

TWS357X Series

SOP4, DC Input Photo Transistor Coupler

Description

The TWS357X series combine an AlGaAs infrared emitting diode 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, TWS357 series provide the most stable isolation feature.

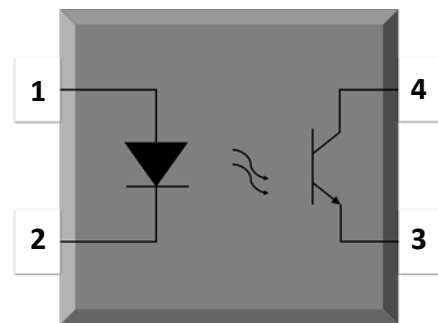
Features

- 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

Applications

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

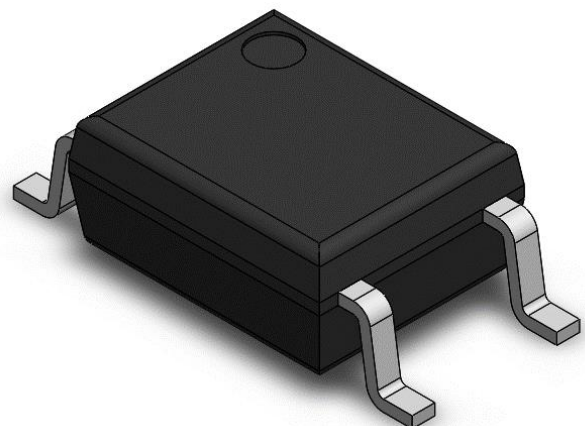
SCHEMATIC



PIN DEFINITION

1. Anode
2. Cathode
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
Reverse Voltage	V_R	6	V	
Input Power Dissipation	P_I	100	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	35	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}	-55~125	°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	IF=10mA	
Reverse Current	I_R	-	-	10	μA	VR=6V	
Input Capacitance	C_{in}	-	10	-	pF	V=0, f=1kHz	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	VCE=20V, IF=0	
Collector-Emitter Breakdown Voltage	BV_{CEO}	35	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	TWS357	CTR	50	-	600	%	IF=5mA, VCE=5V
	TWS357A		80	-	160		
	TWS357B		130	-	260		
	TWS357C		200	-	400		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.06	0.2	V	IF=20mA, IC=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	f_c	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω, -3dB	4
Response Time (Rise)	t_r	-	3	18	μs	VCE=2V, IC=2mA	3
Response Time (Fall)	t_f	-	4	18	μs	RL=100Ω	3

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

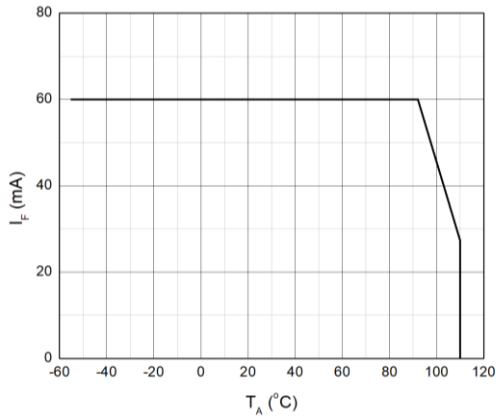


Fig.2 Collector Power Dissipation vs. Ambient Temperature

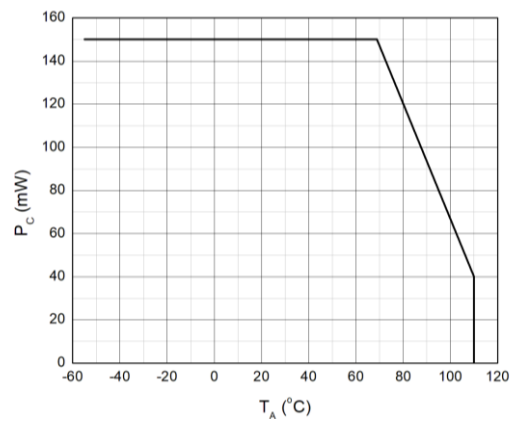


Fig.3 Forward Current vs. Forward Voltage

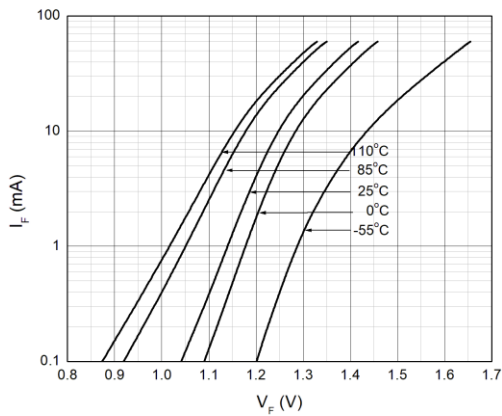


Fig.4 Collector Dark Current vs. Ambient Temperature

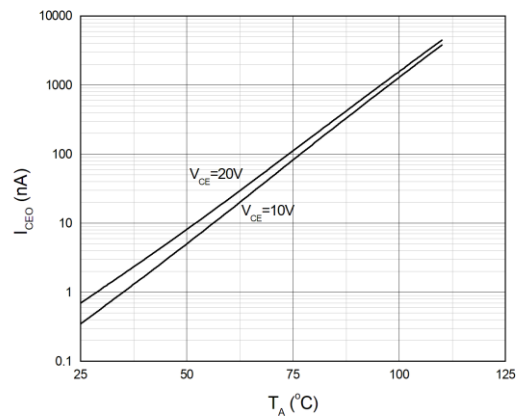


Fig.5 Collector Current vs. Collector-emitter Voltage

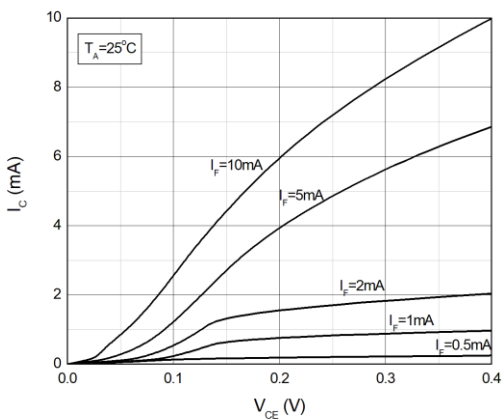
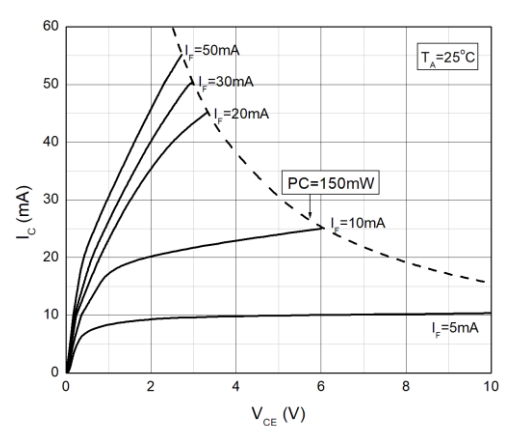


Fig.6 Collector Current vs. Collector-emitter Voltage



CHARACTERISTIC CURVES

Fig.7 Normalized Current Transfer Ratio vs. Forward Current

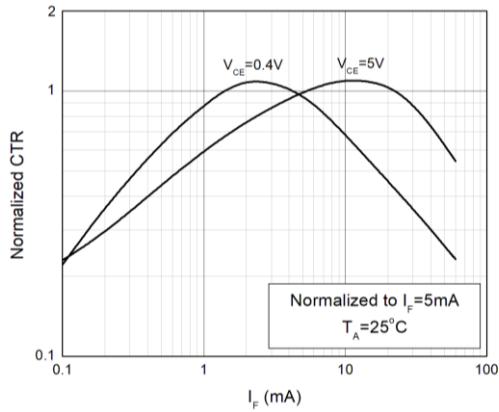


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

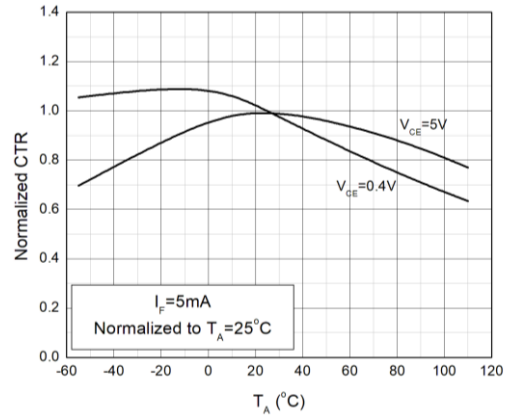


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

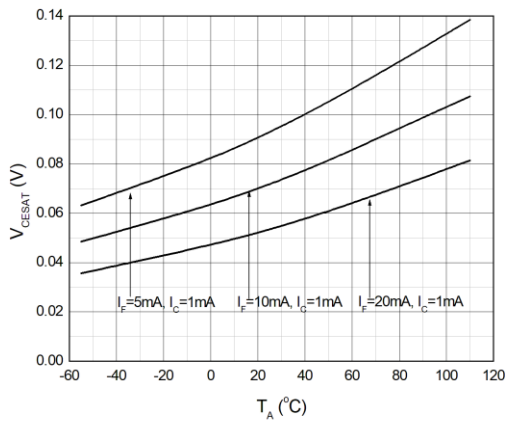


Fig.10 Switching Time vs. Load Resistance

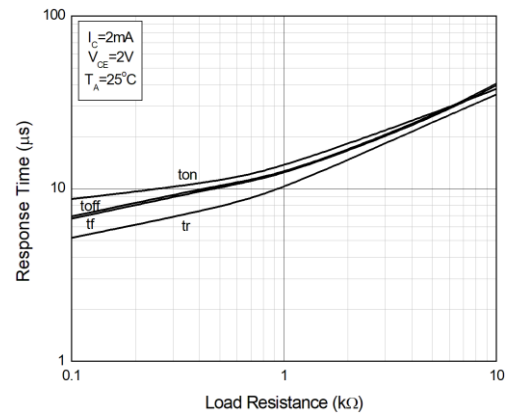
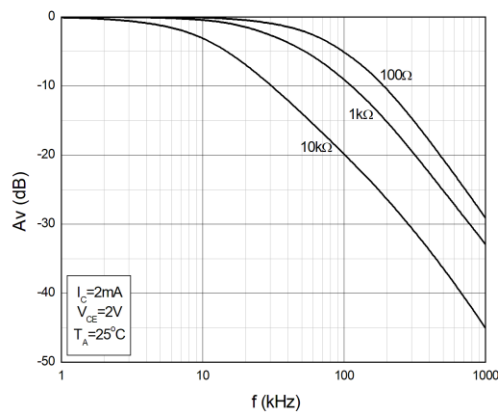


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

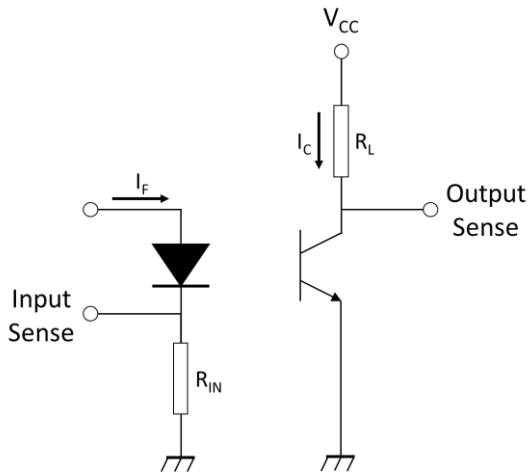


Fig.13 Curves of Response Time

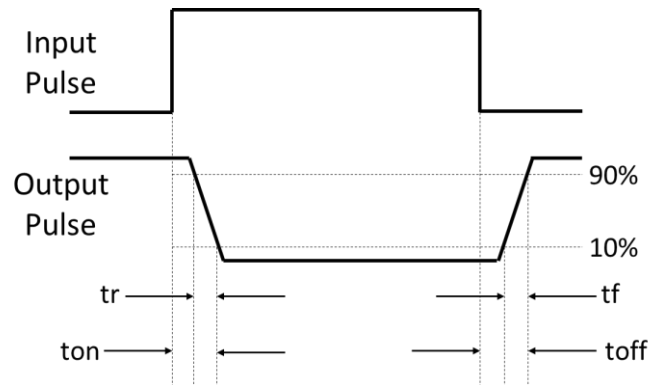
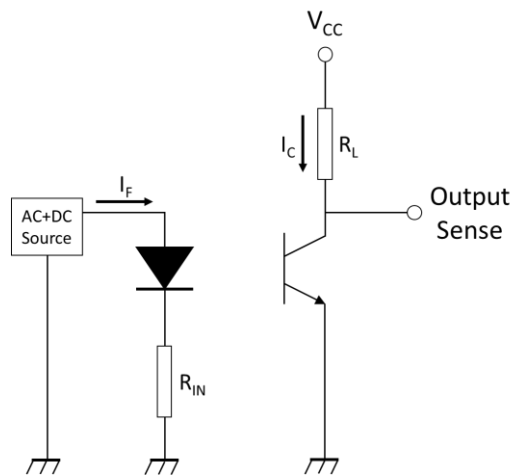


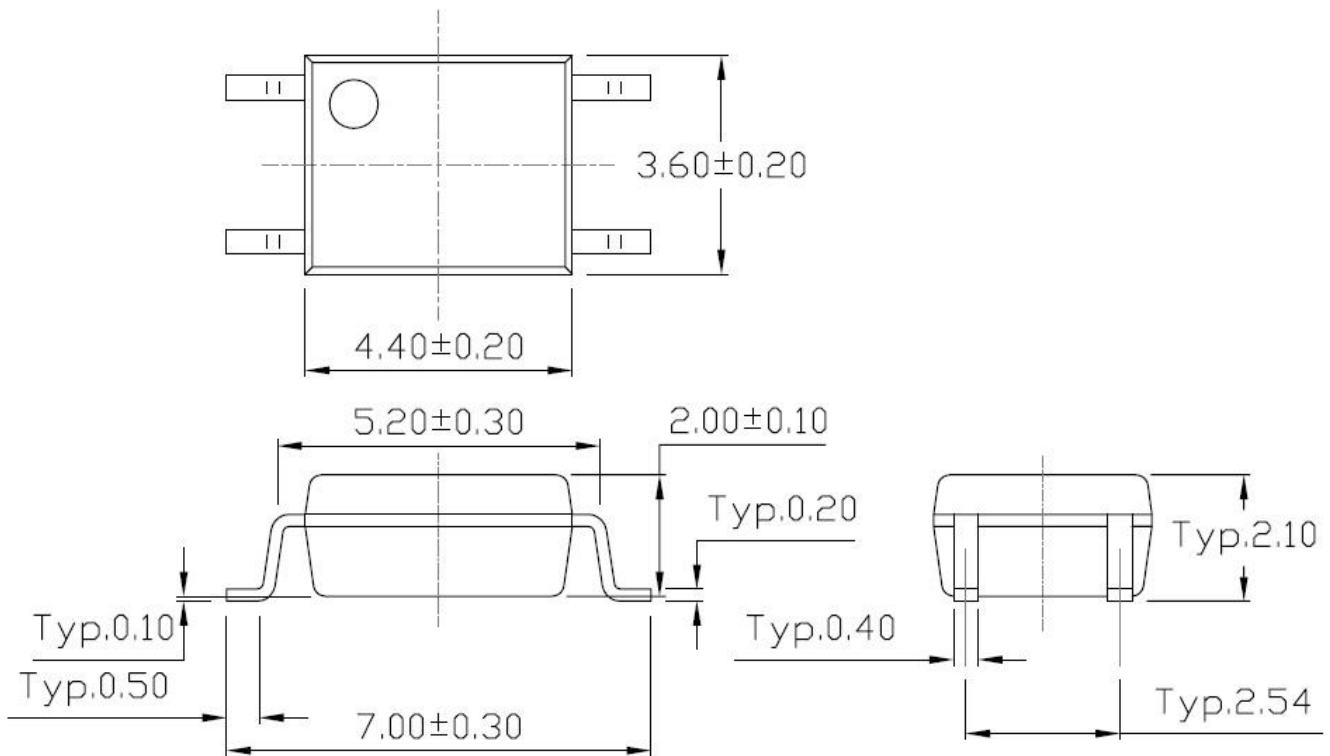
Fig.14 Test Circuits of Frequency Response



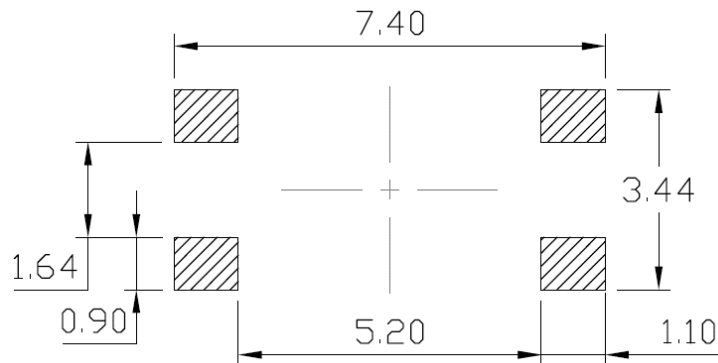
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PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



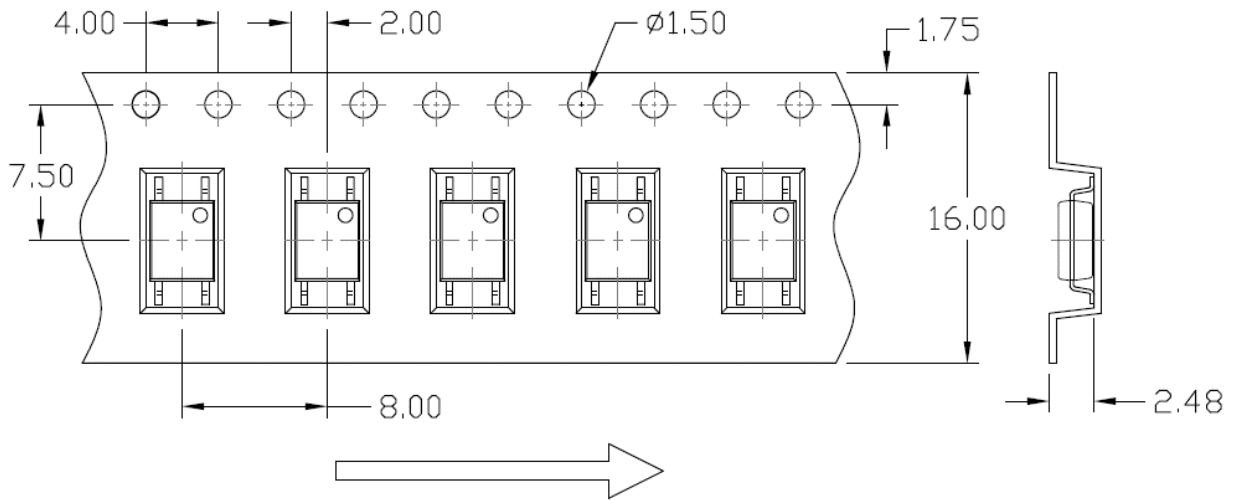
Recommended Solder Mask (Dimensions in mm unless otherwise stated)



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CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)

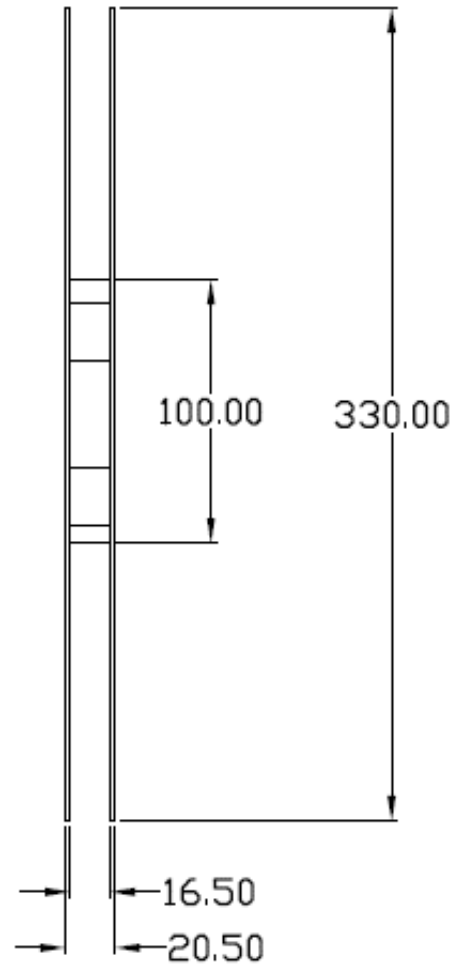
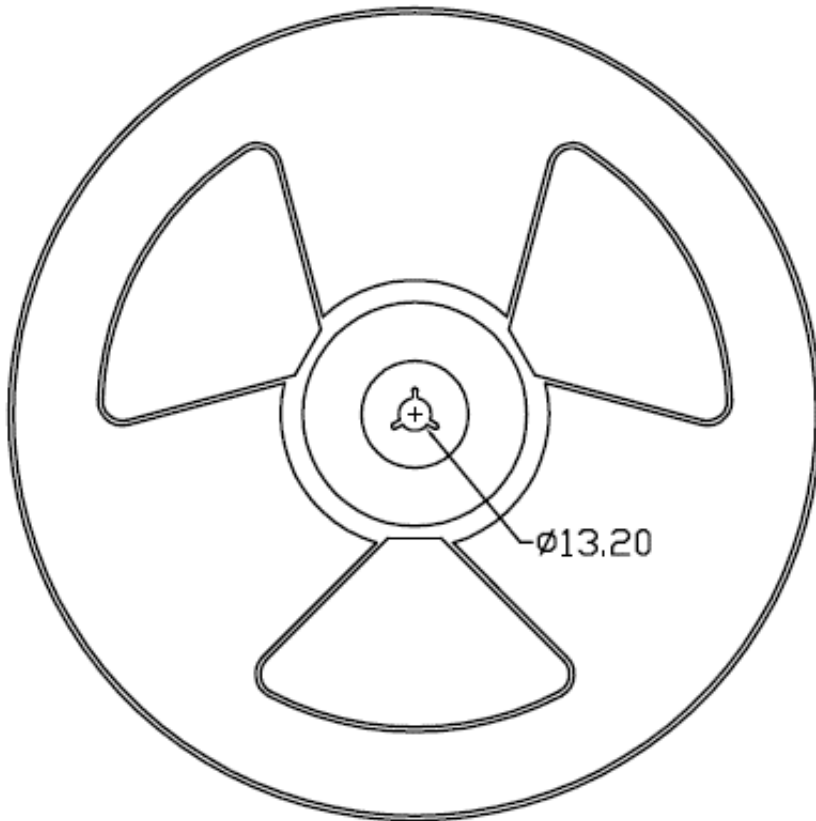


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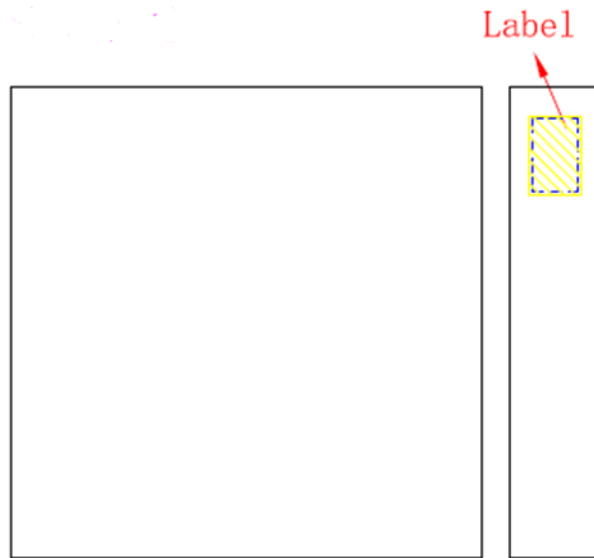
REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)

Option T1 & T2



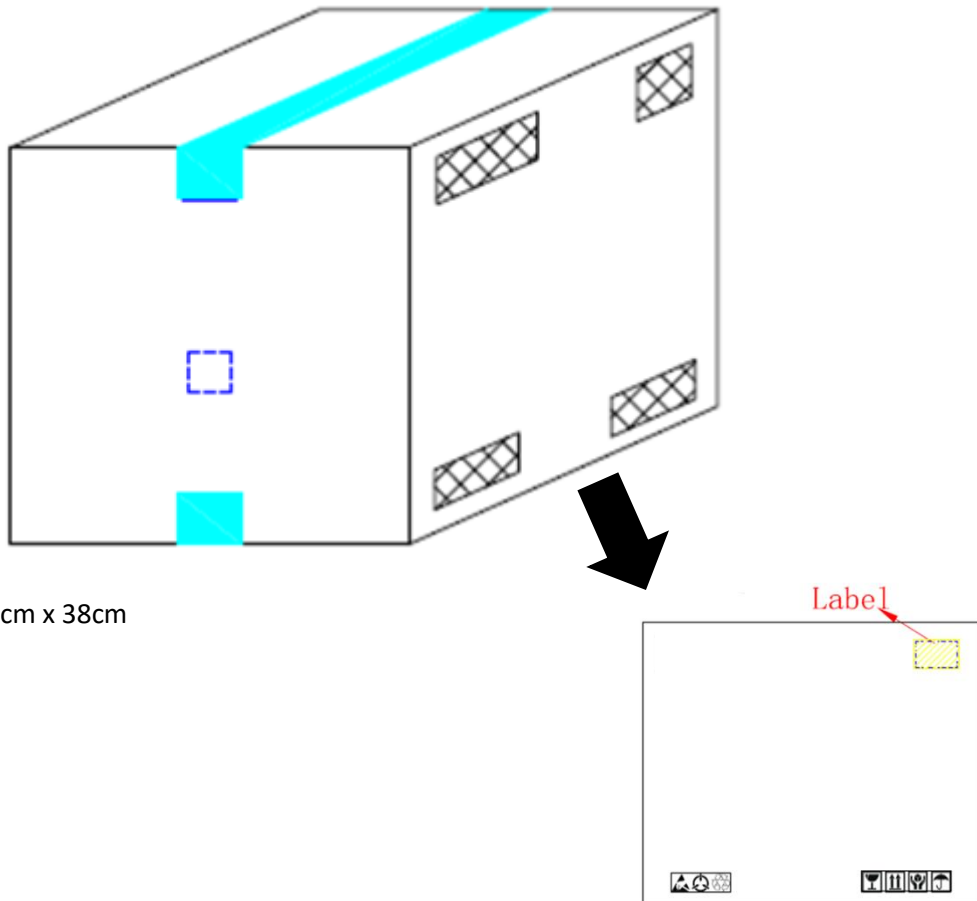
BOX SPECIFICATIONS (Reel Type)

Inner Box



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

Outer Box



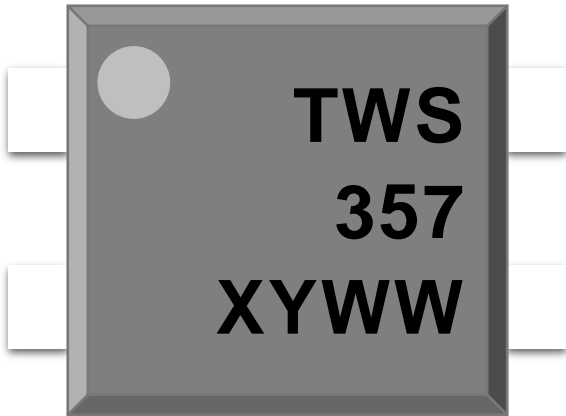
- L x W x H = 45cm x 38cm x 38cm

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ORDERING AND MARKING INFORMATION

MARKING INFORMATION



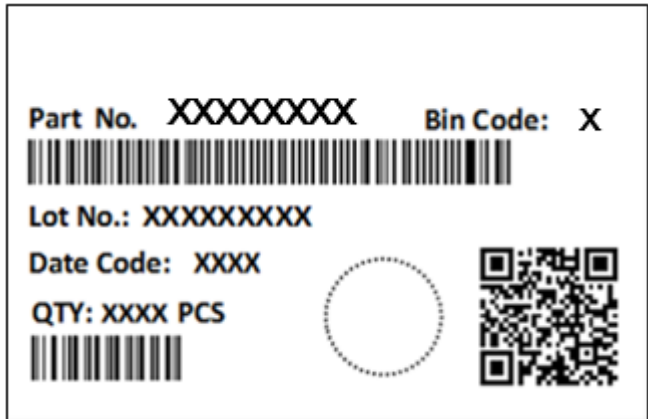
TWS : Company Abbr.
357 : Part Number
X : CTR Rank
Y : Fiscal Year
WW : Work Week

ORDERING INFORMATION

TWS357X

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

LABEL INFORMATION

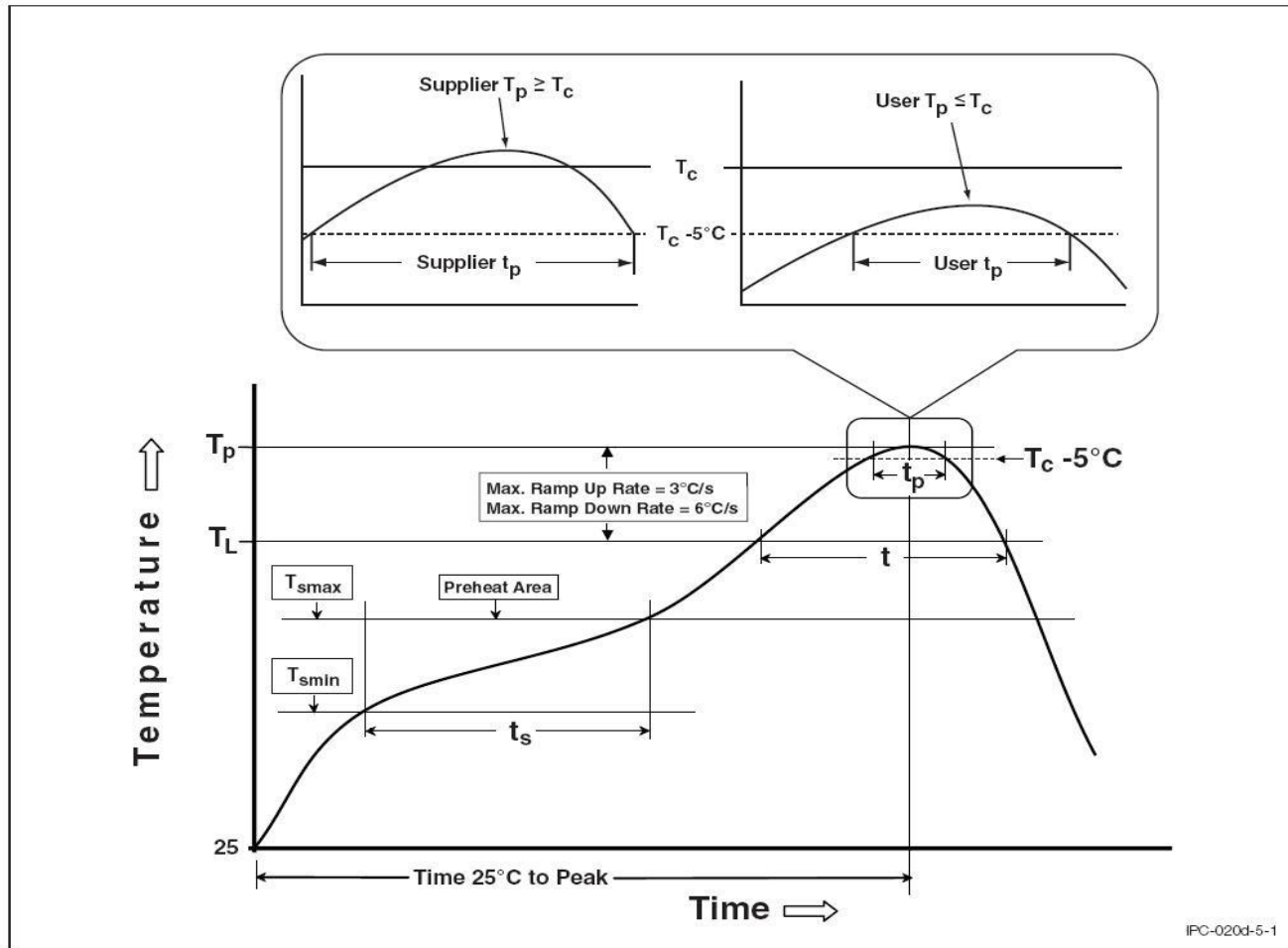


PACKING QUANTITY

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. (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.