

Data Sheet

Model No.: SP-P278NBV

View angle:110

| | | | | |
|---|---------------------|---------------|----------------|----------------|
| Official Product | Part No. SP-P278NBV | Your Part No. | | Data Sheet No. |
| Tentative Product | ***** | ***** | | HDS-278-SP124 |
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 MODEL NO. 5

 LOT No. 5

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Introduction

- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by SP for any infringements of intellectual property or other rights of the third parties which may result from it use.
- SP is continually making an effort to improve the quality of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing SP products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such SP products cause loss of human life, bodily injury or damage to property.
- The SP products listed in this document are intended for usage in general electronics (computer, personal equipment, office equipment, industrial robotics, domestic, etc...) These products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury.
- In developing your designs, please ensure that SP products are used within specified operating ranges as set forth in the most recent SP products specifications.
- Also, please keep in mind of the precautions listed in this document.

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Product Specification

| | Specification | Material | Quantity |
|---------------------|----------------------------------|-------------|----------------|
| Total Flux | Typical 12lm @700mA/ Ta= 25°C | | |
| Dominant Wavelength | 450nm-480nm @700mA/ Ta=25°C | | |
| V _F | 3.03-3.99V @700mA/ Ta=25°C | | |
| I _R | SP standard | | |
| Resin | White | Epoxy resin | |
| Tube | SP standard | Conductive | 50pcs per tube |
| Label | SP standard | Paper | |
| Carton | SP standard | Paper | Non-specified |

Others:

ATTENTION: Electric Static Discharge (ESD) protection



The symbol shown on the page herein to introduce 'Electro-Optical Characteristics'. ESD protection for GaP and AlGaAs based chips is still necessary even though they are safe in low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are

STATIC SENSITIVE devices. ESD protection has to considered and taken in the initial design stage. If manual work/process is needed, please ensure the device is well protected from ESD during all the process.

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Description of Model No. and Lot No.

Model No.

S P - P 2 7 8 N B V

| Company | Product Name | Dice | Package | Emitter Color | Current code |
|--------------------|------------------|-------------------------------|-------------------|---------------|--------------|
| SP: For Soft Power | P: Power Package | 1: Single 2: Twin . . . | Outline dimension | NB: Blue | V:700mA |

Lot No.

1 2 3 4 5 6 7 8 9 10
P 1 2 2 3 0 A - D T

| Code 1 | Code 2 | Code 3 | Code 4, 5 | Code 6, 7 | Code 9 | Code 10 |
|-----------------------|-----------------------------|--|------------|--------------------|----------------|---------------|
| | Mfg. Year | Mfg. Month | Mfg. Date | Lots | Resin Color | Packaging |
| Internal Tracing Code | Z: 2000 1: 2001 | 1: Jan. 2: Feb. 9: Sep. A: Oct. B: Nov. C: Dec. | 1~31/ (30) | 01~99, A,B,C... | D: Milky White | T: Taped Reel |

Product Feature

- Wide view angle
- Easy to fixed
- No UV
- Long operating time (Up to 50,000hrs)
- Lower forward voltage operated
- More energy efficient than incandescent and most halogen lamps
- ESD: InGaN/Al₂O₃ with 8KV
- Instant light (less than 100nS)

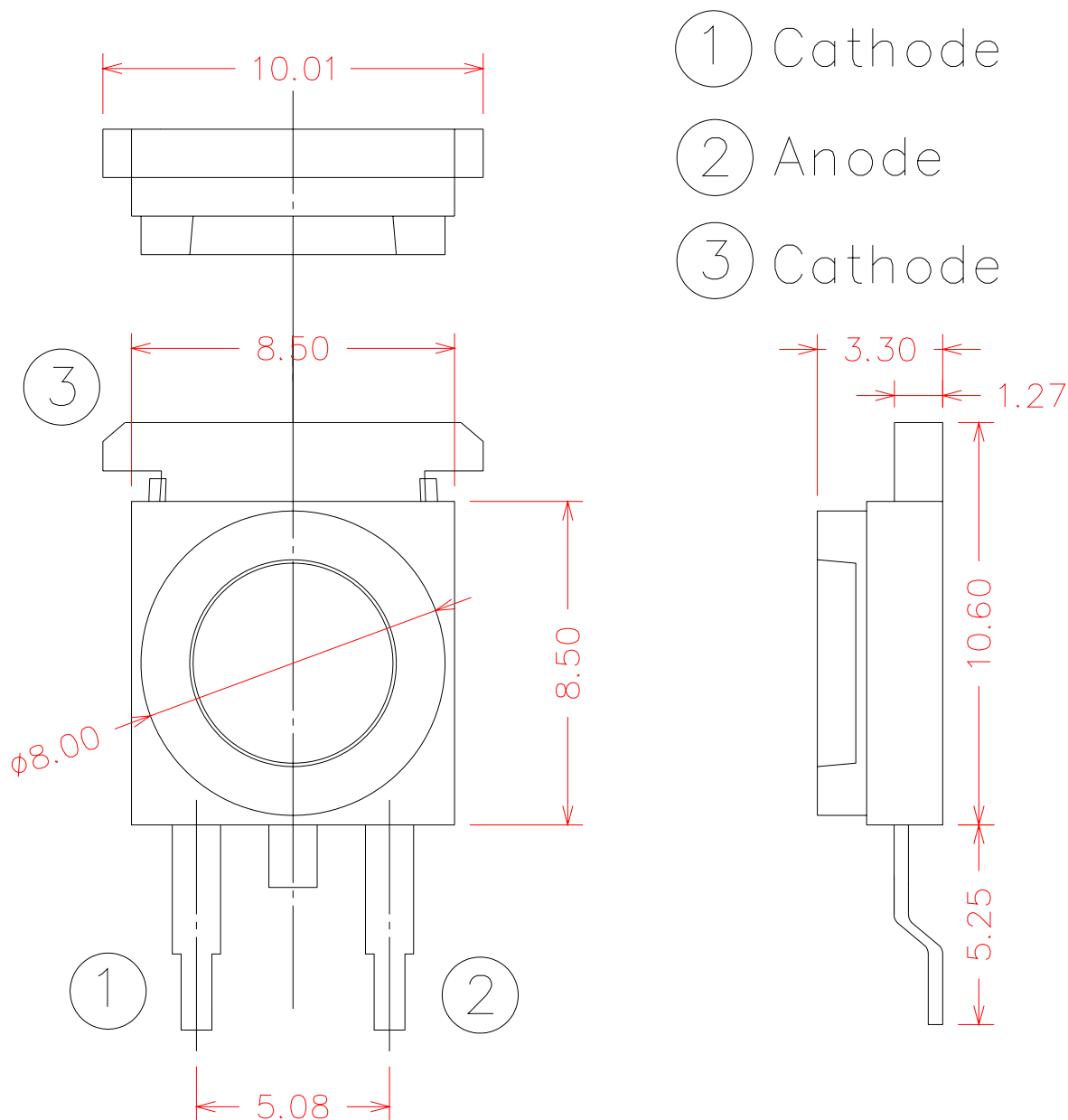
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Application

- Reading lights (car, bus, aircraft)
- Portable (flashlight, bicycle)
- Task lighting
- Garden lighting
- Rail lighting
- Wayside lighting
- LCD Backlights
- Light Guides
- Traffic signaling
- Architectural lighting

Product Out Line Dimension (SP-P278NBV)

Tolerance: +/-0.1



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Electro-Optical
Absolute Maximum Ratings

 (T_a =25°C)

| Parameter | Rating | Unit | Conditions |
|---|----------|------|-----------------|
| DC Forward Current ^{*1} | 800 | mA | - |
| Peak Pulsed Forward Current ^{*2} | 1000 | mA | - |
| Reverse Voltage | 5 | V | - |
| LED junction Temperature | 120 | °C | - |
| Operating Temperature | -30~+85 | °C | - |
| Storage Temperature | -40~+120 | °C | - |
| Soldering Temperature | 260 | °C | For 5 sec. Max. |

*1: Proper current derating must be observed to maintain junction temperature below the maximum

*2:tp ≤ 10μs, Duty cycle=0.01

Electro-Optical Characteristics

 (T_a =25°C)

| Parameter | Symbol | Min. | TYP. | Max. | Unit |
|--|---------------------|------|------|------|-------|
| Viewing angle | 2θ ½ | - | 110 | - | Deg. |
| Forward Voltage (I _F =700mA) | V _F | 3.03 | - | 3.99 | V |
| Luminous Flux | Flux | 4.9 | 12 | - | lm |
| Dominant Wavelength | λ _d | 450 | - | 480 | nm |
| Temperature Coefficient of Forward Voltage | ΔV _F /ΔT | - | -2 | - | mV/°C |
| Thermal Resistance Junction to Board (I _F =700mA) | Rθ _{J-B} | - | 20 | - | °C/W |

Luminous Flux Rank

| Rank Code | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------|--------|-----------------------|------|------|------|------|
| Full | ΦV | I _F =700mA | 4.9 | - | 18.1 | lm |
| PJ | | | 4.9 | - | 6.3 | |
| PK | | | 6.3 | - | 8.2 | |
| PL | | | 8.2 | - | 10.7 | |
| PM | | | 10.7 | - | 13.9 | |
| PN | | | 13.9 | - | 18.1 | |
| PP | | | 18.1 | - | 23.5 | |

Note: It maintains a tolerance of ±10% on flux

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Electrical Rank

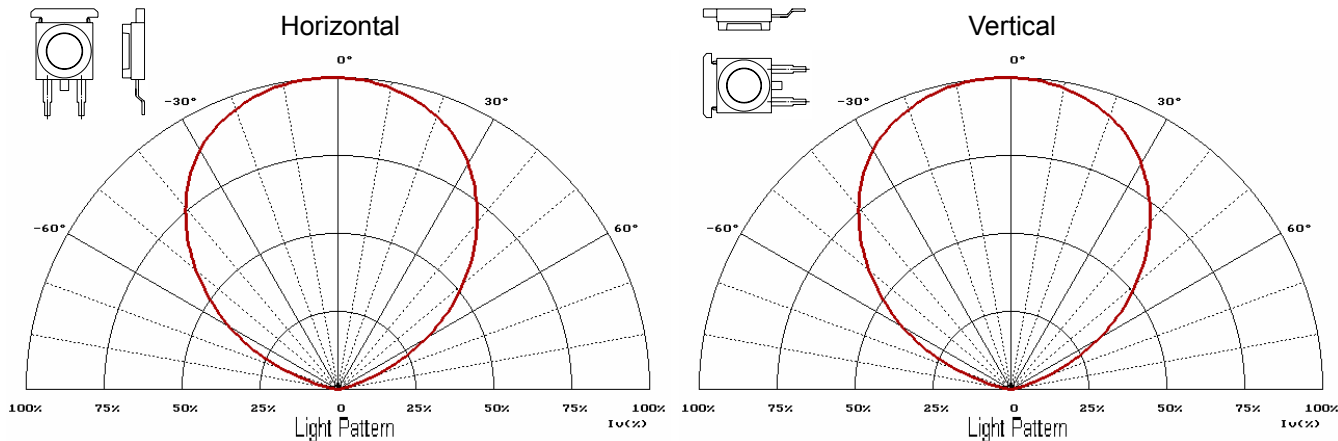
| Rank Code | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-----------|----------------|-----------------------|------|------|------|------|
| Full | V _F | I _F =700mA | 3.03 | - | 3.99 | V |
| P5 | | | 3.03 | - | 3.27 | |
| P6 | | | 3.27 | - | 3.51 | |
| P7 | | | 3.51 | - | 3.75 | |
| P8 | | | 3.75 | - | 3.99 | |

Note: It maintains a tolerance of ±0.1V on forward voltage measurements

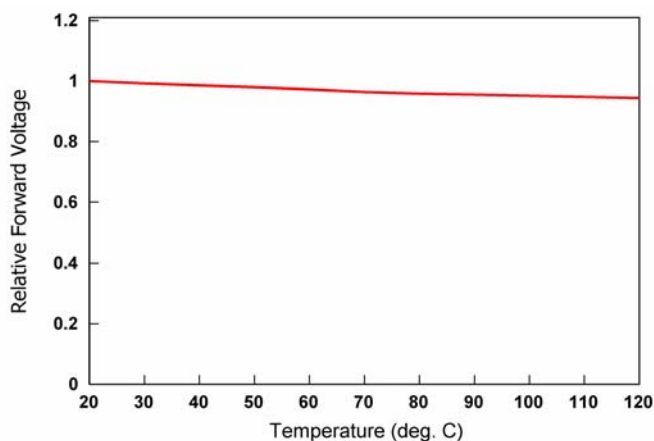
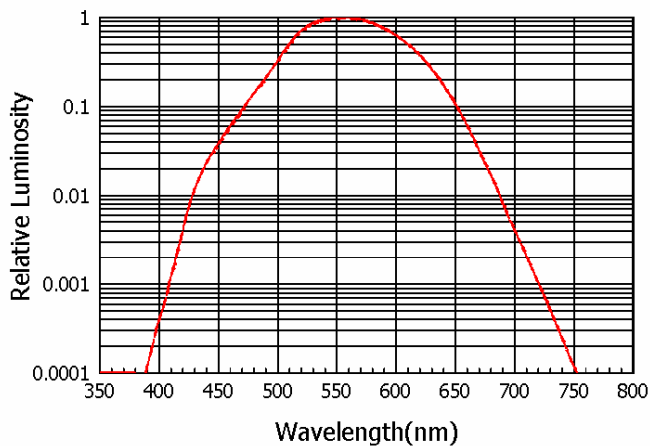
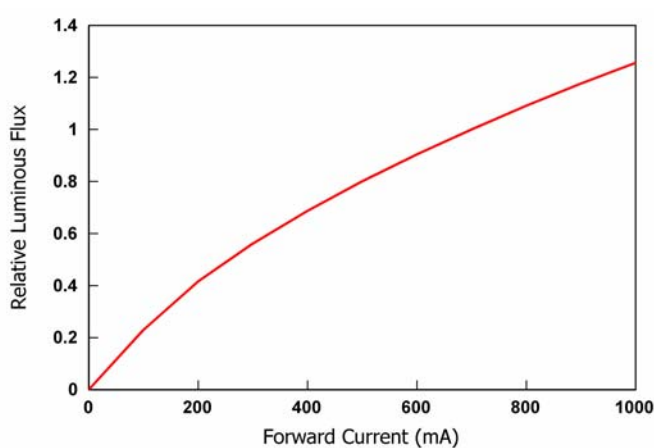
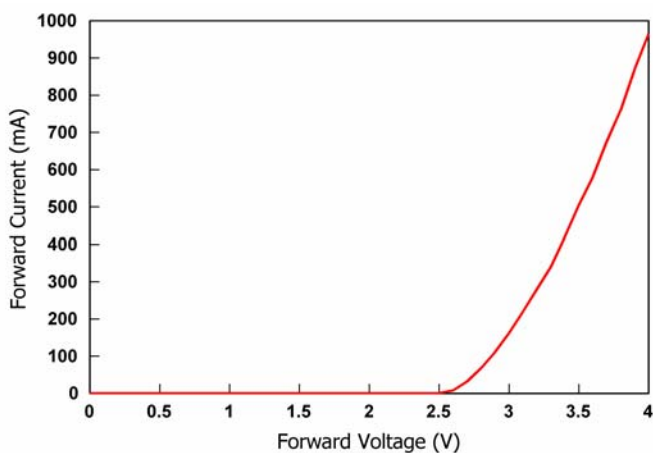
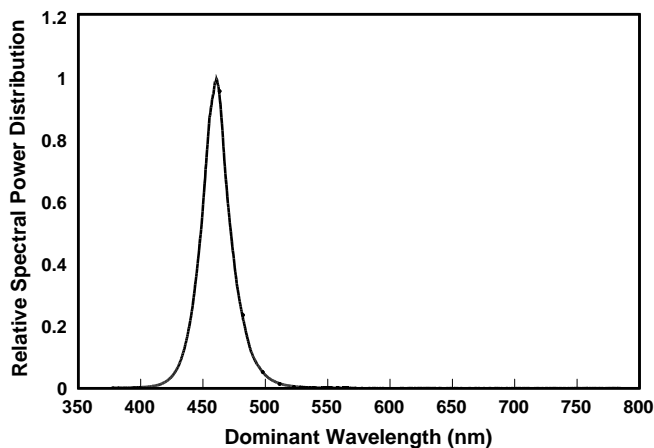
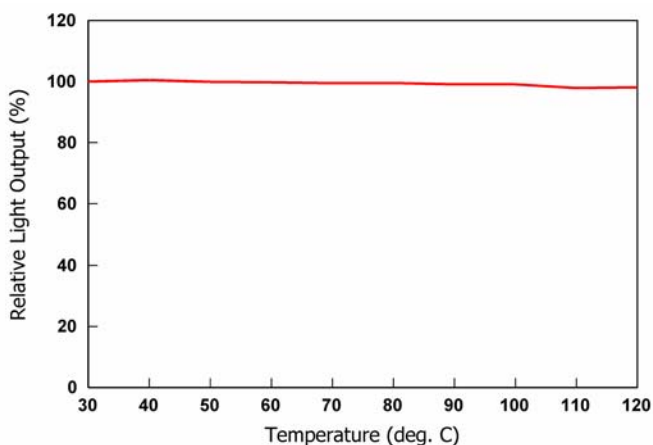
Dominant Wavelength

| Rank Code | Symbol | Condition | Min. | Max. | Unit |
|-----------|----------------|-----------------------|------|------|------|
| 1 | λ _d | I _F =700mA | 450 | 455 | nm |
| 2 | | | 455 | 460 | |
| 3 | | | 460 | 465 | |
| 4 | | | 465 | 470 | |
| 5 | | | 470 | 475 | |
| 6 | | | 475 | 480 | |

Characteristics



| | | | |
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LEDs and Eye Safety:

In the 1993 edition of IEC-60825-1, LEDs were included: "Throughout this part 1 light emitting diodes (LED) are included whenever the word "laser" is used." The CENELEC document EN 60825-1 contains all the technical content of the IEC standard.

The scope of the IEC standard states that "...products which are sold to other manufacturers for use as components of any system for subsequent sale are not subject to IEC 60825-1, since the final product will itself be subject to this standard." Therefore, it is important to determine the Laser Safety Class of the final product. However, it is important that employees working with LEDs are trained to use them safely.

Most of the products containing LEDs will fall in either Class 1 or Class 2. A Class 1 label is optional:

CLASS 1 LED PRODUCT

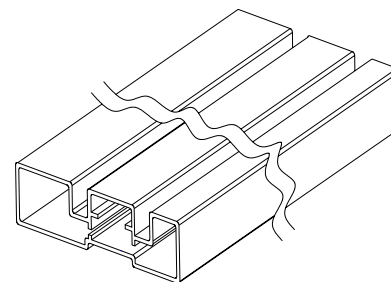
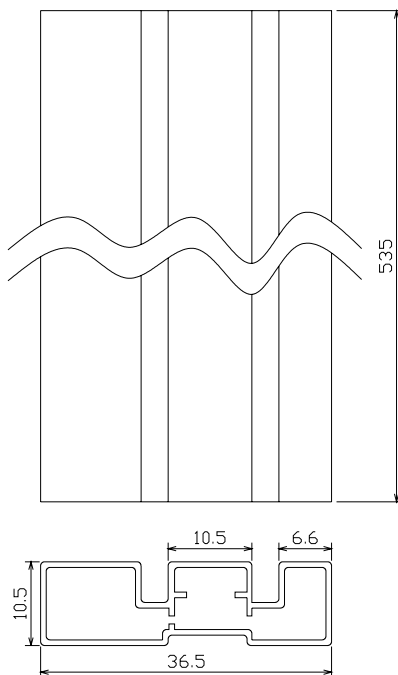
If a label is not used, this description must be included in the information for the user. Amendment 2 to IEC 60825-1 is expected to be published in January 2001. The CENELEC equivalent is expected to follow three months after the IEC publication. This document contains increased Class 1 and Class 2 limits, as well as the introduction of less restrictive Class 1M and Class 2M.

For the exact classification and further information, the IEC document can be used:

IEC-60825-1 ISBN 2-8318-4169-0

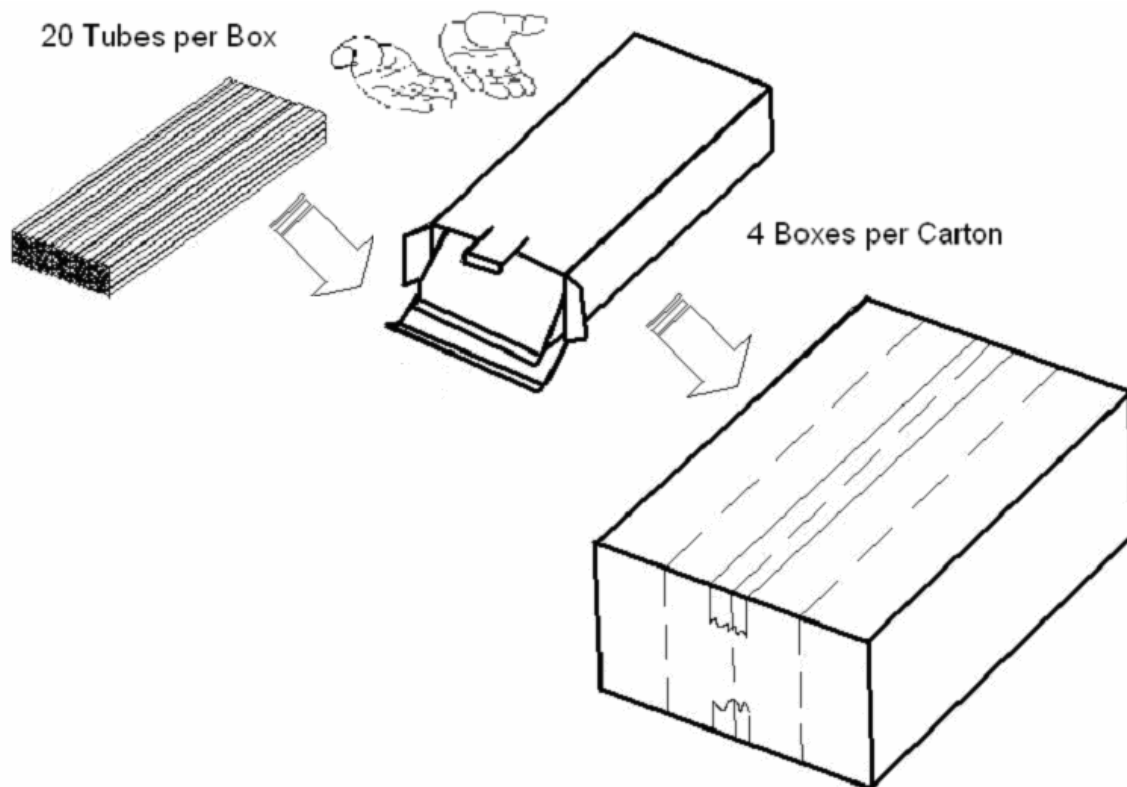
Tube and Packing

Tube Dimension



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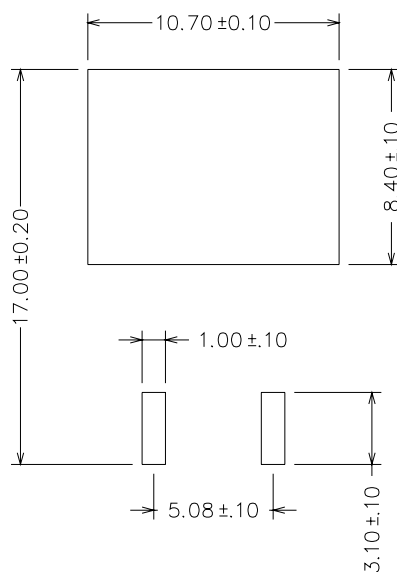
Packing Model



Precaution of Application

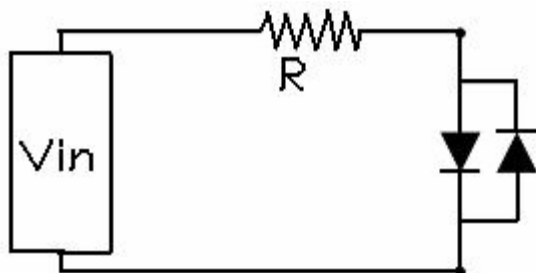
Designing 1: Soldering Pattern

The dimensions of the recommended soldering pattern may not meet every user. Please confirm and study first before designing the soldering pattern in order to obtain the best performance of soldering. Recommended soldering pattern is listed below:



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Designing 2: Circuit Layout



Designing 3: Max Rating

Any application should refer to the specifications of absolute maximum ratings.

Storage

It's recommended to store the products in the following conditions:

Humidity: 60 %RH Max.

Temperature: 5°C ~30°C (41°F~86°F)

Soldering

Manual soldering

Soldering tin material: tin 6/4 alloy or contained Ag.

To prevent cracking, please bake before manual soldering.

Temperature at tip of iron : 300°C±5°C Max.(25W)

It's banned to load any stress on the resin during soldering.

Soldering time : 3±1sec

Cleaning

The conditions of cleaning after soldering:

An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.

Temperature Time: <50°C×30sec, or <30°C×3min

Ultra sonic cleaning: < 15W/ bath; Bath volume: 1liter max.

Curing: 100°C max, <3min

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Reliability Test

| Item | Duration | Standards Reference | | Conditions | Criteria |
|---|------------|---------------------|-----------------------------|--|--------------------|
| | | MIL-STD 883 Ref | JIS C 7021 Ref | | |
| High Temperature Operating Life (HTOL) | 1000 Hours | | | 55°C, I _F =max DC (Note 1) | Note 2 |
| Room Temperature Operating Life (RTOL) | 1000 Hours | | | 25°C, I _F =max DC (Note 1) | Note 2 |
| Low Temperature Operating Life (LTOL) | 1000 Hours | | | -40°C, I _F =max DC | Note 2 |
| Wet High Temperature Operating Life (WHTOL) | 1000 Hours | | Method B-11, Condition C | 85°C/85%RH, I _F =max DC | Note 2 |
| Powered Temperature Cycle (PTMCL) | 200 Cycles | | | -40°C/85°C, 18min dwell, 42min xfer (2 hours cycle), 5min ON/ 5min OFF, I _F =max DC | Note 2 |
| Non Operating Temperature Cycle (TMCL) | 200 Cycles | 1010 | Method A-4 | -40°C/120°C, 30min dwell/ 5 min xfer | No Catastrophic |
| High Temperature Storage Life (HTSL) | 1000 Hours | 1005 | Method B-10 | 110°C, non operating | Note 2 |
| Low Temperature Storage Life (LTSL) | 1000 Hours | 1005 | Method B-12 | -40°C, non operating | Note 2 |
| Non Operating Thermal Shock (TMSK) | 200 Cycles | | | -40°C/110°C, 20min dwell/<20 sec xfer | No Catastrophic |
| Non Operating Thermal Shock (TMSK) | 200 Cycles | | | -40°C/120°C, 20min dwell/<20 sec xfer | No Catastrophic |
| Mechanical Shock | 5 Shocks | 2002 | Method A-7 Condition F | 1500G, 0.5 sec pulse, 5shocks each 6 axis | No Catastrophic |
| Natural Drop | 3X | | Method A-8 | On concrete from 1.2m | No Catastrophic |
| Variable Vibration Frequency | | 2007 | Method A-10 Condition D | 10-2000-10 Hz, log or linear sweep rate 20G about 1min, 1.5mm, 3X/axis | No Catastrophic |
| Variable Vibration Frequency | | 2007 | Method A-10 Condition D | 10-55-10 Hz, ± 0.75mm, 55-2000, 10G, 1 octave/min, 3X/axis | No Catastrophic |
| Random Vibration | | | | 6G RMS from 10 to 2KHz, 10min/axis | No Catastrophic |
| Solder Heat Resistance (SHR) | | | | 260°C±5°C, 10 sec | No Catastrophic |
| Solder ability | | | | Steam age for 16hr, then solder dip at 245 °C for 5sec | Solder Coverage |
| Lead Strength | | | | 1 lb, 30sec | No Catastrophic |
| Lead Fatigue | | | | 1 lb, 3X45° bend | No Catastrophic |
| Salt Atmosphere | 48 Hours | 1009 | | 35°C | No Catastrophic |

Note 1: Depending on the maximum de-rating curve

Note 2: Failure criteria includes units with catastrophic failure, or units with greater than 50% I_v degradation at 1000 hours, or an average I_v degradation for the test of greater than 35% at 1000 hours

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Revise Notes

| Rev. | Descriptions | Date | Name |
|------|--|-----------|----------|
| 1.0 | - | 6/17/2005 | Ricky_Wu |
| 1.1 | 1. Modify the Absolute Maximum Rating(700mA changed to 800mA) and add the *1 | 9/5/2005 | Ricky_Wu |
| | | | |
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