



# MPC354X1 Series

## SOP4, AC Input, Photo Transistor Coupler

### Description

The MPC354X1 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, MPC354X1 series provide the most stable isolation feature.

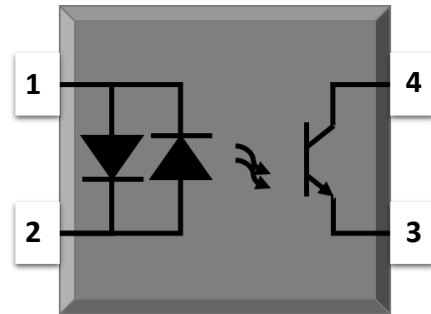
### Features

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

### Applications

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

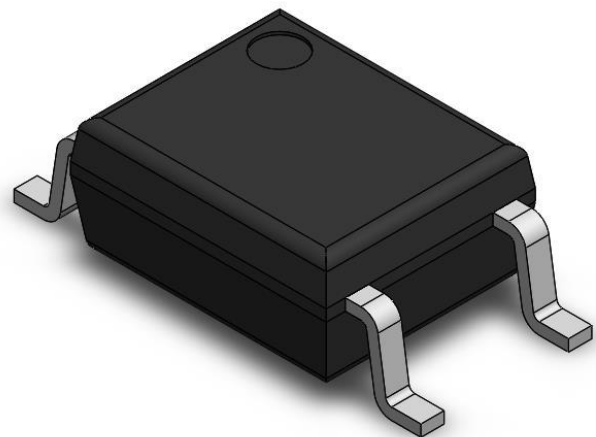
### SCHEMATIC



### 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	$I_F$	$\pm 60$	mA	
Peak Forward Current	$I_{FP}$	$\pm 1$	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 <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. 100 $\mu$ 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 <sub>F</sub>	-	1.24	1.4	V	I <sub>F</sub> =±10mA		
Input Capacitance	C <sub>in</sub>	-	10	-	pF	V=0, f=1kHz		
OUTPUT								
Collector Dark Current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> =20V, I <sub>F</sub> =0		
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0		
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	6	-	-	V	I <sub>E</sub> =0.1mA, I <sub>F</sub> =0		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	3541	CTR	20	-	300	%	I <sub>F</sub> =±1mA, V <sub>CE</sub> =5V	
	354A1		50	-	150			
	354B1		80	-	400			
CTR Symmetry		0.7	-	1.3		I <sub>F</sub> =±1mA, V <sub>CE</sub> =5V		
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.09	0.2	V	I <sub>F</sub> =±20mA, I <sub>C</sub> =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>	-	7	18	μs	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA	3	
Response Time (Fall)	t <sub>f</sub>	-	9	18	μs	RL=100Ω	3	

Note 3. Fig.12&13

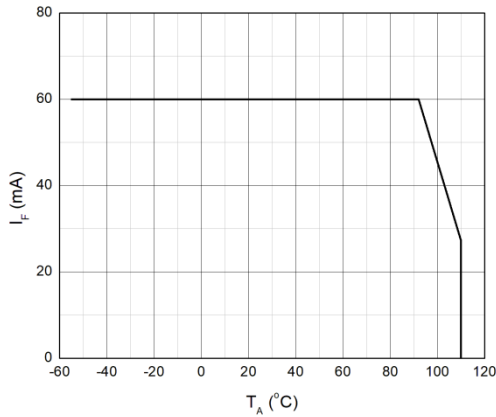


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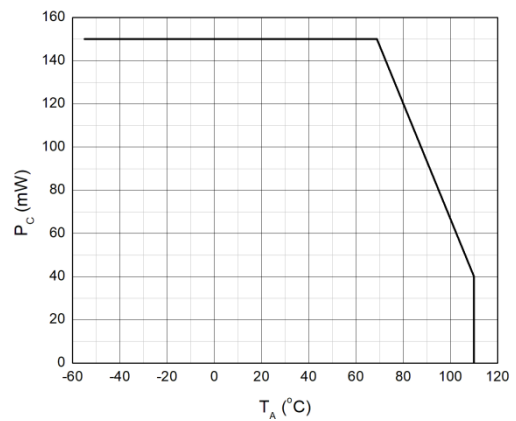
## SOP4, AC Input, Photo Transistor Coupler

### CHARACTERISTIC CURVES

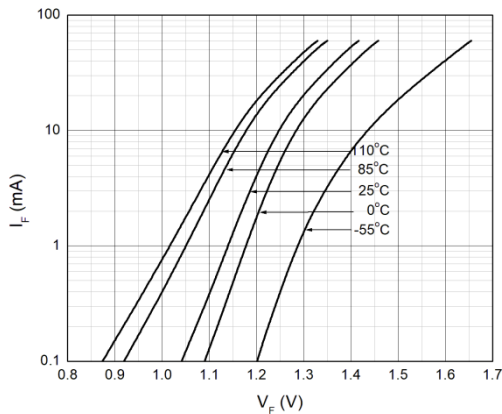
**Fig.1 Forward Current vs. Ambient Temperature**



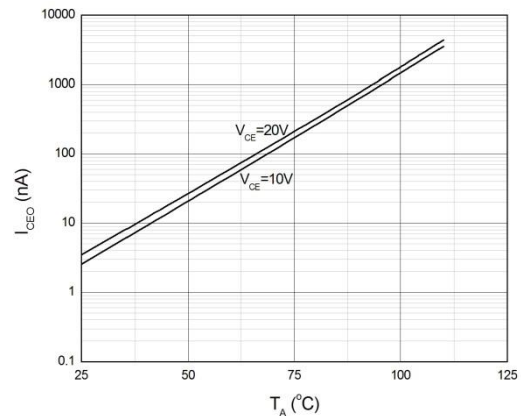
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



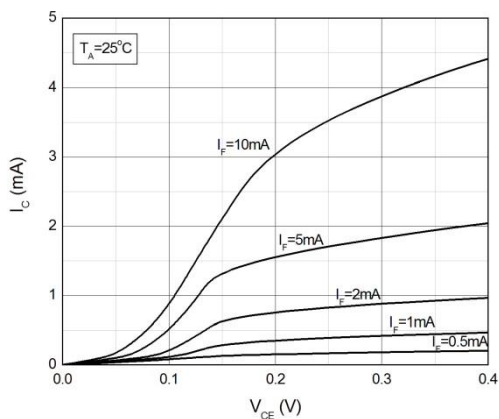
**Fig.3 Forward Current vs. Forward Voltage**



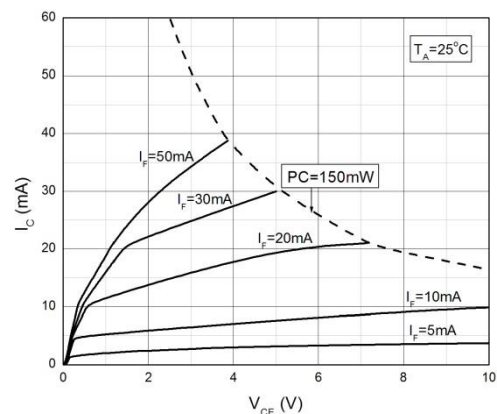
**Fig.4 Collector Dark Current vs. Ambient Temperature**



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



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



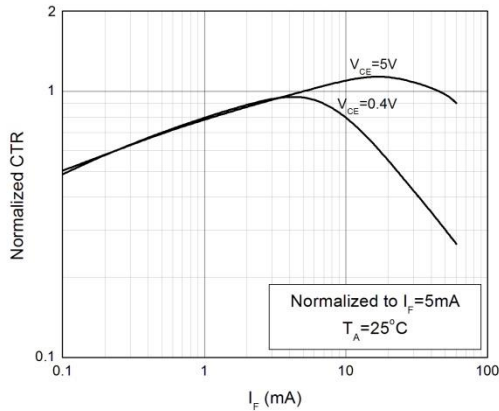


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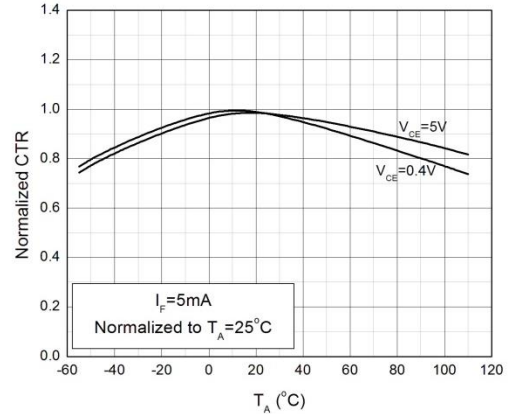
## SOP4, AC Input, Photo Transistor Coupler

### CHARACTERISTIC CURVES

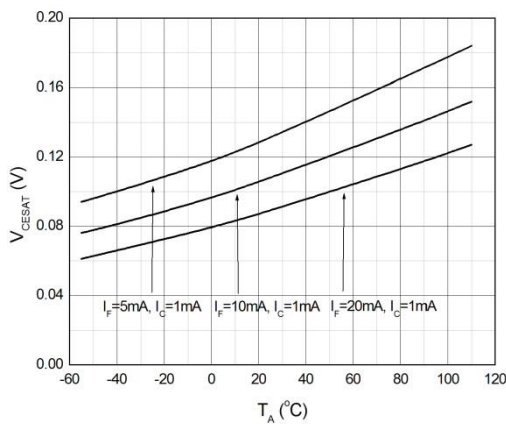
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



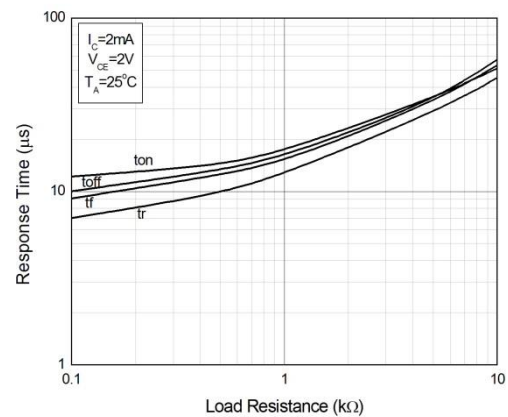
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



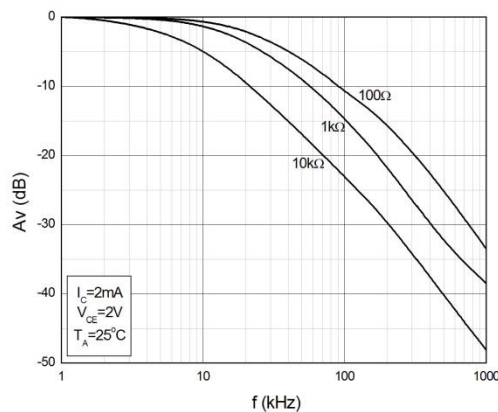
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



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



**Fig.11 Frequency Response**





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### TEST CIRCUITS

Fig.12 Test Circuits of Response Time

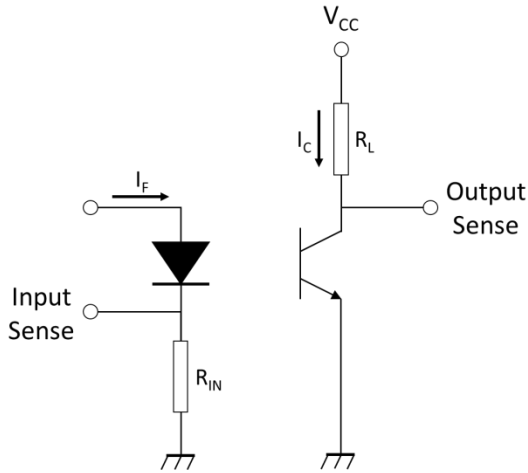
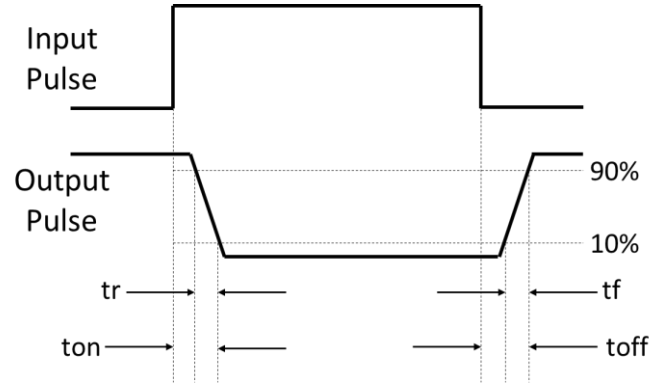


Fig.13 Curves of Response Time

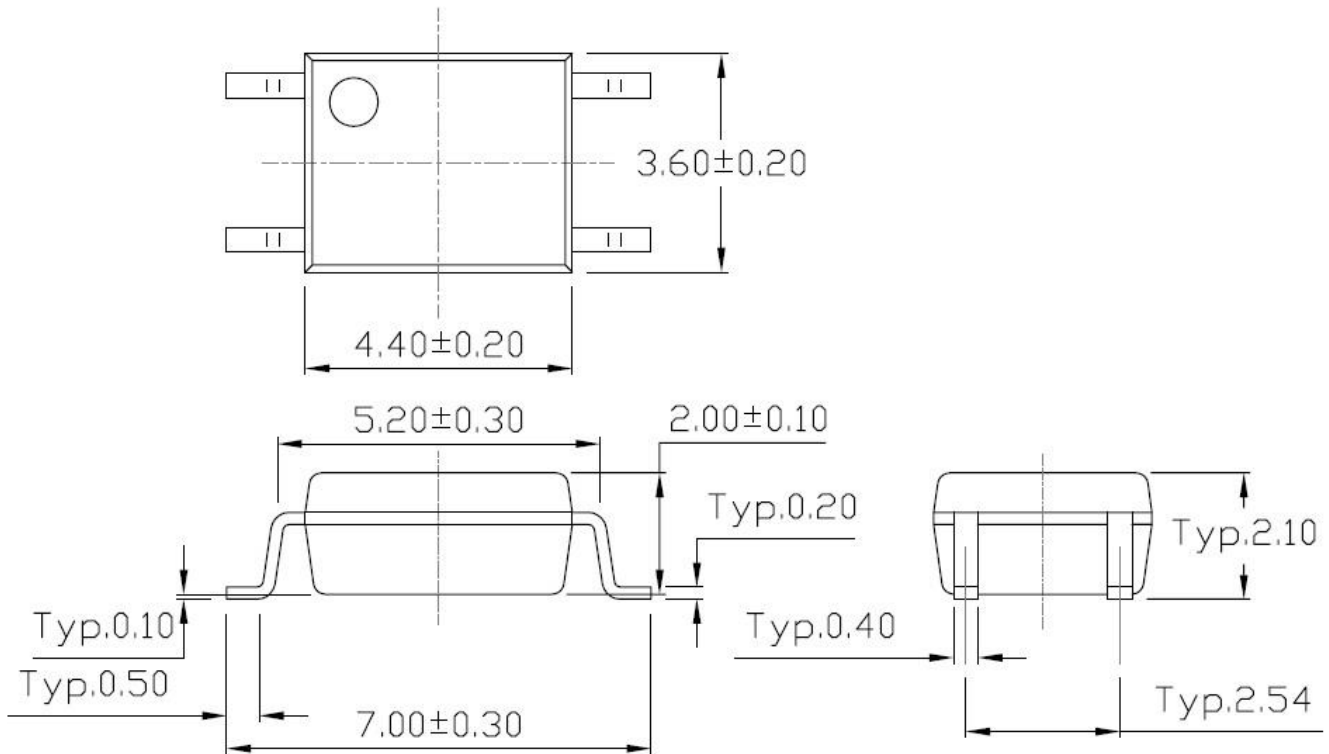




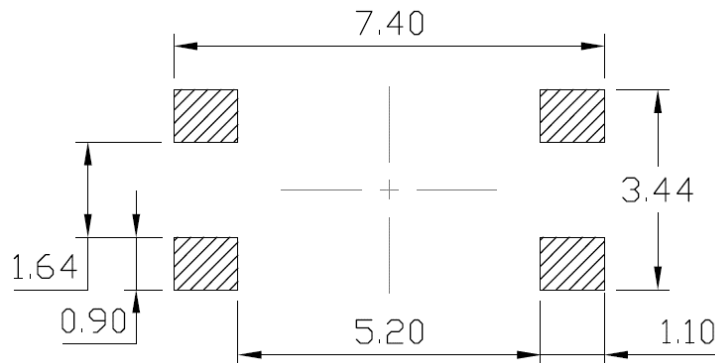
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### PACKAGE DIMENSIONS (Dimensions in mm unless otherwise stated)



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



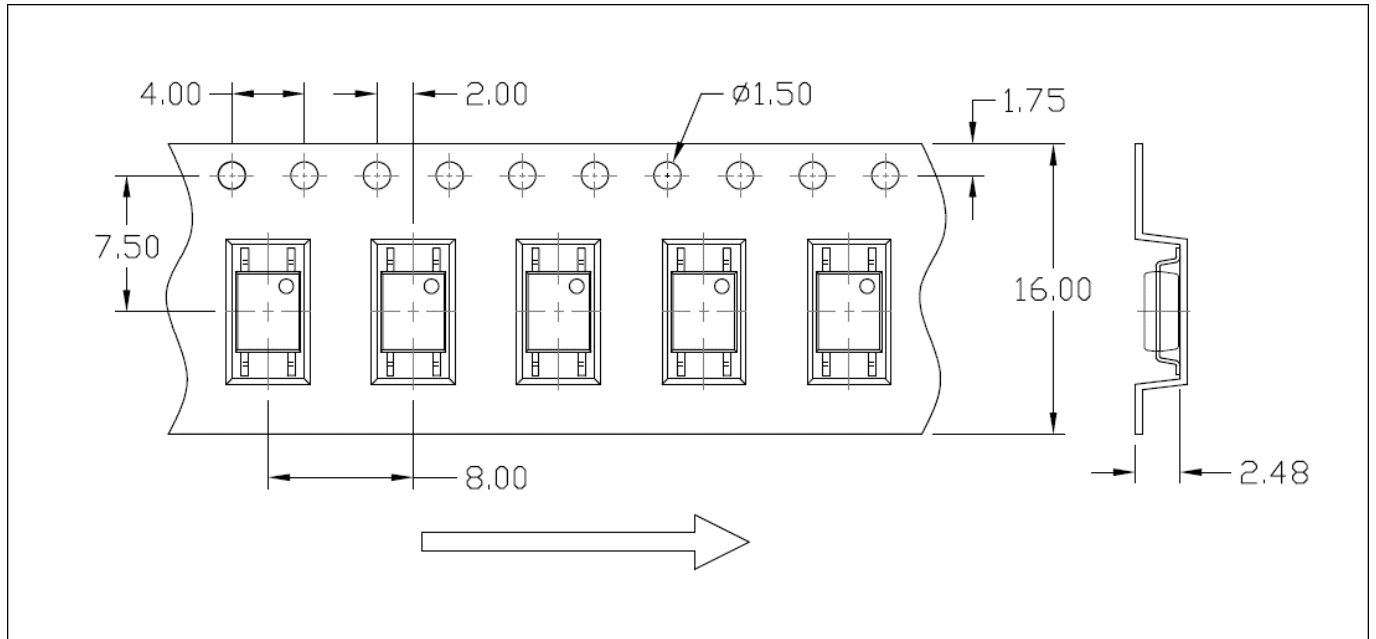


# MPC354X1 Series

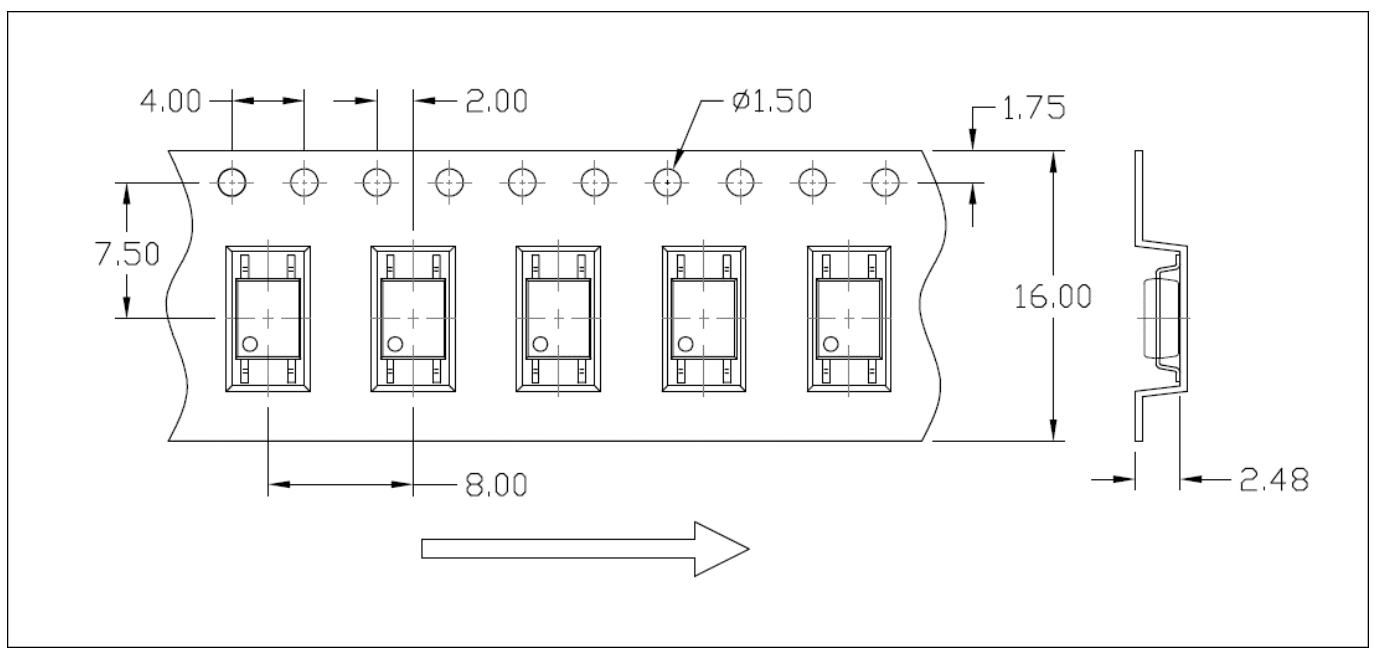
## SOP4, AC Input, Photo Transistor Coupler

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

#### Option T1



#### Option T2



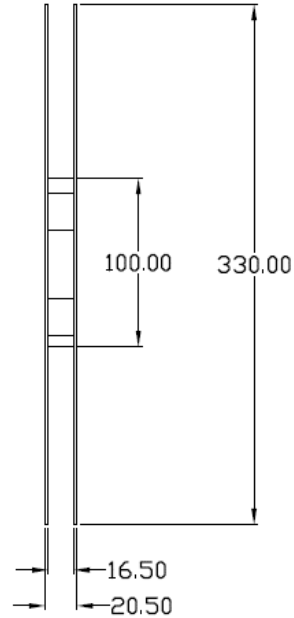
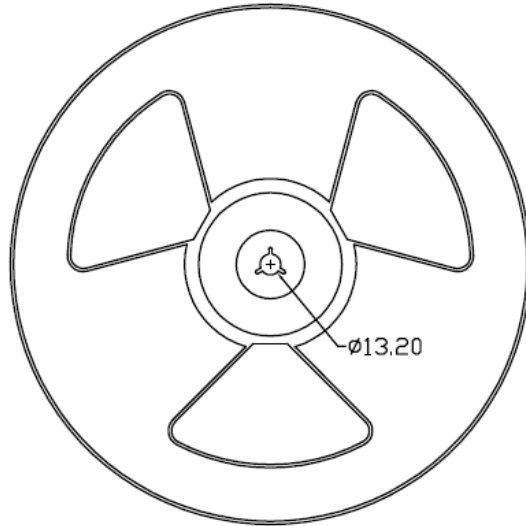




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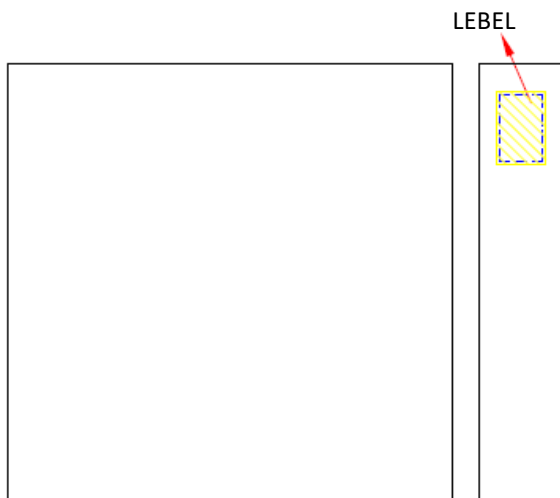
## SOP4, AC Input, Photo Transistor Coupler

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



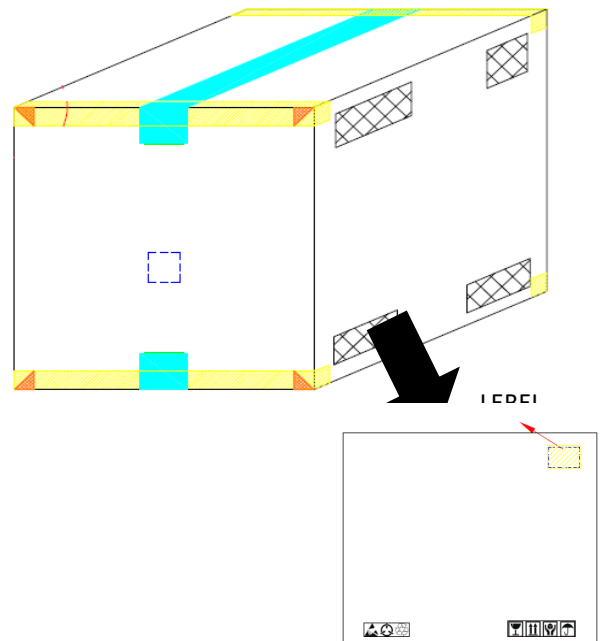
### BOX SPECIFICATIONS (Reel Type)

#### 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

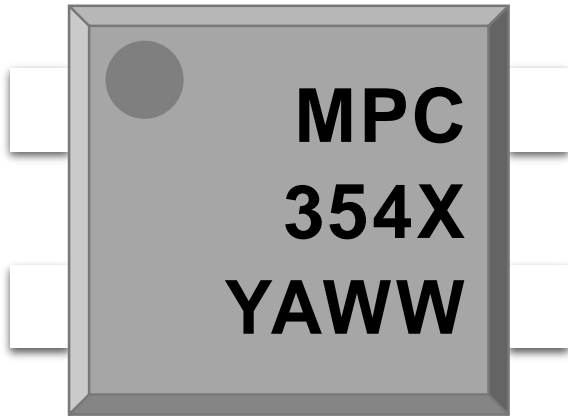


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### ORDERING AND MARKING INFORMATION

#### MARKING INFORMATION



**MPC** : Company Abbr.  
**354** : Part Number  
**X** : CTR Rank  
**V** : VDE Option  
**Y** : Fiscal Year  
**A** : Manufacturing Code  
**WW** : Work Week

#### ORDERING INFORMATION

### MPC354X1(Z)-GV

MPC – Company Abbr.  
 354 – Part Number  
 X1 – Rank (X= A/B or None)  
 Z – Tape and Reel Option (T1/T2)  
 G – G=Green, None=non-Green  
 V – VDE Option (V or None)

#### LABEL INFORMATION



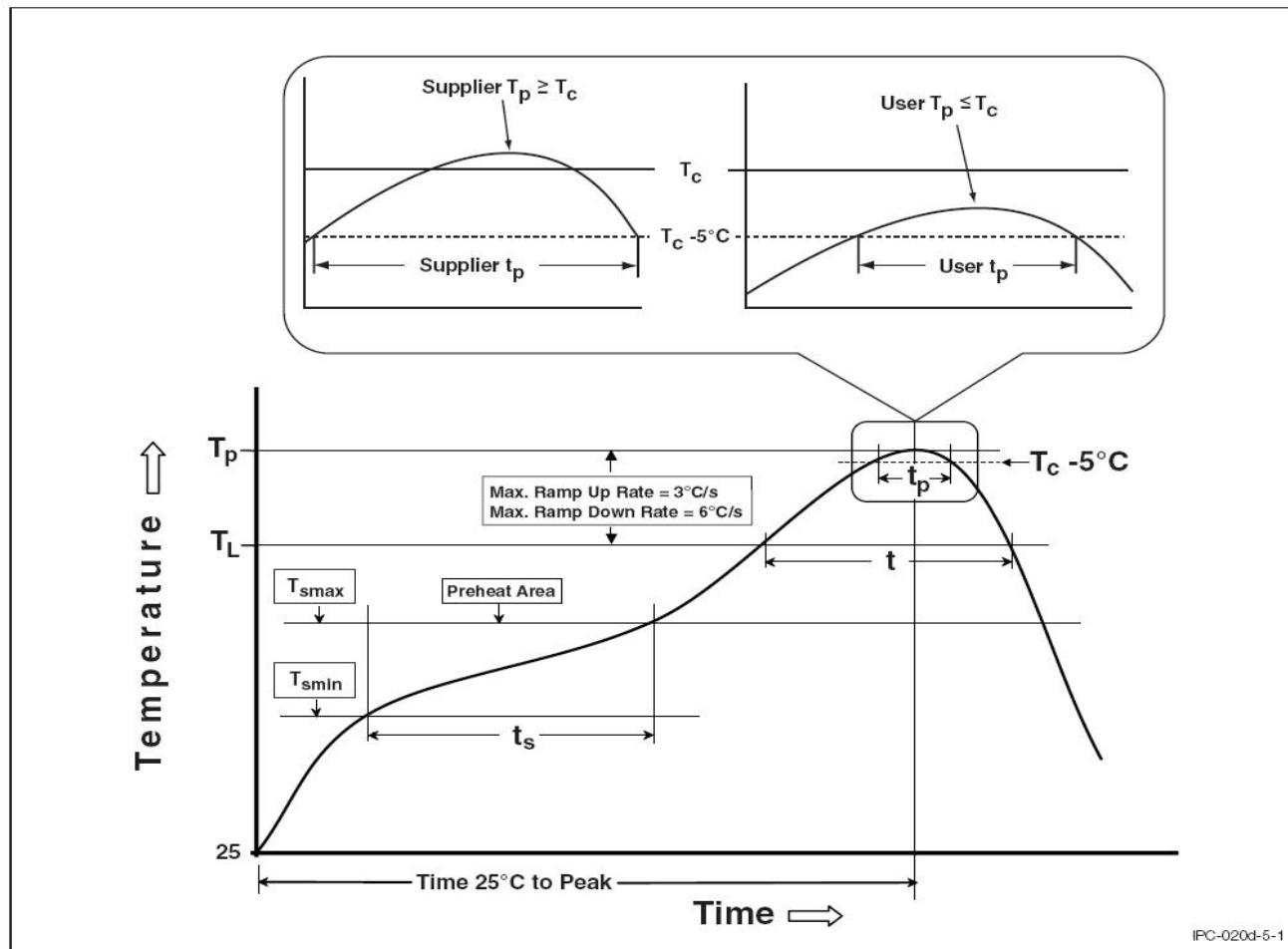
#### PACKING QUANTITY

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



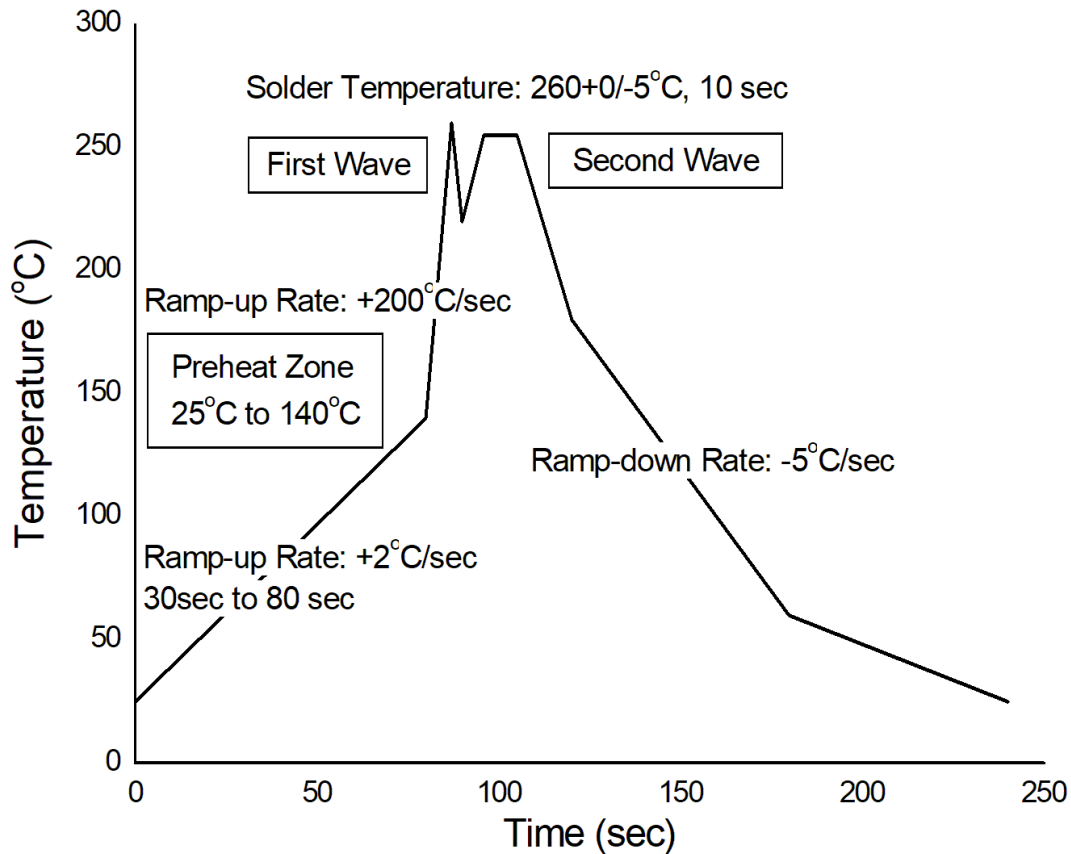
IPC-020d-5-1

Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (T <sub>smin</sub> )	100°C	150°C
Temperature Max. (T <sub>smax</sub> )	150°C	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.



### TEMPERATURE PROFILE OF SOLDERING

#### WAVE SOLDERING (JESD22-A111 COMPLIANT)



#### HAND SOLDERING BY SOLDERING IRON

Soldering Temperature	380±0/-5°C
Soldering Time	3 sec max.

One time soldering is recommended for all soldering method.

Do not solder more than three times for IR reflow soldering.



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### **DISCLAIMER**

- WISELITE is continually improving the quality, reliability, function and design. WISELITE reserves the right to make changes without further notices.
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- This product is not intended to be used for military, aircraft, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact WISELITE 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 WISELITE'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.

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