

Features

- High isolation 5000 V_{RMS}
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 40 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1

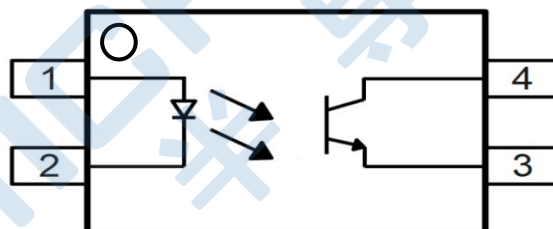
Applications

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

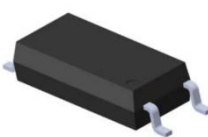
Description

The ICPL-101X series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic LSOP4 package.

With the robust coplanar double mold structure, ICPL-101X series provide the most stable isolation feature.



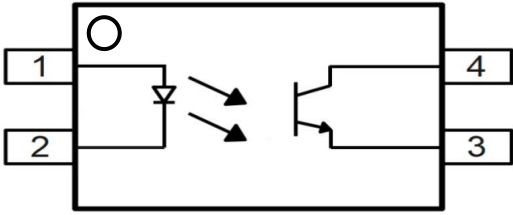
ORDERING INFORMATION

Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity
	ICPL-101X-500E	LSOP4	ICPL101X /YYWW X	Reel	13 "	3000

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PIN CONFIGURATION AND FUNCTIONS

	Pin	Name
	1	Anode
	2	Cathode
	3	Emitter
	4	Collector

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}	7	V	
Collector Current	I_C	50	mA	
Output Power Dissipation	P_O	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	250	mW	
Isolation Voltage	V_{iso}	5000	Vrms	2
Operating Temperature	T_{opr}	-40~110	°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%

ELECTRICAL OPTICAL CHARACTERISTICS(T_a=25°C)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test Condition	Note
INPUT								
Forward Voltage		V _F	-	1.24	1.4	V	I _F =10mA	
Reverse Current		I _R	-	-	10	μA	V _R =6V	
Input Capacitance		C _{in}	-	30	250	pF	V=0, f=1kHz	
OUTPUT								
Collector Dark Current		I _{CEO}	-	-	100	nA	V _{CE} =20V, I _F =0	
Collector-Emitter Breakdown Voltage		BV _{CEO}	80	-	-	V	I _C =0.1mA, I _F =0	
Emitter-Collector Breakdown Voltage		BV _{ECO}	7	-	-	V	I _E =0.1mA, I _F =0	
TRANSFER CHARACTERISTICS								
Current Transfer Ratio	ICPL-1010	CTR	300	-	600	%	I _F =5mA, V _{CE} =5V	
	ICPL-1015		50	-	150			
	ICPL-1016		100	-	300			
	ICPL-1017		80	-	160			
	ICPL-1018		130	-	260			
	ICPL-1019		200	-	400		I _F =10mA, V _{CE} =5V	
	ICPL-1011		60	-	300			
	ICPL-1012		63	-	125			
	ICPL-1013		100	-	200			
	ICPL-1014		160	-	320		I _F =1mA, V _{CE} =5V	
	ICPL-1012		22	-	-			
	ICPL-1013		34	-	-			
	ICPL-1014		56	-	-			
Collector-Emitter Saturation Voltage		V _{CE(sat)}	-	0.1	0.3	V	I _F =10mA, I _C =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	V _{CE} =2V, I _C =2mA R _L =100Ω, -3dB	3
Response Time (Rise)		t _r	-	5	18	μs	V _{CE} =2V, I _C =2mA R _L =100Ω	4
Response Time (Fall)		t _f	-	6	18	μs		4

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

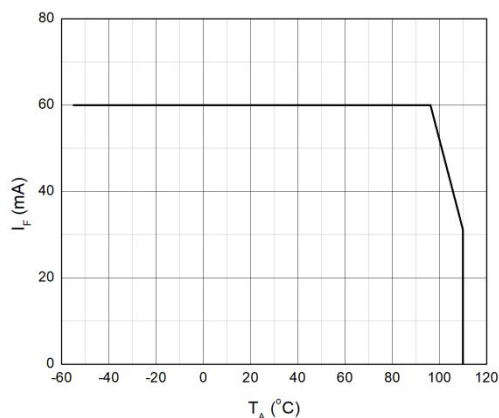


Fig.2 Collector Power Dissipation vs. Ambient Temperature

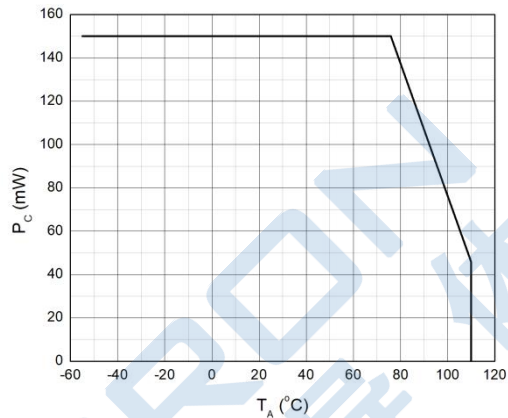


Fig.3 Forward Current vs. Forward Voltage

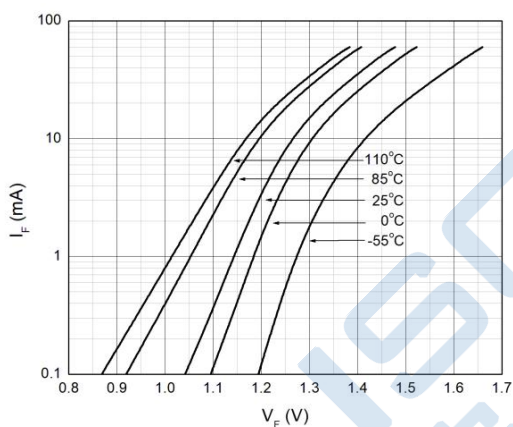


Fig.4 Collector Dark Current vs. Ambient Temperature

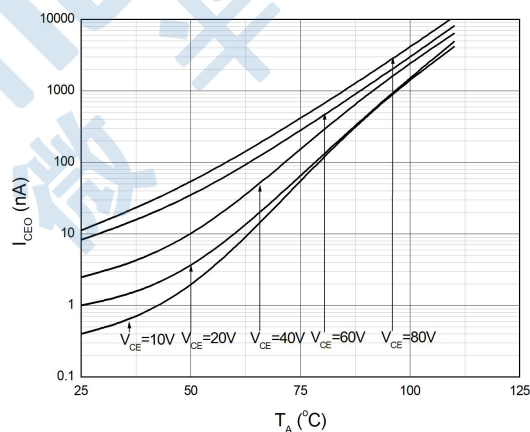


Fig.5 Collector Current vs. Collector-emitter Voltage

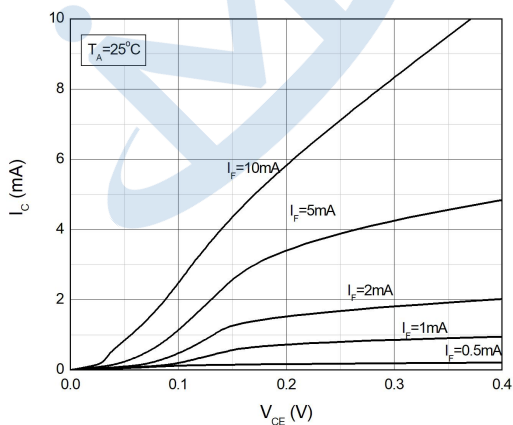


Fig.6 Collector Current vs. Collector-emitter Voltage

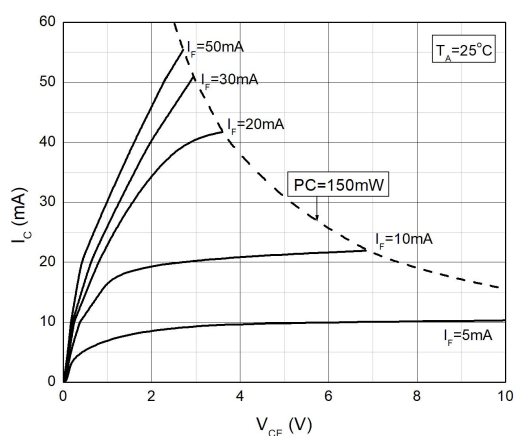
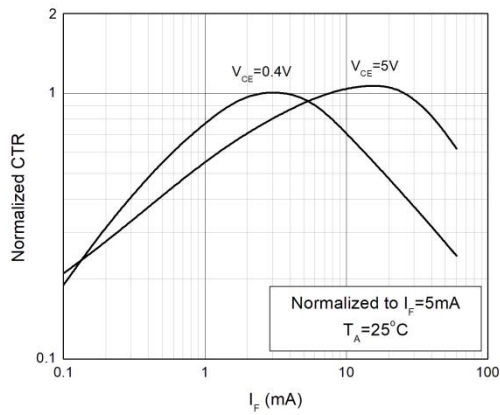
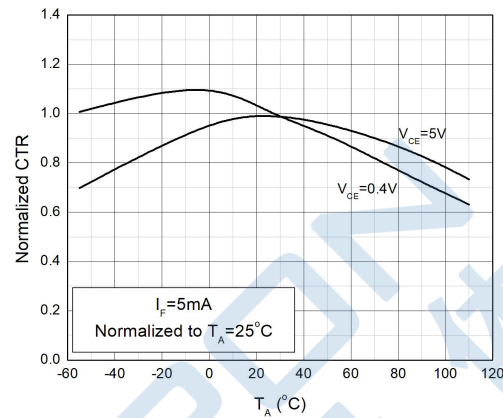
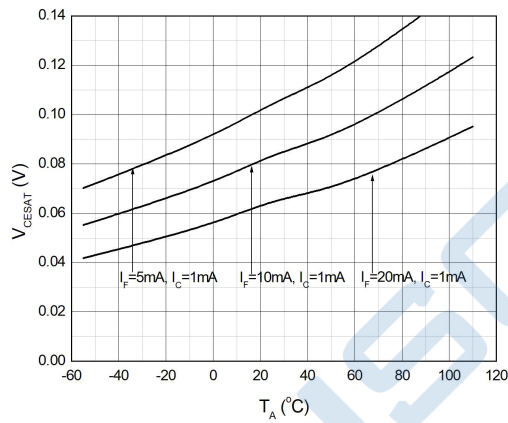
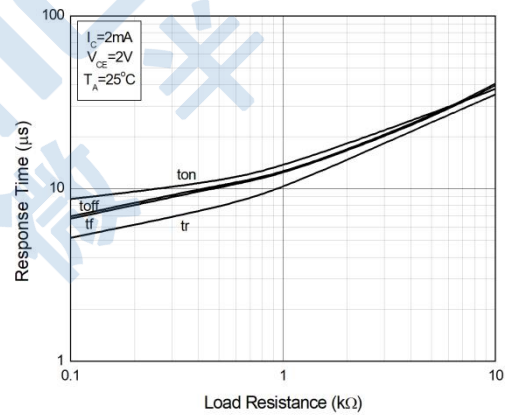
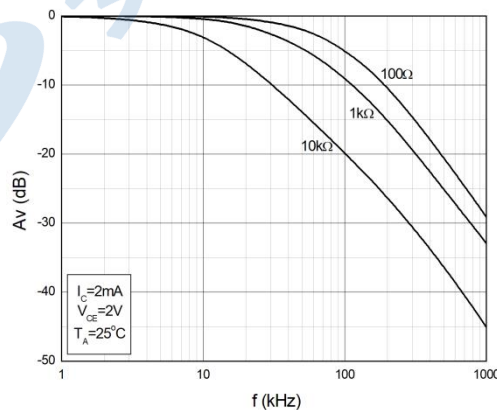


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

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

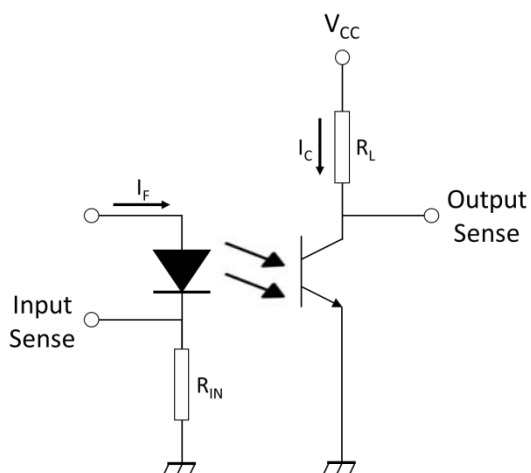


Fig.13 Curves of Response Time

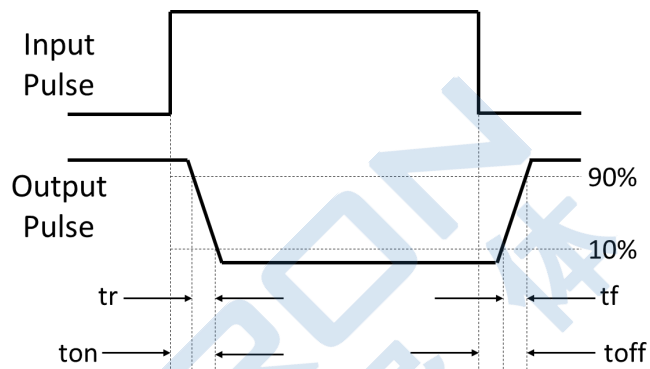
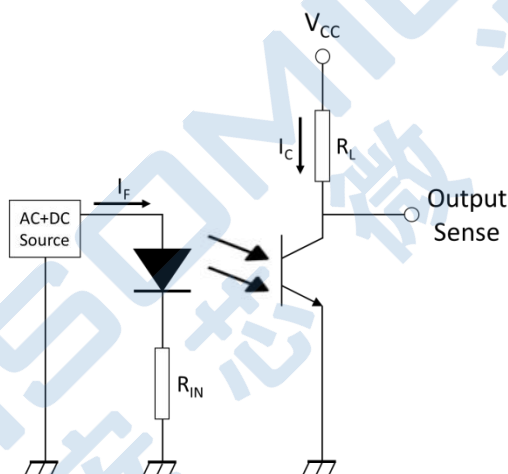
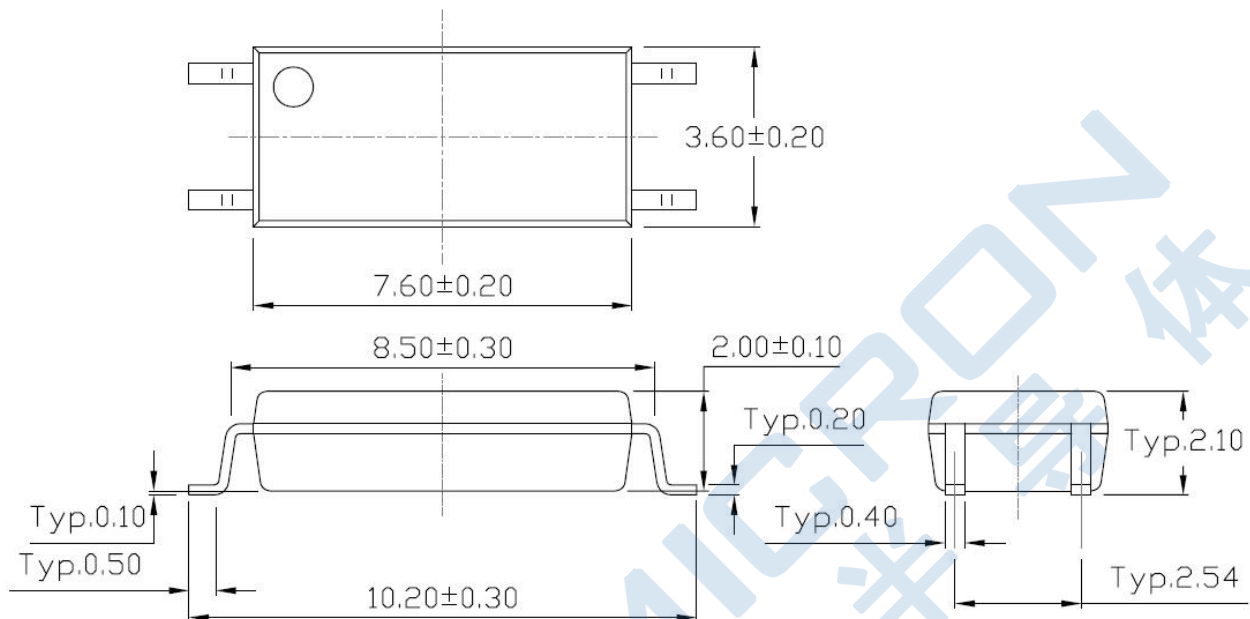


Fig.14 Test Circuits of Frequency Response



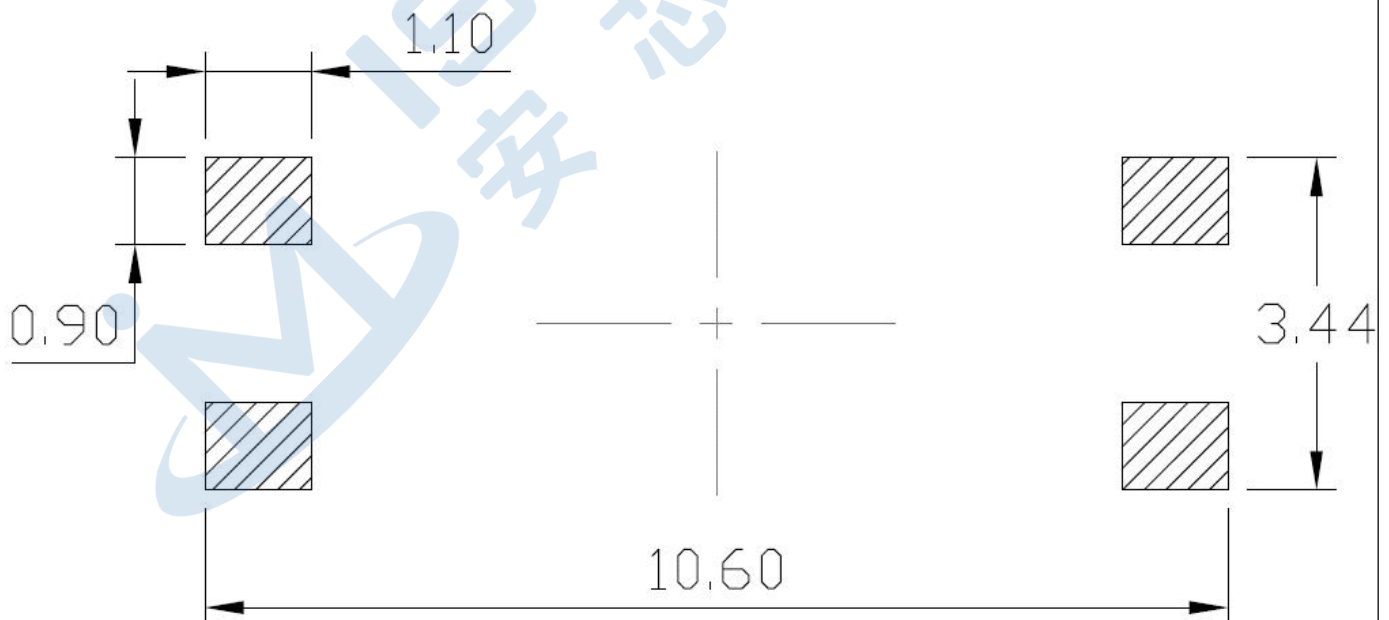
PACKAGE DIMENSIONS

Surface Mount (Low Profile)- LSOP4



RECOMMENDED SOLDER MASK

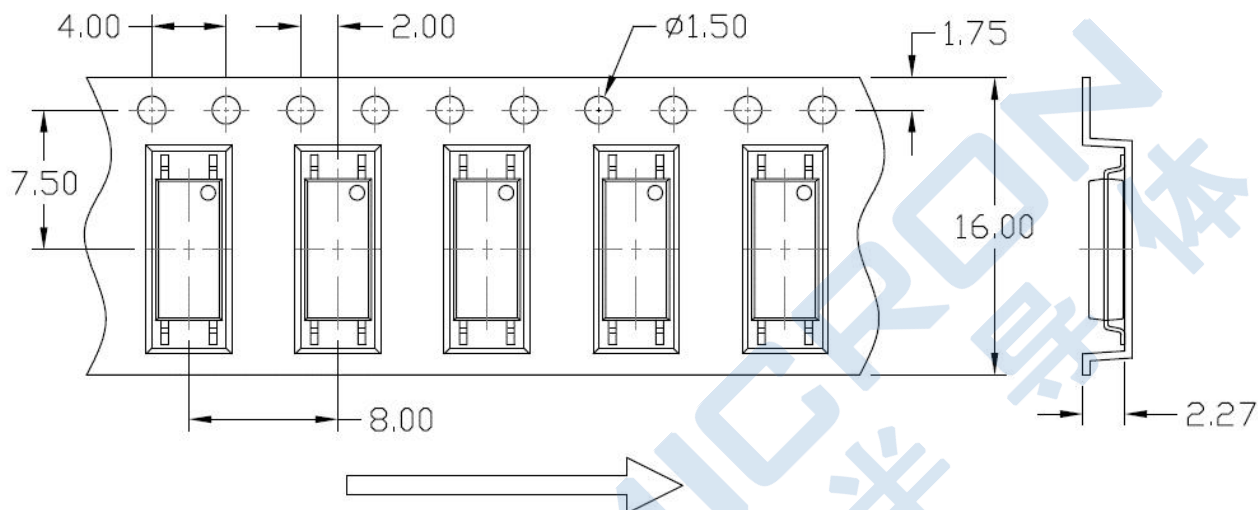
Surface Mount (Low Profile) Lead Forming



- Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS

Option LSOP4



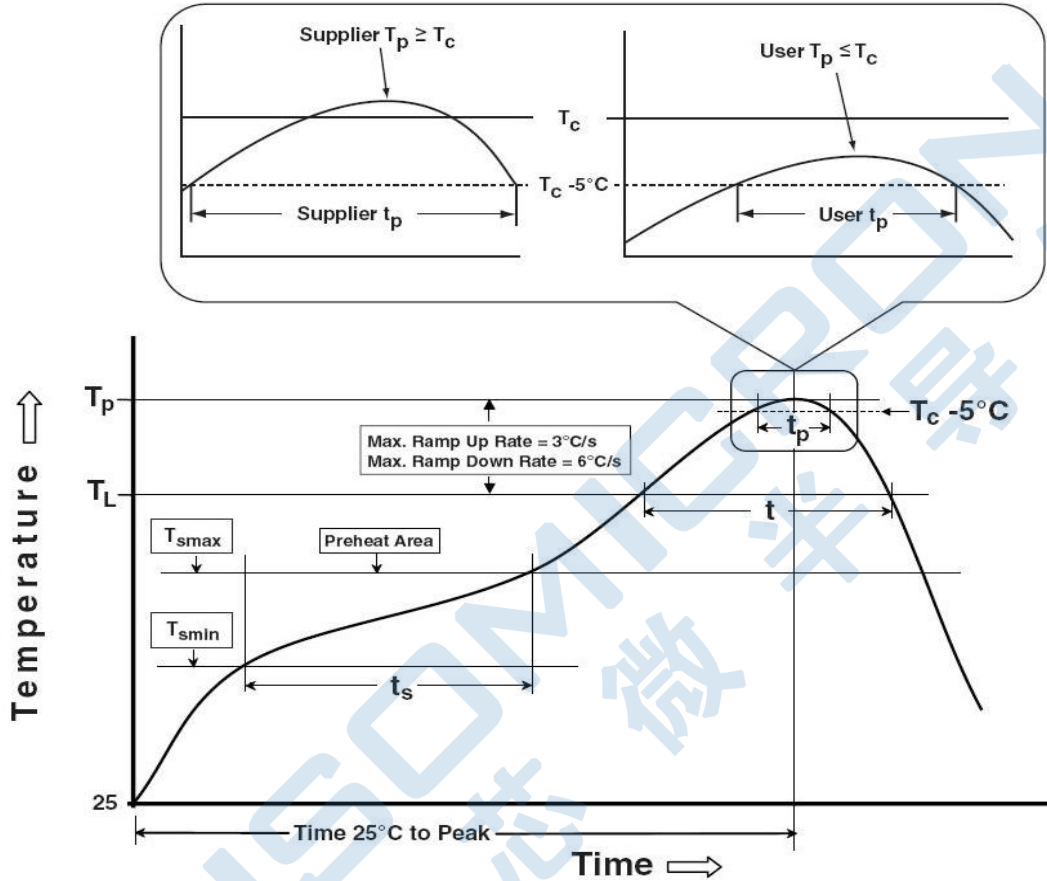
- Dimensions in mm unless otherwise stated

ORDERING AND MARKING INFORMATION

Marking Information			
		ICPL : Company Abbr. 101x : Part Number & CTR Rank / : ISOMICRON YY : Fiscal Year WW : Work Week A : Manufacturing Code	
Order Code			
Company Abbr. Part Number X: CTR Grade Lead Forming: 5: SM-SL		ICPL - 101X - 5 0 0 E Halogen Free: E: Halogen-free, Lead-free Z: Halogen, Lead-free None: 0 Performance: 0: Normal 1: Enhanced 2: Industrial level 3: Auto level 4: Military level	
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity – Outer box
SM-SL	3000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 30k Units

TEMPERATURE PROFILE OF SOLDERING

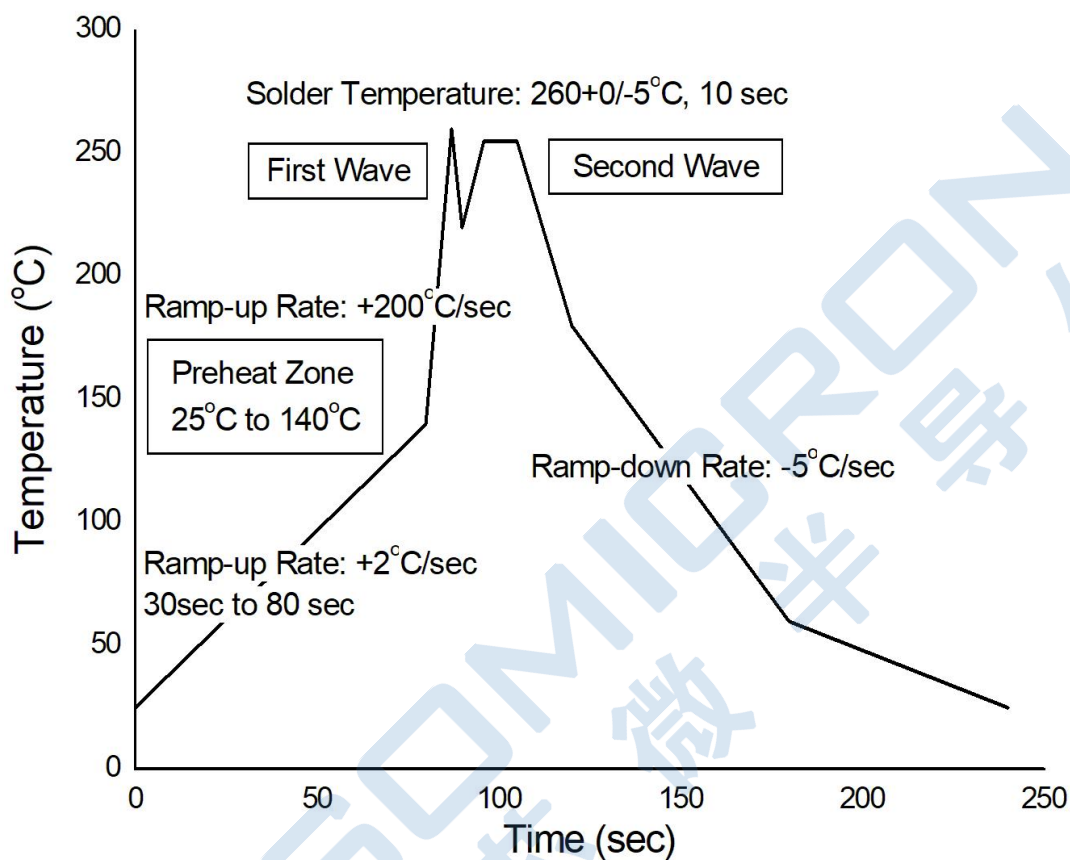
Reflow Soldering



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.

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.

Note 5. One time soldering is recommended for all soldering method.

Note 6. Do not solder more than three times for IR reflow soldering.

DISCLAIMER

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- 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 ISOMICRON sales agent for special application request.
- Immerge unit's body in solder paste is not recommended.
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- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.