

Features

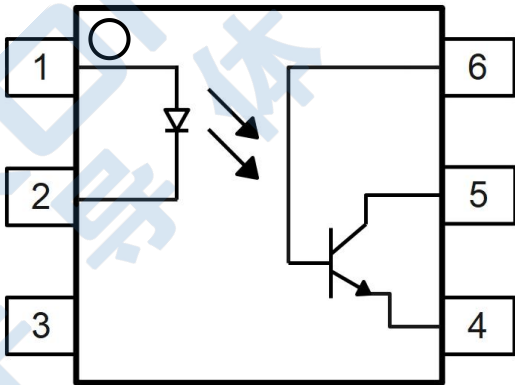
- High isolation 5000 VRMS
- DC input with transistor output
- Operating temperature range - 40 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1

Applications

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

Description

The 4N25, 4N26, 4N27, 4N28, 4N35, 4N36, 4N37, 4N38 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic DIP6 package with different lead forming options.



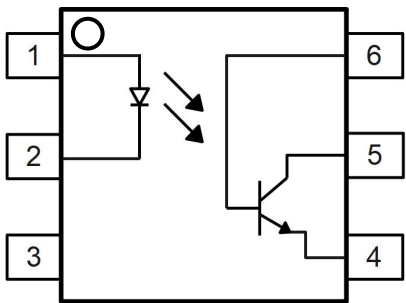
ORDERING INFORMATION

Outline	PART NUMBER	Package	Marking	Packing	Packing Size	Quantity
	4NXX-000E	DIP6	4NXX /YYWW A	Tube	500mm	65
	4NXX-100E	DIP6-M		Tube	500mm	65
	4NXX-500E	DIP6-SL		Reel	13 "	1000

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PIN CONFIGURATION AND FUNCTIONS

	Pin	Name
	1	Anode
	2	Cathode
	3	NC
	4	Emitter
	5	Collector
	6	Base

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit	Note
INPUT				
Forward Current	I_F	50	mA	
Peak Forward Current($t=10\mu s$)	I_{FP}	1	A	1
Reverse Voltage	V_R	6	V	
Power Dissipation($T_a=25^\circ C$)	P_D	70	mW	
OUTPUT				
Collector - Emitter Voltage	V_{CEO}	80	V	
Collector-Base Breakdown Voltage	V_{CBO}	80	V	
Emitter - Collector Voltage	V_{ECO}	7	V	
Emitter-Base Breakdown Voltage	V_{EBO}	7	V	
Collector Current	I_C	80	mA	
Power Dissipation($T_a=25^\circ C$)	P_C	150	mW	
COMMON				
Total Power Dissipation	P_{tot}	200	mW	
Isolation Voltage	V_{iso}	5000	Vrms	2
Operating Temperature	T_{opr}	$-40\sim+110$	$^\circ C$	
Storage Temperature	T_{stg}	$-55\sim+125$	$^\circ C$	
Soldering Temperature	T_{sol}	260	$^\circ C$	

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

Note 2. For 10 seconds

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

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
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}	-	30	-	pF	$V=0, f=1\text{kHz}$
Collector Dark Current	I_{CEO}	-	-	50	nA	$V_{CE}=10\text{V}, I_F=0$
Collector-Emitter Breakdown Voltage	BV_{CEO}	80	-	-	V	$I_C=1\text{mA}, I_F=0$
Emitter-Collector Breakdown Voltage	BV_{ECO}	7	-	-	V	$I_E=0.1\text{mA}, I_F=0$
Collector-Base Breakdown	BV_{CBO}	80	-	-	V	$I_C=0.1\text{mA}, I_F=0$
Emitter-Base Breakdown	BV_{EBO}	7	-	-	V	$I_E=0.1\text{mA}, I_F=0$

TRANSFER CHARACTERISTICS

Parameter	Symbol		Min	Typ	Max	Unit	Test Condition
Current Transfer Ratio	CTR	4N35(4N36, 4N37)	100	-	-	%	$I_F=10\text{mA}$, $V_{CE}=10\text{V}$
		4N25(4N26, 4N38)	20	-	-		
		4N27(4N28)	10	-	-		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	4N35(4N36, 4N37)	-	-	0.3	V	$I_F=10\text{mA}$, $I_C=0.5\text{mA}$
		4N38	-	-	1.0		$I_F=20\text{mA}$, $I_C=4\text{mA}$
		4N25(4N26) 4N27(4N28)	-	-	0.5		$I_F=50\text{mA}$, $I_C=2\text{mA}$
Isolation Resistance	R_{IO}		10^{12}	10^{14}	-	Ω	$V_{IO}=500\text{Vdc}$.
Floating Capacitance	C_{IO}		-	0.2	1	pF	$V=0$, $f=1\text{MHz}$
Cut-off Frequency	f_c		-	6	-	kHz	$V_{CE}=5\text{V}$, $I_C=2\text{mA}$ $R_L=100\Omega$, -3dB
Turn On Time	t_{on}	4N25(4N26) 4N27(4N28)	-	3	15	us	$I_F=10\text{mA}$, $V_{CC}=10\text{V}$, $R_L=100\Omega$
		4N35(4N36, 4N37) 4N38	-	10	12	us	$I_C=2\text{mA}$, $V_{CC}=10\text{V}$, $R_L=100\Omega$
Turn Off Time	t_{off}	4N25(4N26) 4N27(4N28)	-	3	16	us	$I_F=10\text{mA}$, $V_{CC}=10\text{V}$, $R_L=100\Omega$
		4N35(4N36, 4N37) 4N38	-	9	12	us	$I_C=10\text{mA}$, $V_{CC}=10\text{V}$, $R_L=100\Omega$

CHARACTERISTIC CURVES

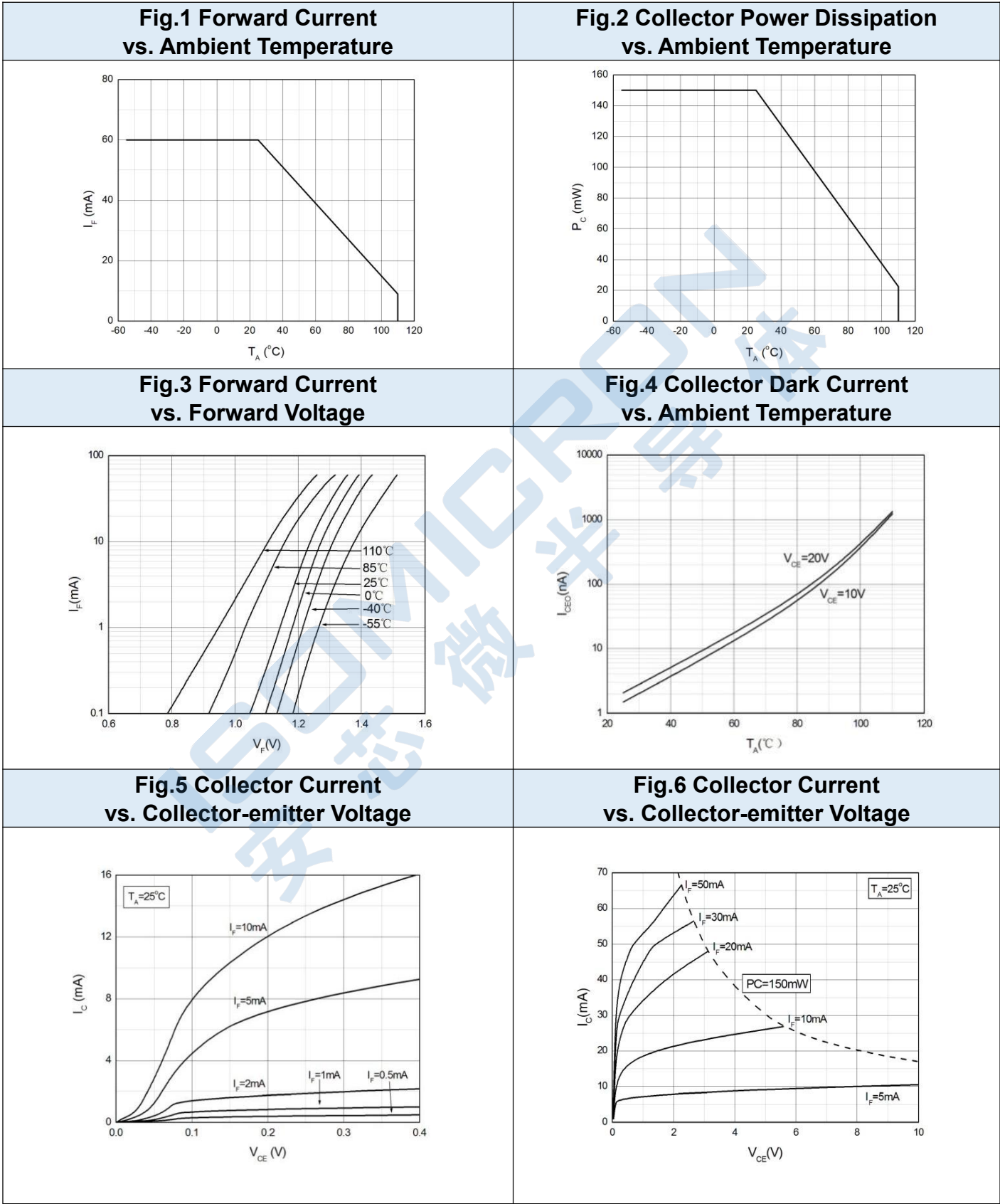


Fig.7 Normalized Current Transfer Ratio
vs. Forward Current

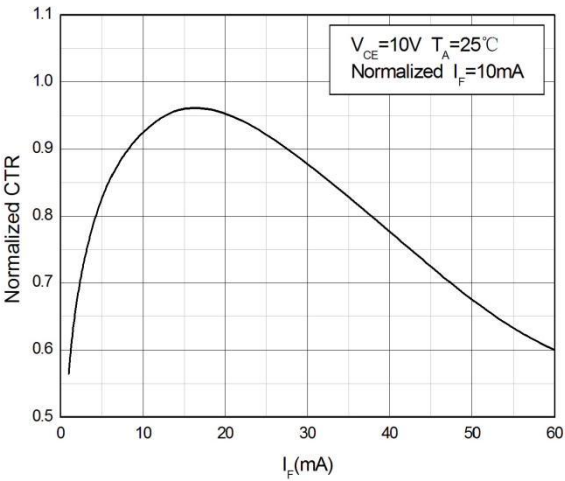


Fig.8 Normalized Current Transfer Ratio
vs. Ambient Temperature

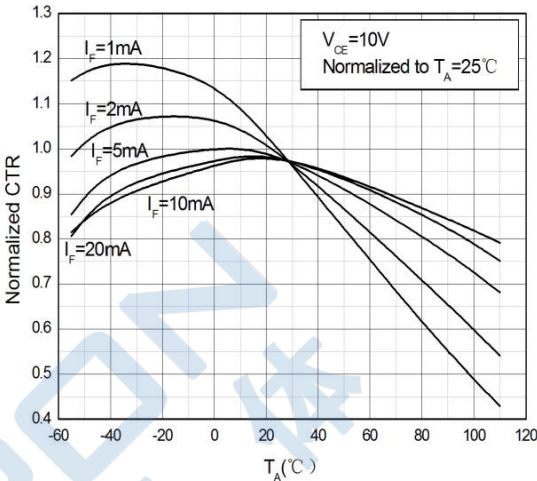


Fig.9 Current Transfer Ratio(Unsaturated) vs
Base-Emitter Resistance

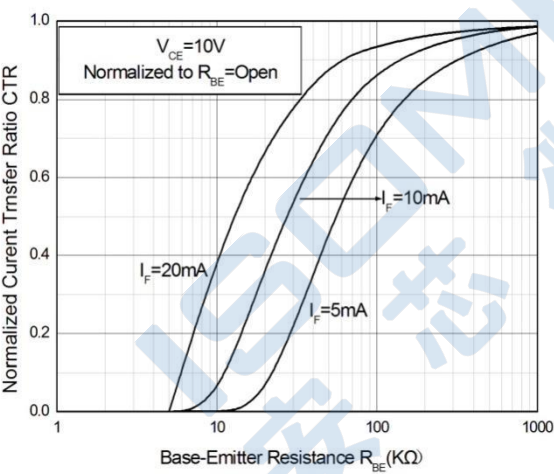
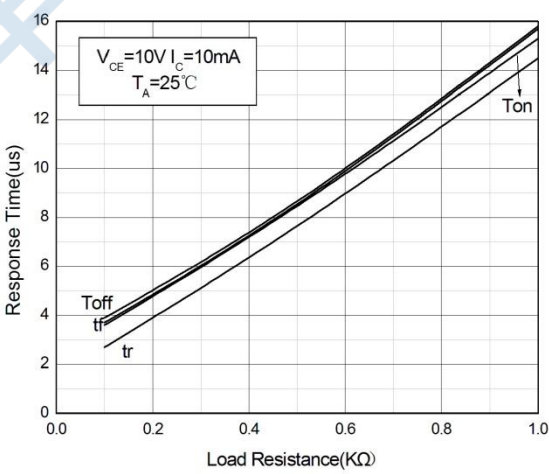
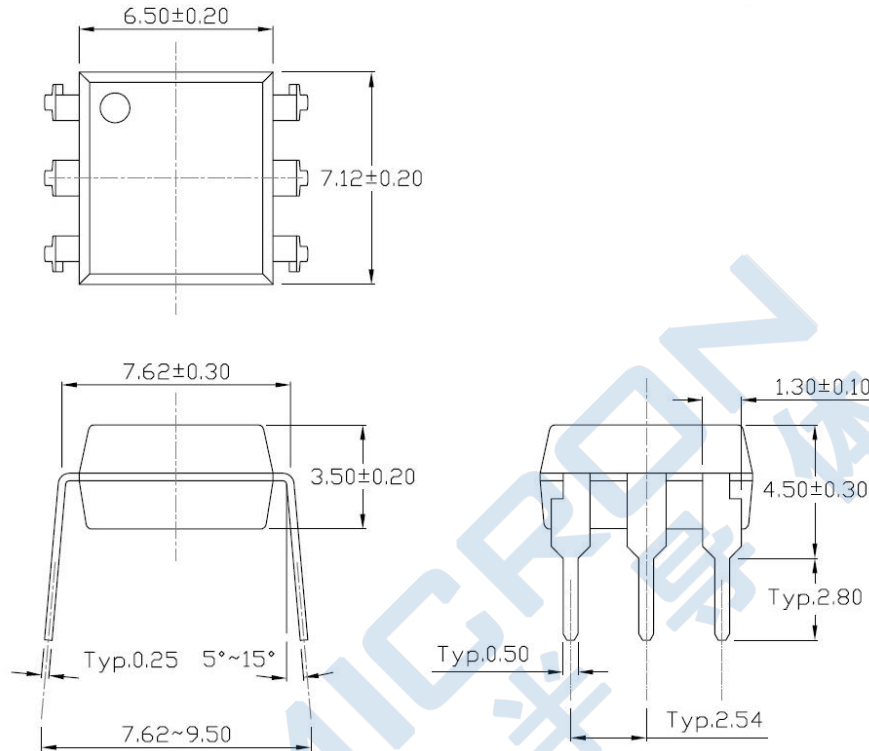


Fig.10 Switching Time
vs. Load Resistance

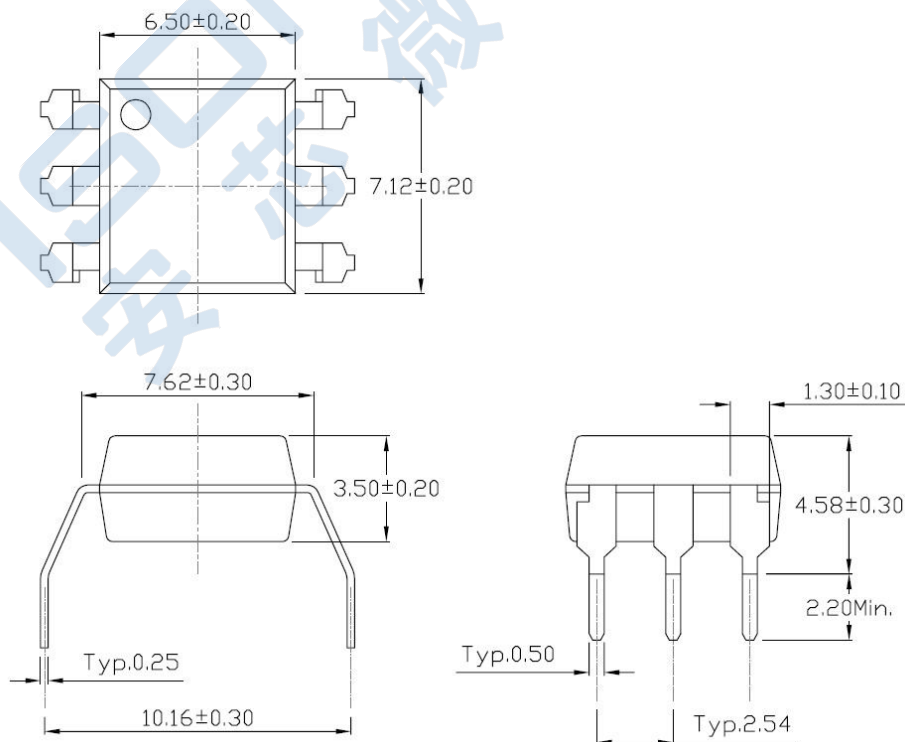


PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)

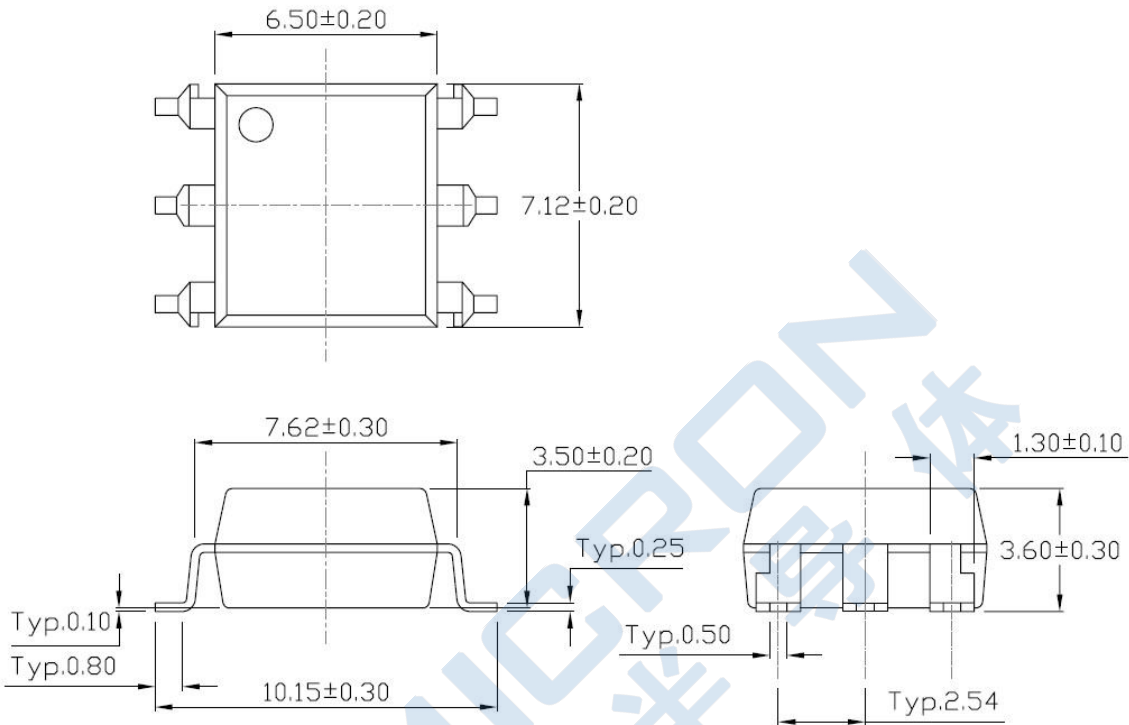


Gullwing (400mil) Lead Forming – Through Hole (M Type)



PACKAGE DIMENSIONS

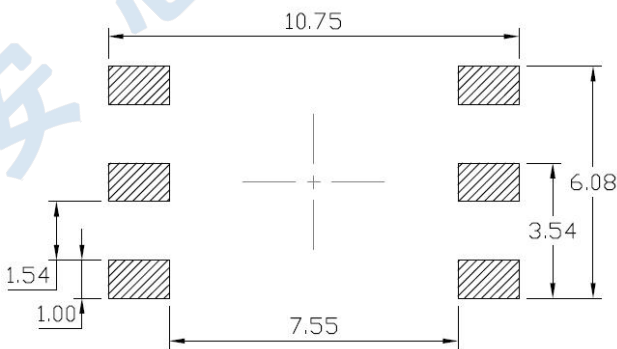
Surface Mount (Low Profile) Lead Forming (SL Type)



- Dimensions in mm unless otherwise stated

Recommended Solder Mask

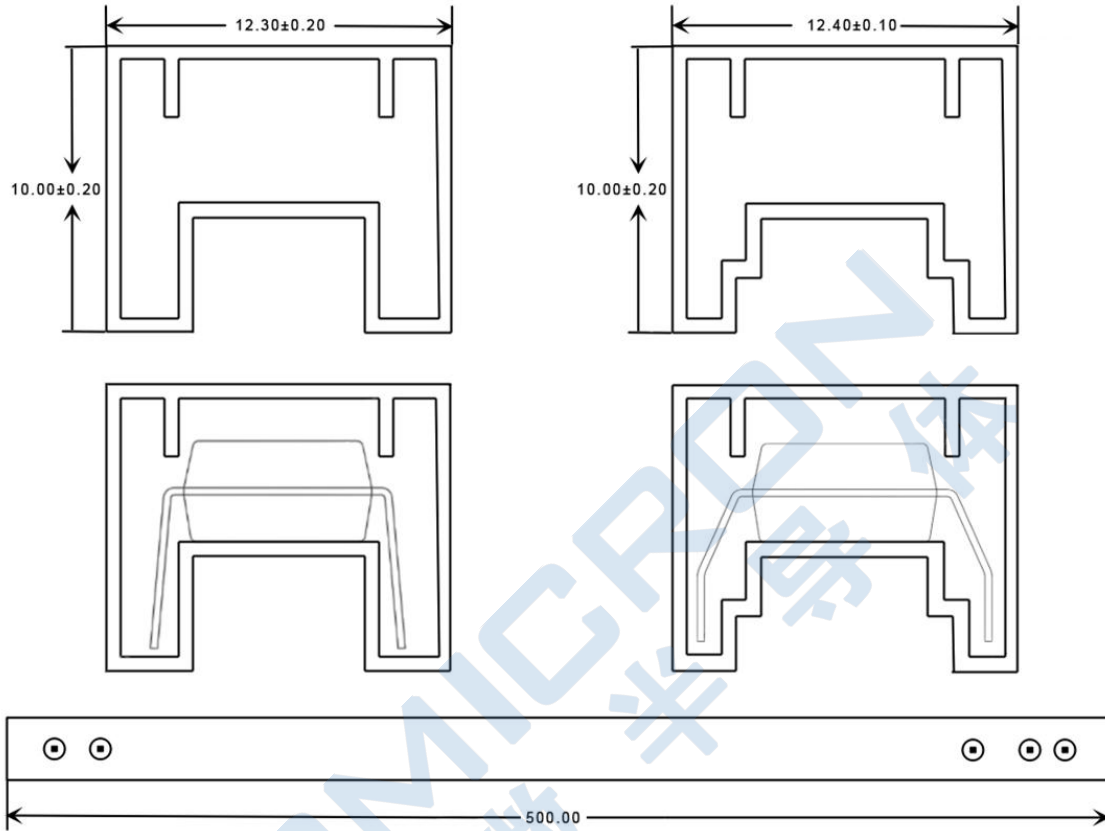
Surface Mount (Low Profile) Lead Forming



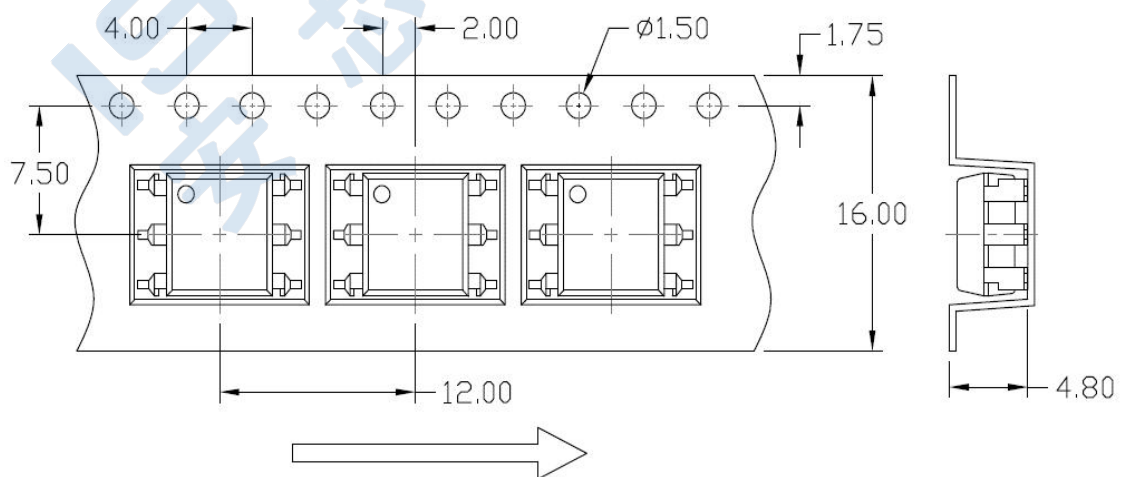
- Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS

Option DIP6 & DIP6-M



Option DIP6-SL

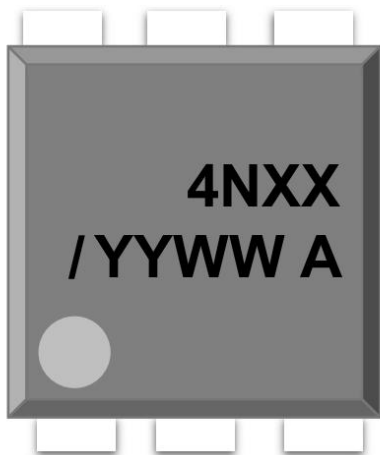


● Dimensions in mm unless otherwise stated
4NXX

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ORDERING AND MARKING INFORMATION

Marking Information



4NXX : Product Series & Rank
/ : ISOMICRON
YY : Fiscal Year
WW : Work Week
A : Manufacturing Code

Order Code

4N XX - XXXX

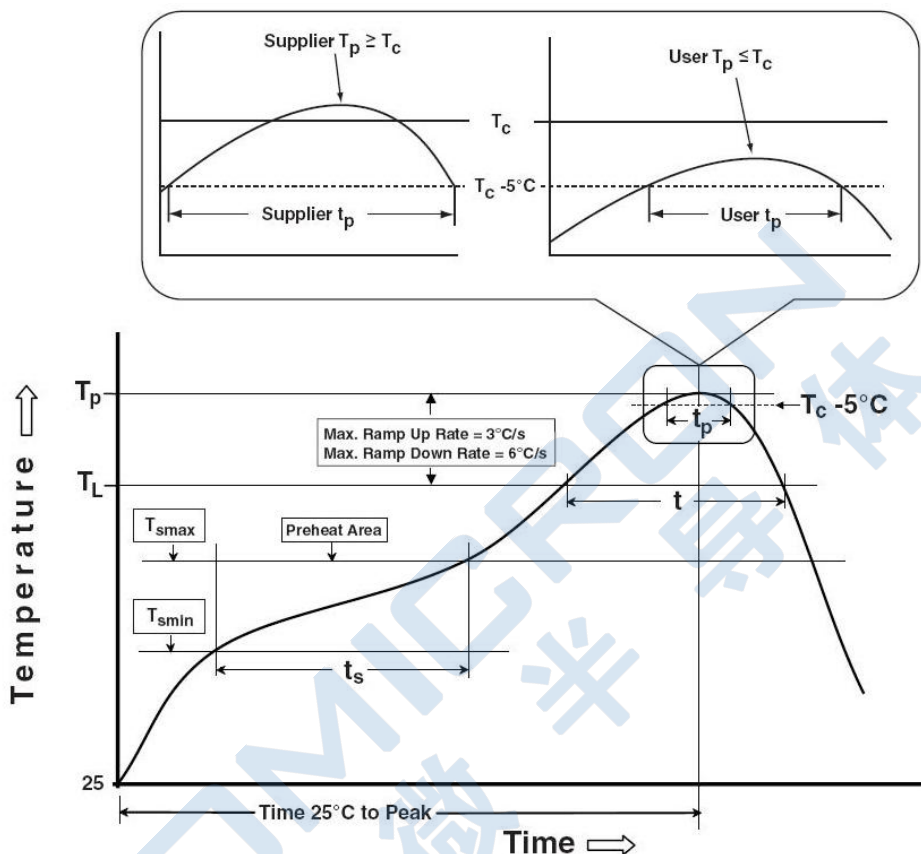
- Product Series**: Points to the first two digits (XX).
- Rank**: Points to the next three digits (XXX).
- Lead Forming**: Points to the final digit (X).
- Halogen Free**: Points to the final digit (X).
 E: Halogen-free, Lead-free
 Z: Halogen, Lead-free
- CTR Rank**: Points to the third digit from the left (the first X of the XXX).
- Performance**: Points to the final digit (X).
 0: Normal
 1: Enhanced

Packing Quantity

Option	Quantity	Quantity – Inner box	Quantity – Outer box
DIP-Standard	65 Units/Tube	20 Tubes/Inner box	6 Inner box/Outer box = 7.8k Units
DIP-M	65 Units/Tube	20 Tubes/Inner box	6 Inner box/Outer box = 7.8k Units
SM-SL	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units

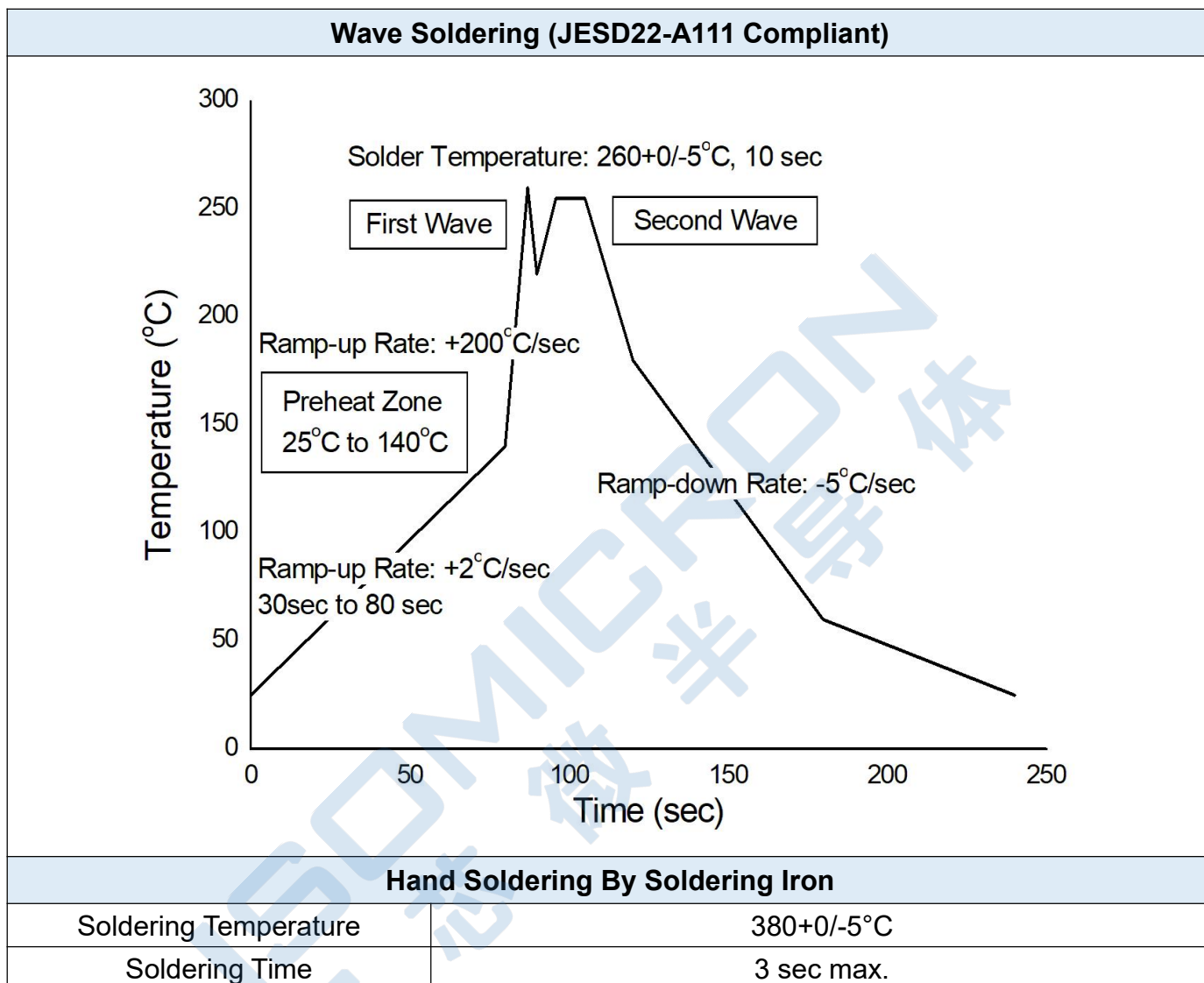
REFLOW INFORMATION

Reflow Profile



Profile Feature	Sn-Pb Assembly Profile	Pb-Free Assembly Profile
Temperature Min. (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



- One time soldering is recommended for all soldering method.
- Do not solder more than three times for IR reflow soldering.

DISCLAIMER

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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.