Infrared Remote-control Receiver Module

MODEL NO : IRM-8601S

Features :
• High protection ability to EMI and metal case can be customized.
• Mold type and metal case type to meet the design of front panel.
• Elliptic lens to improve the characteristic against
• Line-up for various center carrier frequencies.
• Low voltage and low power consumption.
• High immunity against ambient light.
• Photodiode with integrated circuit.
• TTL and CMOS compatibility.
• Long reception distance.
• High sensitivity.

Description :
• The device is a miniature type infrared remote control system receiver which has been developed and designed by utilizing the most updated IC technology. The PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as an IR filter. The demodulated output signal can directly be decoded by a microprocessor.

Applications :
1. Optical switch
2. Light detecting portion of remote control
• AV instruments such as Audio, TV, VCR, CD, MD, etc.
• Home appliances such as Air-conditioner, Fan, etc.
• The other equipments with wireless remote control.
• CATV set top boxes
• Multi-media Equipment

<table>
<thead>
<tr>
<th>PART</th>
<th>MATERIAL</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chip</td>
<td>Silicon</td>
<td>Black</td>
</tr>
<tr>
<td>Shell</td>
<td>Tinplate</td>
<td>Silver-white</td>
</tr>
</tbody>
</table>
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NOTES :
1. This drawing measure is a standard value. All dimensions are in millimeter.
2. In case of designation is tolerance ± 0.3mm.
3. Lead spacing is measured where the lead emerge from the package.
4. Protruded resin under flange 1.0mm Max.
5. Lens color: Black.
6. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
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Absolute Maximum Ratings at $T_A = 25°C$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
<th>Notice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>Vcc</td>
<td>0~6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>Topr</td>
<td>-30~+85</td>
<td>℃</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>Tstg</td>
<td>-40~+85</td>
<td>℃</td>
<td></td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td>Tsol</td>
<td>260</td>
<td>℃</td>
<td>4mm from mold body less than 5 seconds</td>
</tr>
</tbody>
</table>

Electronic Optical Characteristics : $T_A = 25°C$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>Unit</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>Vcc</td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
<td>V</td>
<td>DC voltage</td>
</tr>
<tr>
<td>Supply Current</td>
<td>Icc</td>
<td>---</td>
<td>---</td>
<td>3</td>
<td>mA</td>
<td>No signal input</td>
</tr>
<tr>
<td>B.P.F Center Frequency</td>
<td>Fo</td>
<td>---</td>
<td>38</td>
<td>---</td>
<td>KHz</td>
<td></td>
</tr>
<tr>
<td>Peak Wavelength</td>
<td>$\lambda_p$</td>
<td>---</td>
<td>940</td>
<td>---</td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Reception Distance</td>
<td>D</td>
<td>8</td>
<td>---</td>
<td>---</td>
<td>m</td>
<td>At the ray axis $^1$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half Angle(Horizontal)</td>
<td>$\Theta_h$</td>
<td>---</td>
<td>45</td>
<td>---</td>
<td>deg</td>
<td></td>
</tr>
<tr>
<td>Half Angle(Vertical)</td>
<td>$\Theta_v$</td>
<td>---</td>
<td>35</td>
<td>---</td>
<td>deg</td>
<td></td>
</tr>
<tr>
<td>High Level Pulse Width</td>
<td>$T_H$</td>
<td>400</td>
<td>---</td>
<td>800</td>
<td>$\mu$s</td>
<td>At the ray axis $^2$</td>
</tr>
<tr>
<td>Low Level Pulse Width</td>
<td>$T_L$</td>
<td>400</td>
<td>---</td>
<td>800</td>
<td>$\mu$s</td>
<td></td>
</tr>
<tr>
<td>High Level Output Voltage</td>
<td>$V_H$</td>
<td>4.5</td>
<td>---</td>
<td>---</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Low Level Output Voltage</td>
<td>$V_L$</td>
<td>---</td>
<td>0.2</td>
<td>0.5</td>
<td>V</td>
<td></td>
</tr>
</tbody>
</table>
Appendix of Page 3:

*1: The ray receiving surface at a vertex and relation to the ray axis in the range of $\phi = 0^\circ$ and $\phi = 45^\circ$.
*2: A range from 30cm to the arrival distance. Average value of 50 pulses.

Test Method:
The specified electro-optical characteristics is satisfied under the following Conditions at the controllable distance.

1. Measurement place
   - A place that is nothing of extreme light reflected in the room.
2. External light
   - Project the light of ordinary white fluorescent lamps which are not high frequency lamps and must be less then 10 Lux at the module surface.
   $(E_e \leq 10\text{Lux})$
3. Standard transmitter
   - A transmitter whose output is so adjusted as to $V_o = 400mV_{p-p}$ and the output Wave form shown in Fig.-1.According to the measurement method shown in Fig.-2 the standard transmitter is specified.
   However , the infrared photodiode to be used for the transmitter should be $\lambda_p = 940\text{nm,} \Delta \lambda = 50\text{nm}$. Also, photodiode is used of PD438B $(V_r=5V)$.
   (Standard light / Light source temperature $2856^\circ\text{K}$).
4. Measuring system
   - According to the measuring system shown in Fig.-3

Block Diagram:
Infrared Remote-control Receiver Module

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■ Application Circuit :

RC Filter should be connected closely between Vcc pin and GND pin.

Fig.-1 Transmitter Wave Form

Fig.-2 Measuring Method

Fig.-3 Measuring System
Infrared Remote-control Receiver Module

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TYPICAL ELECTRICAL/OPTICAL/CHARACTERISTICS CURVES

- Fig.-4 Relative Spectral Sensitivity vs. Wavelength
- Fig.-5 Relative Transmission Distance vs. Direction
- Fig.-6 Output Pulse Length vs. Arrival Distance
- Fig.-7 Arrival Distance vs. Supply Voltage
- Fig.-8 Relative Transmission Distance vs. Center Carrier Frequency
- Fig.-9 Arrival Distance vs. Ambient Temperature
## Reliability Test Item And Condition

The reliability of products shall be satisfied with items listed below.

- **Confidence level:** 90%
- **LTPD:** 10%

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Test Conditions</th>
<th>Failure Judgement Criteria</th>
<th>Samples(n)</th>
<th>Defective(c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation life</td>
<td>Vcc=5V, Ta: 25°C, 1000hrs</td>
<td></td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>Temperature cycle</td>
<td>1 cycle: -40°C to +100°C (30min)(5min)(30min) 50 cycle test</td>
<td>( L_0 \leq L \times 0.8 ) ( L_{45} \leq L \times 0.8 )</td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>Thermal shock</td>
<td>-10°C to +100°C (5min) (10sec) (5min) 50 cycle test</td>
<td></td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>High temperature storage</td>
<td>Temp: +85°C, 1000hrs</td>
<td></td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>Low temperature storage</td>
<td>Temp: -40°C, 1000hrs</td>
<td></td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>High temperature High humidity</td>
<td>Ta: 85°C, RH: 85%, 1000hrs</td>
<td></td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>Solder heat</td>
<td>Temp: 260± 5°C, 5sec, 4mm from the bottom of the package</td>
<td></td>
<td>n=22, c=0</td>
<td></td>
</tr>
<tr>
<td>Solderability</td>
<td>Temp: 230± 5°C, 5sec, 4mm from the bottom of the package</td>
<td>More than 90% of Lead to be covered by soldering</td>
<td>n=22, c=0</td>
<td></td>
</tr>
</tbody>
</table>
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■ Packing Specifications

1. Bag

![Diagram of Bag packaging with dimensions and label]

2. Box

![Diagram of Box packaging with dimensions and label]

3. Carton

![Diagram of Carton packaging with dimensions and label]

■ Packing Quantity Specification

1. 250 Pcs/1Bag, 6 Bags/1Box
2. 10 Boxes/1Carton

CPN: Customer’s Production Number
P/N: Production Number
QTY: Packing Quantity
CAT: Ranks
HUE: Peak Wavelength
REF: Reference
LOT NO: Lot Number
MADE IN TAIWAN: Production place