

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.

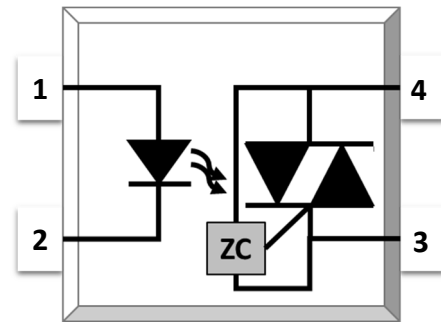
Features

- 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 (Pending Approved)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898

Applications

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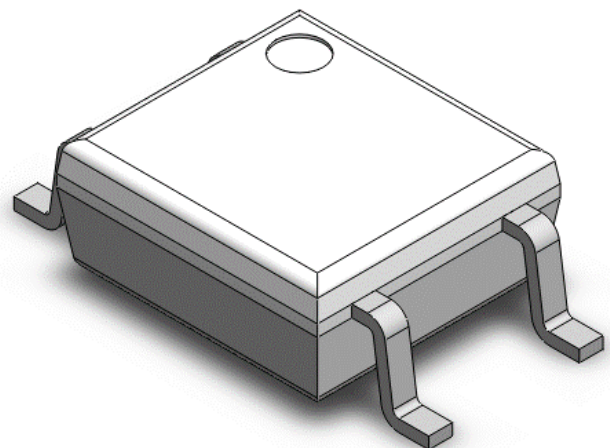
SCHEMATIC



PIN DEFINITION

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

PACKAGE OUTLINE





SOP4, DC Input, Zero-Cross Photo TRIAC Optocoupler

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	
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}	5000	V _{rms}	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



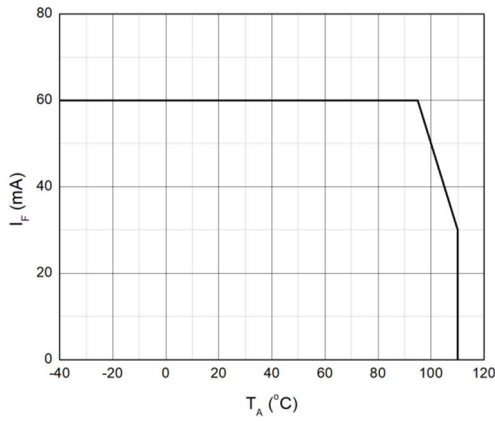
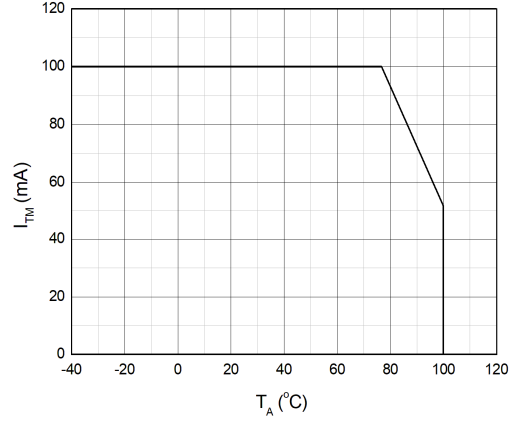
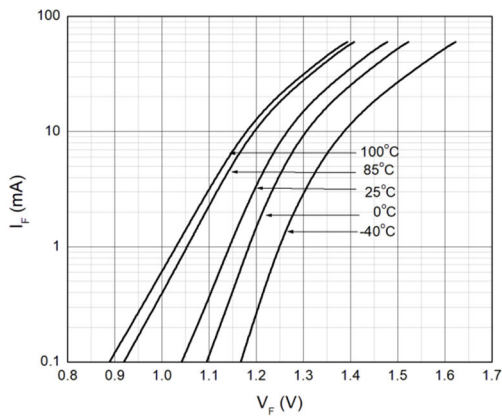
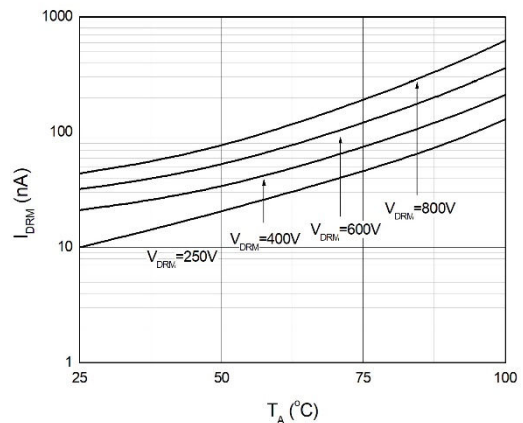
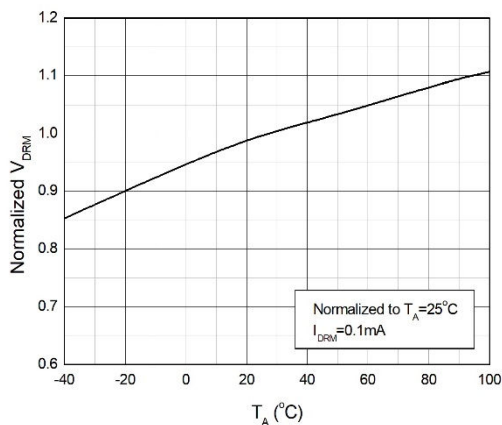
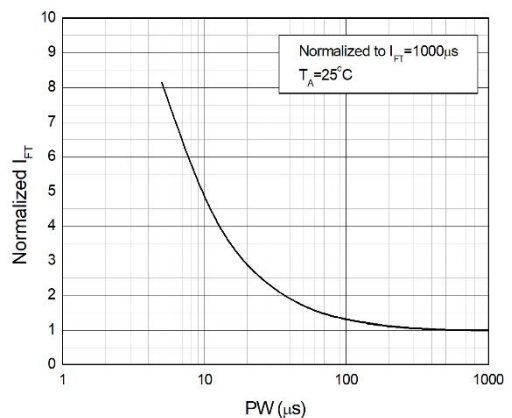
SOP4, DC Input, Zero-Cross Photo TRIAC Optocoupler

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

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

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

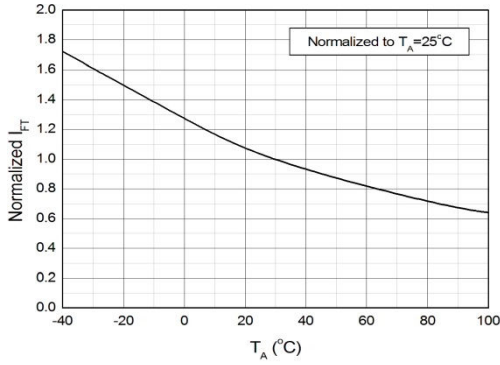


Fig.8 On-state Terminal Voltage vs. Ambient Temperature

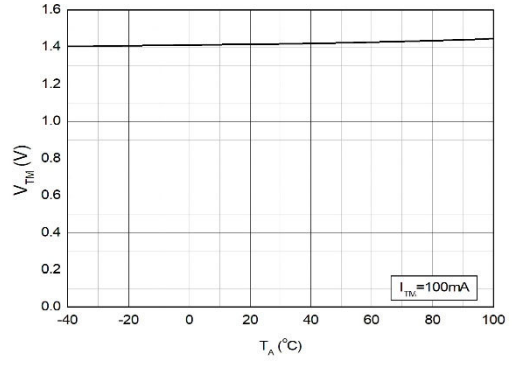


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

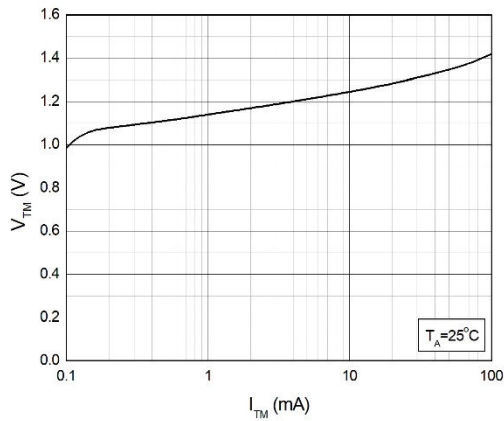


Fig.10 Holding Current vs. Ambient Temperature

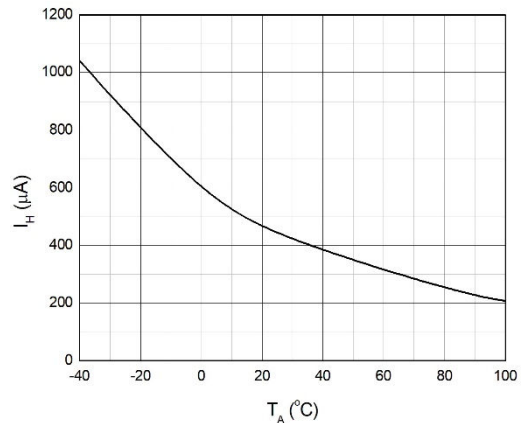


Fig.11 Normalized Inhibit Voltage vs. Ambient Temperature

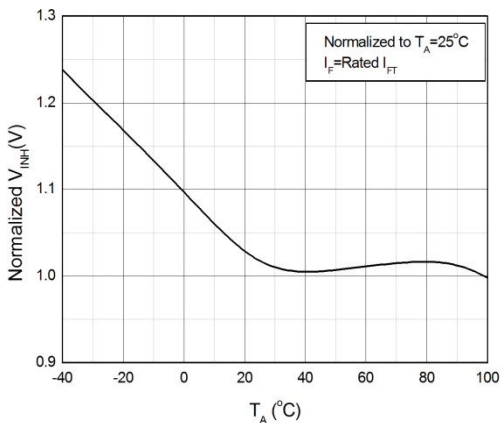
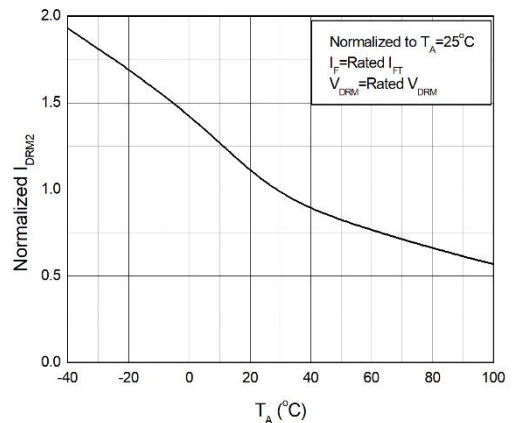


Fig.12 Normalized Leakage in Inhibit State vs. Ambient Temperature



CHARACTERISTIC CURVES

Fig.13 Turn On Time vs. Forward Current

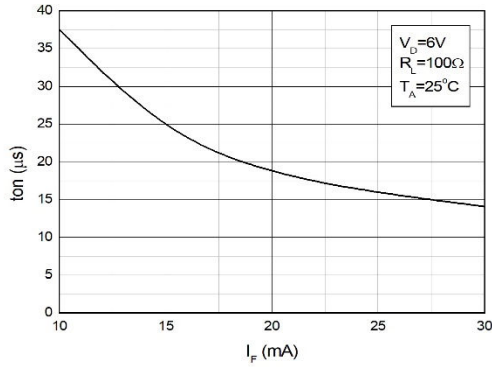
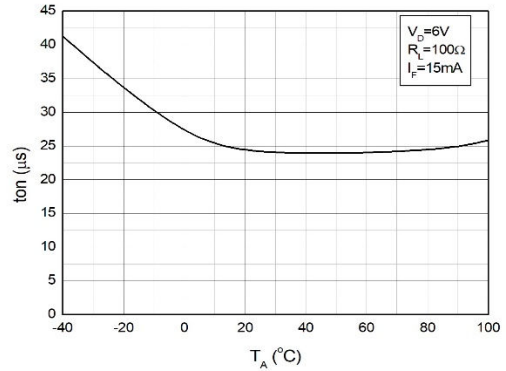


Fig.14 Turn On Time vs. Ambient Temperature



TEST CIRCUITS

Fig.15 Test Circuits of Turn On Time

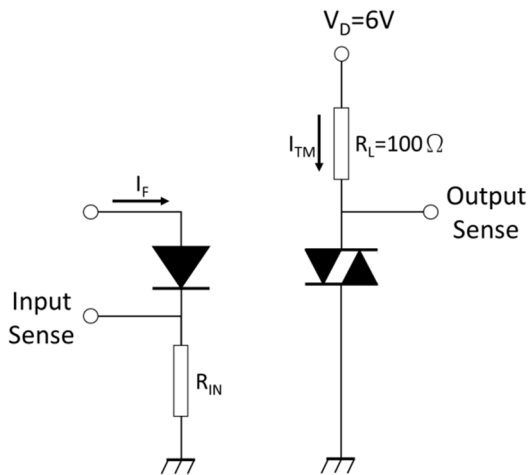


Fig.16 Waveforms of Turn On Time

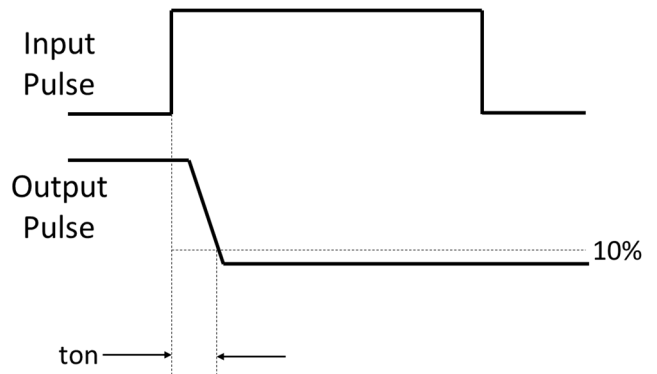


Fig.17 Test Circuits of dV/dt

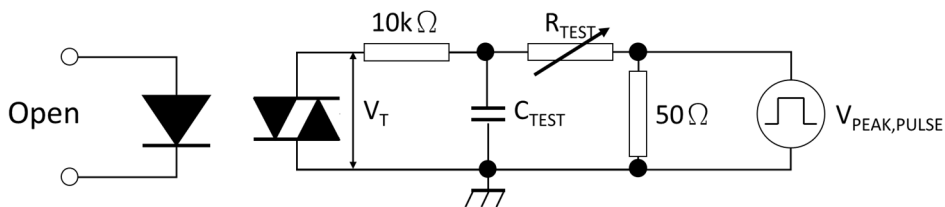
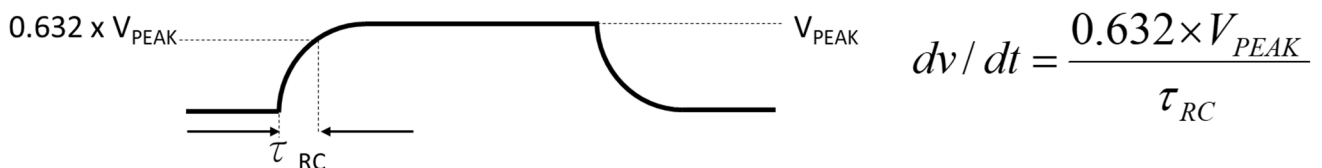
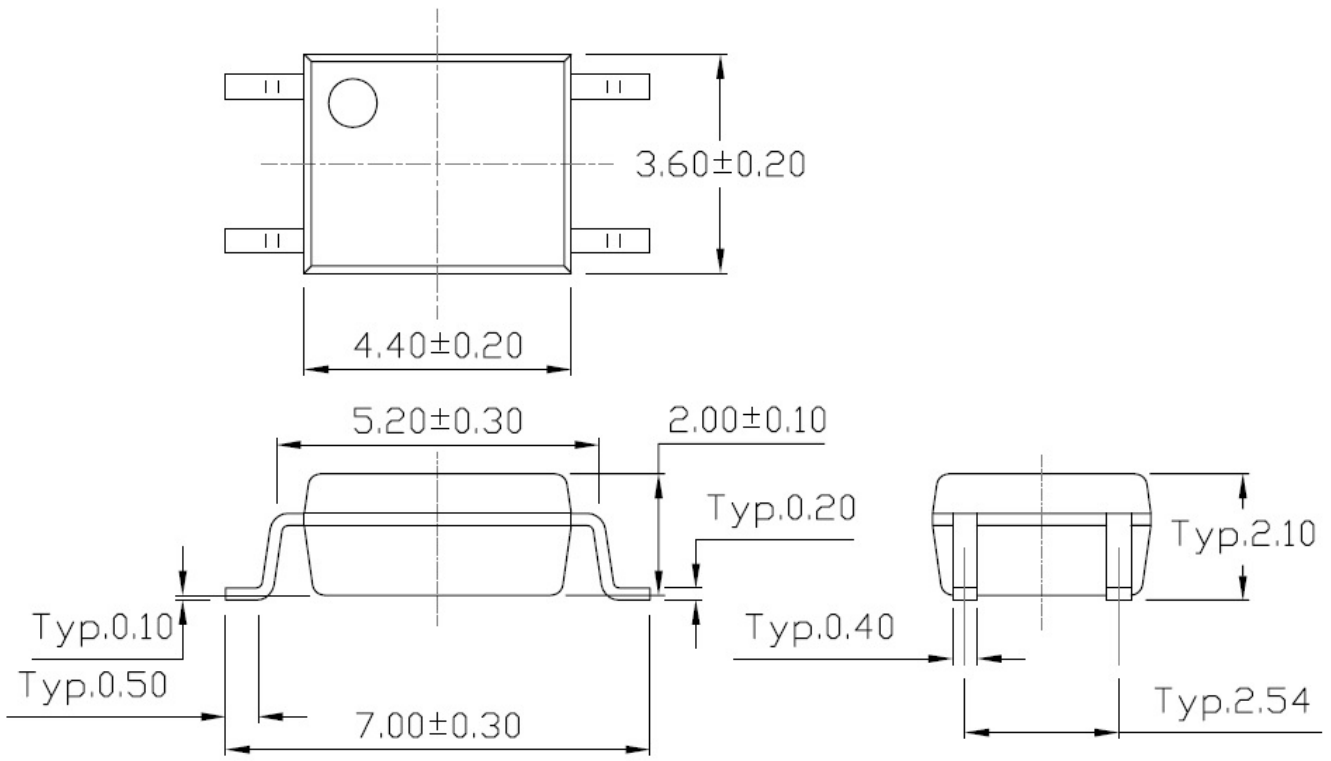


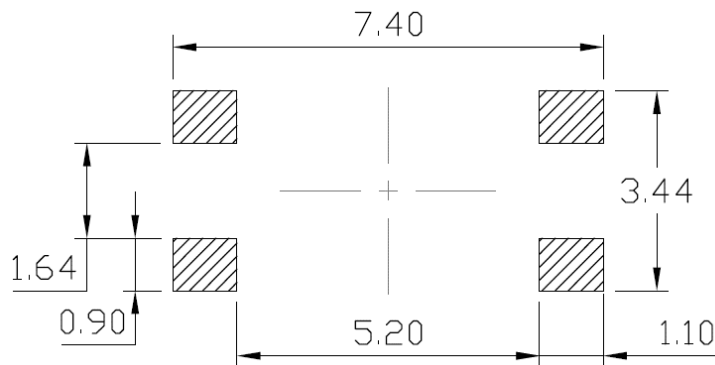
Fig.18 Waveforms of dV/dt



PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

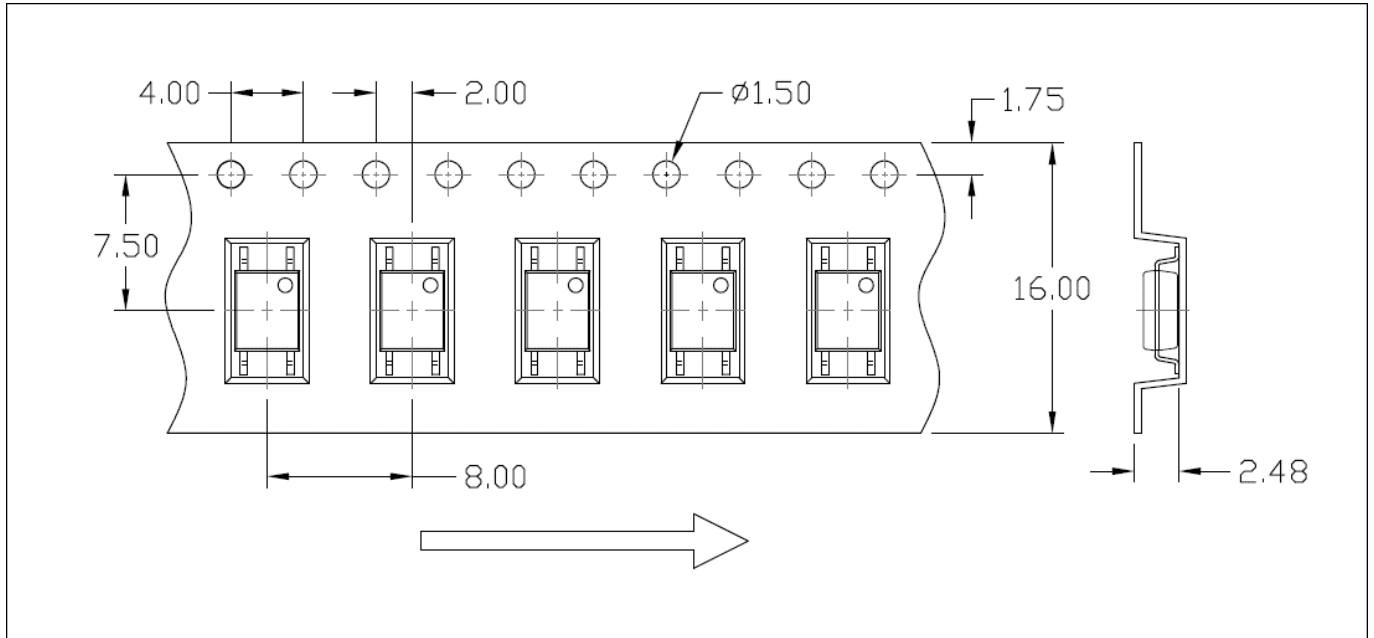


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

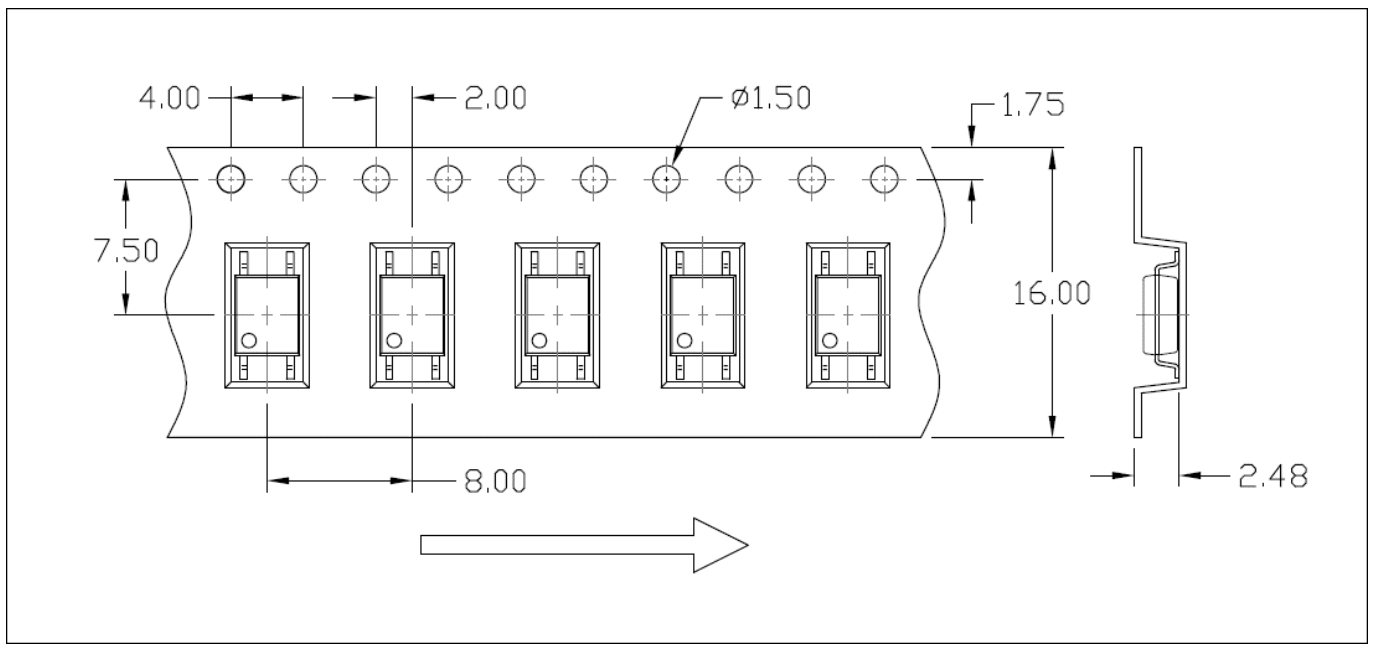


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

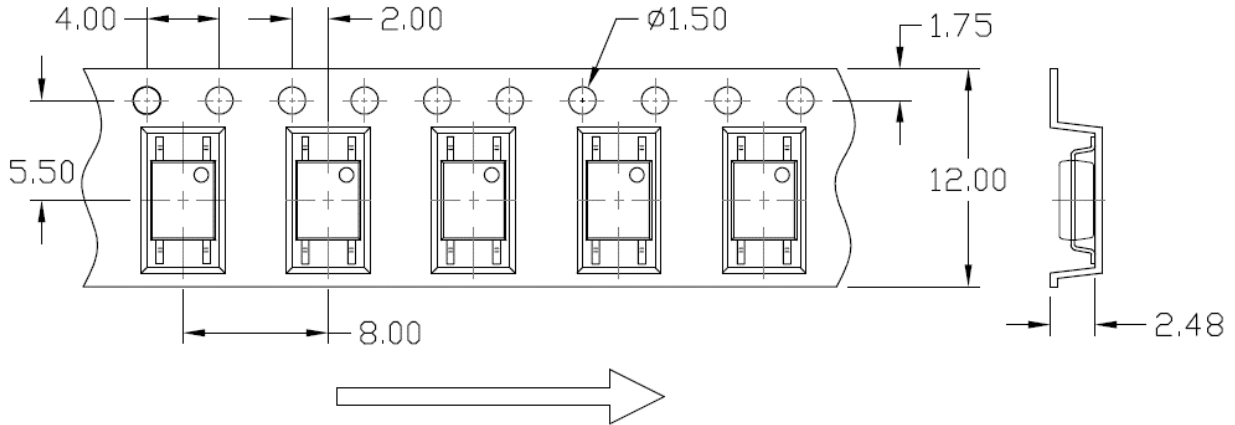


Option T2

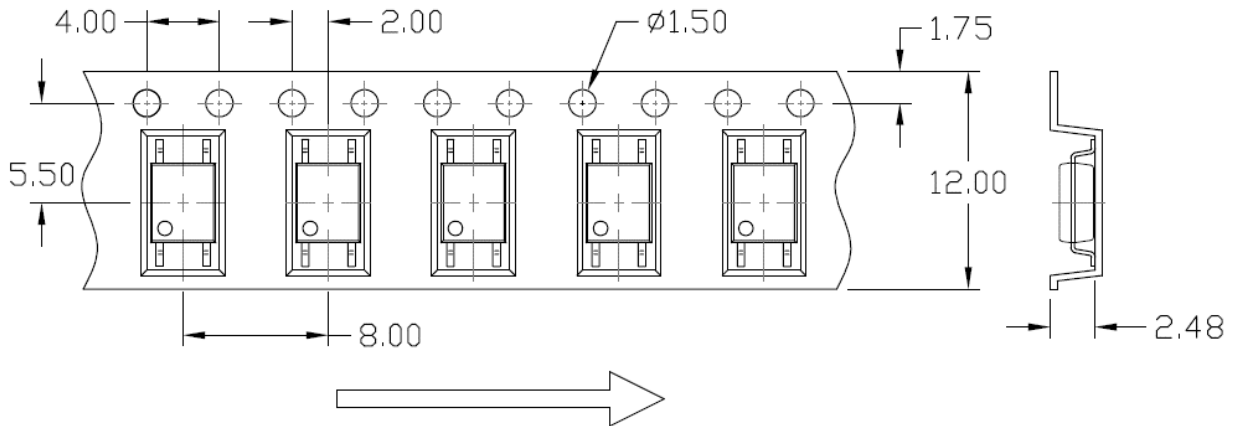


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T3



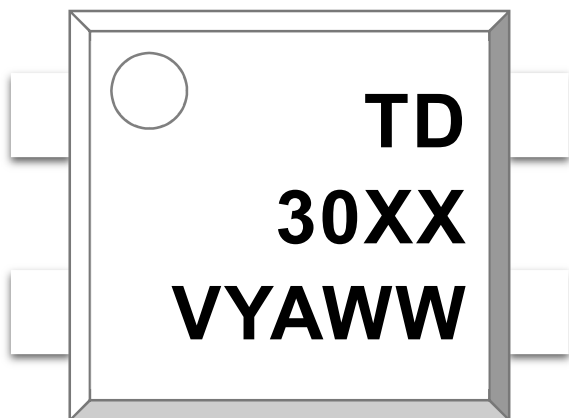
Option T4





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

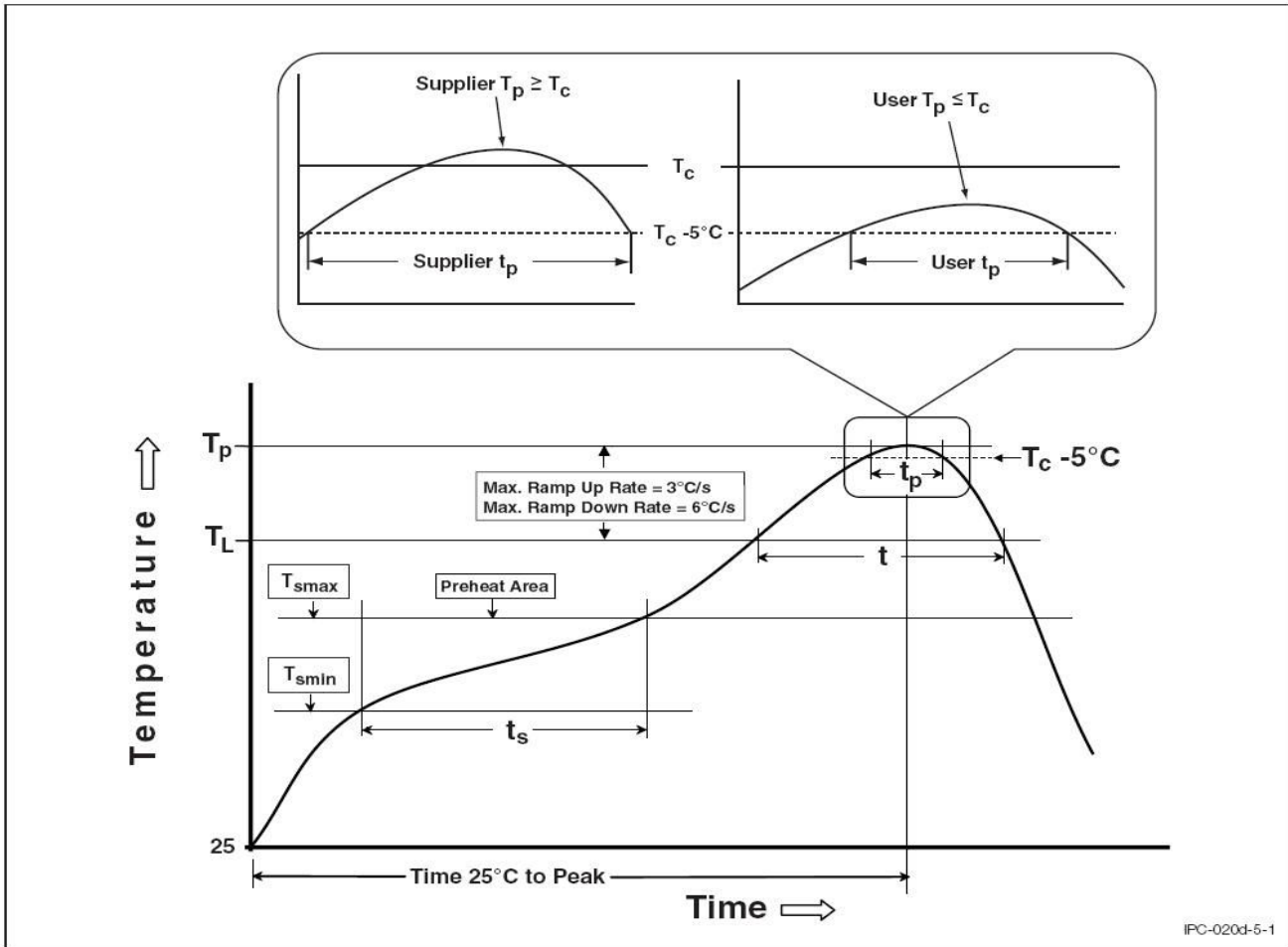
TD – Company Abbr.
 M – SOP Package
 30XX – Rank (31/32/33/41/42/43/61/62/63/81/82/83)
 Z – Tape and Reel Option (T1/T2)
 G – Green
 V – VDE Option (V or None)

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



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T_{smin})	100	150°C
Temperature Max. (T_{smax})	150	200°C
Time (t_s) from (T_{smin} to T_{smax})	60-120 seconds	60-120 seconds
Ramp-up Rate (t_L to t_P)	3°C/second max.	3°C/second max.
Liquidous Temperature (T_L)	183°C	217°C
Time (t_L) Maintained Above (T_L)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t_P) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T_P to T_L)	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.



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- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
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- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact LIGHTNING sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
- Parameters provided in datasheets may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated in each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify LIGHTNING's terms and conditions of purchase, including but not limited to the warranty expressed therein.
- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.