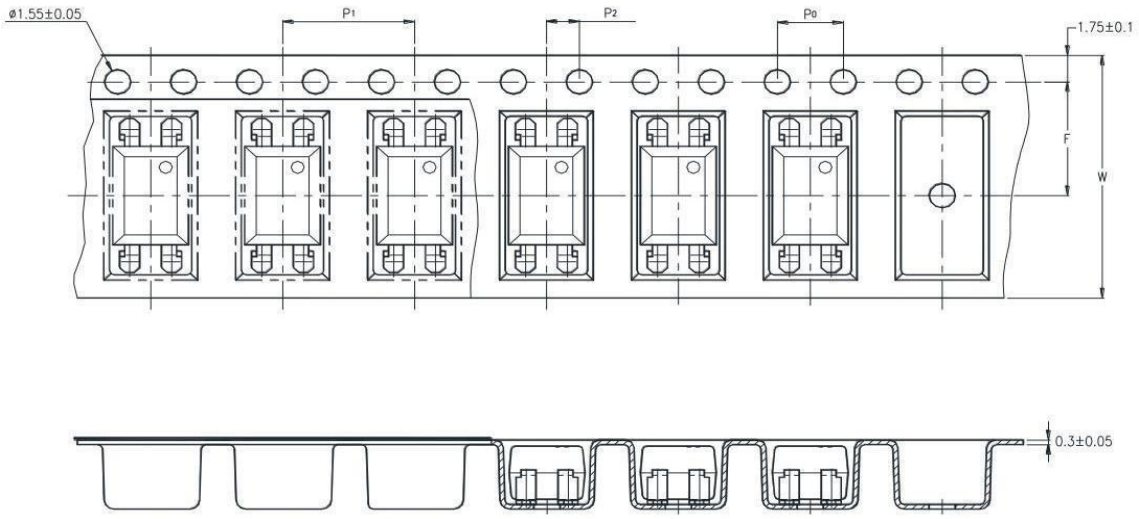


(3) OR-T30XXS

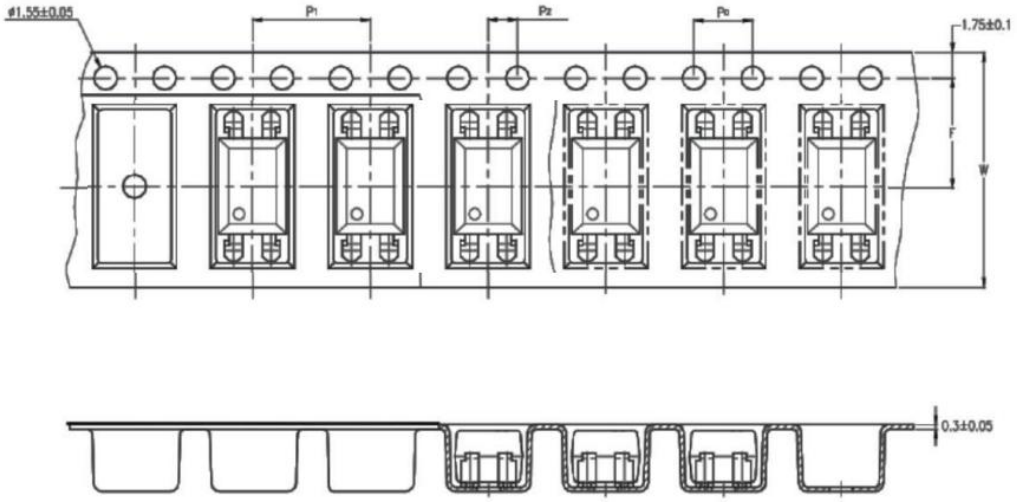


10. Taping Dimensions

(1)OR-T30XXS-TP



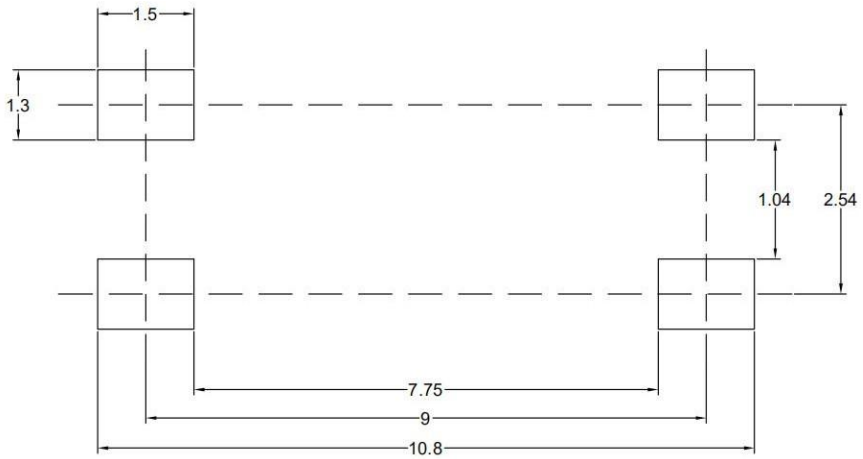
(2)OR-T30XXS-TP1



Description	Symbol	Dimension in mm (inch)
Tape wide	W	16±0.3 (.63)
Pitch of sprocket holes	P_0	4±0.1 (.15)
Distance of compartment	F	7.5±0.1 (.295)
	P2	2±0.1 (.0079)
Distance of compartment to compartment	P1	8±0.1 (.472)

Package Type	TP/TP1
Quantities(pcs)	2000

11. Recommended Foot Print Patterns (Mount Pad) (Unit：mm）



12. Package Dimension

(1) package dimension

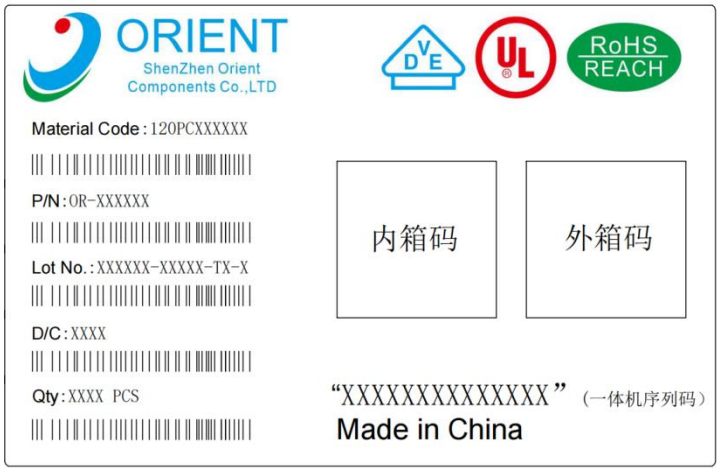
DIP Type

Packing Information	
Packing type	Tube
Qty per Tube	100pcs
Small box (Inner) Dimension	525*128*60mm
Large box (Outer) Dimension	545*290*335mm
The Amount per Inner Box	5,000pcs
The Amount per Outer Box	50,000pcs

SOP Type

Packing Information	
Packing type	Reel type
Tape Width	16mm
Qty per Reel	2,000pcs
Small box (inner) Dimension	345*345*58.5mm
Large box (Outer) Dimension	620x360x360mm
Max qty per small box	4,000pcs
Max qty per large box	40,000pcs

(2)Packing Label Sample



Note:

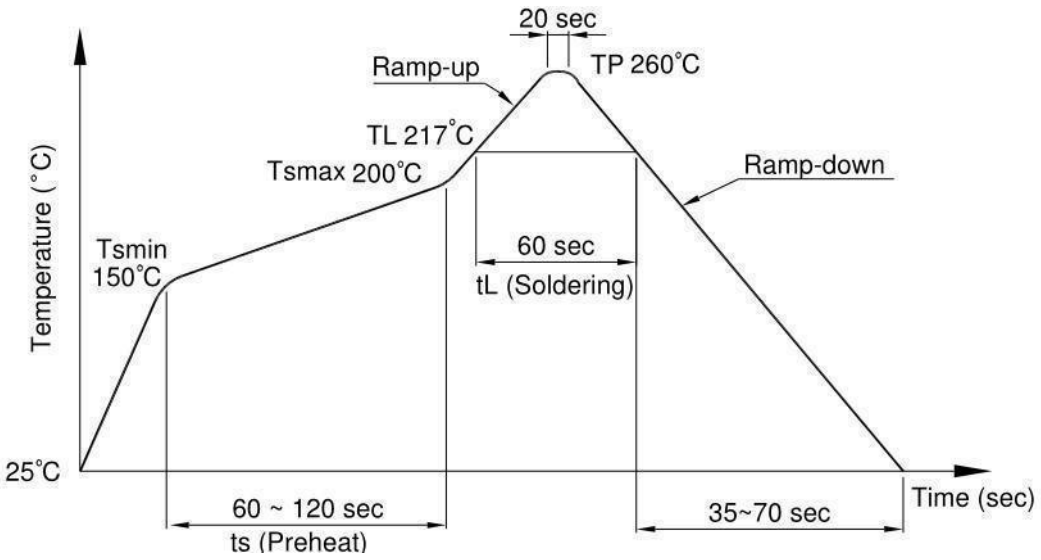
1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

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.

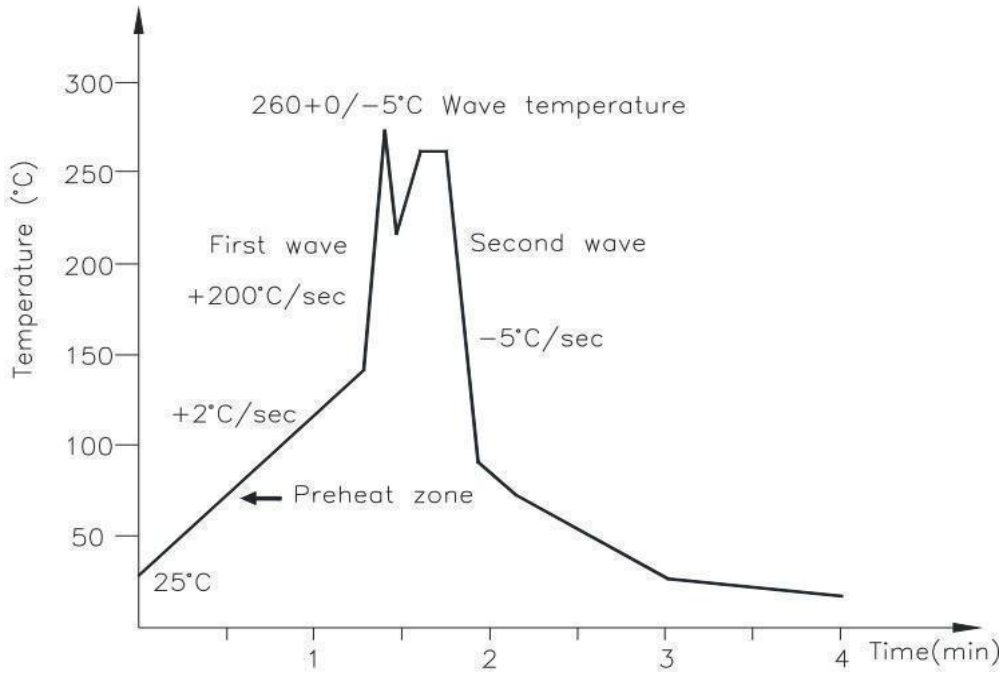
Profile item	Conditions
Preheat - Temperature Min (T Smin) - Temperature Max (T Smax) - Time (min to max) (ts)	 150˚C 200˚C 90±30 sec
Soldering zone - Temperature (TL) - Time (t L)	 217˚C 60 sec
Peak Temperature	260˚C
Peak Temperature time	20 sec
Ramp-up rate	3˚C / sec max.
Ramp-down rate from peak temperature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



(2).Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

Temperature Time	260+0/-5˚C 10 sec
Preheat temperature Preheat time	25 to 140˚C 30 to 80 sec



(3).Hand soldering by soldering iron

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

Temperature Time	380+0/-5˚C 3 sec max

14. Characteristics Curves

Fig.1 Forward current vs Ambient temperature

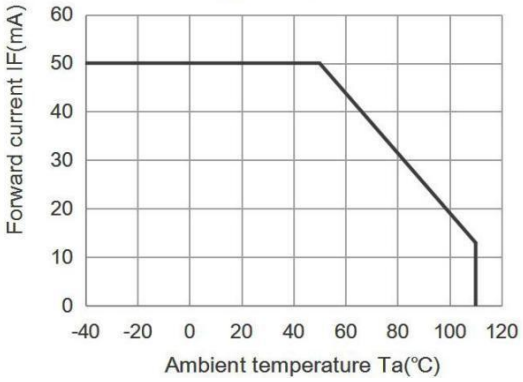


Fig.2 On-state current vs. Ambient temperature

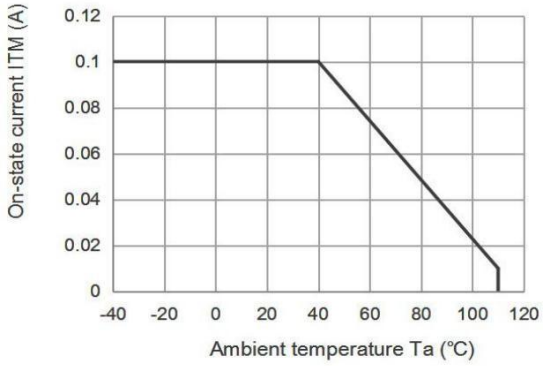


Fig.3 Minimun Trigger Current vs. Ambient temperature

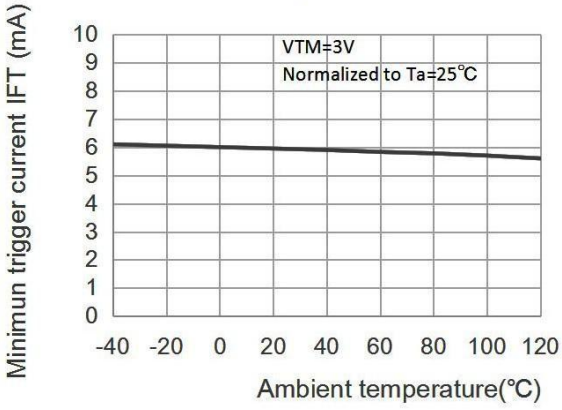


Fig.4 Forward current vs. Forward voltage

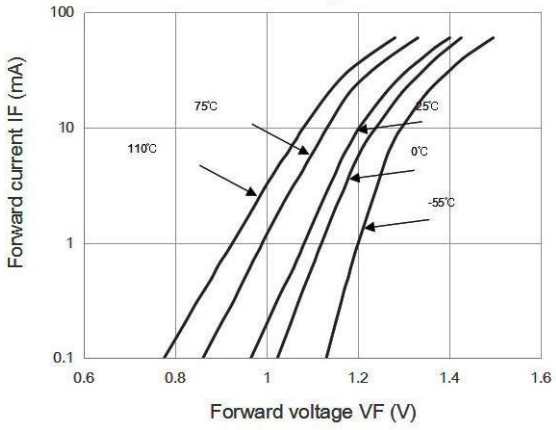


Fig.5 On-state voltage vs. Ambientn temperature

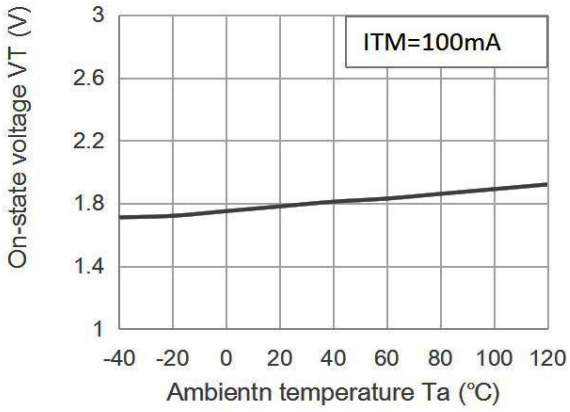


Fig.6 Holding current vs. Ambient temperature

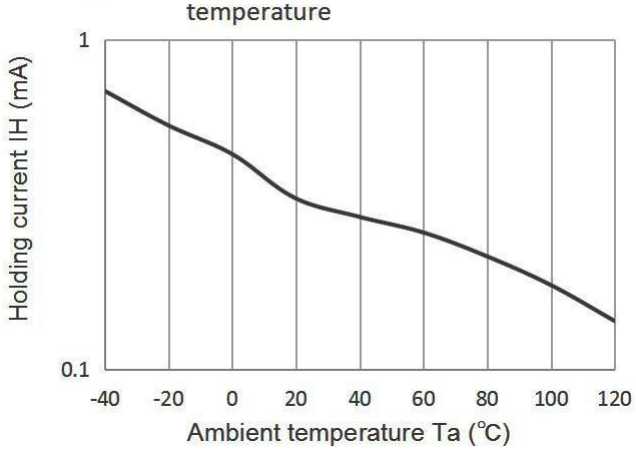


Fig.7 Repetitive peak off-state current vs. Temperature

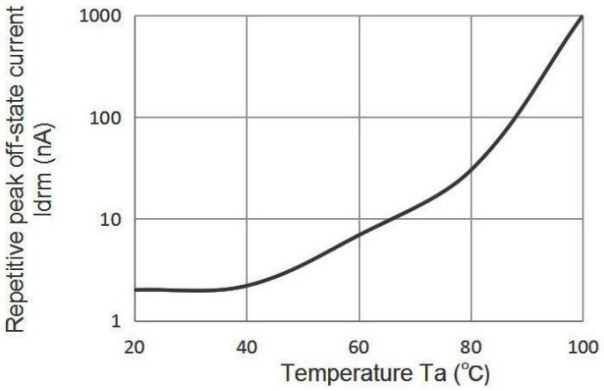


Fig.8 On-state current vs. On-state voltage

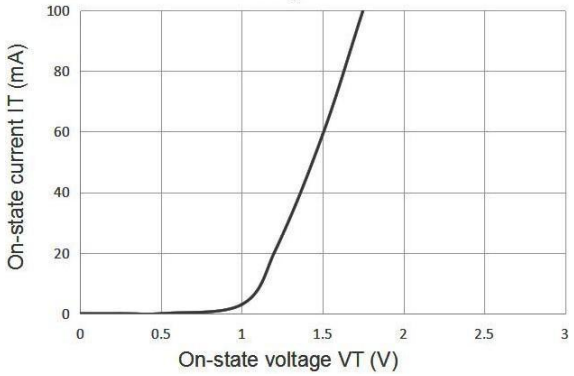


Fig9. Basic Operation Circuit Medium/High Power Triac Drive Circuit

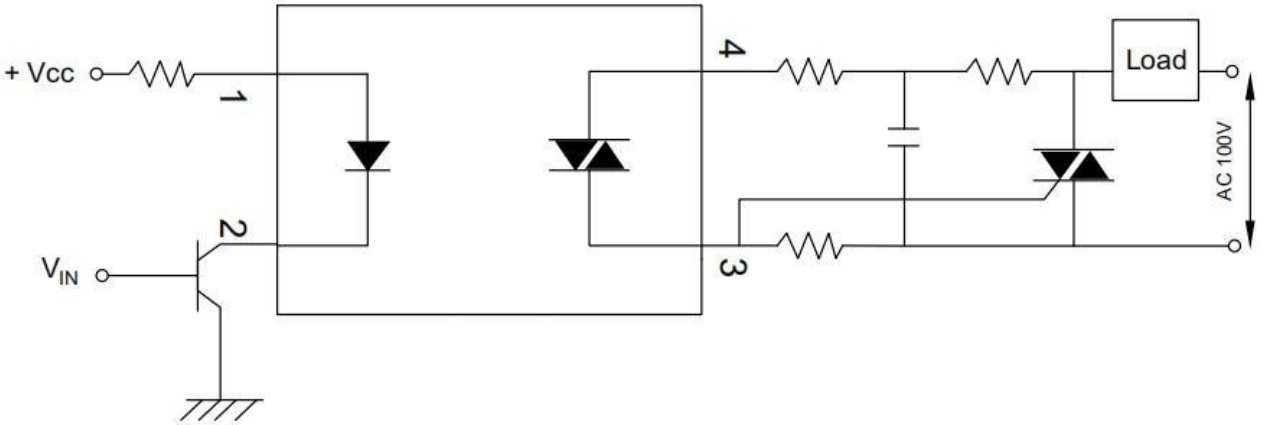
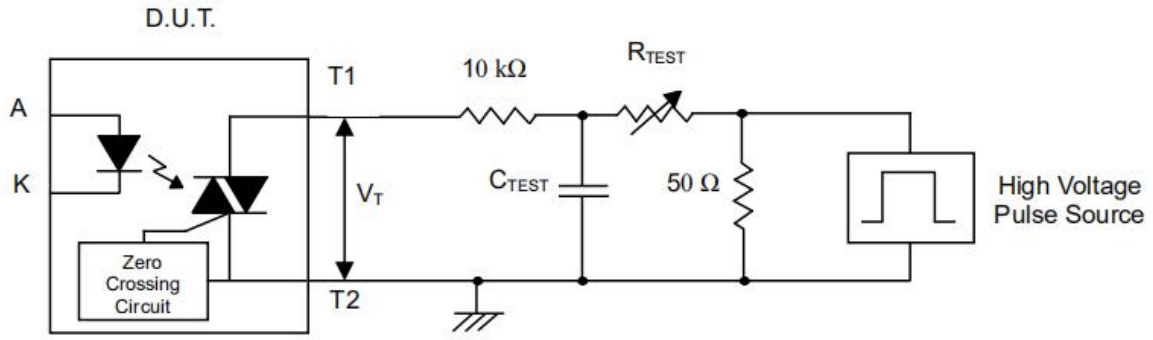
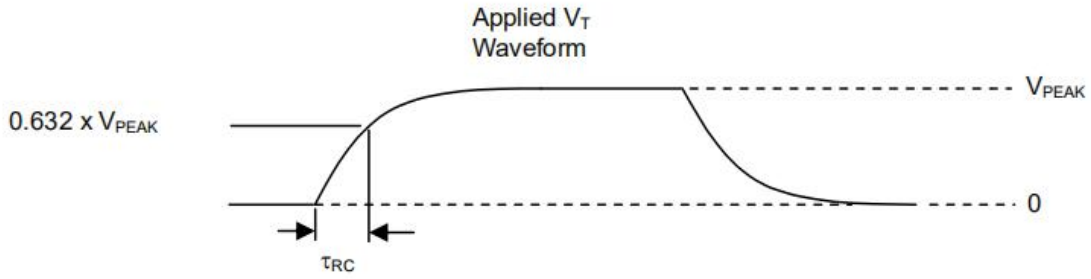


Fig10.Static dv/dt Test Circuit & Waveform





Measurement Method

The high voltage pulse is set to the required V_{PEAK} value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform V_T is monitored using a x100 scope probe. By varying R_{TEST}, the dv/dt (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The dv/dt is then decreased until the D.U.T. stops triggering. At this point, τ_{RC} is recorded and the dv/dt calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

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For example, V_{PEAK} = 600V for EL306X series. The dv/dt value is calculated as follows:

$$dv/dt = \frac{0.63 \times 600}{\tau_{RC}} = \frac{378}{\tau_{RC}}$$