

Features

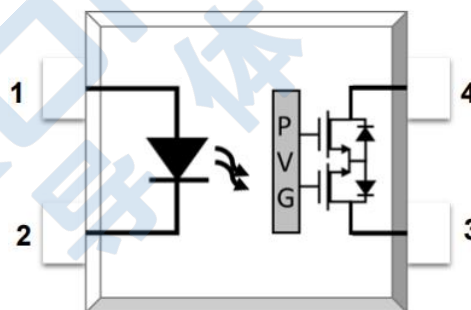
- Low trigger current and high switching time
- High isolation 3750 V_{RMS}
- Guaranteed performance over temperature
-40°C ~ +110°C
- RoHS & REACH Compliance
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898

Applications

- Computer peripheral interface
- Telephone equipment
- Data communication equipment
- Computers

Description

The ICPR21X series combine an LED which is optically coupled to a photovoltaic chip to drive two MOSFET in a plastic SOP4 package. With the patenting stack die structure, ICPR21X series provide the finest trigger current and faster switching time performance.



RoHS

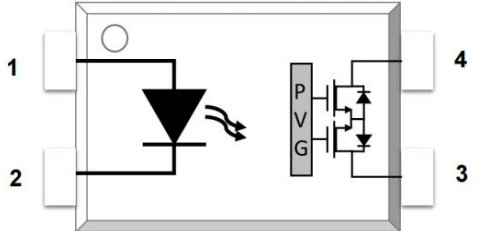
ORDERING INFORMATION

Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity
	ICPR21X-450E	SOP4	ICPR 21X /YYWW A	Reel	13 "	3000

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PIN CONFIGURATION AND FUNCTIONS

		Pin	Name
	1	1	Anode
	2	2	Cathode
	3	3	Terminal 1
	4	4	Terminal 1

ABSOLUTE MAXIMUM RATINGS

Item		Symbol	Value	Unit	Note
Input	Average Forward Input Current	I_F	20	mA	
	Peak Transient Current	$I_{F(trans)}$	1	A	1
	Reverse Input Voltage	V_R	5	V	
	Input Power Dissipation	P_I	45	mW	
Output	Load voltage	ICPR21E	60	V	
		ICPR21F	250		
		ICPR21G	400		
		ICPR21H	600		
		ICPR21I	100		
	Continuous load current	ICPR21E	0.55	A	
		ICPR21F	0.15		
		ICPR21G	0.12		
		ICPR21H	0.05		
		ICPR21I	0.25		
	Peak load current	ICPR21E	1.2	A	
		ICPR21F	0.5		
		ICPR21G	0.3		
		ICPR21H	0.15		
		ICPR21I	0.75		
	IC Power Dissipation	P_o	500	mW	
I/O isolation voltage		V_{iso}	3750	V_{rms}	2
Operating Temperature		T_{opr}	-40°C~110°C	°C	
Storage Temperature		T_{stg}	-55°C~125°C		

Lead Solder Temperature	T_{sol}	260	$^{\circ}\text{C}$	
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Note 1. $\leq 1\mu\text{s}$ P.W, 300pps

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

ELECTRICAL OPTICAL CHARACTERISTICS ($T_a=25^{\circ}\text{C}$)

Parameter		Symbol	Min	Typ	Max	Unit	Test Condition
INPUT							
Input Forward Voltage		V_F	1.6	2	2.4	V	$I_F = 10\text{mA}$
Input Reverse Voltage		I_R	-	-	10	μA	$V_R = 6\text{V}$
Input Capacitance		C_{IN}	-	60	-	pF	$f = 1\text{MHz}$, $V_F = 0\text{V}$
OUTPUT							
On State Resistance	ICPR21E	R_{on}	-	1.2	2.5	Ω	$I_F = 5\text{mA}$, $I_L = \text{Rated } I_L \text{ MAX}$ $t = 1\text{s}$
	ICPR21F		-	7.5	15		
	ICPR21G		-	23	30		
	ICPR21H		-	30	70		
	ICPR21I		-	2.5	8		
Off state leakage current		I_{Leak}	-	-	1	μA	$I_F = 0\text{mA}$ $V_L = \text{Rated } V_L \text{ MAX}$
Output Capacitance		C_{OUT}	-	80	-	pF	$V=0$, $f = 1\text{MHz}$
TRANSFER CHARACTERISTICS							
LED operate current		I_{FON}	-	0.2	2	mA	$I_L = \text{Rated } I_L \text{ MAX}$
LED turn off voltage		V_{FOFF}	0.8	1.5	-	V	$I_L \leq 10\mu\text{A}$
Turn on time		T_{ON}	-	0.1	1	ms	$I_F = 10\text{mA}$, $I_L = \text{Rated } I_L \text{ MAX}$
Turn off time		T_{OFF}		0.02	0.2	ms	
Input-Output Resistance		R_{I-O}	-	10^{12}	-	Ω	$V_{I-O} = 500\text{V DC}$

CHARACTERISTIC CURVES

Fig.1 LED Forward Current vs. Forward Voltage

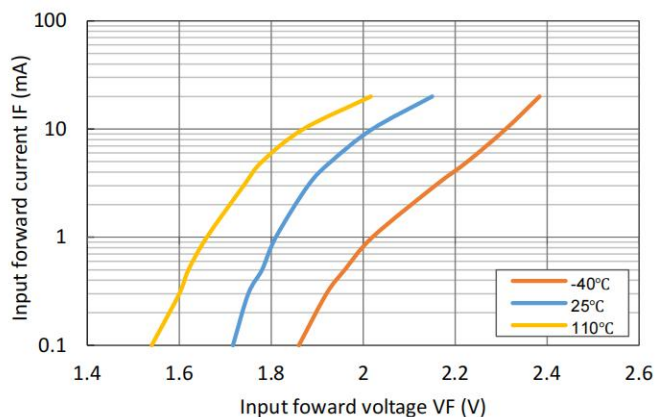


Fig.2 LED operate current vs. Temperature

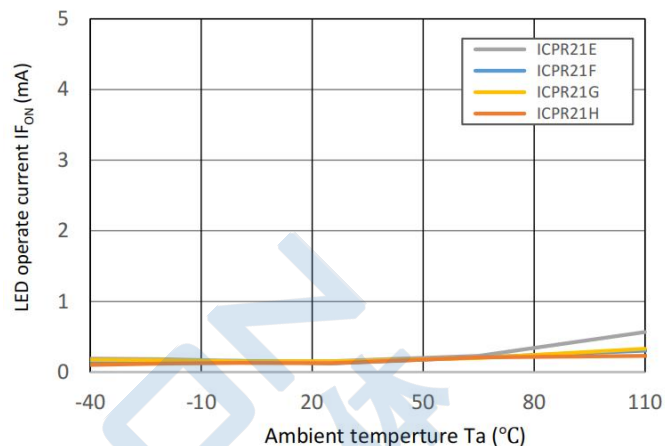


Fig.3 Output Current vs. Output Voltage-ICPR21E

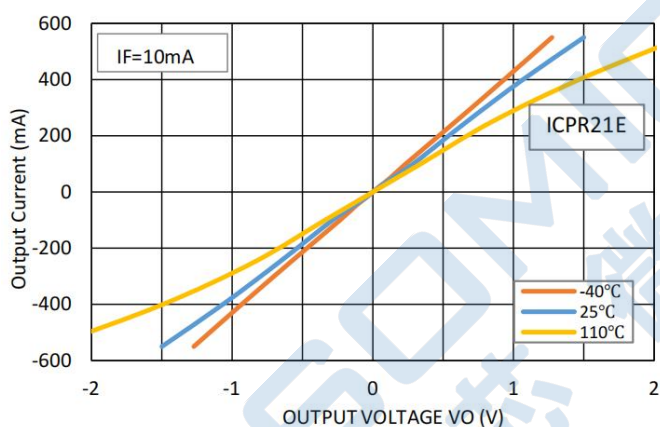


Fig.4 Output Current vs. Output Voltage-ICPR21F

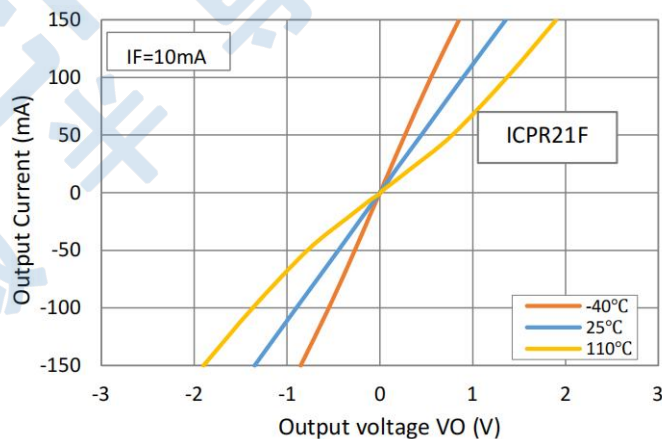


Fig.5 Output Current vs. Output Voltage-ICPR21G

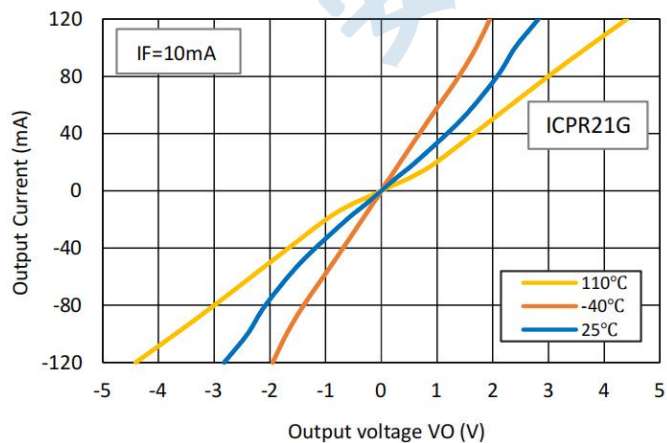


Fig.6 Output Current vs. Output Voltage-ICPR21H

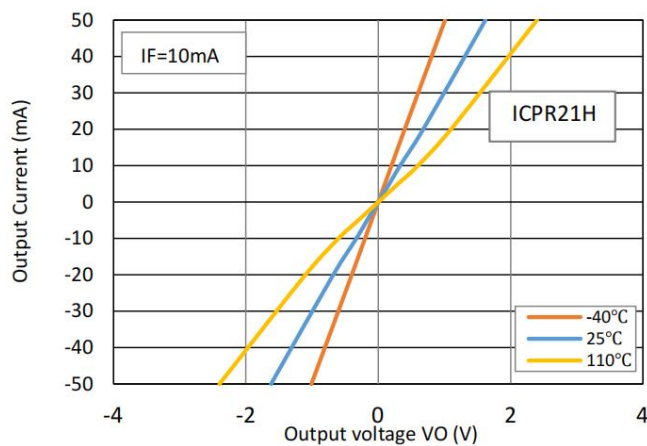


Fig.7 Turn on time vs. Temperature

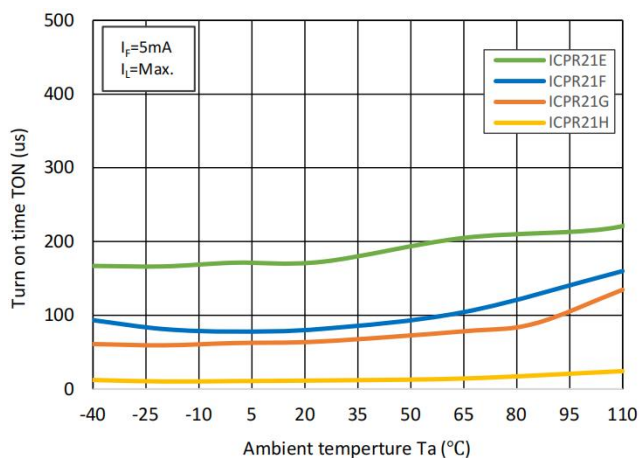


Fig.8 Turn on time vs. Temperature

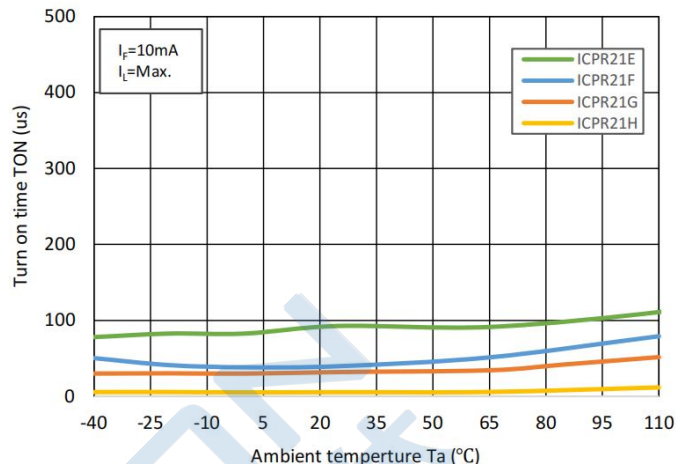


Fig.9 Turn off time vs. Temperature

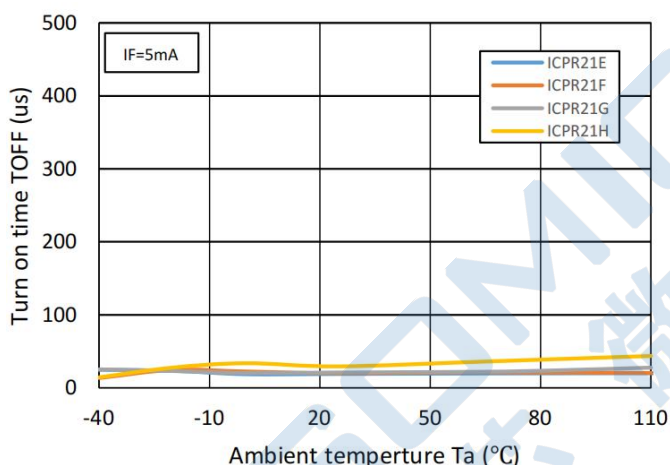


Fig.10 Turn off time vs. Temperature

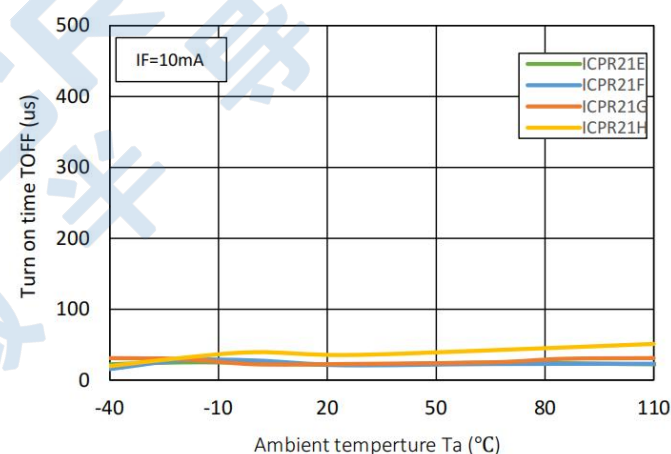


Fig.11 Turn on time vs. LED forward current

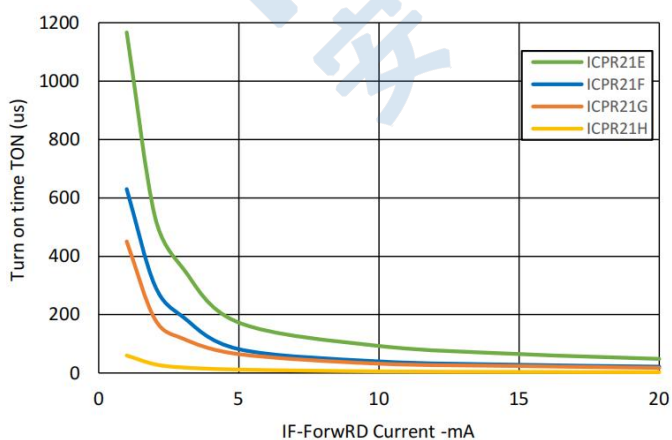
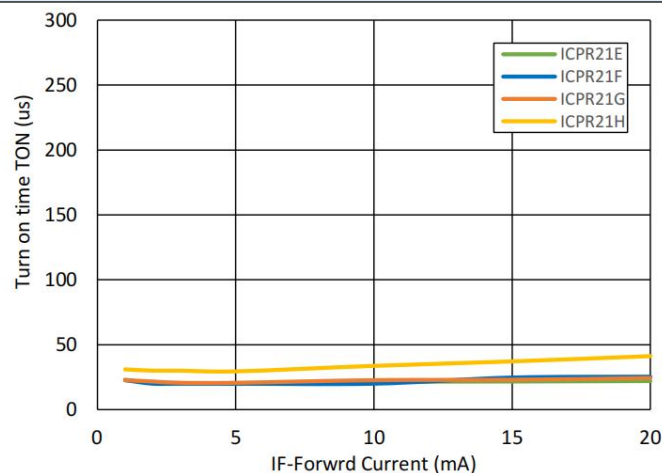
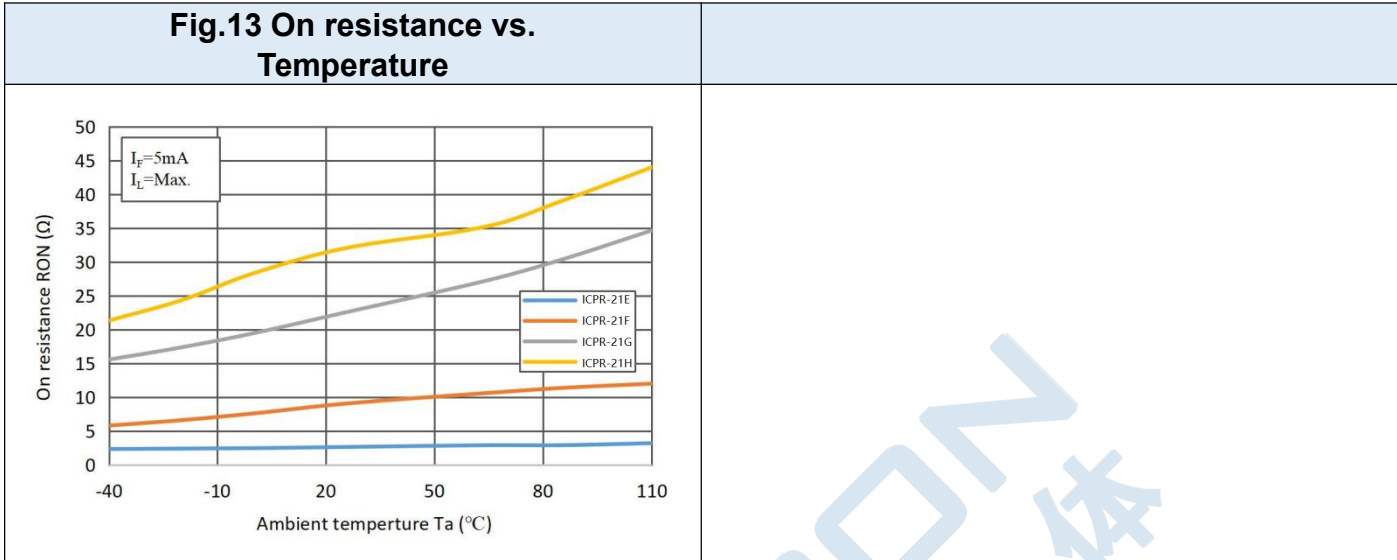


Fig.12 Turn off time vs. LED forward current

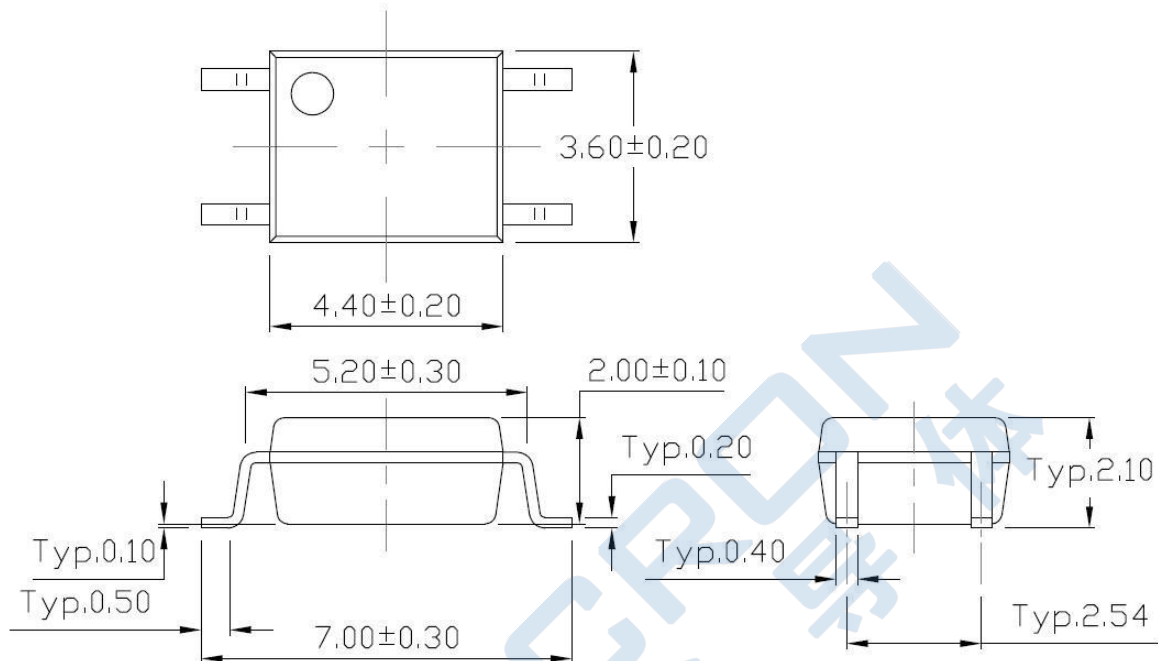


CHARACTERISTIC CURVES



PACKAGE DIMENSIONS

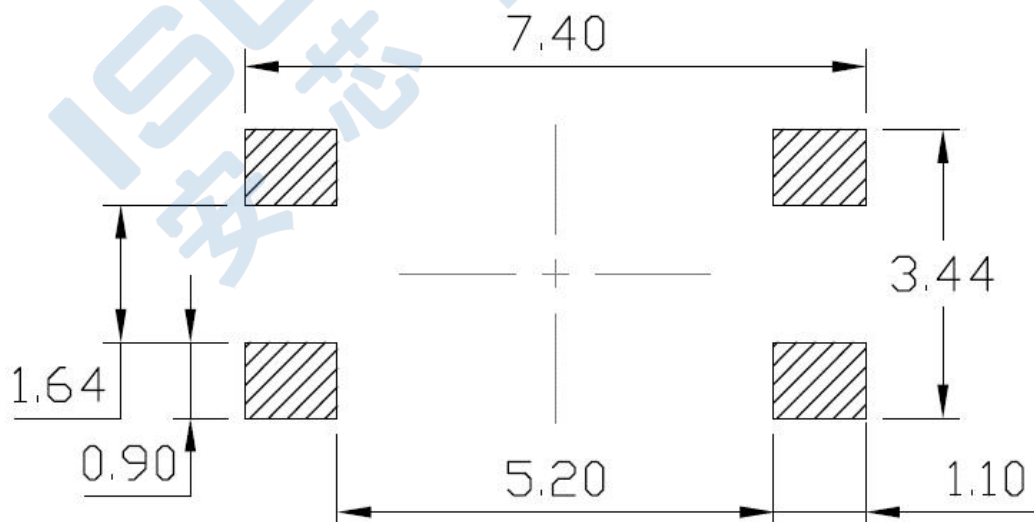
Surface Mount (Low Profile) Lead Forming (SL Type)



- Dimensions in mm unless otherwise stated

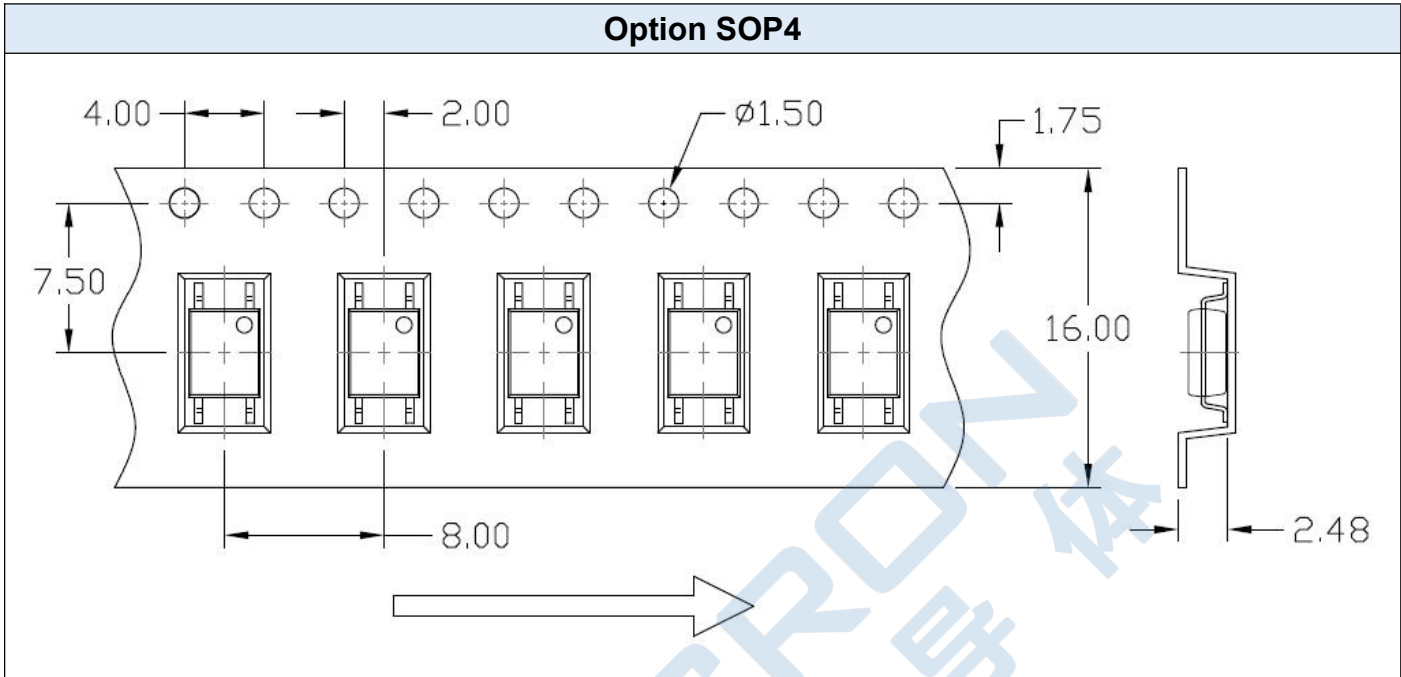
RECOMMENDED SOLDER MASK

Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



- Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS



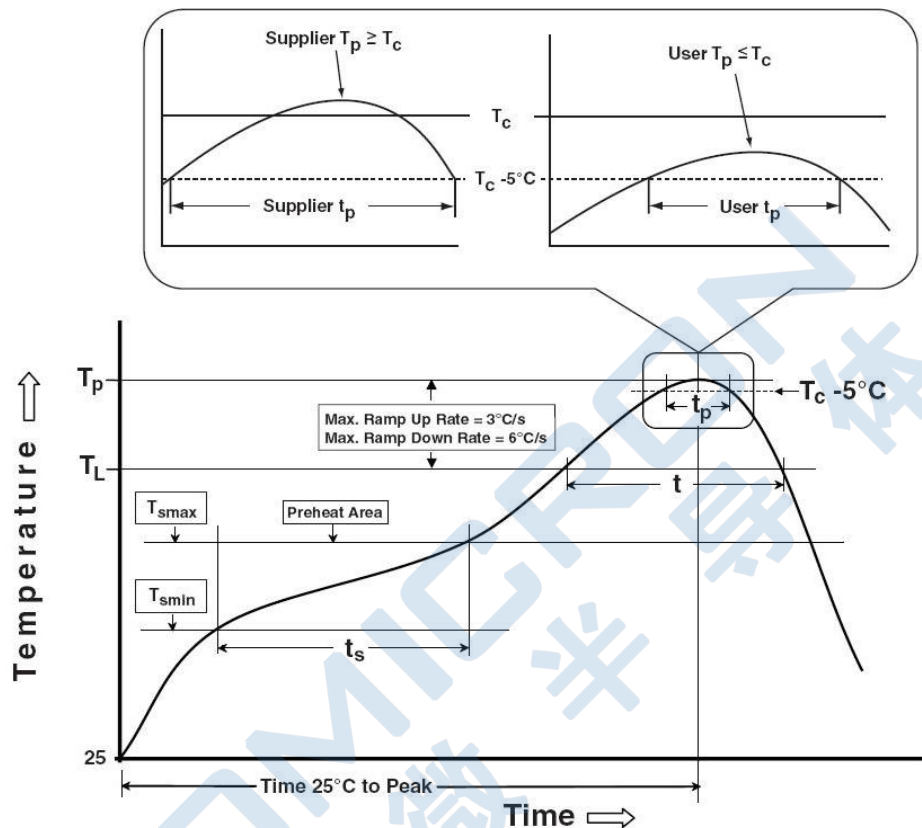
- Dimensions in mm unless otherwise stated

ORDERING AND MARKING INFORMATION

Marking Information			
		ICPR : Company Abbr. 21X : Part Number / : ISOMICRON YY : Fiscal Year WW : Work Week A : Manufacturing Code	
Order Code			
ICPR 21X - 4 5 0 E Company Abbr. ← Part Number ← Lead Frame Option ← 4: Pin4 → Halogen Free E: Halogen-free,Lead-free Z: Halogen, Lead-free → Performance 0: Normal 1: Enhanced → Lead Forming 5: SM-SL			
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity – Outer box
SM-SL	3000 Units/Reel	3 Reels/Inner box	5 Inner box/Outer box =45k Units

REFLOW INFORMATION

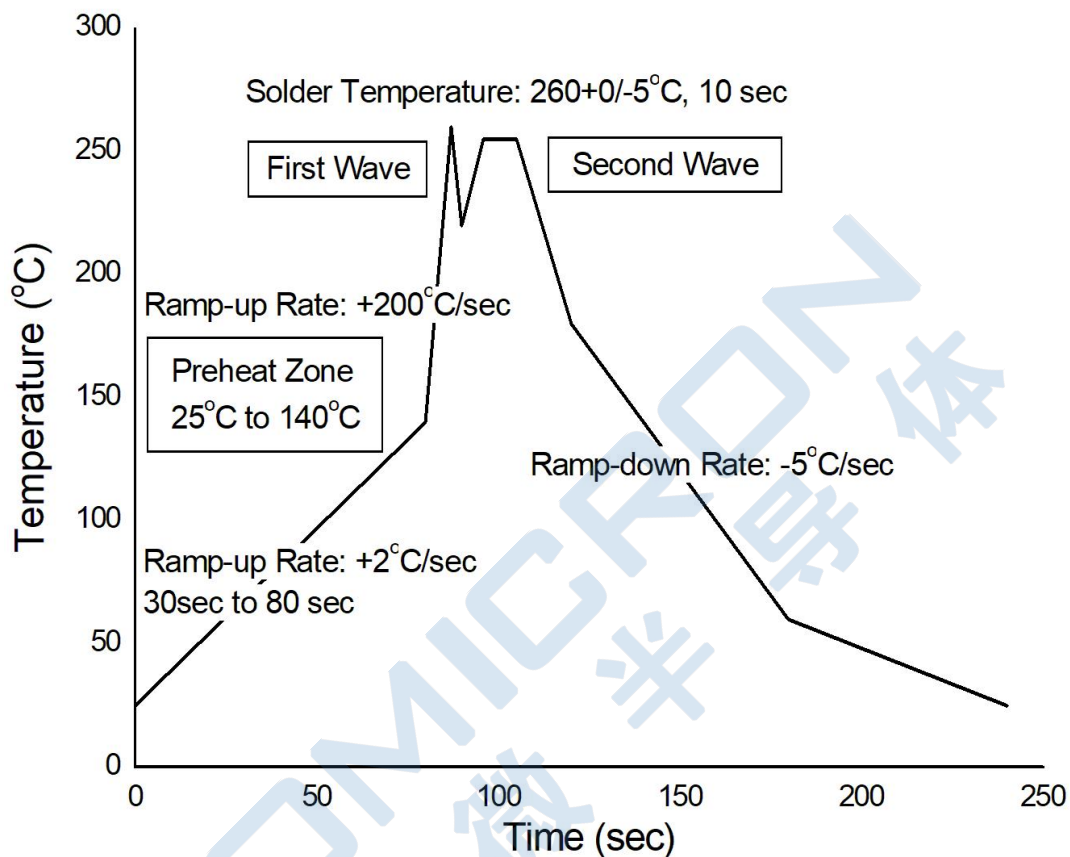
Reflow Profile



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100	150°C
Temperature Max. (Tsmax)	150	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3°C/second max.	3°C/second max.
Liquidous Temperature (TL)	183°C	217°C
Time (tL) Maintained Above (TL)	60 – 150 seconds	60 – 150 seconds
Peak Body Package Temperature	235°C +0°C / -5°C	260°C +0°C / -5°C
Time (tP) within 5°C of 260°C	20 seconds	30 seconds
Ramp-down Rate (TP to TL)	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±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

- ISOMICRON is continually improving the quality, reliability, function and design. ISOMICRON 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 ISOMICRON 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 ISOMICRON'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.