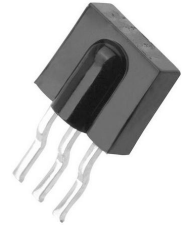


### Features

- Photo detector and preamplifier in one package
- Low supply current
- Wide operating voltage : 2.7V ~ 5.5V
- Available for Carrier Frequencies between 32.7kHz to 56kHz,
- Internal filter for PCM frequency
- Insensitive to supply voltage ripple and noise
- Improved shielding against EMI (Built-in Shield Case)
- Improved immunity against ambient light (Built-in Filter & AGC Circuit)
- Open collector output (Built-in inter pull-up resistor – typ. 40 kΩ )
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



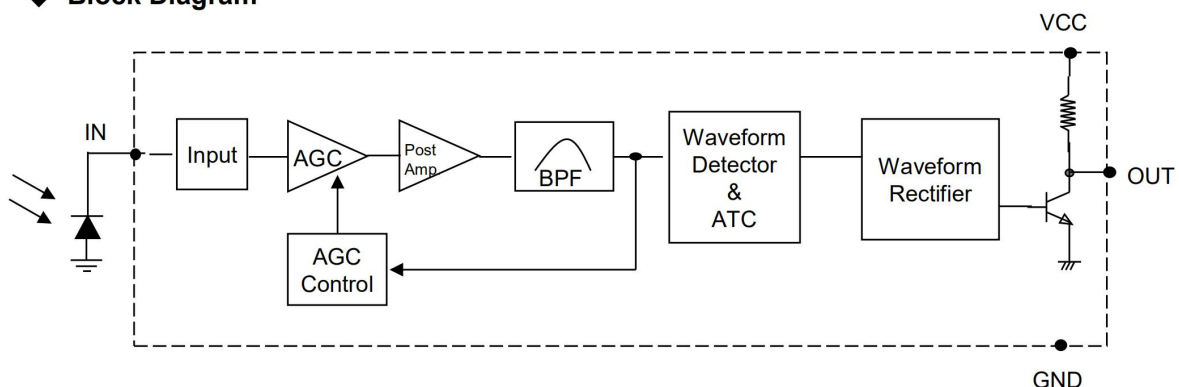
### Application

- TV, VCR, AUDIO, SET TOP BOX
- Home Appliances
- Remote Control Equipment

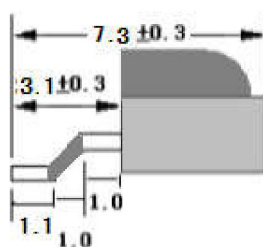
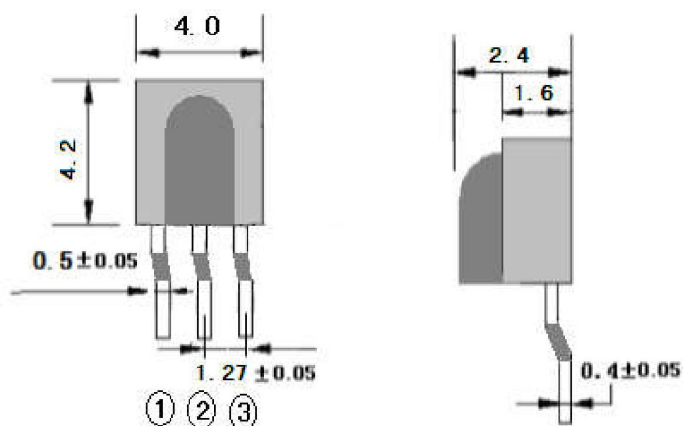
### Description

The IRM75438 Series are miniaturized receiver for infrared remote control system. A PIN Photodiode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The module has excellent performance even in disturbed ambient light application and provides protection against uncontrolled output pulses. This component has not been qualified according to automotive specifications.

#### ◆ Block Diagram



## PACKAGE DIMENSIONS



- ① OUT
- ② GND
- ③ VCC

### NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is  $\pm 0.2\text{mm}$  (.010") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.

### ◆ Absolute Maximum Ratings

(Ta = 25°C)

| Parameter                    | Symbol                         | Min.                   | Max. | Unit |
|------------------------------|--------------------------------|------------------------|------|------|
| Supply Voltage               | VCC                            | 0                      | 6.0  | V    |
| Supply Current               | ICC                            | 0                      | 2.5  | mA   |
| Output Voltage               | Vout                           | 0                      | 6.0  | V    |
| Output Current               | Iout                           | 0                      | 2.5  | mA   |
| Storage Temperature          | Tstg                           | -30                    | 85   | °C   |
| Soldering Temperature        | T <sub>sd</sub>                | 260°C ±5°C, Max 10 sec |      | °C   |
| Reflow Soldering Temperature | T <sub>sol</sub>               | 260°C ±5°C, Max 10 sec |      | °C   |
| Moisture Sensitive Level     | Level 5a (≤30°C/60%RH 24Hours) |                        |      |      |

\* Stress above those listed under “Absolute Maximum Ratings” may cause permanent damage of device. This is stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for longer periods may affect device reliability.

### ◆ Recommended operating Conditions

| Parameter             | Symbol           | Min. | Max. | Unit |
|-----------------------|------------------|------|------|------|
| Operating Voltage     | VCC              | 2.7  | 5.5  | V    |
| Input Frequency       | f <sub>in</sub>  | 32   | 40   | kHz  |
| Operating temperature | T <sub>amb</sub> | -20  | 80   | °C   |

### ◆ Electro-optical Characteristics

(Ta = 25°C)

| Parameter                     | Symbol               | Conditions                           | Min                  | Typ  | Max | Unit |
|-------------------------------|----------------------|--------------------------------------|----------------------|------|-----|------|
| Operating Voltage             | V <sub>cc</sub>      | -                                    | 2.7                  | -    | 5.5 | V    |
| Supply Current                | I <sub>cc</sub>      | No input signal                      | 0.2                  | 0.56 | 0.7 | mA   |
|                               |                      | V <sub>cc</sub> =5V                  |                      | 0.42 |     |      |
| Peak Wave Length              | (※1) λ <sub>P</sub>  |                                      | -                    | 940  | -   | nm   |
| B.P.F Center Frequency        | (※2) f <sub>o</sub>  |                                      | -                    | 37.9 | -   | KHz  |
| High Level Output Voltage     | (※1) V <sub>OH</sub> | 30cm over the ray axis               | V <sub>cc</sub> -0.5 | -    | -   | V    |
| Low Level Output Voltage      | (※1) V <sub>OL</sub> |                                      | -                    | 0.2  | 0.4 | V    |
| High Level Output Pulse Width | (※1) T <sub>WH</sub> | Burst Wave = 600μs<br>Period = 1.2ms | 400                  | -    | 800 | μs   |
| Low Level Output Pulse Width  | (※1) T <sub>WL</sub> |                                      | 400                  | -    | 800 | μs   |
| Arrival Distance              | (※1) L               | Fig. 1,2,3                           | ±0°                  | 25   | -   | m    |
|                               |                      |                                      | ±30°                 | 15   | -   |      |
| Output Form                   | Active Low           |                                      |                      |      |     |      |

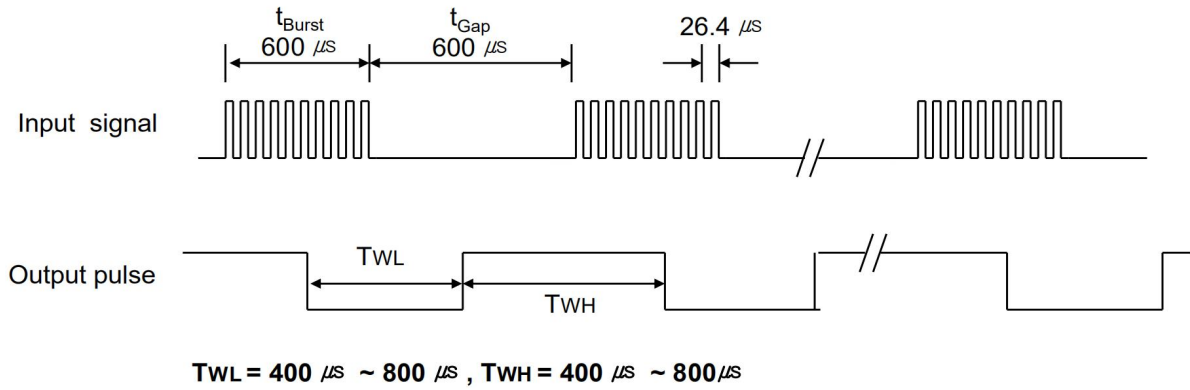
※ 1. 600/600μs burst wave is transmitted by standard(Fig.2, Fig.3) transmitter. However, it measured after the initial transmission pulse is 10(60ms) pulse.

Arrival Distance Effected by Environment

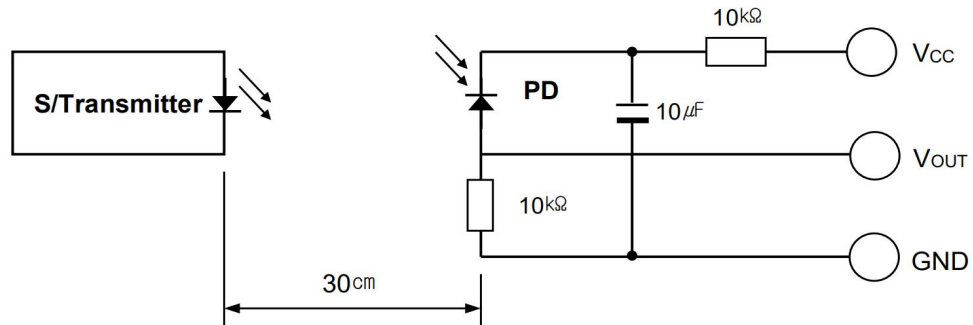
※ 2. The following band pass frequencies are available.(32.7kHz/36.7kHz/37.9kHz/40kHz/56.7kHz)  
Carrier frequencies adjusted by zener-diode fusing method.

**Measurement Conditions (Ta=25°)**

[ Fig.1 ] Output Waveform ( at freq.=37.9KHz )

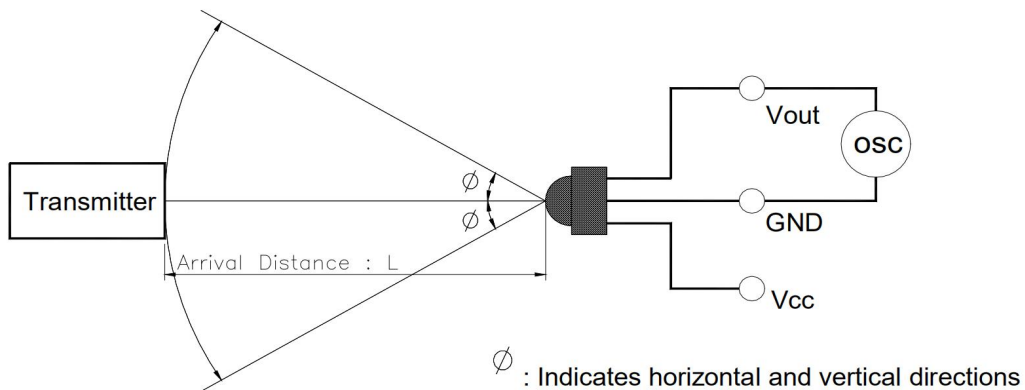


[ Fig.2 ] Transmitter



※ The specifications shall be satisfied under the following conditions. The standard transmitter shall be specified of the burst wave form adjusted to  $V_{OUT}$  200mVp-p upon  $P_o$  measuring circuit Standard Transmitter

[ Fig.3 ] Test condition of arrival distance

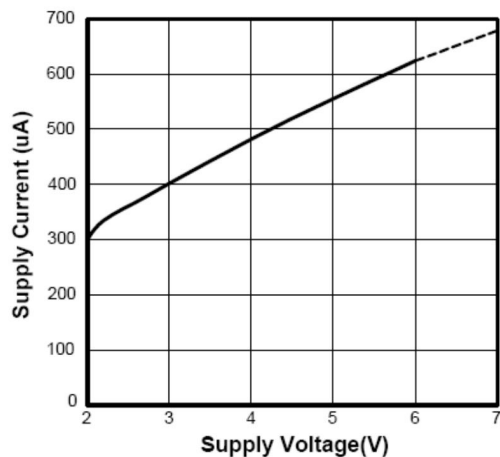


[ Measurement condition for arrival distance ]

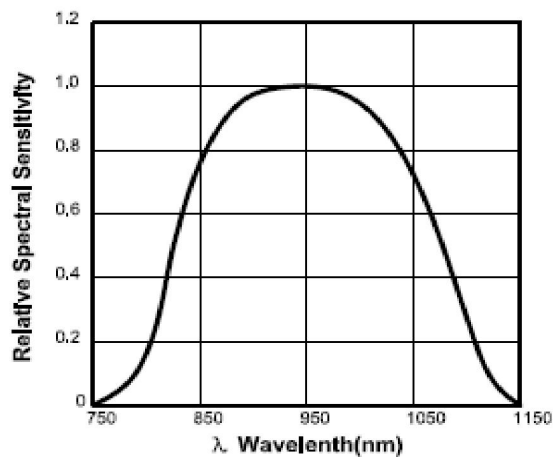
☞ Ambient light source : Detecting surface illumination shall be irradiate  $200 \pm 50 \text{Lux}$  under ordinary white fluorescence lamp without high frequency lighting

## Electrical / Optical Characteristics (Ta=25°)

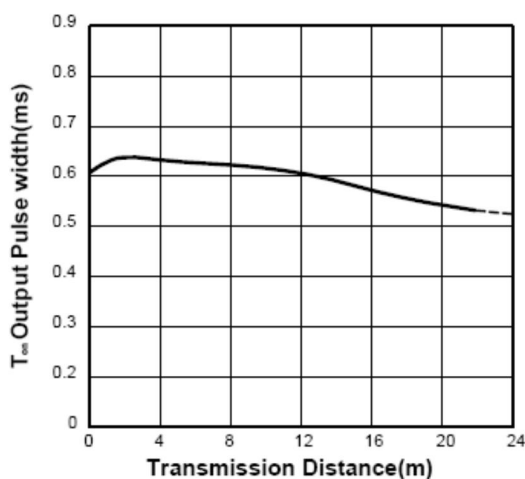
[ Fig.4 ] Supply Current vs. Voltage



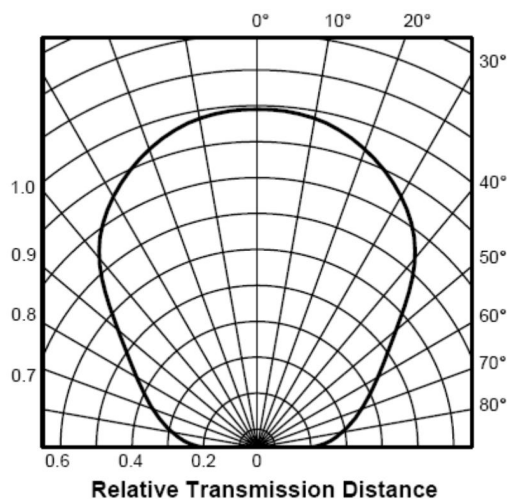
[ Fig.5 ] Relative Spectral Sensitivity



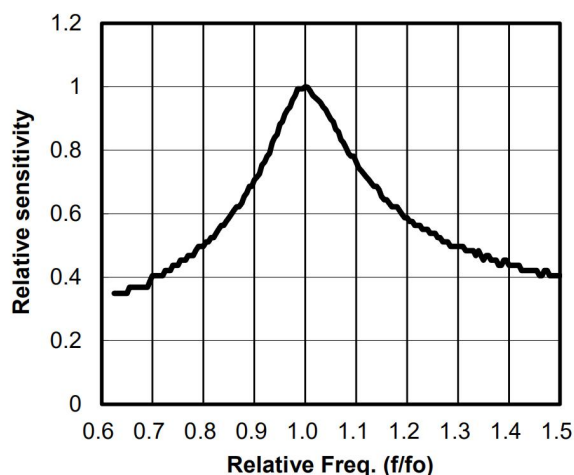
[ Fig.6 ] Output Pulse Width vs. Distance



[ Fig.7 ] Directivity



[ Fig.8 ] B.P.F Fc Curve



ESD Test Results

| Parameter            | Specification | Results  |
|----------------------|---------------|----------|
| Machine Model        | Min ±200V     | > ±400V  |
| Human Body Model     | Min ±2000V    | > ±4000V |
| Charged Device Model | Min ±400V     | > ±600V  |



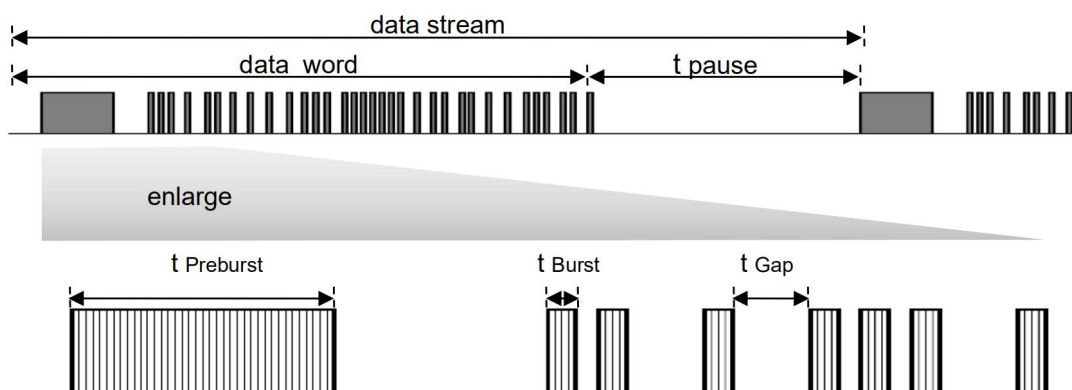
| Item                     | Symbol  | Time       |
|--------------------------|---|------------|
| Minimum Data word length | -   | Max. 100ms |
| Minimum Burst length     | $t_{Burst}$   | Min. 300us |
| Minimum Gap Time         | $t_{Gap}$   | Min. 350us |
| Minimum data pause time  | $t_{Pause}$   | Min. 50ms  |
| Required data pause time | $t_{Pause} > \{ (\sum t_{Burst} * 2) / 2.5 \} + 30$ |            |

\* note 1)

:  $t_{Pause\_min}$  Could be changed by different data word format.

Therefore, for new application on sets please refer to "Required data pause time( $t_{Pause}$ )" on above.

[ Fig. 9 ] Data Signal diagram



- $t_{Burst}$  ; length of a burst in pulses of the carrier frequency.
- $t_{Gap}$  ; length of the gap between two burst in pulses of carrier.
- $t_{pause}$  ; length of the pause between two data words.
- $t_{Preburst}$  ; lead code of data word

### External Application Circuit - Power Noise reduction & ESD Protection

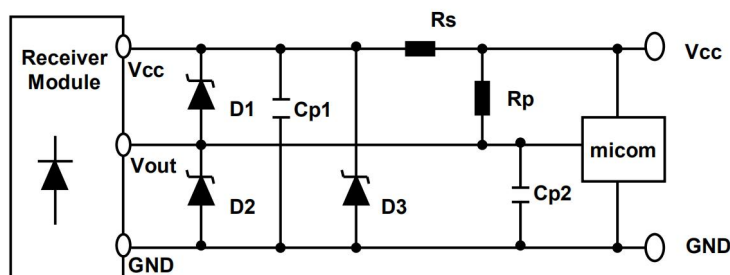
A further influence to the IR receiver modules may come from a supply voltage which is not stable. Such a disturbed supply voltage can be caused by switching power supply.

which is not filtered well or by other components in the circuit which produced spikes on the supply line.

This disturbed supply will reduce the sensitivity of receiver modules.

This application circuit will filter the disturbed supply voltage.

[ Fig 10 ] Application for power supply ripple suppression



| Component   | Recommend                                  |
|-------------|--|
| 1) $R_s$    | Typ. 100ohm (47 $\Omega$ ~470 $\Omega$ )   |
| 2) $C_{p1}$ | Typ. 100uF (47uF~100uF)                    |
| 3) $R_p$    | Optional (10k $\Omega$ or more)            |
| 4) $C_{p2}$ | Typ. 1nF (1nF ~ 10nF)                      |
| 5) D1~D3    | Zener diode or TVS (ESD Protection device) |

### Reliability Test Items

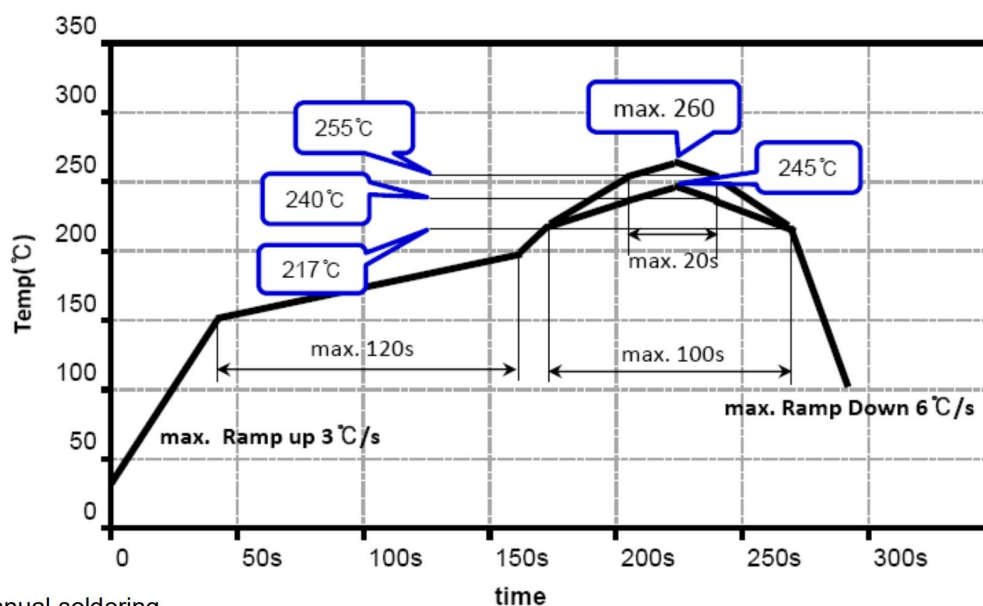
| Parameter                 | Test conditions                      | Remark   |
|---------------------------|--------------------------------------|----------|
| High Temperature          | Ta=+85, Vcc=5.0V t=240h              | ※ 1, ※ 2 |
| Low Temperature           | Ta=-30, Vcc=5.0V t=240h              | ※ 1, ※ 2 |
| High Temp./ High Humidity | Ta=+85℃ 85%RH, Vcc=5.0V t=240h       | ※ 1, ※ 2 |
| Heat Cycle                | Ta=-20℃(0.5h) to +85℃(0.5h) 20 cycle | ※ 2, ※ 3 |
| Fall Test                 | Height=75cm, 3 times                 | ※ 4      |

- ※ 1. Supply voltage of load test is 5V.
- ※ 2. Electro-optical characteristics shall be satisfied after leaving 2 hours in the normal condition.
- ※ 3. Heat cycle test shall repeat above condition 20 times under no load.
- ※ 4. The test devices shall be dropped three time on the hard wooden board from a height of 75cm.

### Material Configuration

| Parameter    | Configuration                          | Remark |
|--------------|--|--------|
| IC           | Silicon(99%)                           |        |
| Photo diode  | Silicon(99%)                           |        |
| Lead frame   | Copper(99.5%), Silver(0.5%)            |        |
| Epoxy resin  | Resin(55.5%), Hardener(45.5%)          |        |
| Silver epoxy | Silver(80%), Resin(10%), Hardener(10%) |        |
| Bond wire    | Gold(99.99%)                           |        |

### Lead(Pb)-Free Reflow Solder Profile



- ※ Manual soldering
- Use a soldering iron of 25W or less. Adjust the temperature of the soldering iron below 260℃.

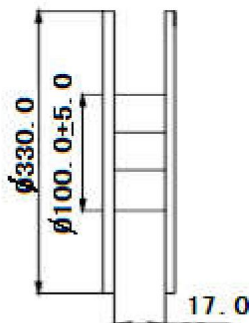
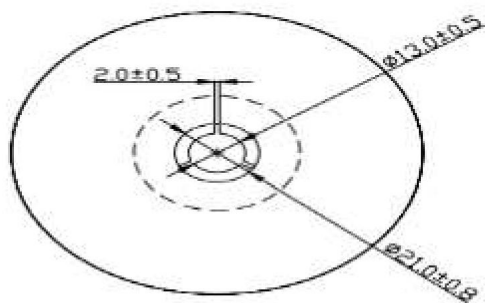
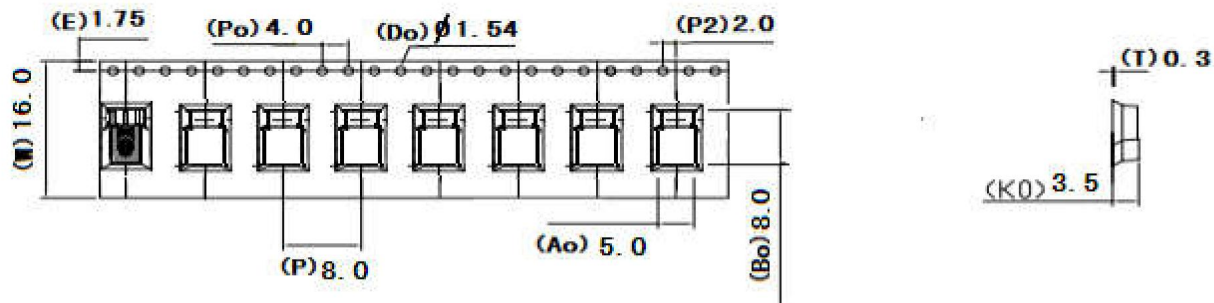
## Packing Quantity Specification

1. 2500Pcs/1Reel,2 Reel/1Box
2. 4Boxes/1Carton

## Label Form Specification

|                    |  |
|--------------------|--|
| 製品名<br>PRODUCT     |  |
| コードNo.<br>CODE No. |  |
| 数量<br>Q'TY         |  |
| ロットNo.<br>LOT No.  |  |
| 備考<br>REMARKS      |  |
|                    |  |

- PRODUCT: Part Number
- CODE NO.: Product Serial Number
- QTY: Packing Quantity
- LOT No: Lot Number
- REMARKS:Remarks





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