

SSOP4, DC Input, Photo Transistor Coupler**Description**

The TWS3H7 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SSOP4 package with different lead forming options.

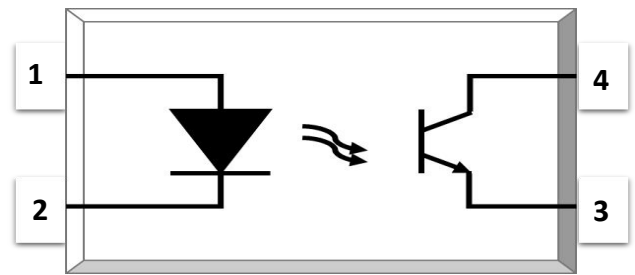
With the robust coplanar double mold structure, TWS3H7 series provide the most stable isolation feature.

Features

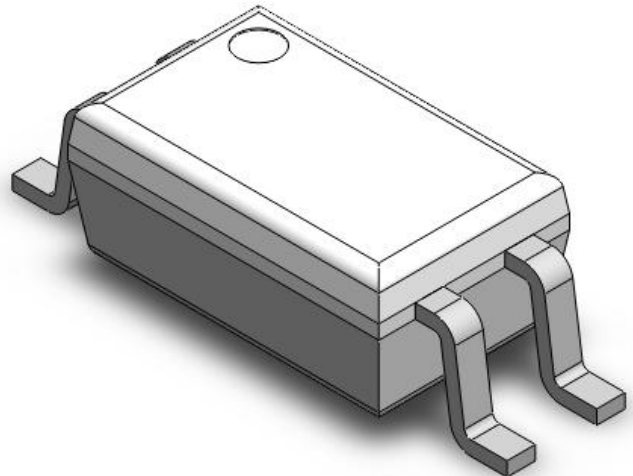
- High isolation 3750 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1, GB8898

Applications

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

SCHEMATIC**PIN DEFINITION**

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

PACKAGE OUTLINE

SSOP4, DC Input, Photo Transistor Coupler**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	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	3750	V _{rms}	2
Operating Temperature	T_{opr}	-55~110	°C	
Storage Temperature	T_{stg}	-55~125	°C	

Note 1. 100μs pulse, 100Hz frequency

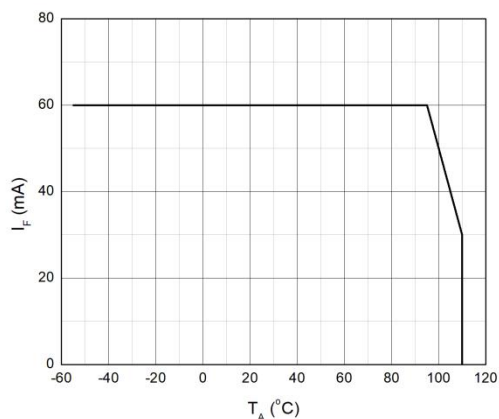
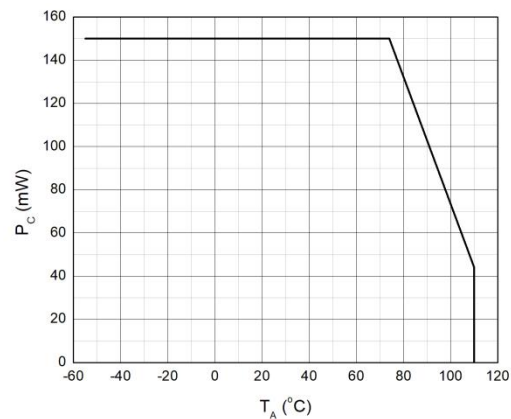
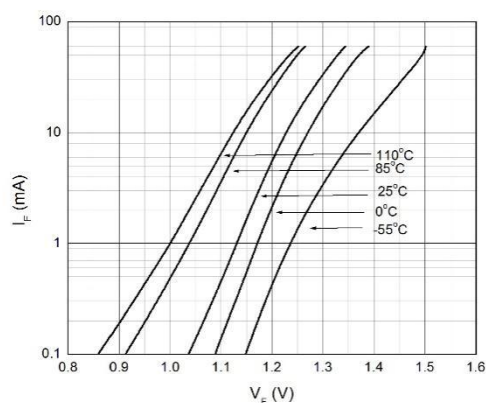
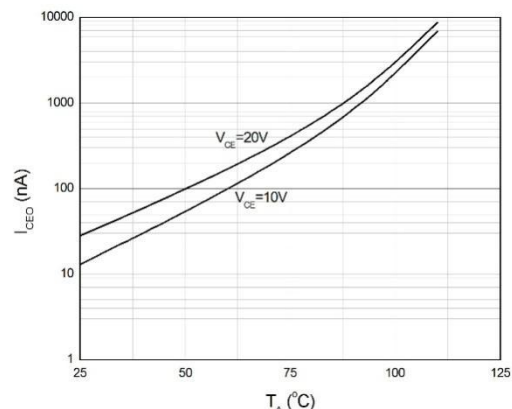
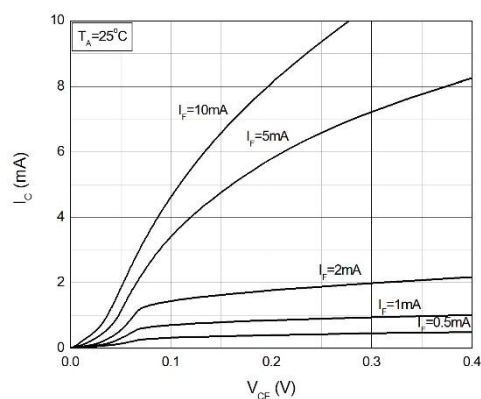
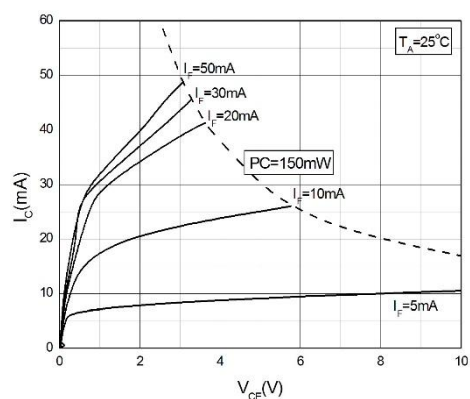
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

SSOP4, DC Input, Photo Transistor Coupler

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C							
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V_F	-	-	1.4	V	$I_F=10\text{mA}$	
Reverse Current	I_R	-	-	10	μA	$V_R=6\text{V}$	
Input Capacitance	C_{in}	-	10	-	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE}=20\text{V}, I_F=0$	
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	$I_C=0.1\text{mA}, I_F=0$	
Emitter-Collector Breakdown Voltage	BV_{ECO}	6	-	-	V	$I_E=0.1\text{mA}, I_F=0$	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	TWS3H7	CTR	50	-	600	$I_F=5\text{mA}, V_{CE}=5\text{V}$	
	TWS3H7A		80	-	160		
	TWS3H7B		130	-	260		
	TWS3H7C		200	-	400		
	TWS3H7D		300	-	600		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.1	0.2	V	$I_F=10\text{mA}, I_C=1\text{mA}$	
Isolation Resistance	R_{ISO}	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.4	1	pF	$V=0, f=1\text{MHz}$	
Response Time (Rise)	t_r	-	3	18	μs	$V_{CE}=2\text{V}, I_C=2\text{mA}$	3
Response Time (Fall)	t_f	-	4	18	μs	$R_L=100\Omega$	3
Cut-off Frequency	f_c	-	80	-	kHz	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$	4

Note 3. Fig.12&13

Note 4. Fig.14

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

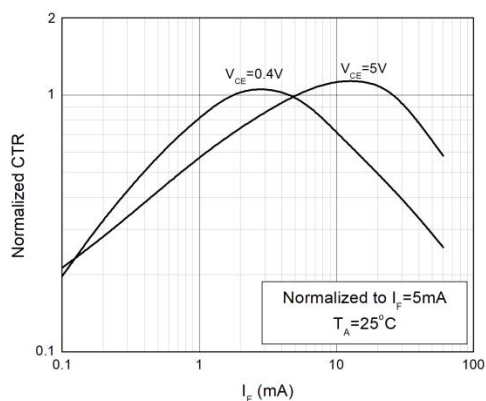
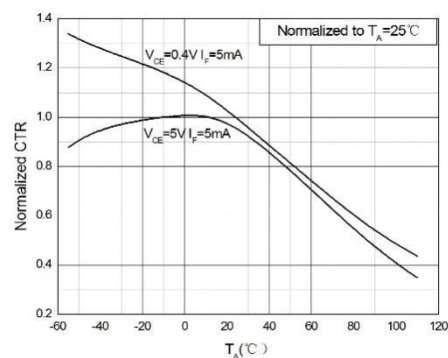
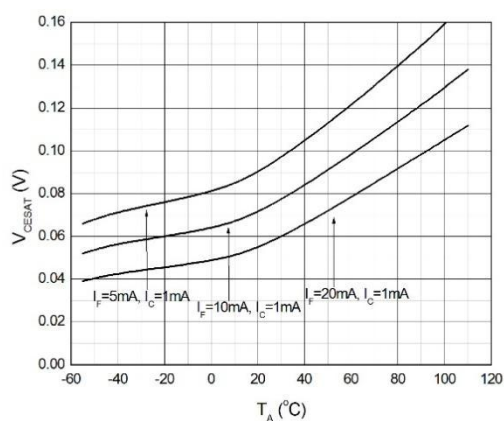
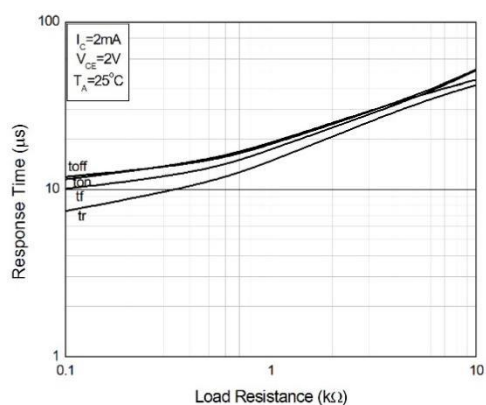
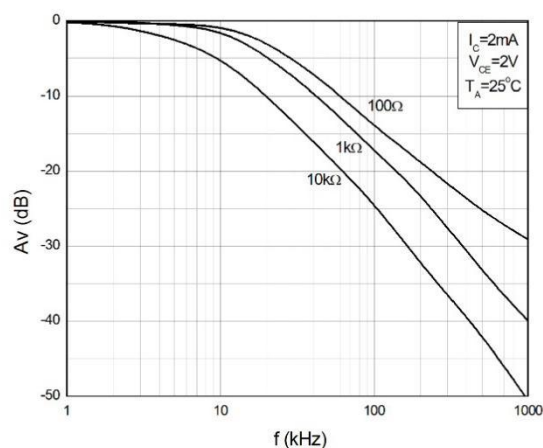
Fig.7 Normalized Current Transfer Ratio
vs. Forward CurrentFig.8 Normalized Current Transfer Ratio
vs. Ambient TemperatureFig.9 Collector-emitter Saturation Voltage
vs. Ambient TemperatureFig.10 Switching Time
vs. Load Resistance

Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

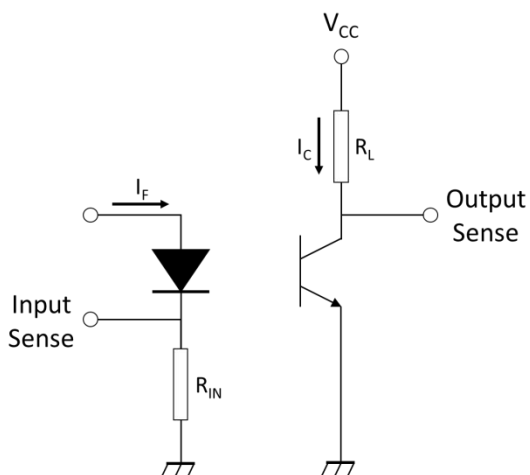


Fig.13 Curves of Response Time

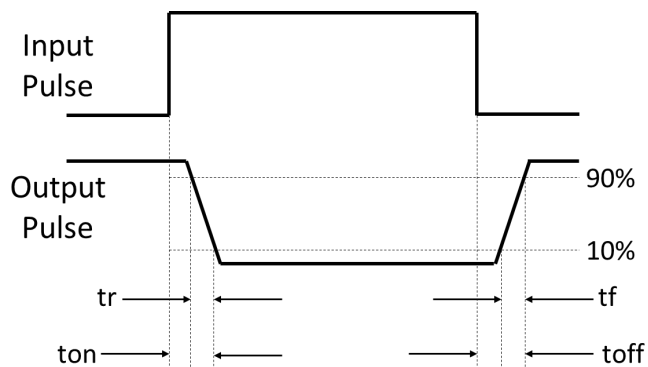
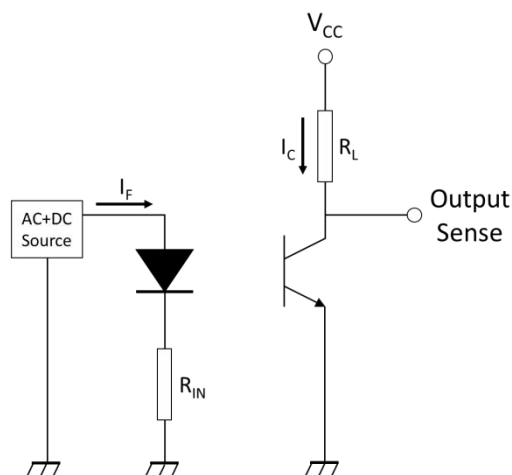
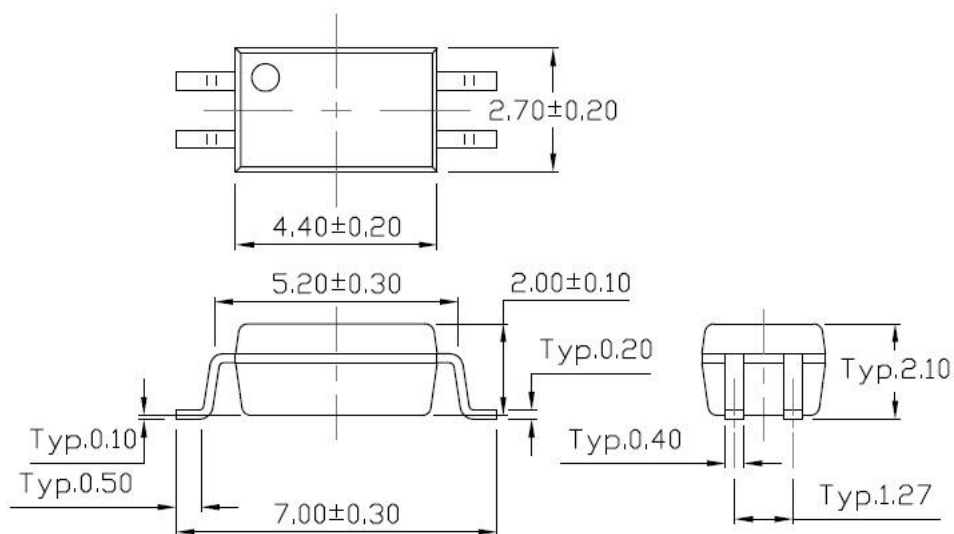
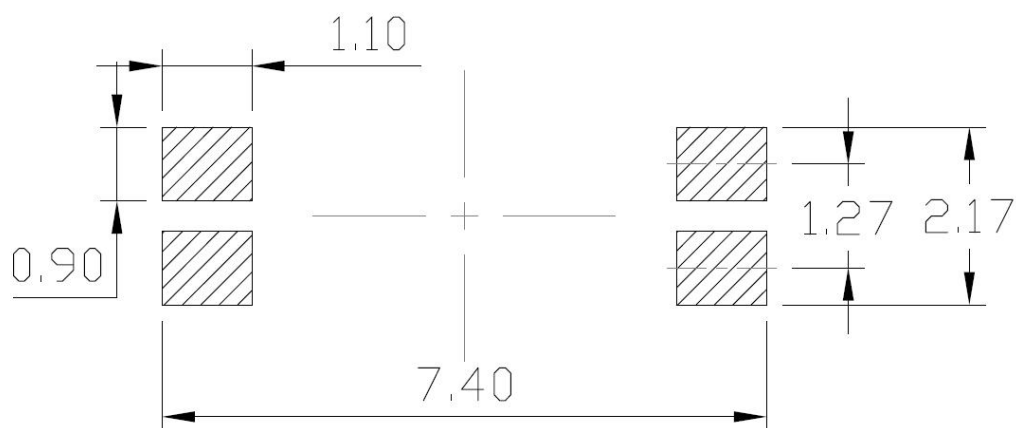
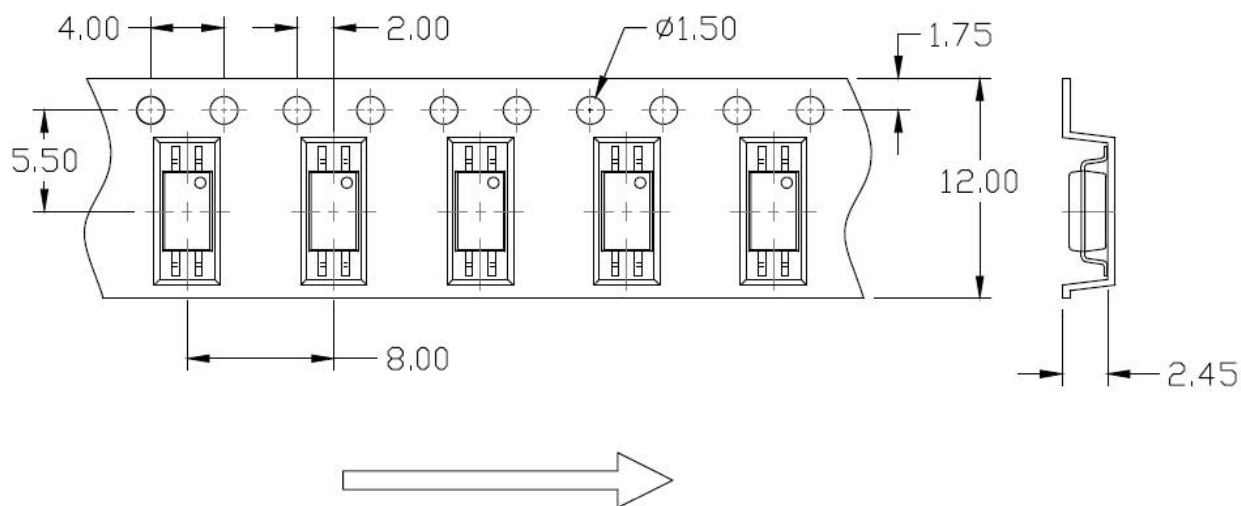
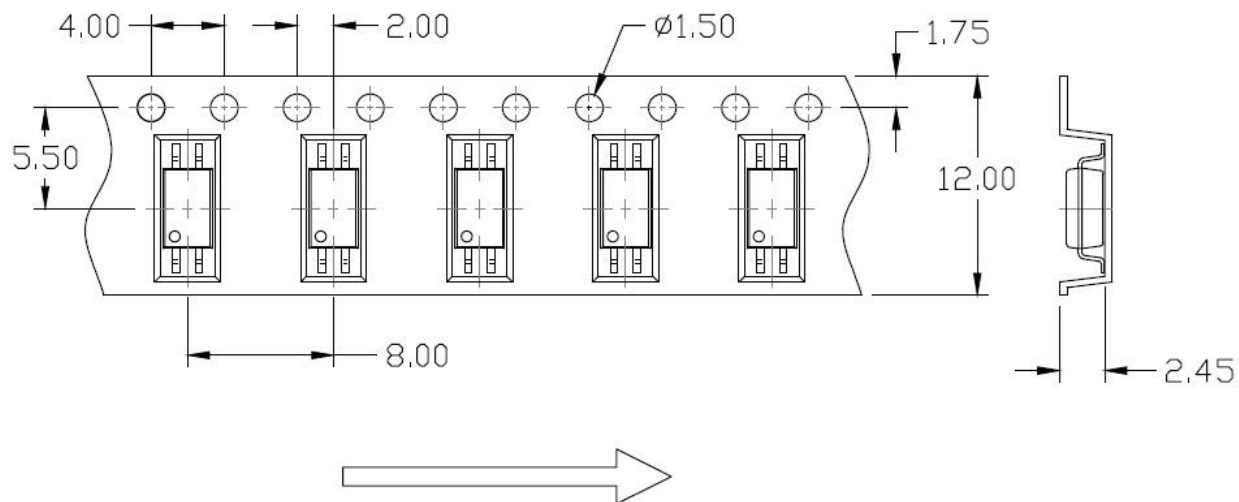
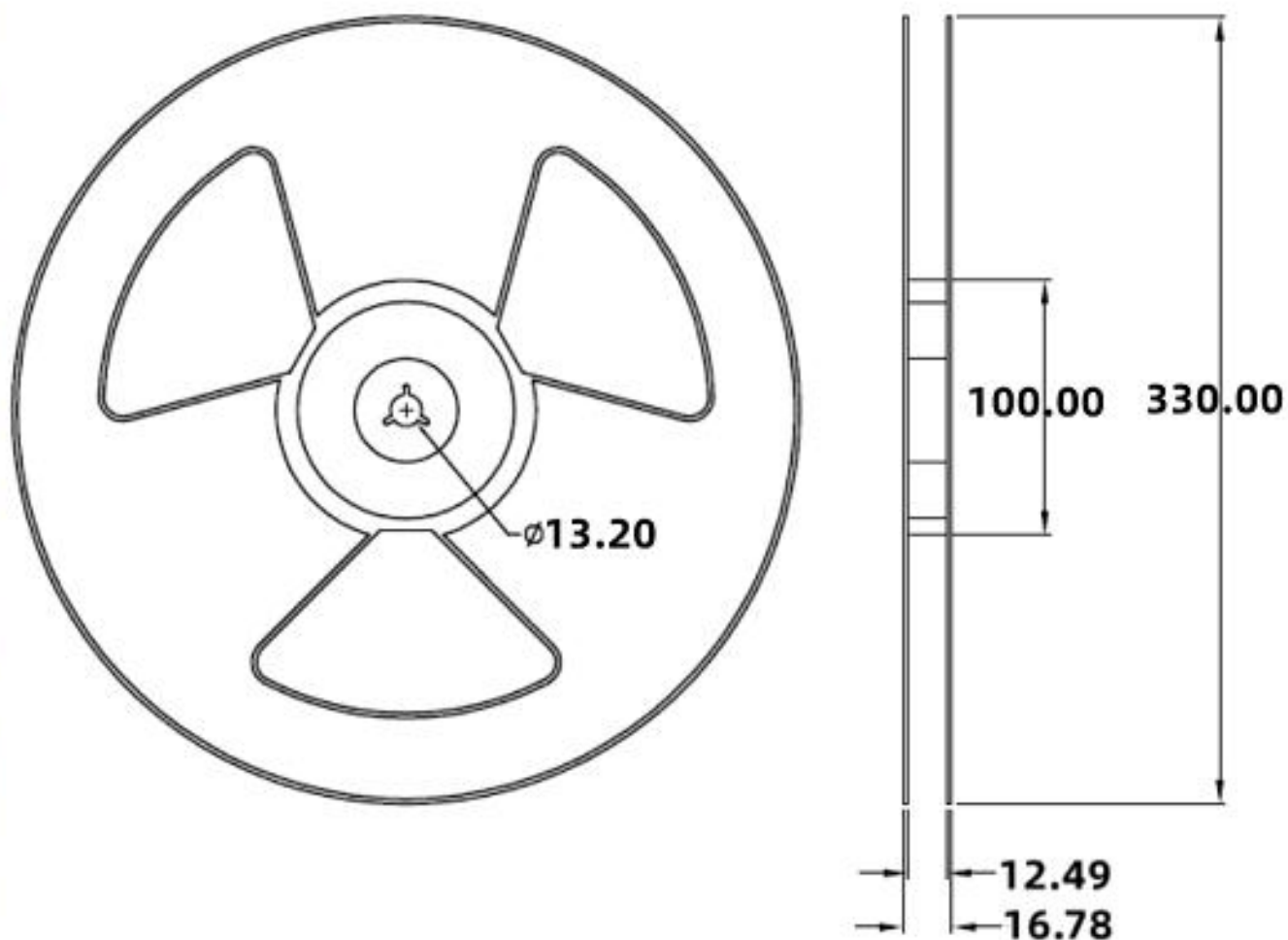


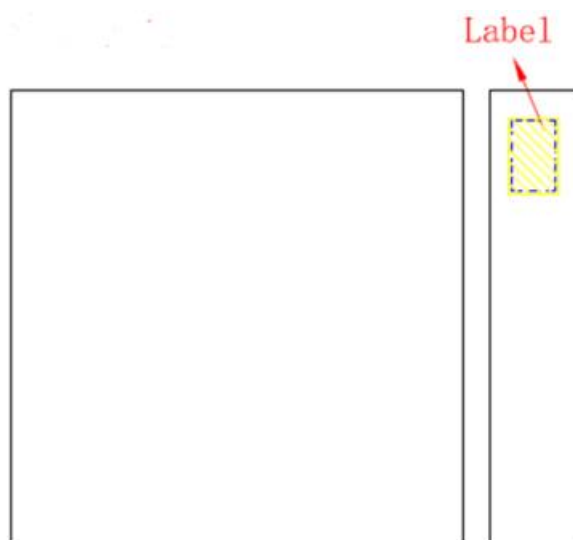
Fig.14 Test Circuits of Frequency Response



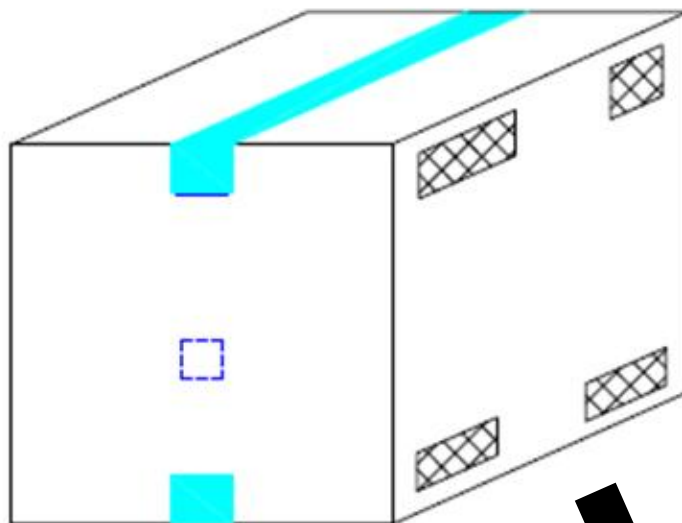
SSOP4, DC Input, Photo Transistor Coupler**PACKAGE DIMENSIONS** (Dimensions in mm unless otherwise stated)**Recommended Solder Mask** (Dimensions in mm unless otherwise stated)

CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**Option T1****Option T2**

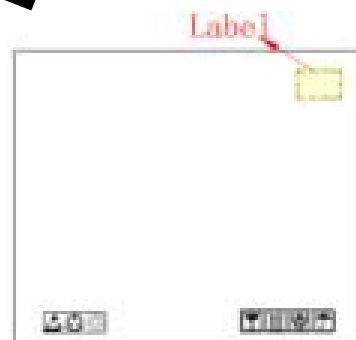
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**Option T1 & T2**

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

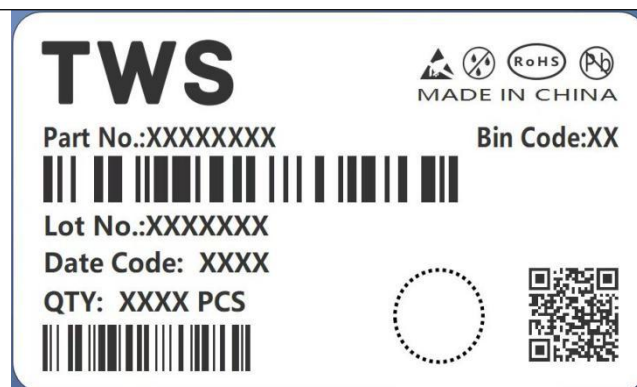


ORDERING AND MARKING INFORMATION**MARKING INFORMATION**

TWS : Company Abbr.
3H7 : Part Number
X : CTR Rank
V : VDE Option
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION**TWS3H7X(Z)-GV**

TWS – Company Abbr.
 3H7 – Part Number
 X – Rank (A/B or None)
 Z – Tape and Reel Option (T1/T2)
 G – Green
 V – VDE Option (V or None)

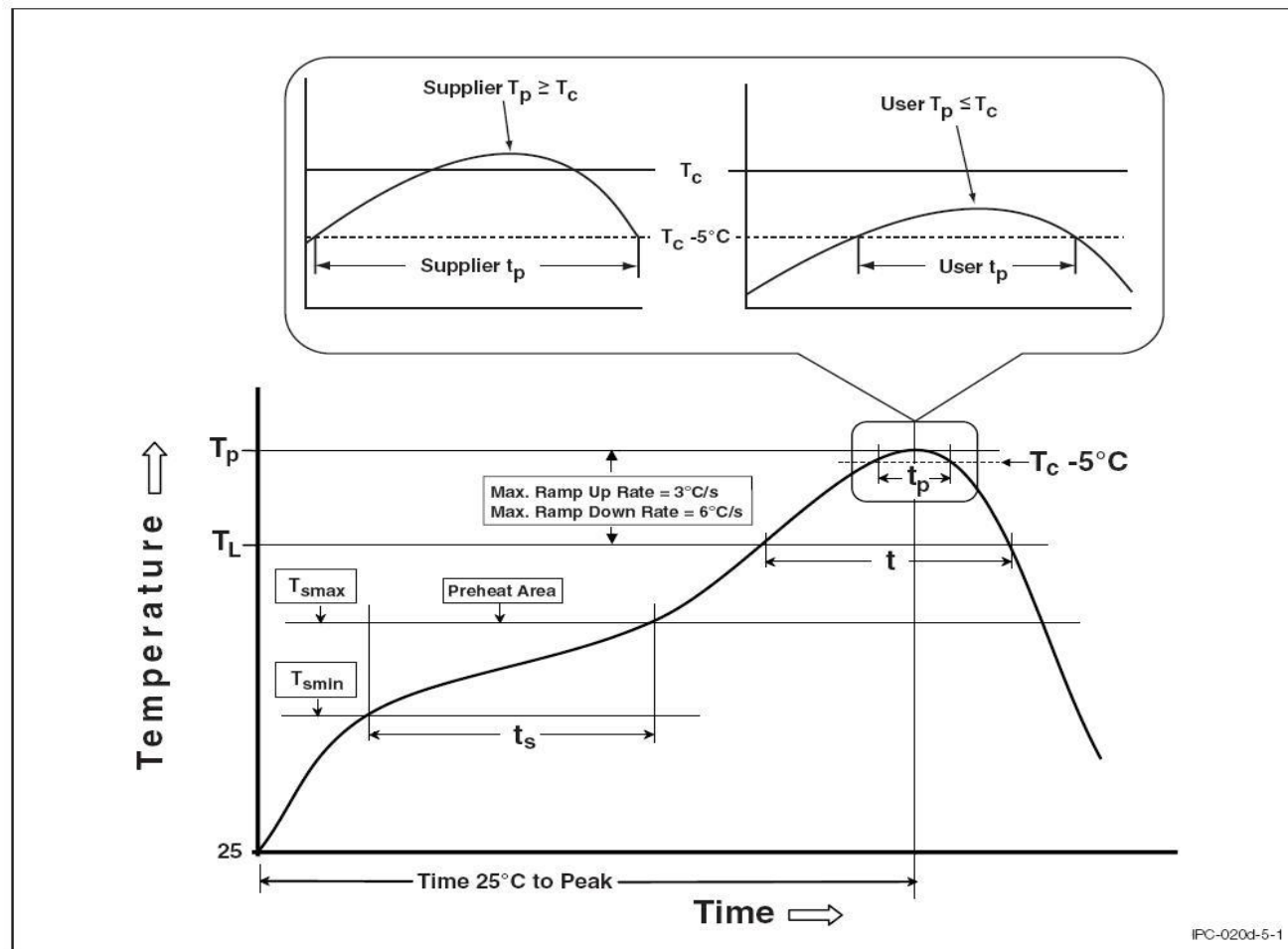
LABEL INFORMATION**PACKING QUANTITY**

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

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REFLOW INFORMATION

REFLOW PROFILE



IPC-020d-5-1

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.

SSOP4, DC Input, Photo Transistor Coupler**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.