



### Description

The TDM303X, TDM304X, TDM306X and TDM308X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a monolithic silicon zero-cross photo triac in a plastic SOP4 package. With the robust coplanar double mold structure, TDM303X, TDM304X, TDM306X and TDM308X series provide the most stable isolation feature.

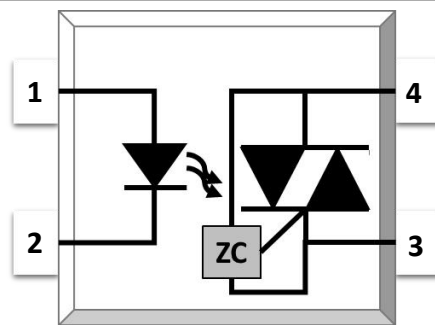
### Features

- High isolation 3750 VRMS
- DC input with zero-cross photo triac output
- Operating temperature range - 40 °C to 100 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1, GB8898
  - cUL- CSA Component Acceptance Service Notice No. 5A

### Applications

- Solenoid/valve controls
- Lighting controls
- Motor controls
- Temperature controls
- Static AC power switches
- Solid state relays
- Interfacing microprocessors to 115 to 240VAC peripherals

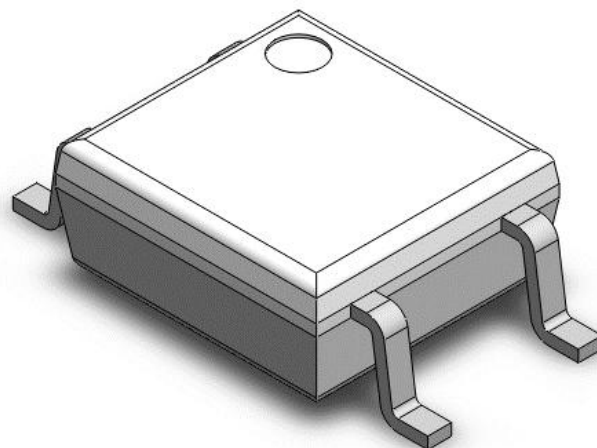
### SCHEMATIC



### PIN DEFINITION

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

### PACKAGE OUTLINE





ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	$I_F$	60	mA	
Reverse Voltage	$V_R$	6	V	
Junction Temperature	$T_j$	125	°C	
Input Power Dissipation	$P_I$	100	mW	
OUTPUT				
Off-state Output Terminal Voltage	TDM303X	250	V	
	TDM304X	400		
	TDM306X	600		
	TDM308X	800		
Peak Repetitive Surge Current PW=100µs, 120pps	$I_{TSM}$	1	A	
On-State RMS Current	$I_{T(RMS)}$	100	mA	
Junction Temperature	$T_j$	125	°C	
Output Power Dissipation	$P_O$	300	mW	
COMMON				
Total Power Dissipation	$P_{tot}$	400	mW	
Isolation Voltage	$V_{iso}$	3750	V <sub>rms</sub>	1
Operating Temperature	$T_{opr}$	-40~100	°C	
Storage Temperature	$T_{stg}$	-55~150	°C	
Soldering Temperature	$T_{sol}$	260	°C	2

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

Note 2. For 10 seconds



**ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C**

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
<b>INPUT</b>							
Forward Voltage	V <sub>F</sub>	-	1.24	1.4	V	I <sub>F</sub> =10mA	
Reverse Current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> =6V	
Input Capacitance	C <sub>in</sub>	-	8.5	250	pF	V=0, f=1kHz	
<b>OUTPUT</b>							
Peak Off-state Current, Either Direction	I <sub>DRM</sub>	-	-	500	nA	V <sub>DRM</sub> =Rated V <sub>DRM</sub> I <sub>F</sub> =0	3
Peak On-state Current, Either Direction	V <sub>TM</sub>	-	1.42	2.5	V	I <sub>TM</sub> =100mA	
Critical Rate of Rise of Off-state Voltage	dV/dt	1000	-	-	V/μs	V <sub>PEAK</sub> =Rated V <sub>DRM</sub>	4
<b>TRANSFER CHARACTERISTICS</b>							
LED Trigger Current	TDM3031, TDM3041, TDM3061, TDM3081	I <sub>FT</sub>	-	-	15	mA	Terminal Voltage = 3V I <sub>TM</sub> =100mA
	TDM3032, TDM3042, TDM3062, TDM3082		-	-	10		
	TDM3033, TDM3043, TDM3063, TDM3083		-	-	5		
Holding Current	I <sub>H</sub>	-	450	-	μA		
Isolation Resistance	R <sub>iso</sub>	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C <sub>io</sub>	-	0.4	1	pF	V=0, f=1MHz	
<b>ZERO-CROSSING CHARACTERISTICS</b>							
Inhibit Voltage	V <sub>INH</sub>	-	-	20	V	I <sub>F</sub> =Rated I <sub>FT</sub>	
Leakage in Inhibited State	I <sub>DRM2</sub>	-	-	500	μA	I <sub>F</sub> =Rated I <sub>FT</sub> V <sub>DRM</sub> =Rated V <sub>DRM</sub>	

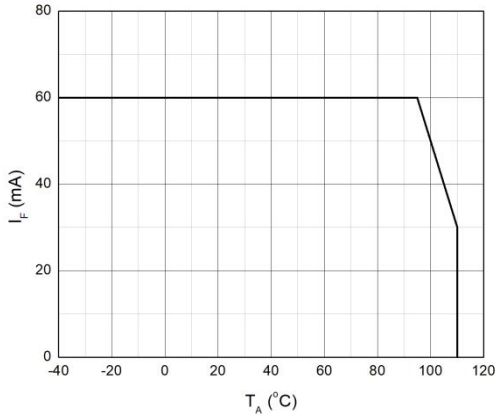
Note3. Test voltage must be applied within dV/dt rating.

Note4. Refer to Fig.17 & Fig.18

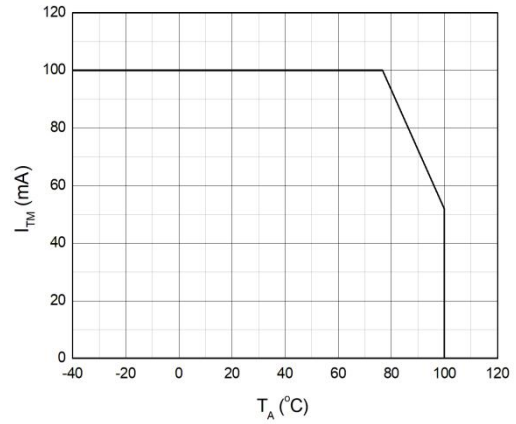


**CHARACTERISTIC CURVES**

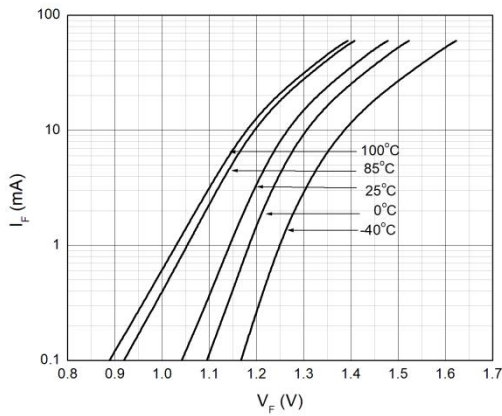
**Fig.1 Forward Current vs. Ambient Temperature**



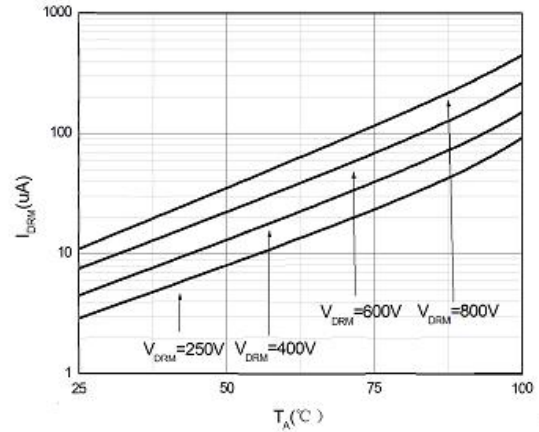
**Fig.2 On-state Terminal Current vs. Ambient Temperature**



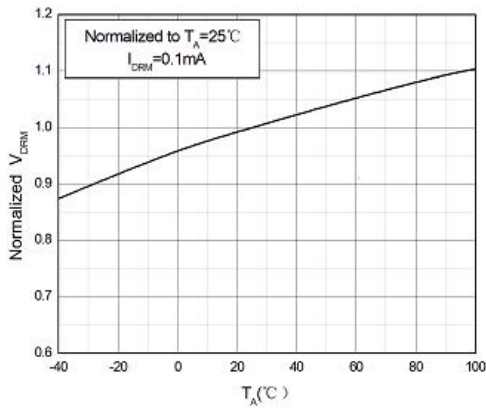
**Fig.3 Forward Current vs. Forward Voltage**



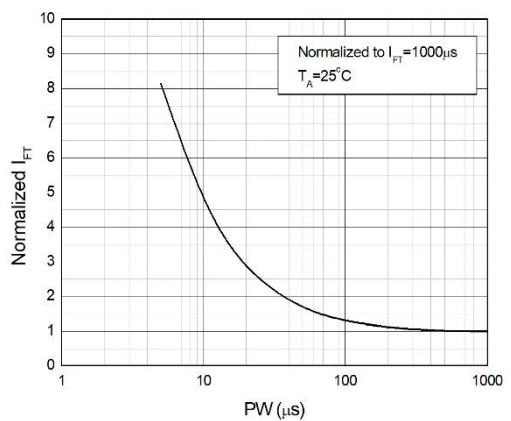
**Fig.4 Off-state Terminal Current vs. Ambient Temperature**



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



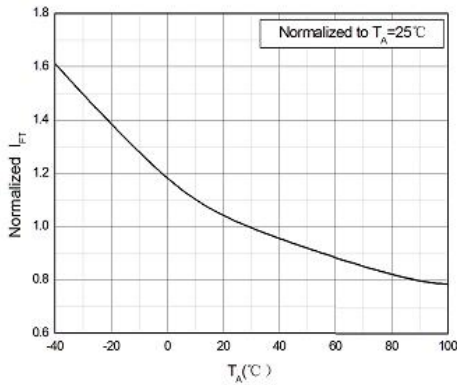
**Fig.6 Normalized Trigger Current vs. LED Trigger Pulse Width**



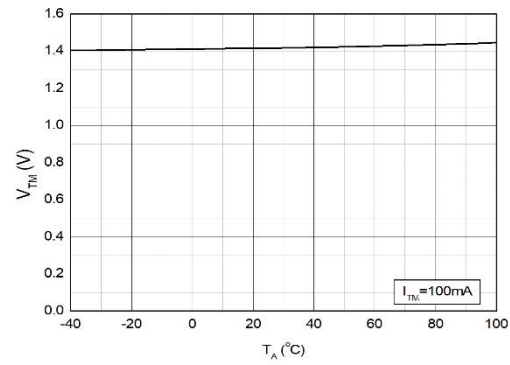
**CHARACTERISTIC CURVES**



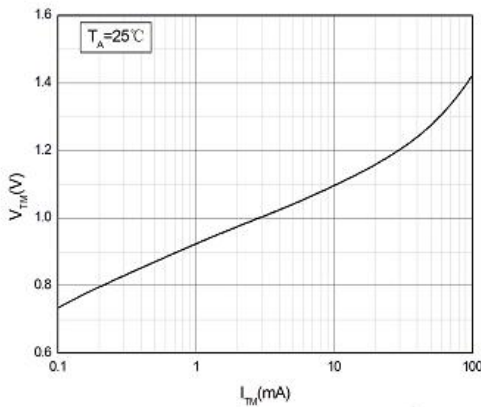
**Fig.7 Normalized Trigger Current vs. Ambient Temperature**



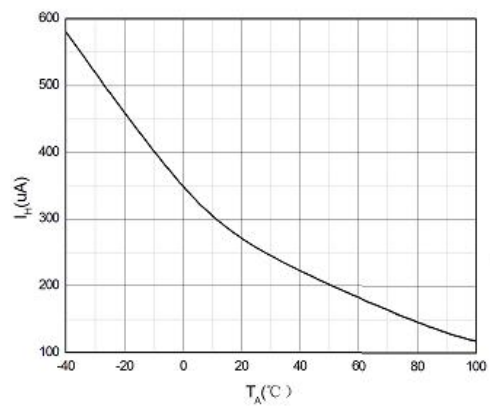
**Fig.8 On-state Terminal Voltage vs. Ambient Temperature**



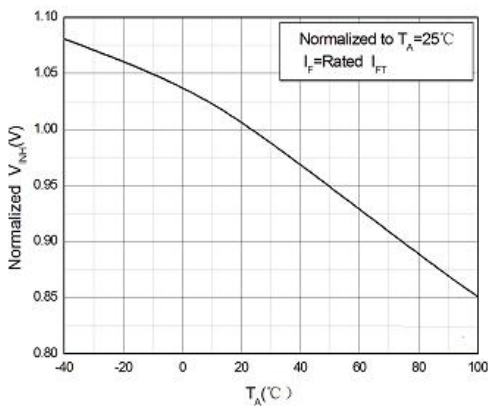
**Fig.9 On-state Terminal Voltage vs. On-state Terminal Current**



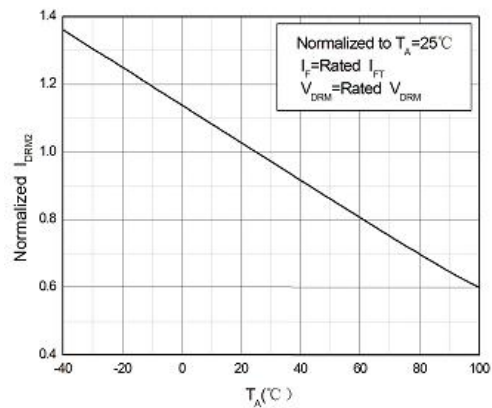
**Fig.10 Holding Current vs. Ambient Temperature**



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



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



**CHARACTERISTIC CURVES**

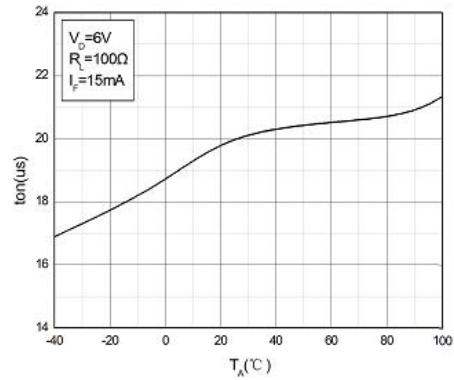
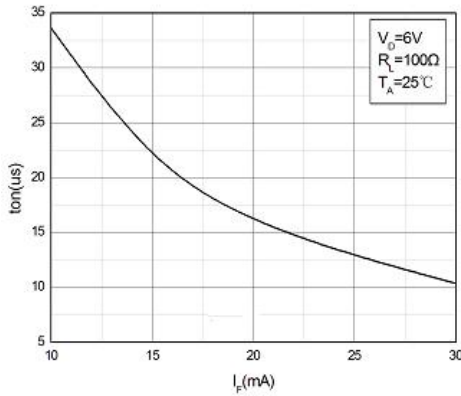
**Fig.13 Turn On Time**

**Fig.14 Turn On Time**



**LIGHTNIMS Forward Current**

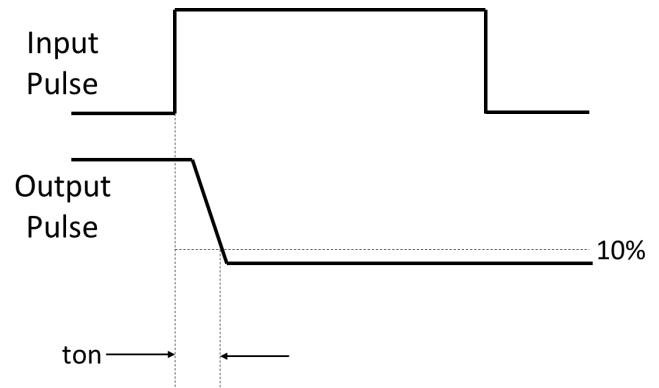
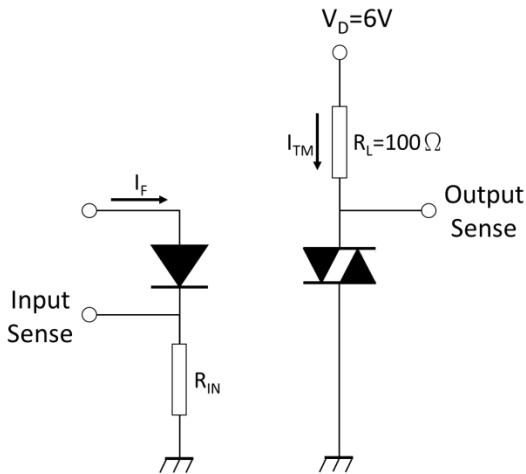
**vs. Ambient Temperature**



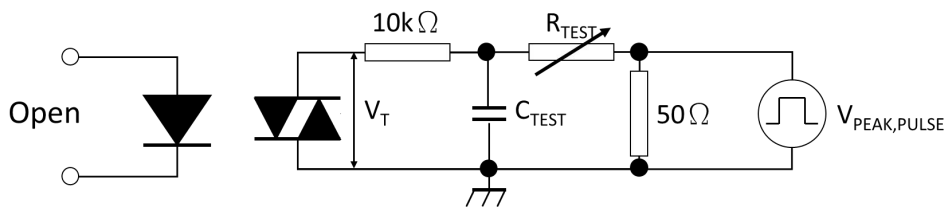
**TEST CIRCUITS**

**Fig.15 Test Circuits of Turn On Time**

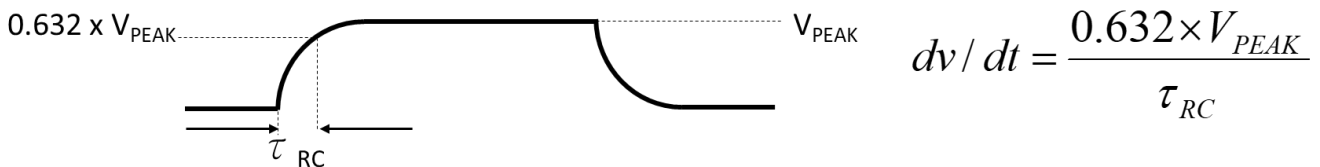
**Fig.16 Waveforms of Turn On Time**



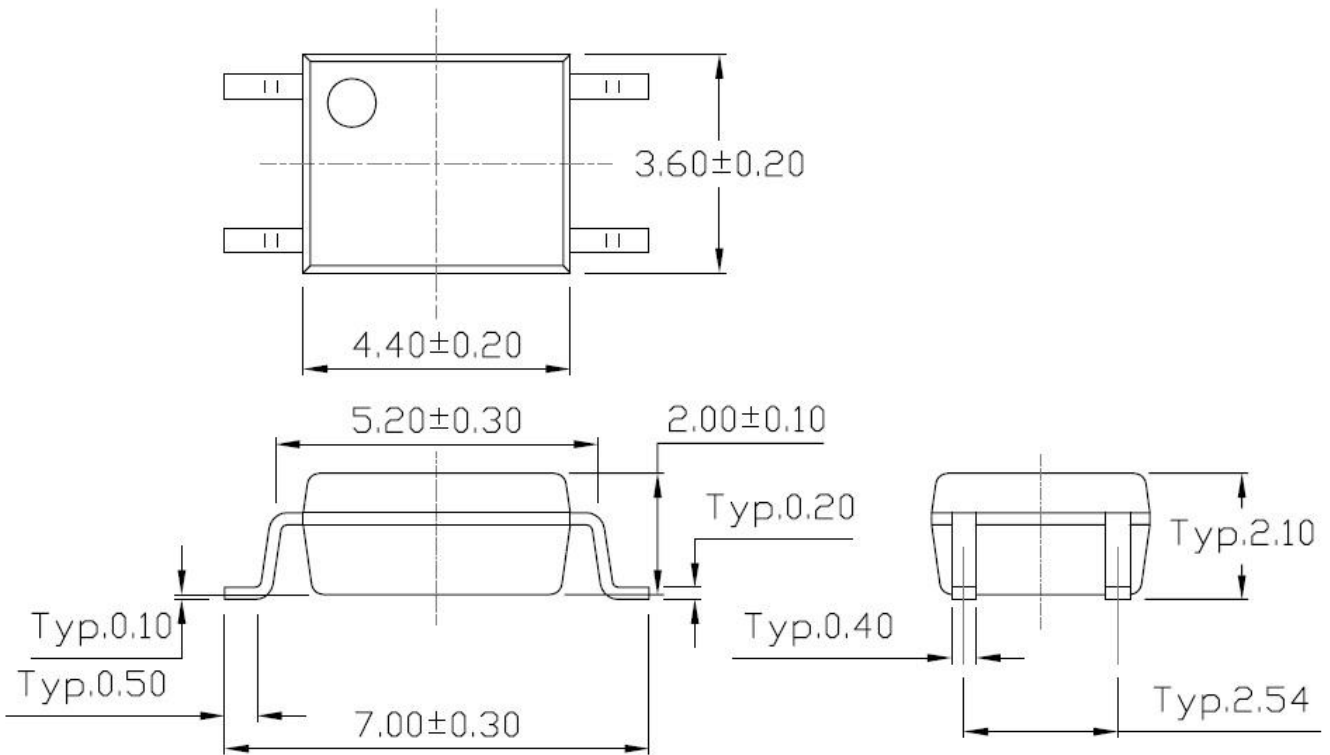
**Fig.17 Test Circuits of dV/dt**



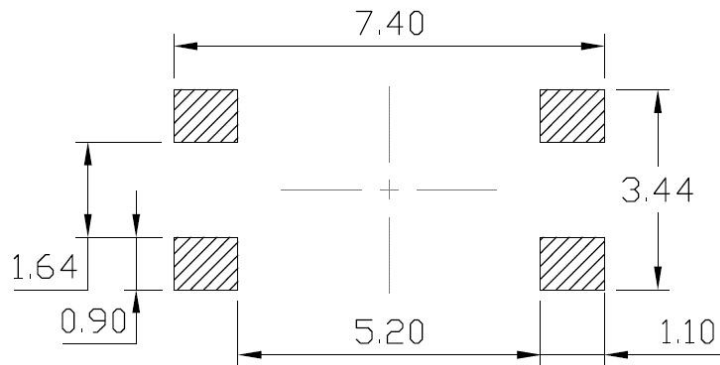
**Fig.18 Waveforms of dV/dt**



**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**



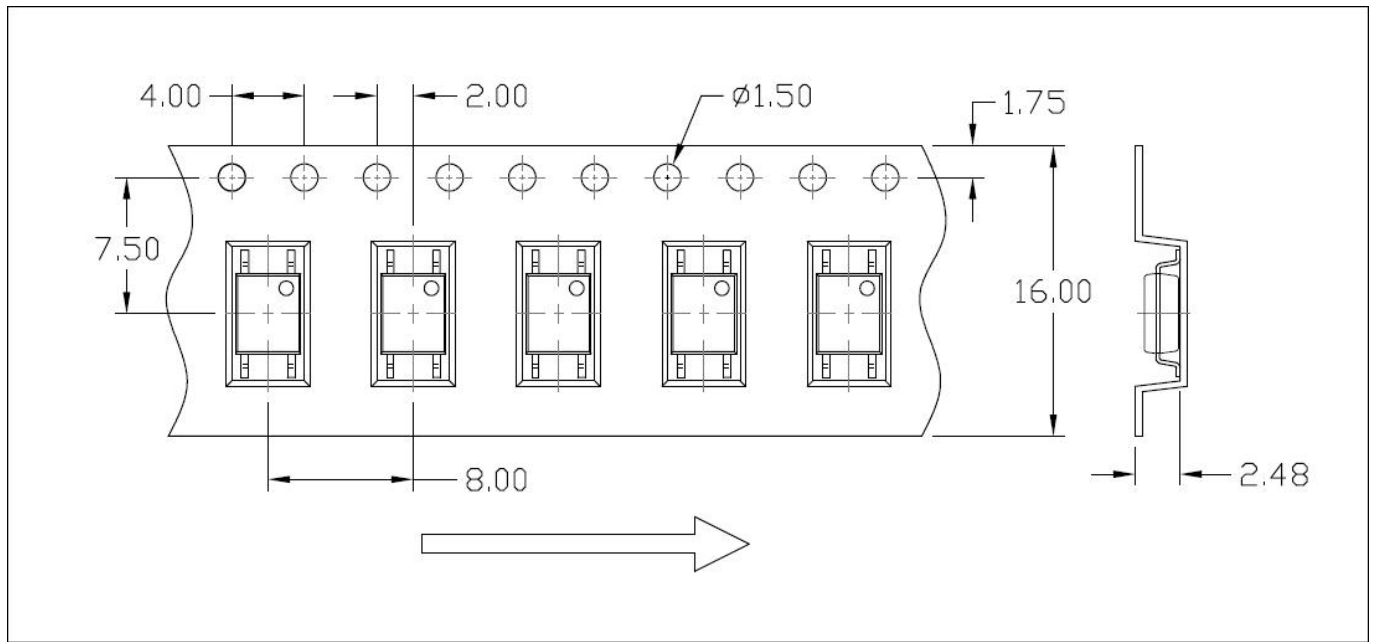
**Recommended Solder Mask (Dimensions in mm unless otherwise stated)**



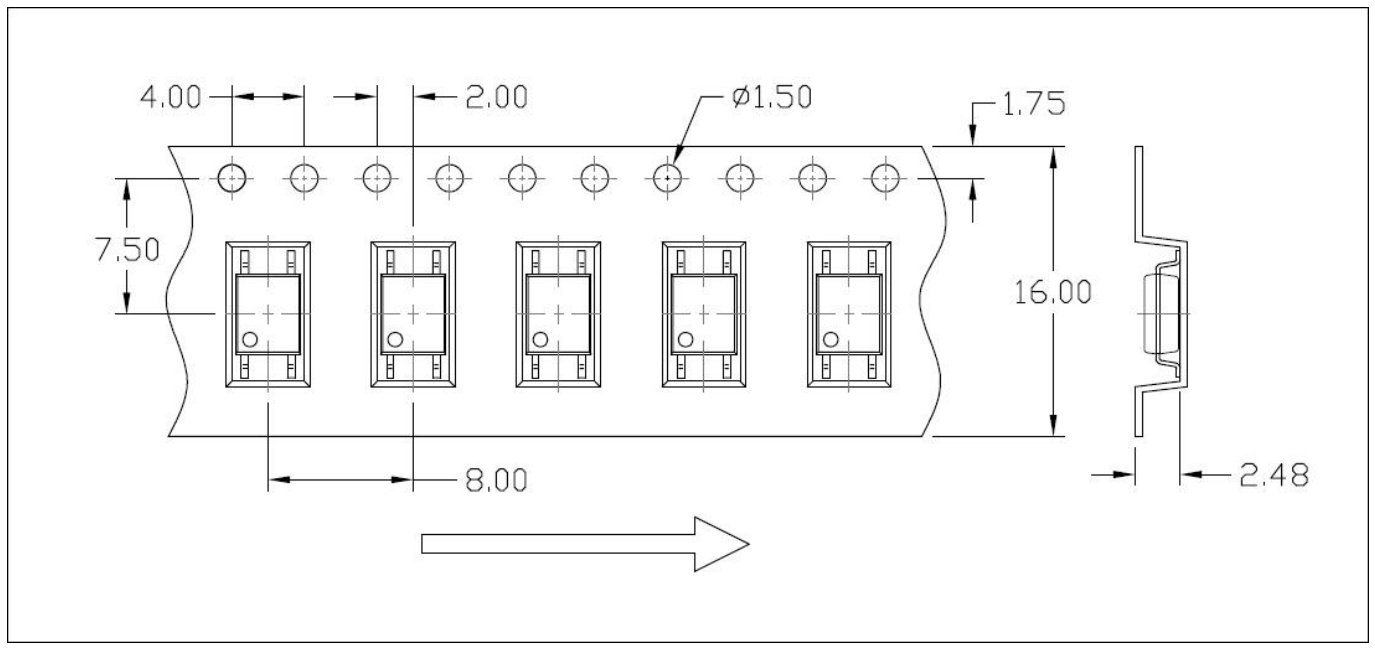


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**



**Option T2**

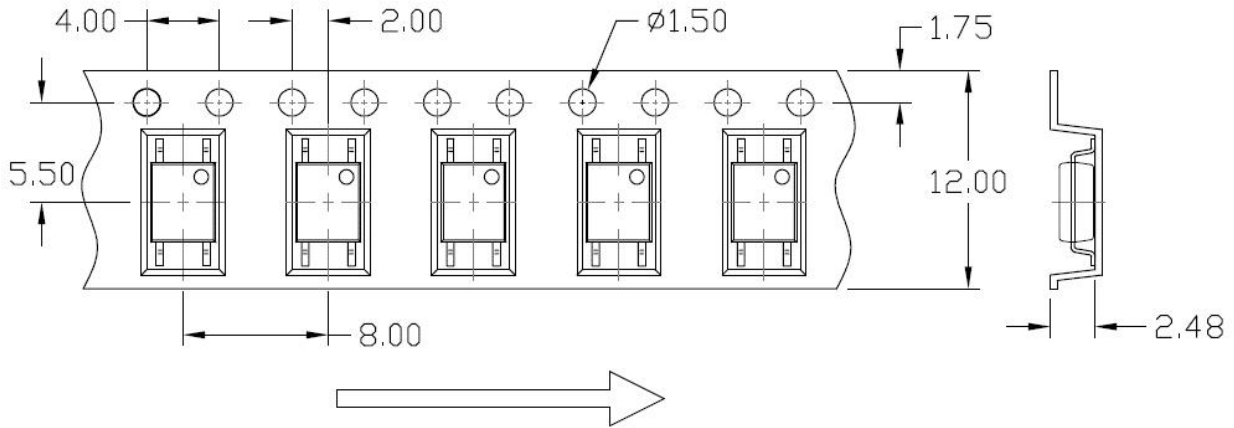




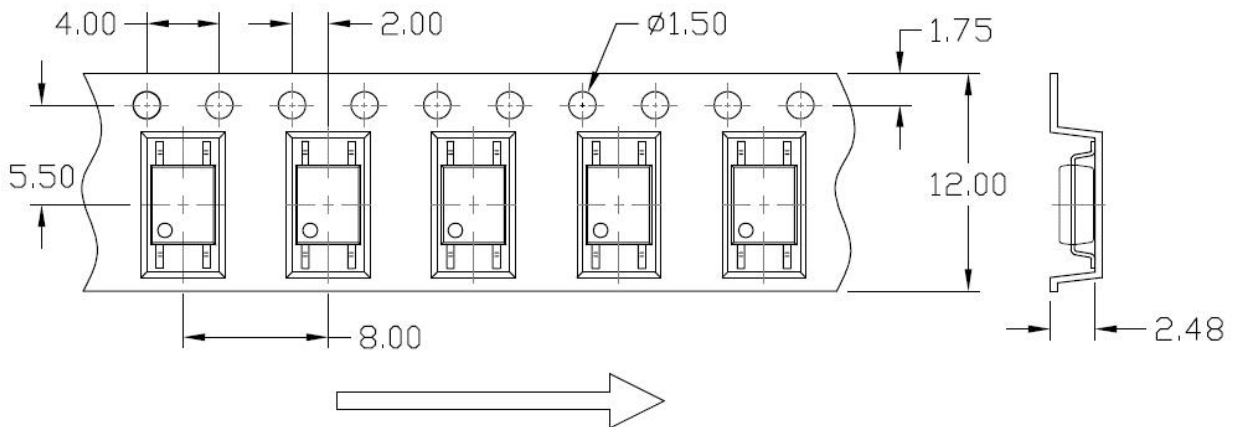


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T3**



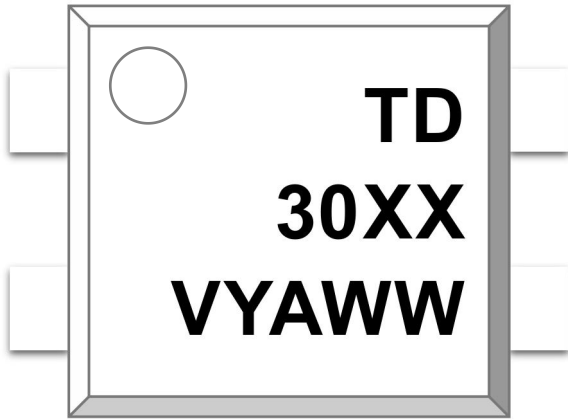
**Option T4**





**ORDERING AND MARKING INFORMATION**

**MARKING INFORMATION**



**TD** : Company Abbr.  
**30XX** : Part Number & Rank  
**V** : VDE Option  
**Y** : Fiscal Year  
**A** : Manufacturing Code  
**WW** : Work Week

**ORDERING INFORMATION**

**TDM30XX(Z)-GV**

**TD** – Company Abbr.  
**M** – SOP Package  
**30XX** – Rank  
 (31/32/33/41/42/43/61/62/63/81/82/83)  
**Z** – Tape and Reel Option (T1/T2)  
**G** – Green  
**V** – VDE Option (V or None)



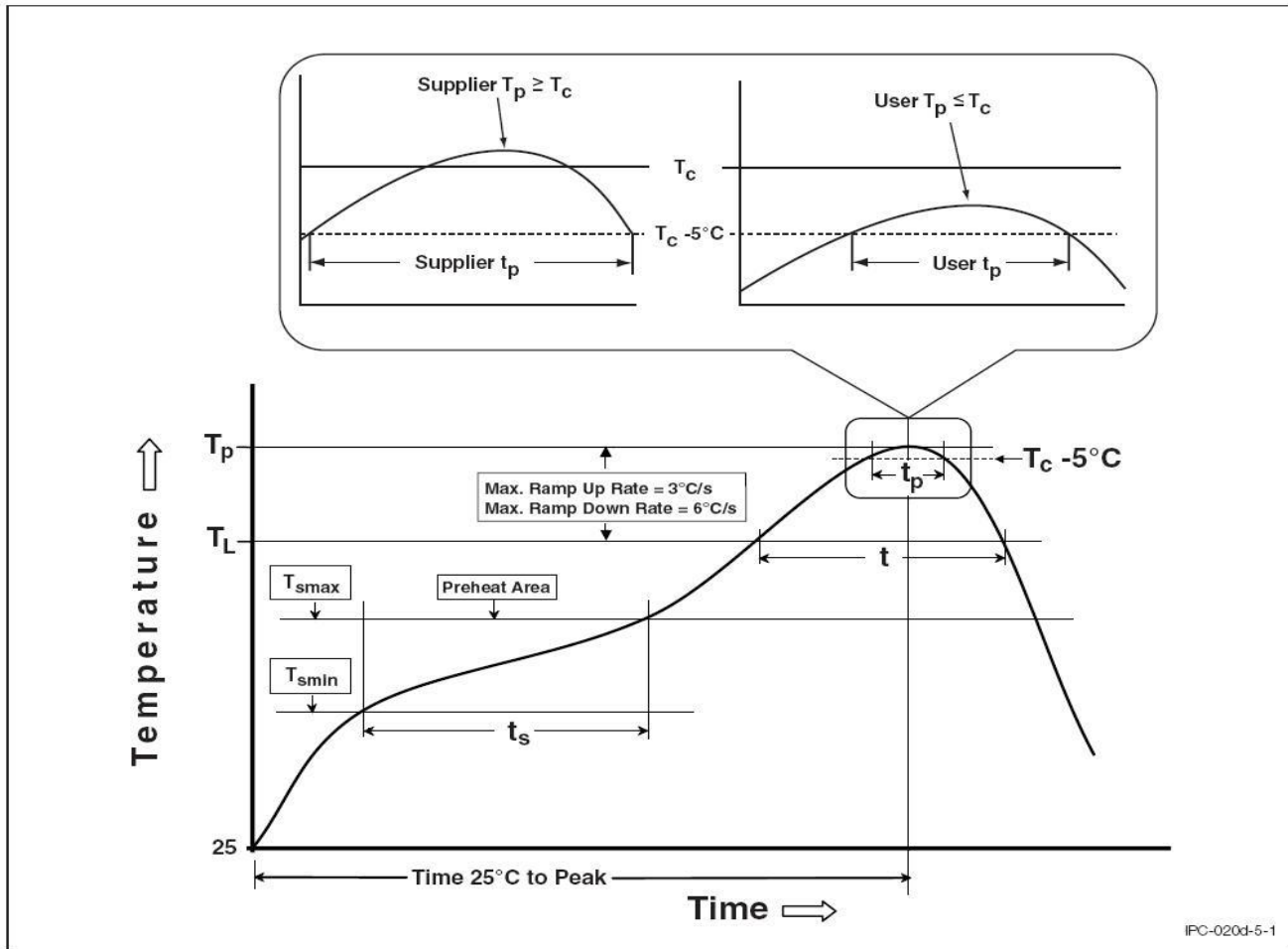
**Packing Quantity**

Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Taping	3000Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000Units/Reel



**REFLOW INFORMATION**

**REFLOW PROFILE**



IPC-020d-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100	150°C
Temperature Max. (Tsmax)	150	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3°C/second max.	3°C/second max.
Liquidous Temperature (TL)	183°C	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (tP) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (TP to TL)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



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- Please contact LIGHTNING sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
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