ISP827

High Isolation Photo Coupler

Features

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

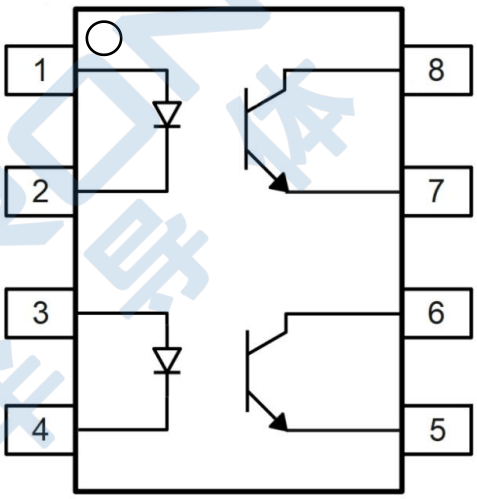
Applications

- Computer peripheral interface
- Microprocessor system interface

Description

The ISP827 series provide two channel operation, and each combines an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP8 package with different lead forming options.

With the robust coplanar double mold structure, ISP827 series provide the most stable isolation feature.



ORDERING INFORMATION

Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity
	ISP827XX	DIP8	ISP827X /YYWW A	Tube	500mm	45
	ISP827XXSMT&R	DIP8-SL		Reel	13 "	1000

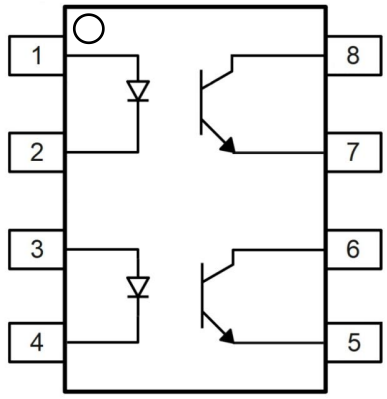
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PIN CONFIGURATION AND FUNCTIONS



Pin	Name
1	Anode
2	Cathode
3	Anode
4	Cathode
5	Emitter
6	Collector
7	Emitter
8	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}	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}	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%

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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}	6	-	-	V	I_E=0.1mA, I_F=0	
TRANSFER CHARACTERISTICS							
Current Transfer Ratio	CTR	130	-	400	%	I_F=5mA, V_{CE}=5V	
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	
Response Time (Rise)	t_r	-	6	18	μs	V_{CE}=2V, I_C=2mA	3
Response Time (Fall)	t_f	-	8	18	μs	R_L=100Ω	3
Cut-off Frequency	f_c	-	80	-	kHz	V_{CE}=2V, I_C=2mA R_L=100Ω,-3dB	4

Note 3. Fig.14
Note 4. Fig.12&13

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CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

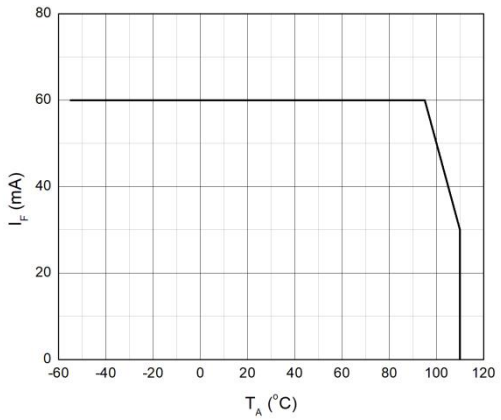


Fig.2 Collector Power Dissipation vs. Ambient Temperature

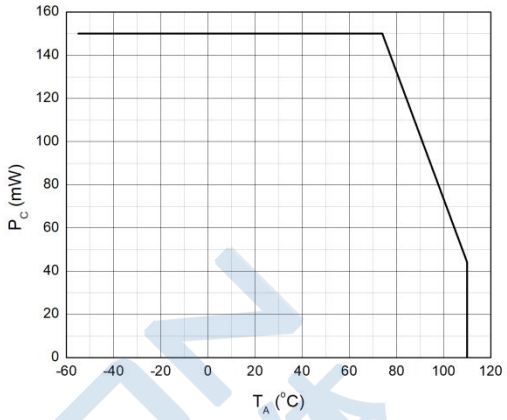


Fig.3 Forward Current vs. Forward Voltage

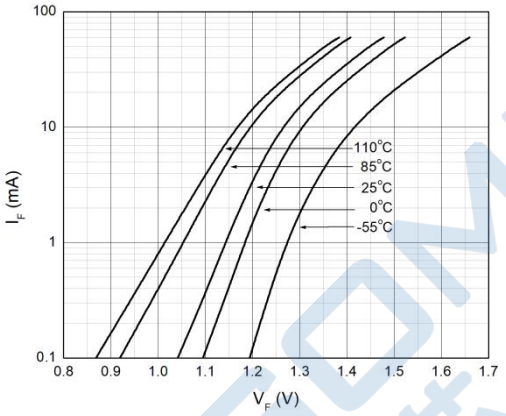


Fig.4 Collector Dark Current vs. Ambient Temperature

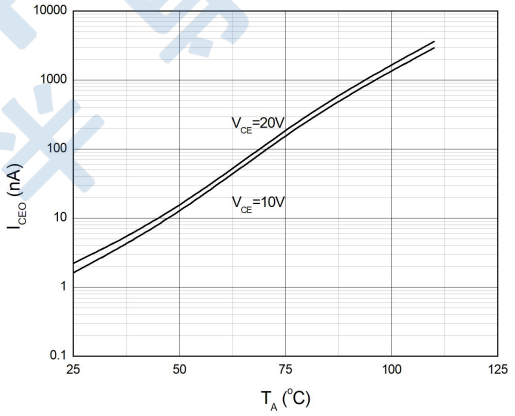


Fig.5 Collector Current vs. Collector-emitter Voltage

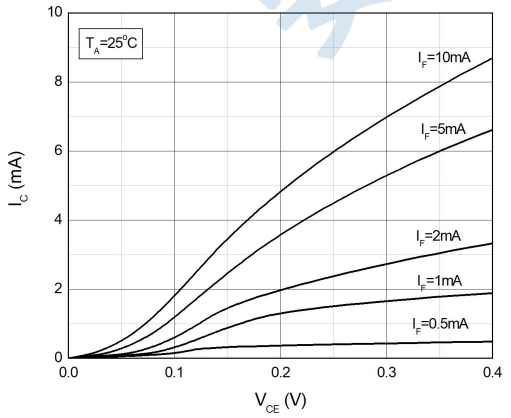
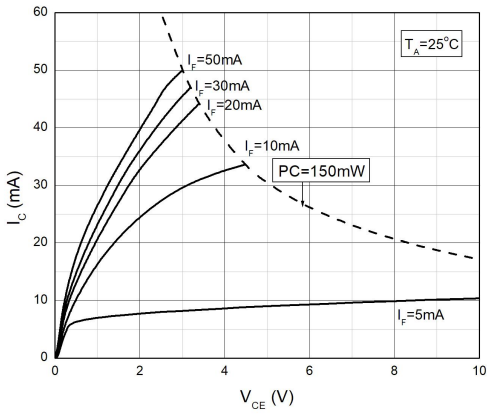


Fig.6 Collector Current vs. Collector-emitter Voltage



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Fig.7 Normalized Current Transfer Ratio vs. Forward Current

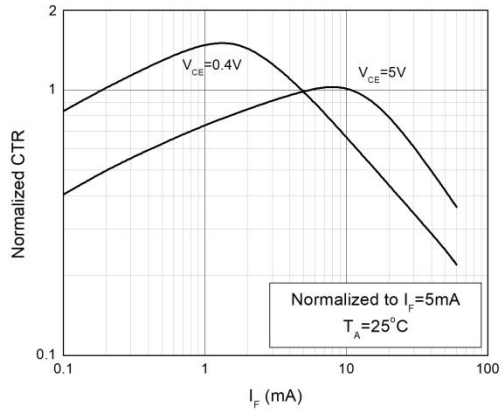


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

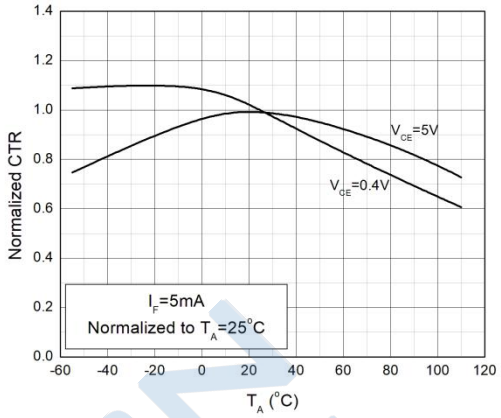


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

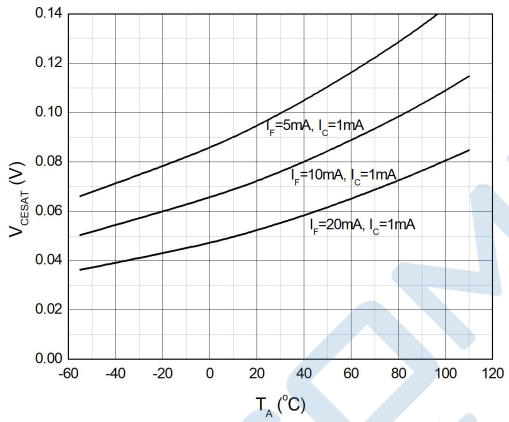


Fig.10 Switching Time vs. Load Resistance

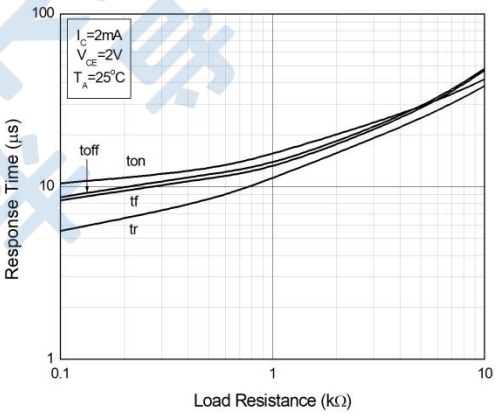
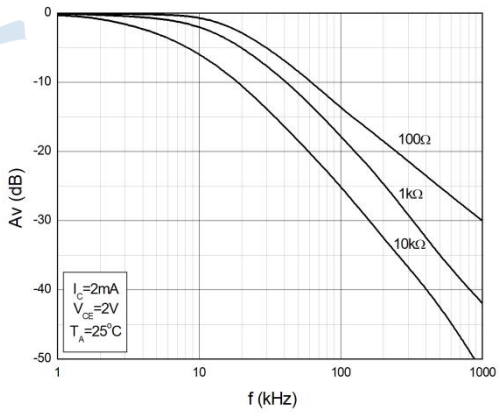


Fig.11 Frequency Response



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TEST CIRCUITS

Fig.12 Test Circuits of Response Time

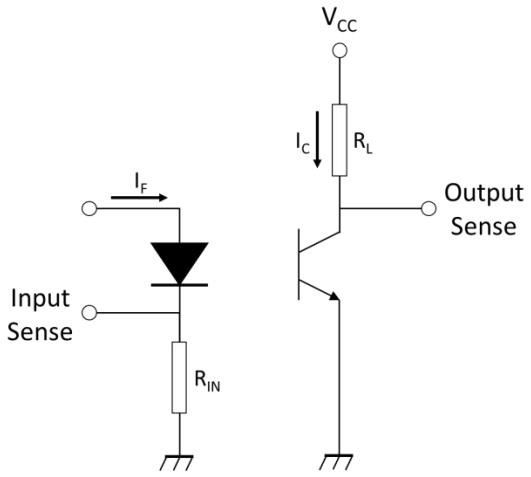


Fig.13 Curves of Response Time

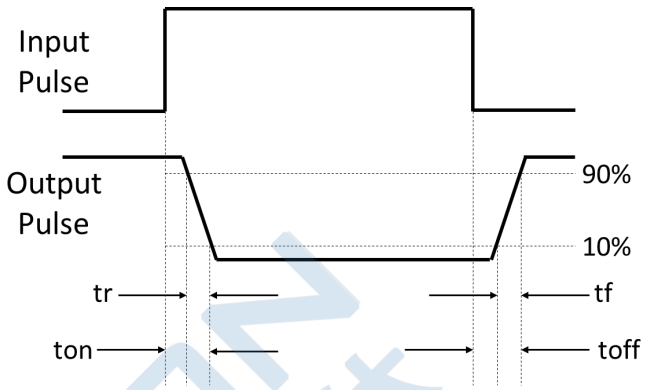
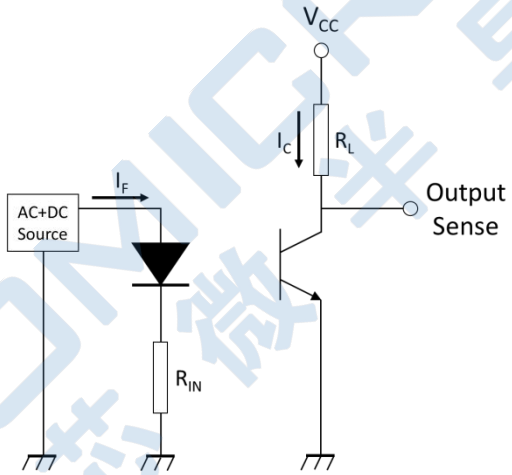


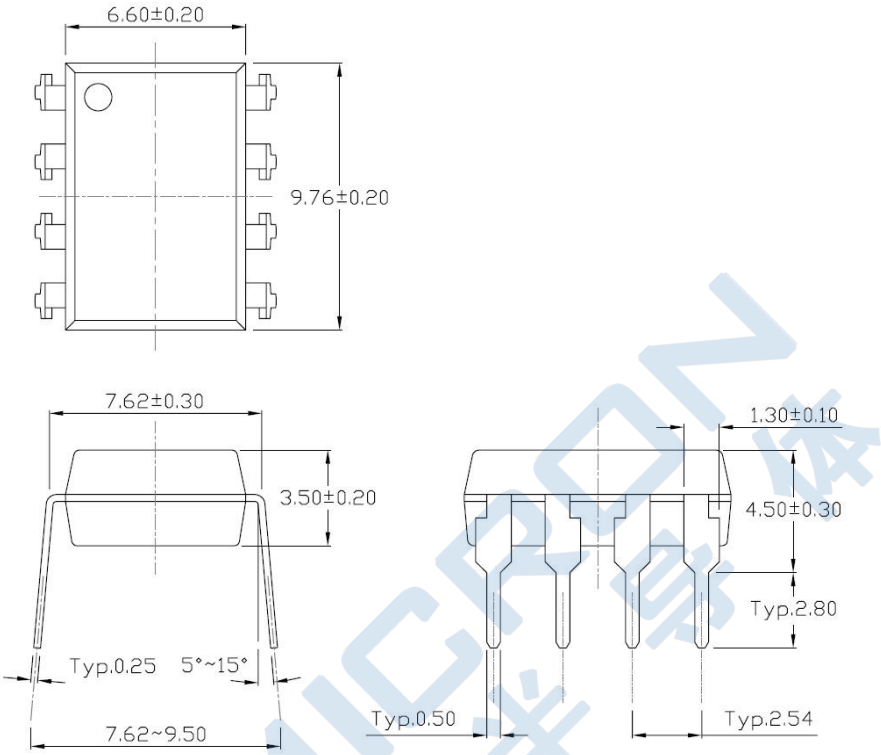
Fig.14 Test Circuits of Frequency Response



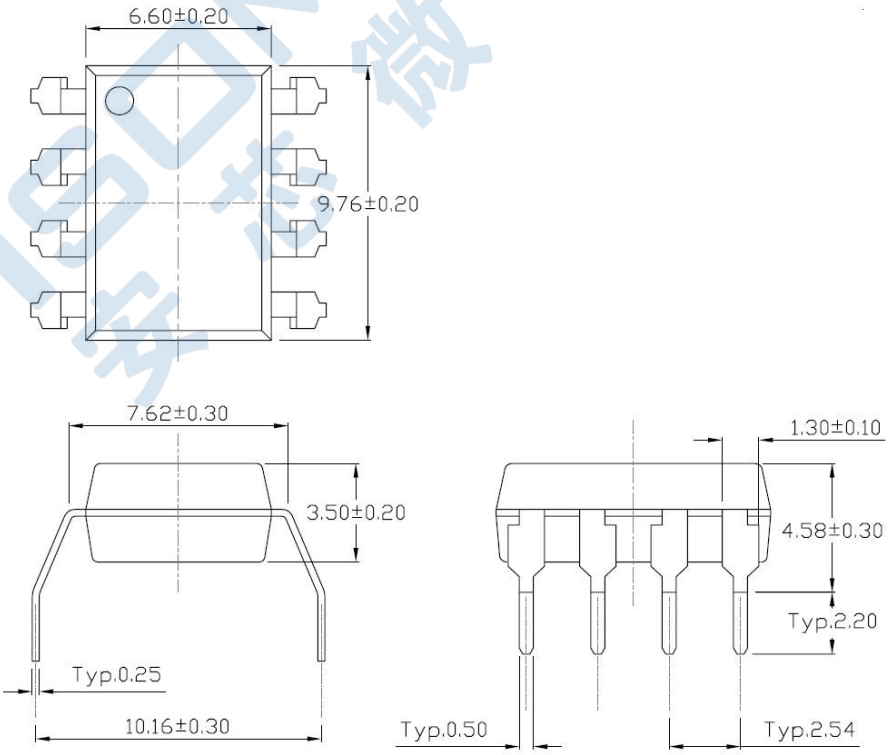
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PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)

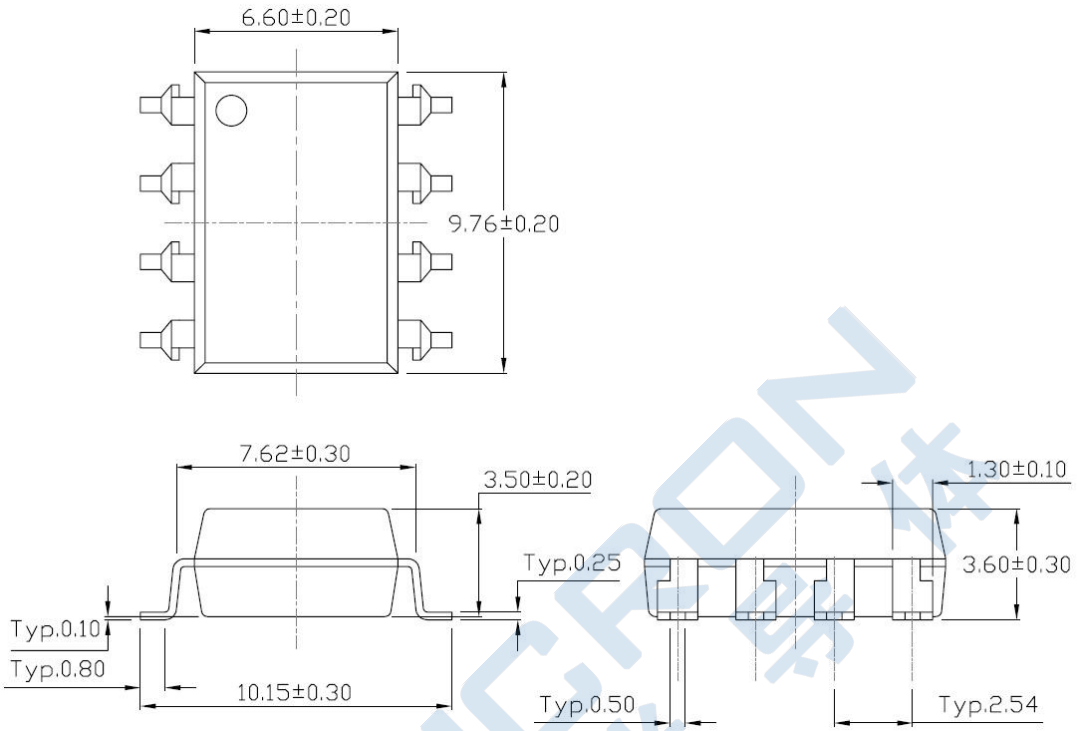


Gullwing (400mil) Lead Forming – Through Hole (M Type)



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

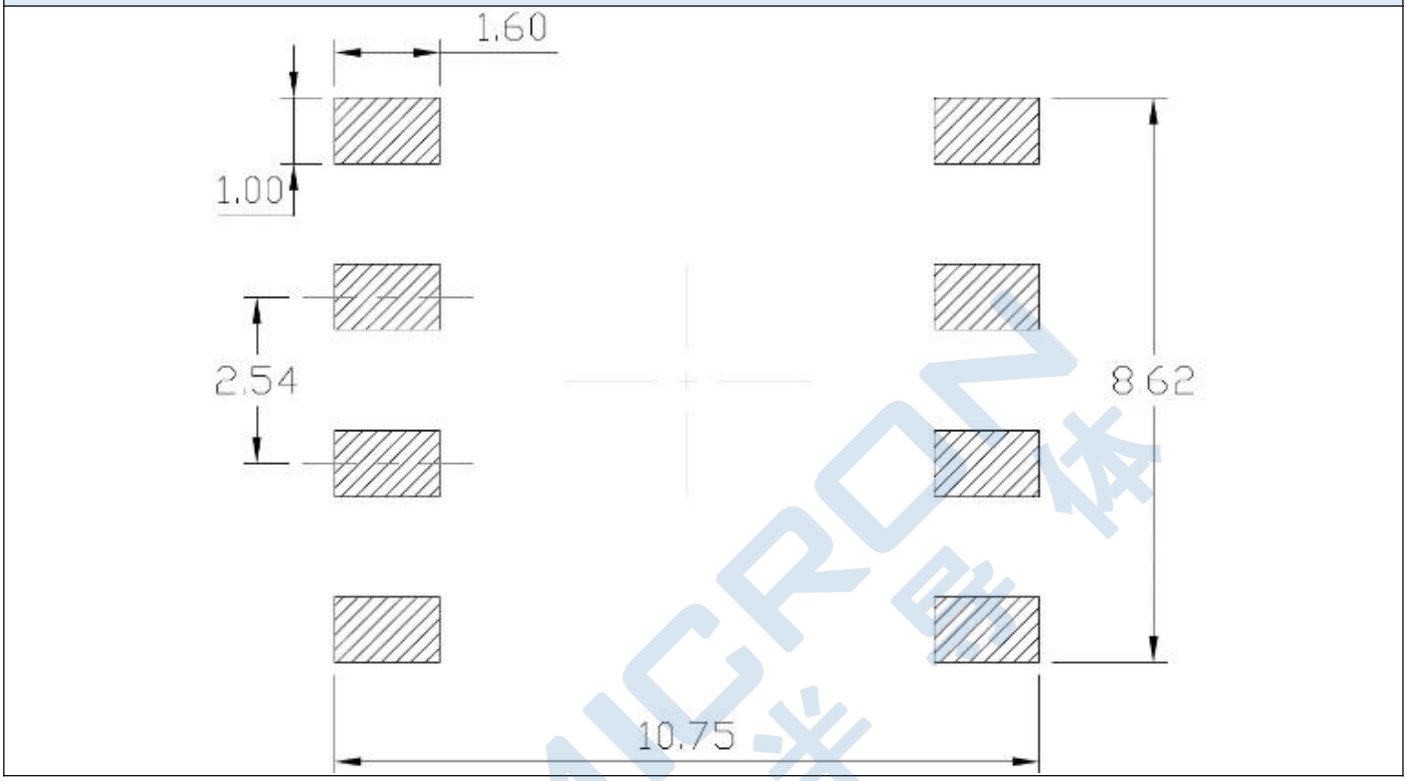


- **Dimensions in mm unless otherwise stated**

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RECOMMENDED SOLDER MASK

Surface Mount (Low Profile) Lead Forming

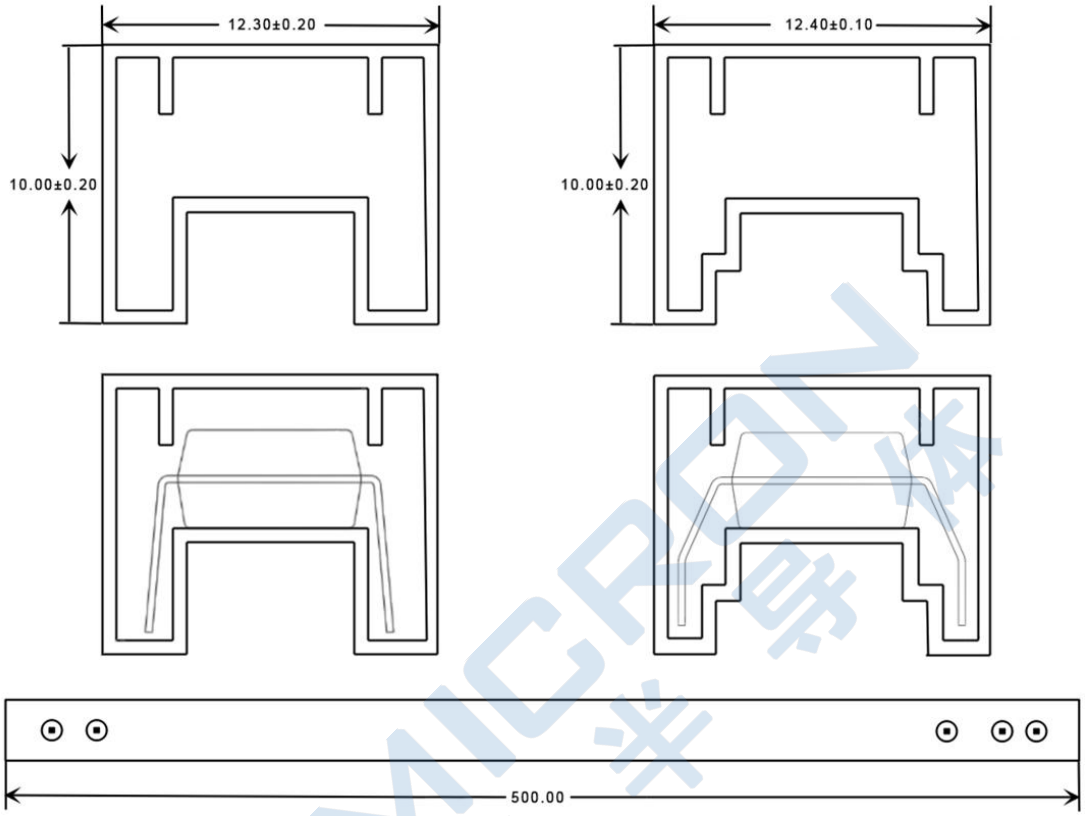


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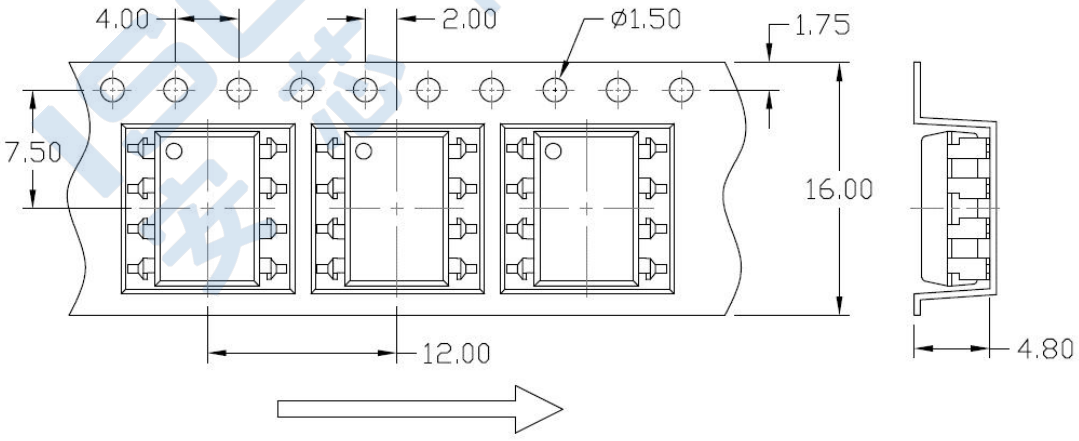
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CARRIER TAPE SPECIFICATIONS

Option DIP-Standard & DIP-M



Option SM-SL

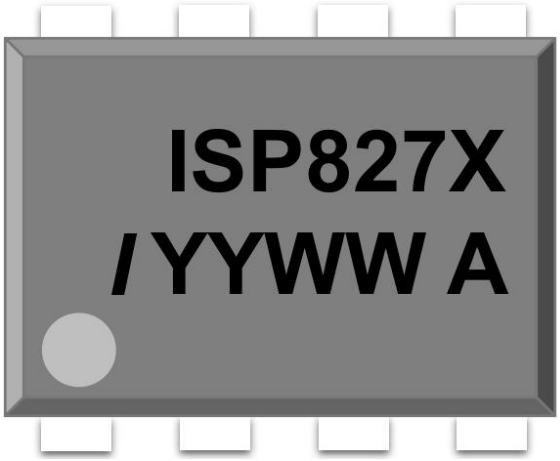


- **Dimensions in mm unless otherwise stated**

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ORDERING AND MARKING INFORMATION

Marking Information



ISP	:	Company Abbr.
827	:	Part Number
X	:	VDE Option
/	:	ISOMICRON
YY	:	Fiscal Year
WW	:	Work Week
A	:	Manufacturing Code

Order Code

ISP 827 X X SM T&R

Company Abbr.

Part Number

VDE Option:
X：X-VDE approval

CTR Rank:
None

Tape And Reel Option:
T&R: Reel ; None: Tube

Lead Forming:
SM: SM-SL
None: DIP-Standard

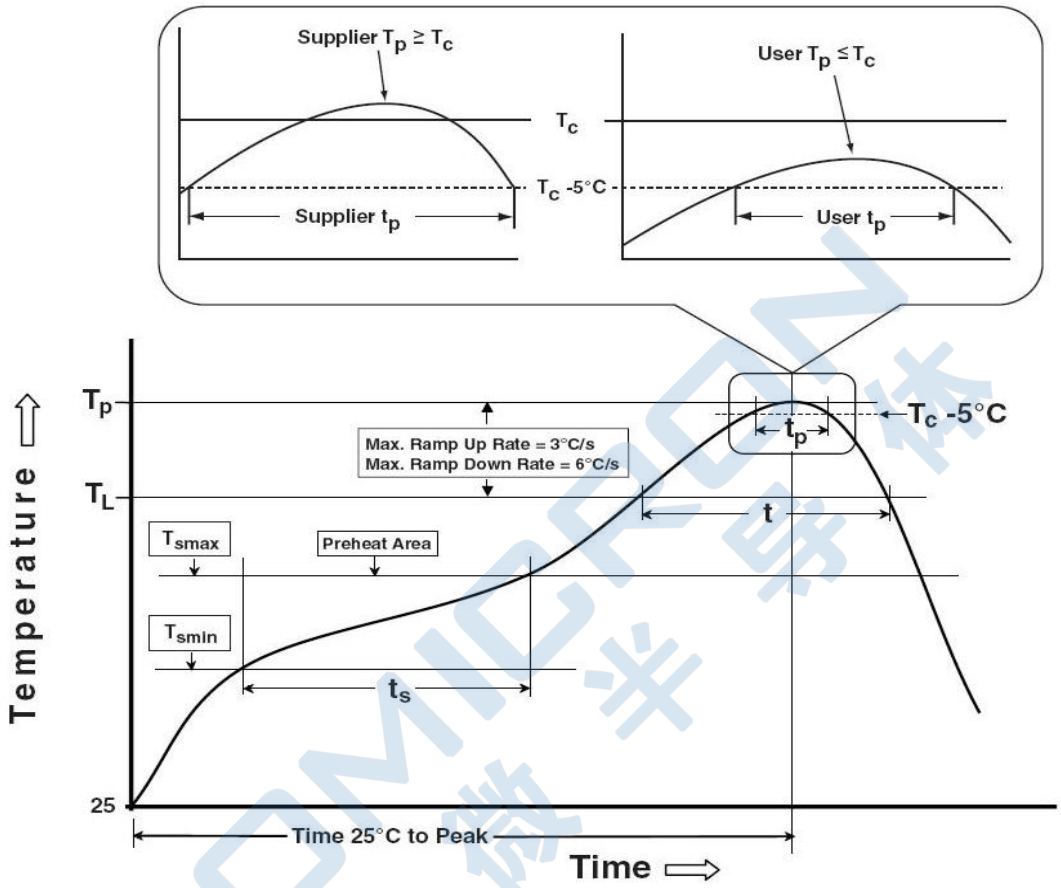
Packing Quantity

Option	Quantity	Quantity – Inner box	Quantity – Outer box
DIP-Standard	45 Units/Tube	25 Tubes/Inner box	6 Inner box/Outer box = 6.75k Units
DIP-M	45 Units/Tube	25 Tubes/Inner box	6 Inner box/Outer box = 6.75k Units
SM-SL	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units

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REFLOW INFORMATION

Reflow Profile

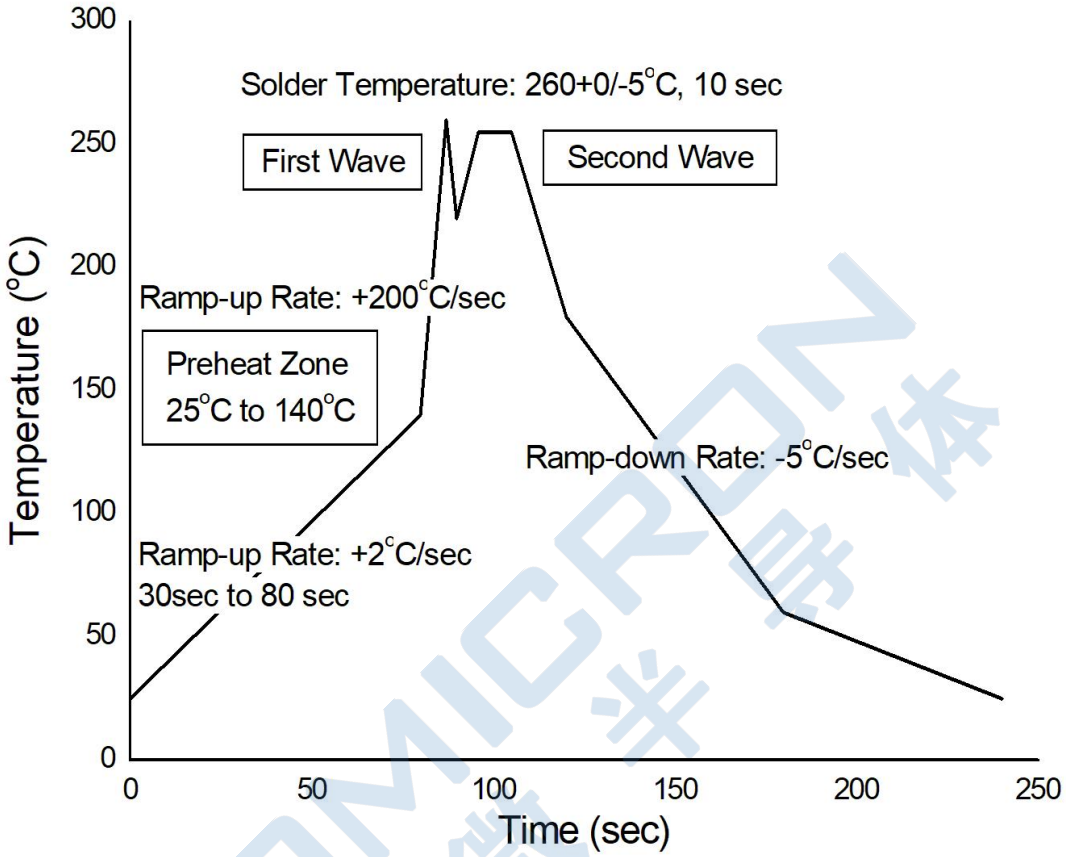


Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (Tsmin)	100	150°C
Temperature Max. (Tsmax)	150	200°C
Time (ts) from (Tsmin to Tsmax)	60-120 seconds	60-120 seconds
Ramp-up Rate (tL to tP)	3°C/second max.	3°C/second max.
Liquidous Temperature (TL)	183°C	217°C
Time (tL) 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.

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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

- 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.
- ISOMICRON makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, ISOMICRON disclaims (a) any and all liability arising out of the application or use of any product, (b) any and all liability, including without limitation special, consequential or incidental damages, and (c) any and all implied warranties, including warranties of fitness for particular
- 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, 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.

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