



JOC356X1 Series

DC Input Photo Transistor Coupler

**Description**

The JOC356X1 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, JOC356X1 series provide the most stable isolation feature.

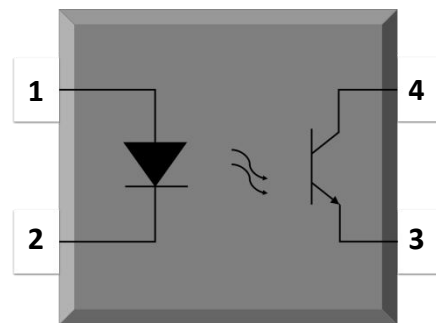
**Features**

- 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
- Regulatory Approvals
  - UL
  - VDE
  - CQC

**Applications**

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

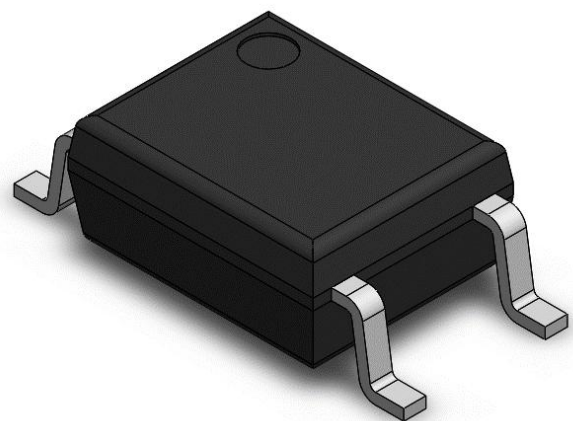
**SCHEMATIC**



**PIN DEFINITION**

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

**PACKAGE OUTLINE**



### 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	$V_{CEO}$	80	V	
Emitter - Collector Voltage	$V_{ECO}$	6	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. 100 $\mu$ s pulse, 100Hz frequency

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

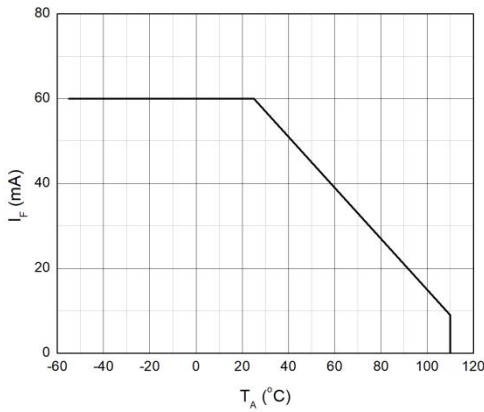
ELECTRICAL OPTICAL CHARACTERISTICS at Ta=25°C								
PARAMETER	SYMBOL	MIN	TYP.	MAX.	UNIT	TEST CONDITION	NOTE	
INPUT								
Forward Voltage	$V_F$	-	1.24	1.4	V	$I_F=10\text{mA}$		
Reverse Current	$I_R$	-	-	10	$\mu\text{A}$	$V_R=6\text{V}$		
Input Capacitance	$C_{in}$	-	10	-	pF	$V=0, f=1\text{kHz}$		
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	$BV_{ECO}$	6	-	-	V	$I_E=0.1\text{mA}, I_F=0$		
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	JOC356	CTR	50	-	600	%	$I_F=5\text{mA}, V_{CE}=5\text{V}$	
	JOC356A1		80	-	160			
	JOC356B1		130	-	260			
	JOC356C1		200	-	400			
	JOC356D1		300	-	600			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.06	0.2	V	$I_F=20\text{mA}, I_C=1\text{mA}$		
Isolation Resistance	$R_{ISO}$	$10^{12}$	$10^{14}$	-	$\Omega$	DC500V, 40 ~ 60% R.H.		
Floating Capacitance	$C_{IO}$	-	0.4	1	pF	$V=0, f=1\text{MHz}$		
Response Time (Rise)	$t_r$	-	3	18	$\mu\text{s}$	$V_{CE}=2\text{V}, I_C=2\text{mA}$	3	
Response Time (Fall)	$t_f$	-	4	18	$\mu\text{s}$	$R_L=100\Omega$	3	
Cut-off Frequency	$f_c$	-	80	-	kHz	$V_{CE}=2\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$	4	

Note 3. Fig.12&amp;13

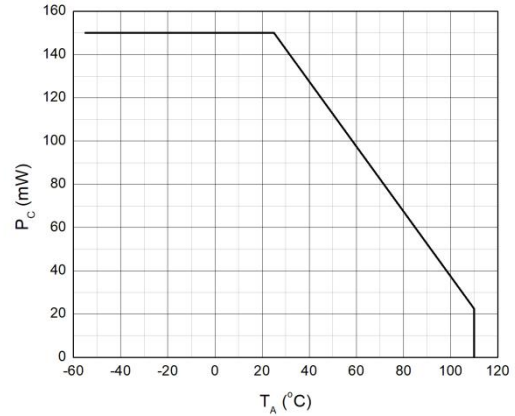
Note 4. Fig.14

**CHARACTERISTIC CURVES**

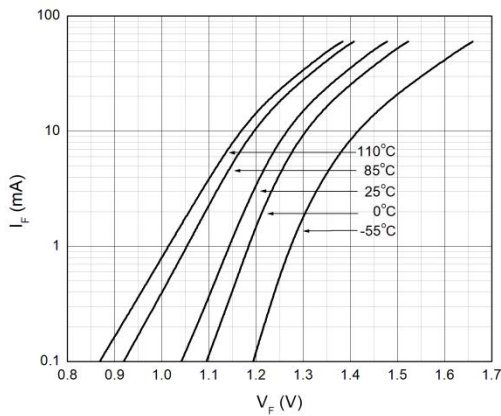
**Fig.1 Forward Current vs. Ambient Temperature**



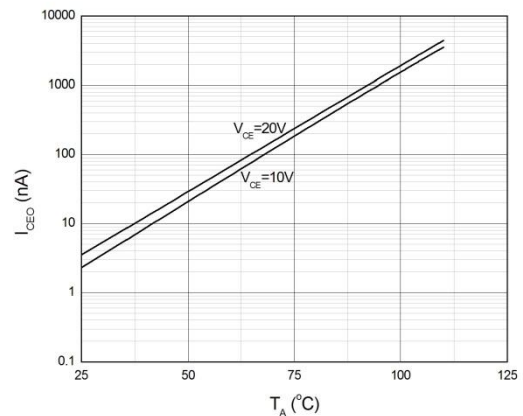
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



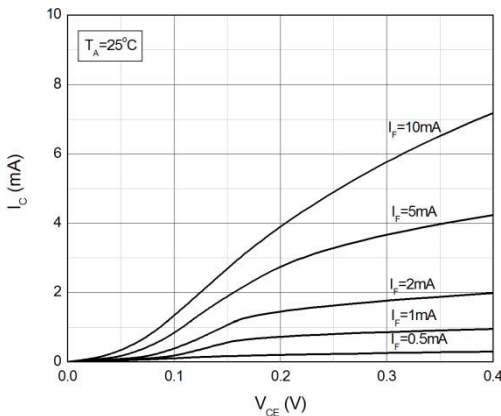
**Fig.3 Forward Current vs. Forward Voltage**



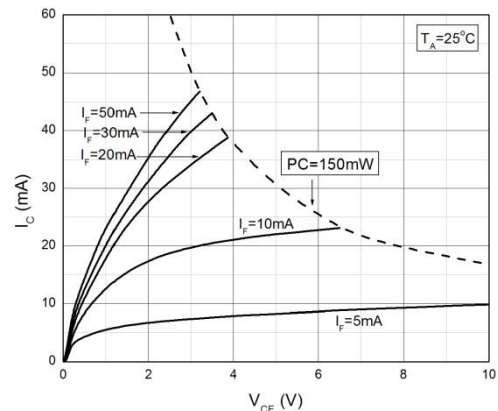
**Fig.4 Collector Dark Current vs. Ambient Temperature**



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

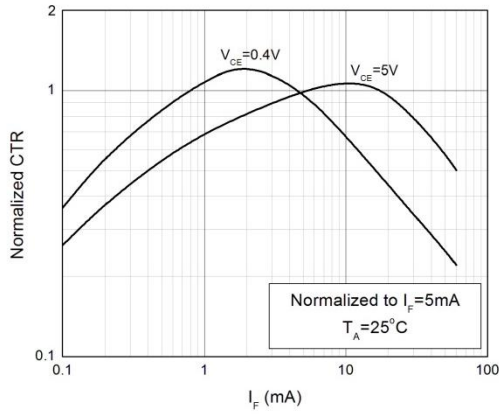


**Fig.6 Collector Current vs. Collector-emitter Voltage**

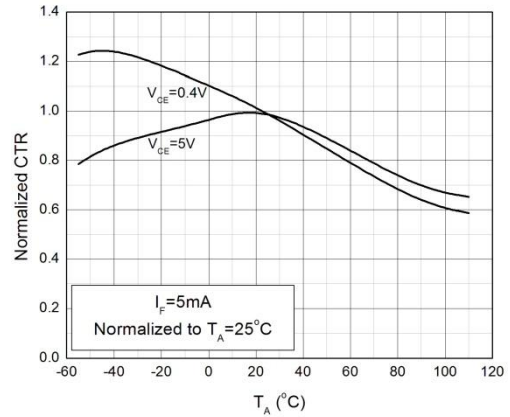


**CHARACTERISTIC CURVES**

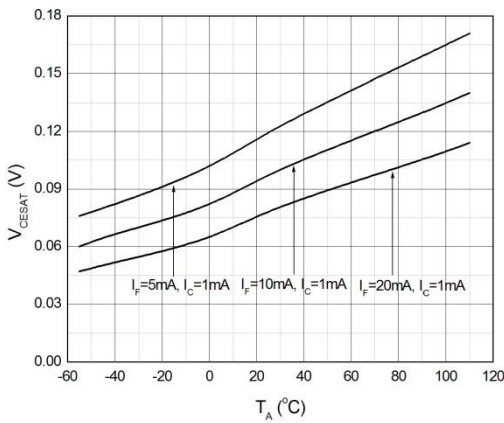
**Fig.7 Normalized Current Transfer Ratio vs. Forward Current**



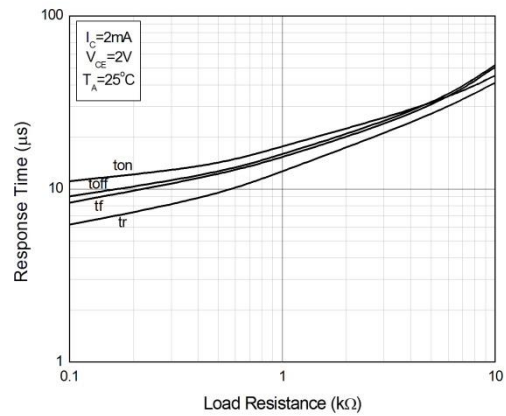
**Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature**



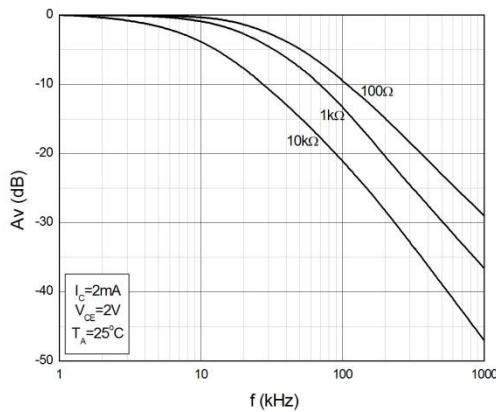
**Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature**



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

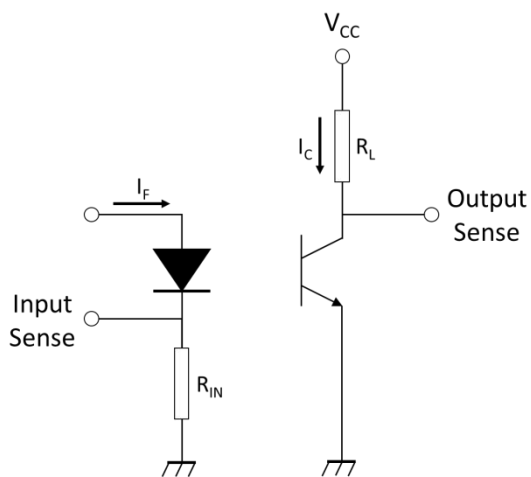


**Fig.11 Frequency Response**

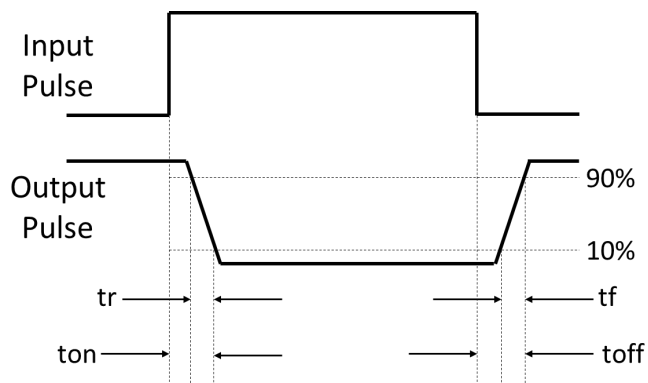


**TEST CIRCUITS**

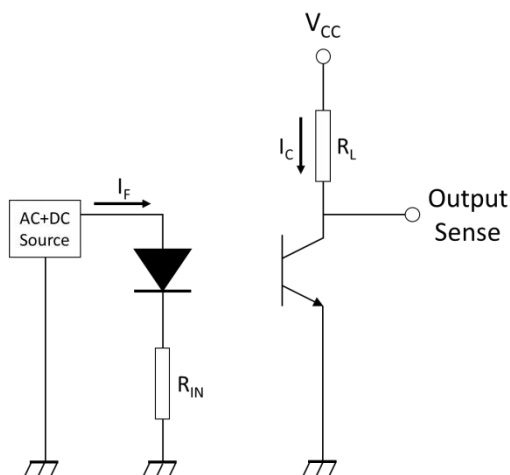
**Fig.12 Test Circuits of Response Time**



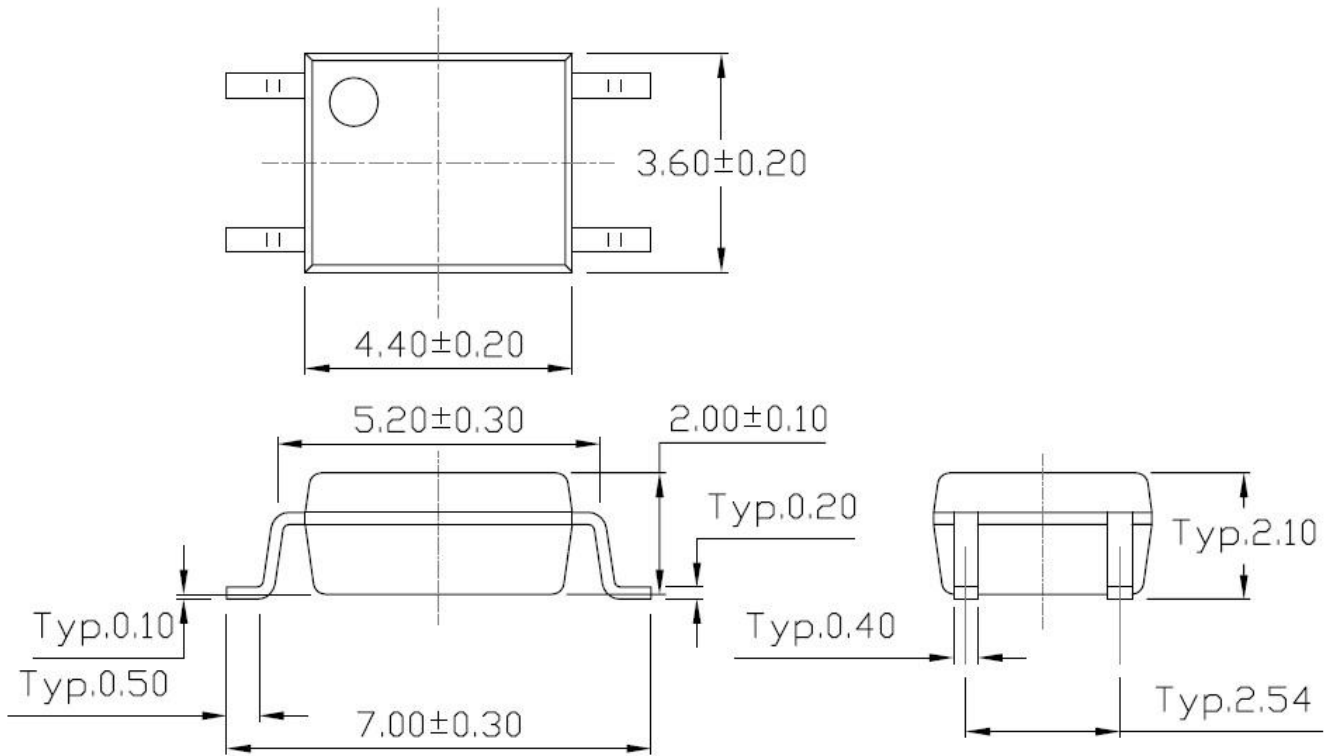
**Fig.13 Curves of Response Time**



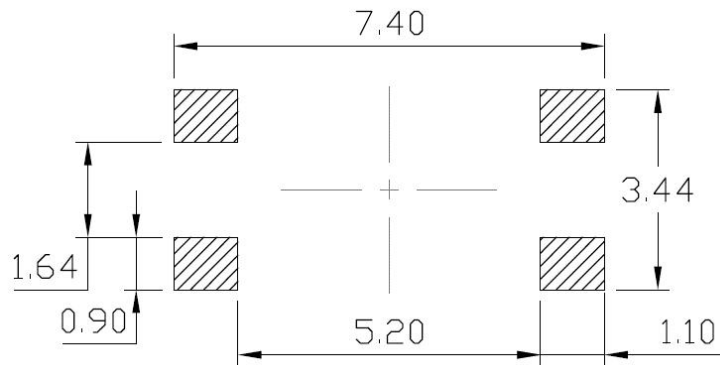
**Fig.14 Test Circuits of Frequency Response**



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

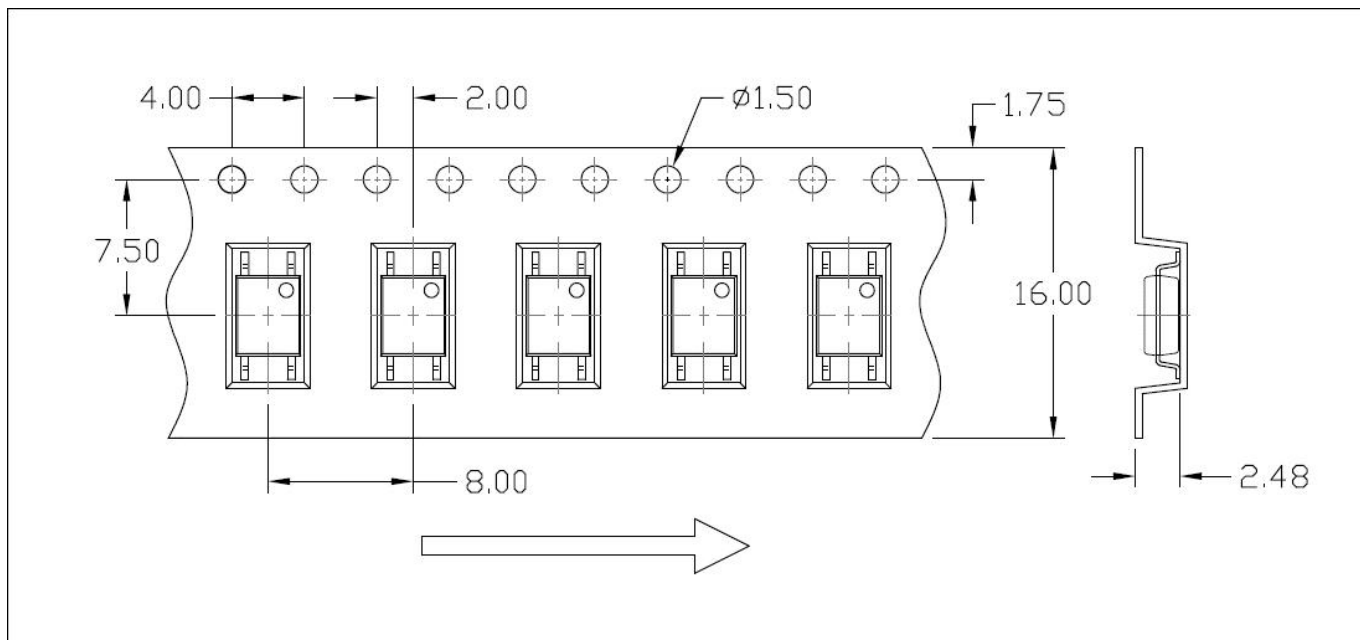


**Recommended Solder Mask (Dimensions in mm unless otherwise stated)**

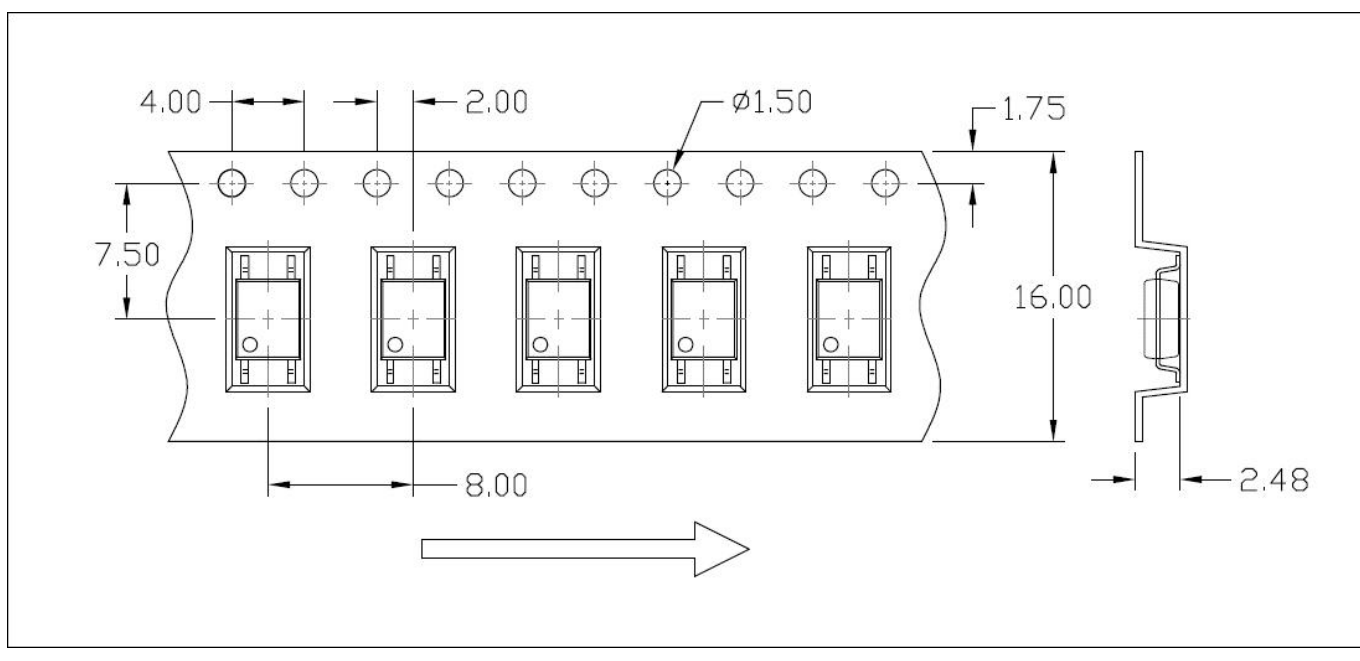


**CARRIER TAPE SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1**



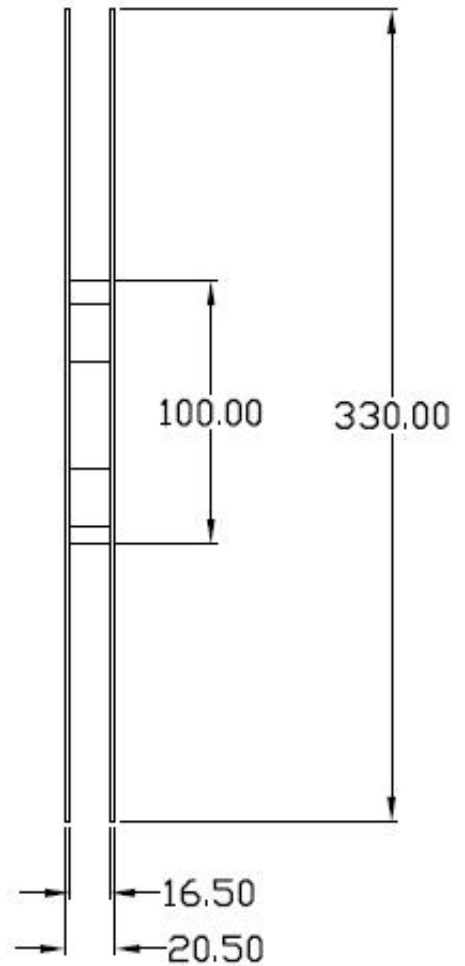
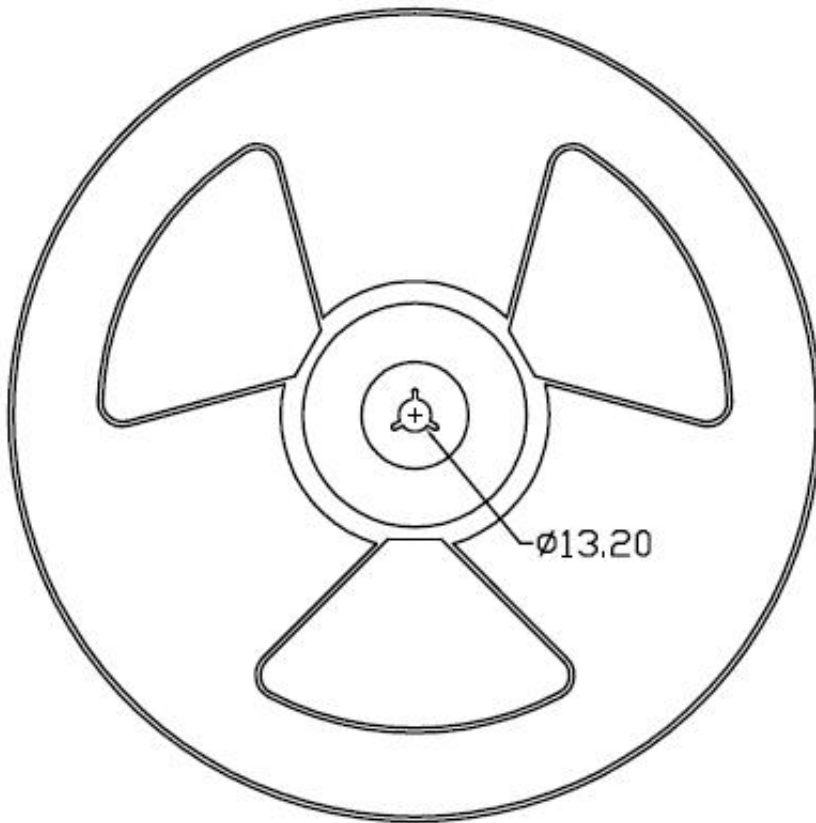
**Option T2**





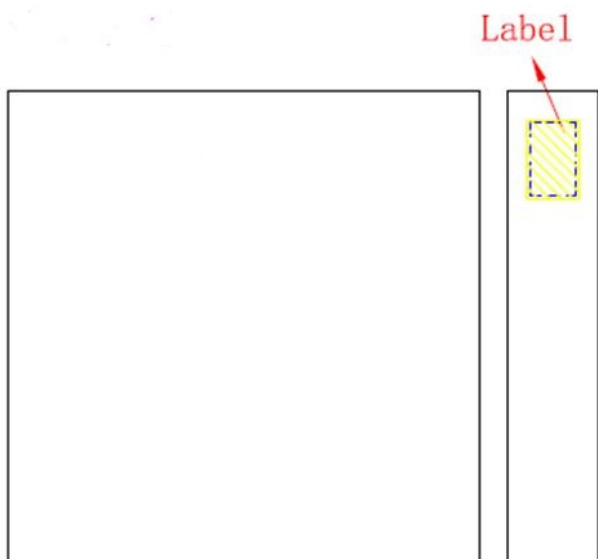
**REEL SPECIFICATIONS (Dimensions in mm unless otherwise stated)**

**Option T1 & T2**



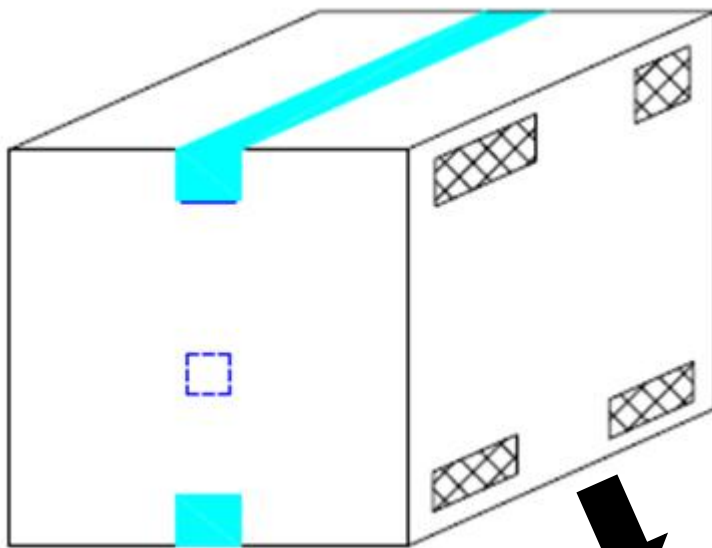
### BOX SPECIFICATIONS (Reel Type)

#### Inner Box

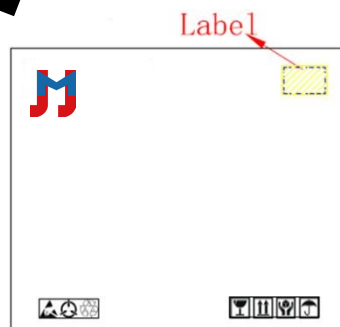


- L x W x H = 36cm x 36cm x 6.9cm

#### Outer Box

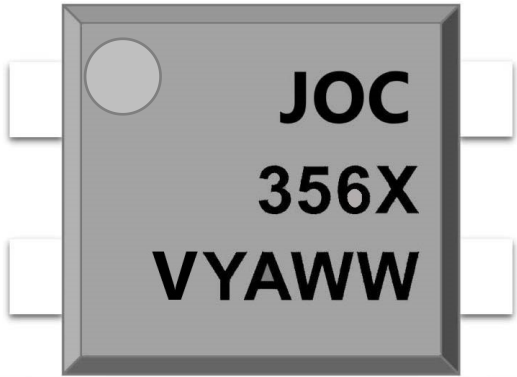


- L x W x H = 45cm x 38cm x 38cm



**ORDERING AND MARKING INFORMATION**

**MARKING INFORMATION**



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

**ORDERING INFORMATION**

**JOC356X1(Z)-GV**

JOC – Company Abbr.  
 356 – 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**

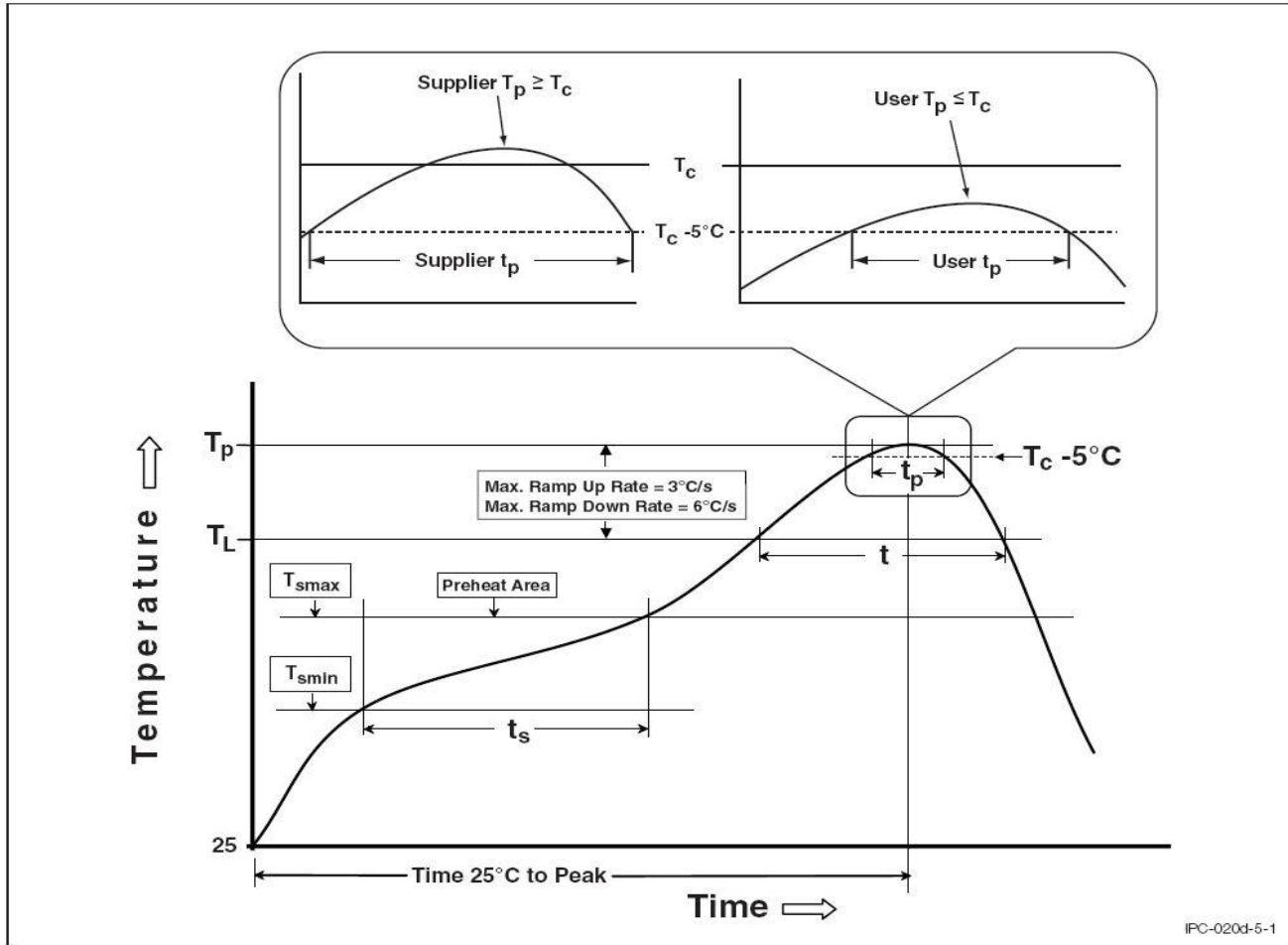


**PACKING QUANTITY**

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

**REFLOW INFORMATION**

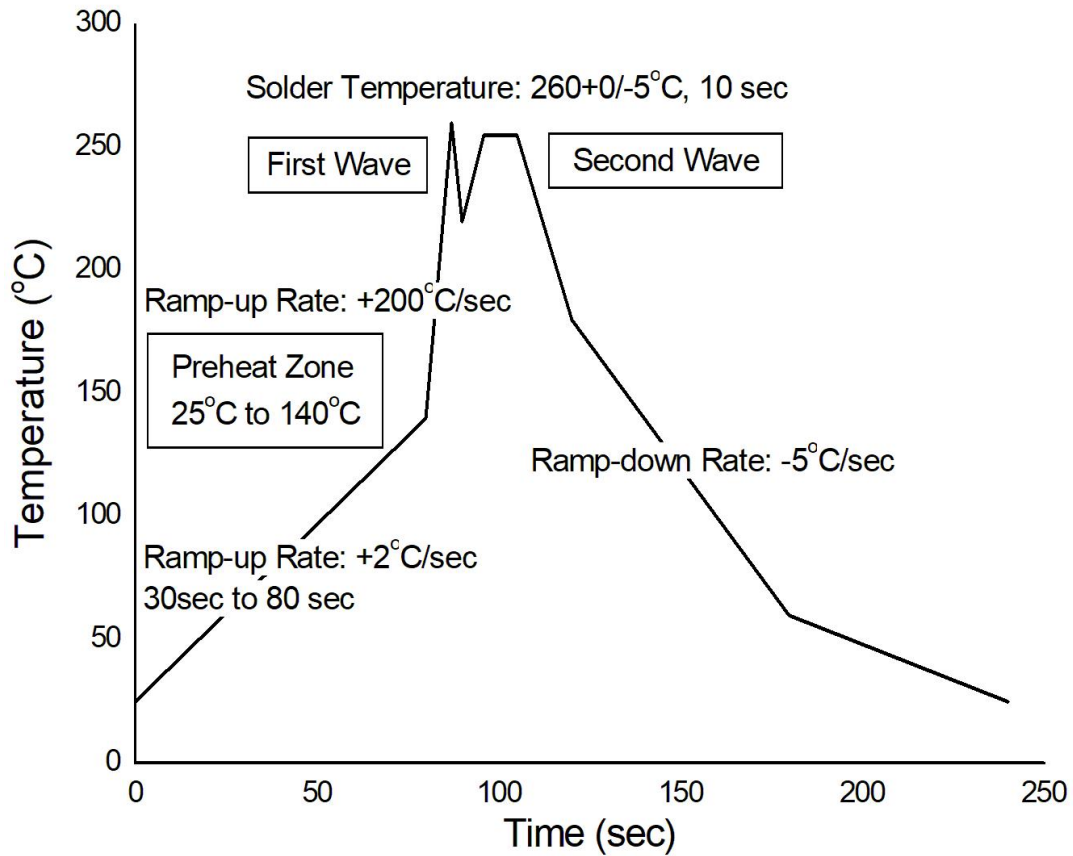
**REFLOW PROFILE**



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.

**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.

**DISCLAIMER**

- JIEJIE is continually improving the quality, reliability, function and design. JIEJIE 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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- This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or lifesaving applications or any other application which can result in human injury or death.
- Please contact JIEJIE 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 JIEJIE'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.