

TWS354X Series

SOP4, DC Input Photo Transistor Coupler

Description

The TWS354X series combine two AlGaAs infrared emitting diodes as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SOP4 package.

With the robust coplanar double mold structure, TWS354 series provide the most stable isolation feature.

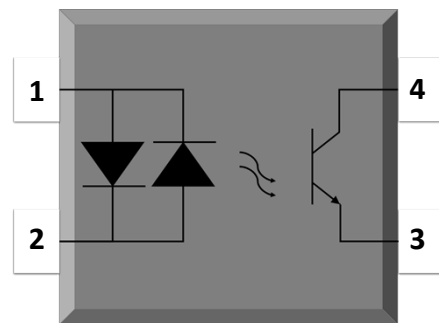
Features

- 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

Applications

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

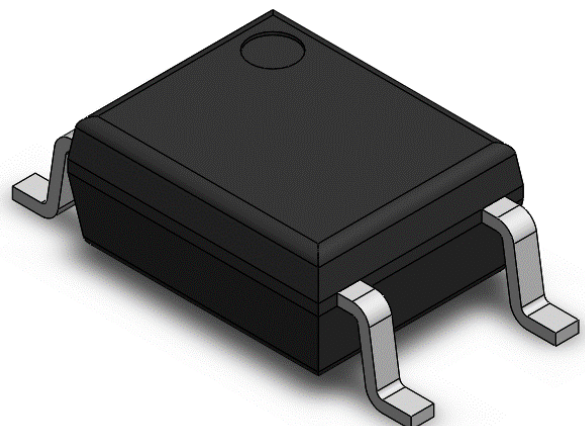
SCHEMATIC



PIN DEFINITION

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

PACKAGE OUTLINE



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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}	7	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. 100 μ s pulse, 100Hz frequency

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

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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}	7	-	-	V	$I_E = 0.1\text{mA}, I_F = 0$	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	TWS354	CTR	20	-	300	%	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
	TWS354A		50	-	150		
	TWS354B		80	-	400		
CTR Symmetry		0.7	-	1.3		$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.07	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	-	5	18	μs	$V_{CE} = 2\text{V}, I_C = 2\text{mA}$	3
Response Time (Fall)	t_f	-	6	18	μs	$R_L = 100\Omega$	3

Note 3. Fig.12&13

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

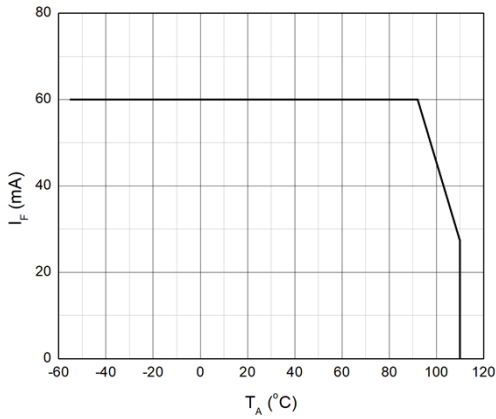


Fig.2 Collector Power Dissipation vs. Ambient Temperature

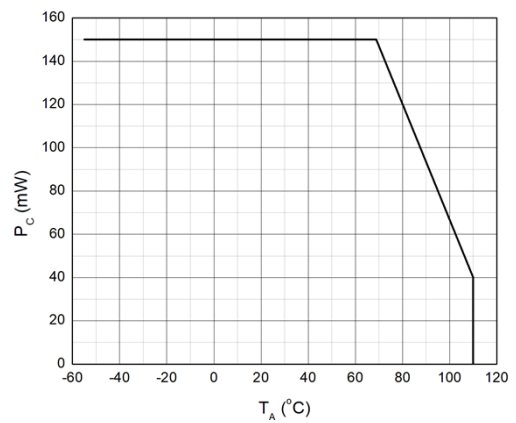


Fig.3 Forward Current vs. Forward Voltage

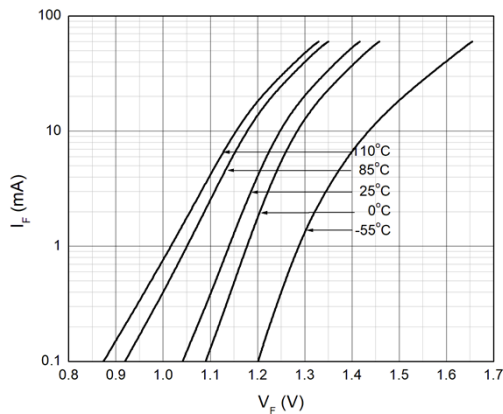


Fig.4 Collector Dark Current vs. Ambient Temperature

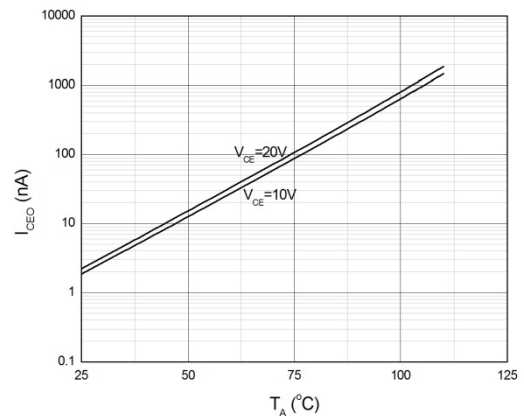


Fig.5 Collector Current vs. Collector-emitter Voltage

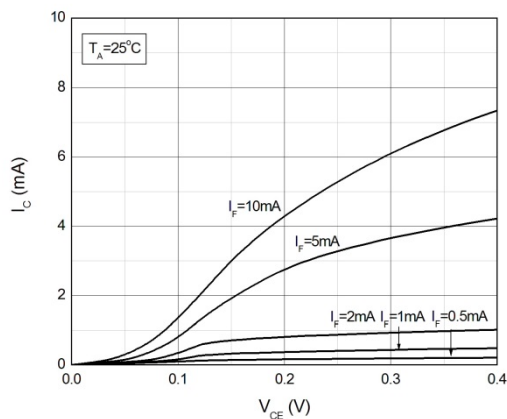
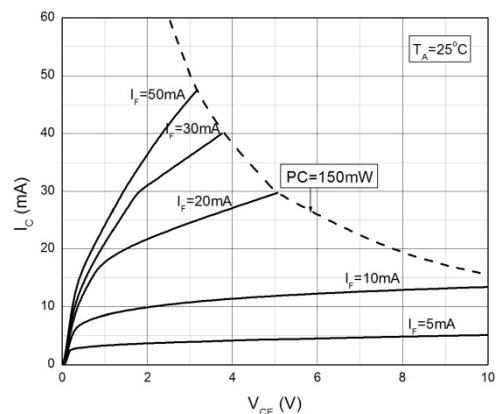


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

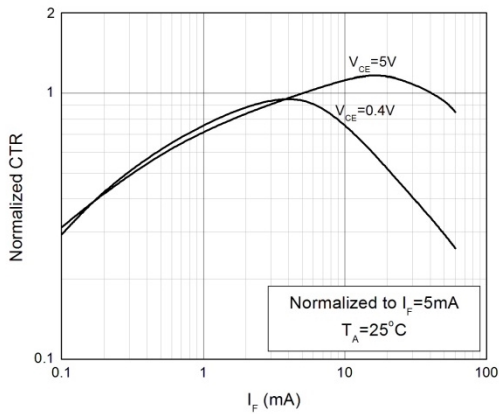


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

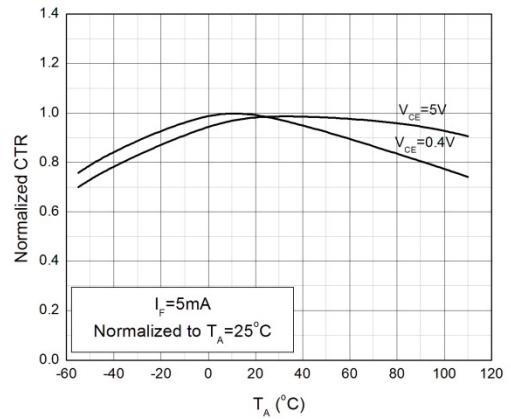


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

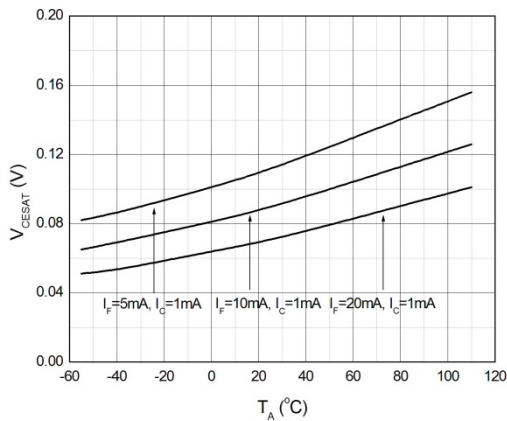


Fig.10 Switching Time vs. Load Resistance

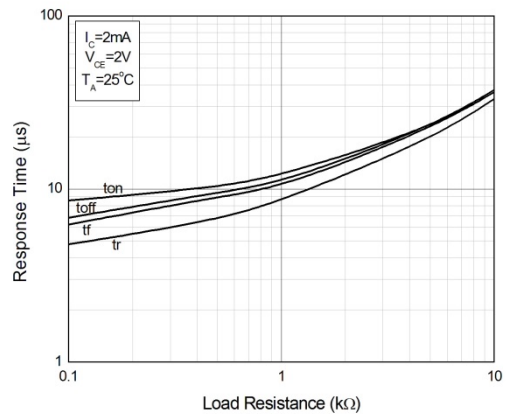
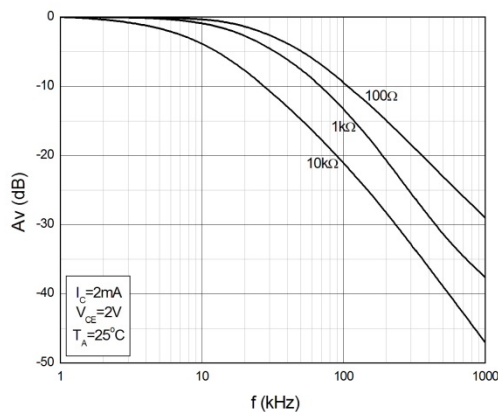


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

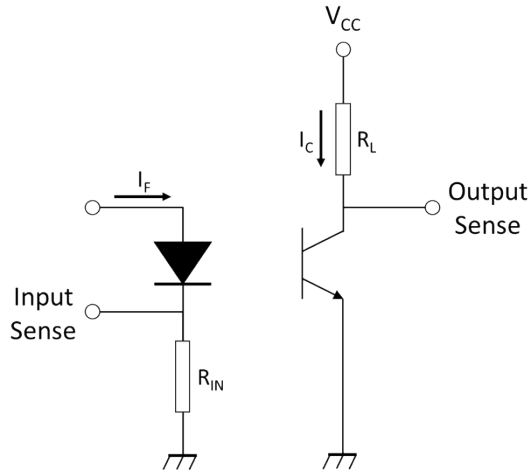
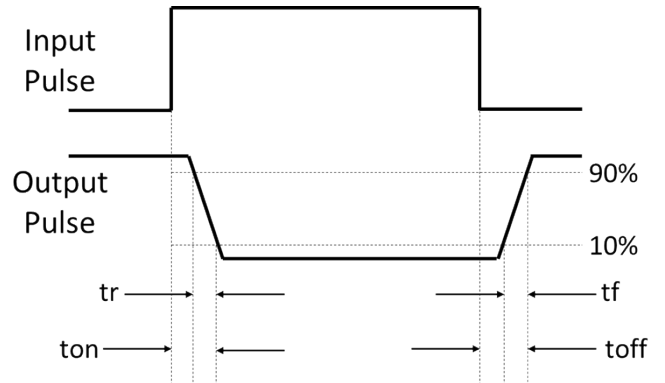


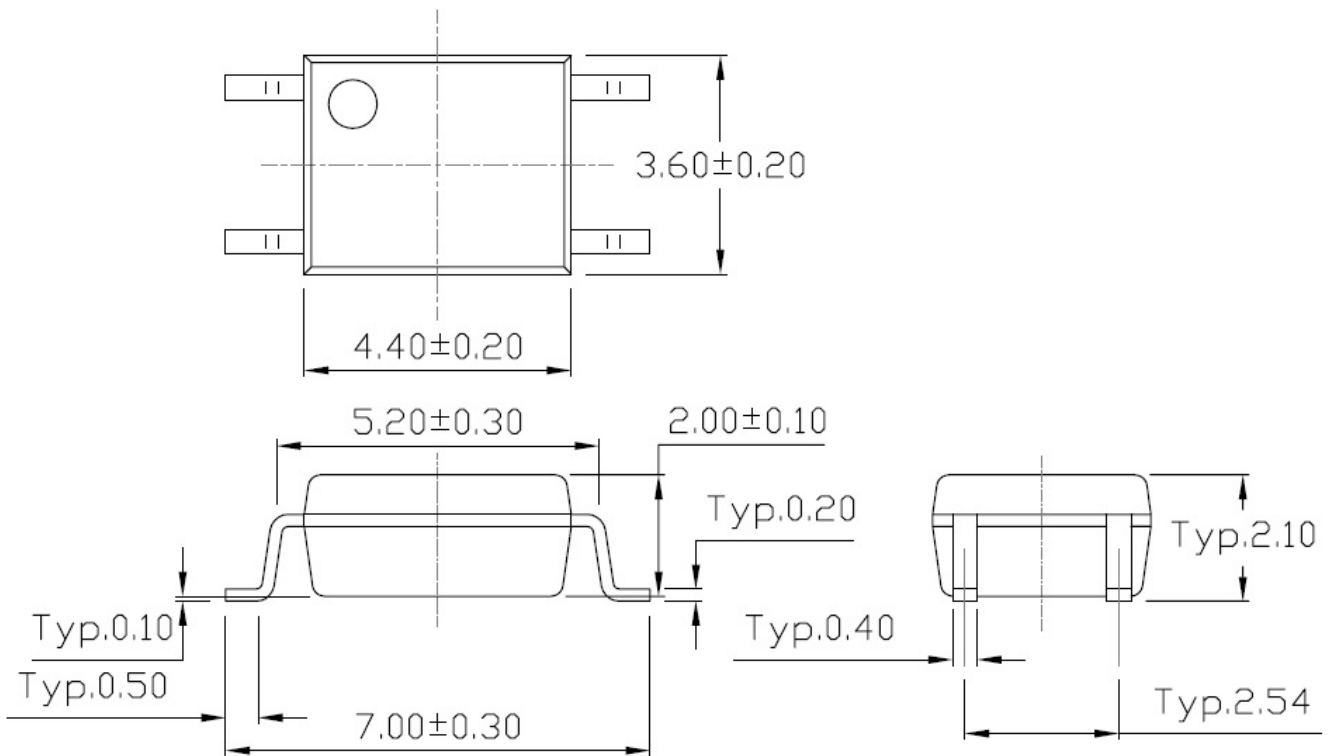
Fig.13 Curves of Response Time



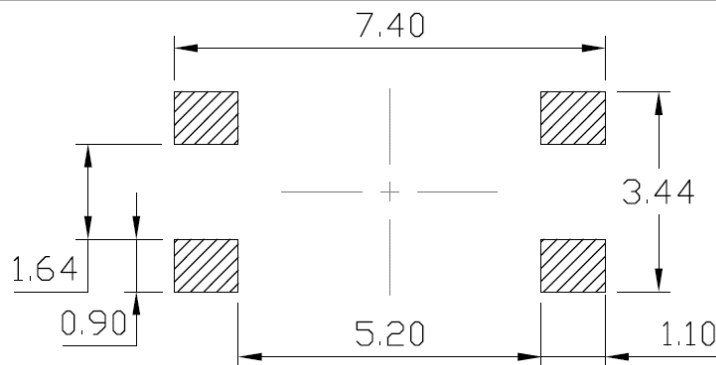
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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



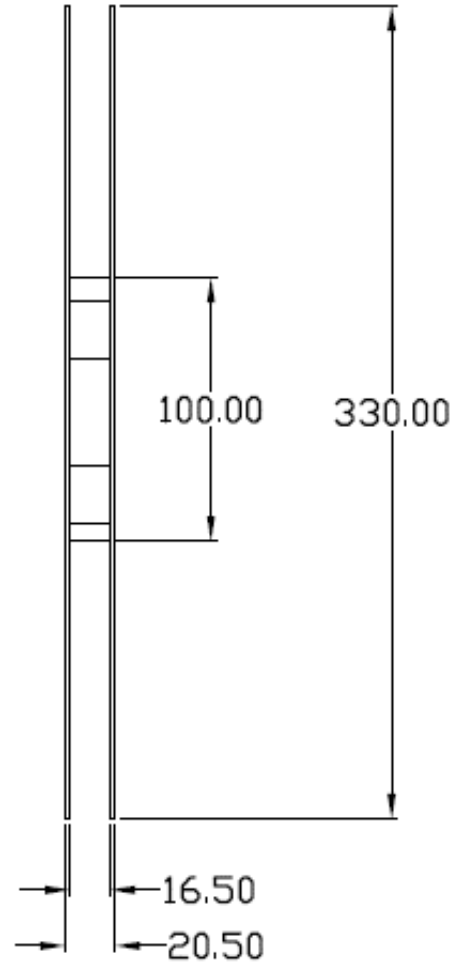
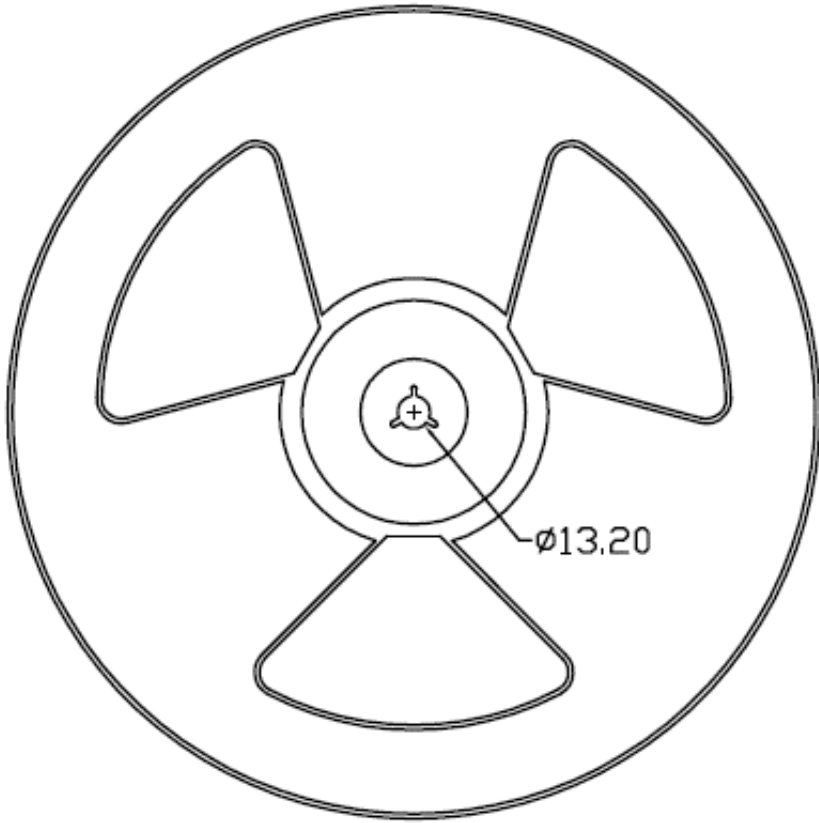
Recommended Solder Mask (Dimensions in mm unless otherwise stated)



TWS354X Series

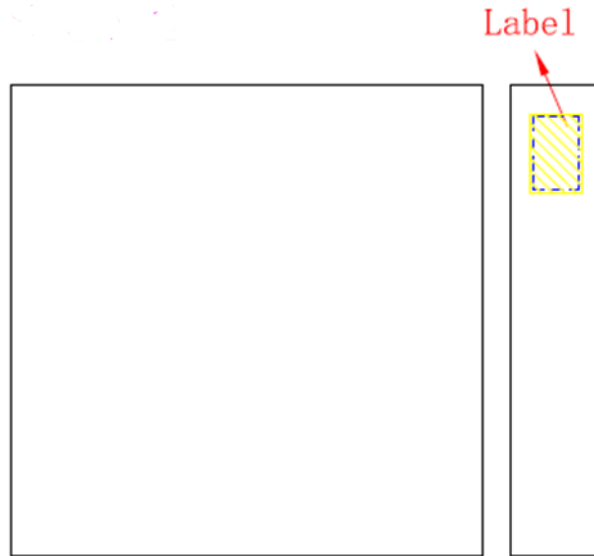
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REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)



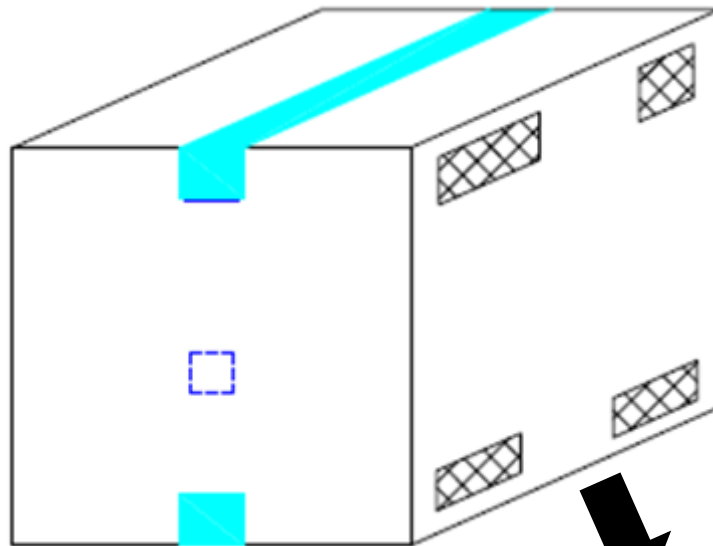
BOX SPECIFICATIONS (Reel Type)

Inner Box

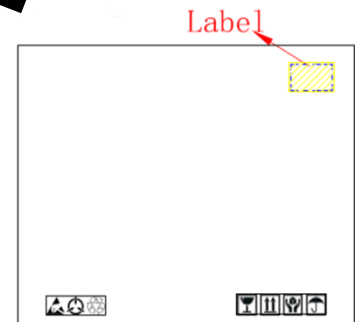


- L x W x H = 36cm x 36cm x 6.9cm

Outer Box



- L x W x H = 45cm x 38cm x 38cm

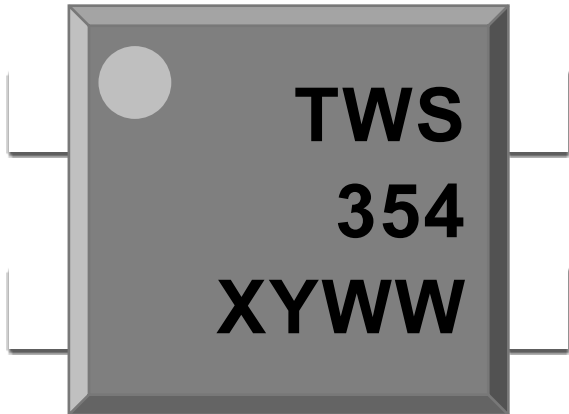


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ORDERING AND MARKING INFORMATION

MARKING INFORMATION



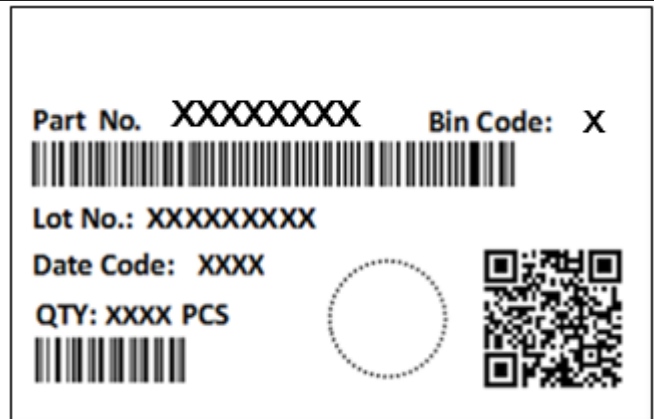
TWS : Company Abbr.
354 : Part Number
X : CTR Rank
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION

TWS354X

TWS – Company Abbr.
 354 – Part Number
 X – Rank (A/B or None)

LABEL INFORMATION

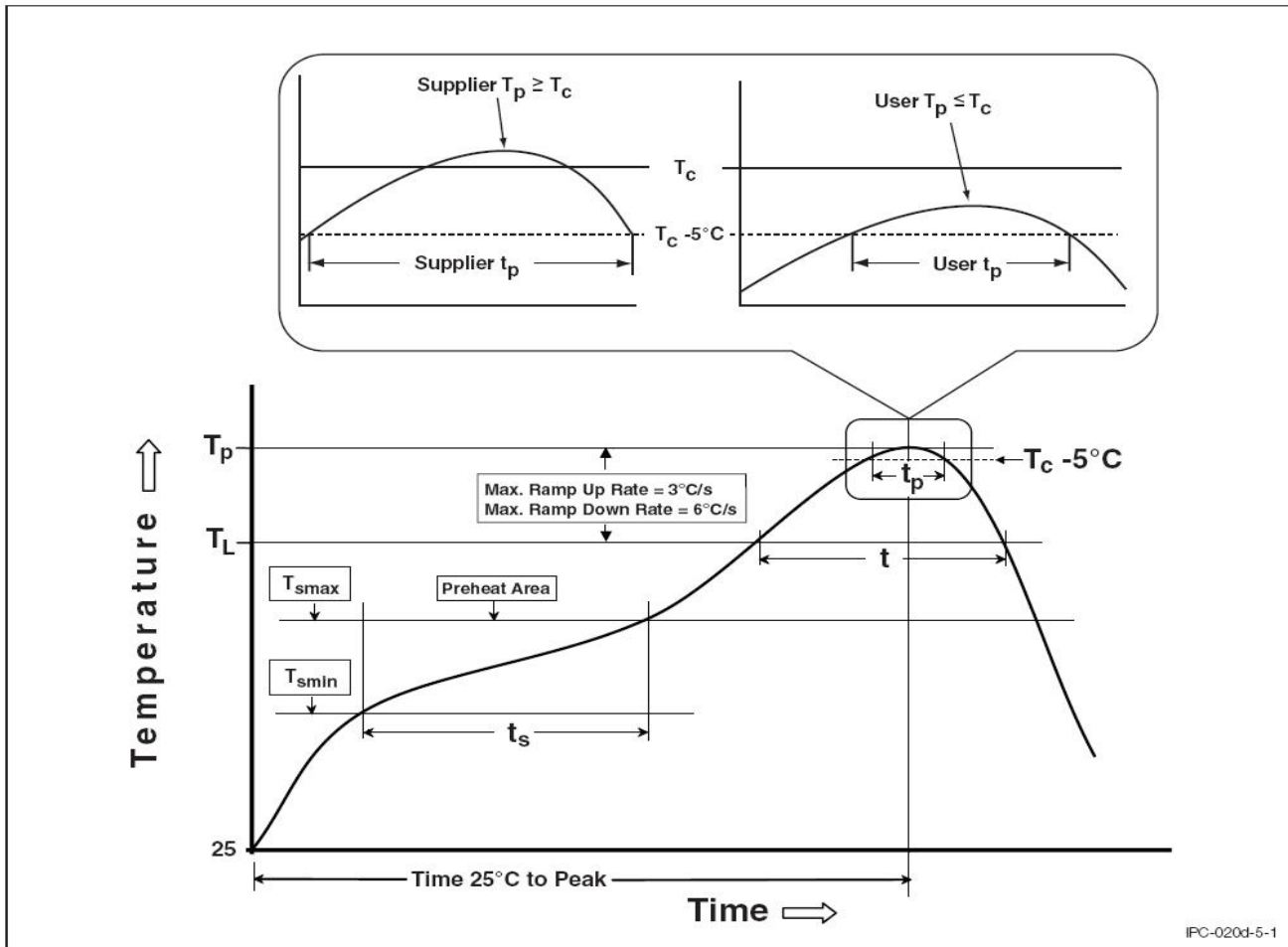


PACKING QUANTITY

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

REFLOW INFORMATION

REFLOW PROFILE



IPC-020d-5-1

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.