

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 compliance
- Halogen free
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1

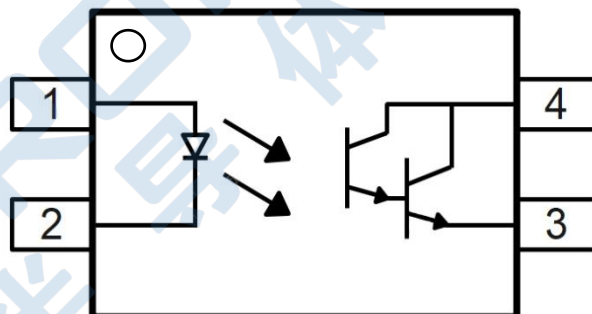
Applications

- Sequence controller
- Telephone/FAX
- System appliances, measuring instrument
- Programmable logic controller

Description

The ICPL-815 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar darlington phototransistor detector in a plastic DIP4 package with different lead forming options.

With the robust coplanar double mold structure, ICPL-815 series provide the most stable isolation feature.



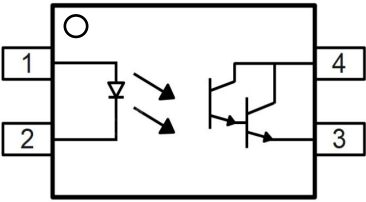
ORDERING INFORMATION

Outline	Part Number	Package	Marking	Packing	Packing Size	Quantity
	ICPL-815-010E	DIP4	ICPL 815 /YYWW A	Tube	500mm	100
	ICPL-815-110E	DIP4-M		Tube	500mm	100
	ICPL-815-510E	DIP4-SL		Reel	13 "	1000

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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}	40	V	
Emitter - Collector Voltage	V_{ECO}	6	V	
Collector Current	I_C	80	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%

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

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	μA	$V_R=6\text{V}$	
Input Capacitance	C_{in}	-	10	-	pF	$V=0, f=1\text{kHz}$	
OUTPUT							
Collector Dark Current	I_{CEO}	-	-	100	nA	$V_{CE}=10\text{V}, I_F=0$	
Collector-Emitter Breakdown Voltage	BV_{CEO}	40	-	-	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	CTR	600	-	7500	%	$I_F=1\text{mA}, V_{CE}=2\text{V}$	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	-	0.8	1.0	V	$I_F=20\text{mA}, I_C=5\text{mA}$	
Isolation Resistance	R_{ISO}	10^{12}	10^{14}	-	Ω	DC500V, 40 ~ 60% R.H.	
Floating Capacitance	C_{IO}	-	0.4	1	pF	$V=0, f=1\text{MHz}$	
Response Time (Rise)	t_r	-	95	300	μs	$V_{CE}=2\text{V}, I_C=10\text{mA}$ $R_L=100\Omega$	3
Response Time (Fall)	t_f	-	84	250	μs		3
Cut-off Frequency	f_c	-	1	-	kHz	$V_{CE}=2\text{V}, I_C=10\text{mA}$ $R_L=100\Omega, -3\text{dB}$	4

Note 3. Fig.12&13

Note 4. Fig.14

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

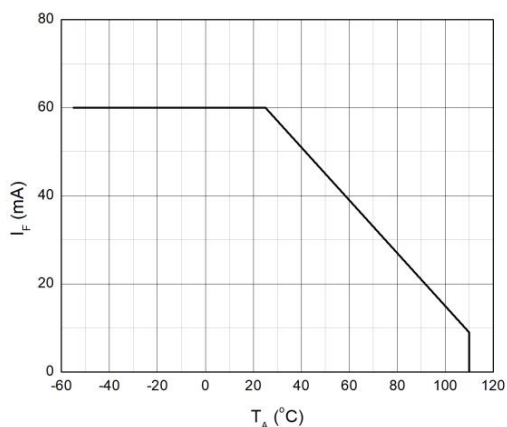


Fig.2 Collector Power Dissipation vs. Ambient Temperature

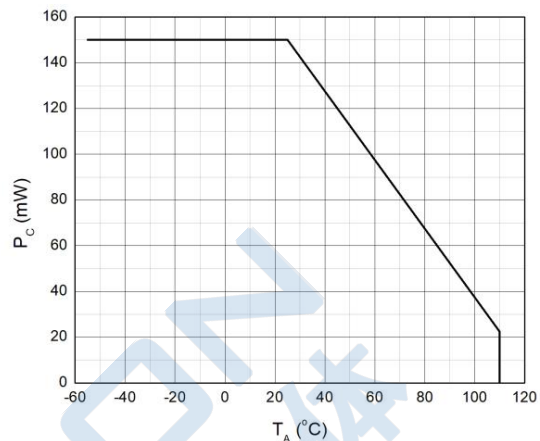


Fig.3 Forward Current vs. Forward Voltage

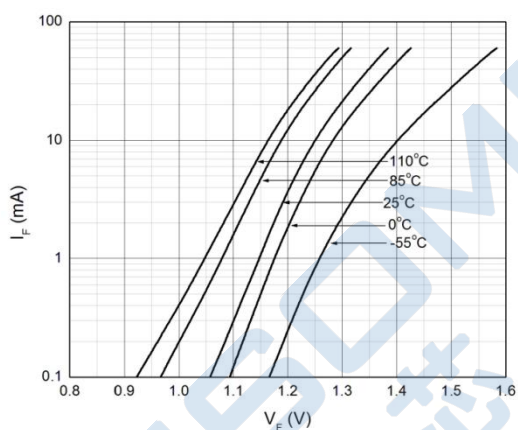


Fig.4 Collector Dark Current vs. Ambient Temperature

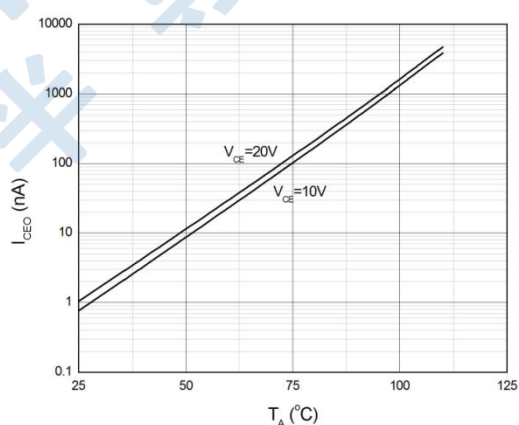


Fig.5 Collector Current vs. Collector-emitter Voltage

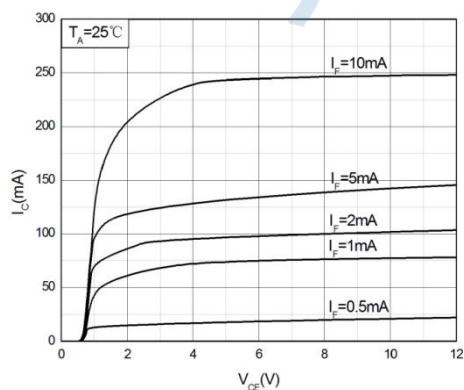


Fig.6 Collector Current vs. Collector-emitter Voltage

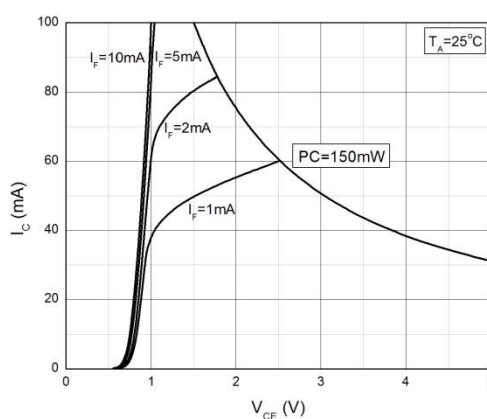


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

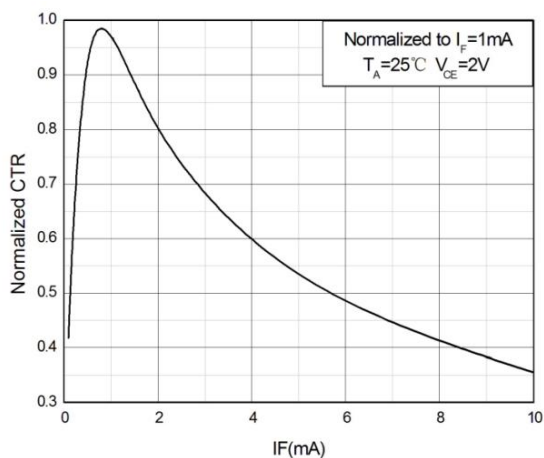


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

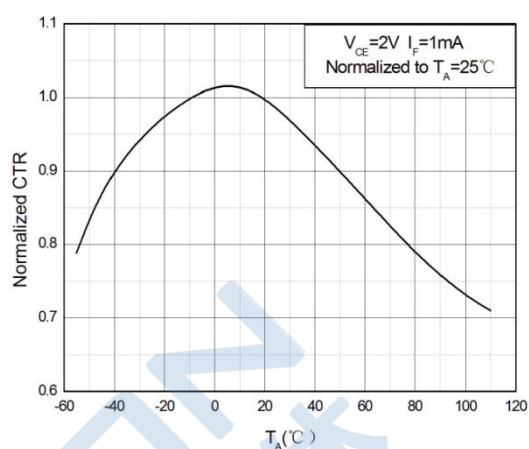


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

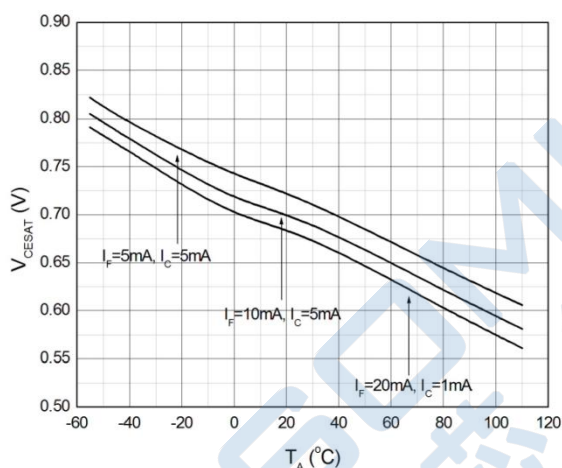


Fig.10 Switching Time vs. Load Resistance

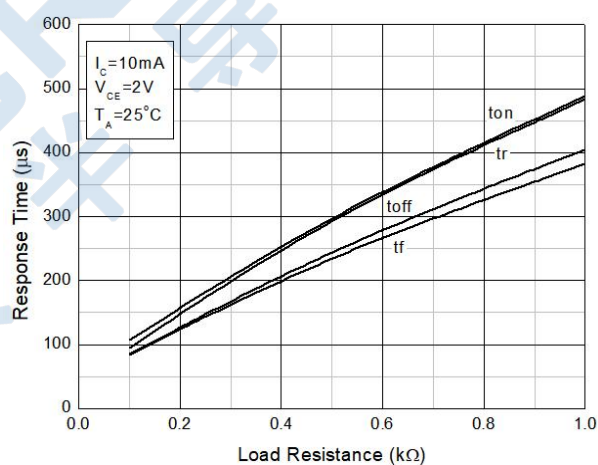
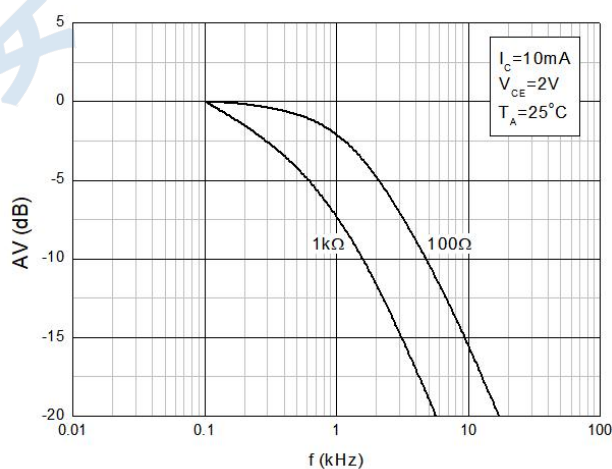
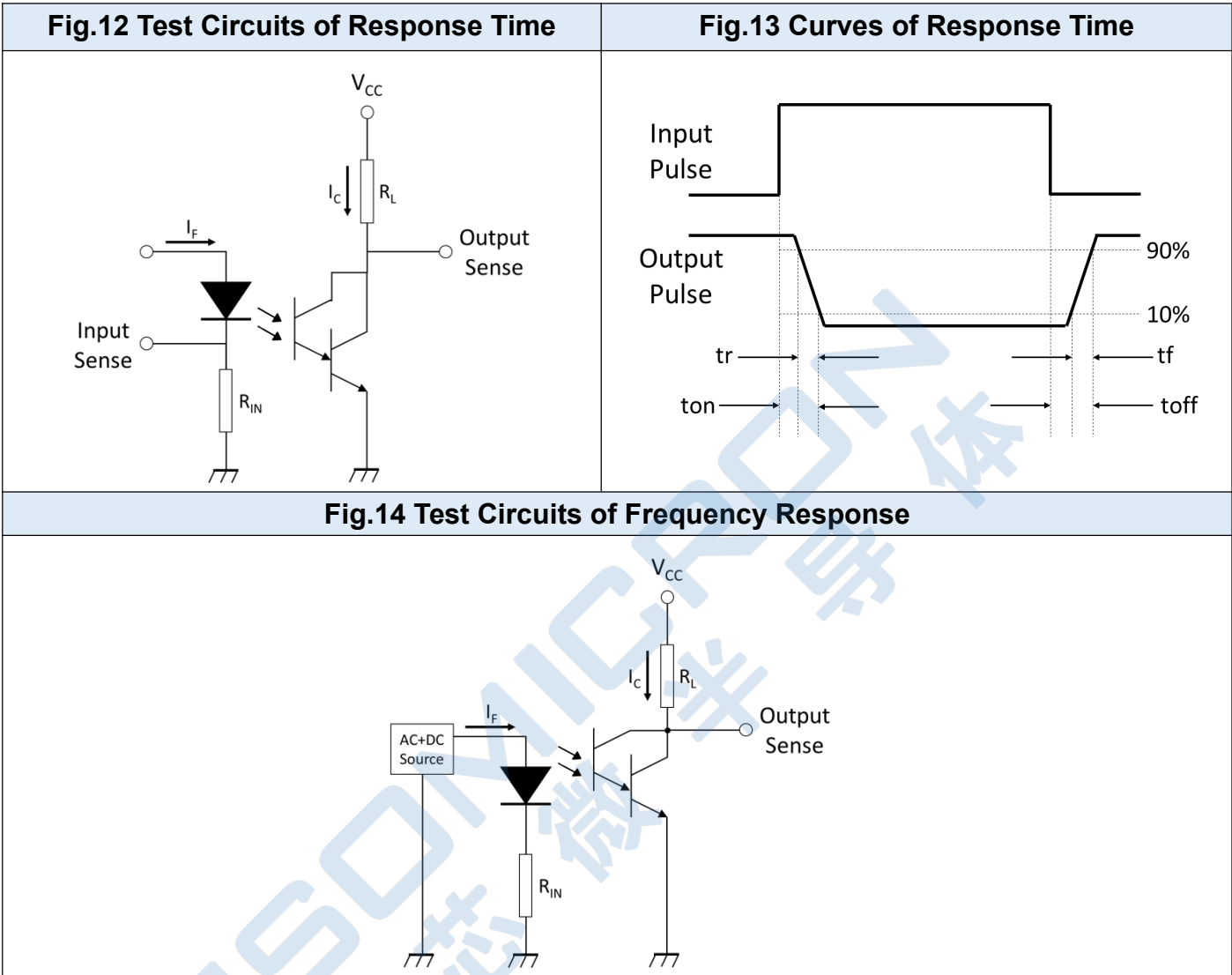


Fig.11 Frequency Response

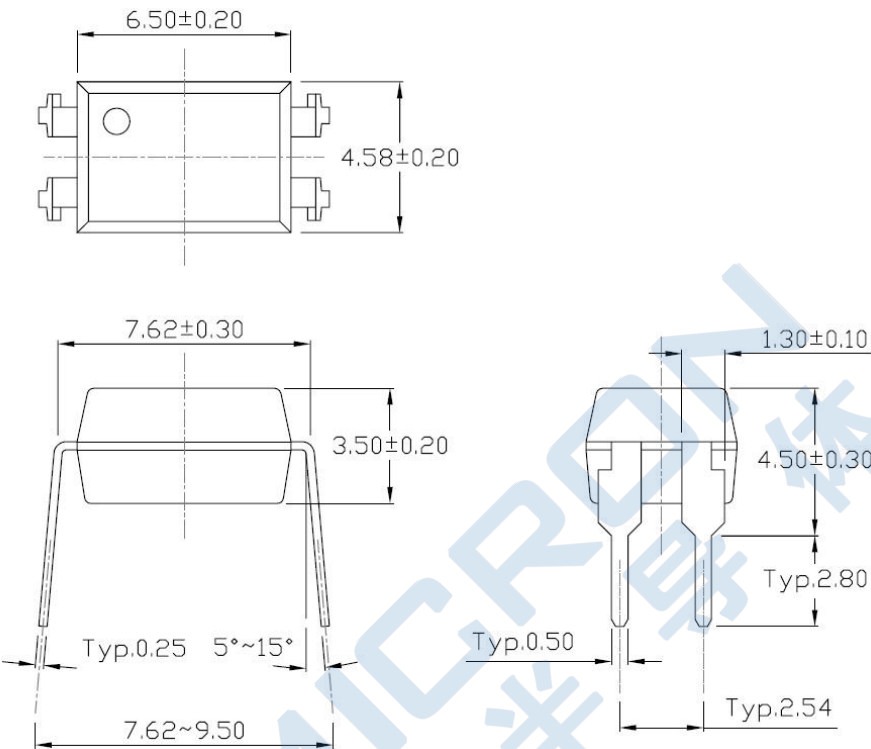


TEST CIRCUITS

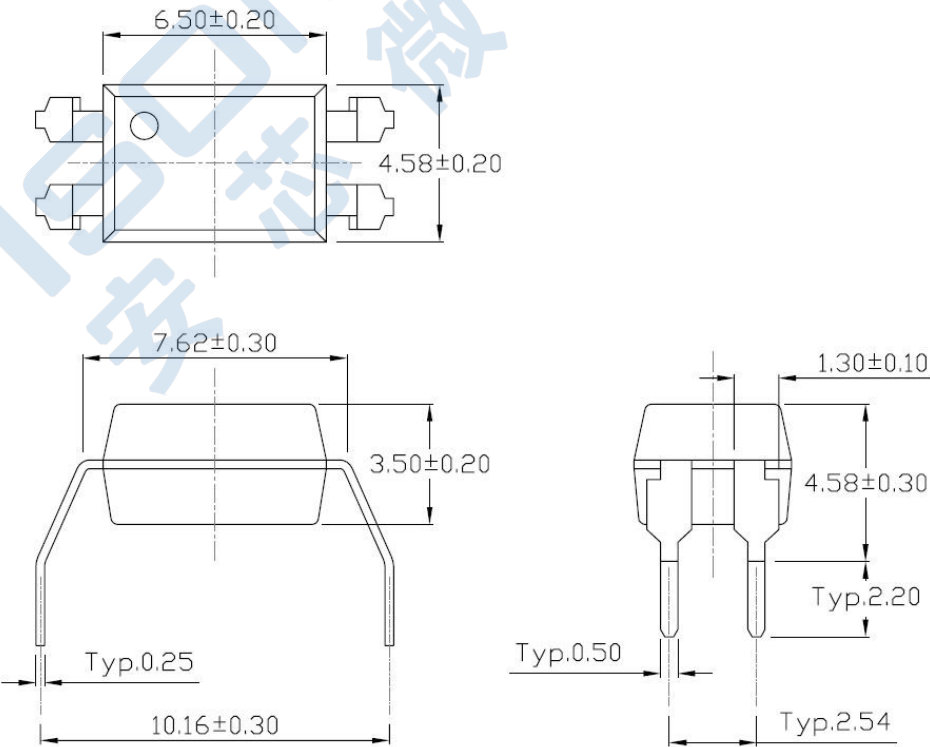


PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)

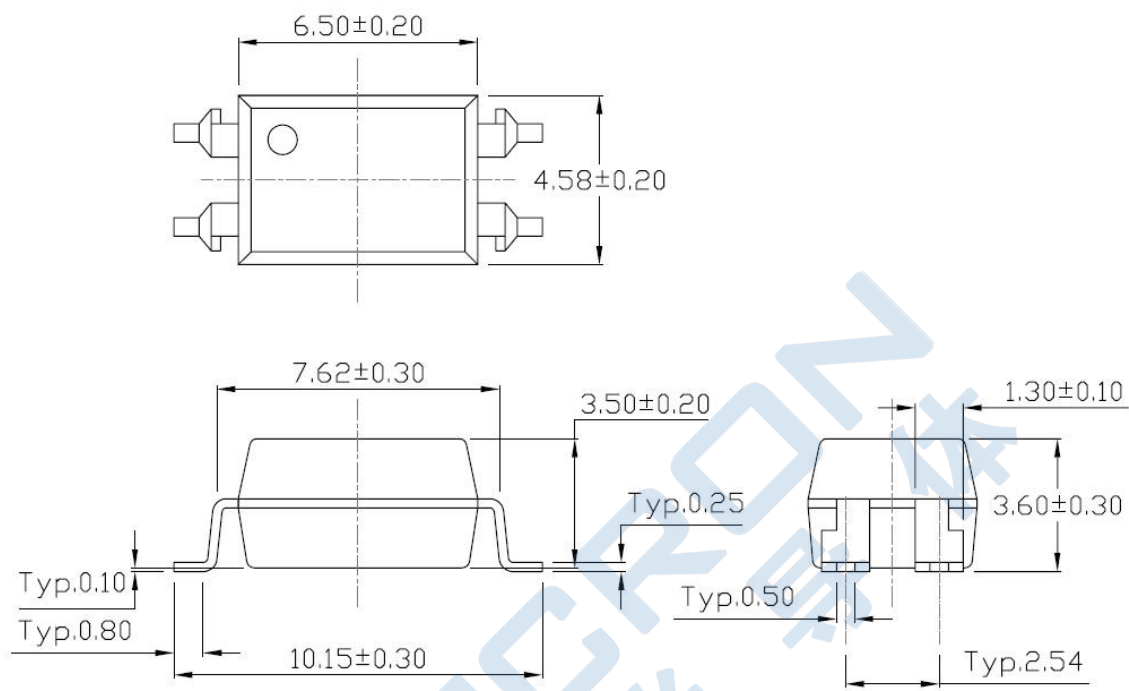


Gullwing (400mil) Lead Forming – Through Hole (M Type)



PACKAGE DIMENSIONS

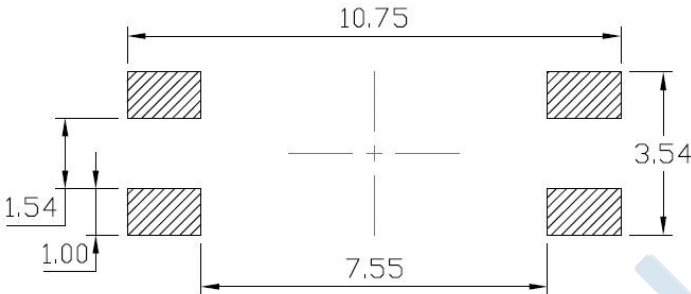
Surface Mount (Low Profile) Lead Forming (SL Type)



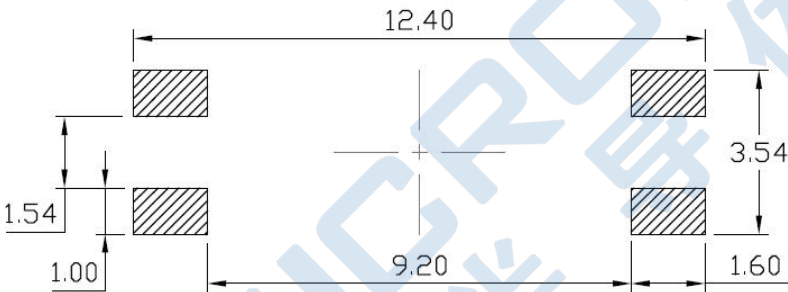
- Dimensions in mm unless otherwise stated

RECOMMENDED SOLDER MASK

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



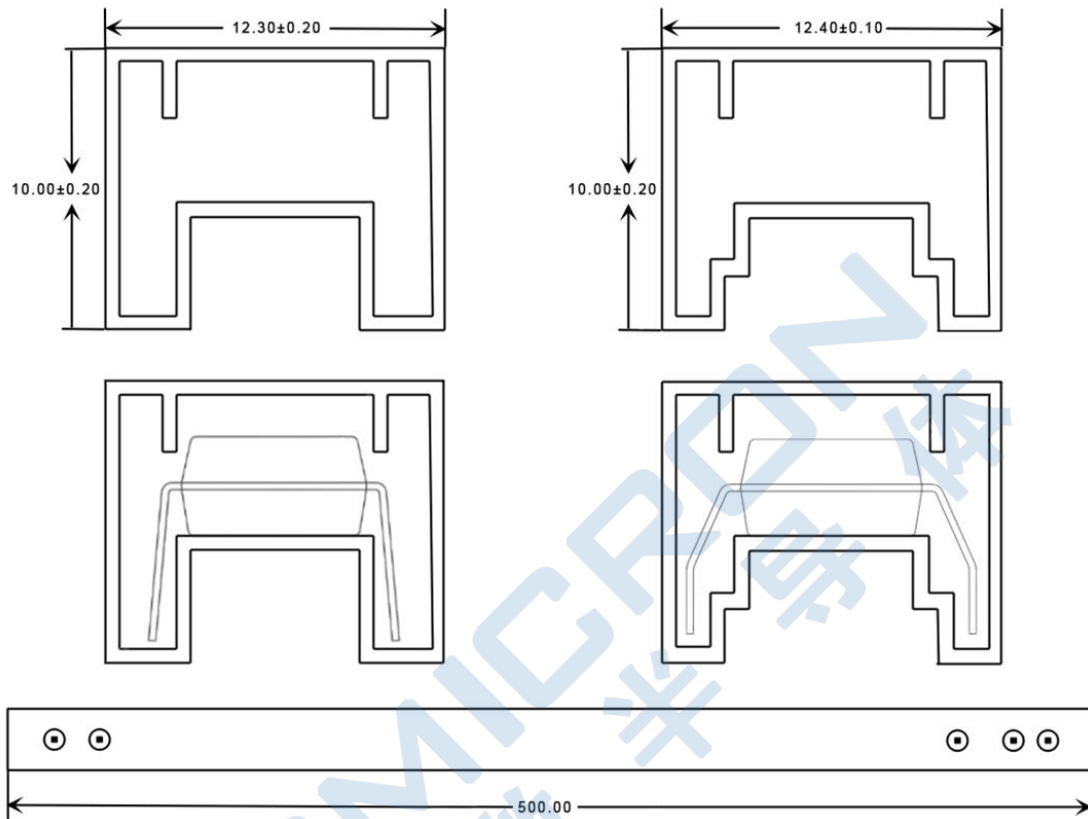
Surface Mount (Gullwing) Lead Forming



- Dimensions in mm unless otherwise stated

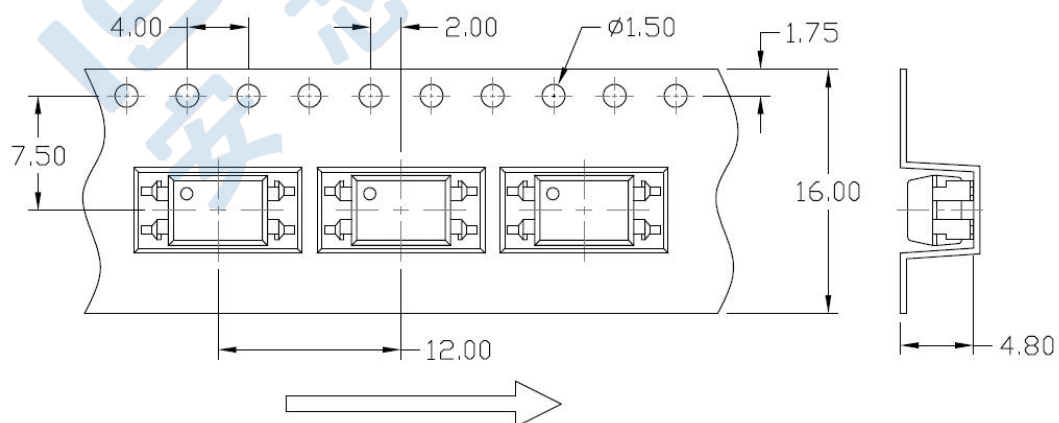
CARRIER TAPE SPECIFICATIONS

Option DIP-Standard & DIP-M



CARRIER TAPE SPECIFICATIONS

Option SM-SL



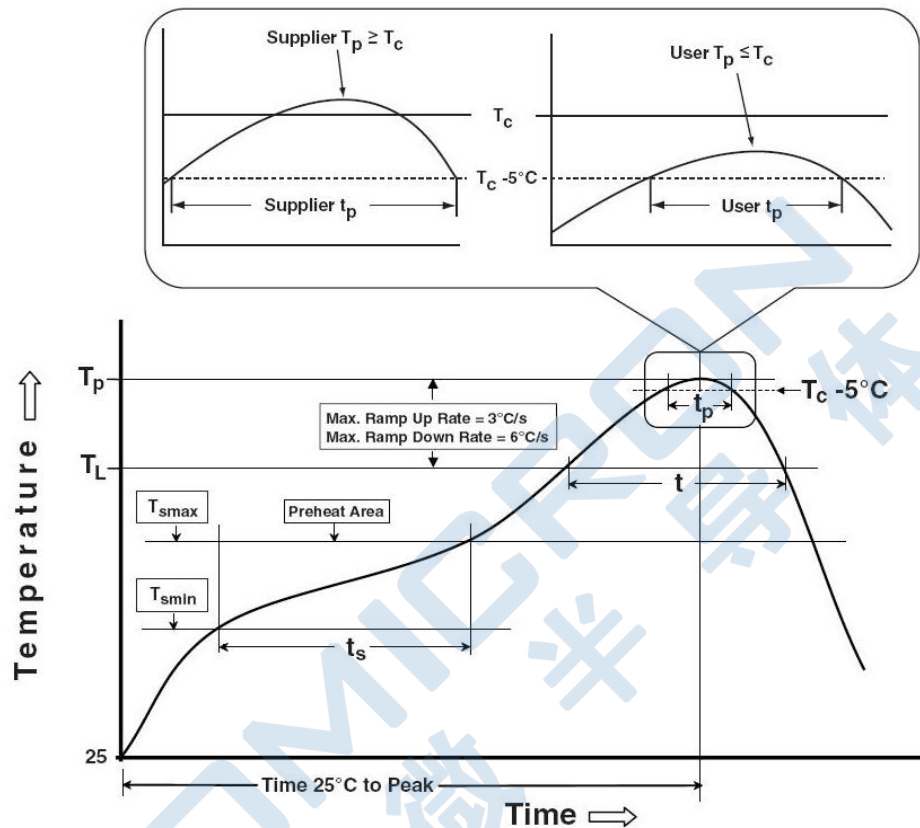
- Dimensions in mm unless otherwise stated

ORDERING AND MARKING INFORMATION

Marking Information			
		ICPL : Company Abbr. 815 : Part Number / : ISOMICRON YY : Fiscal Year WW : Work Week A : Manufacturing Code	
Order Code			
ICPL - 815 - 5 1 0 E Company Abbr. Part Number Lead Forming 0: DIP-Standard 1: DIP-M Type 5: SM-SL Halogen Free: E: Halogen-free,Lead-free Z: Halogen, Lead-free CTR Rank: 0: None Performance 0: Normal 1: Enhanced			
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
DIP M type	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

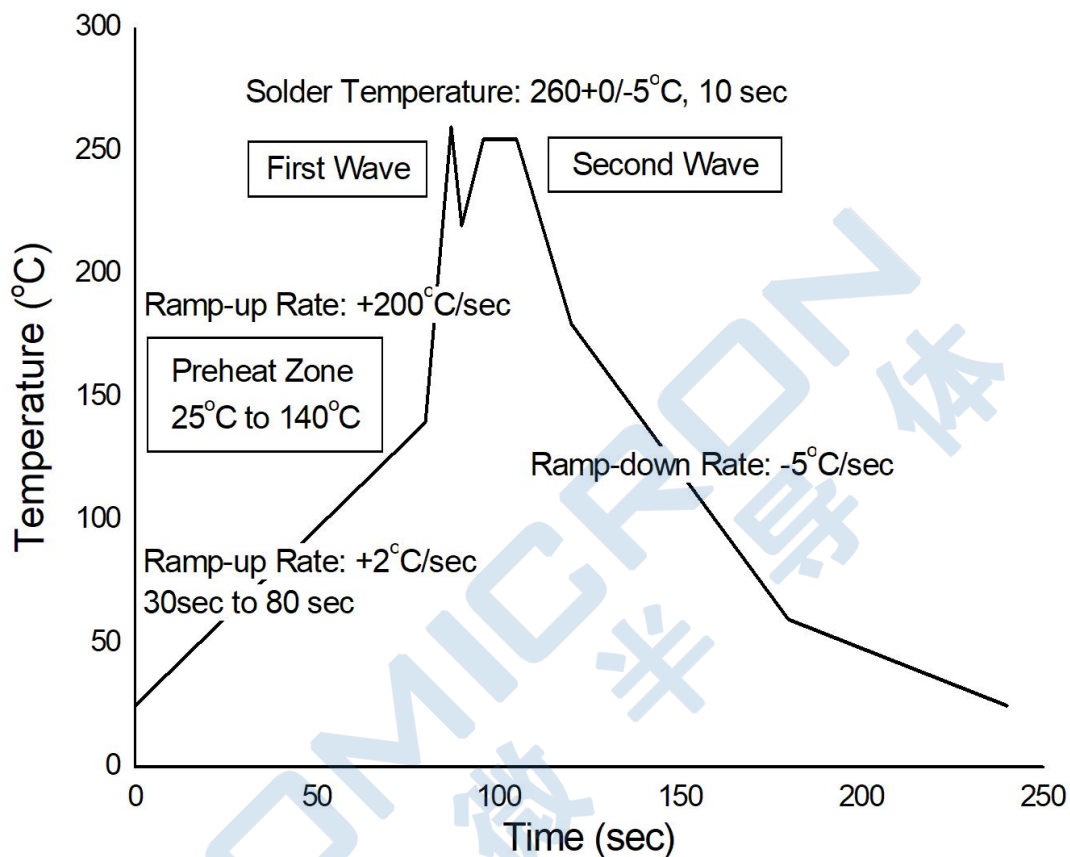
Reflow Profile



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+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

- 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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- 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.