



## Technical Data Sheet

# Infrared Remote-control Receiver Module

### IRM-36xxB SERIES

#### Features

- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Low power consumption
- Improved immunity against ambient light
- Suitable burst length  $\geq 10$  cycles/burst
- Pb free
- BiCMOS manufacture IC ; ESD HBM>4000V ; MM>375V
- The product itself will remain within RoHS compliant version.



#### Descriptions

The IRM-36xxB SERIES are miniaturized receivers for infrared remote control systems. PIN diode 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. IRM-36xxB SERIES is the standard IR remote control receiver series, supporting all major transmission codes.

#### Applications

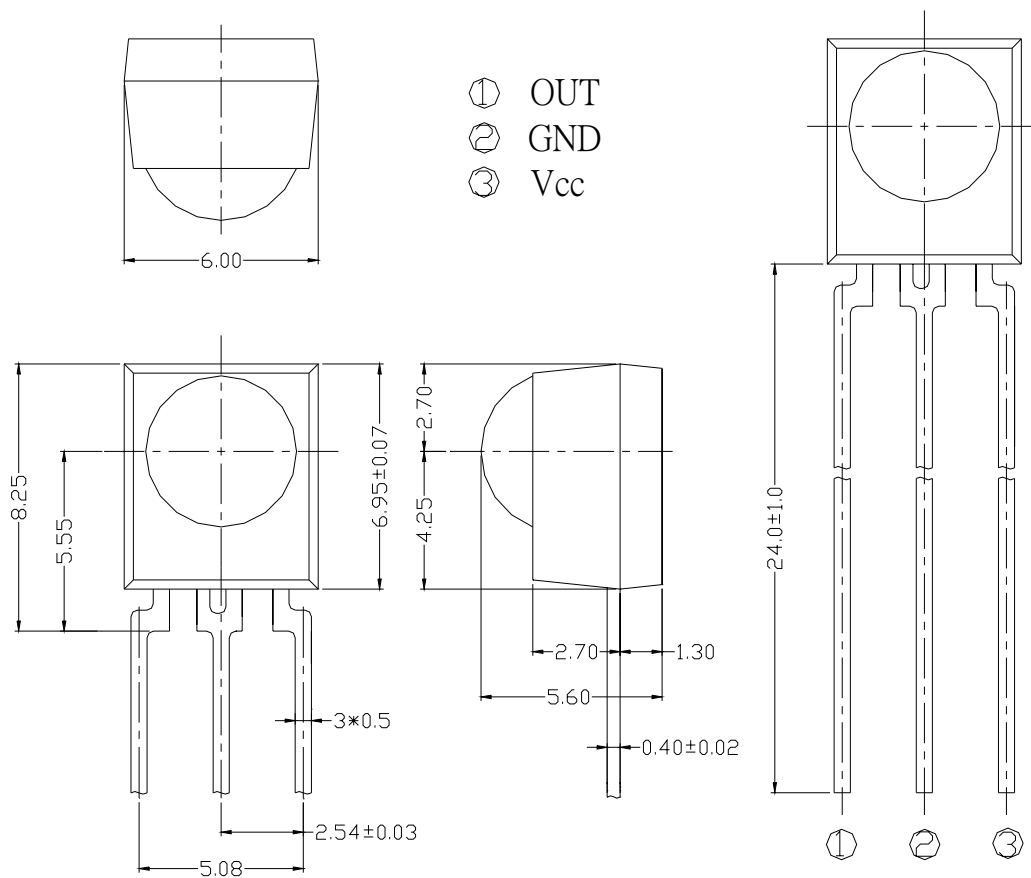
Light detecting portion of remote control

- 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

| PART     | MATERIAL | COLOR |
|----------|----------|-------|
| Chip     | Silicon  | ---   |
| Compound | Epoxy    | Black |

**IRM-36xxB SERIES**

**Package Dimensions**



- Notes:** 1.All dimensions are in millimeters.  
 2.Tolerances unless dimensions  $\pm 0.3$ mm.

**Available Types For Different Carrier Frequencies**

| Type      | Carrier Frequencies(Typ) |
|-----------|--------------------------|
| IRM-3638B | 38 kHz                   |

**IRM-36xxB SERIES**
**Absolute Maximum Ratings (Ta=25°C)**

| Parameter             | Symbol | Rating    | Unit | Notice                                     |
|-----------------------|--------|-----------|------|--------------------------------------------|
| Supply Voltage        | Vcc    | 6         | V    |                                            |
| Operating Temperature | Topr   | -25 ~ +85 | °C   |                                            |
| Storage Temperature   | Tstg   | -25 ~ +85 | °C   |                                            |
| Soldering Temperature | Tsol   | 260       | °C   | 4mm from mold body<br>less than 10 seconds |

**Recommended Operating Condition**

Supply Voltage Rating: Vcc 2.7V to 5.5V, TYP. 3V

**Electro-Optical Characteristics (Ta=25°C, and Vcc=3 V)**

| Parameter                 | Symbol          | MIN. | TYP. | MAX. | Unit    | Condition             |
|---------------------------|-----------------|------|------|------|---------|-----------------------|
| Consumption Current       | Icc             | ---  | 0.8  | 1.0  | mA      | No signal input       |
| Peak Wavelength           | $\lambda_p$     | ---  | 940  | ---  | nm      |                       |
| Reception Distance        | L <sub>0</sub>  | ---  | 14   | ---  | m       | At the ray axis<br>*1 |
|                           | L <sub>45</sub> | ---  | 6    | ---  |         |                       |
| Half Angle(Horizontal)    | $\Theta_h$      | ---  | 45   | ---  | deg     |                       |
| Half Angle(Vertical)      | $\Theta_v$      | ---  | 45   | ---  | deg     |                       |
| High Level Pulse Width    | T <sub>H</sub>  | 400  | ---  | 800  | $\mu s$ | At the ray axis<br>*2 |
| Low Level Pulse Width     | T <sub>L</sub>  | 400  | ---  | 800  | $\mu s$ |                       |
| High Level Output Voltage | V <sub>H</sub>  | 2.7  | ---  | ---  | V       |                       |
| Low Level Output Voltage  | V <sub>L</sub>  | ---  | ---  | 0.25 | V       |                       |

\*1:The ray receiving surface at a vertex and relation to the ray axis in the range of  $\theta=0^\circ$  and  $\theta=45^\circ$ .

\*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

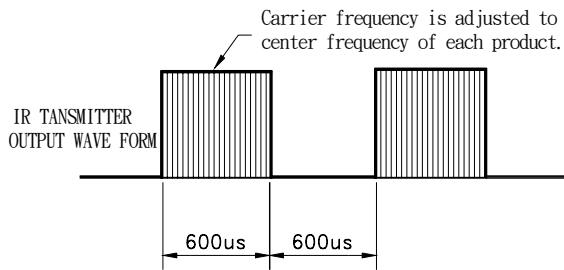
A transmitter whose output is so adjusted as to  $V_o=400\text{mVp-p}$  and the output Wave form shown in Fig.-1. According to the measurement method shown in Fig.-2 the standard transmitter is specified.

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( $V_r=5\text{V}$ ).

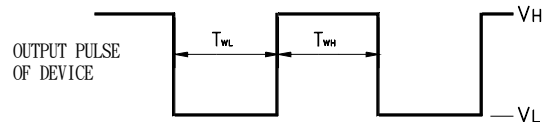
④ Measuring system

According to the measuring system shown in Fig.-3

Fig.-1 Transmitter Wave Form



D.U.T output Pulse



Duty=0.5

**IRM-36xxB SERIES**

Fig.-2 Measuring Method

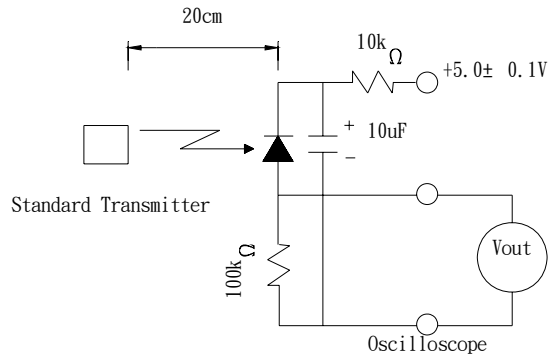
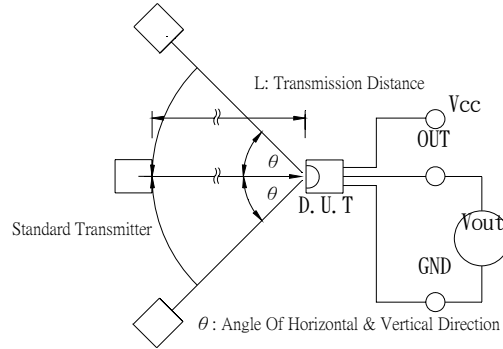
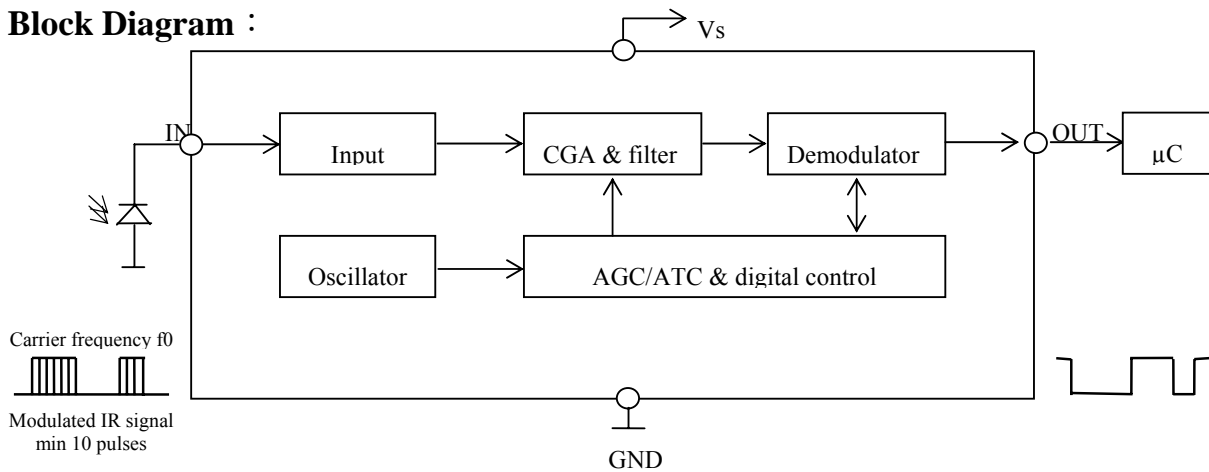


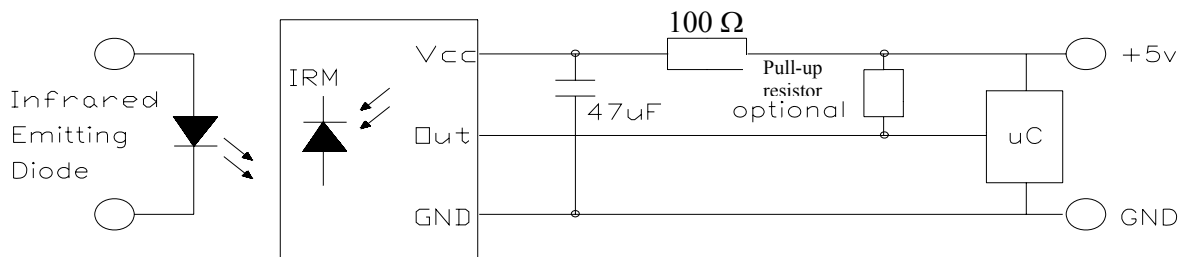
Fig.-3 Measuring System



**Block Diagram :**



**Application Circuit :**



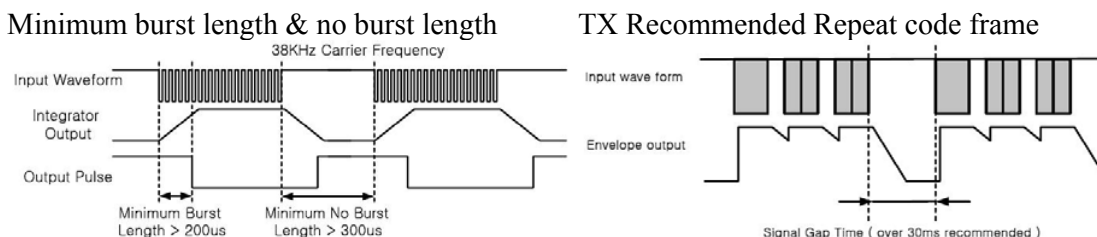
RC Filter should be connected closely between Vcc pin and GND pin.

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**The Notice of Application:**

Transmission o remote control signal consist of four parts: Encode Part, IR Transmitter Source, IRM device, Decode Part

1. When IRM-36xxB code select frequency, it need to well understand the center system of encode part.
2. Strong or weak light of IR Transmitter can affect distance of transmission.
3. When using IRM-36xxB device, it requires the composition of code pattern to reach the demand as follows:



- \*Minimum Burst Length > 200μs
- \*Minimum No Burst Length > 300μs

\*Signal Gap Time > 30ms

4. It needs to ensure the translation range of decode part if it is applied to the pulse-width range.

If the above items hardly assure of its application, it'll cause NG(no good) message from the edge of signal.

**IRM-36xxB Code Property:**

|                             | Simple Code | Repeat Code                    |
|-----------------------------|-------------|--------------------------------|
| Grundig code                | Best        | Suppressed after a few seconds |
| NEC code                    | Best        | Best                           |
| RC5 code                    | Best        | Best                           |
| RC6 code                    | Best        | Best                           |
| RCMM code                   | NG          | NG                             |
| RCS-80 code                 | NG          | NG                             |
| RCA code                    | NG          | NG                             |
| Sharp code                  | Best        | Best                           |
| Sony 12-bit code            | Best        | Good                           |
| Sony 15-bit code            | Best        | Suppressed after a few seconds |
| Sony 20-bit code            | Good        | Suppressed after a few seconds |
| Standard data rate code     | Best        | Best                           |
| High data rate (4000 bit/s) | NG          | NG                             |

**Typical Electro-Optical Characteristics Curves**

Fig.-4 Relative Spectral Sensitivity vs. Wavelength

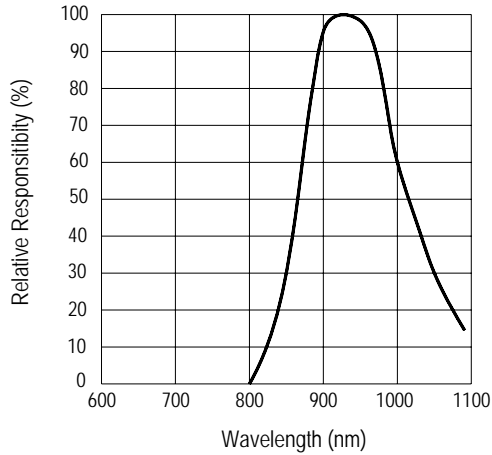


Fig.-5 Relative Transmission Distance vs. Direction

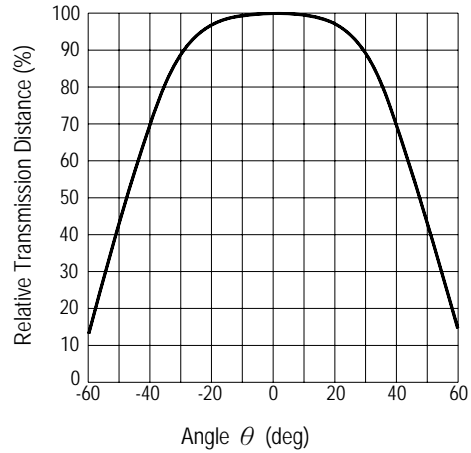


Fig.-6 Arrival Distance vs. Ambient Temperature

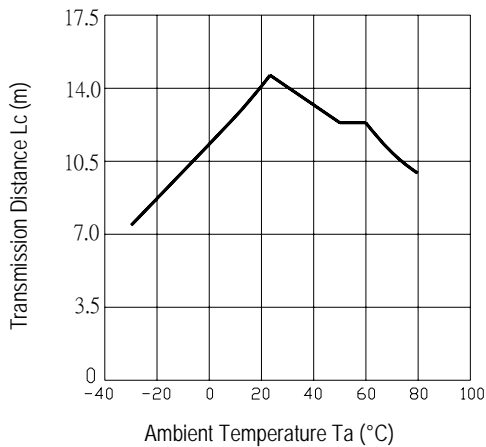


Fig.-7 Arrival Distance vs. Supply Voltage

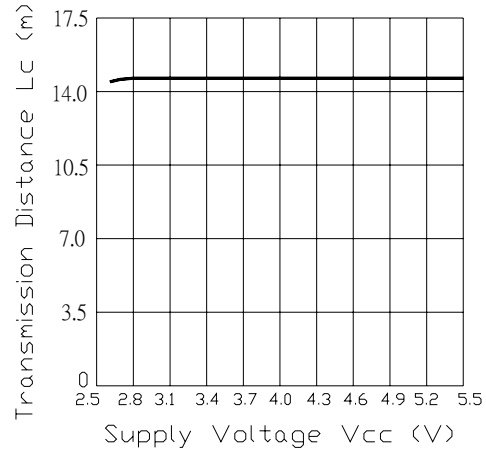


Fig.-8 Output Pulse Length vs. Arrival Distance

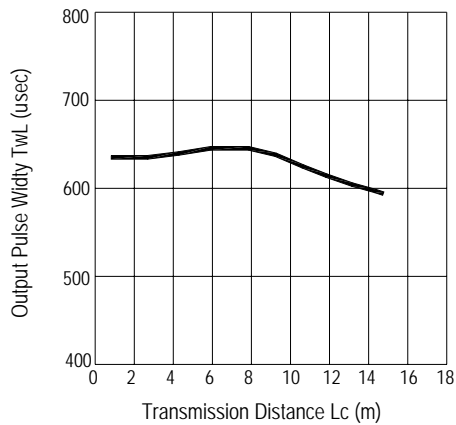
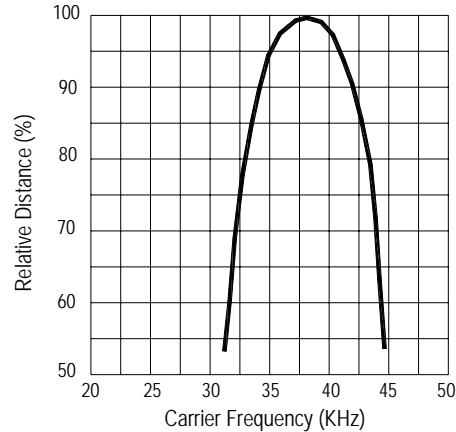


Fig.-9 Relative Transmission Distance vs. Center Carrier Frequency



**IRM-36xxB SERIES**

**Reliability Test Item And Condition**

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

Confidence level : 90%

LTPD : 10%

| Test Items                     | Test Conditions                                                 | Failure Judgement Criteria                                                            | Samples(n)<br>Defective(c) |
|--------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------|
| Temperature cycle              | 1 cycle -25°C ↔ +85°C<br>(30min)(5min)(30min)<br>300 cycle test | $L0 \leq L \times 0.8$<br>$L45 \leq L \times 0.8$<br><br>L: Lower specification limit | n=22,c=0                   |
| High temperature test          | Temp: +85°C<br>Vcc:5V<br>1000hrs                                |                                                                                       | n=22,c=0                   |
| Low temperature storage        | Temp: -25°C<br>1000hrs                                          |                                                                                       | n=22,c=0                   |
| High temperature High humidity | Ta: 85°C,RH:85%<br>1000hrs                                      |                                                                                       | n=22,c=0                   |
| Solder heat                    | Temp: 260±5°C 10sec<br>4mm From the bottom of the package.      |                                                                                       | n=22,c=0                   |



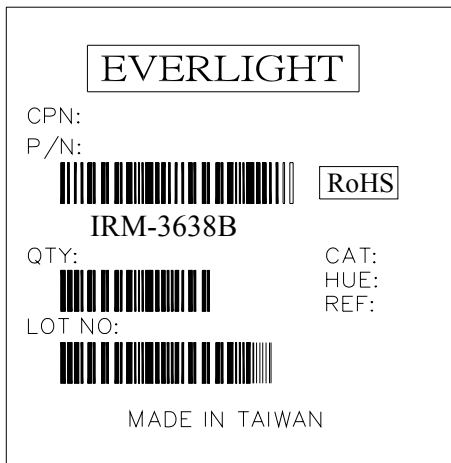


**IRM-36xxB SERIES**

**Packing Quantity Specification**

1. 1500PCS/1Box
2. 10Boxes/1Carton

**Label Form Specification**



CPN: Customer's Production Number  
P/N : Production Number  
QTY: Packing Quantity  
CAT: Ranks  
HUE: None  
REF: Reference  
LOT No: Lot Number  
MADE IN TAIWAN: Production Place

**Notes**

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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