

## Features

- High isolation 3750 VRMS
- CTR flexibility available see order information
- AC input with transistor output
- Operating temperature range - 55 °C to 110 °C
- REACH compliance
- Halogen free
- Regulatory Approvals
  - UL - UL1577
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC - GB4943.1

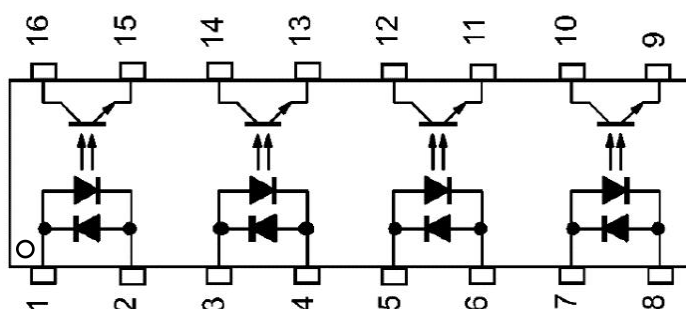
## Applications

- Switch mode power supplies
- Programmable controllers
- Household appliances
- Office equipment

## Description

The IS280-4 series combine two AlGaAs infrared emitting diodes as the emitter which is optically coupled to a silicon planar phototransistor detector in a plastic SO16 package.

With the robust coplanar double mold structure, IS280-4 series provide the most stable isolation feature.



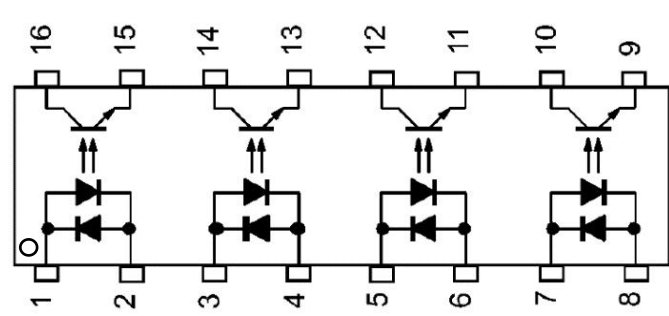
## ORDERING INFORMATION

| Outline                                                                             | Part Number | Package | Marking               | Packing | Packing Size | Quantity |
|-------------------------------------------------------------------------------------|-------------|---------|-----------------------|---------|--------------|----------|
|  | IS280-4     | SSOP16  | IS280-4<br>/YYWW<br>B | Reel    | 13 "         | 2000     |

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## PIN CONFIGURATION AND FUNCTIONS

|  | Pin         | Name           |
|-----------------------------------------------------------------------------------|-------------|----------------|
|                                                                                   | 1、3、5、7     | Cathode /Anode |
|                                                                                   | 2、4、6、8     | Anode/Cathode  |
|                                                                                   | 9、11、13、15  | Emitter        |
|                                                                                   | 10、12、14、16 | Collector      |

## ABSOLUTE MAXIMUM RATINGS

| Parameter                                                                | Symbol    | Value    | Unit                 | Note |
|--------------------------------------------------------------------------|-----------|----------|----------------------|------|
| INPUT                                                                    |           |          |                      |      |
| Forward Current                                                          | $I_F$     | $\pm 50$ | mA                   |      |
| Power Dissipation                                                        | $P_D$     | 70       | mW                   |      |
| Power dissipation Derating factor<br>(above $T_a = 100^\circ \text{C}$ ) | $P_{DD}$  | 2.9      | mW/ $^\circ\text{C}$ |      |
| OUTPUT                                                                   |           |          |                      |      |
| Collector - Emitter Voltage                                              | $V_{CEO}$ | 80       | V                    |      |
| Emitter - Collector Voltage                                              | $V_{ECO}$ | 7        | V                    |      |
| Collector Current                                                        | $I_C$     | 50       | mA                   |      |
| Collector Power Dissipation                                              | $P_C$     | 150      | mW                   |      |
| COMMON                                                                   |           |          |                      |      |
| Total Power Dissipation                                                  | $P_{tot}$ | 500      | mW                   |      |
| Isolation Voltage                                                        | $V_{iso}$ | 3750     | V <sub>rms</sub>     |      |
| Operating Temperature                                                    | $T_{opr}$ | -55~110  | $^\circ\text{C}$     |      |
| Storage Temperature                                                      | $T_{stg}$ | -55~125  | $^\circ\text{C}$     |      |
| Soldering Temperature                                                    | $T_{sol}$ | 260      | $^\circ\text{C}$     |      |

Note 1. 100 $\mu$ s pulse, 100Hz frequency

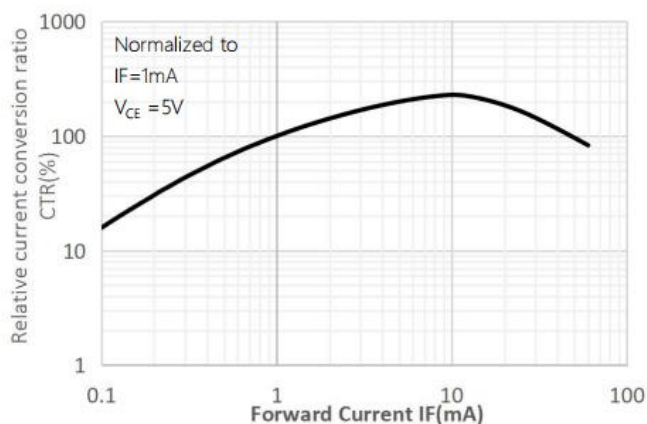
Note 2. AC For 1 Minute, R.H. = 40 ~ 60%

**ELECTRICAL OPTICAL CHARACTERISTICS(T<sub>a</sub> = 25°C)**

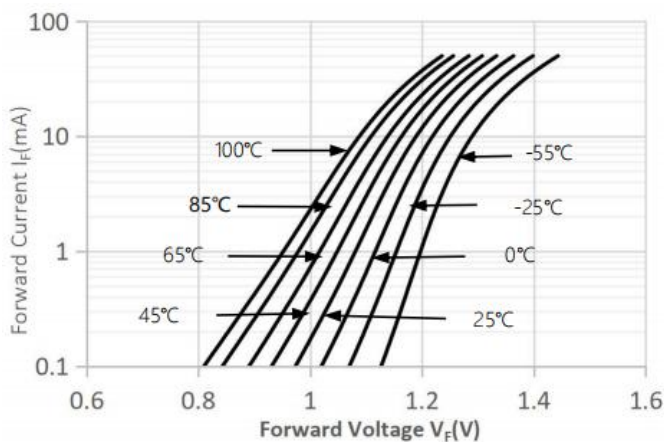
| Parameter                            | Symbol               | Min                | Typ.               | Max. | Unit | Test Condition                                                       | Note |
|--------------------------------------|----------------------|--------------------|--------------------|------|------|----------------------------------------------------------------------|------|
| INPUT                                |                      |                    |                    |      |      |                                                                      |      |
| Forward Voltage                      | V <sub>F</sub>       | -                  | 1.2                | 1.4  | V    | I <sub>F</sub> =±20mA                                                |      |
| Terminal Capacitance                 | C <sub>t</sub>       | -                  | 30                 | 250  | pF   | V=0, f=1kHz                                                          |      |
| OUTPUT                               |                      |                    |                    |      |      |                                                                      |      |
| Collector Dark Current               | I <sub>CEO</sub>     | -                  | -                  | 100  | nA   | V <sub>CE</sub> =20V, I <sub>F</sub> =0                              |      |
| Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>    | 80                 | -                  | -    | V    | I <sub>C</sub> =0.1mA, I <sub>F</sub> =0                             |      |
| Emitter-Collector Breakdown Voltage  | BV <sub>ECO</sub>    | 7                  | -                  | -    | V    | I <sub>E</sub> =10uA, I <sub>F</sub> =0                              |      |
| TRANSFER CHARACTERISTICS             |                      |                    |                    |      |      |                                                                      |      |
| Current Transfer Ratio               | CTR                  | 50                 | -                  | 300  | %    | I <sub>F</sub> =±1mA, V <sub>CE</sub> =5V                            |      |
| Collector-Emitter Saturation Voltage | V <sub>CE(sat)</sub> | -                  | 0.1                | 0.2  | V    | I <sub>F</sub> =±20mA, I <sub>C</sub> =1mA                           |      |
| Isolation Resistance                 | R <sub>ISO</sub>     | 5x10 <sup>10</sup> | 1x10 <sup>11</sup> | -    | Ω    | DC500V, 40 ~ 60% R.H.                                                |      |
| Isolation Capacitance                | C <sub>f</sub>       | -                  | 0.6                | 1    | pF   | V=0, f=1MHz                                                          |      |
| Cut-off Frequency                    | F <sub>C</sub>       | -                  | 80                 | -    | kHz  | V <sub>CE</sub> =5V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω, -3dB |      |
| Response Time (Rise)                 | t <sub>r</sub>       | -                  | -                  | 18   | μs   | V <sub>CE</sub> =2V, I <sub>C</sub> =2mA<br>R <sub>L</sub> =100Ω     |      |
| Response Time (Fall)                 | t <sub>f</sub>       | -                  | -                  | 18   | μs   |                                                                      |      |

## CHARACTERISTIC CURVES

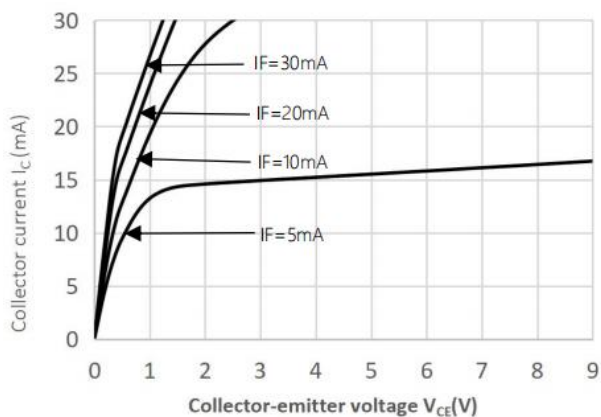
**Fig.1 Relative Current Transfer Ratio vs. Forward Current**



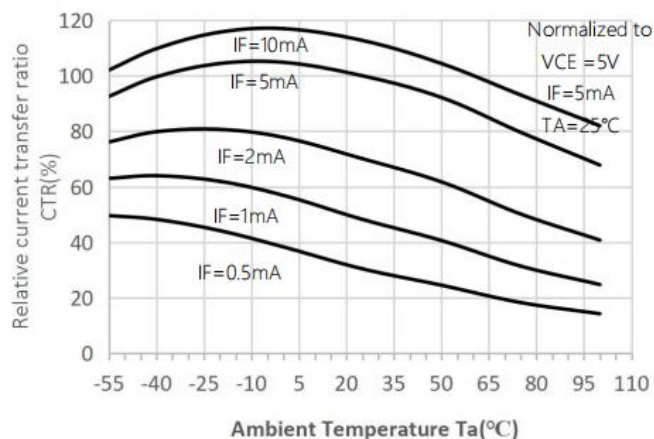
**Fig.2 Forward Current vs. Forward Voltage**



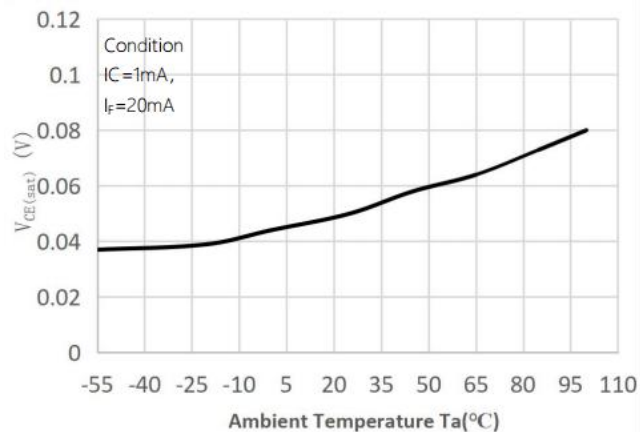
**Fig.3 Collector Current vs. Collector-emitter Voltage**



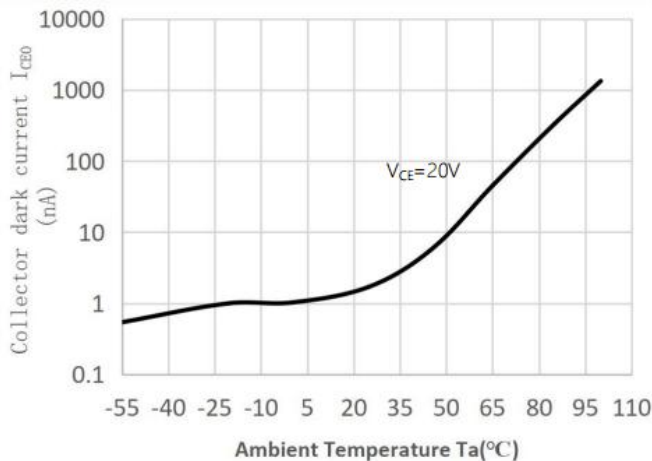
**Fig.4 Relative Current Transfer Ratio vs. Ambient Temperature**



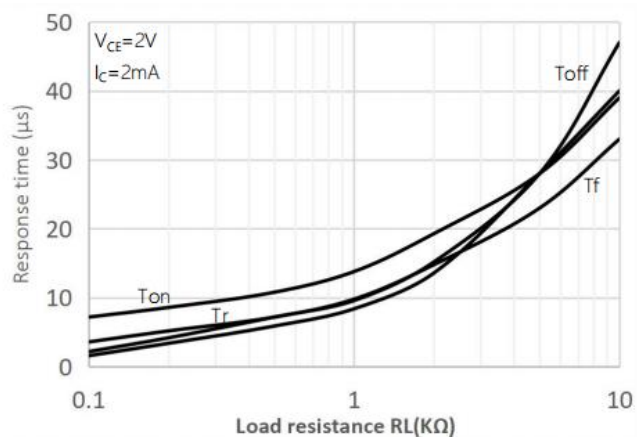
**Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature**



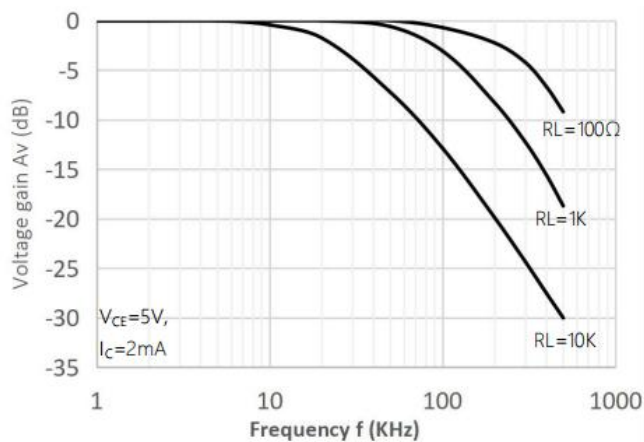
**Fig.6 Collector Dark Current vs Ambient Temperature**



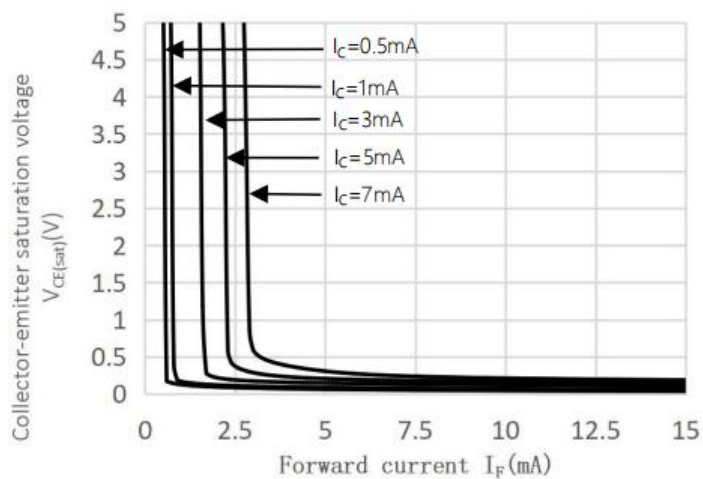
**Fig.7 Response Time vs. Load Resistance**



**Fig.8 Frequency Response**

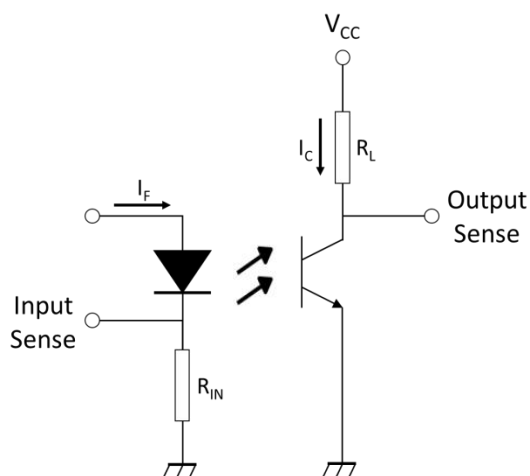


**Fig.9 Collector-emitter Saturation Voltage vs Forward Current**

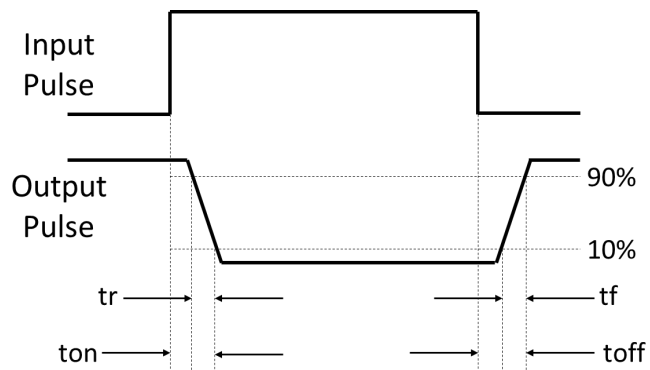


## TEST CIRCUITS

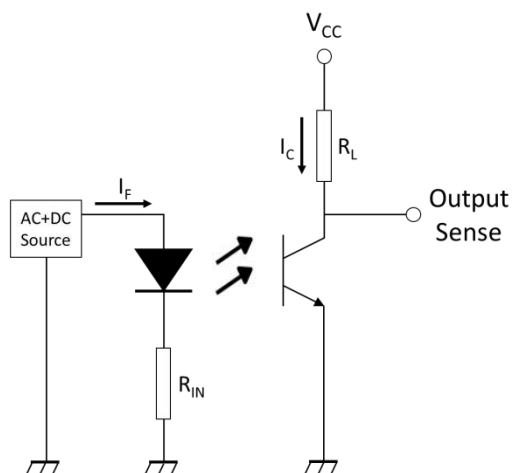
**Fig.12 Test Circuits of Response Time**



**Fig.13 Curves of Response Time**

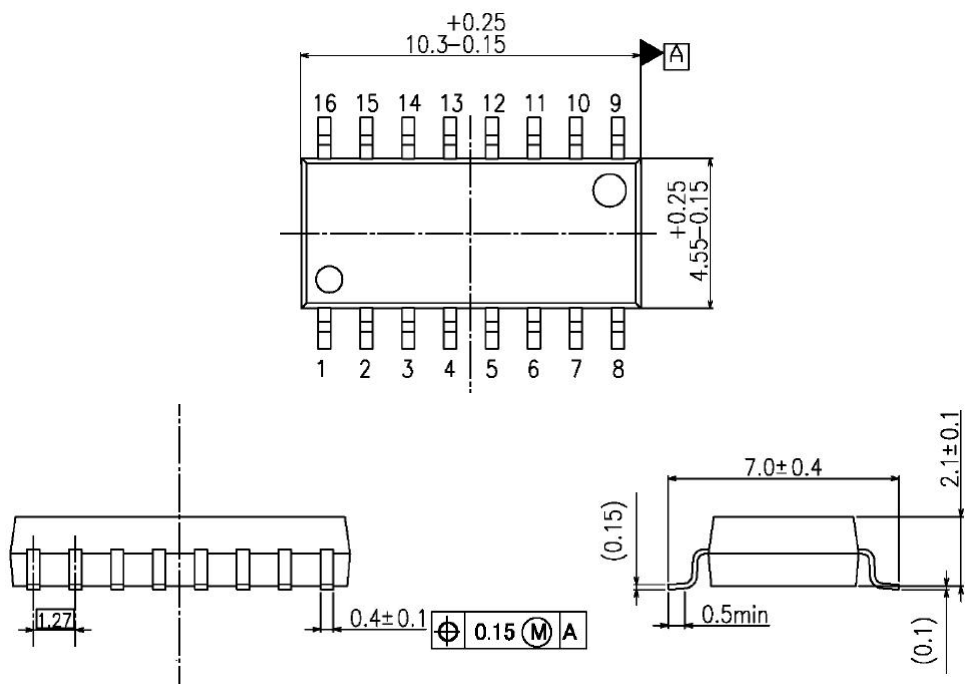


**Fig.14 Test Circuits of Frequency Response**

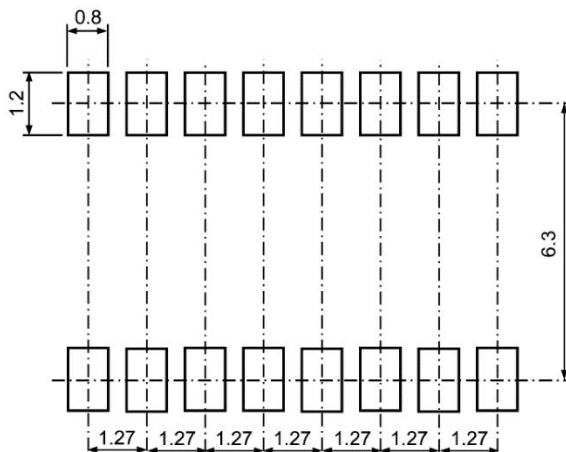


## PACKAGE DIMENSIONS

### Surface Mount (Low Profile) - (SSOP16)



### Recommended Solder Mask

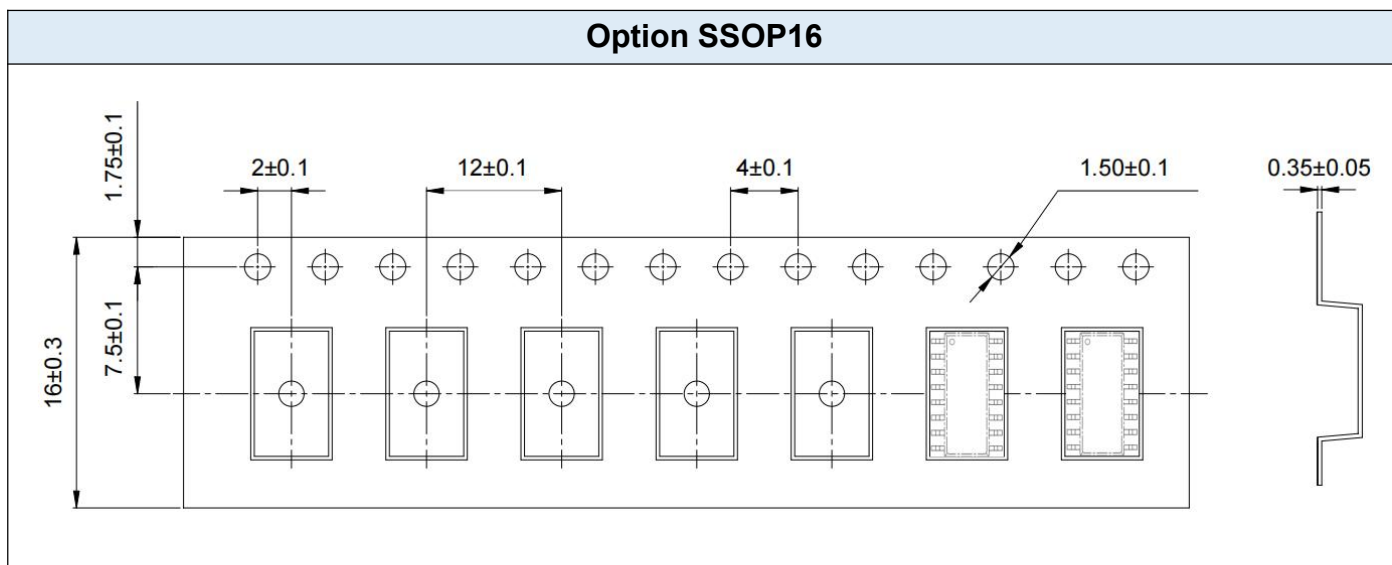


Dimensions in mm

unless otherwise stated

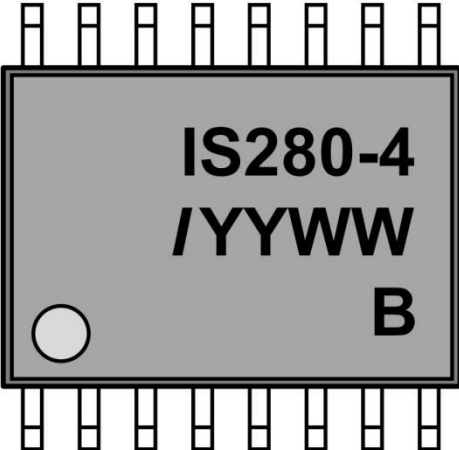
## CARRIER TAPE SPECIFICATIONS

### Option SSOP16



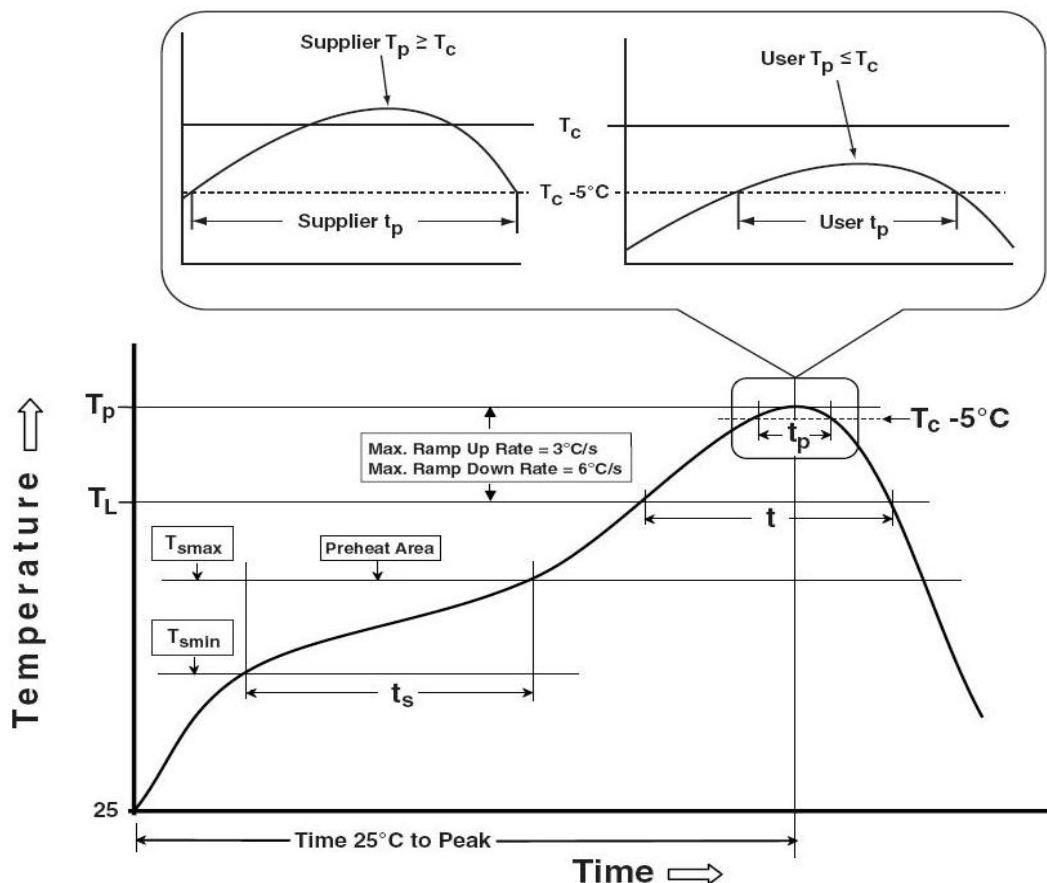
- Dimensions in mm unless otherwise stated

## ORDERING AND MARKING INFORMATION

| Marking Information                                                               |                 |                                                                                                                                                                                                                                                                                                                                                                         |                                   |
|-----------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|  |                 | <div><div>IS</div><div>:</div><div>Company Abbr.</div></div> <div><div>280-4</div><div>:</div><div>Part Number</div></div> <div><div>/</div><div>:</div><div>ISOMICRON</div></div> <div><div>YY</div><div>:</div><div>Fiscal Year</div></div> <div><div>WW</div><div>:</div><div>Work Week</div></div> <div><div>Z</div><div>:</div><div>Manufacturing Code</div></div> |                                   |
| Order Code                                                                        |                 |                                                                                                                                                                                                                                                                                                                                                                         |                                   |
| <div><div>Company Abbr.</div><div>Part Number</div></div>                         |                 | <div><div>IS 280-4 - X X</div><div><div>Halogen Free:</div><div>E/None: Halogen-free,Lead-free</div><div>Z: Halogen, Lead-free</div></div><div><div>Performance:</div><div>N: Enhanced</div><div>None: Normal</div></div></div>                                                                                                                                         |                                   |
| Packing Quantity                                                                  |                 |                                                                                                                                                                                                                                                                                                                                                                         |                                   |
| Option                                                                            | Quantity        | Quantity – Inner box                                                                                                                                                                                                                                                                                                                                                    | Quantity – Outer box              |
| SSOP16                                                                            | 2000 Units/Reel | 2 Reels/Inner box                                                                                                                                                                                                                                                                                                                                                       | 5 Inner box/Outer box = 20k Units |

## REFLOW INFORMATION

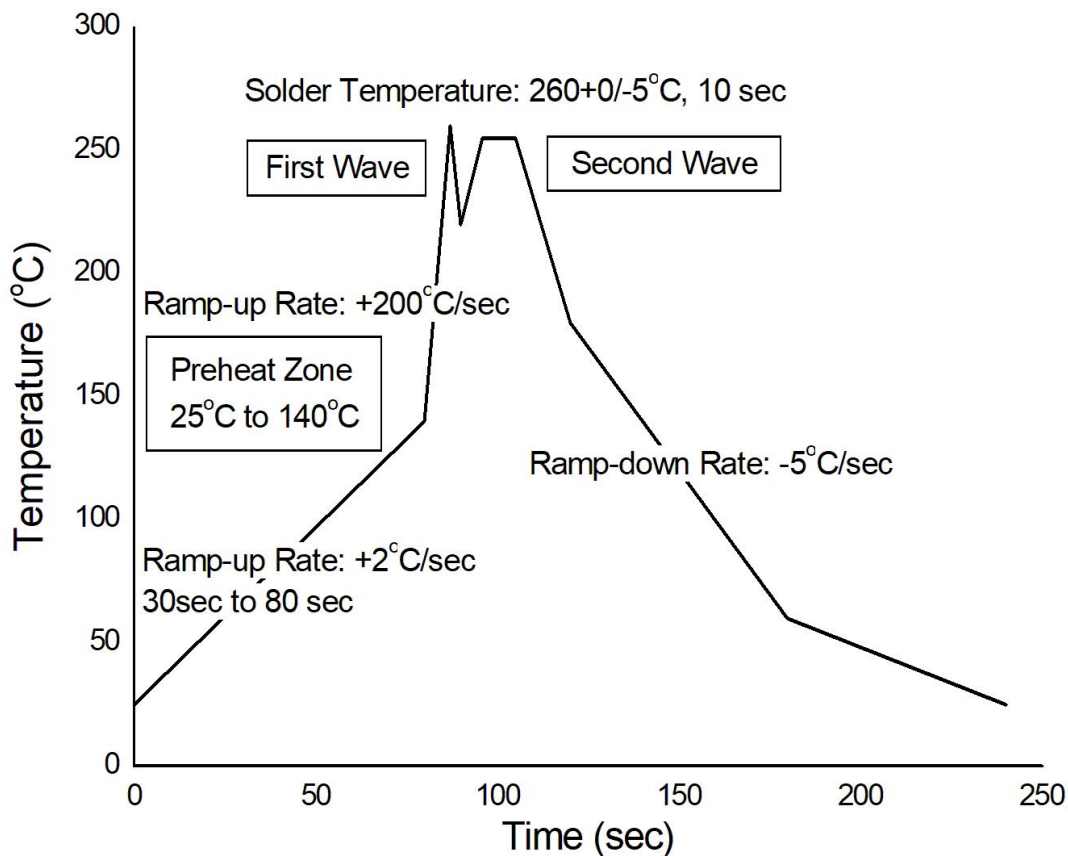
### Reflow Profile



| 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

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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.