



## Technical Data Sheet

### Infrared Remote-control Receiver Module

**IRM-2133**

#### ■ Features :

- High protection ability against EMI .
- Circular lens to improve the receive characteristic.
- 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

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

Device NO: **DMO-021-154**

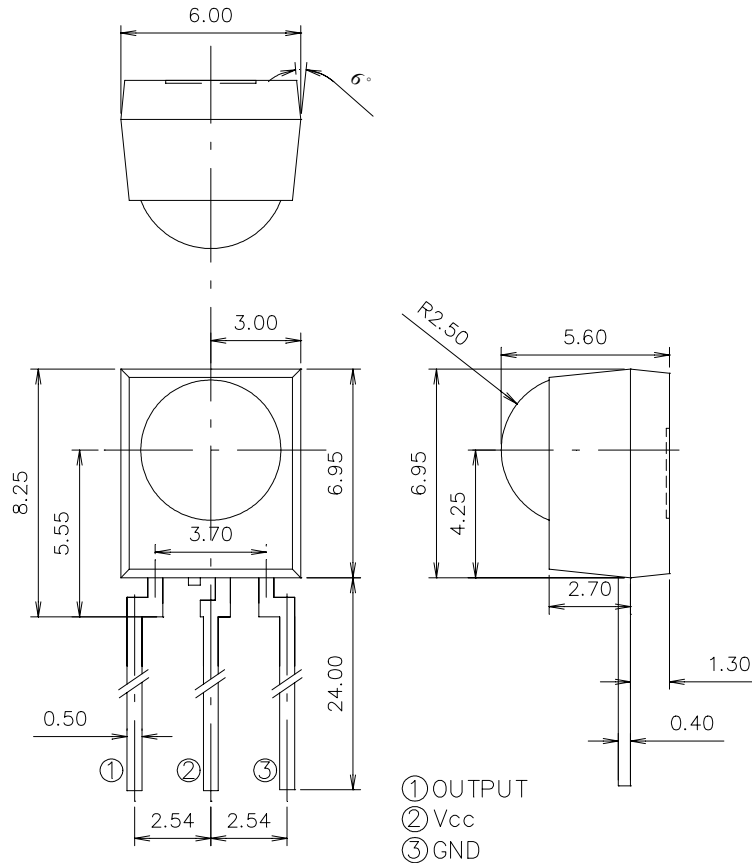


## Technical Data Sheet

### Infrared Remote-control Receiver Module

**IRM-2133**

#### Package Dim



#### NOTES :

1. All dimensions are in millimeters.
2. In case of designation is tolerance  $\pm 0.3\text{mm}$ .

#### Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

| Parameter             | Symbol | Rating    | Unit | Notice                                    |
|-----------------------|--------|-----------|------|-------------------------------------------|
| Supply Voltage        | Vcc    | 0~6       | V    |                                           |
| Operating Temperature | Topr   | -25 ~ +80 | °C   |                                           |
| Storage Temperature   | Tstg   | -40 ~ +85 | °C   |                                           |
| Soldering Temperature | Tsol   | 260       | °C   | 4mm from mold body<br>less than 5 seconds |

Device NO: DMO-021-154

**Electronic Optical Characteristics :**
**TA = 25°C**

| Parameter                 | Symbol          | MIN. | TYP. | MAX. | Unit    | Condition             |
|---------------------------|-----------------|------|------|------|---------|-----------------------|
| Supply Voltage            | V <sub>CC</sub> | 4.5  | 5    | 5.5  | V       | DC voltage            |
| Supply Current            | I <sub>CC</sub> | ---  | ---  | 3    | mA      | No signal input       |
| B.P.F Center Frequency    | F <sub>0</sub>  | ---  | 33   | ---  | KHz     |                       |
| Peak Wavelength           | $\lambda_p$     | ---  | 940  | ---  | nm      |                       |
| Reception Distance        | L <sub>0</sub>  | 12   | ---  | ---  | m       | At the ray axis<br>*1 |
|                           | L <sub>45</sub> | 5    | ---  | ---  |         |                       |
| 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>  | 4.5  | ---  | ---  | V       |                       |
| Low Level Output Voltage  | V <sub>L</sub>  | ---  | 0.2  | 0.5  | V       |                       |

**Appendix of Page 3 :**

\*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

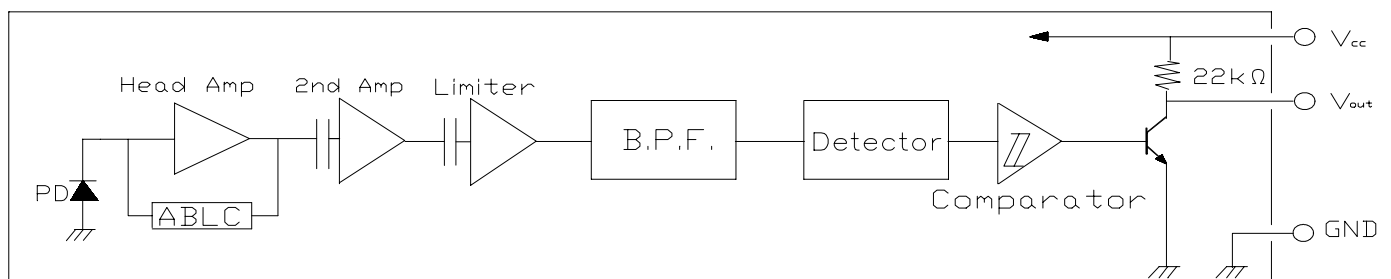
A transmitter whose output is so adjusted as to  **$V_o=400\text{mVp-p}$**  and the output Wave form shown in Fig.-1. According to the measurement method shown in Fig.-2 the standard transmitter is specified.

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( $V_r=5\text{V}$ ).  
(Standard light / Light source temperature  $2856^\circ\text{K}$ ).

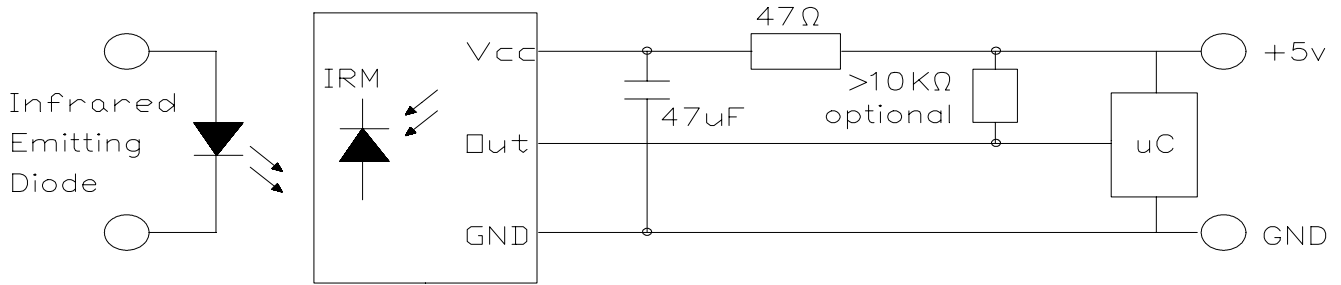
### ④ Measuring system

According to the measuring system shown in Fig.-3

## ■ Block Diagram :



■ **Application Circuit :**



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

Fig.-1 Transmitter Wave Form

D.U.T output Pulse

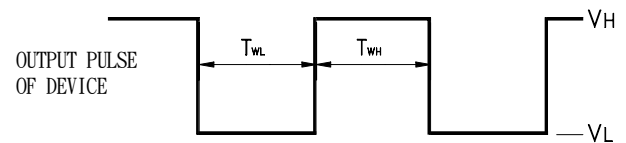
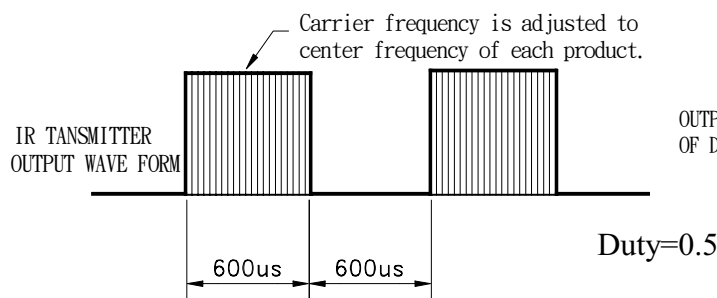
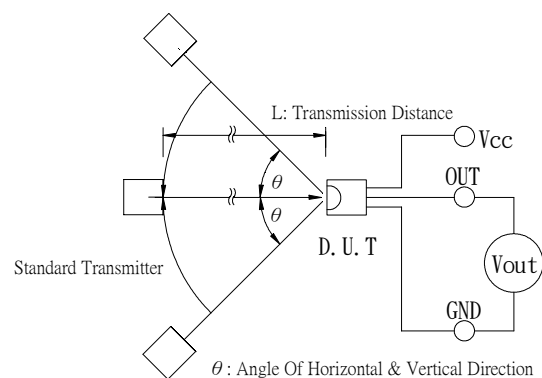
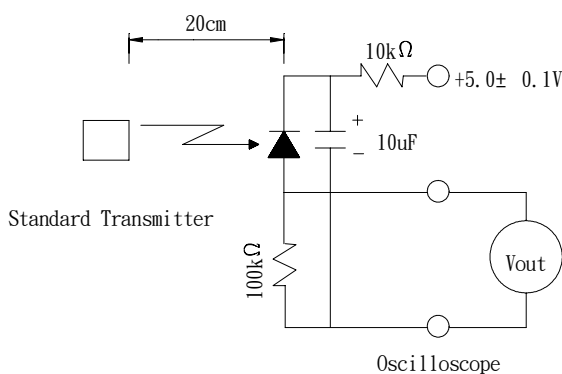


Fig.-2 Measuring Method

Fig.-3 Measuring System



## ■ TYPICAL ELECTRICAL/OPTICAL/CHARACTERISTICS CURVES

Fig.-4 Relative Spectral Sensitivity vs. Wavelength    Fig.-5 Relative Transmission Distance vs. Direction

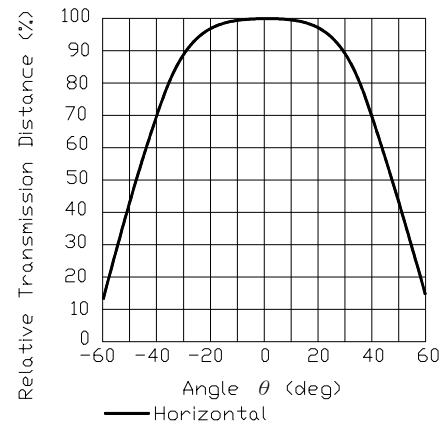
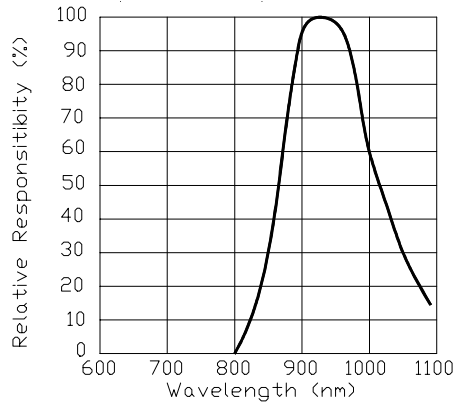


Fig.-6 Output Pulse Length vs. Arrival Distance

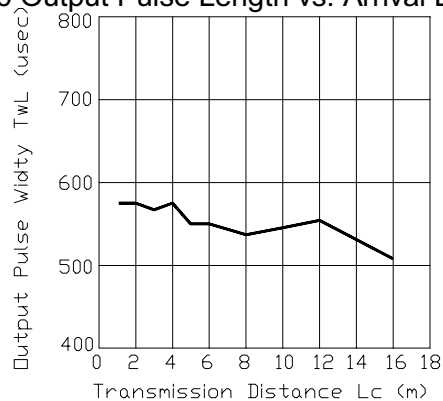


Fig.-7 Arrival Distance vs. Supply Voltage

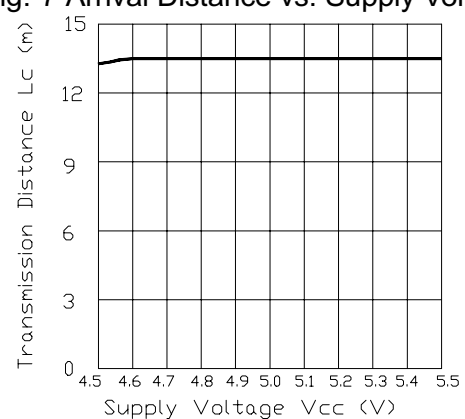


Fig.-8 Relative Transmission Distance vs. Center Carrier Frequency

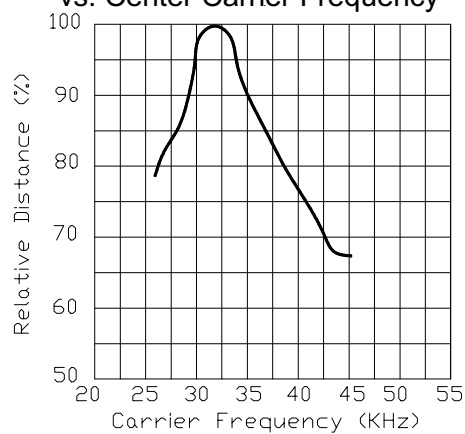
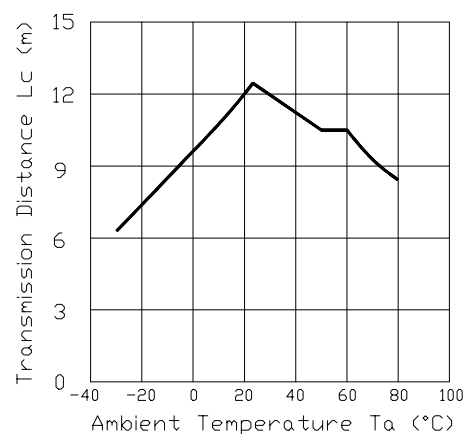


Fig.-9 Arrival Distance vs. Ambient Temperature





## IRM-2133

### 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 -40°C +25°C +85°C<br>(30min)(5min)(30min)<br>300 cycle test | $L_0 \leq L \times 0.8$<br>$L_{45} \leq L \times 0.8$<br><br>L: Lower<br>specification limit | n=22,c=0                   |
| High temperature test             | Temp: +85°C<br>Vcc:6V<br>1000hrs                                    |                                                                                              | n=22,c=0                   |
| Low temperature storage           | Temp: -40°C<br>1000hrs                                              |                                                                                              | n=22,c=0                   |
| High temperature<br>High humidity | Ta: 60°C, RH:90%<br>Vcc:6V<br>1000hrs                               |                                                                                              | n=22,c=0                   |
| Solder heat                       | Temp: 260± 5°C 10sec<br>4mm From the bottom of the<br>package.      |                                                                                              | n=22,c=0                   |

**EVERLIGHT ELECTRONICS CO., LTD.**

Tel: 886-2-2267-2000, 2267-9936

Office: No 25, Lane 76, Sec 3, Chung Yang Rd,

Fax: 886-2267-6244, 2267-6189, 2267-6306

Device NO: **DMO-021-154**