

Features

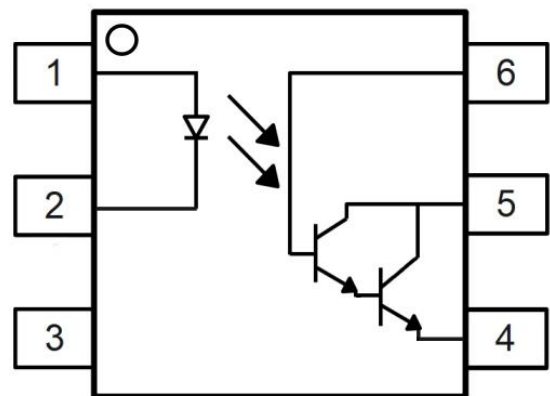
- High isolation 5000 VRMS
- DC input with transistor output
- Operating temperature range - 40 °C to 110 °C
- RoHS & REACH Compliance
- MSL class 1
- Regulatory Approvals
 - UL - UL1577
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC - GB4943.1

Applications




- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Interfacing coupling systems of different potentials and impedances

Description

The 4N32, 4N33 series combine an AlGaAs infrared emitting diode as the emitter which is optically coupled to a silicon planar darlington phototransistor detector in a plastic DIP6 package with different lead forming options.



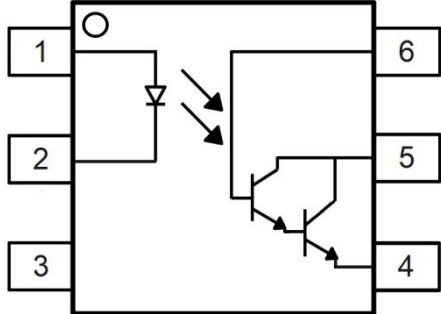
ORDERING INFORMATION

| 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 |

CONTENTS

| | |
|---|----|
| Pin Configuration And Functions. | 3 |
| Absolute Maximum Ratings. | 3 |
| Electrical Optical Characteristics. | 4 |
| Transfer Characteristics. | 5 |
| Characteristic Curves. | 6 |
| Test Circuits | 8 |
| Package Dimensions. | 9 |
| Recommended SoldeMask. | 10 |
| Carrier Tape Specifications. | 11 |
| Ordering And Marking Information. | 12 |
| Reflow Information | 13 |
| Temperature Profile Of Soldering | 14 |
| Disclaimer | 15 |

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 | 60 | mA | |
| Peak Forward Current(t=10μs) | I_{FP} | 1 | A | 1 |
| Reverse Voltage | V_R | 6 | V | |
| Power Dissipation($T_a=25^\circ\text{C}$) | P_D | 120 | mW | |
| OUTPUT | | | | |
| Collector - Emitter Voltage | V_{CEO} | 55 | V | |
| Collector-Base Breakdown Voltage | V_{CBO} | 55 | V | |
| Emitter - Collector Voltage | V_{ECO} | 7 | V | |
| Emitter-Base Breakdown Voltage | V_{EBO} | 7 | V | |
| Collector Current | I_C | 150 | mA | |
| Power Dissipation($T_a=25^\circ\text{C}$) | P_C | 150 | mW | |
| COMMON | | | | |
| Total Power Dissipation | P_{TOT} | 200 | mW | |
| Isolation Voltage | V_{ISO} | 5000 | V _{rms} | 2 |
| Operating Temperature | T_{opr} | -40~+110 | °C | |
| Storage Temperature | T_{stg} | -55~+125 | °C | |
| Soldering Temperature | T_{sol} | 260 | °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 | 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} | - | 50 | - | pF | V=0, f=1kHz | |
| OUTPUT | | | | | | | |
| Collector Dark Current | I _{CEO} | - | - | 100 | nA | V _{CE} =10V | |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | 55 | - | - | V | I _C =0.1mA | |
| Collector-Base Breakdown Voltage | BV _{CBO} | 55 | - | - | V | I _C =0.1mA | |
| Emitter-Collector Breakdown Voltage | BV _{ECO} | 7 | - | - | V | I _E =0.1mA | |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 7 | - | - | V | I _E =0.1mA, I _F =0 | |

TRANSFER CHARACTERISTICS

| Parameter | Symbol | Min | Typ. | Max | Unit | Test Condition | Note |
|--------------------------------------|---------------|-----------|------|-----|---------------|--|------|
| Current Transfer Ratio | CTR | 500 | - | - | % | $I_F=10\text{mA}$, $V_{CE}=10\text{V}$ | |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | - | - | 1.0 | V | $I_F=8\text{mA}$, $I_C=2\text{mA}$ | |
| Isolation Resistance | R_{IO} | 10^{11} | - | - | Ω | $V_{IO}=500\text{Vdc}$ | |
| Floating Capacitance | C_{IO} | - | 0.8 | - | pF | $V=0$, $f=1\text{MHz}$ | |
| Turn On Time | t_{on} | - | - | 5 | μs | $I_C=10\text{mA}$, $V_{CC}=2\text{V}$, $R_L=100\Omega$ | |
| Turn Off Time | t_{off} | - | - | 100 | μs | $I_C=10\text{mA}$, $V_{CC}=2\text{V}$, $R_L=100\Omega$ | |

CHARACTERISTIC CURVES

Fig.1 Forward Current vs. Ambient Temperature

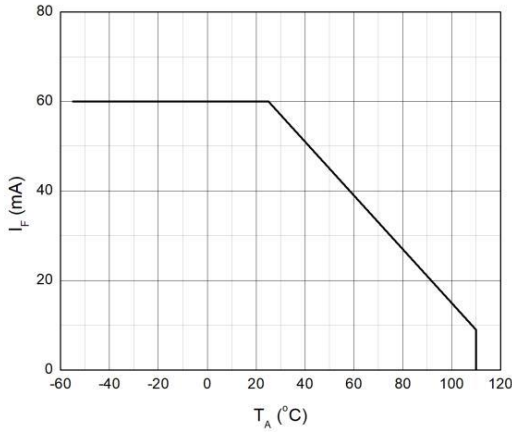


Fig.2 Collector Power Dissipation vs. Ambient Temperature

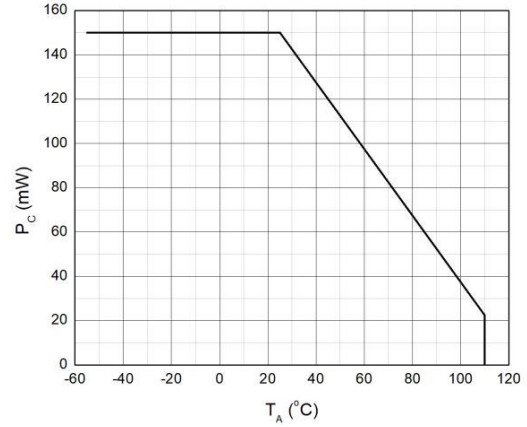


Fig.3 Forward Current vs. Forward Voltage

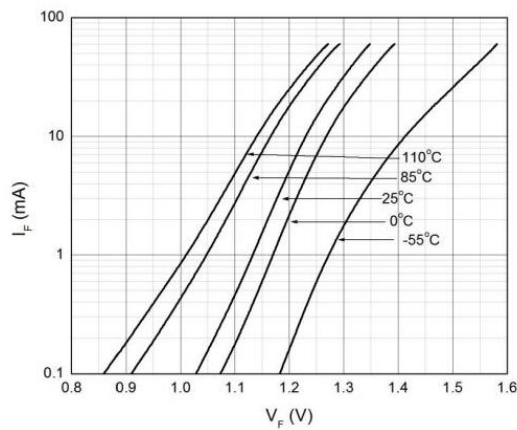


Fig.4 Collector Dark Current vs. Ambient Temperature

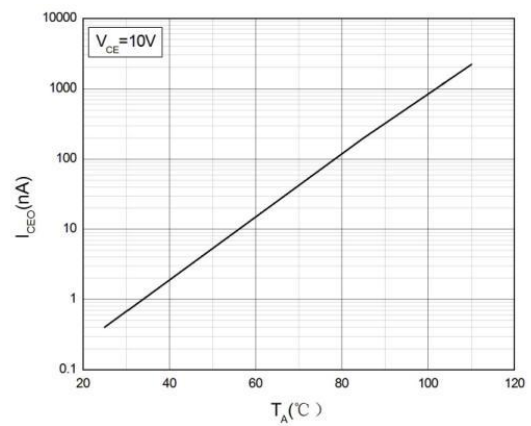


Fig.5 Collector Current vs. Collector-emitter Voltage

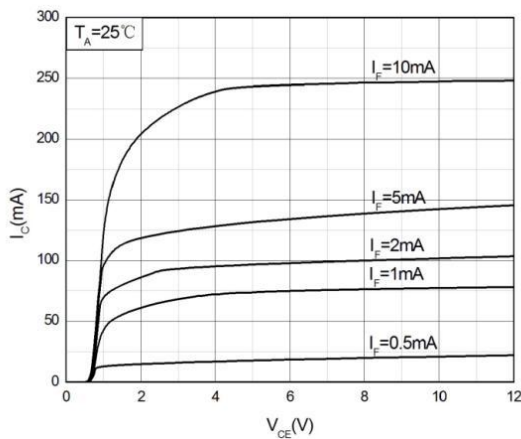


Fig.6 Collector Current vs. Collector-emitter Voltage

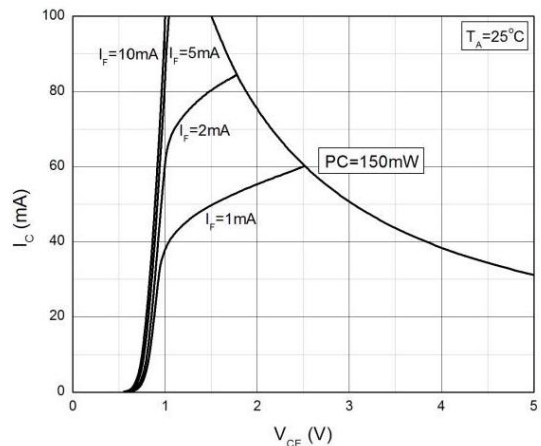


Fig.7 Normalized Current Transfer Ratio vs. Forward Current

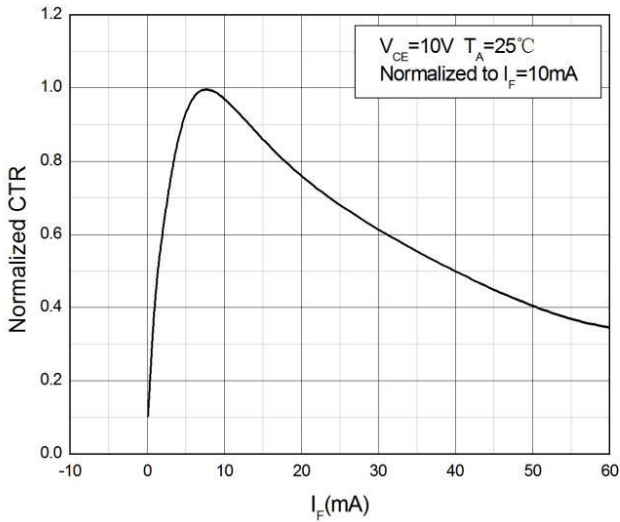


Fig.8 Normalized Current Transfer Ratio vs. Ambient Temperature

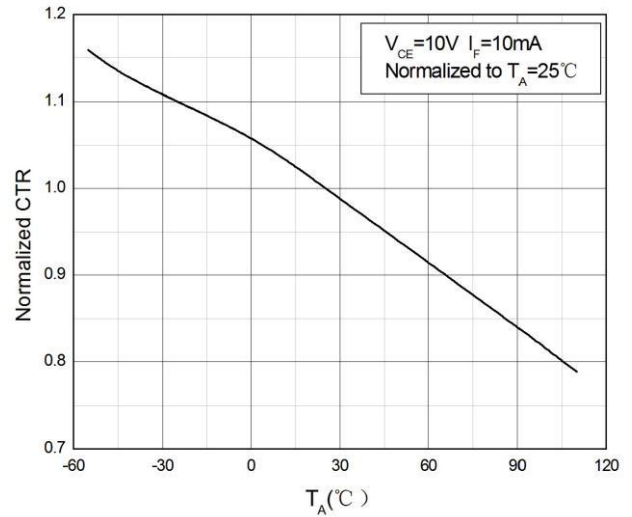


Fig.9 Collector-emitter Saturation Voltage vs. Ambient Temperature

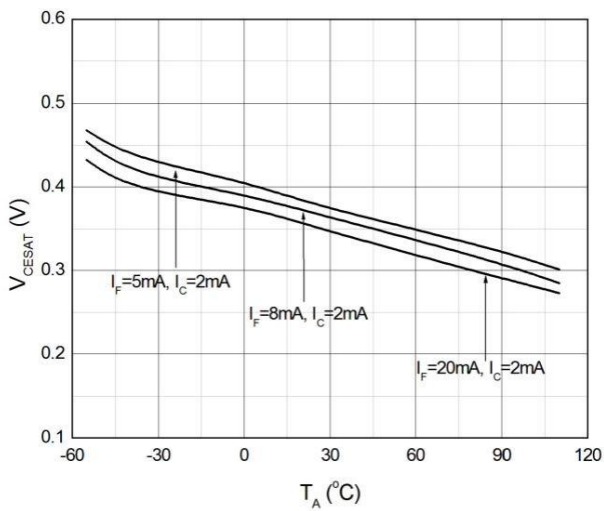
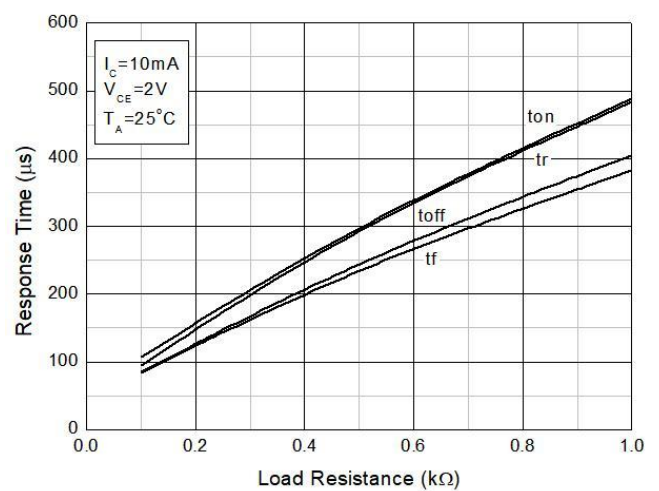
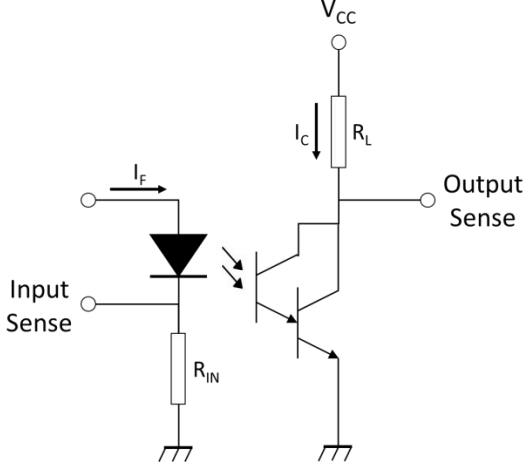
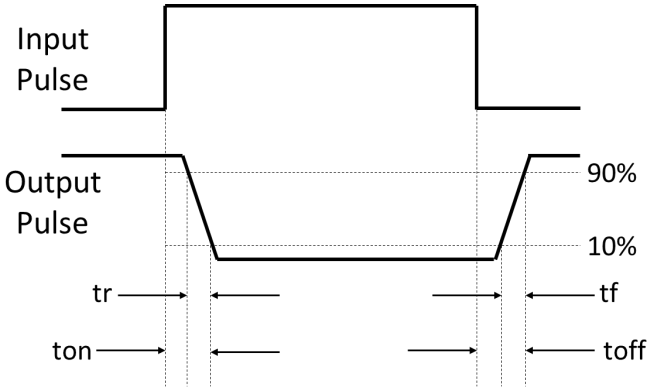
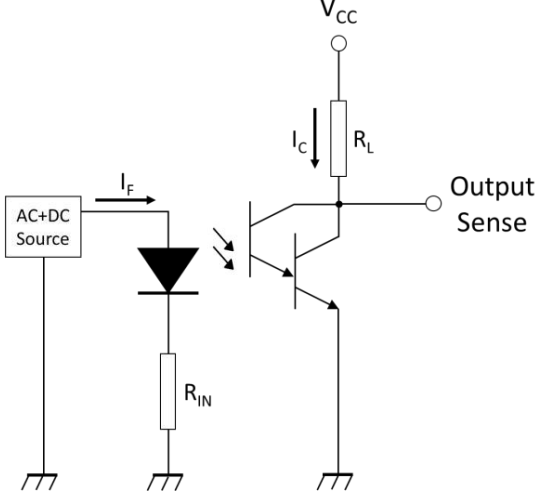


Fig.10 Switching Time vs. Load Resistance

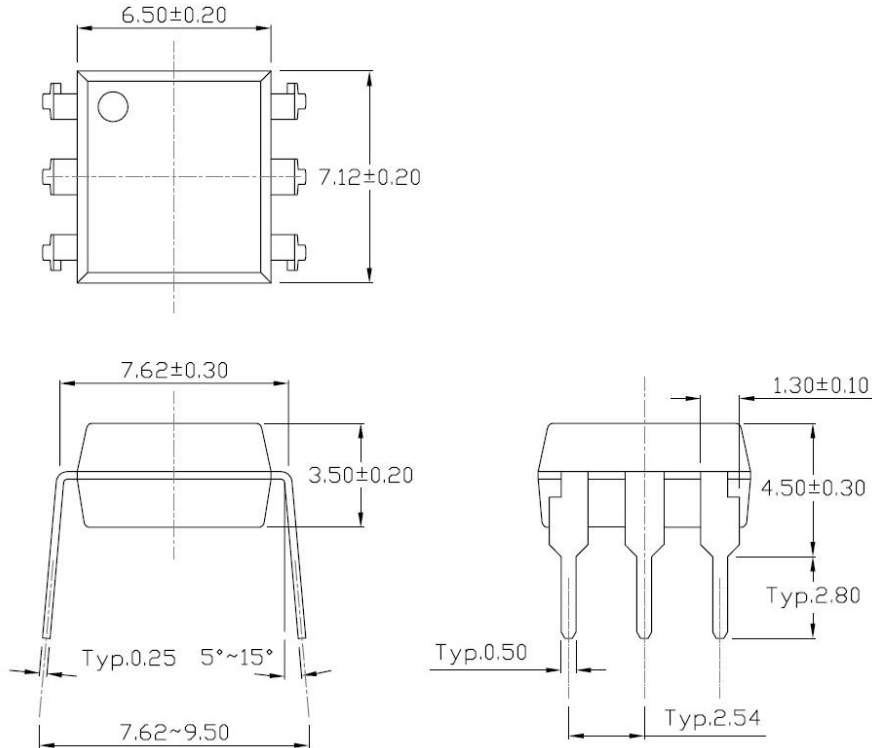


TEST CIRCUITS

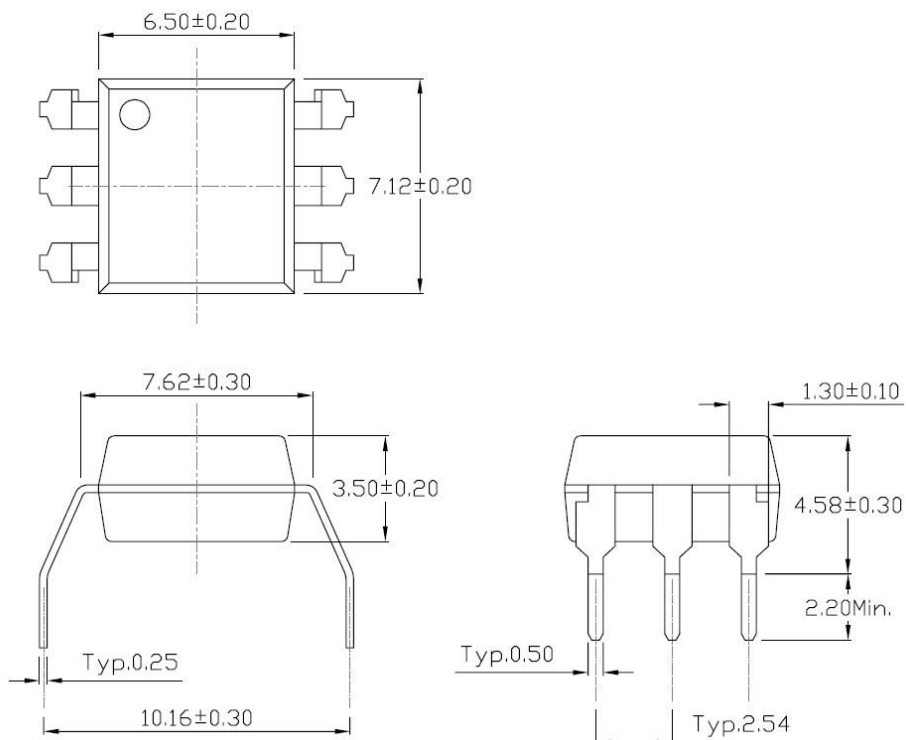
| Fig.11 Test Circuits of Response Time | Fig.12 Curves of Response Time |
|--|--|
|  |  |
| Fig.13 Test Circuits of Frequency Response | |
|  | |

PACKAGE DIMENSIONS

Standard DIP – Through Hole (DIP Type)

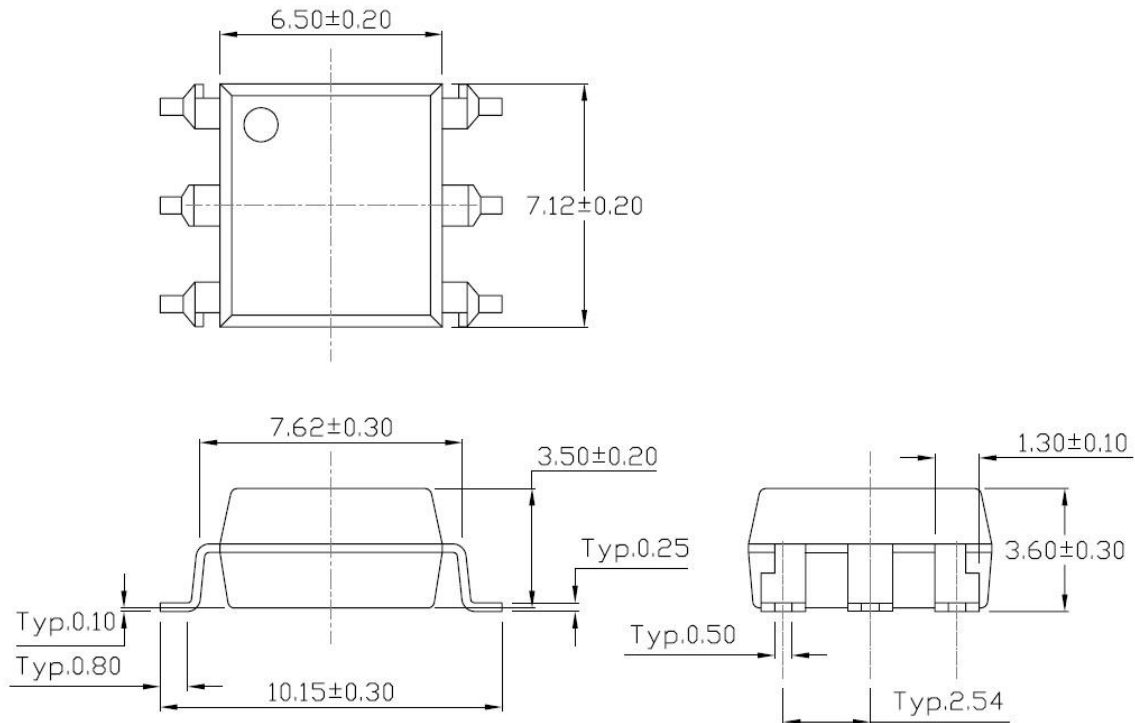


Gullwing (400mil) Lead Forming – Through Hole (M Type)



PACKAGE DIMENSIONS

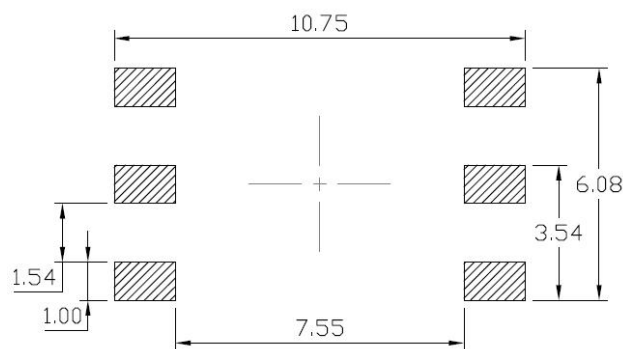
Surface Mount (Low Profile) Lead Forming (SL Type)



- Dimensions in mm unless otherwise stated

Recommended Solder Mask

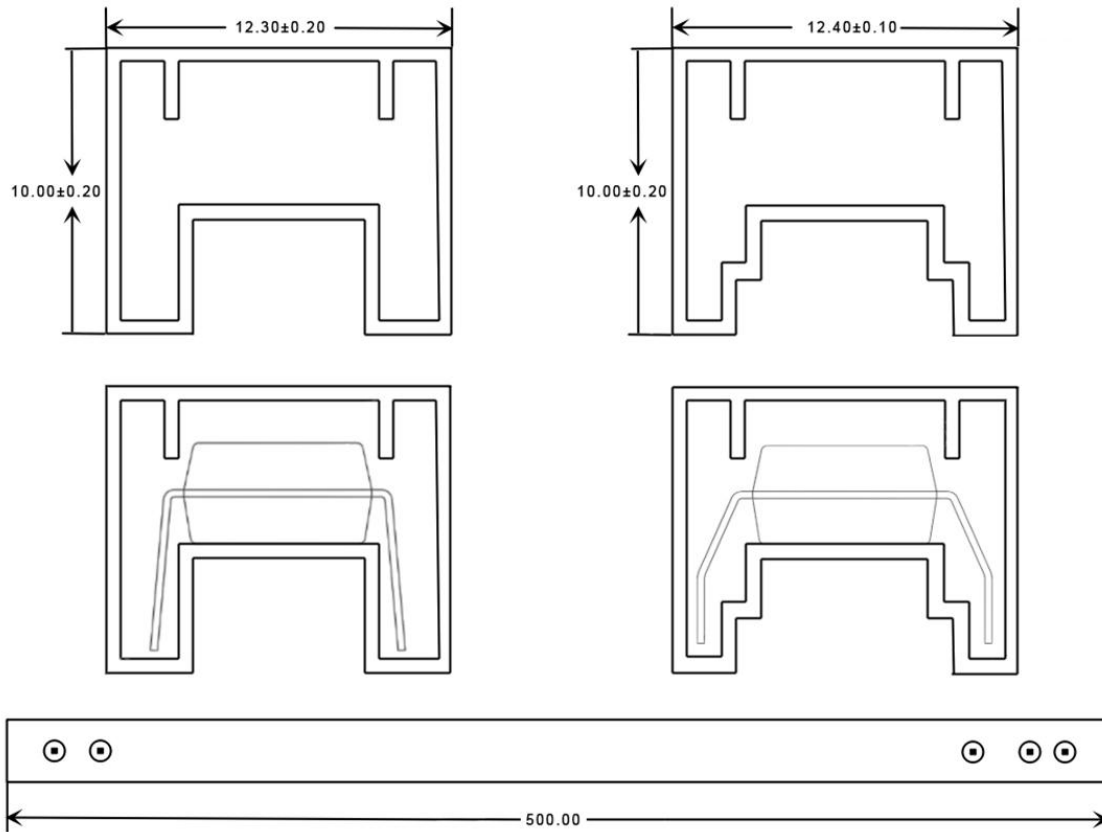
Surface Mount (Low Profile) Lead Forming



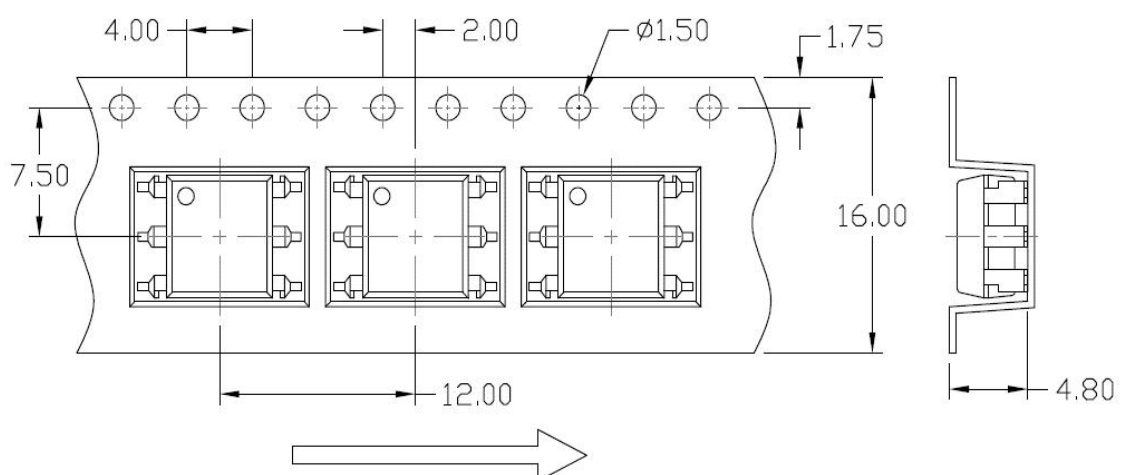
- Dimensions in mm unless otherwise stated

CARRIER TAPE SPECIFICATIONS

Option DIP6 & DIP6-M



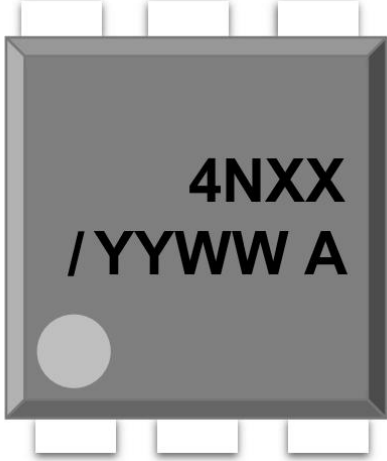
Option DIP6-SL



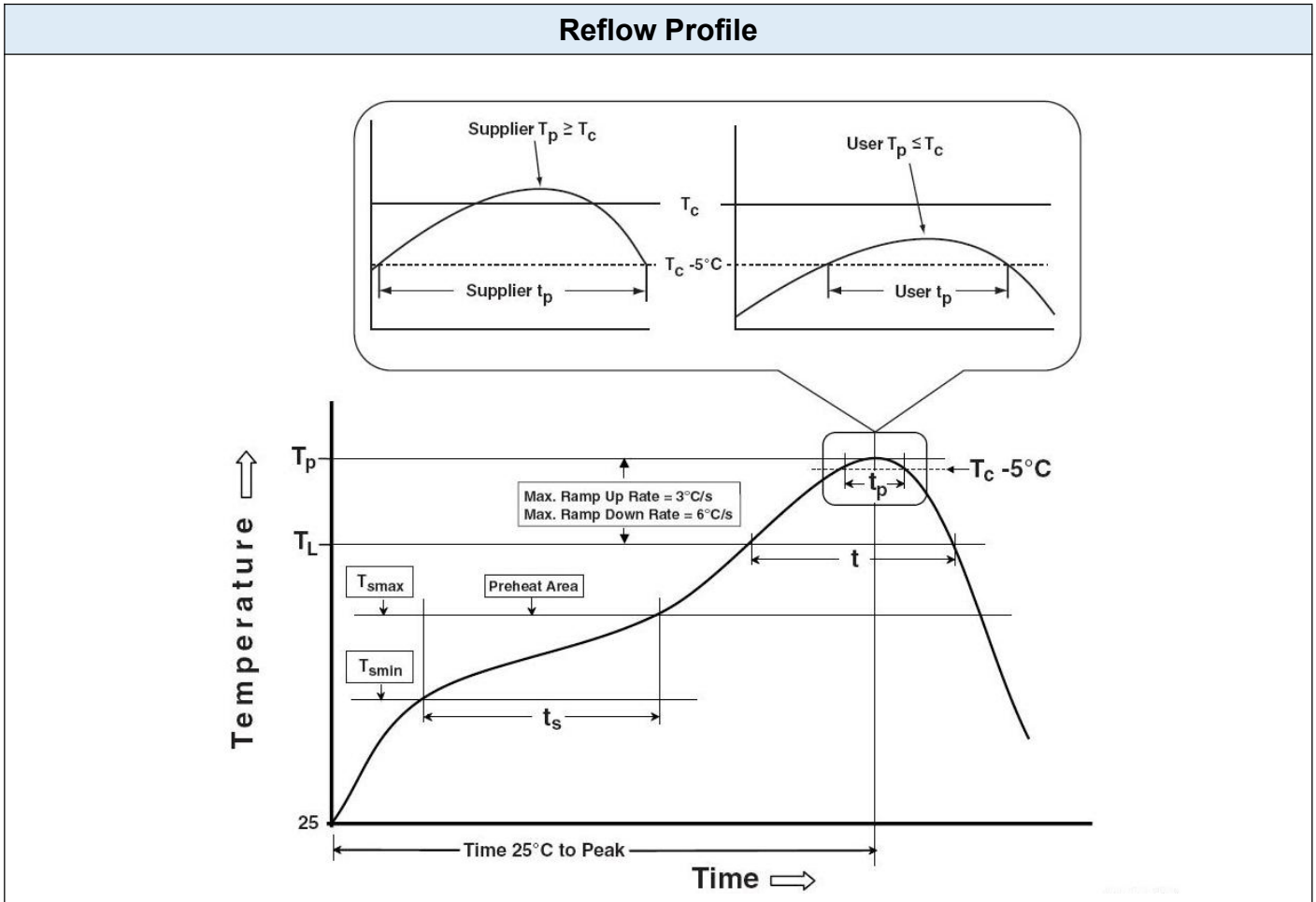
● **Dimensions in mm unless otherwise stated**
4N32/4N33

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ORDERING AND MARKING INFORMATION

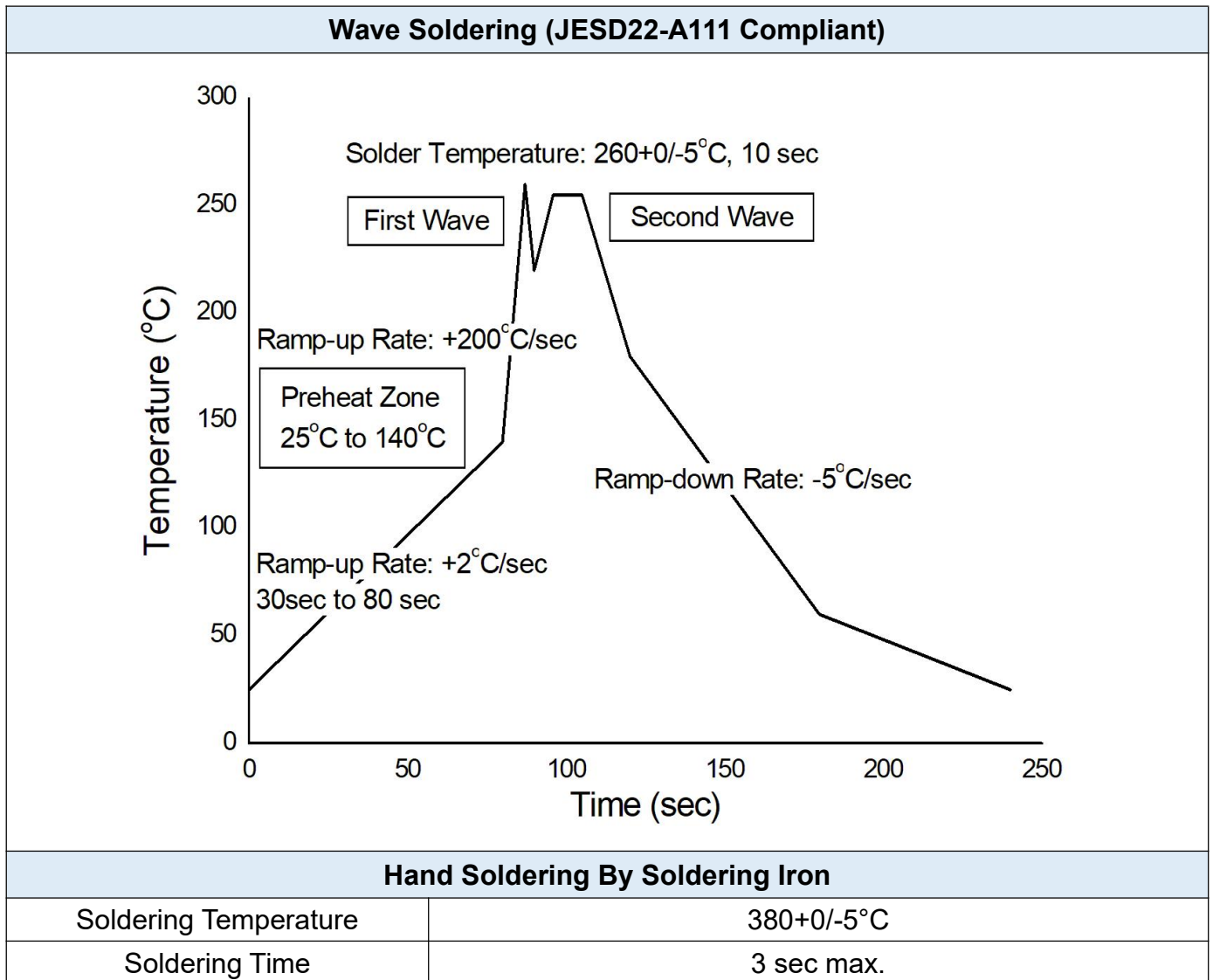
| Marking Information | | | |
|---|-----------------|--|--|
|  | | 4NXX : Product Series & Rank / : ISOMICRON YY : Fiscal Year WW : Work Week A : Manufacturing Code | |
| Order Code | | | |
| 4N XX - X X X X | | | |
| Product Series Rank 32/33 Lead Forming 0: DIP-Standard 1: DIP-M Type 5: SM-SL Type | ← | → | Halogen Free E: Halogen-free, Lead-free Z: Halogen, Lead-free CTR Rank Performance 0: Normal 1: Enhanced 2: Industrial level 3: Auto level 4: Military level |
| 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

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- Discoloration might be occurred on the package surface after soldering, reflow or long-time use. It neither impacts the performance nor reliability.