TWS100X(B) Series

LSOP4, DC Input, Photo Transistor Coupler

Description

The TWS100X(B) series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic LSOP4 package.

With the robust coplanar double mold structure, TWS100X(B) series provide the most stable isolation feature.

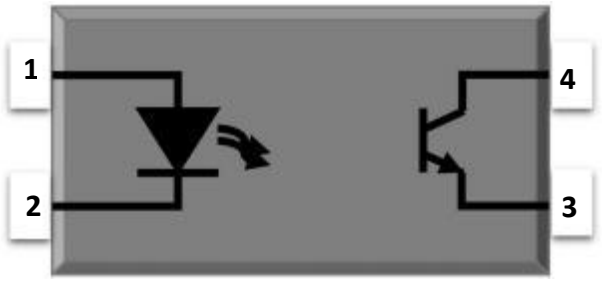
Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1, GB8898

Applications

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

SCHEMATIC



PIN DEFINITION

1. **Anode**
2. **Cathode**
3. **Emitter**
4. **Collector**

PACKAGE OUTLINE



ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	VALUE	UNIT	NOTE
INPUT				
Forward Current	I_F	60	mA	
Peak Forward Current	I_{FP}	1	A	1
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	V	
Emitter - Collector Voltage	V_{ECO}	6	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	Ptot	250	mW	
Isolation Voltage	Viso	5000	Vrms	2
Operating Temperature	Topr	-55~110	°C	
Storage Temperature	Tstg	-55~125	°C	
Soldering Temperature	Tsol	260	°C	

Note 1. 100μs pulse, 100Hz frequency

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

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	Cin	-	30	250	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	V_{CE}=20V, I_F=0	
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	I_C=0.1mA, I_F=0	
Emitter-Collector Breakdown Voltage	BV_{ECO}	6	-	-	V	I_E=0.1mA, I_F=0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	TWS1000	CTR	300	-	600	%	I_F=5mA, V_{CE}=5V	
	TWS1005		50	-	150			
	TWS1006		100	-	300			
	TWS1007		80	-	160			
	TWS1008		130	-	260			
	TWS1009		200	-	400			
	TWS1001		60	-	300		I_F=10mA, V_{CE}=5V	
	TWS1002		63	-	125			
	TWS1003		100	-	200			
	TWS1004		160	-	320			
	TWS1002		22	-	-		I_F=1mA, V_{CE}=5V	
	TWS1003		34	-	-			
	TWS1004		56	-	-			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$		-	0.1	0.3	V	I_F=10mA, I_C=1mA	
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	
Cut-off Frequency	Fc		-	80	-	kHz	V_{CE}=2V, I_C=2mA R_L=100Ω,-3dB	3
Response Time (Rise)	Tr		-	5	18	μs	V_{CE}=2V, I_C=2mA R_L=100Ω	4
Response Time (Fall)	Tf		-	6	18	μs		4

Note 3. Fig.23

Note 4. Fig.24&25

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

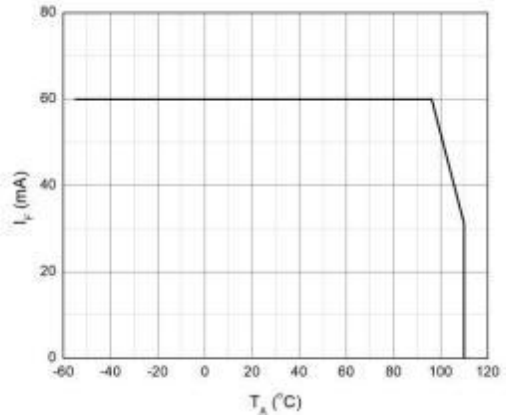


Fig.2 Collector Power Dissipation vs. Ambient Temperature

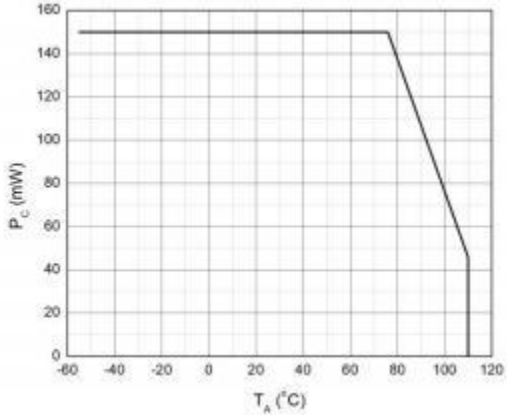


Fig.3 Forward Current vs. Forward Voltage

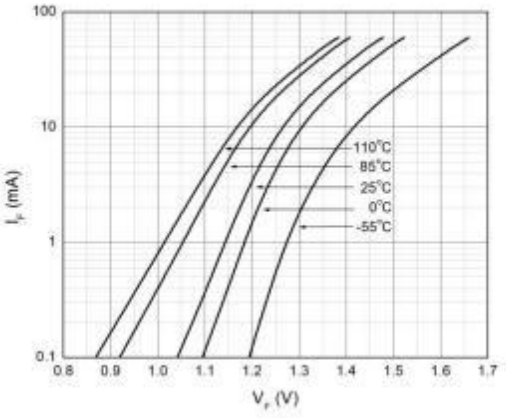


Fig.4 Collector Dark Current vs. Ambient Temperature

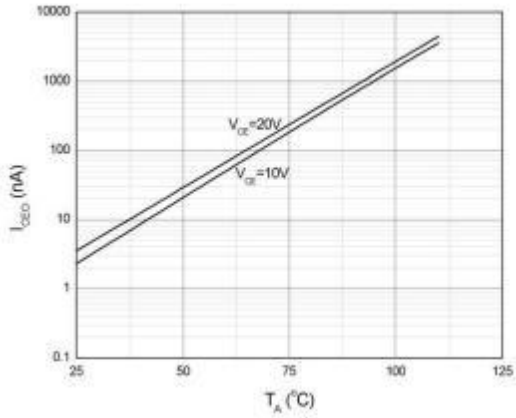


Fig.5 Collector Current vs. Collector-emitter Voltage

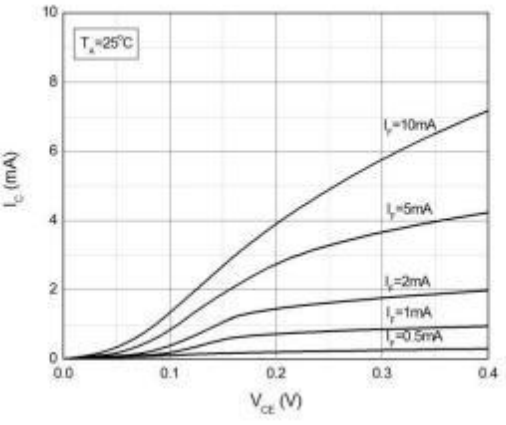
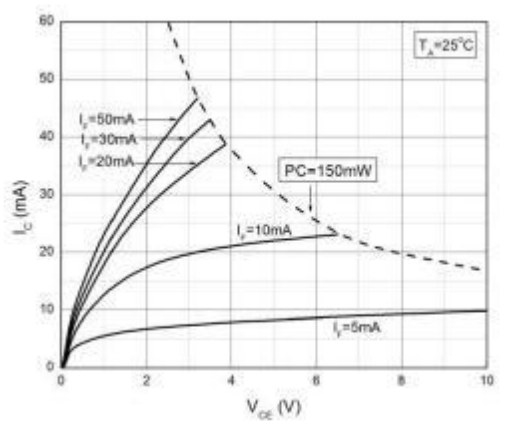


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

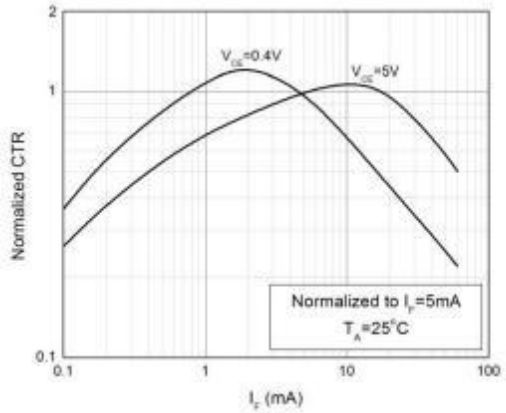


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

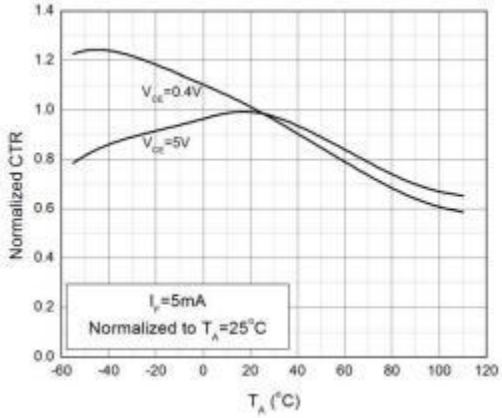


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

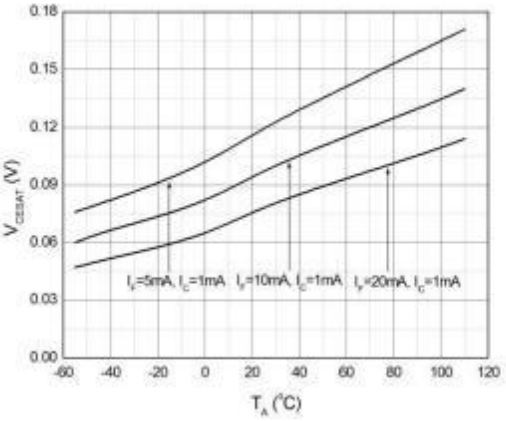


Fig.10 Switching Time vs. Load Resistance

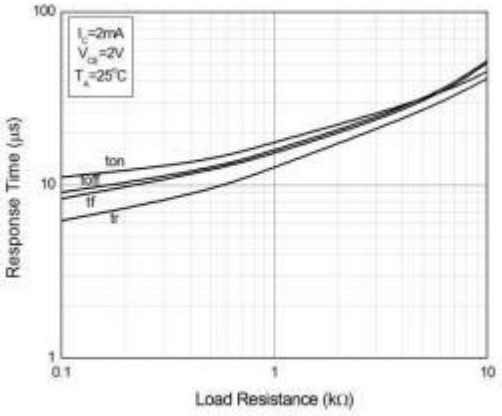
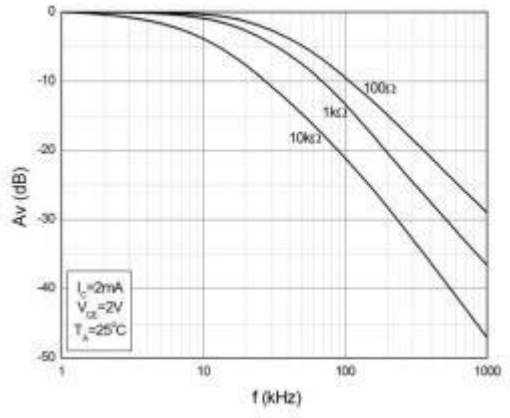


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

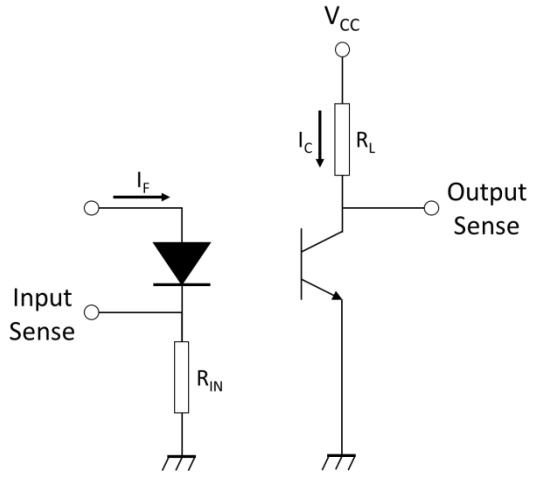


Fig.13 Curves of Response Time

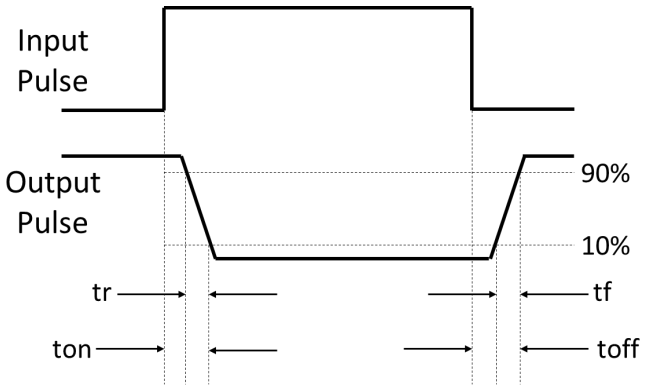
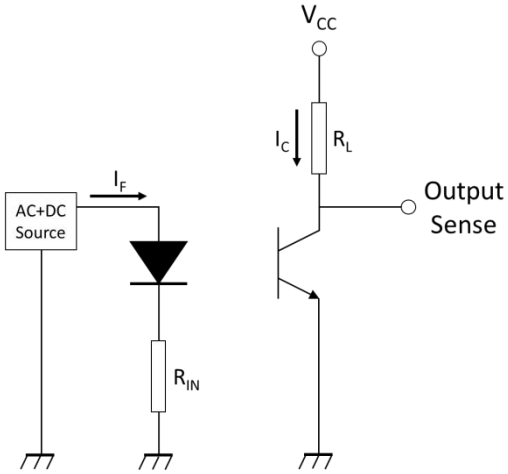
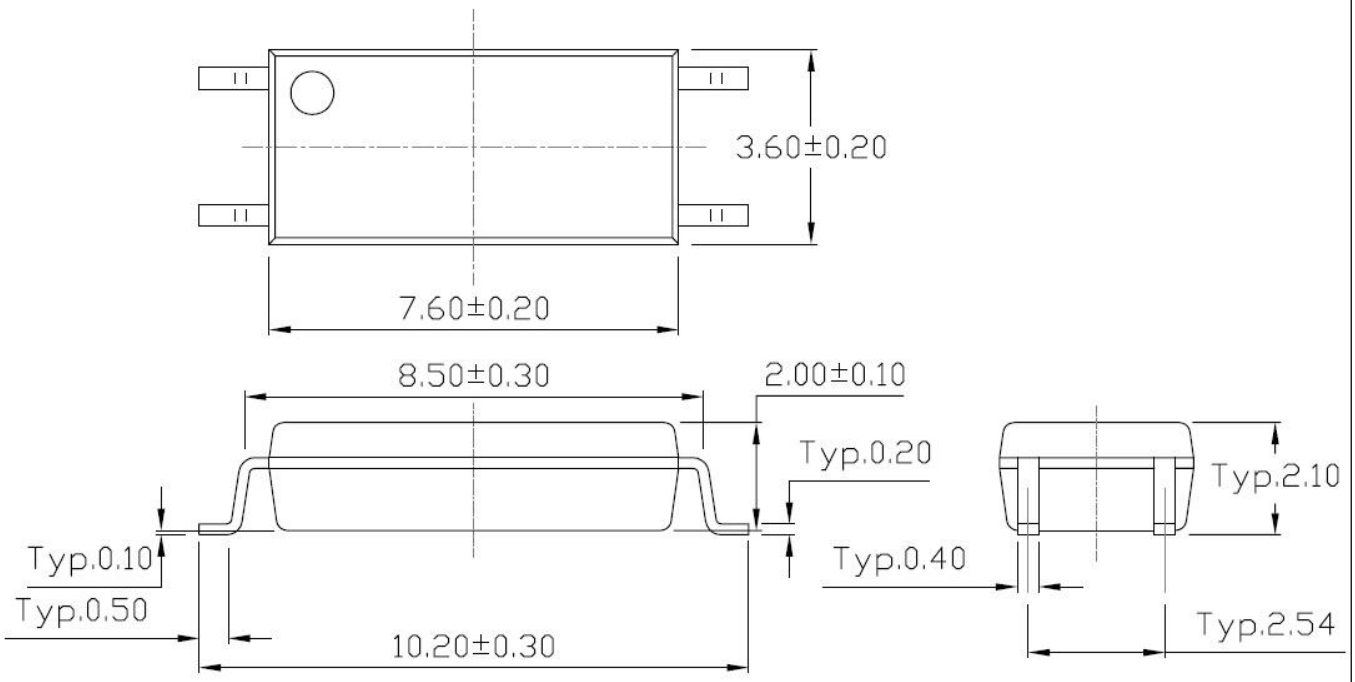


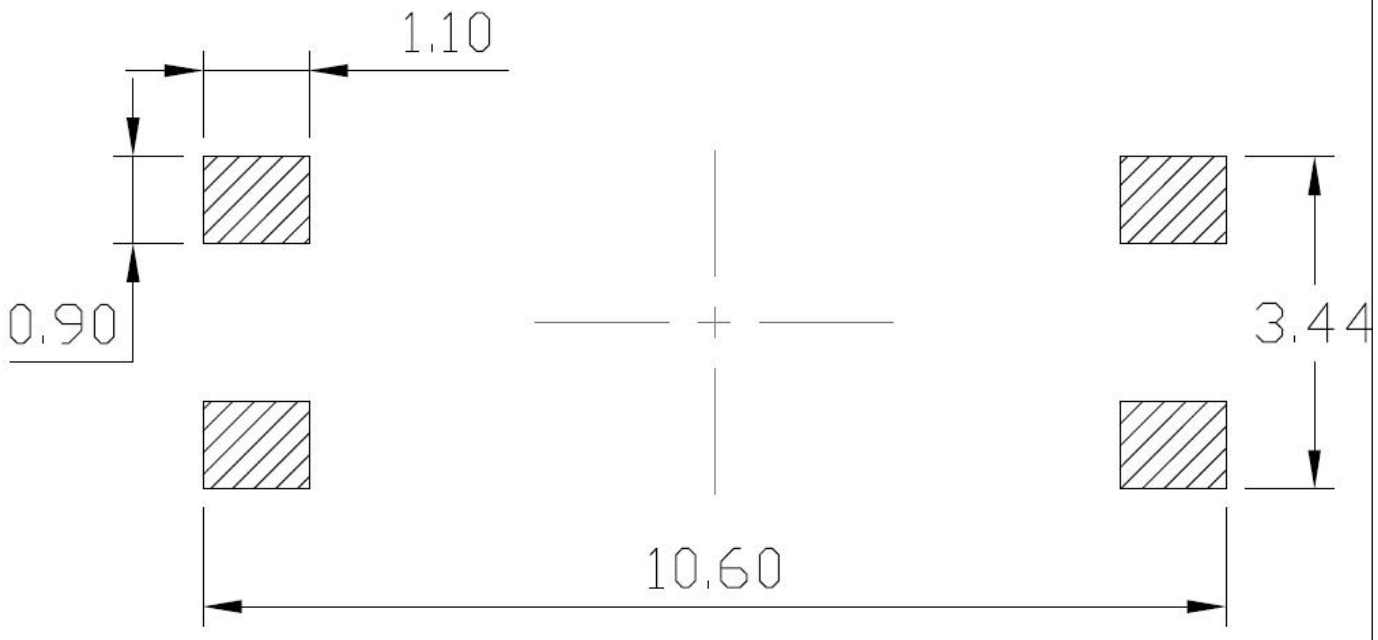
Fig.14 Test Circuits of Frequency Response



PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)

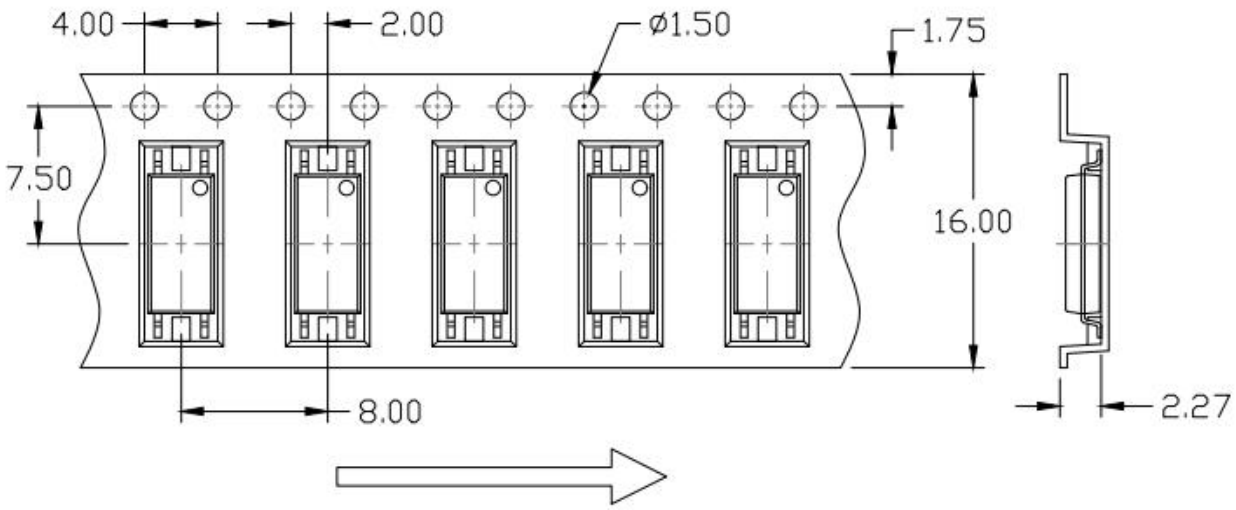


RECOMMENDED SOLDER MASK (Dimensions in mm unless otherwise stated)

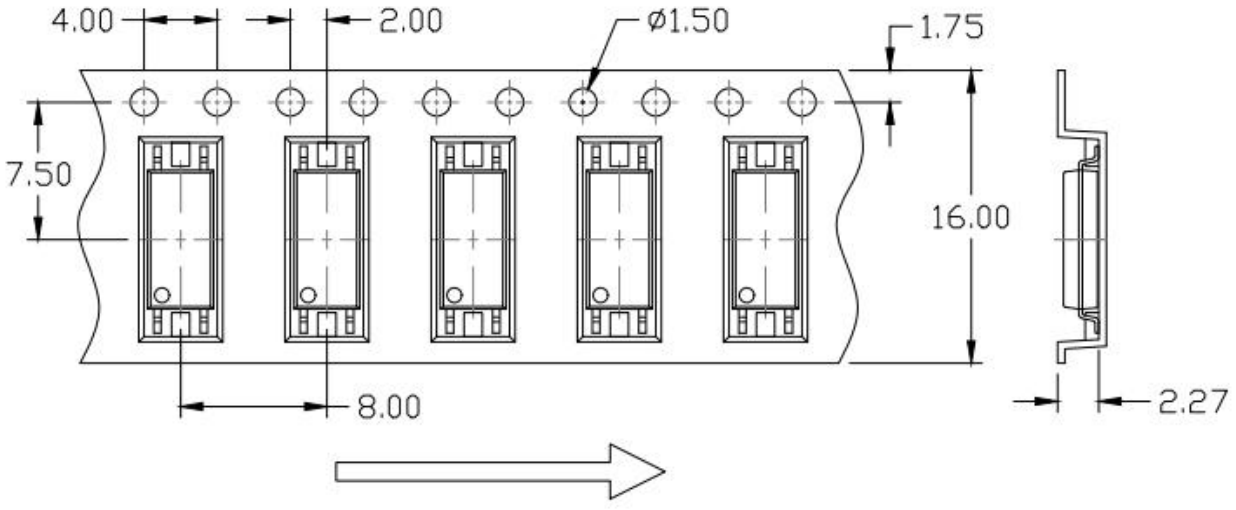


CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1

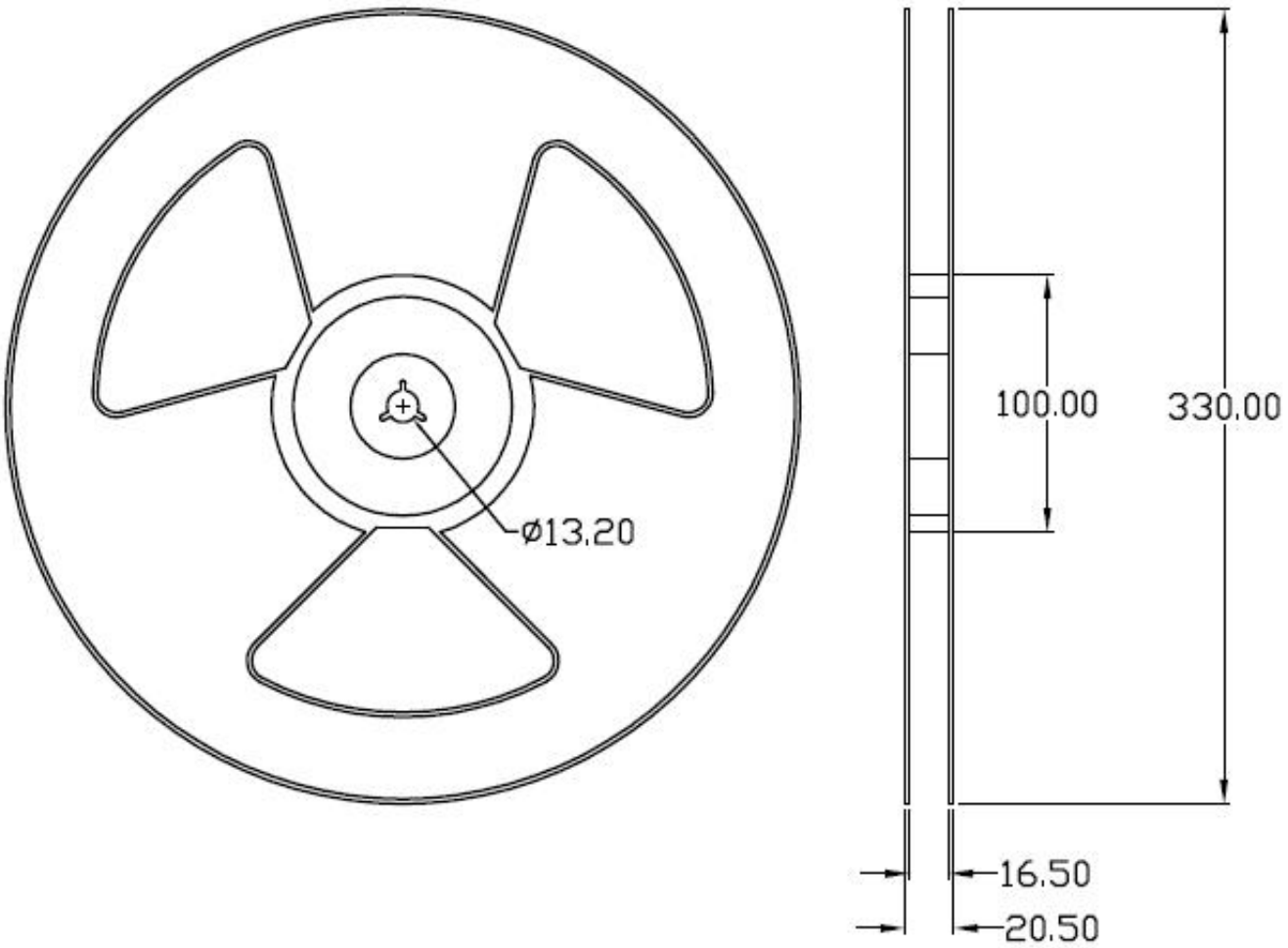


Option T2



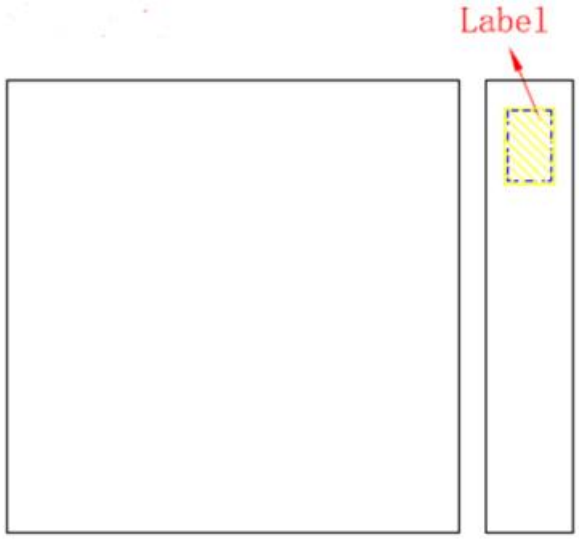
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1 & T2



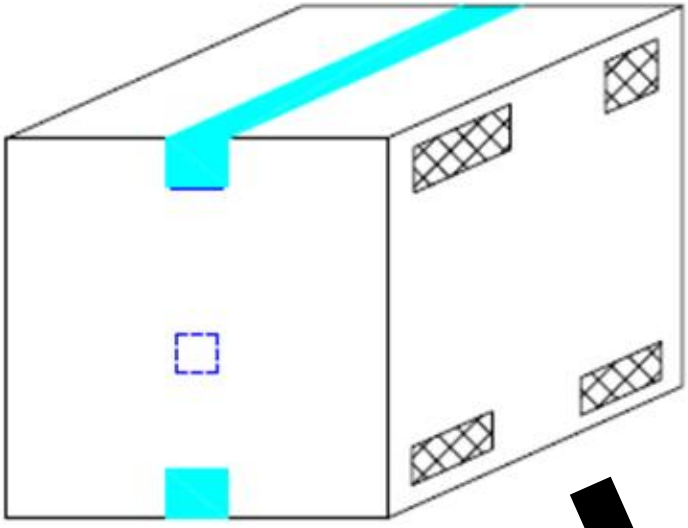
BOX SPECIFICATIONS (Reel Type)

Inner Box

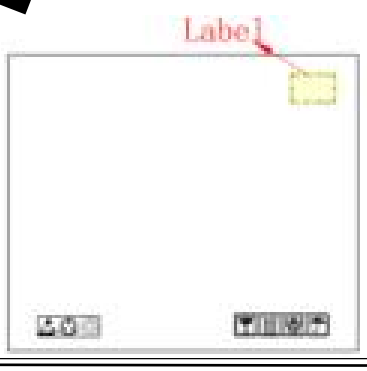


- L x W x H = 36cm x 36cm x 6.9cm

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



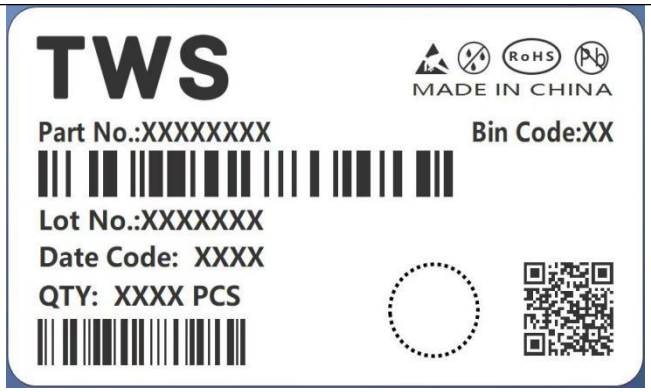
TWS : Company Abbr.
100X : Part Number & Rank
V : VDE Option
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION

TWS100X(Z)-GV(B)

TWS – Company Abbr.
100X – Rank (0/1/2/3/4/5/6/7/8/9)
Z – Tape and Reel Option (T1/T2)
G – Green
V – VDE Option (V or None)
B – Black

LABEL INFORMATION

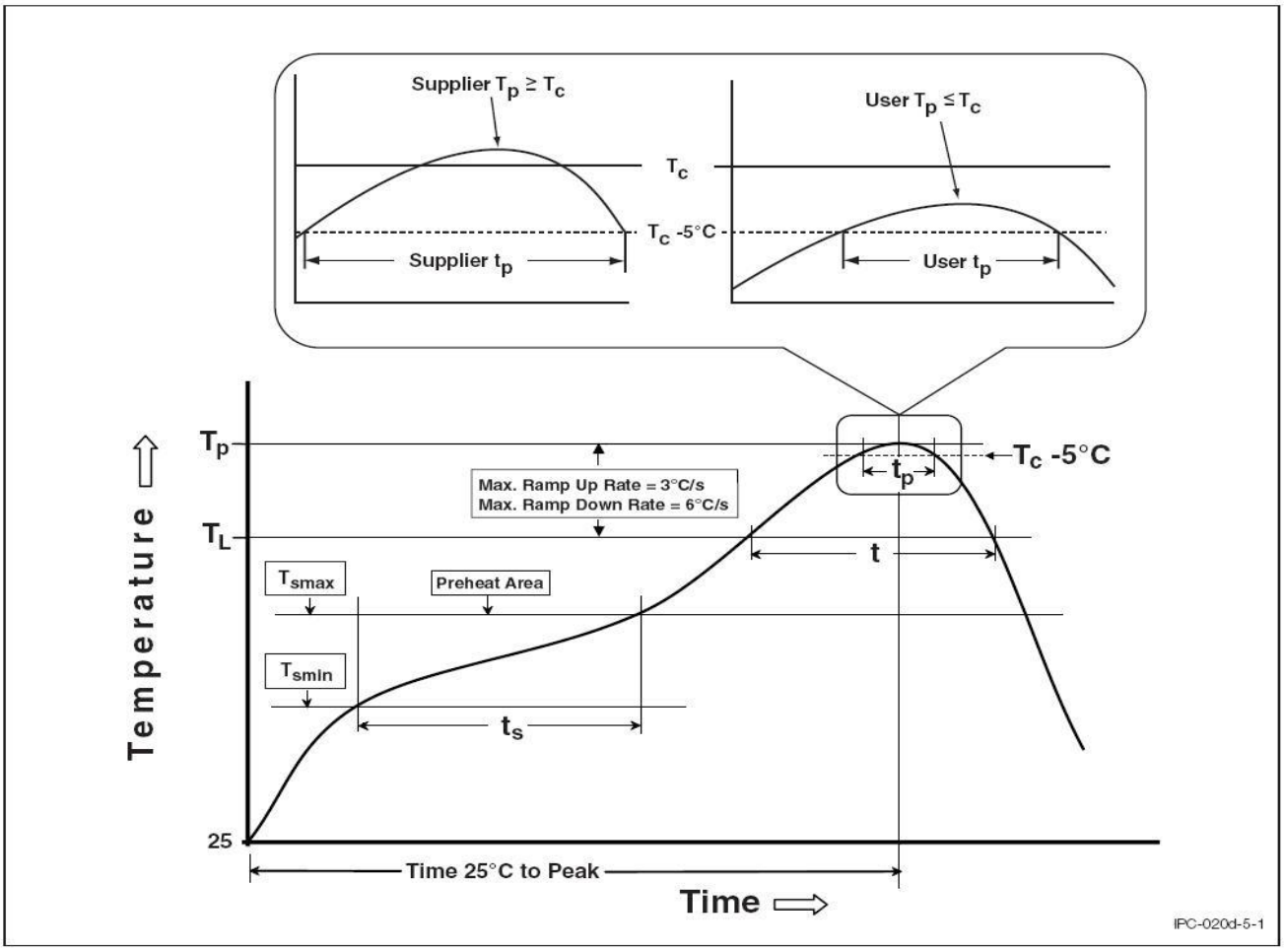


PACKING QUANTITY

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. (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.

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.
- TWS makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, TWS disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- 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.