

SOP4, DC Input, Zero-Cross Photo TRIAC Optocoupler

Description

The TWSM303X, TWSM304X, TWSM306X and TWSM308X 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, TWSM303X, TWSM304X, TWSM306X and TWSM308X series provide the most stable isolation feature.

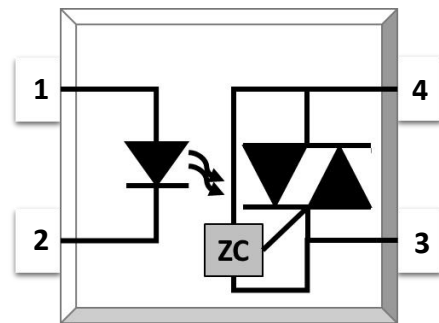
Features

- 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

Applications

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

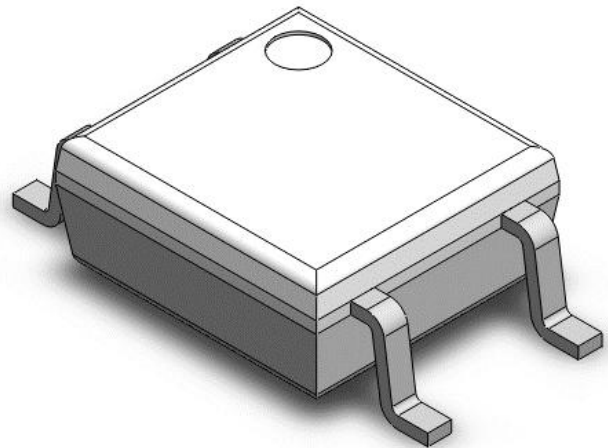
SCHEMATIC



PIN DEFINITION

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

PACKAGE OUTLINE



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	TWSM303X	V_{DRM}	250	V	
	TWSM304X		400		
	TWSM306X		600		
	TWSM308X		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	Vrms	1
Operating Temperature		T_{opr}	-40~100	°C	
Storage Temperature		T_{stg}	-55~125	°C	
Soldering Temperature		T_{sol}	260	°C	2

Note 1. 100μs pulse, 100Hz frequency

Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

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	$I_F=10\text{mA}$	
Reverse Current	I_R	-	-	10	μA	$V_R=6\text{V}$	
Input Capacitance	C_{in}	-	8.5	250	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Peak Off-state Current, Either Direction	I_{DRM}	-	-	500	nA	$V_{DRM}=\text{Rated } V_{DRM}$ $I_F=0$	
Peak On-state Voltage, Either Direction	V_{TM}	-	1.42	2.5	V	$I_{TM}=100\text{mA}$	
Critical Rate of Rise of Off-state Voltage	dV/dt	1000	-	-	V/ μs	$V_{PEAK}=400\text{V},$ $I_F=0$	3
TRANSFER CHARACTERISTICS							
LED Trigger Current	TWSM3031,TWSM3041, TWSM3061,TWSM3081	I_{FT}	-	-	15	Terminal Voltage = 3V $I_{TM}=100\text{mA}$	
	TWSM3032,TWSM3042, TWSM3062,TWSM3082		-	-	10		
	TWSM3033,TWSM3043, TWSM3063,TWSM3083		-	-	5		
Holding Current	I_H	-	450	-	μA		
Isolation Resistance	Riso	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.4	1	pF	$V=0, f=1\text{MHz}$	
ZERO-CROSSING CHARACTERISTICS							
Inhibit Voltage	V_{INH}	-	-	20	V	$I_F=\text{Rated } I_{FT}$	
Leakage in Inhibited State	I_{DRM2}	-	-	500	μA	$I_F=\text{Rated } I_{FT}$ $V_{DRM}=\text{Rated } V_{DRM}$	

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

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

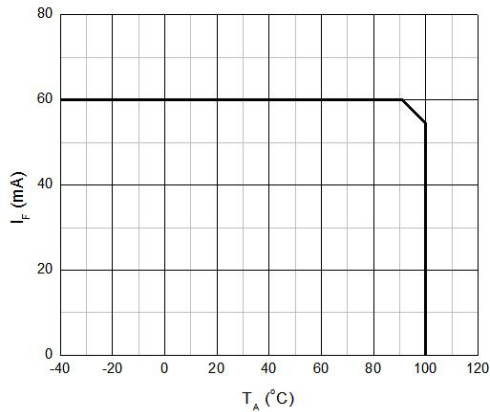


Fig.2 On-state Terminal Current vs. Ambient Temperature

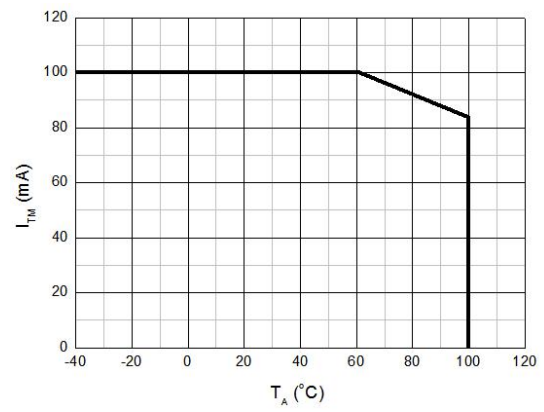


Fig.3 Forward Current vs. Forward Voltage

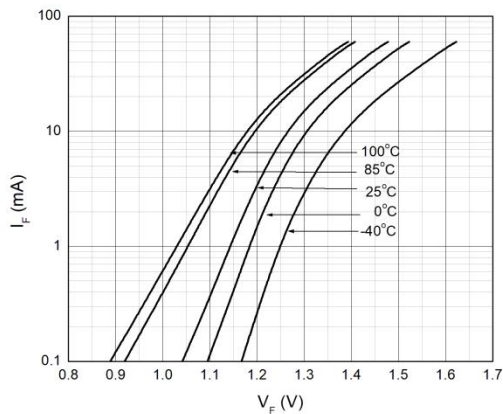


Fig.4 Off-state Terminal Current vs. Ambient Temperature

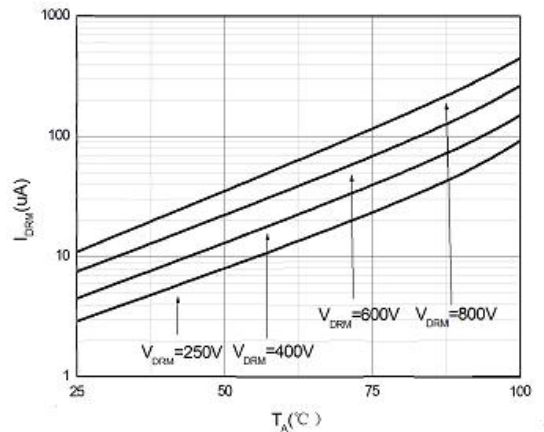


Fig.5 Normalized Off-state Terminal Voltage vs. Ambient Temperature

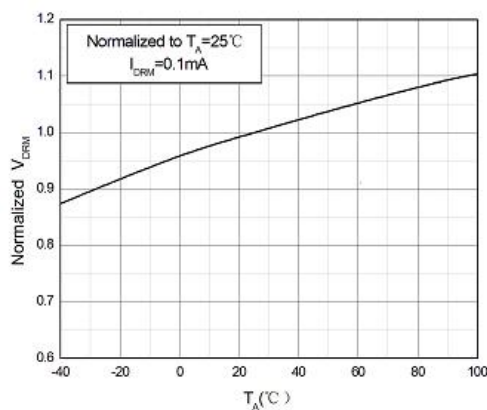
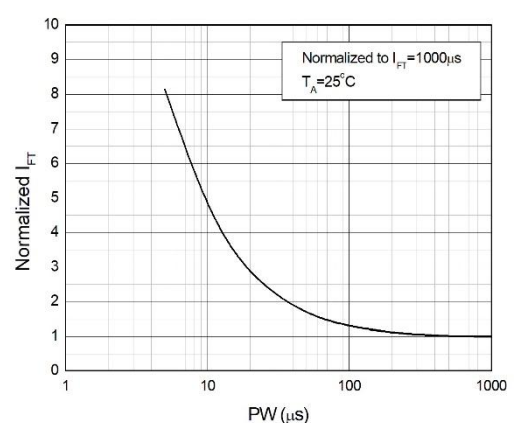


Fig.6 Normalized Trigger Current vs. LED Trigger Pulse Width



CHARACTERISTIC CURVES

Fig.7 Normalized Trigger Current vs. Ambient Temperature

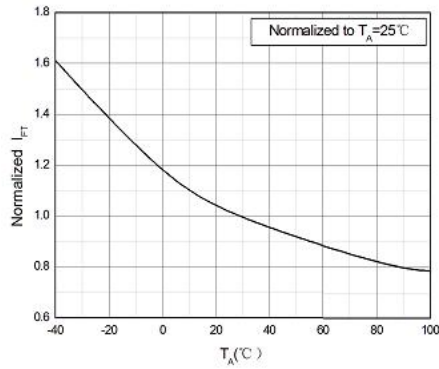


Fig.8 On-state Terminal Voltage vs. Ambient Temperature

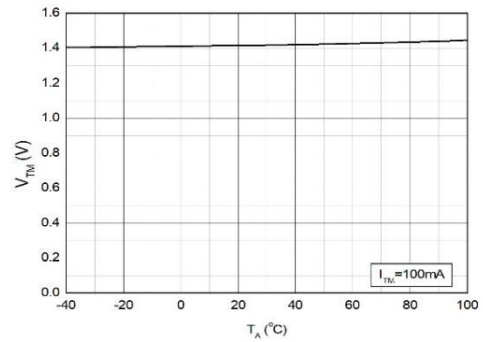


Fig.9 On-state Terminal Voltage vs. On-state Terminal Current

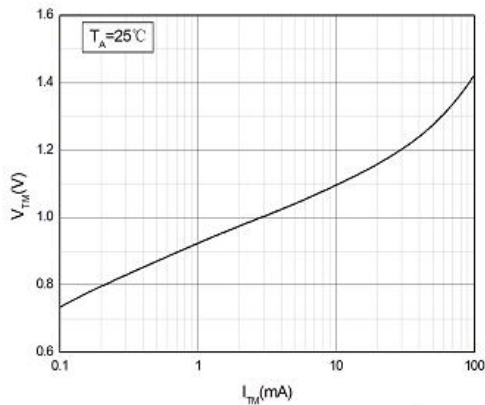


Fig.10 Holding Current vs. Ambient Temperature

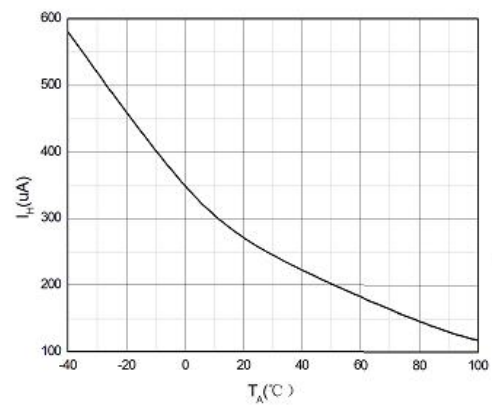


Fig.11 Normalized Inhibit Voltage vs. Ambient Temperature

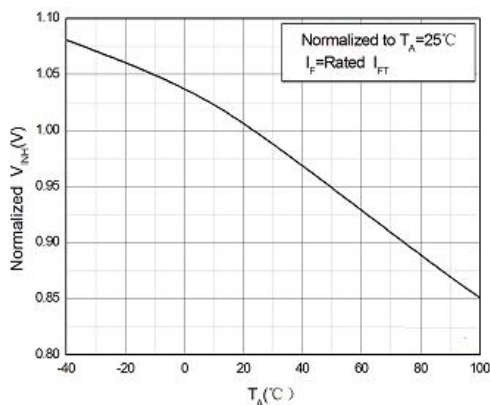
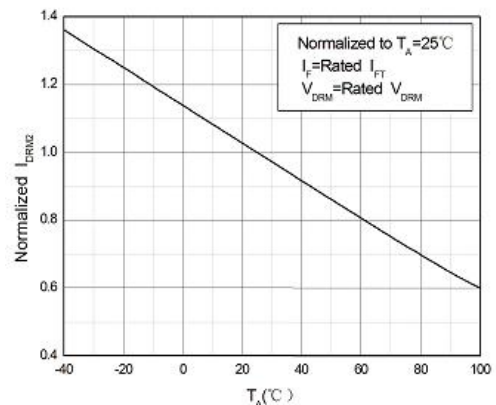


Fig.12 Normalized Leakage in Inhibit State vs. Ambient Temperature



CHARACTERISTIC CURVES

Fig.13 Turn On Time vs. Forward Current

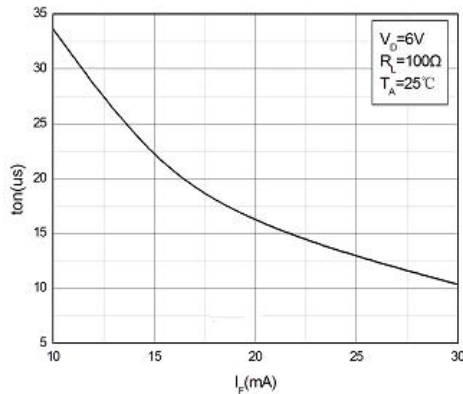
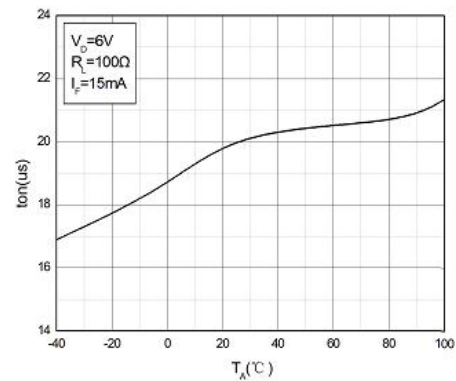


Fig.14 Turn On Time vs. Ambient Temperature



TEST CIRCUITS

Fig.15 Test Circuits of Turn On Time

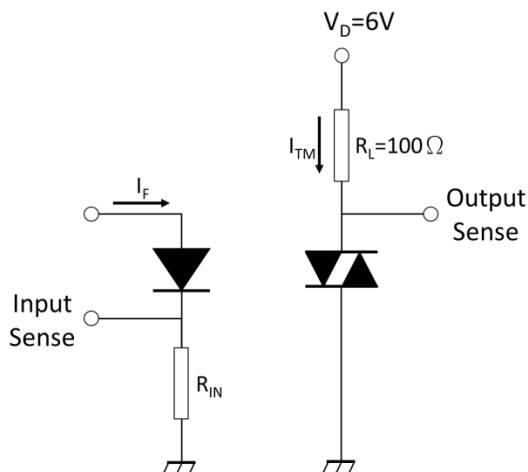


Fig.16 Waveforms of Turn On Time

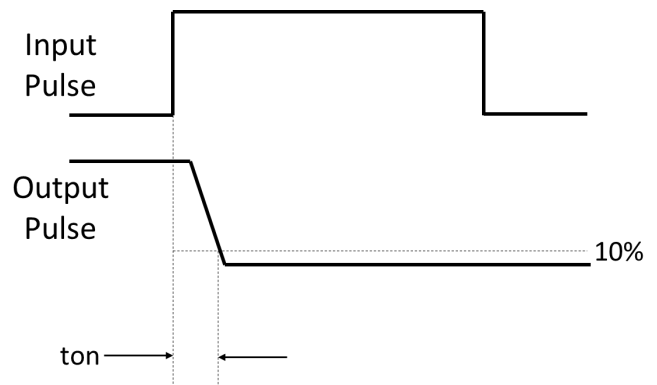


Fig.17 Test Circuits of dV/dt

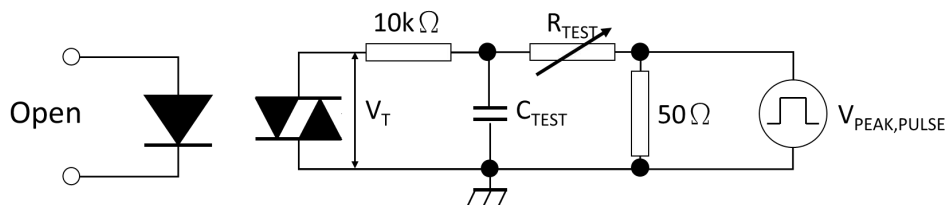
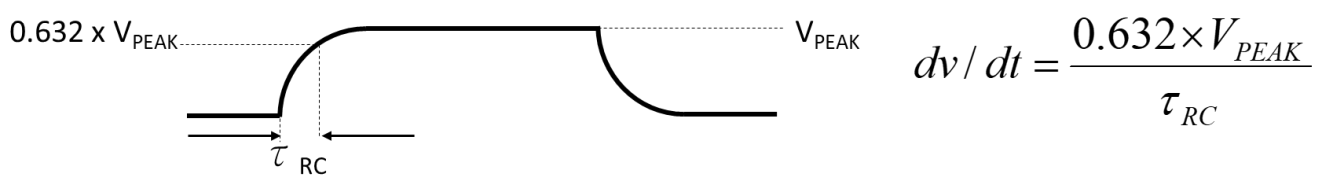
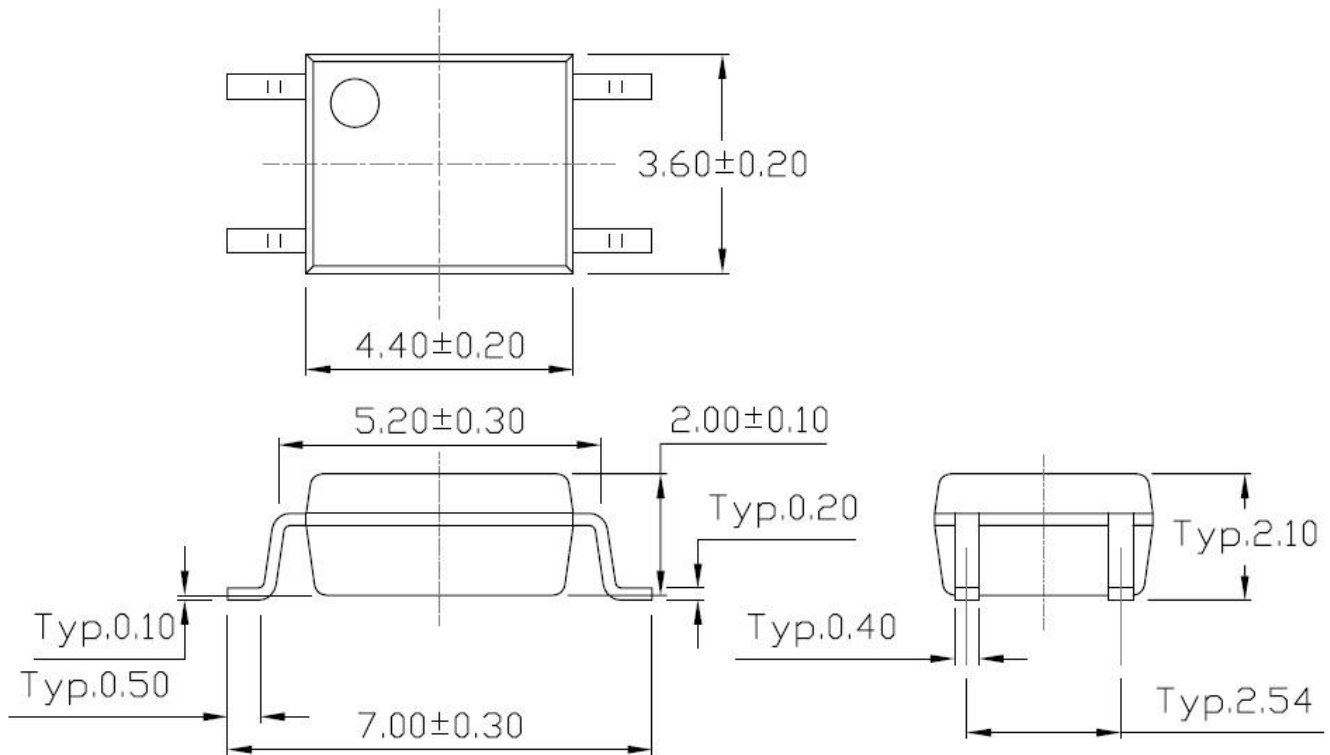


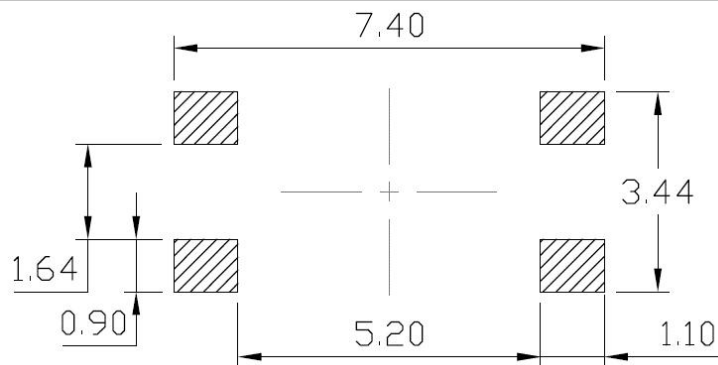
Fig.18 Waveforms of dV/dt



PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

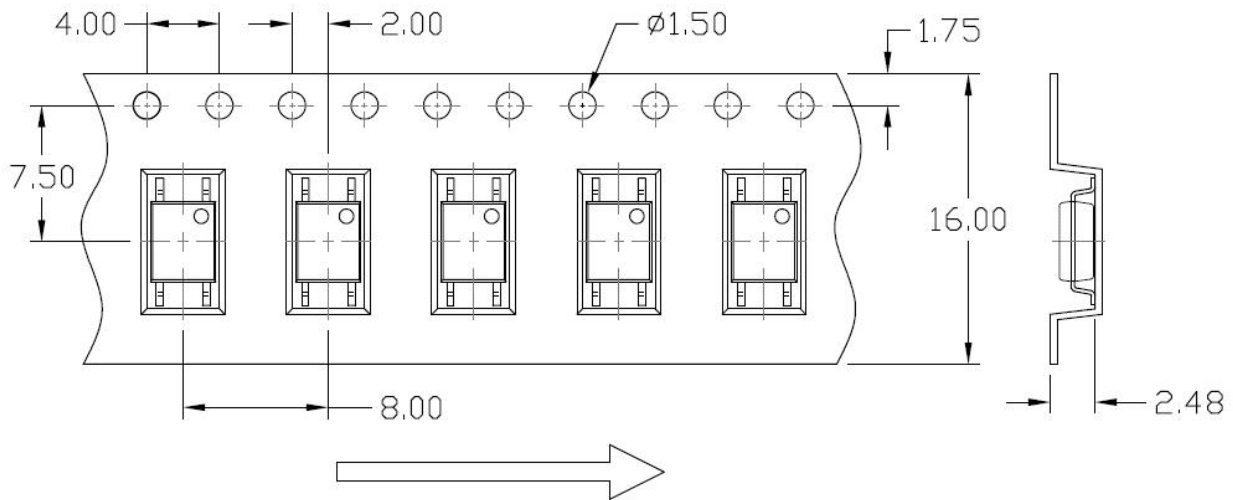


Recommended Solder Mask (Dimensions in mm unless otherwise stated)

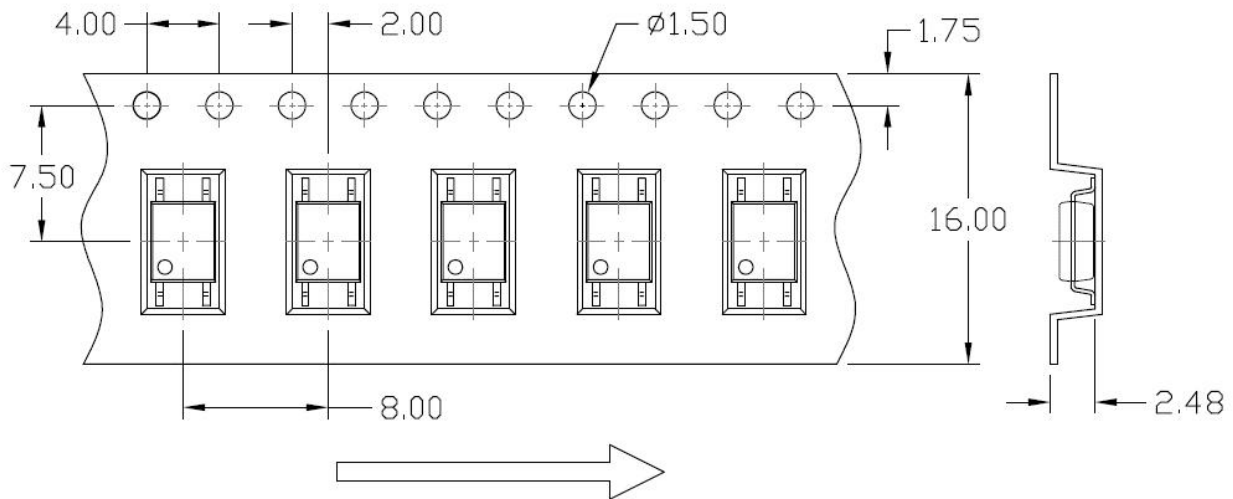


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

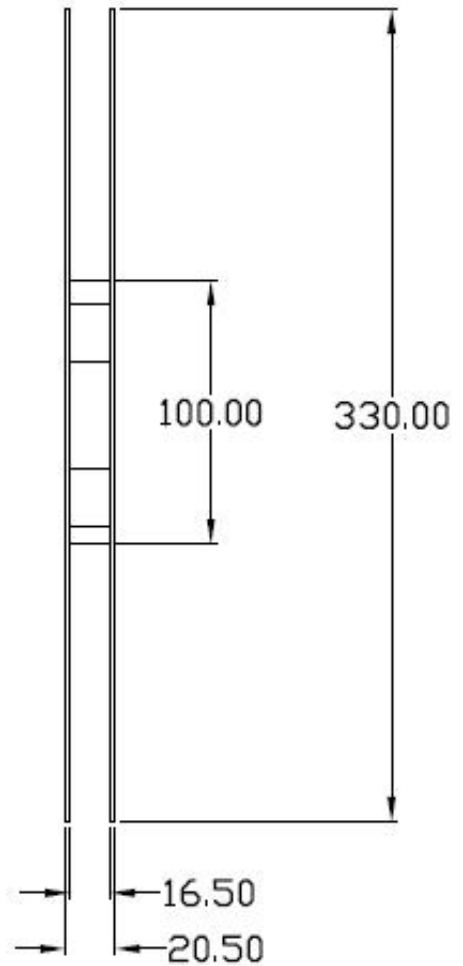
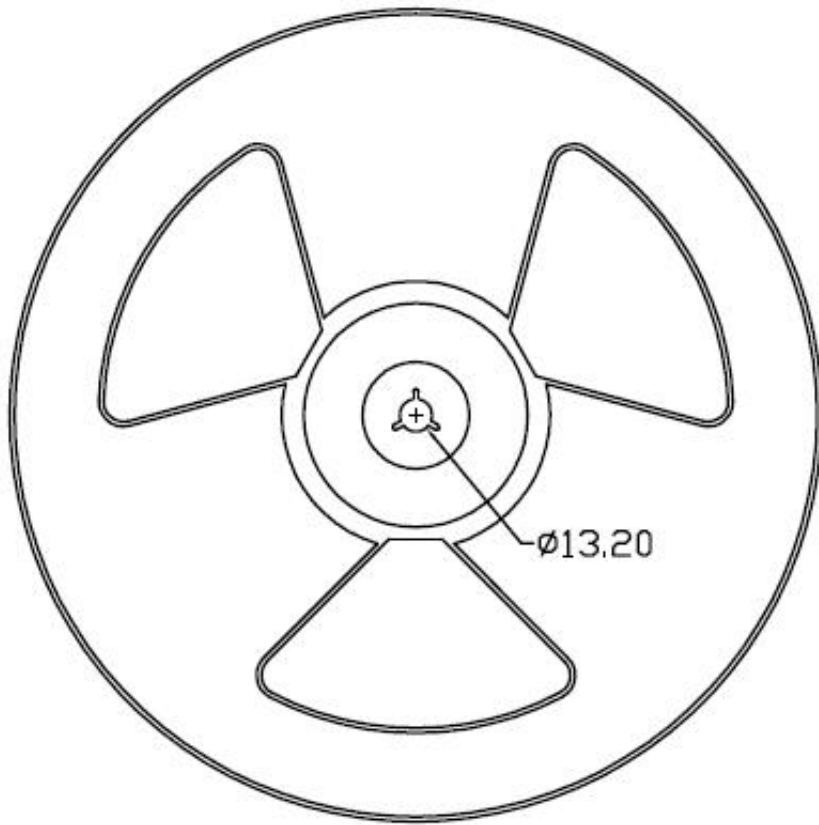


Option T2



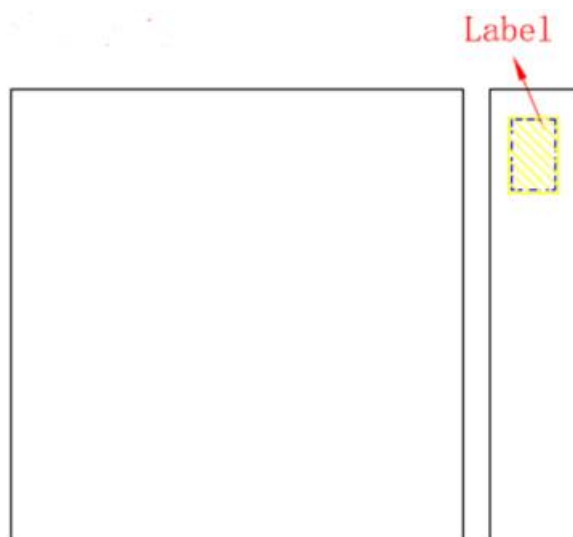
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1 & T2



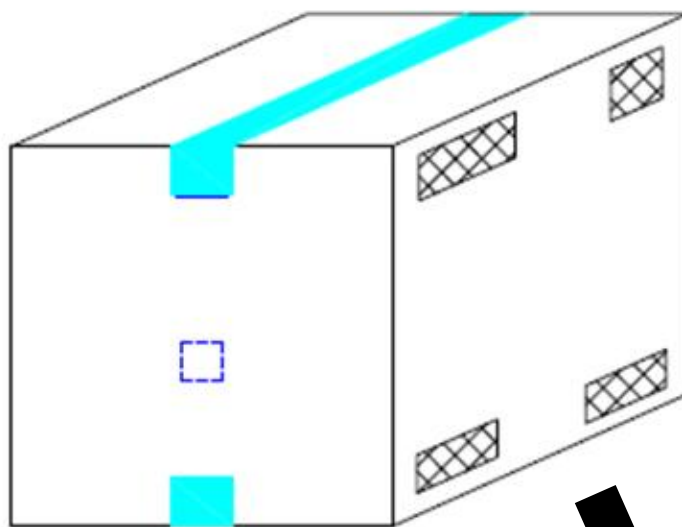
BOX SPECIFICATIONS (Reel Type)

Inner Box

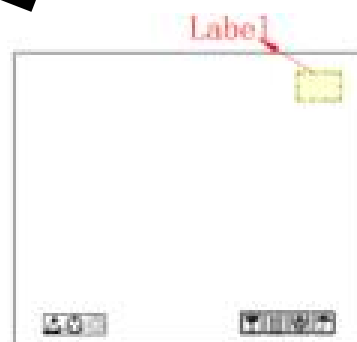


- L x W x H = 36cm x 36cm x 6.9cm

Outer Box

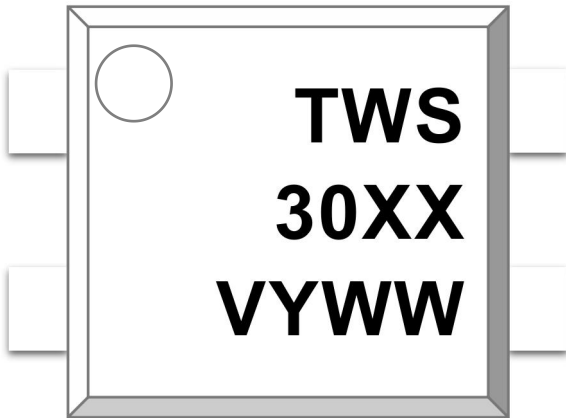


- Option1: L x W x H = 45cm x 38cm x 38cm
- Option2: L x W x H = 39cm x 38cm x 38cm



ORDERING AND MARKING INFORMATION

MARKING INFORMATION



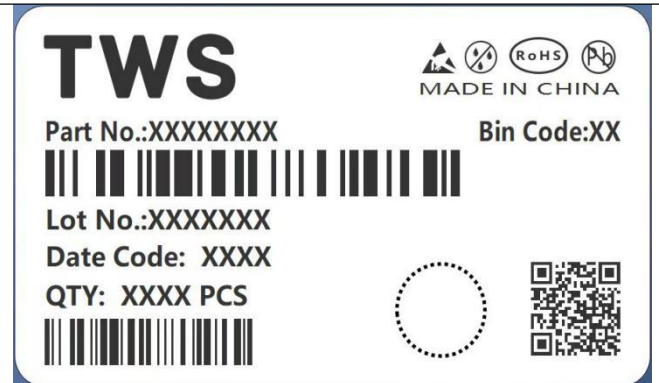
TWS : Company Abbr.
30XX : Part Number
V : VDE Option
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION

TWS30XX(Z)-GV

TWS – Company Abbr.
 30XX – Part Number
 (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)

LABEL INFORMATION

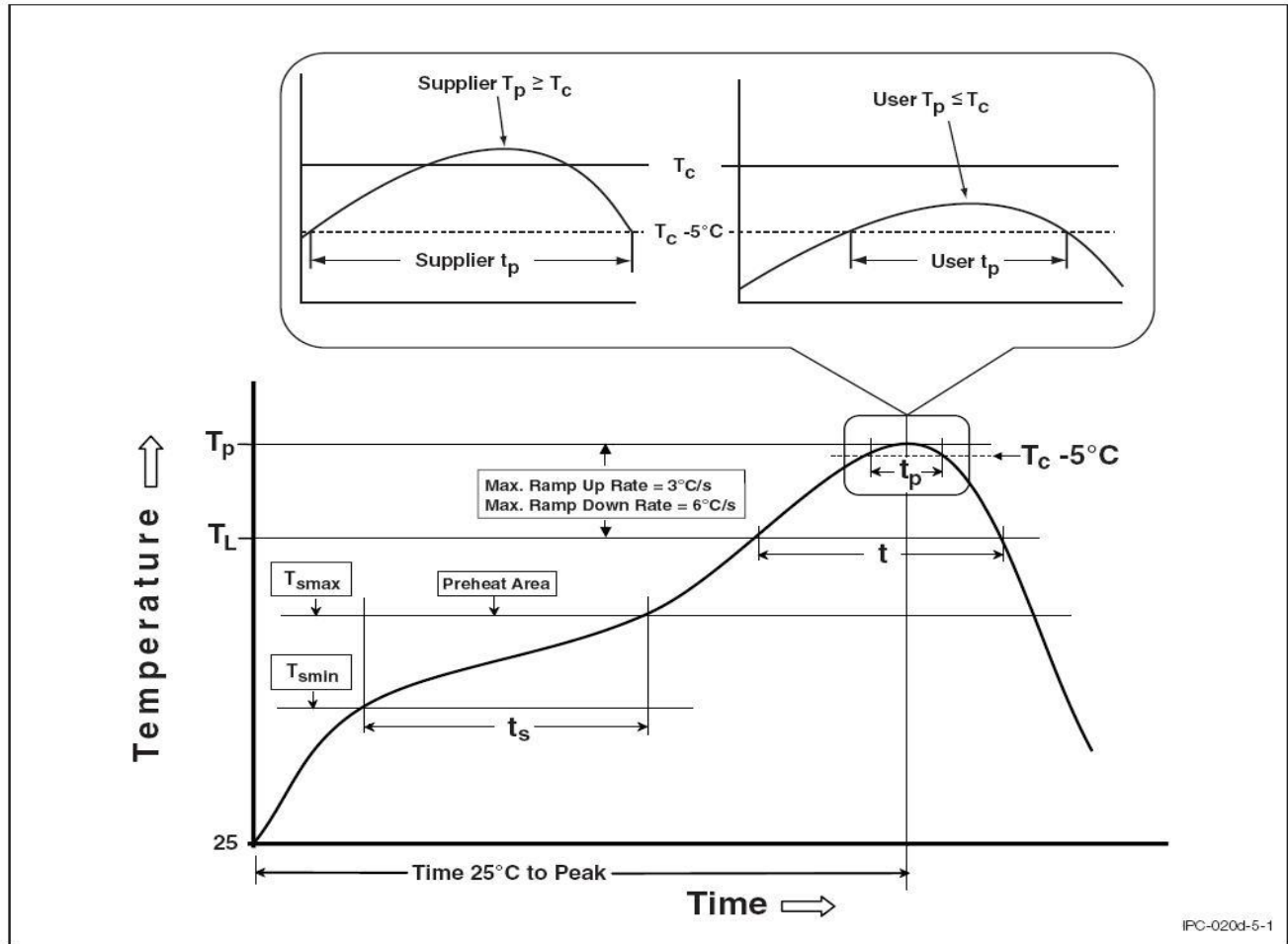


PACKING QUANTITY

Option	Quantity	Quantity – Inner box	Quantity – Outer box
T1	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units
T2	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box = 45k Units

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.

DISCLAIMER

- TWS is continually improving the quality, reliability, function and design. TWS reserves the right to make changes without further notices.
- 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 TWS 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 TWS'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.