

Features

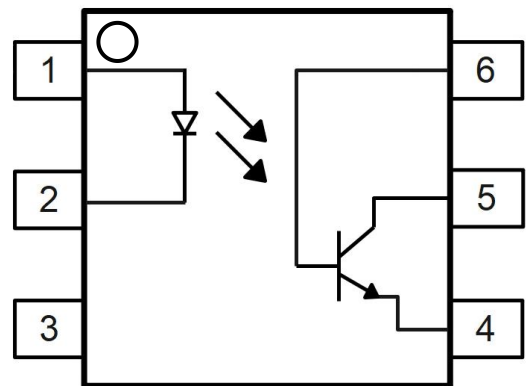
- High isolation 5000 VRMS
- DC input with transistor output
- Operating temperature range - 40 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1

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	50
	4NXX-100E	DIP6-M		Tube	500mm	50
	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~+110	$^\circ C$	
Storage Temperature	T_{stg}	-55~+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°C)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
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}	-	30	-	pF	V=0, f=1kHz
Collector Dark Current	I _{CEO}	-	-	50	nA	V _{CE} =10V, I _F =0
Collector-Emitter Breakdown Voltage	BV _{CEO}	80	-	-	V	I _C =1mA, I _F =0
Emitter-Collector Breakdown Voltage	BV _{ECO}	7	-	-	V	I _E =0.1mA, I _F =0
Collector-Base Breakdown	BV _{CBO}	80	-	-	V	I _C = 0.1mA, I _F =0
Emitter-Base Breakdown	BV _{EBO}	7	-	-	V	I _E = 0.1mA, I _F =0

TRANSFER CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Current Transfer Ratio	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	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	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	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.1 Forward Current vs. Ambient Temperature

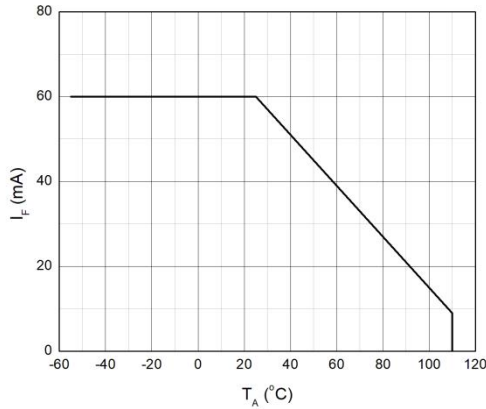


Fig.2 Collector Power Dissipation vs. Ambient Temperature

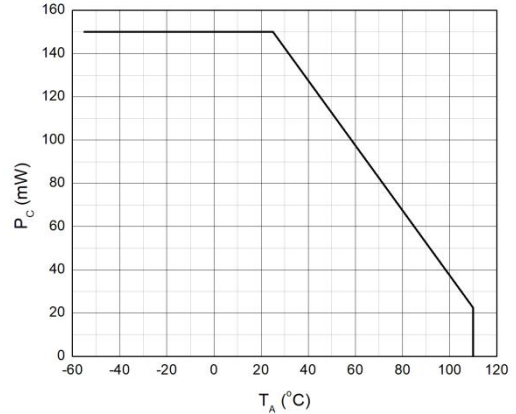


Fig.3 Forward Current vs. Forward Voltage

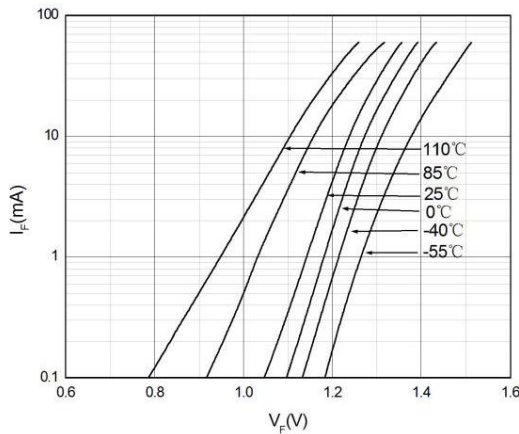


Fig.4 Collector Dark Current vs. Ambient Temperature

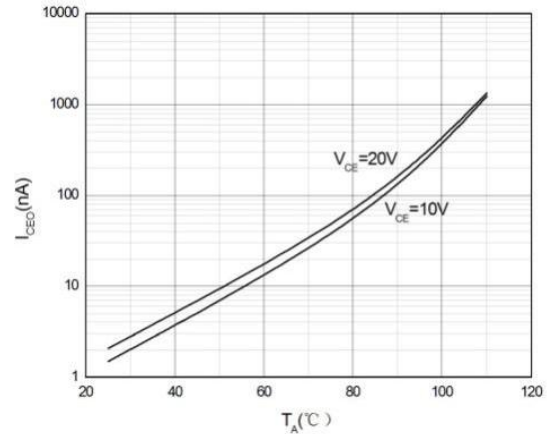


Fig.5 Collector Current vs. Collector-emitter Voltage

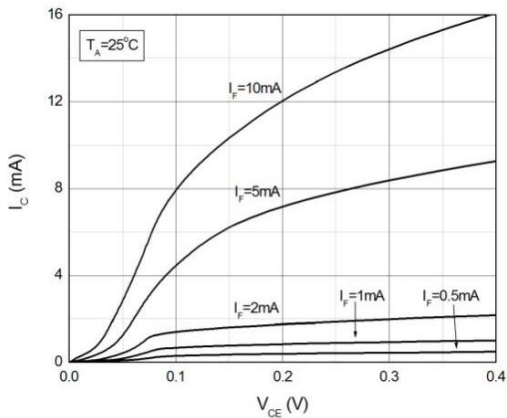


Fig.6 Collector Current vs. Collector-emitter Voltage

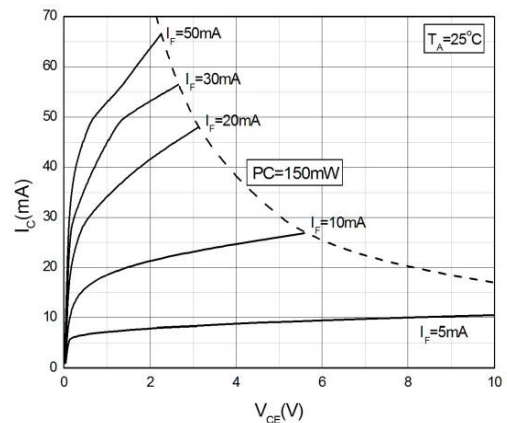


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

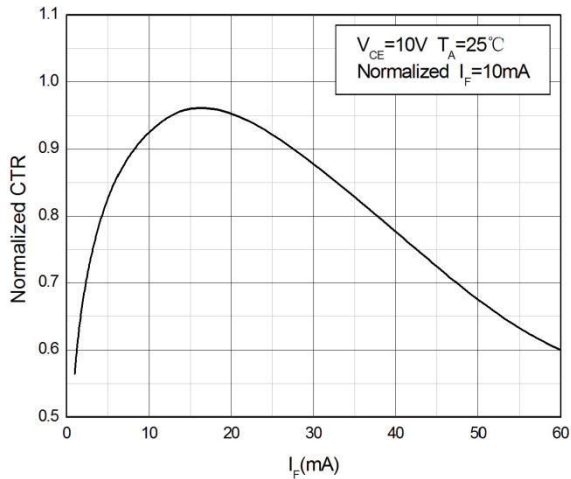


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

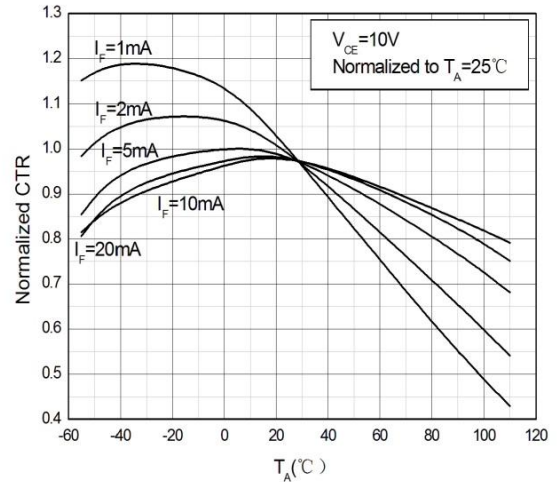


Fig.9 Current Transfer Ratio(Unsaturated) vs Base-Emitter Resistance

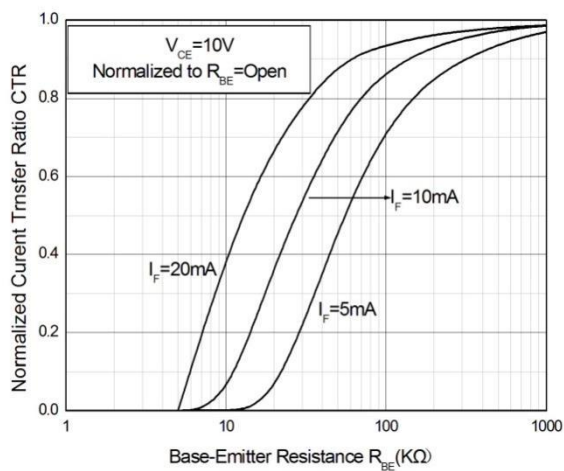
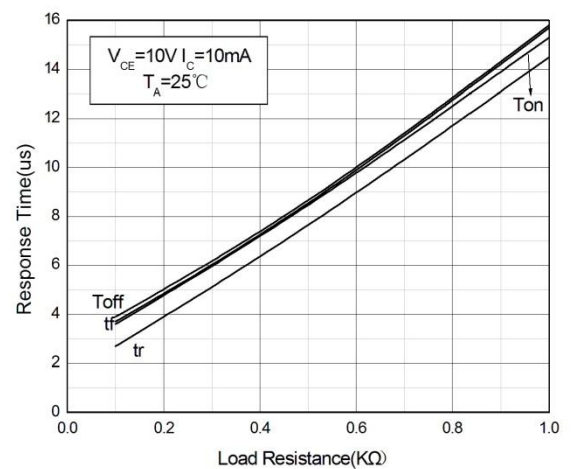
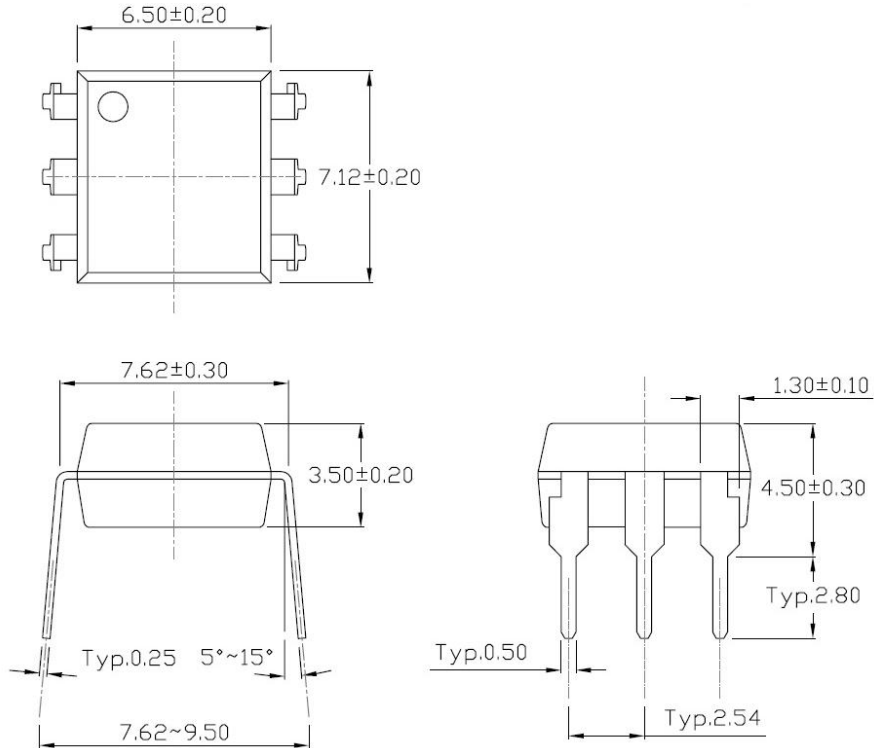


Fig.10 Switching Time vs. Load Resistance

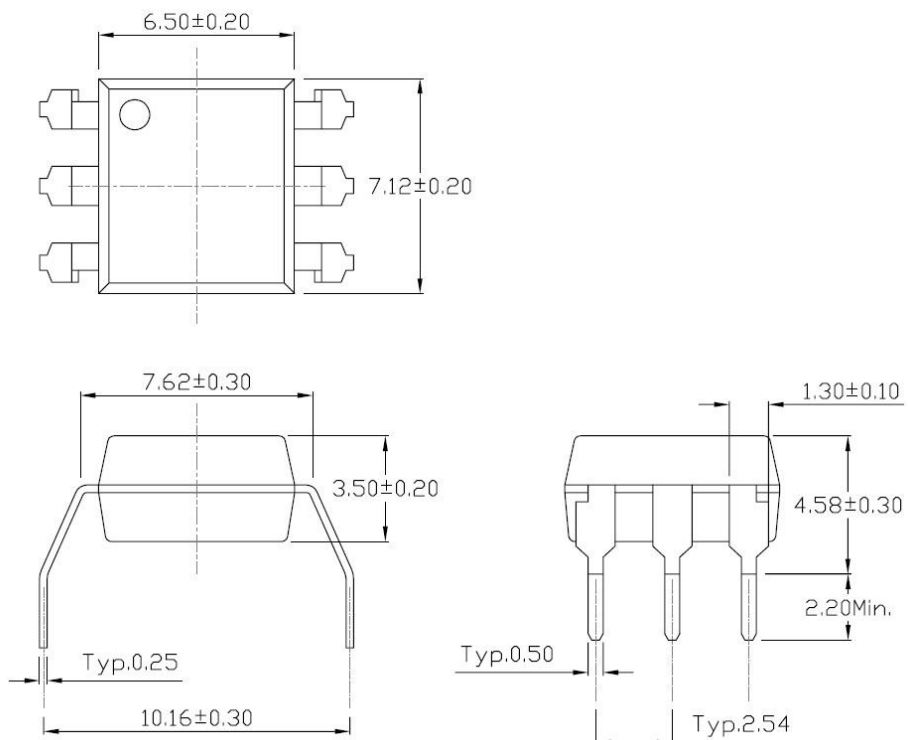


PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)

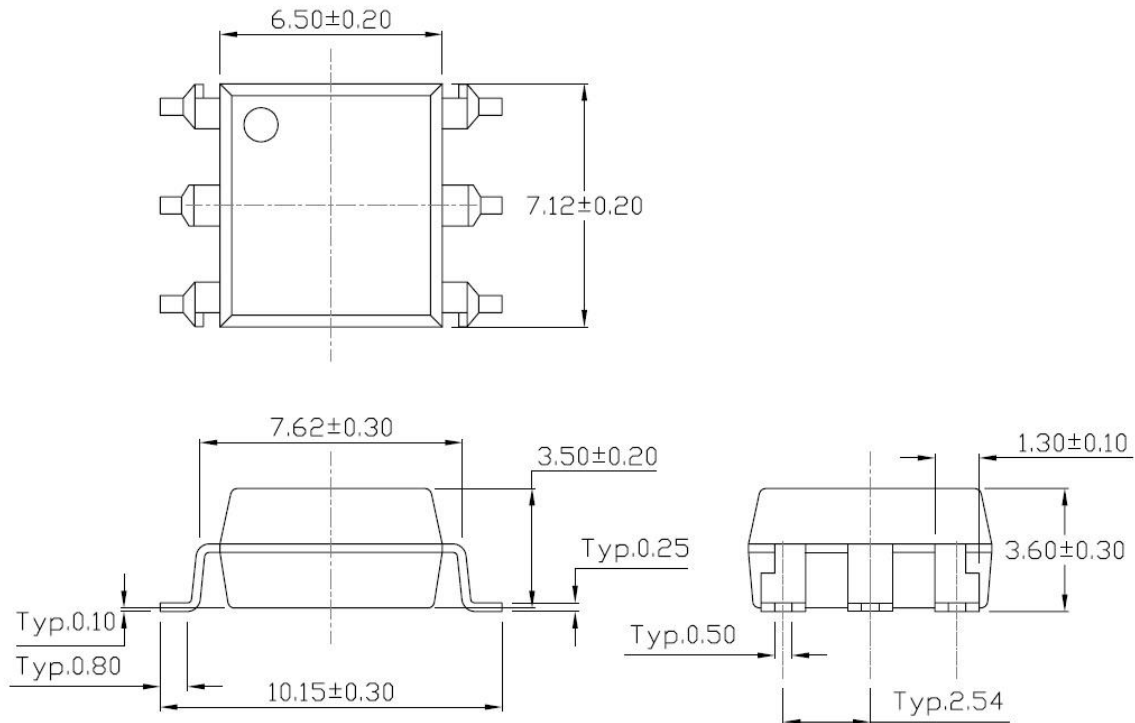


Gullwing (400mil) Lead Forming – Through Hole (M Type)



PACKAGE DIMENSIONS

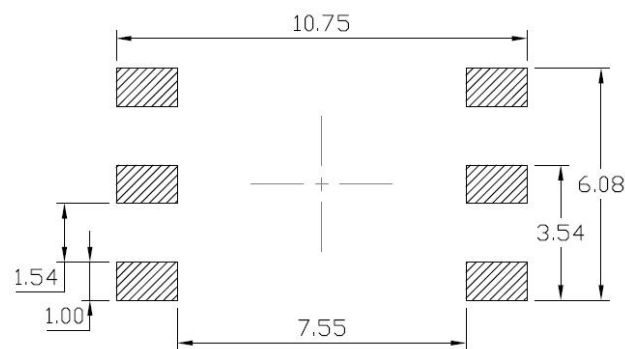
Surface Mount (Low Profile) Lead Forming (SL Type)



- Dimensions in mm unless otherwise stated

Recommended Solder Mask

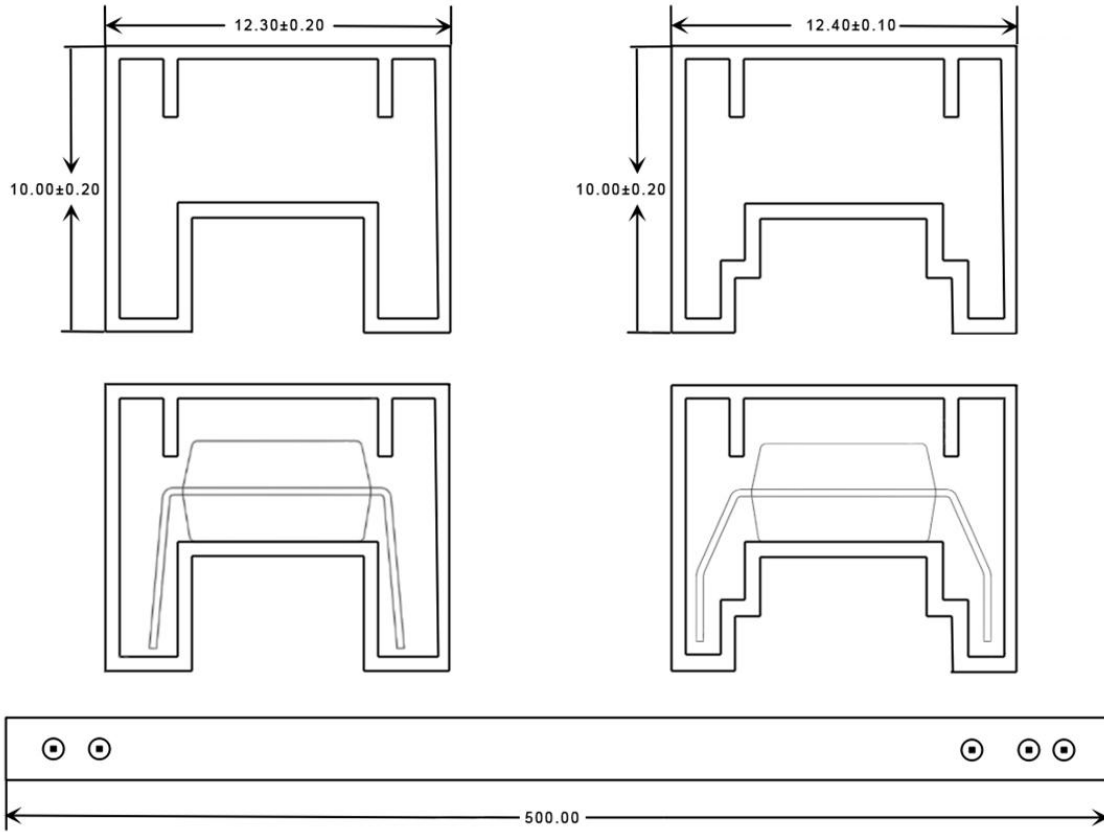
Surface Mount (Low Profile) Lead Forming



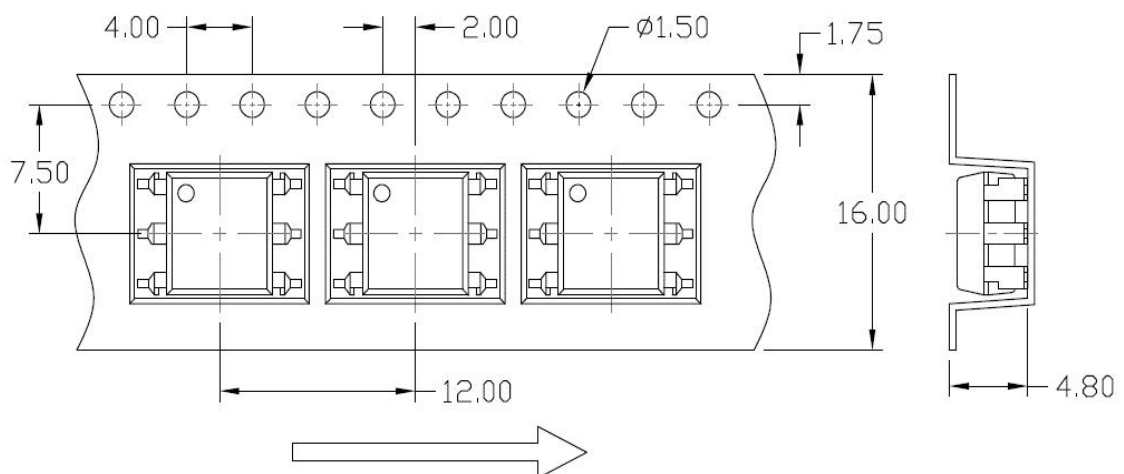
- Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS

Option DIP6 & DIP6-M



Option DIP6-SL

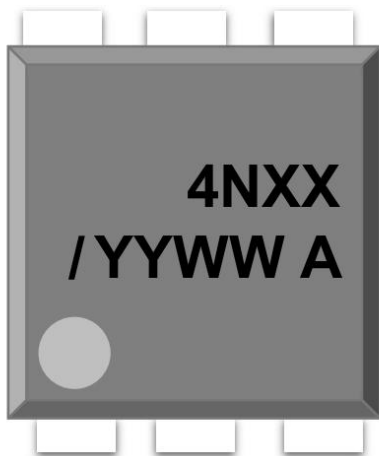


● **Dimensions in mm unless otherwise stated**
4NXX

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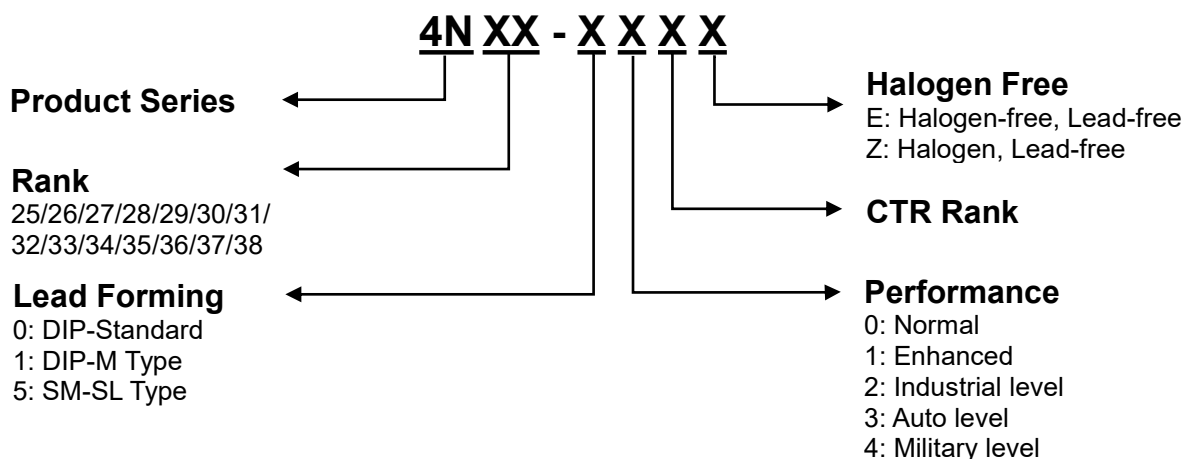
ORDERING AND MARKING INFORMATION

Marking Information



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

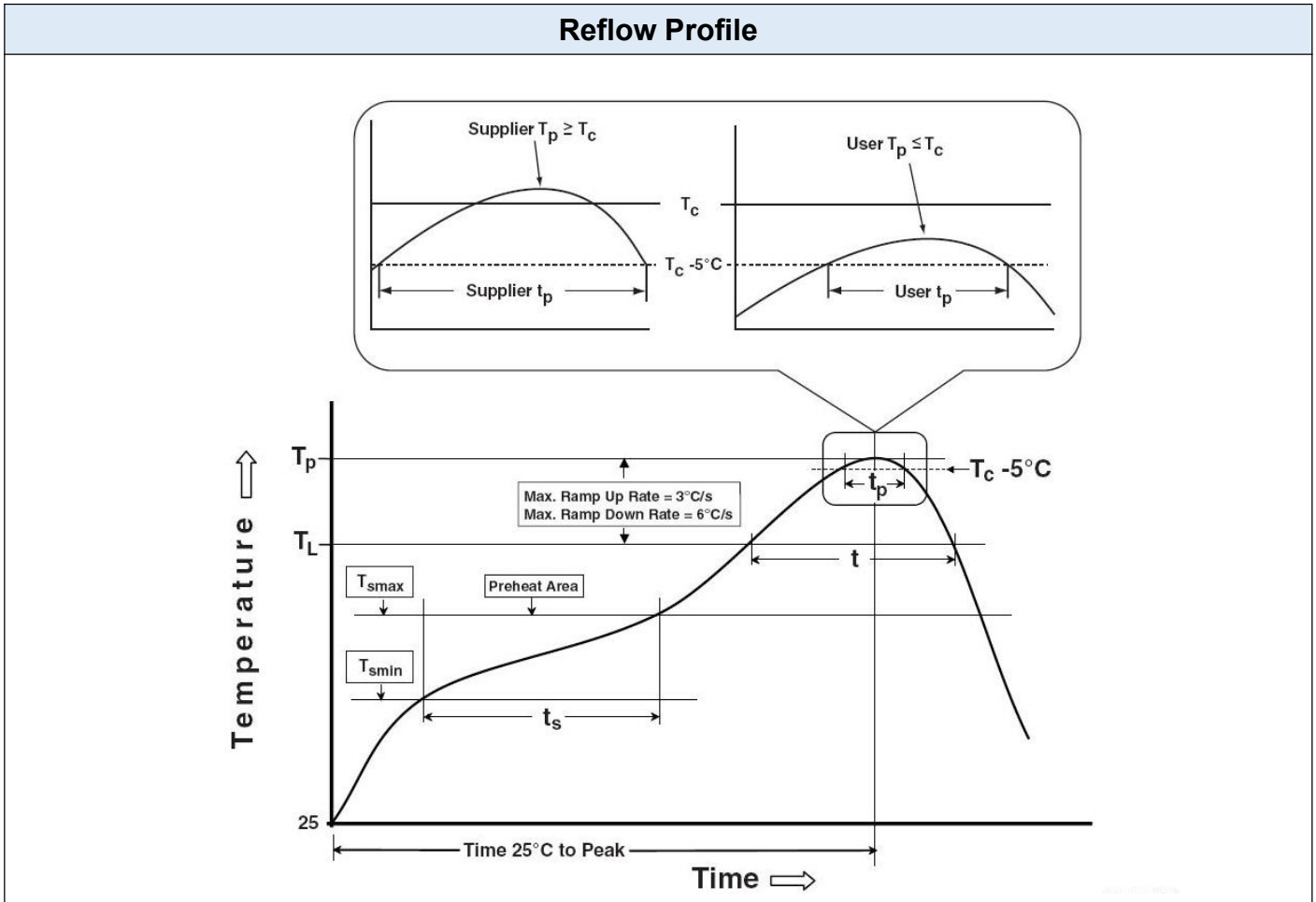
Order Code



Packing Quantity

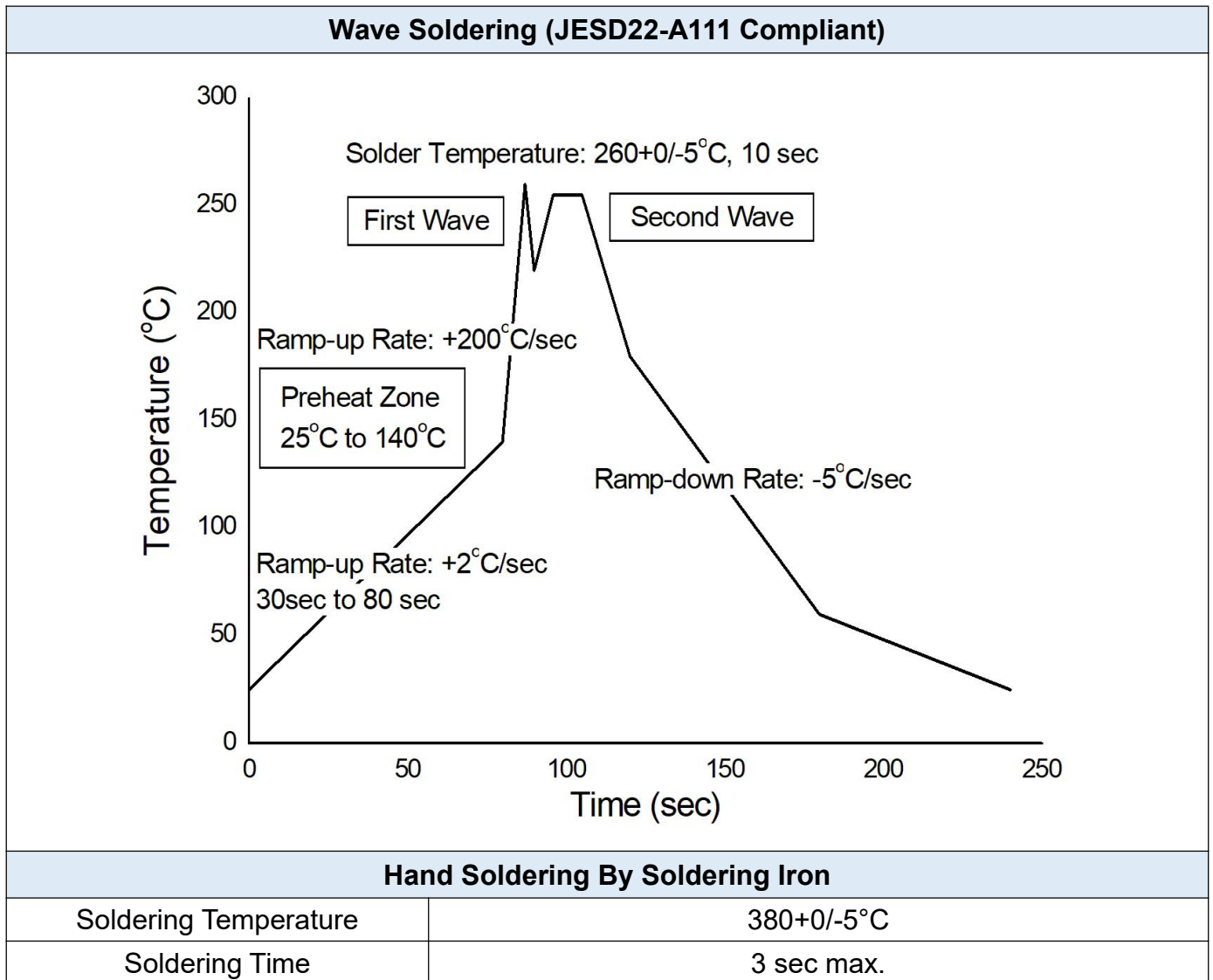
Option	Quantity	Quantity – Inner box	Quantity – Outer box
DIP-Standard	50 Units/Tube	20 Tubes/Inner box	6 Inner box/Outer box = 6k Units
DIP-M	50 Units/Tube	20 Tubes/Inner box	6 Inner box/Outer box = 6k Units
SM-SL	1000 Units/Reel	2 Reels/Inner box	5 Inner box/Outer box = 10k Units

REFLOW INFORMATION



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

- 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.