

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- Operating temperature range - 40 °C to 110 °C
- REACH、ROHS compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1

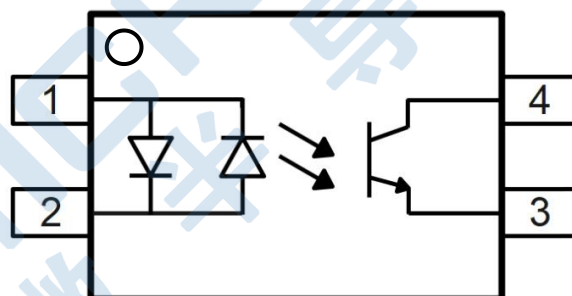
Applications

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

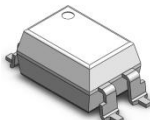
Description

The ISP814X series combine two AlGaAs infrared emitting diodes as the AC input which is optically coupled to a silicon planar phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, ISP814X series provide the most stable isolation feature.



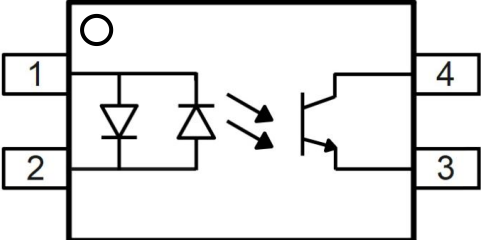
ORDERING INFORMATION

Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity	
	ISP814XA	DIP4	ISP814XX /YYWW A	Tube	500mm	100	
	ISP814XB						
	ISP814XASMT&R	DIP4-SL			Reel	13 "	1000
	ISP814XBSMT&R						

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PIN CONFIGURATION AND FUNCTIONS

	Pin	Name
	1	Anode/ Cathode
	2	Cathode/Anode
	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}	200	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. 100 μ s 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}	-	10	-	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	ISP814XA	CTR	50	-	150	%	I _F =±1mA, V _{CE} =5V	
	ISP814XB		80	-	400			
Collector-Emitter Saturation Voltage		V _{CE(sat)}	-	0.06	0.2	V	I _F =±20mA, 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	4
Response Time (Rise)		t _r	-	3	18	μs	V _{CE} =2V, I _C =2mA R _L =100Ω	3
Response Time (Fall)		t _f	-	4	18	μs		3

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

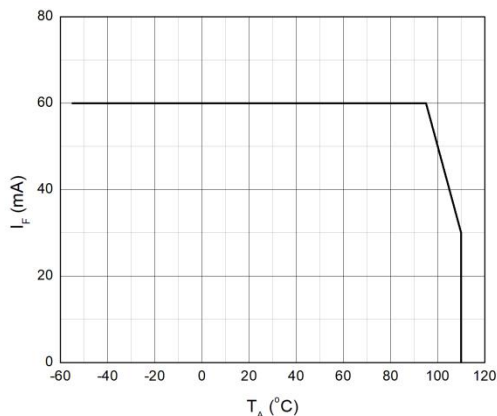


Fig.2 Collector Power Dissipation vs. Ambient Temperature

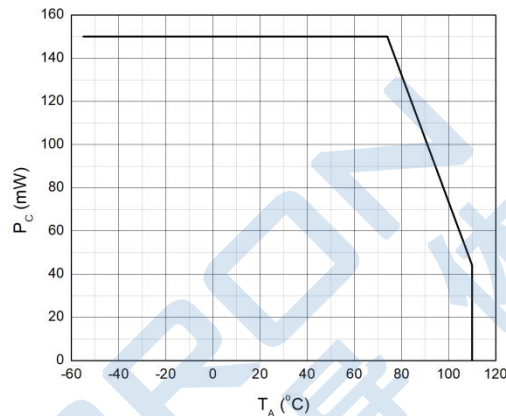


Fig.3 Forward Current vs. Forward Voltage

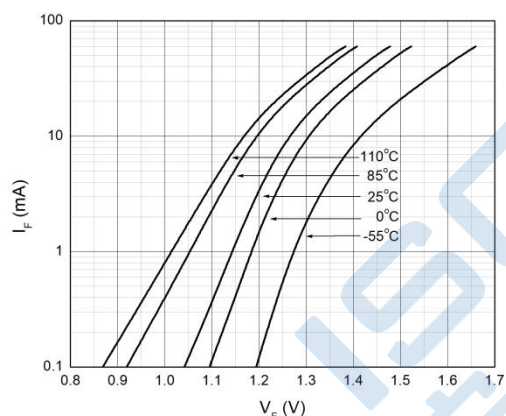


Fig.4 Collector Dark Current vs. Ambient Temperature

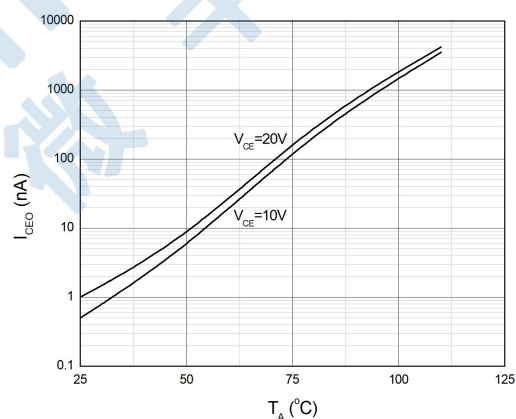


Fig.5 Collector Current vs. Collector-emitter Voltage

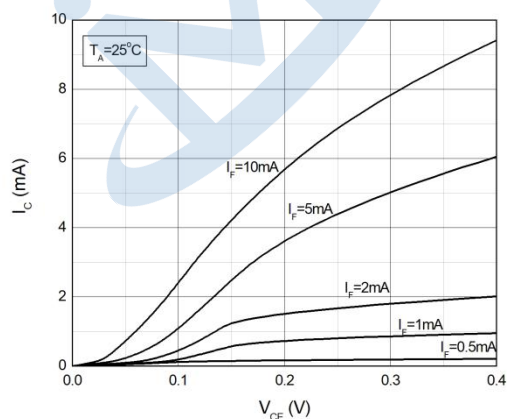


Fig.6 Collector Current vs. Collector-emitter Voltage

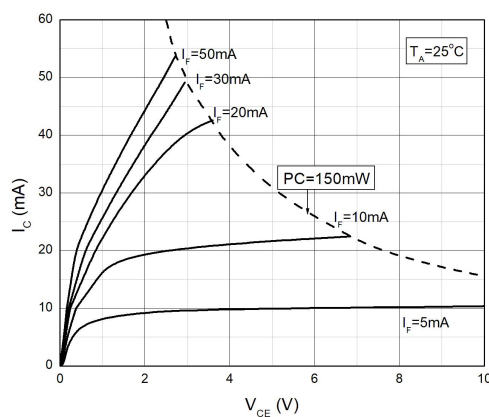


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

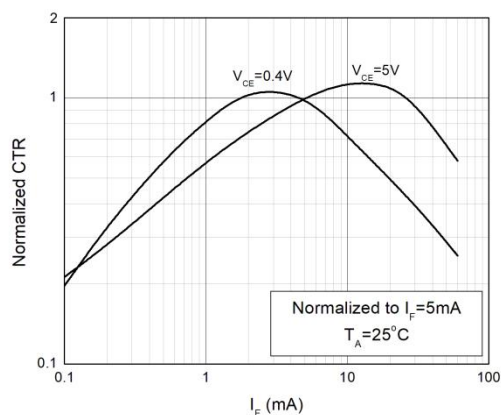


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

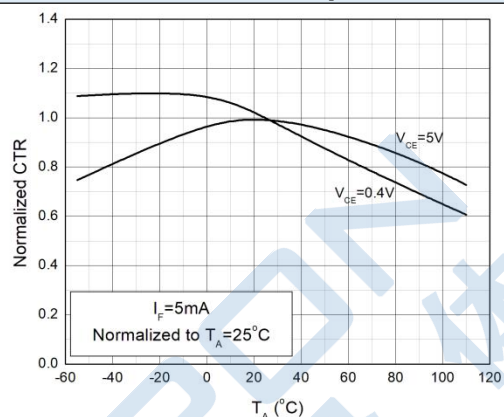


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

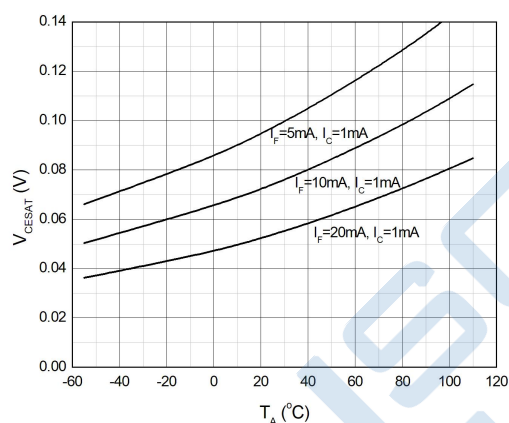


Fig.10 Switching Time vs. Load Resistance

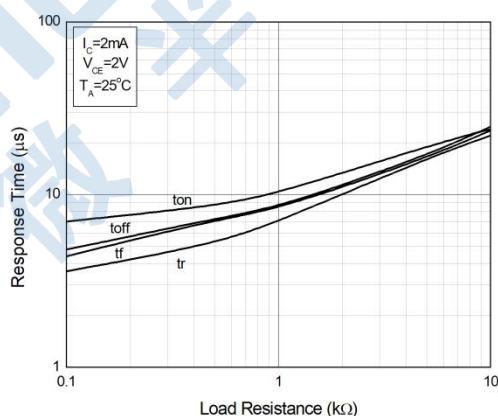
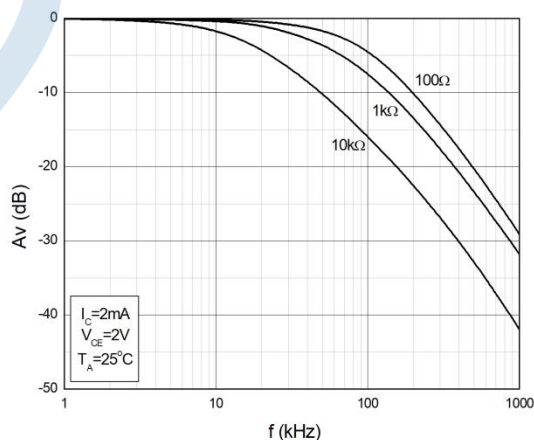


Fig.11 Frequency Response



TEST CIRCUITS

Fig.12 Test Circuits of Response Time

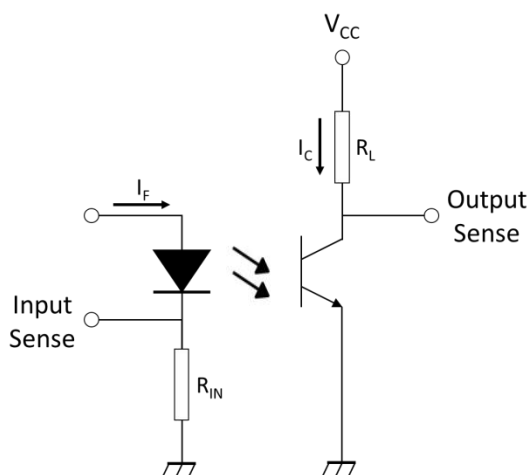


Fig.13 Curves of Response Time

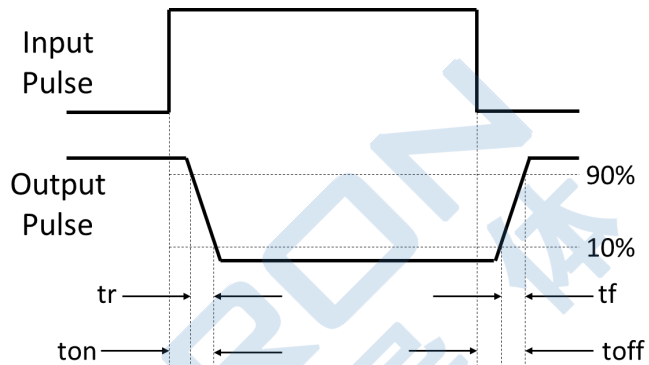
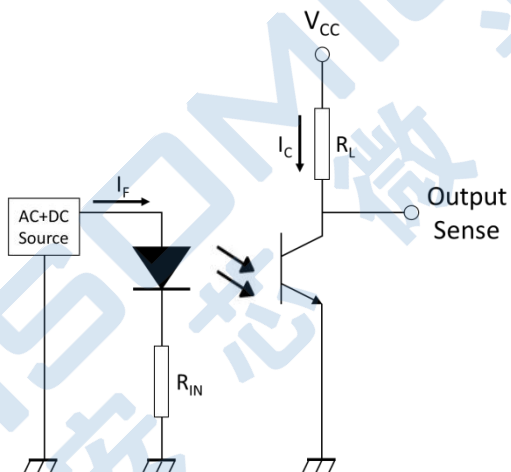
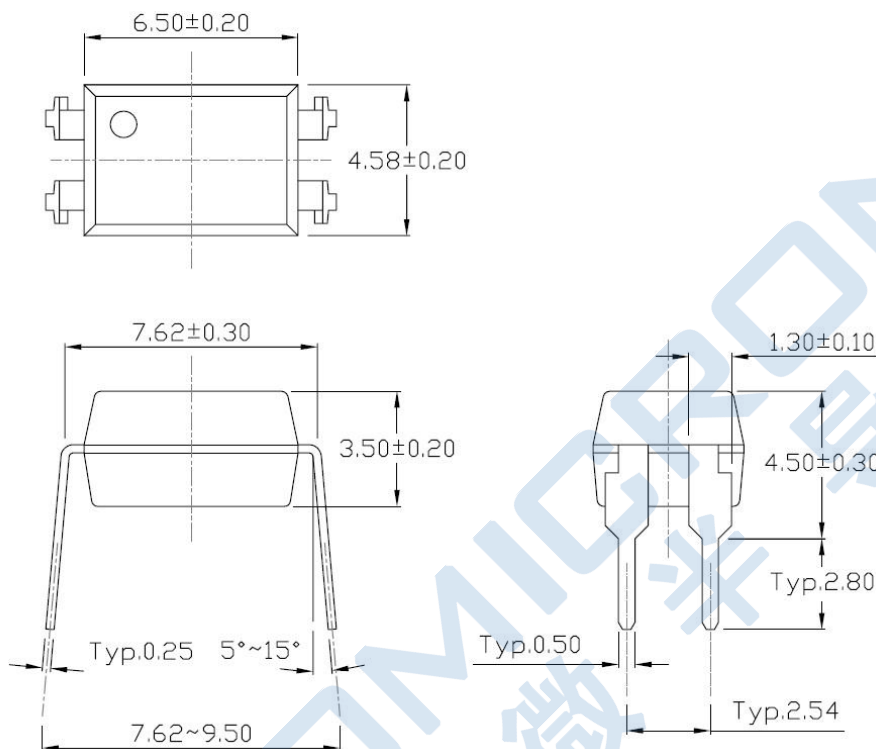


Fig.14 Test Circuits of Frequency Response

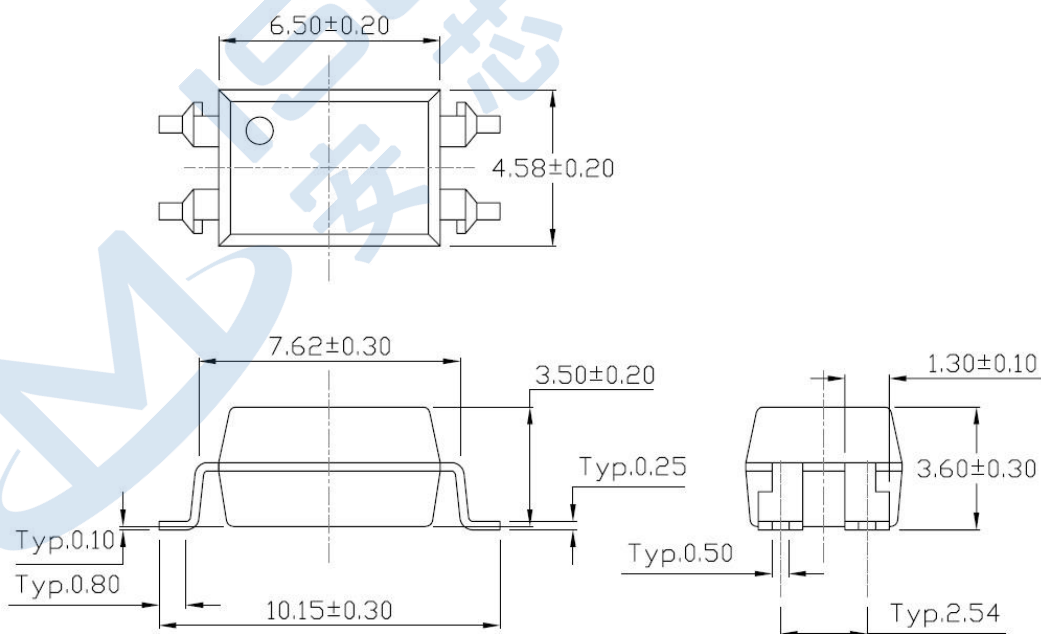


PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)



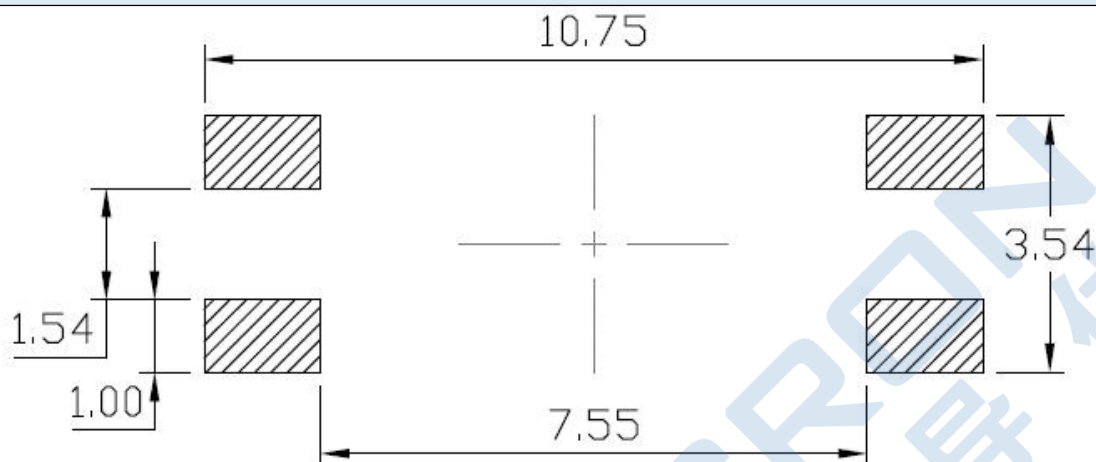
Surface Mount (Low Profile) Lead Forming (SL Type)



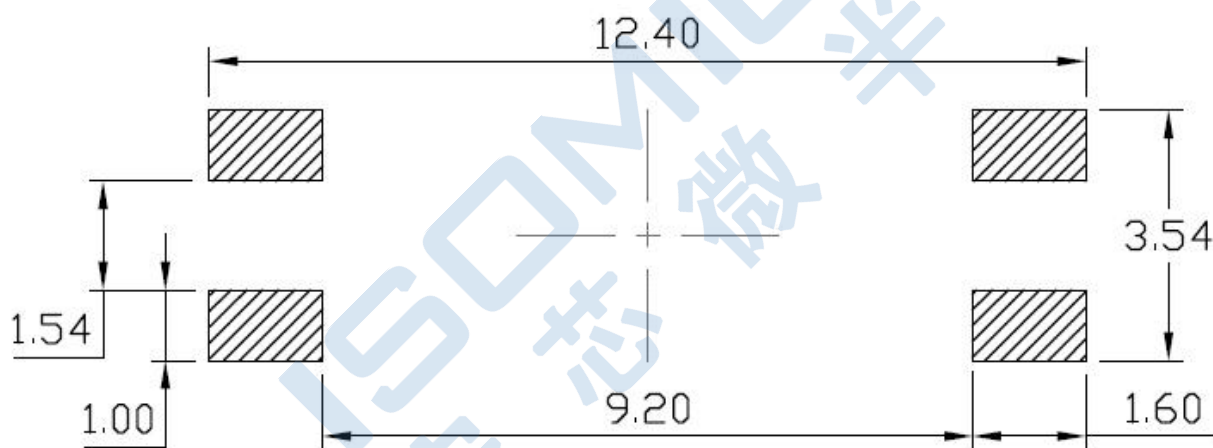
- Dimensions in mm unless otherwise stated

RECOMMENDED SOLDER MASK

Surface Mount (Low Profile) Lead Forming



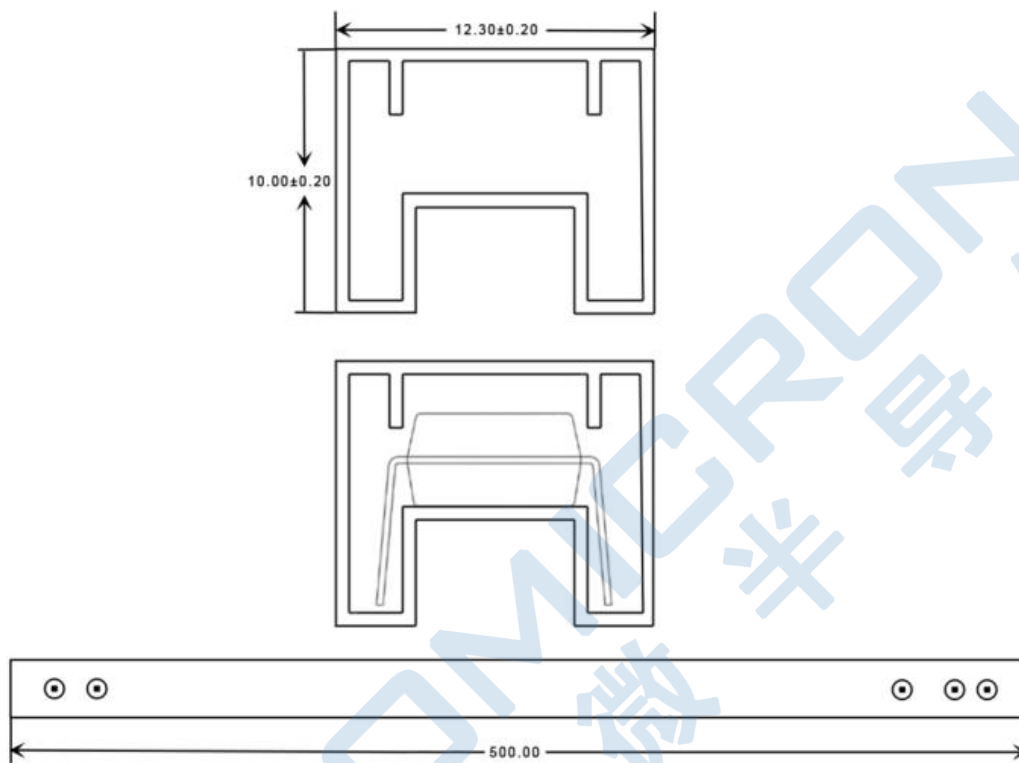
Surface Mount (Gullwing) Lead Forming



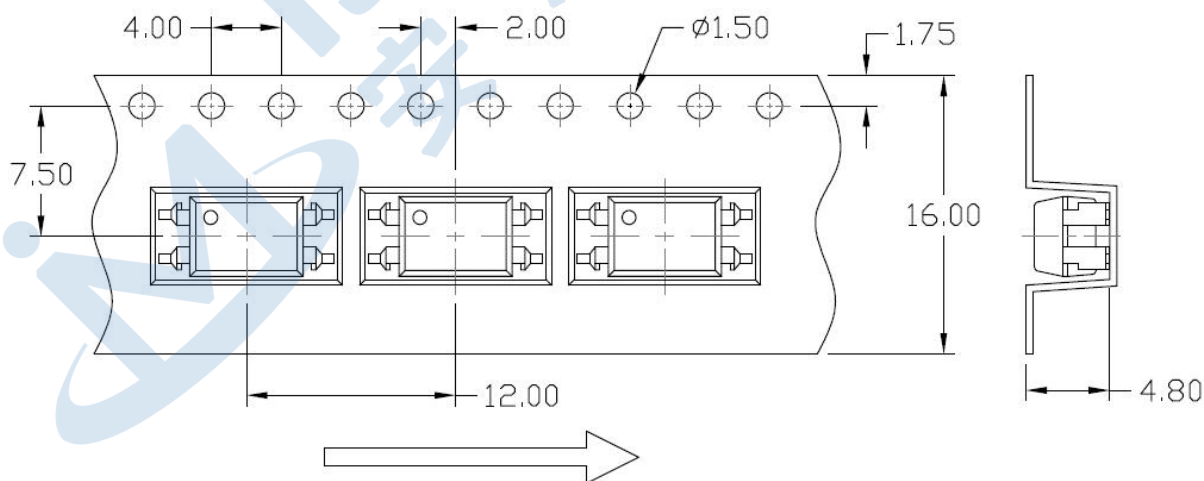
- Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS

Option DIP-Standard



Option SM-SL



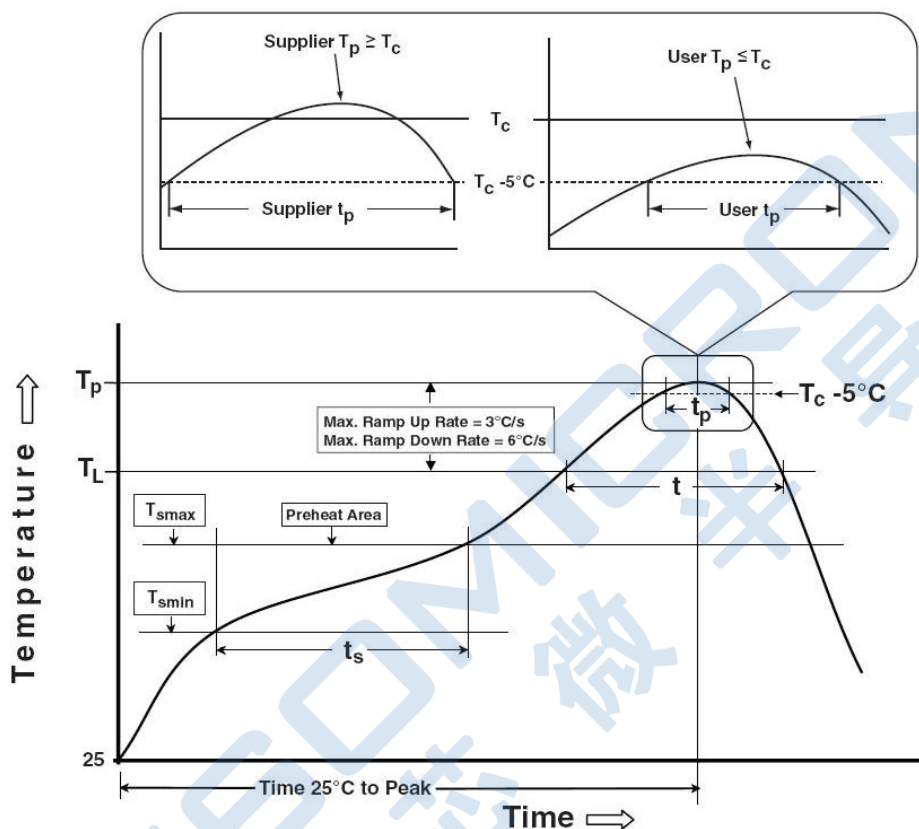
- Dimensions in mm unless otherwise stated

ORDERING AND MARKING INFORMATION

Marking Information			
		ISP : Company Abbr. 814 : Part Number X : VDE Option Y : CTR Rank (A/B) / : ISOMICRON YY : Fiscal Year WW : Work Week A : Manufacturing Code	
Order Code			
ISP814XYSM T&R Company Abbr. Part Number VDE Option X:VDE approval CTR Rank A/B Tape And Reel Option T&R: Reel None: Tube Lead Forming SM: SM-SL None: DIP-Standard			
Packing Quantity			
Option	Quantity	Quantity – Inner box	Quantity – Outer box
DIP-Standard	100 Units/Tube	20 Tubes/Inner box	6 Inner box/Outer box = 12k Units
SM-SL	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units

REFLOW INFORMATION

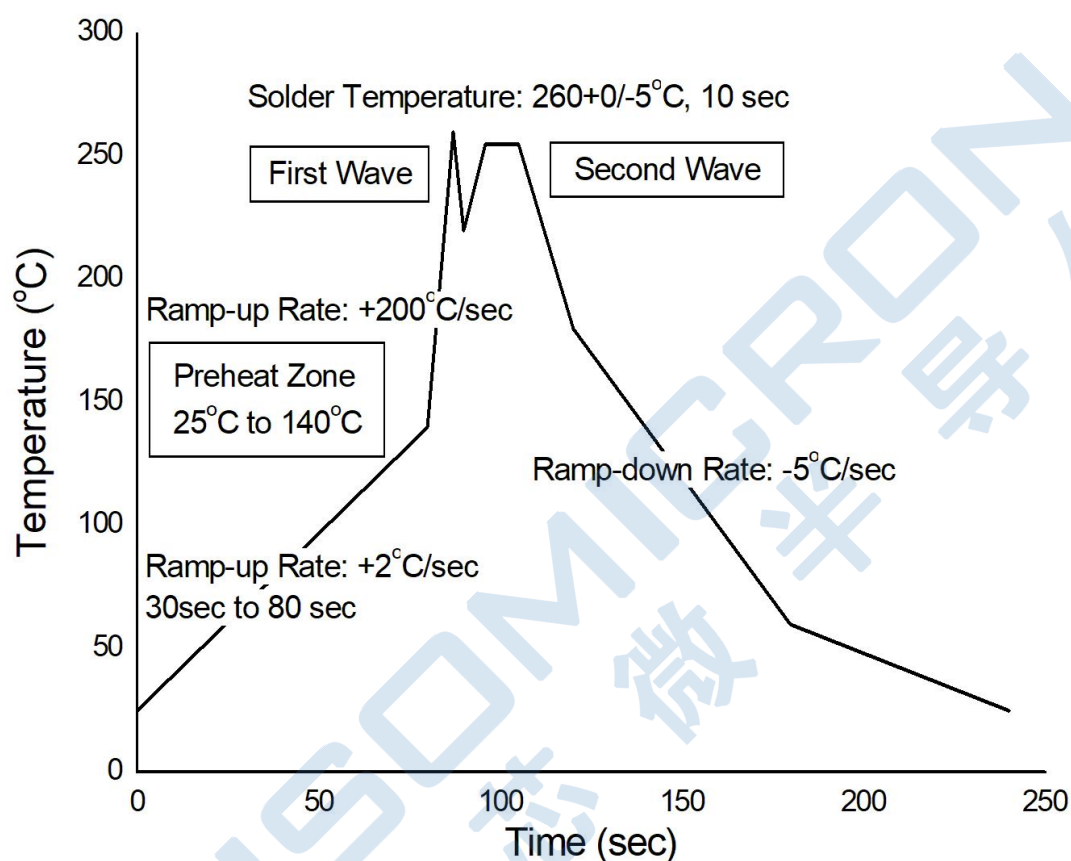
Reflow Profile



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	$380 \pm 5^{\circ}\text{C}$
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.