

SOP4, AC Input, Photo Transistor Coupler**Description**

The TWS354X1 series combine two AlGaAs infrared emitting diode as the AC input which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package.

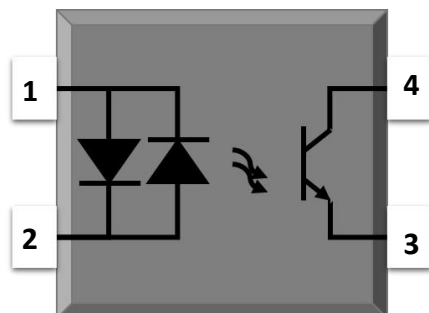
With the robust coplanar double mold structure, TWS354X1 series provide the most stable isolation feature.

Features

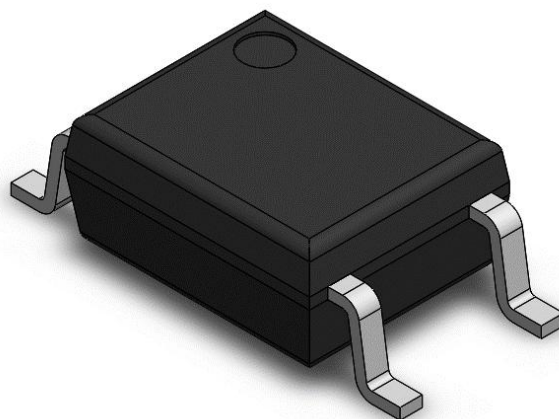
- High isolation 3750 VRMS
- CTR flexibility available see order information
- AC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1, GB8898

Applications

- AC line monitor
- Programmable controller
- Telephone line interface
- System appliance

SCHEMATIC**PIN DEFINITION**

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

PACKAGE OUTLINE

SOP4, AC 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
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}	-55~150	°C	
Soldering Temperature	T_{sol}	260	°C	

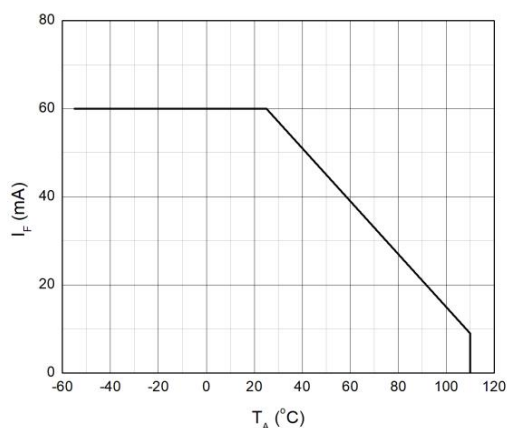
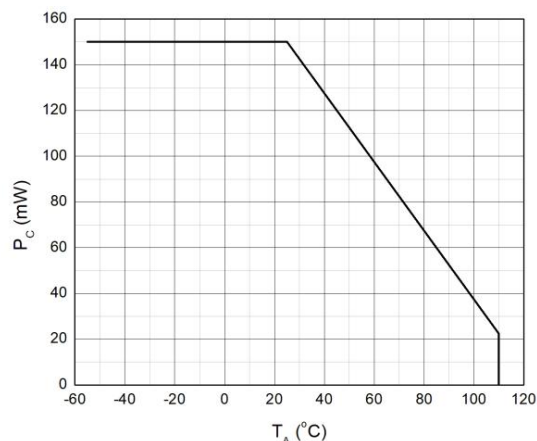
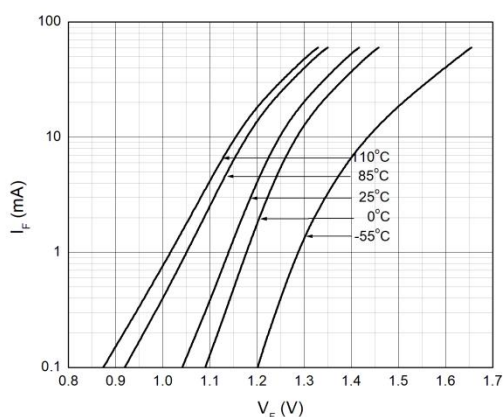
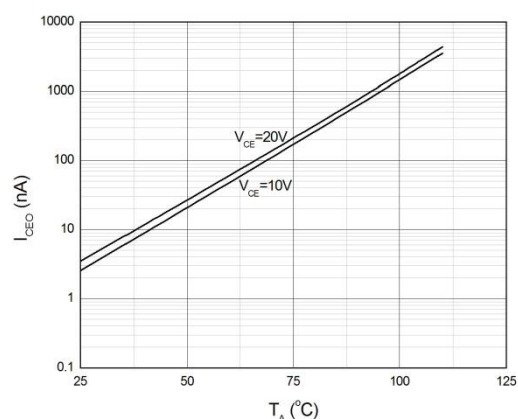
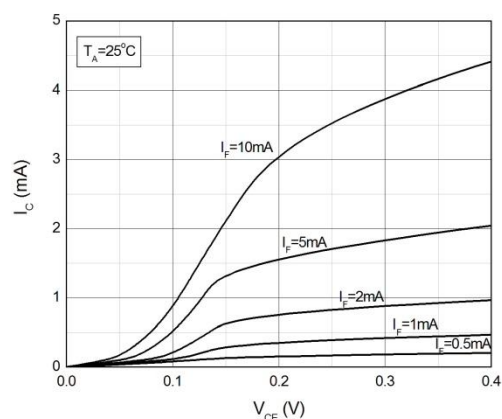
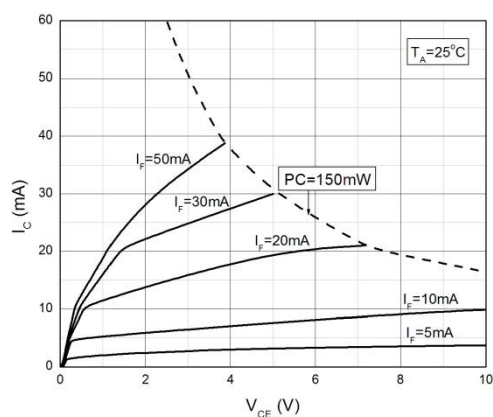
Note 1. 100μs pulse, 100Hz frequency

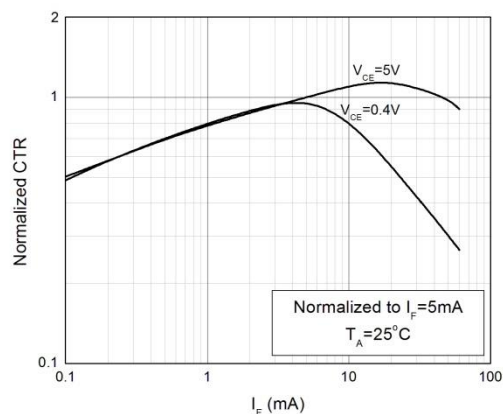
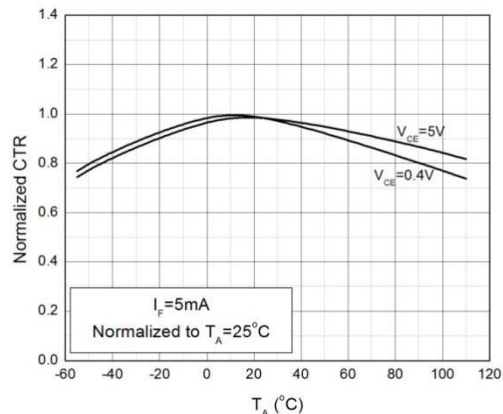
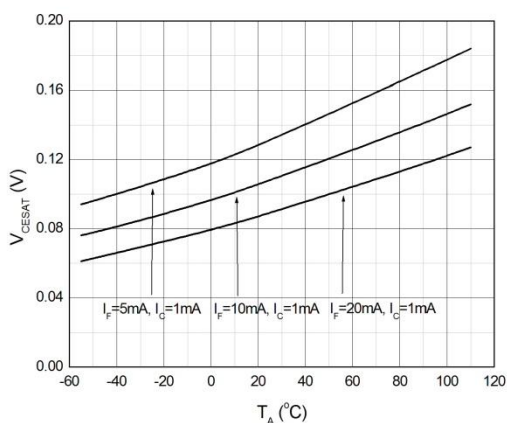
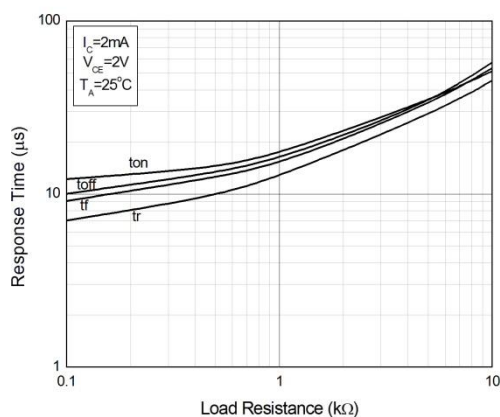
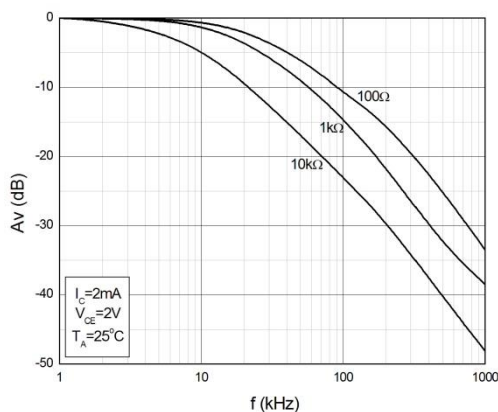
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

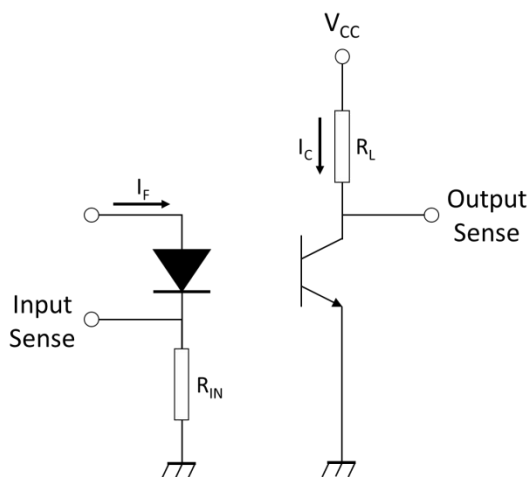
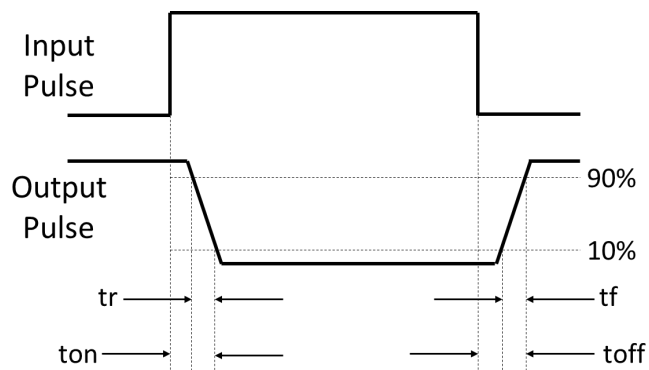
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C

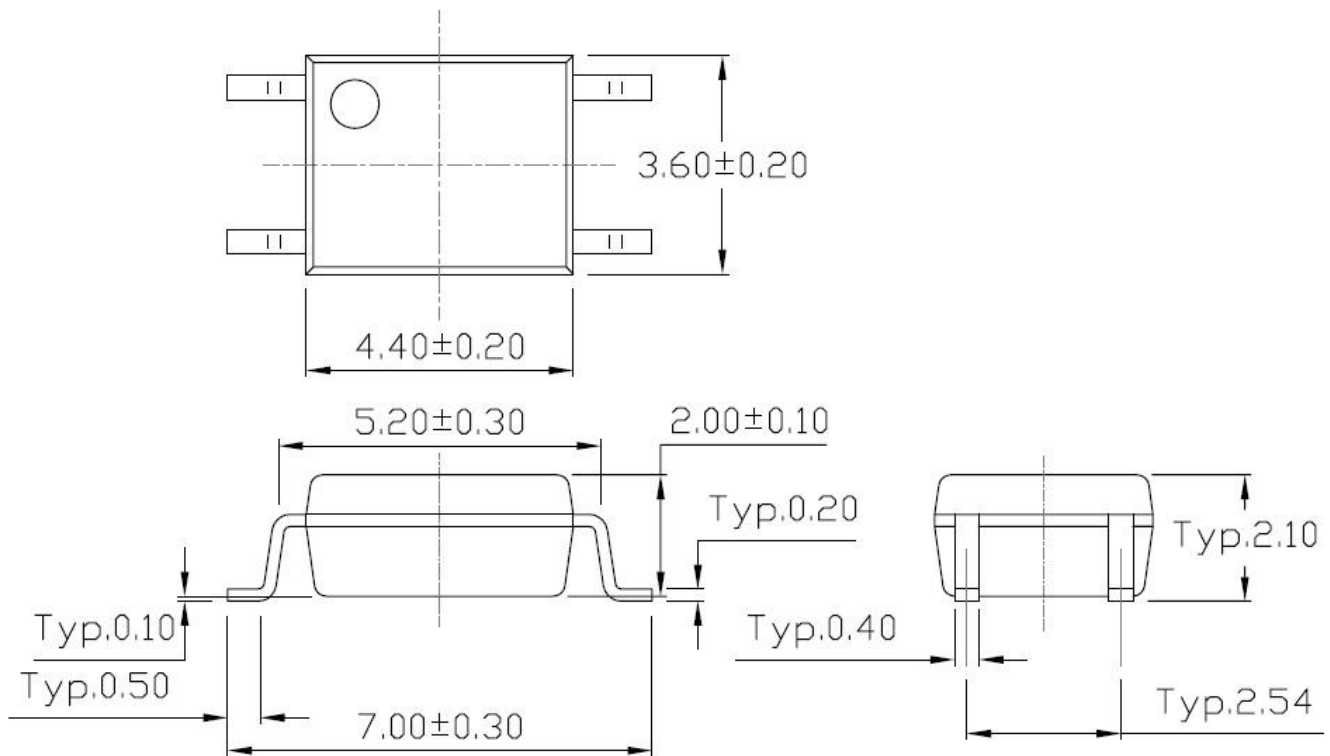
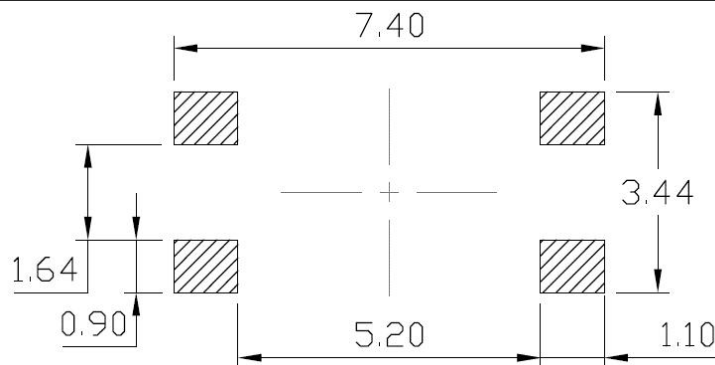
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
INPUT							
Forward Voltage	V_F	-	1.24	1.4	V	$I_F=\pm 10\text{mA}$	
Input Capacitance	C_{in}	-	10	-	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE}=20\text{V}, I_F=0$	
Collector-Emitter Breakdown Voltage	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	TWS354	CTR	20	-	300	$I_F=\pm 1\text{mA}, V_{CE}=5\text{V}$	
	TWS354A1		50	-	150		
	TWS354B1		80	-	400		
CTR Symmetry			0.7	-	1.3	$I_F=\pm 1\text{mA}, V_{CE}=5\text{V}$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.09	0.2	V	$I_F=\pm 20\text{mA}, I_C=1\text{mA}$	
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	-	7	18	μs	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega$	3
Response Time (Fall)	t_f	-	9	18	μs		3

Note 3. Fig.13&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**

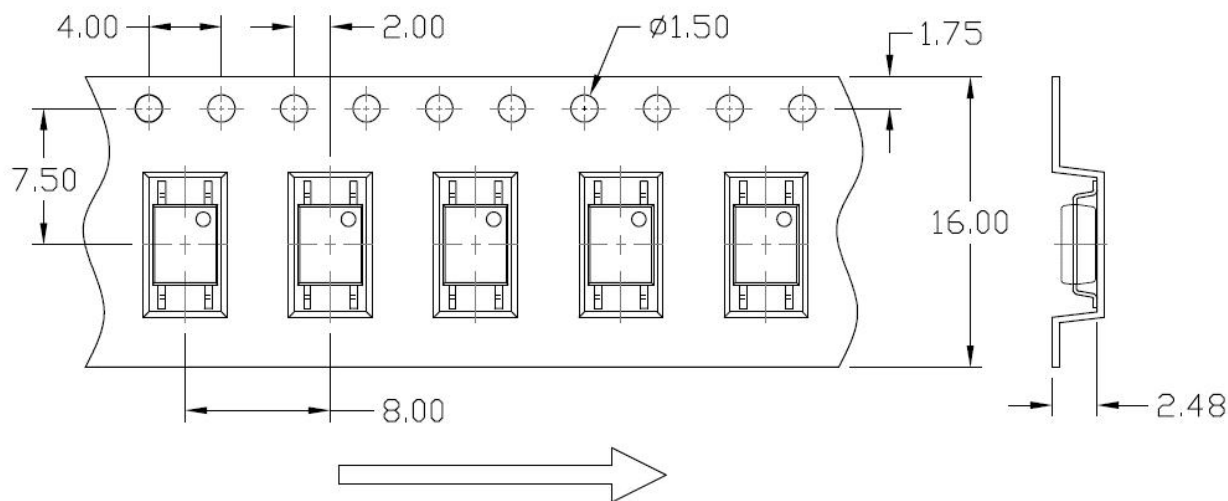
CHARACTERISTIC CURVES**Fig.7 Normalized Current Transfer Ratio
vs. Forward Current****Fig.8 Normalized Current Transfer Ratio
vs. Ambient Temperature****Fig.9 Collector-emitter Saturation Voltage
vs. Ambient Temperature****Fig.10 Switching Time
vs. Load Resistance****Fig.11 Frequency Response**

TEST CIRCUITS**Fig.12 Test Circuits of Response Time****Fig.13 Curves of Response Time**

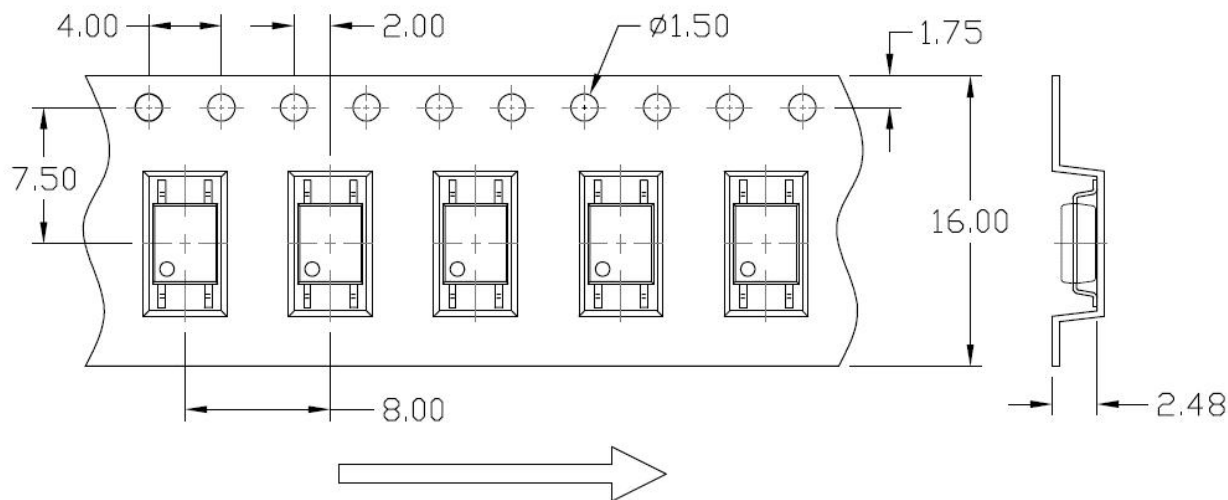
SOP4, AC Input, Photo Transistor Coupler**PACKAGE DIMENSIONS** (Dimensions in mm unless otherwise stated)**Recommended Solder Mask** (Dimensions in mm unless otherwise stated)

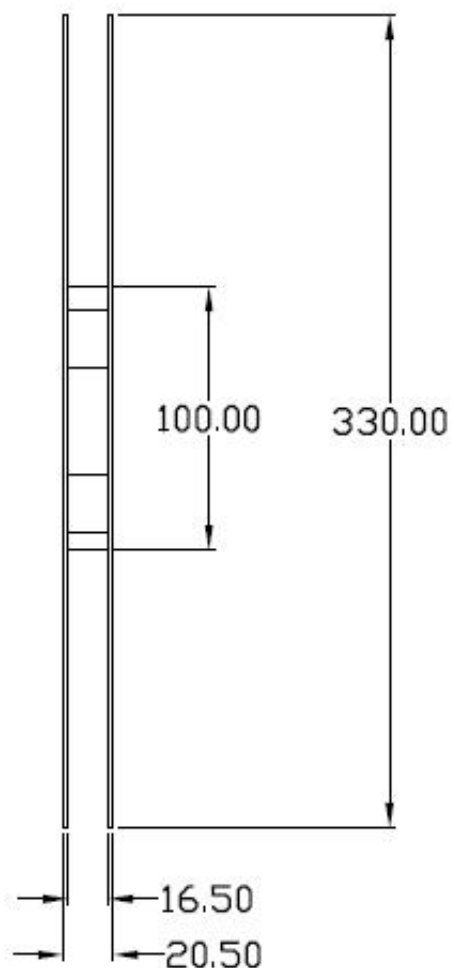
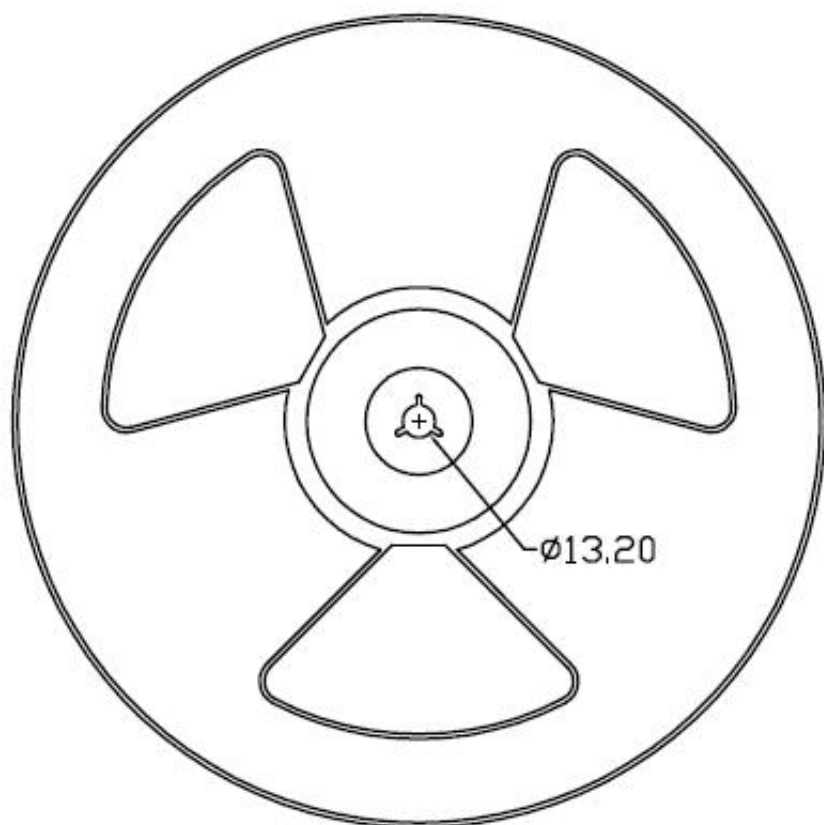
CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

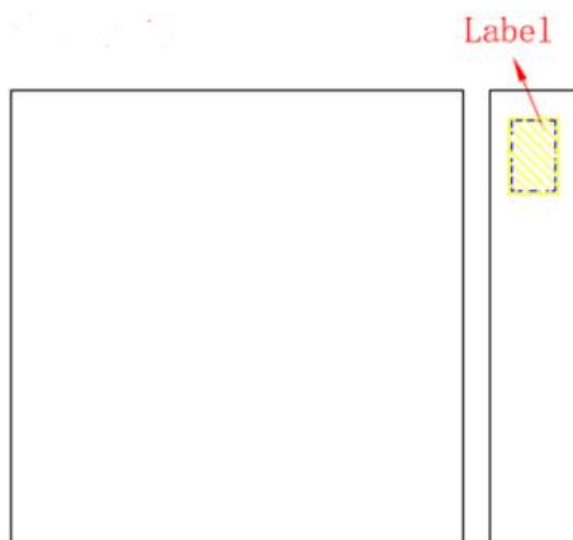
Option T1



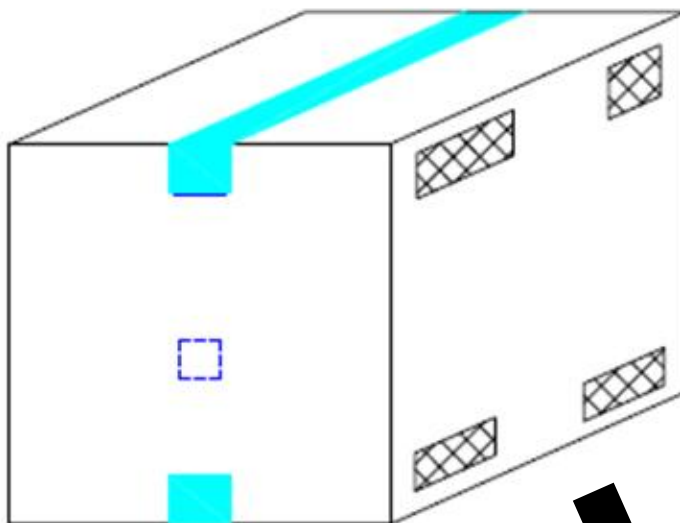
Option T2



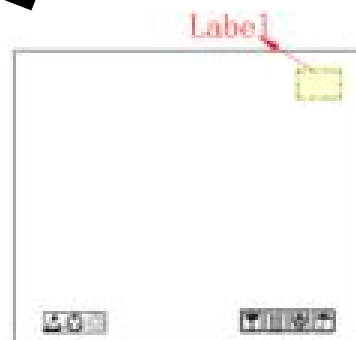
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**Option T1 & T2**

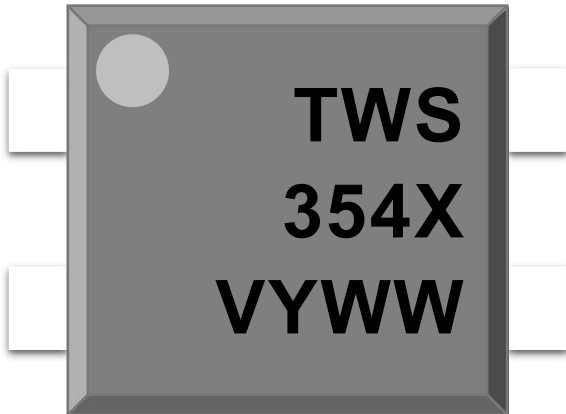
BOX SPECIFICATIONS (Reel Type)**Inner Box**

- 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**

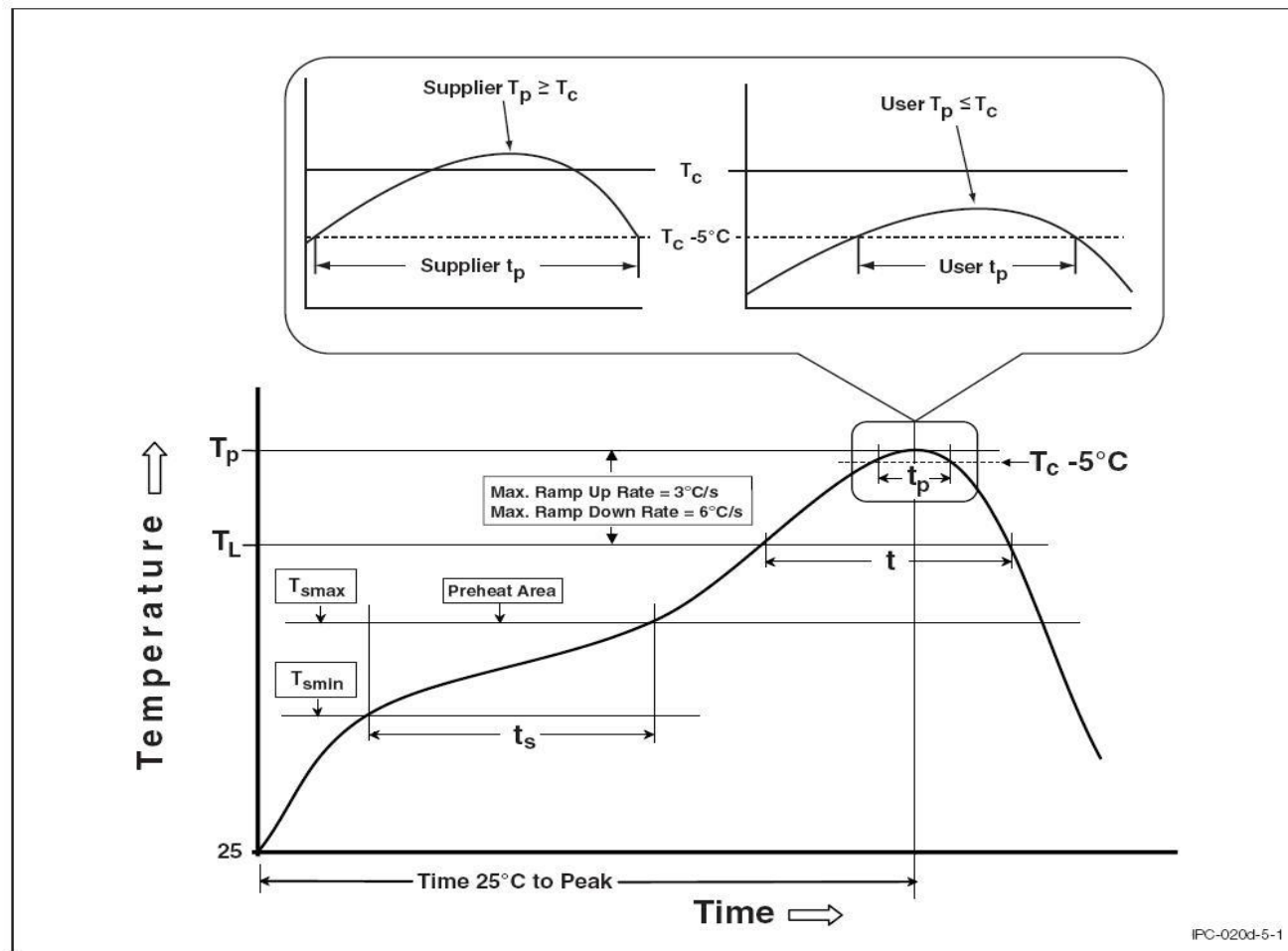
TWS : Company Abbr.
354 : Part Number
X : CTR Rank
V : VDE Option
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION**TWS354X1(Z)-GV**

TWS – Company Abbr.
 354 – Part Number
 X1 – Rank (A1/B1 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

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.

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
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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.