

## 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.

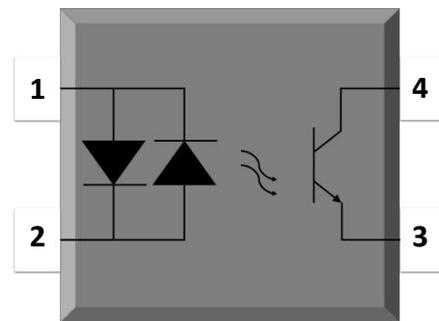
## Features

- 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

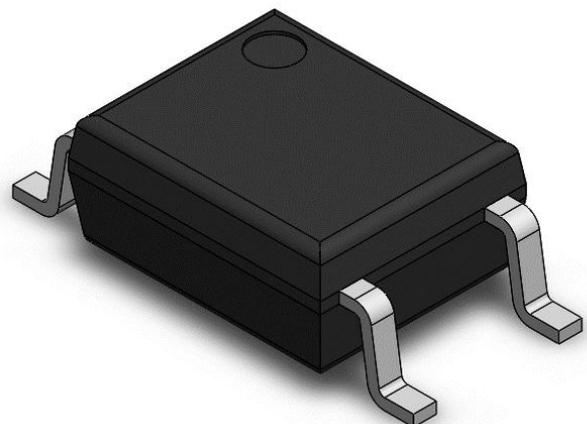
## SCHEMATIC



## PIN DEFINITION

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

## PACKAGE OUTLINE



<b>ABSOLUTE MAXIMUM RATINGS</b>				
PARAMETER	SYMBOL	VALUE	UNIT	NOTE
<b>INPUT</b>				
Forward Current	$I_F$	±60	mA	
Peak Forward Current	$I_{FP}$	±1	A	1
Input Power Dissipation	$P_I$	100	mW	
<b>OUTPUT</b>				
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	
<b>COMMON</b>				
Total Power Dissipation	$P_{tot}$	200	mW	
Isolation Voltage	$V_{iso}$	3750	V <sub>rms</sub>	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

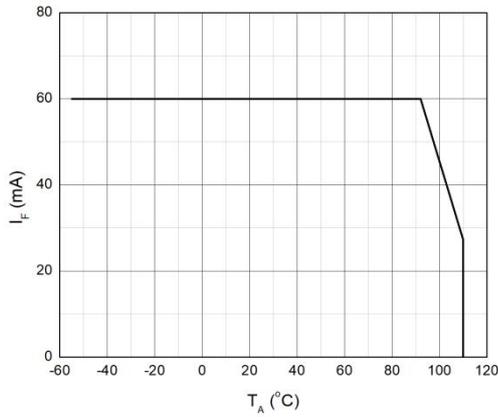
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE	
INPUT								
Forward Voltage	V <sub>F</sub>	-	1.24	1.4	V	IF=±10mA		
Input Capacitance	C <sub>in</sub>	-	10	-	pF	V=0, f=1kHz		
OUTPUT								
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	VCE=20V, IF=0		
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	-	-	V	IC=0.1mA, IF=0		
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	7	-	-	V	IE=0.1mA, IF=0		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	TWS354	CTR	20	-	300	%	IF=±1mA, VCE=5V	
	TWS354A		50	-	150			
	TWS354B		80	-	400			
CTR Symmetry		0.7	-	1.3		IF=±1mA, VCE=5V		
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.07	0.2	V	IF=±20mA, IC=1mA		
Isolation Resistance	R <sub>ISO</sub>	10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	DC500V, 40 ~ 60% R.H.		
Floating Capacitance	C <sub>IO</sub>	-	0.4	1	pF	V=0, f=1MHz		
Response Time (Rise)	t <sub>r</sub>	-	5	18	μs	VCE=2V, IC=2mA	3	
Response Time (Fall)	t <sub>f</sub>	-	6	18	μs	RL=100Ω	3	

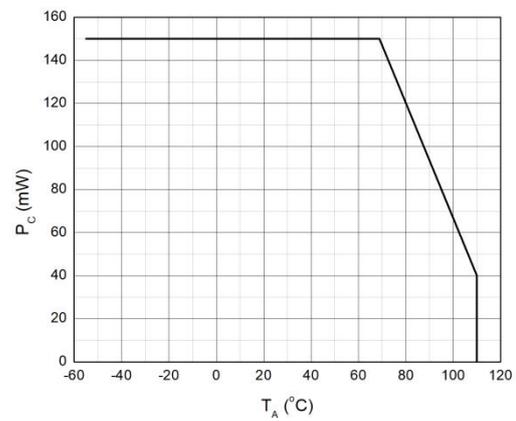
Note 3. Fig.12&13

**CHARACTERISTIC CURVES**

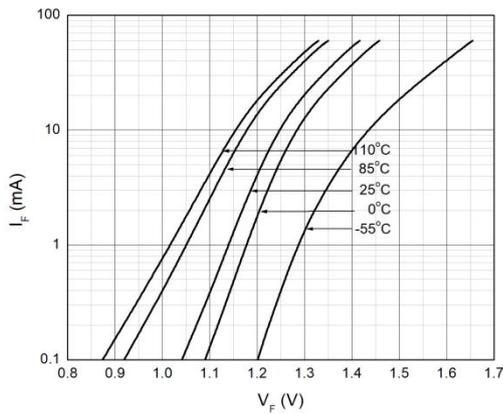
**Fig.1 Forward Current vs. Ambient Temperature**



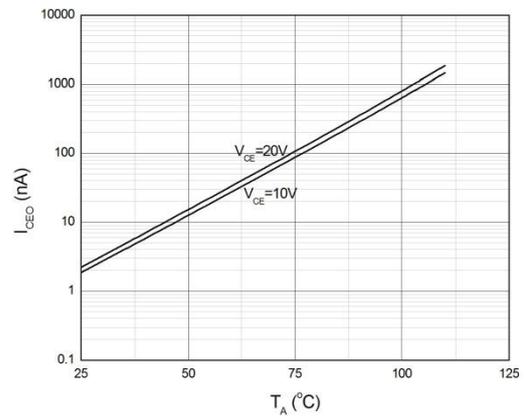
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



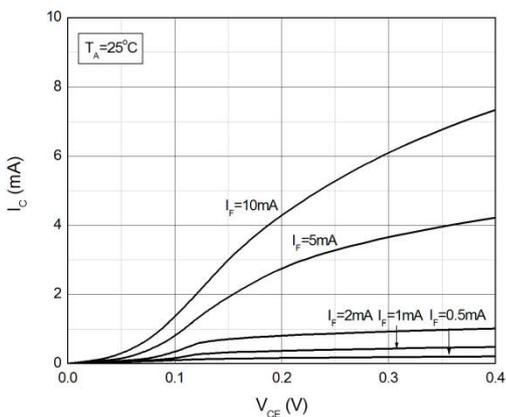
**Fig.3 Forward Current vs. Forward Voltage**



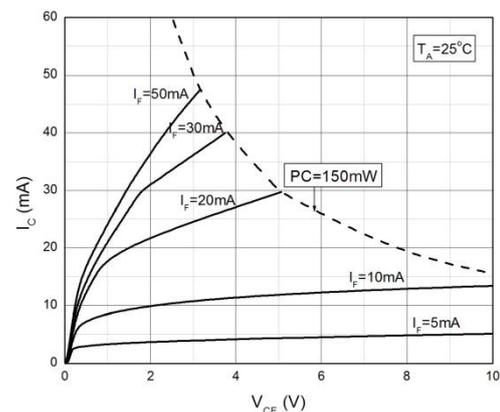
**Fig.4 Collector Dark Current vs. Ambient Temperature**



**Fig.5 Collector Current vs. Collector-emitter Voltage**

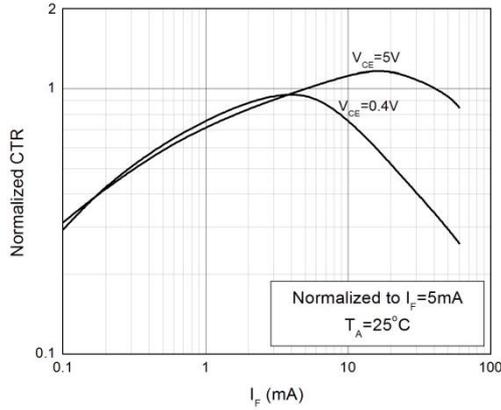


**Fig.6 Collector Current vs. Collector-emitter Voltage**

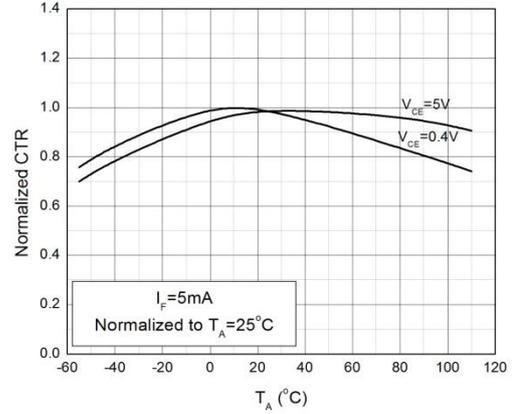


**CHARACTERISTIC CURVES**

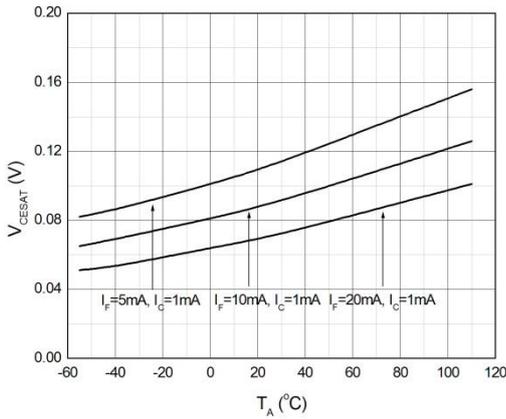
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



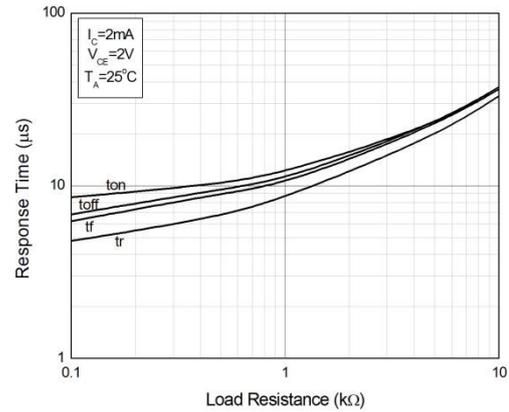
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



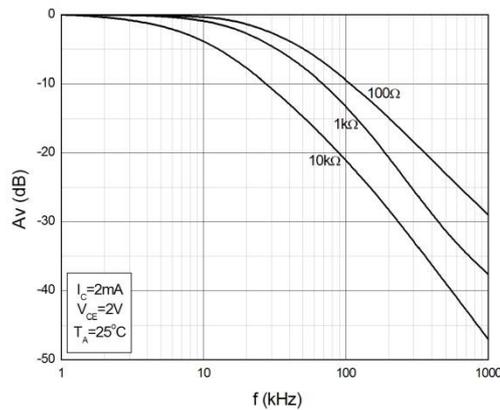
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



**Fig.10 Switching Time vs. Load Resistance**

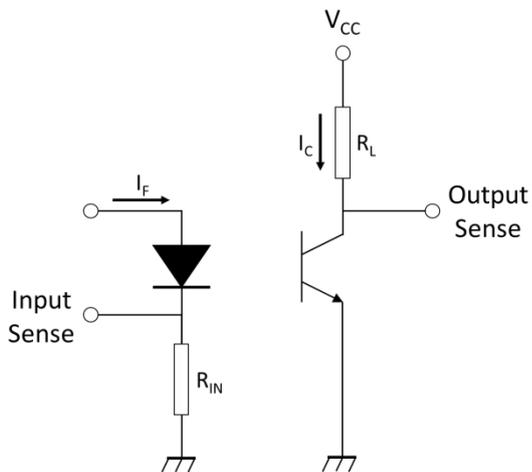


**Fig.11 Frequency Response**

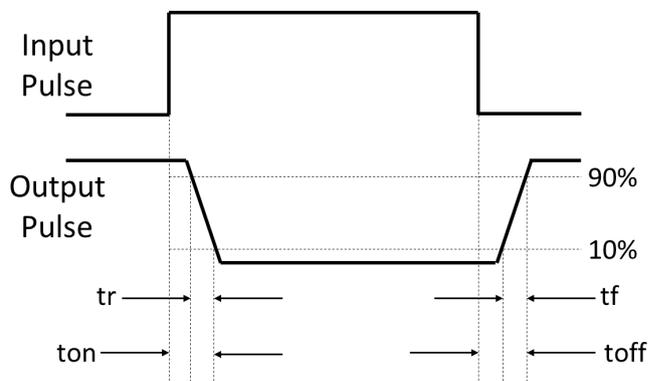


**TEST CIRCUITS**

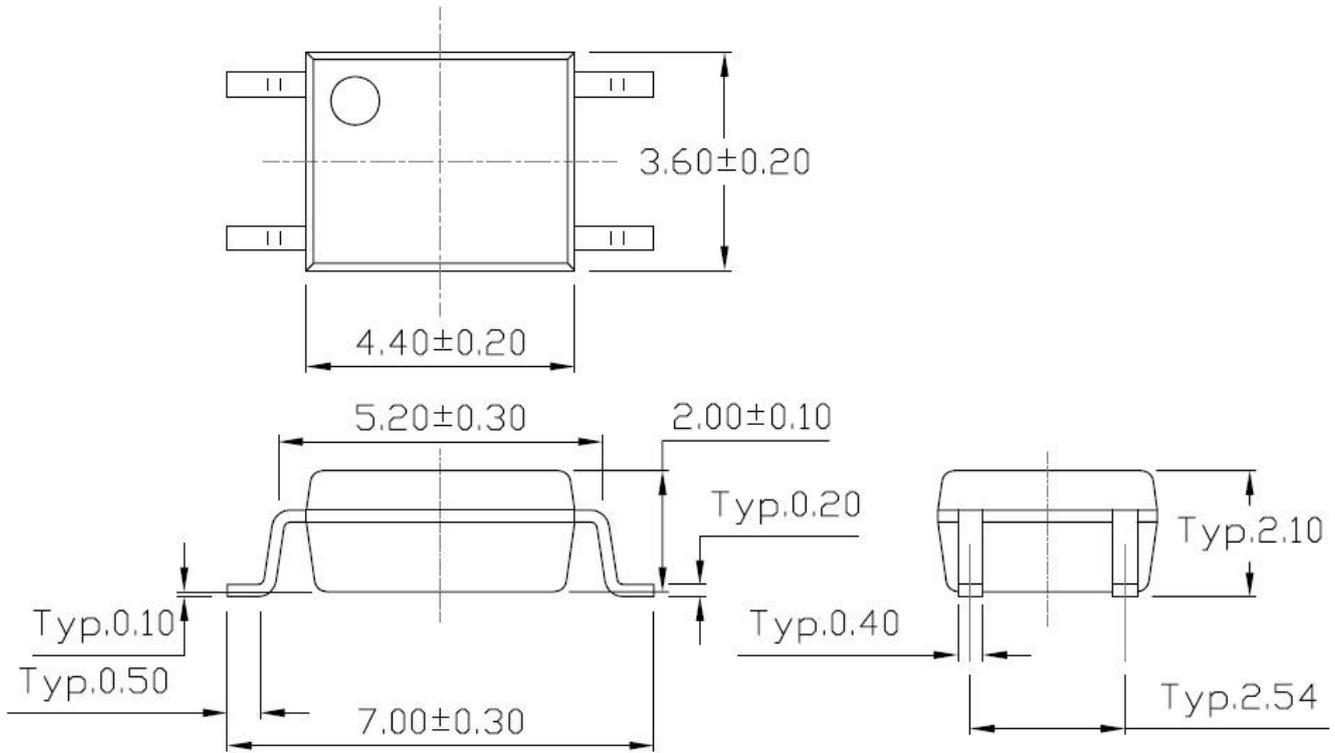
**Fig.12 Test Circuits of Response Time**



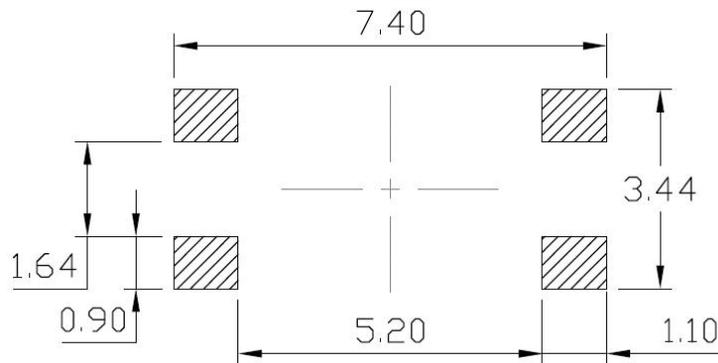
**Fig.13 Curves of Response Time**



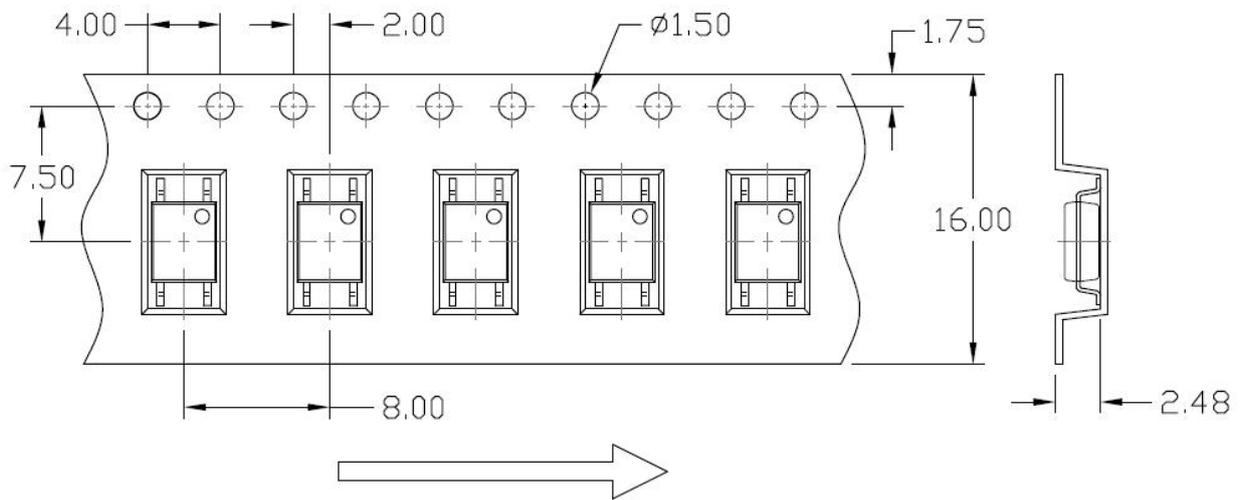
**PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)**



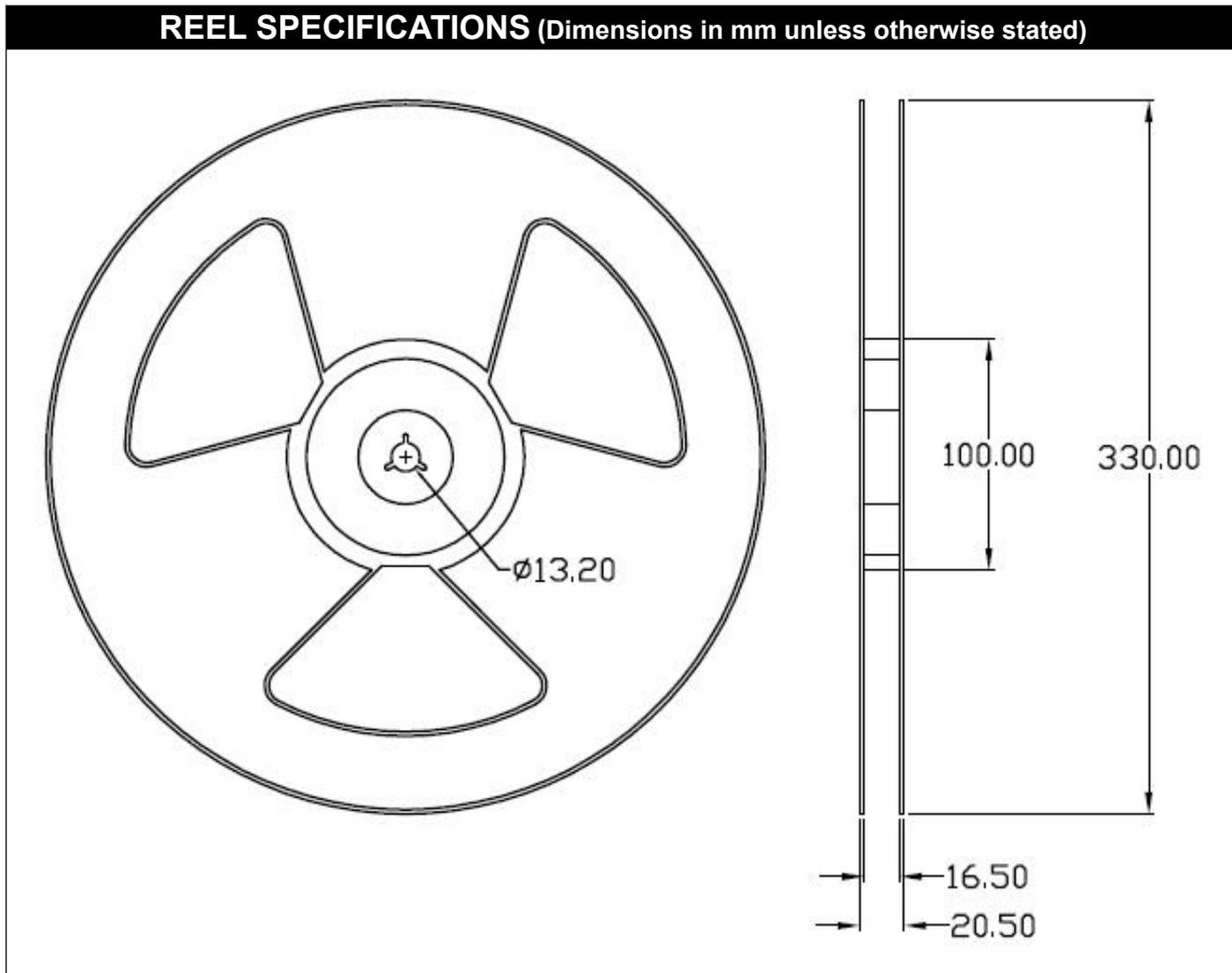
**Recommended Solder Mask (Dimensions in mm unless otherwise stated)**



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

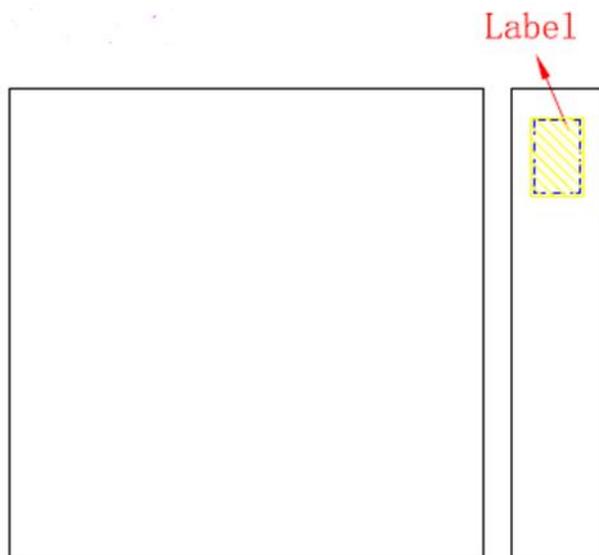


**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**



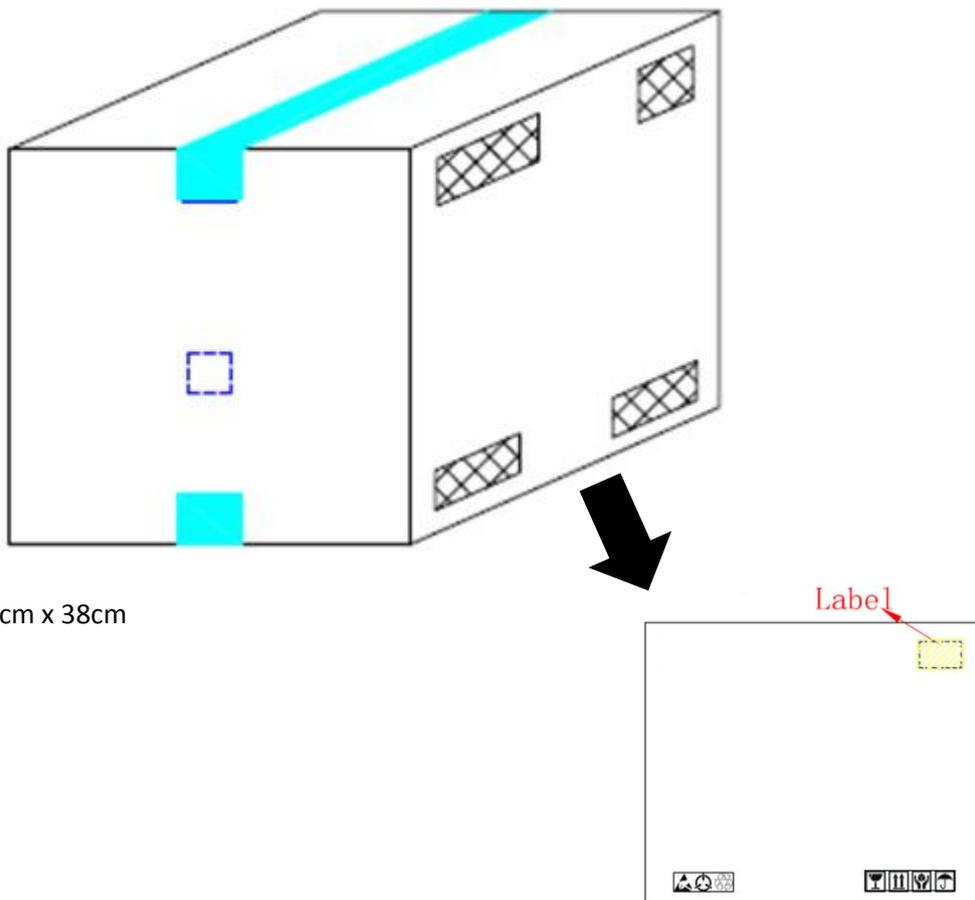
**BOX SPECIFICATIONS (Reel Type)**

**Inner Box**



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

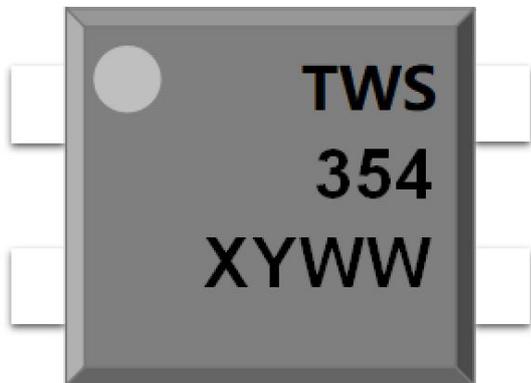
**Outer Box**



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

**ORDERING AND MARKING INFORMATION**

**MARKING INFORMATION**



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

**ORDERING INFORMATION**

**TWS 354X1(Z)-G**

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

**LABEL INFORMATION**

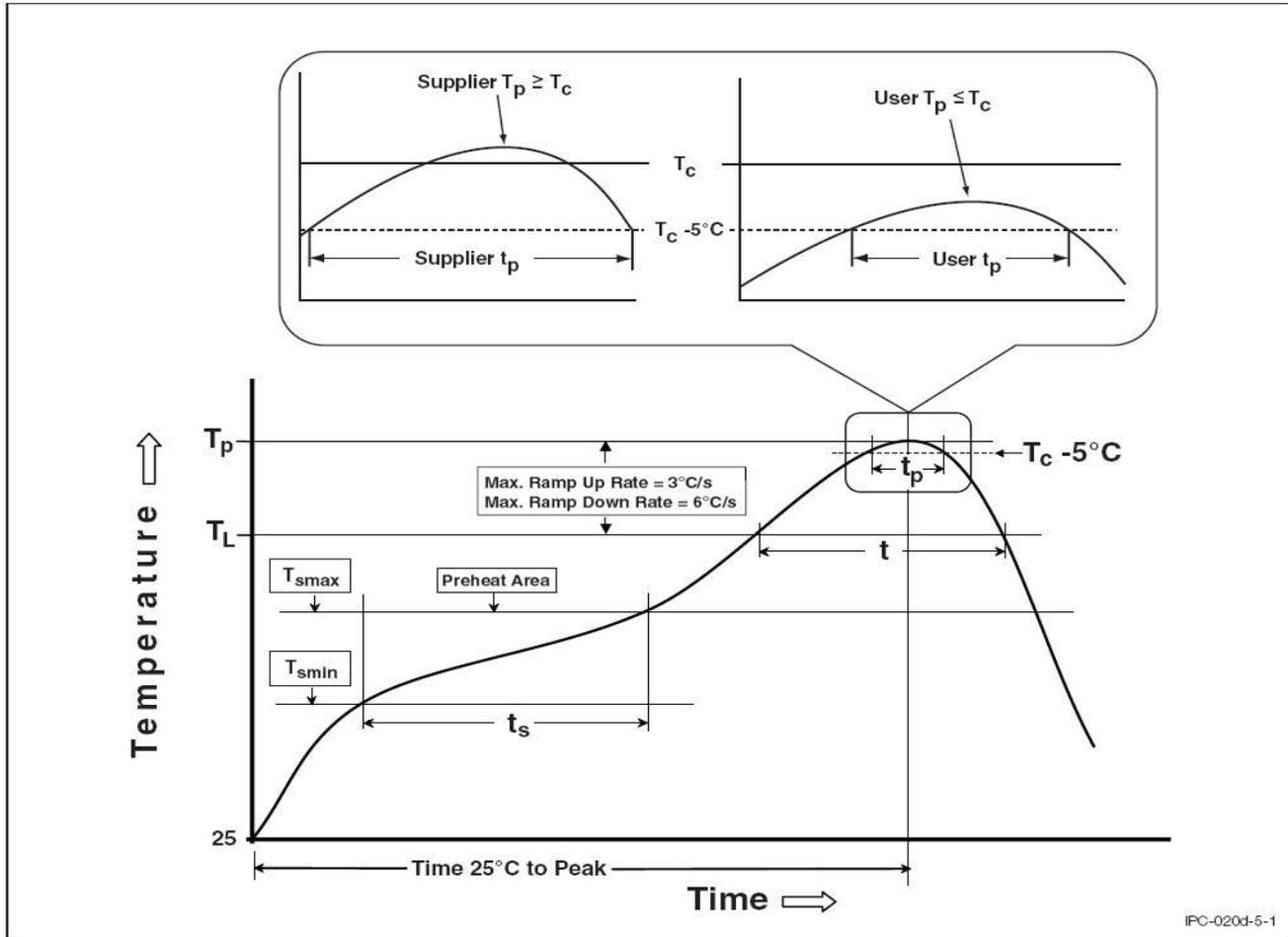


**PACKING QUANTITY**

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**



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100	150°C
Temperature Max. (T <sub>smax</sub> )	150	200°C
Time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	60-120 seconds	60-120 seconds
Ramp-up Rate (t <sub>L</sub> to t <sub>P</sub> )	3°C/second max.	3°C/second max.
Liquidous Temperature (T <sub>L</sub> )	183°C	217°C
Time (t <sub>L</sub> ) Maintained Above (T <sub>L</sub> )	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (t <sub>P</sub> ) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (T <sub>P</sub> to T <sub>L</sub> )	6°C/second max	6°C/second max
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.