



# MPC357X1 Series

## SOP4, DC Input Photo Transistor Coupler

### Description

The MPC357X1 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, MPC357X1 series provide the most stable isolation feature.

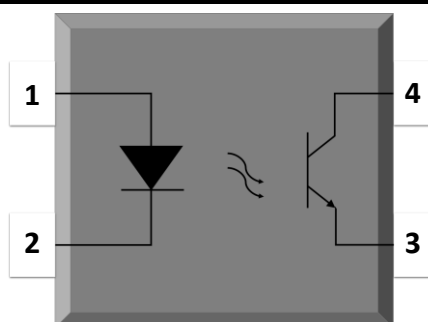
### Features

- High isolation 3750 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- RoHS & REACH Compliance
- Halogen free (Optional)
- MSL class 1
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)

### Applications

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

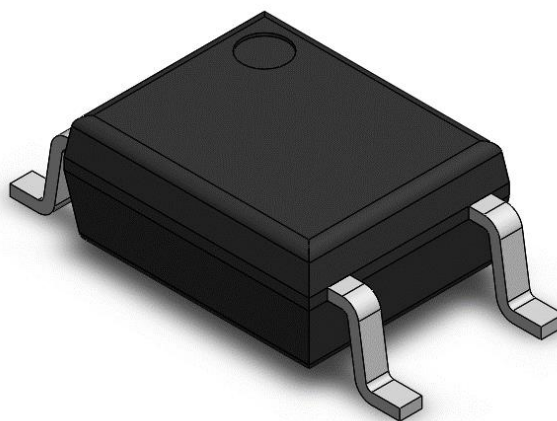
### SCHEMATIC



### 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 <sub>rms</sub>	2
Operating Temperature	$T_{opr}$	-55~110	°C	
Storage Temperature	$T_{stg}$	-55~125	°C	
Soldering Temperature	$T_{sol}$	260	°C	

Note 1. 100μs 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	IF=10mA	
Reverse Current	I <sub>R</sub>	-	-	10	μA	VR=6V	
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>	35	-	-	V	IC=0.1mA, IF=0	
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	6	-	-	V	IE=0.1mA, IF=0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	357	CTR	50	-	600	IF=5mA, VCE=5V	
	357A		80	-	160		
	357B		130	-	260		
	357C		200	-	400		
	357D		300	-	600		
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	-	0.06	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	
Cut-off Frequency	f <sub>c</sub>	-	80	-	kHz	VCE=2V, IC=2mA RL=100Ω, -3dB	4
Response Time (Rise)	t <sub>r</sub>	-	6	18	μs	VCE=2V, IC=2mA RL=100Ω	3
Response Time (Fall)	t <sub>f</sub>	-	8	18	μs		3

Note 3. Fig.12&13

Note 4. Fig.14

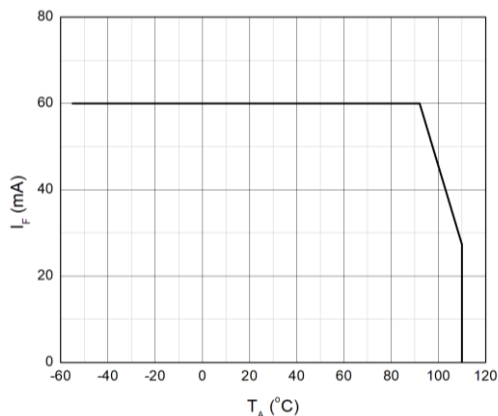


# MPC357X1 Series

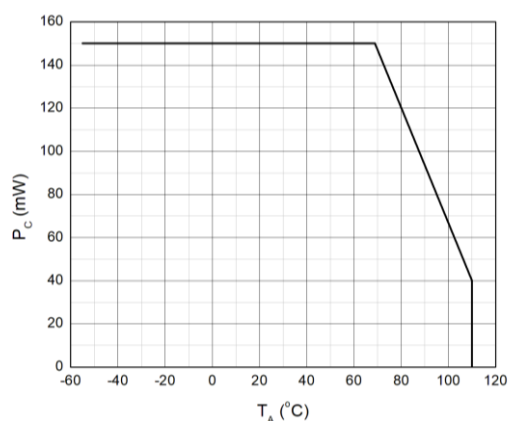
## SOP4, DC Input Photo Transistor Coupler

### CHARACTERISTIC CURVES

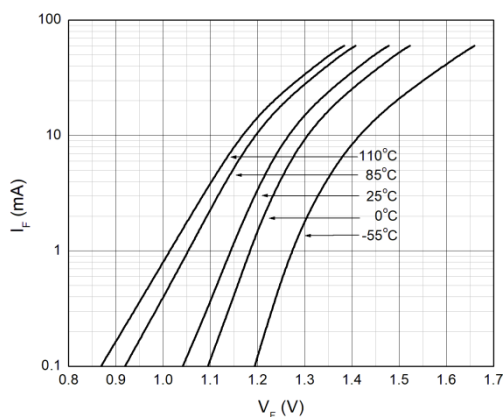
**Fig.1 Forward Current  
vs. Ambient Temperature**



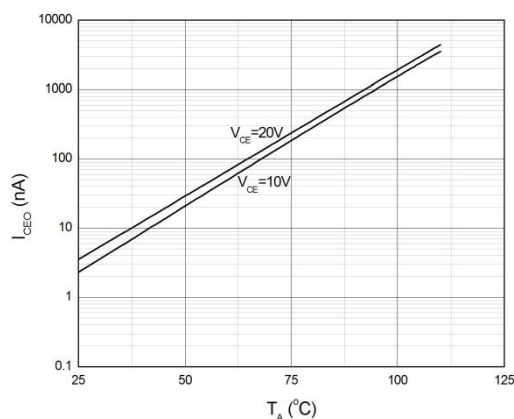
**Fig.2 Collector Power Dissipation  
vs. Ambient Temperature**



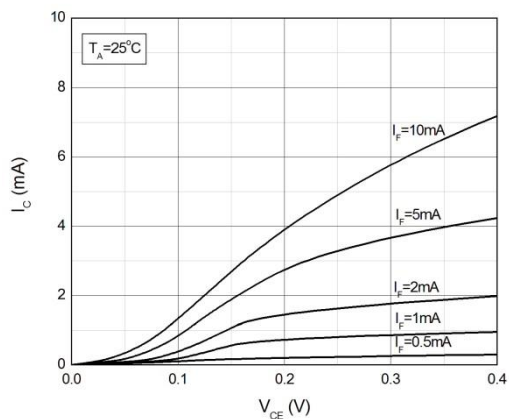
**Fig.3 Forward Current  
vs. Forward Voltage**



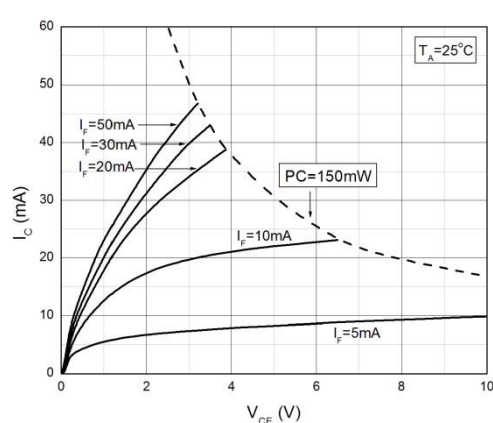
**Fig.4 Collector Dark Current  
vs. Ambient Temperature**



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



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



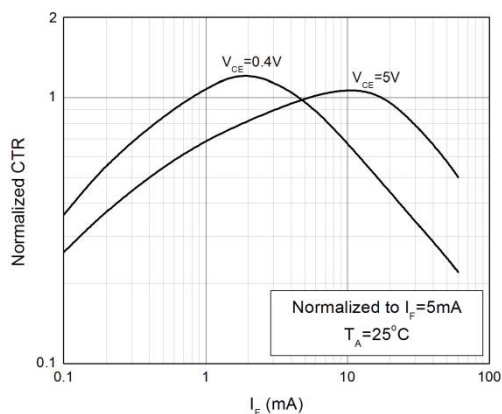


# MPC357X1 Series

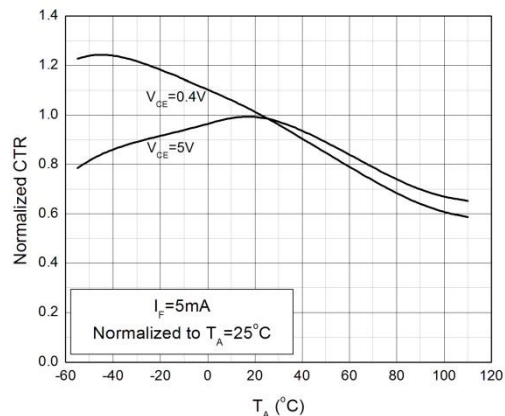
## SOP4, DC Input Photo Transistor Coupler

### CHARACTERISTIC CURVES

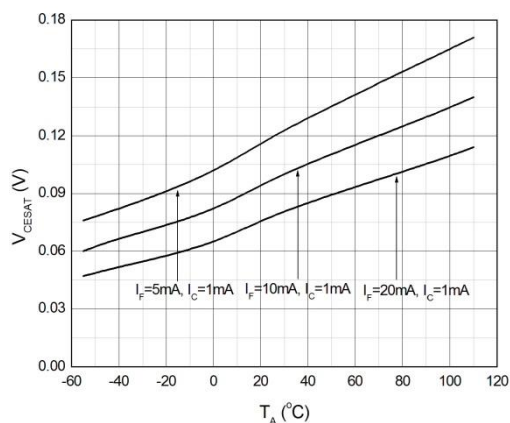
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



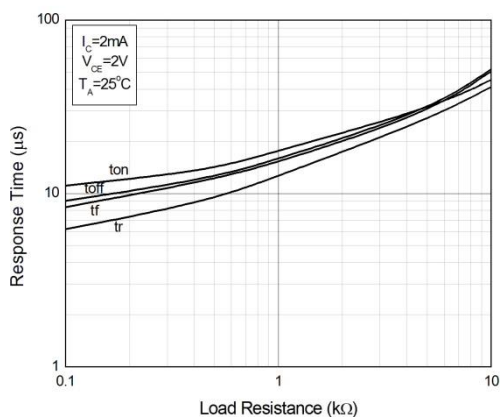
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



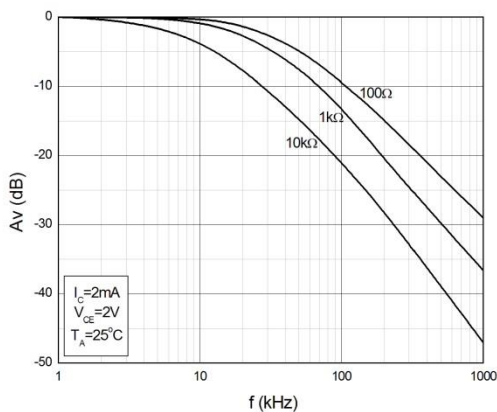
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



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



**Fig.11 Frequency Response**





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## SOP4, DC Input Photo Transistor Coupler

### TEST CIRCUITS

Fig.12 Test Circuits of Response Time

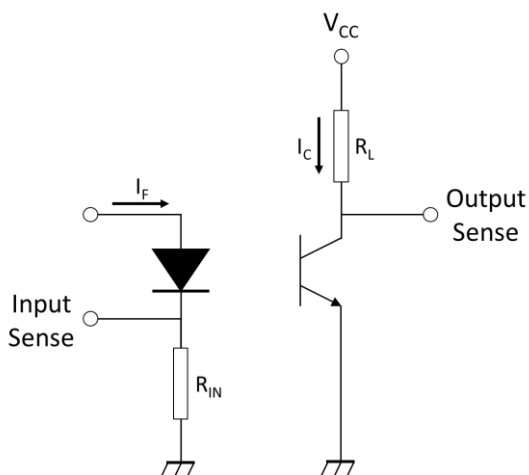


Fig.13 Curves of Response Time

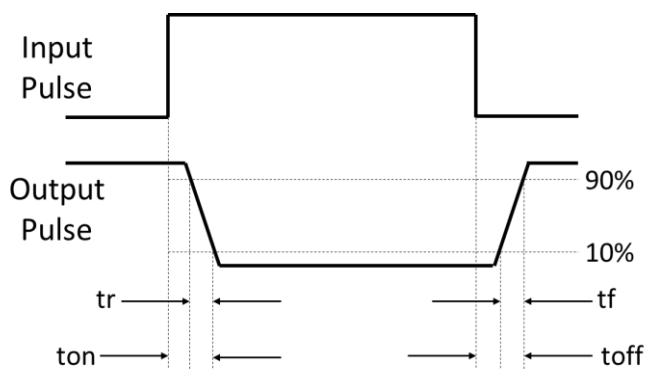
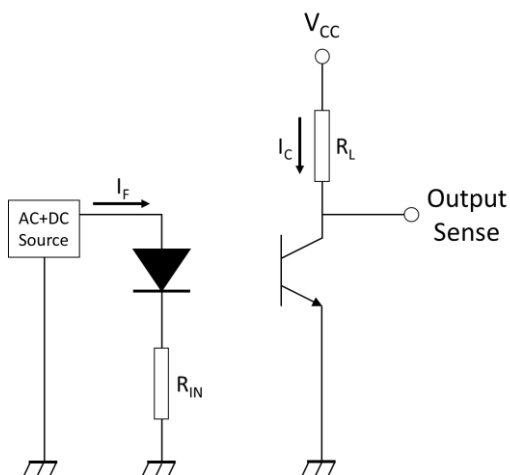


Fig.14 Test Circuits of Frequency Response

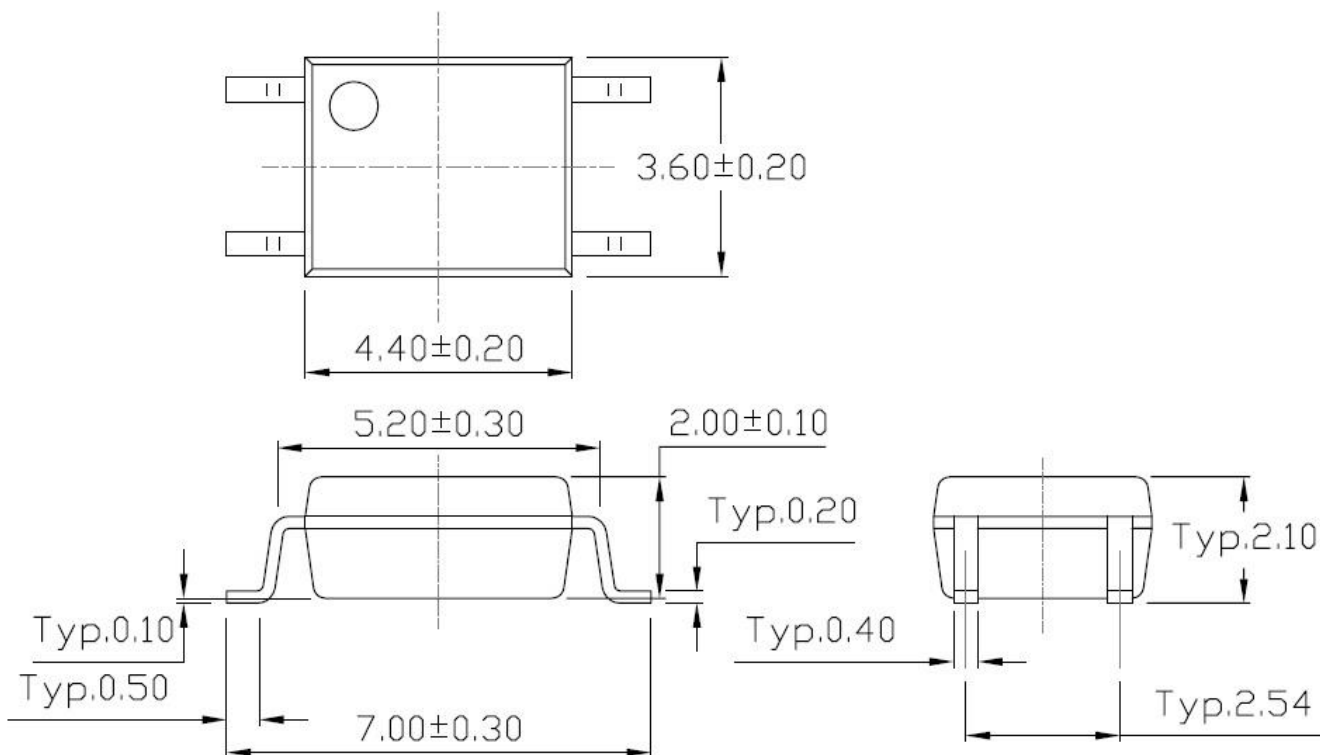




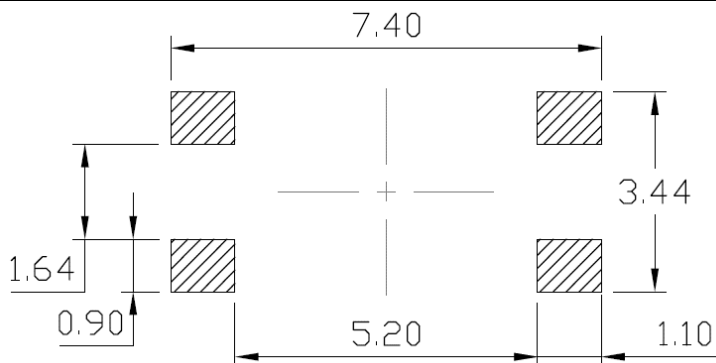
# MPC357X1 Series

## SOP4, DC Input Photo Transistor Coupler

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



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



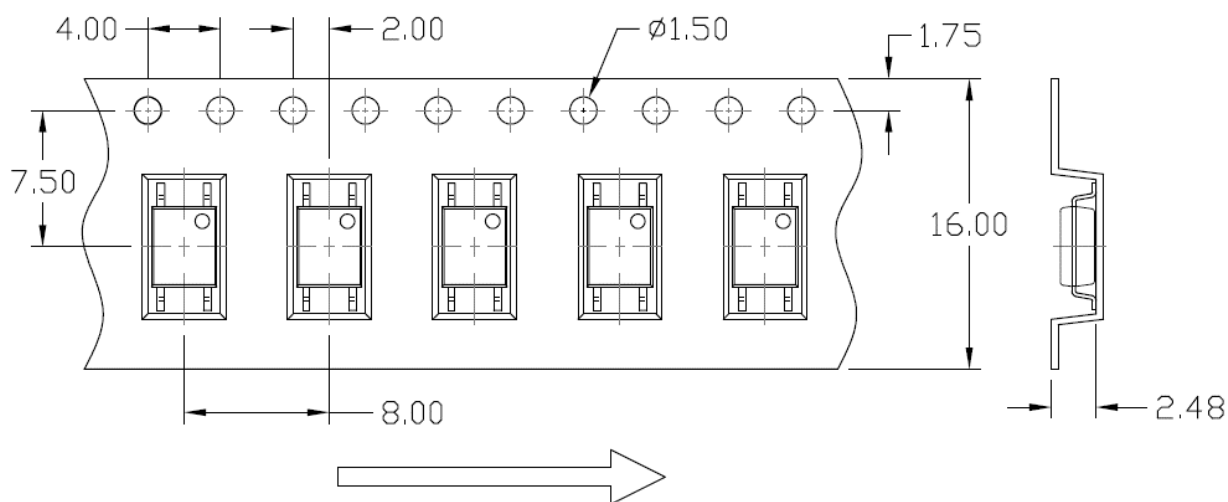


# MPC357X1 Series

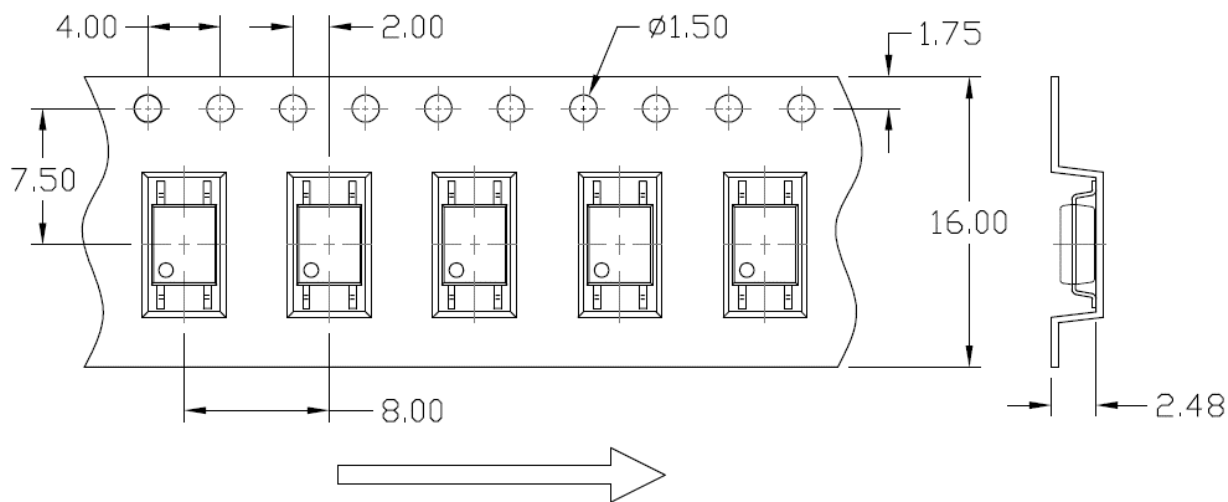
## SOP4, DC Input Photo Transistor Coupler

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

Option T1



Option T2





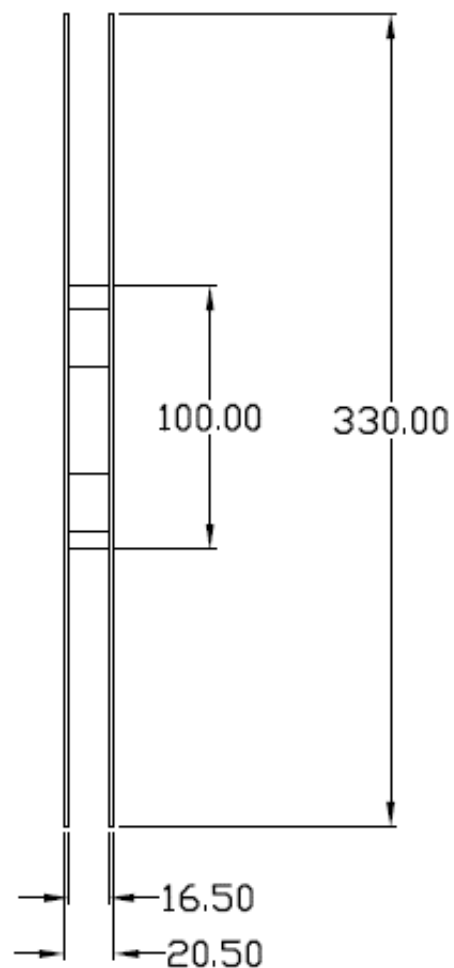
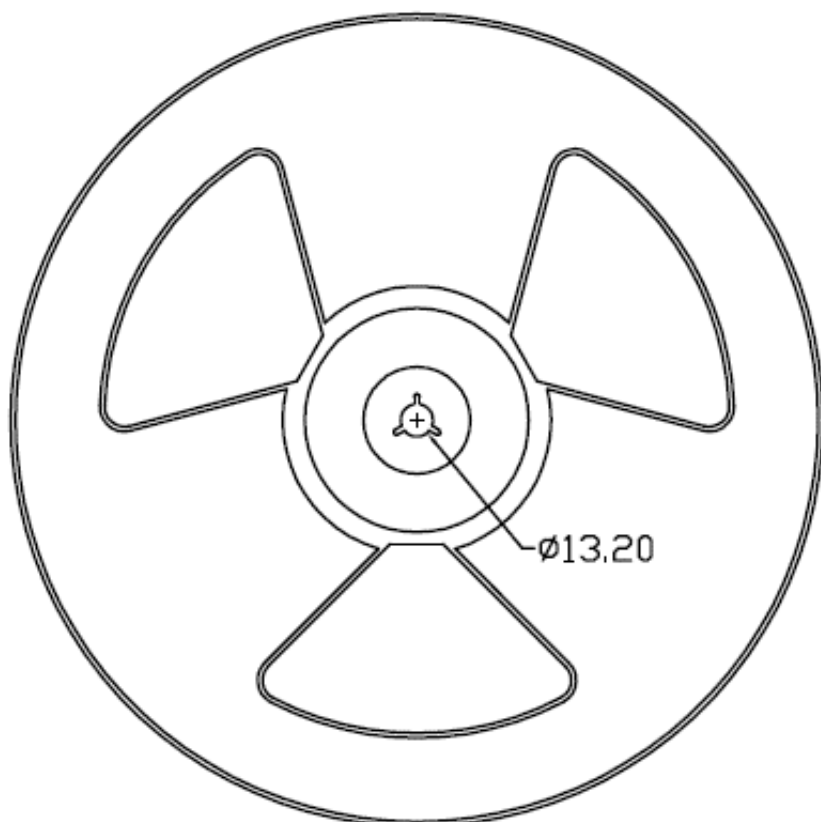


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## SOP4, DC Input Photo Transistor Coupler

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

Option T1 & T2



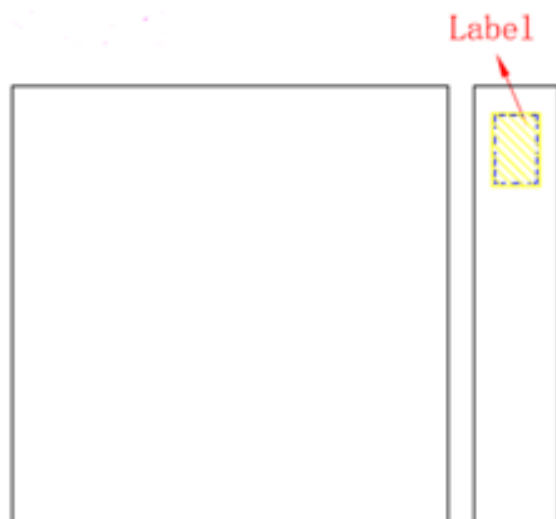


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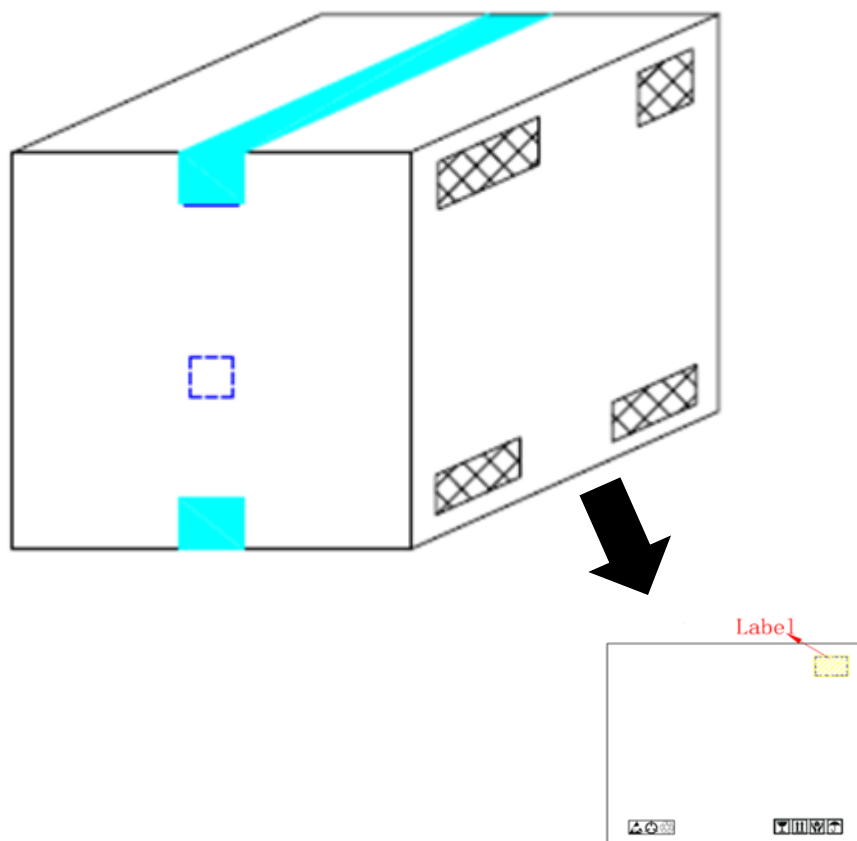
### BOX SPECIFICATIONS (Reel Type)

#### 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

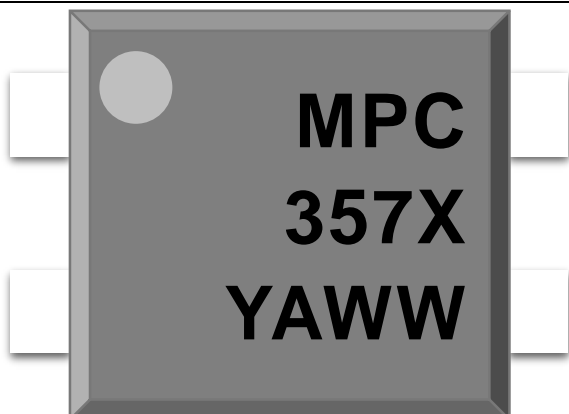


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## SOP4, DC Input Photo Transistor Coupler

### ORDERING AND MARKING INFORMATION

#### MARKING INFORMATION



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

#### ORDERING INFORMATION

### MPC357X1(Z)-GV

MPC – Company Abbr.  
357 – Part Number  
X – Rank (A/B/C/D 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

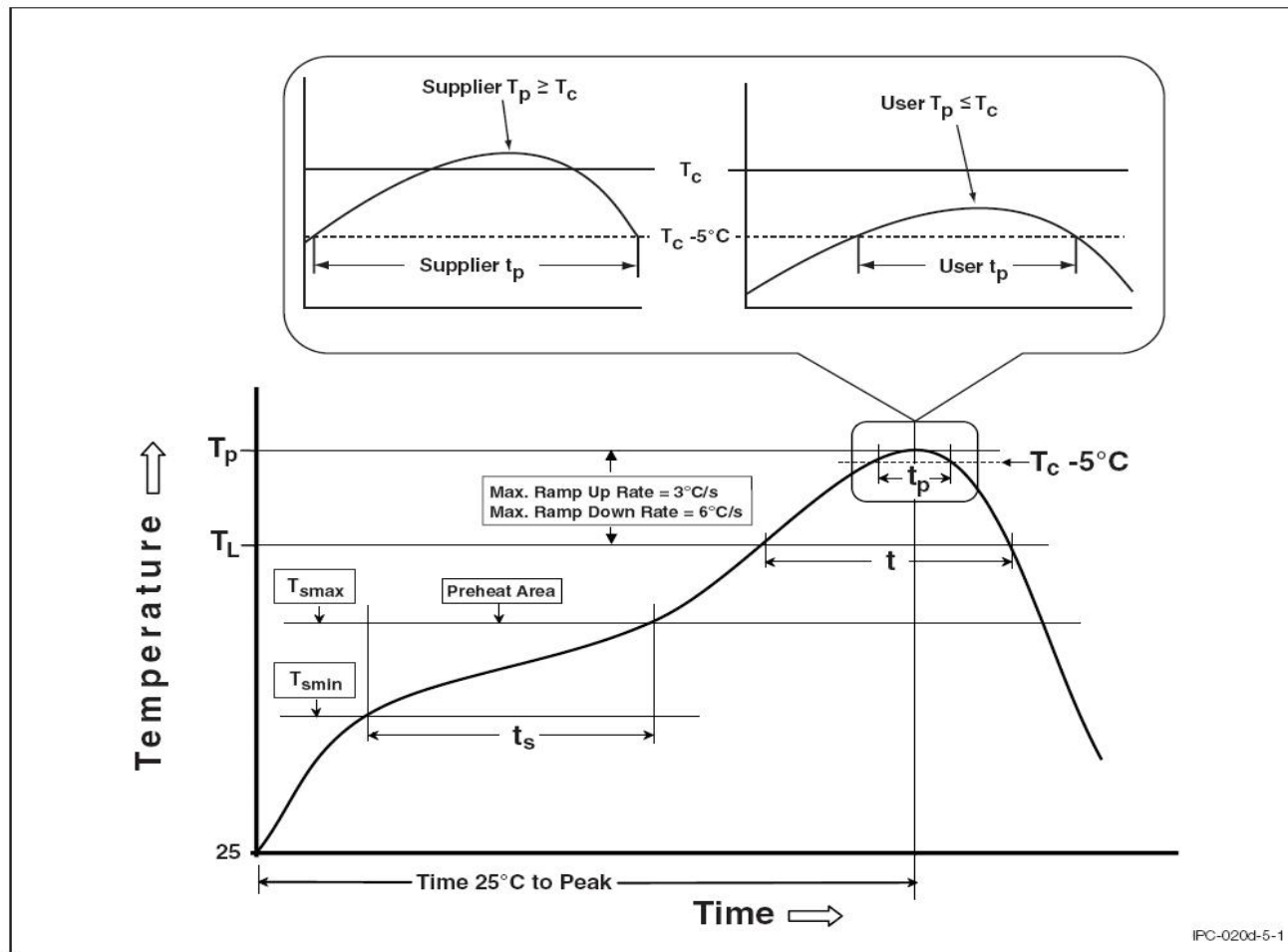


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### REFLOW INFORMATION

#### REFLOW PROFILE



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.

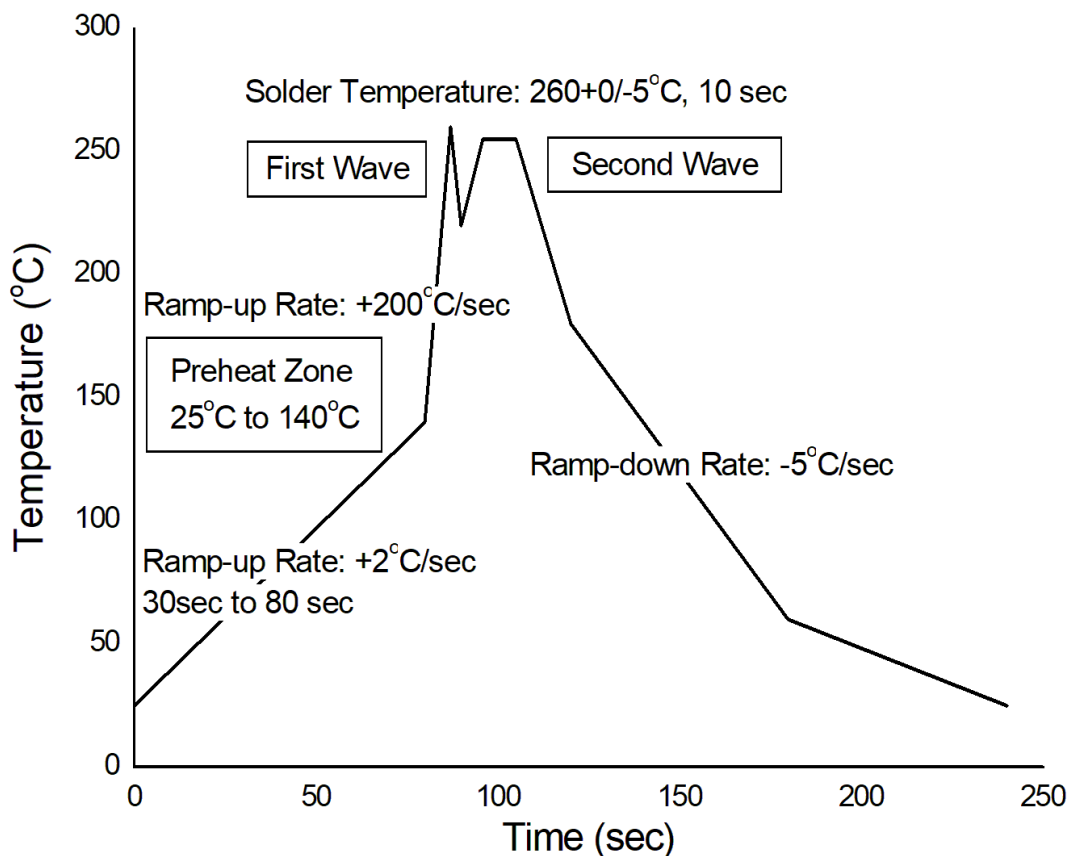


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### TEMPERATURE PROFILE OF SOLDERING

#### 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.
- The characteristic curves shown in this datasheet are representing typical performance which are not guaranteed.
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- The products shown in this publication are designed for the general use in electronic applications such as office automation, equipment, communications devices, audio/visual equipment, electrical application and instrumentation purpose, non-infringement and merchantability.
- 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.