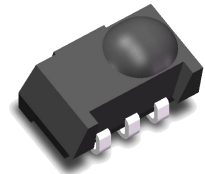


**IR Receiver Module for PCM Remote Control Systems**

**Description**

The SSR438S-TR is a one lens miniaturized SMD-IR receiver for infrared remote control systems. Two PIN diodes and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.

The demodulated output signal can directly be decoded by a microprocessor. The main benefit is the reliable function even in disturbed ambient and the protection against uncontrolled output pulses.



**Features**

- Photo detector and IC in one single package
- TTL and CMOS compatible
- Output active low
- Enhanced immunity against disturbance from lamps
- No occurrence of disturbance pulses at the output
- Suitable burst  $\geq 15$  cycles/burst
- RoHS compliance

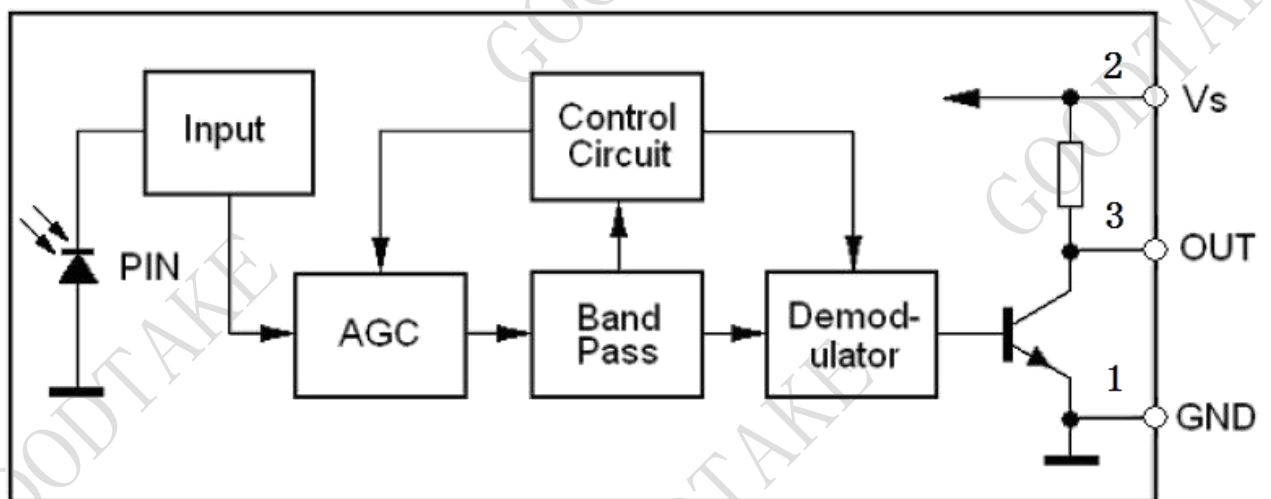
**Special Features**

- TV
- Audio Video equipments
- Home appliances with remote control systems

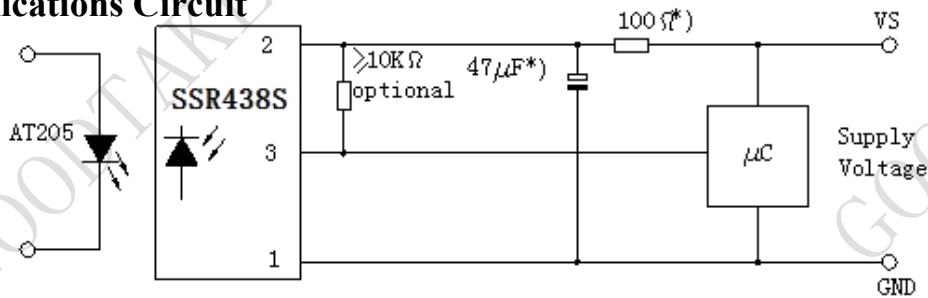
**Applications**

TV, VTR, Acoustic Devices, Air Conditioner, Car Stereo Units, Computers, Interior controlling appliances, and all appliances that require remote controlling

**Block Diagram**



**Applications Circuit**



\*) recommended to suppress power supply disturbances

\* Note: Power line filter is recommended - resistor 47 ohm with 47uF capacitor

**Absolute Maximum Ratings**

Tamb = 25 °C

| Parameter                   | Test Conditions        | Symbol | Value      | Unit |
|-----------------------------|------------------------|--------|------------|------|
| Supply Voltage              | (Pin 2)                | Vs     | -0.3...6.0 | V    |
| Supply Current              | (Pin 2)                | Is     | 3          | mA   |
| Output Voltage              | (Pin 3)                | Vo     | -0.3...6.0 | V    |
| Storage Temperature Range   |                        | Tstg   | -25...+85  | °C   |
| Operating Temperature Range |                        | Tamb   | -25...+85  | °C   |
| Power Consumption           |                        | ptot   | 18         | mW   |
| Soldering Temperature       | t ≤ 5s, 1 mm from case | Tsd    | 260        | °C   |

**Electrical & Optical Characteristics**

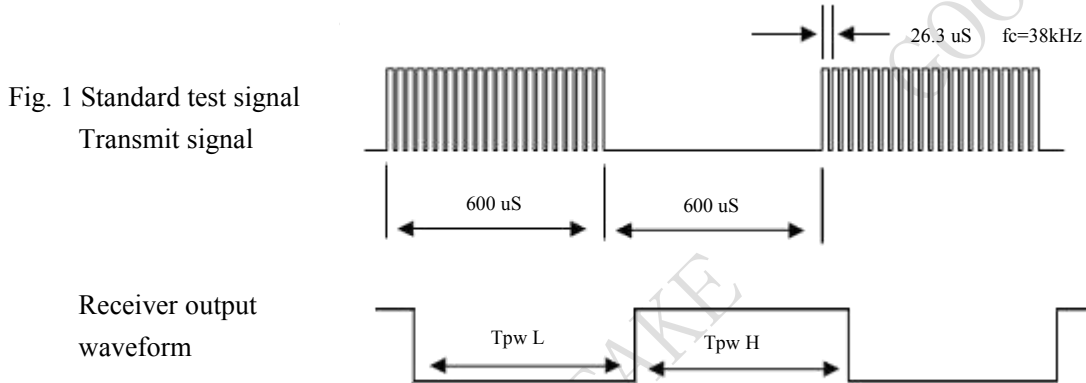
Tamb = 25 °C Vs = 5.0V

| Parameter  | Test Condition                     | Symbol | Min  | Typ  | Max  | Unit |
|--|------------------------------------|--------|------|------|------|------|
| Supply current   | Vs = 5V, Ev = 0                    | Is     |      | 0.45 | 0.80 | mA   |
|  | Vs = 3V, Ev = 0                    |        | 0.15 | 0.35 |      |      |
| Operating Voltage  | (Pin 2)                            | Vs     | 2.7  | 3.0  | 5.5  | V    |
| Transmission distance  | IR diode AT205, IF = 400mA, Ev = 0 |        | 22   | 25   |      | m    |
| The minimum distance between the remote control and the receiver | IR diode AT205, IF = 400mA         |        | 0.3  |      |      | m    |
| Output Voltage High  | Vs = 5V                            | VOSH   | 4.5  |      |      | V    |
| Output Voltage Low   | IOSL = 2 mA, f = fo, tp/T = 0.4    | VOSL   |      |      | 400  | mV   |
| Peak Wavelength  | Internal IR filter                 | λ      |      | 940  |      | nm   |
| Carrier frequency  | Internal BPF                       | fc     |      | 38   |      | kHz  |
| Output pulse width   | Input burst = 600µS                | Tp     | 400  |      | 800  | µS   |
| Angle of 1/2 Distance  | Horizontal Half angle              | ½θ     |      | ±45° |      | Deg  |

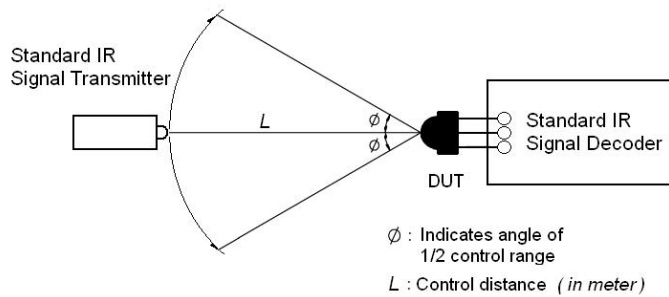
1) Standard test signal at 38kHz carrier, Ton / Toff = 600µS / 600µS

**Test Condition:**

1. Test signal for output pulse width

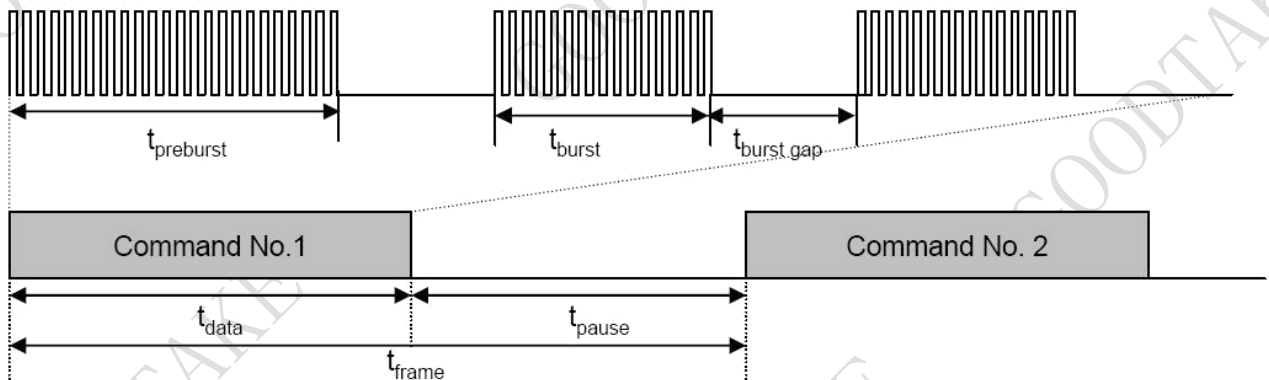


2. Arrival distance



Test condition for measuring the control distance

3. Suitable Data Format



- Minimum burst length ( $t_{burst}$ ) of 15 pulses per burst
- Minimum burst gap time ( $t_{burst\ gap}$ ) 20pulse
- Minimum data pause time ( $t_{pause}$ ) > 22msec
- Suitable data format are : NEC Code, RC 5, RC 6 Toshiba

Characteristics Curve ( $T_{amb}=25^{\circ}C$  unless otherwise specified)

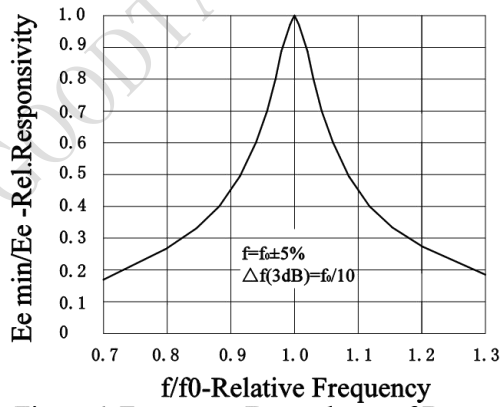


Figure.1-Frequency Dependence of Responsivity

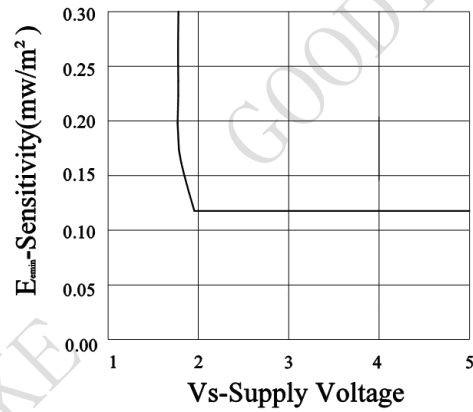


Fig.2-Sensitivity VS. Supply Voltage

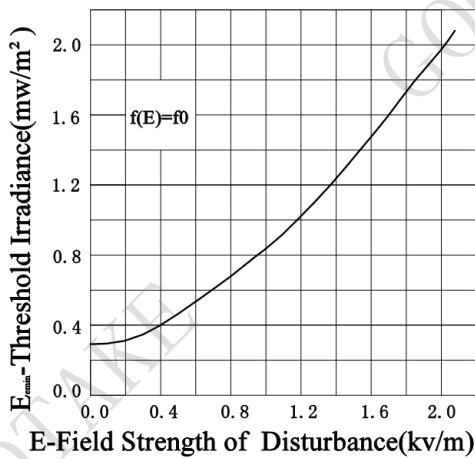


Figure.3- Sensitivity vs. Electric Field Disturbances

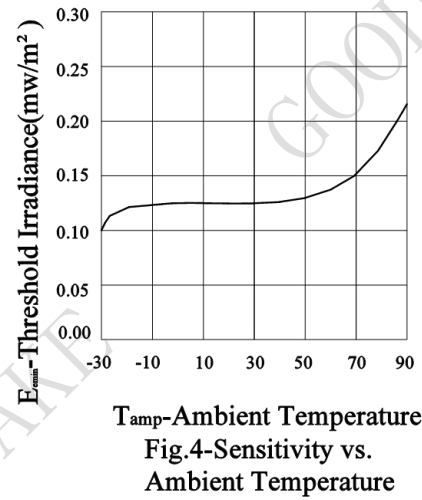


Fig.4-Sensitivity vs. Ambient Temperature

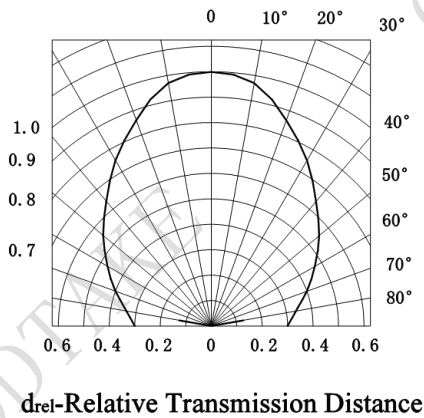


Fig.5-Vertical Directivity

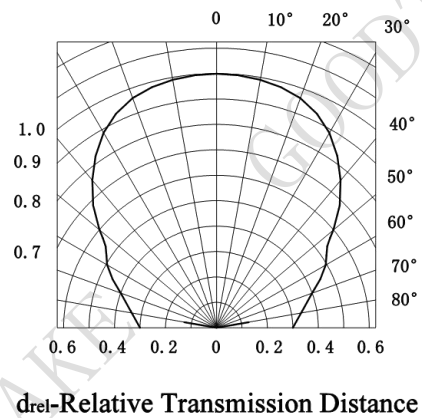


Fig.6-Horizontal Directivity

Reliability Test

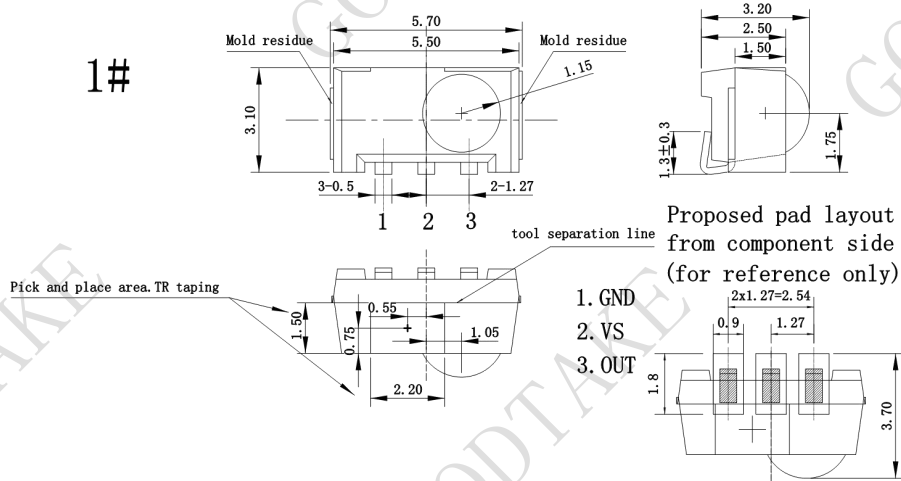
| TEST ITEM                  | TEST CONDITION                | TEST TIME          | SAMPLE NUM | OK NUM |
|----------------------------|-------------------------------|--------------------|------------|--------|
| High Temperature Storage   | Ta=+85°C                      | t=240H             | 22         | 22     |
| Low Temperature Storage    | Ta=-25°C                      | t=240H             | 22         | 22     |
| Electro Static Discharge   | HBM C=100pF,<br>R=1.5kΩ, 2kV, | each pin test once | 22         | 22     |
| High Temperature/Humidity* | Ta=+85°C, 90%RH               | t=240H             | 22         | 22     |
| Heat Cycle*                | -25°C~+85°C(0.5H)             | 20cycle            | 22         | 22     |

**Note** : \*(electro-optical characteristics) shall be satisfied after leaving 2 hours in the normal temperature

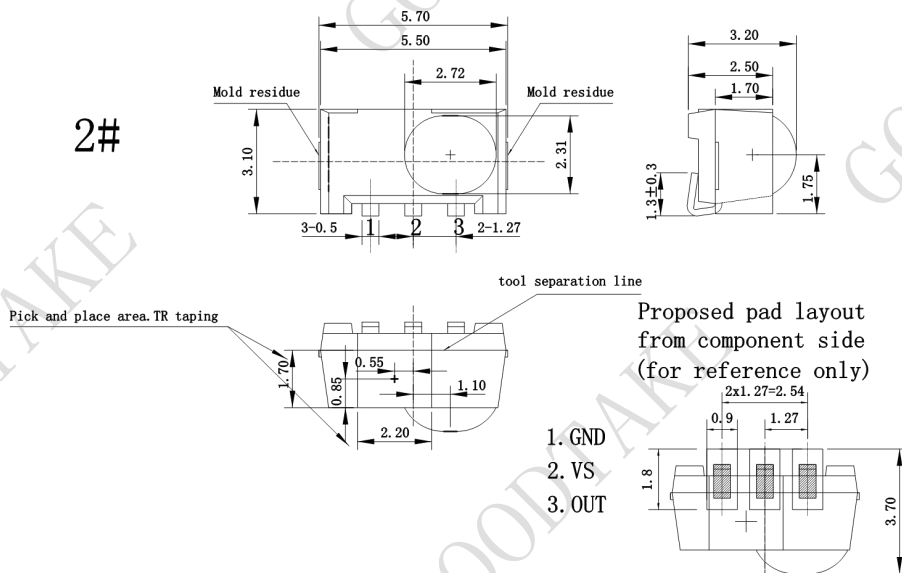
Package Outline

Dimensions in mm: General tolerance ± 0.3mm

1#

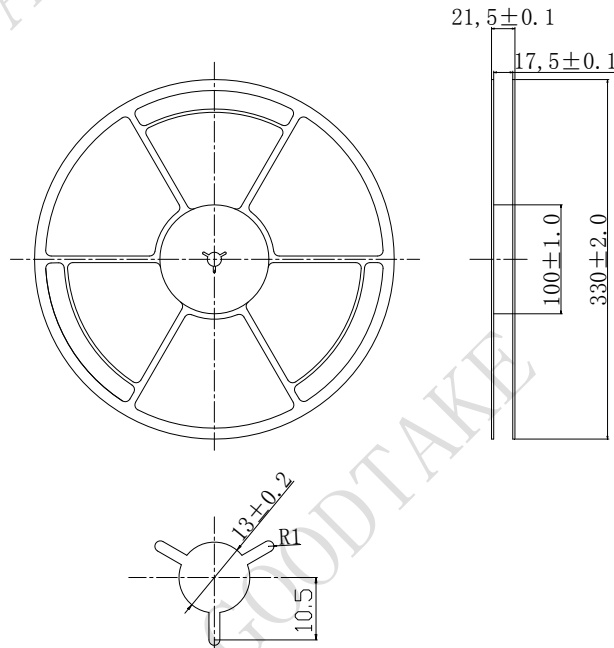


2#

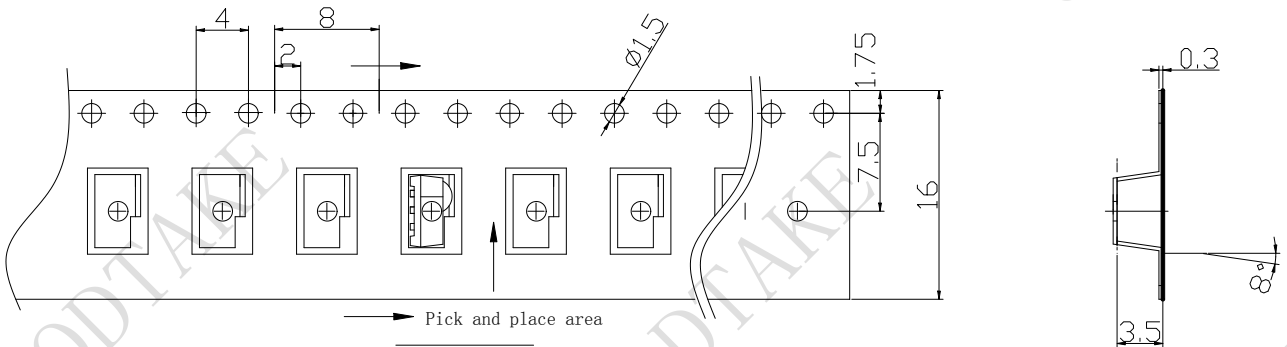


**Taping Specifications**

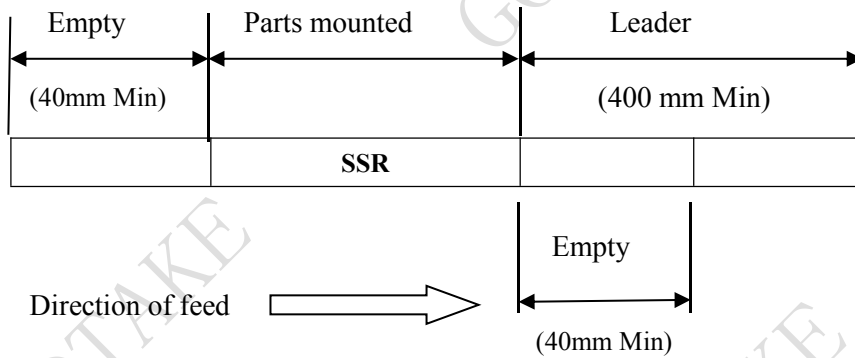
(1) Shape and dimensions of reels: unit in mm



(2) Dimensions of tape

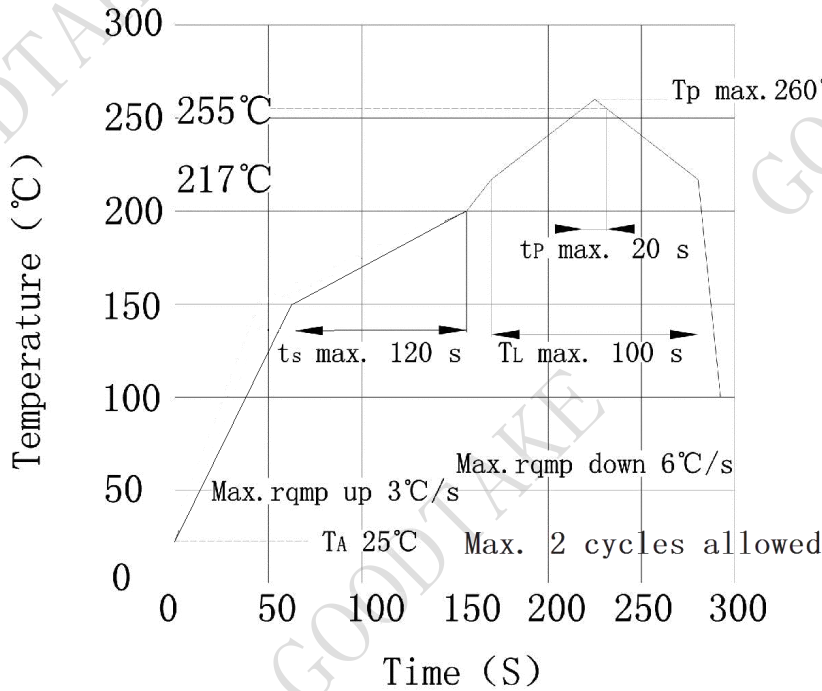


(3) Configuration of tape



(4) Quantity : 2,000pcs. / reel

**Reflow Soldering profile**



**Soldering Iron:** With rating 25watt or below, ESD protected iron, maximum 350 °C & complete soldering within 3 seconds. Do not put force on device while soldering, and leave 2 seconds or more before apply heat to another terminal pad.

**Pb-free solder :** Pb-free soldering paste, melting temperature: 230~235°C

Compositions : Sn/Ag 3%/ Cu 0.5%

**Antistatic Dry Packing**

Opto devices in SMD package may be sensitive to moisture. Devices are taped & reeled, sealed in antistatic bag with silica gel desiccants.

Do not open the sealed moisture-proof bag before ready to use. If sealing is void, baking treatment may be required.

**Storage**

**Shelf life** – Devices should be stored in its original packing, in a controlled environment of temperature less than 40°C and relative humidity below 90%.

Suggested shelf life is 12 months.

**Floor life** – After opening of the sealed package, the reeled devices should be consumed within 72 hours, in a controlled environment with such condition of Tamb < 30 °C, RH = <60%.

Remaining unused parts should be stored in DRY BOX.

**Drying (Baking Process) -**

If original packing is voided (such as faded silica gel or exceeded storage time), baking treatment should be performed with the following conditions:-

Dry Box chamber : T=40 °C+5°C, RH <1%, drying time = 192hours minimum.