

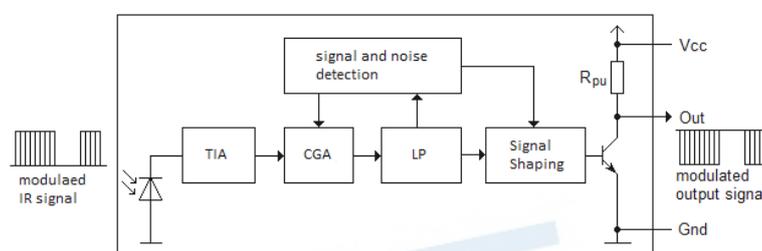
Infrared Receiver Module IRM-3600JW



Pin Configuration

1. Out
2. Gnd
3. V_{CC}

Fig.-1 Block Diagram



Features

- Modulated output signal
- Wide frequency range (20-60kHz)
- improved protection ability against EMI
- Circular lens for improved reception characteristics
- Low operating voltage and low power consumption
- High immunity against ambient light
- Pb free and RoHS compliant
- Compliance with EU REACH
- Compliance Halogen Free (Br < 900ppm, Cl < 900ppm, Br+Cl < 1500ppm)

Description

The IRM-3600JW devices are DIP type infrared receivers which have been developed and designed by using the latest IC technology, providing compatibility to most common IR protocols.

The PIN diode and preamplifier are assembled onto a lead frame and molded into a black epoxy package which operates as an IR filter. The modulated output signal can be used for code learning or IR repeater applications.

Applications

- Code learning
- IR repeater
- AV equipment such as TV, STB, DVD, etc.
- Multi-media Equipment
- Other devices using IR remote control

Part number table

Model No.	Carrier Frequency f_c
IRM-3600JW	20-60 kHz

Absolute Maximum Ratings ($T_a=25^\circ\text{C}$) (note1)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	0 ~ 6	V
Output current	I_{OUT}	2.0	mA
Operating Temperature	T_{opr}	-20 ~ +80	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 ~ +85	$^\circ\text{C}$
Soldering Temperature (note2)	T_{sol}	260	$^\circ\text{C}$

Electro-Optical Characteristics ($T_a=25^\circ\text{C}$, $V_{CC}=3\text{V}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Current consumption	I_{CC}	---	0.3	0.6	mA	No input signal
Supply voltage	V_{CC}	2.7	---	5.5	V	
Peak wavelength	λ_p	---	940	---	nm	
High level output voltage	V_{OH}	$V_{CC}-0.4$	---	---	V	Output open
Low level output voltage	V_{OL}	---	0.2	0.5	V	$I_{OUT} \leq 0.5\text{mA}$
Max Reception range	L_{0max}	5	---	---	m	See chapter 'Test method' $F_{in}=38\text{kHz}$ $T_{OB}= T_B \pm 3 \text{ cycles}$ $T_{OG}= T_G \pm 3 \text{ cycles}$
	L_{45max}	2	---	---		
Min reception distance	L_{0min}	---	---	0.1		
Half angle(horizontal)	Φ_h	---	± 35	---	deg	
Half angle(vertical)	Φ_v	---	± 35	---	deg	

Note1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.

Note2: 4mm from mold body for less than 10 seconds

Test method

The specified electro-optical characteristics are valid under the following conditions.

1. Measurement environment must be a place without extreme reflections
2. Transmitter radiant intensity $I_e = 80\text{mW/sr}$
3. External lighting contains LED lighting with a color temperature of 6000K and illumination at the IR receiver is less than 100lux ($E_v \leq 100\text{Lux}$)
4. Test signal as shown below in figure 2

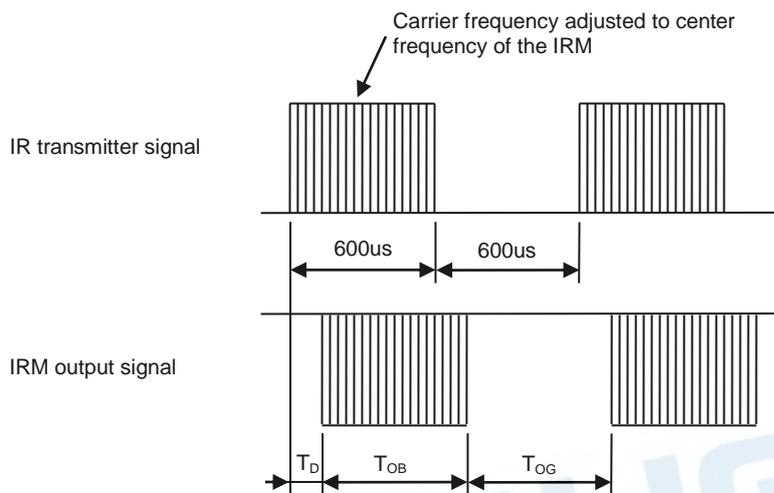


Fig.2 test signal and IRM output signal for reception distance and viewing angle test

Typical Electro-Optical Characteristics Curves

Fig.4 Relative Responsibility vs. Wavelength

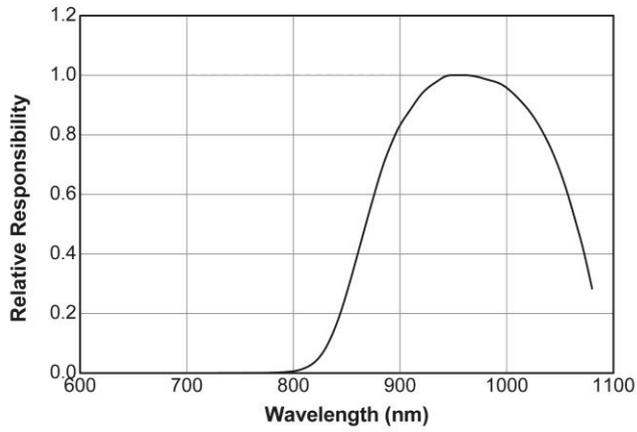


Fig.-5 Relative Sensitivity vs. Angle

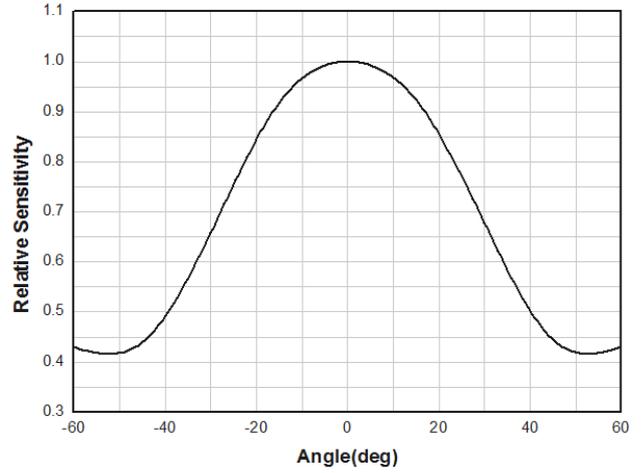


Fig.-6 Relative Sensitivity vs. Supply Voltage

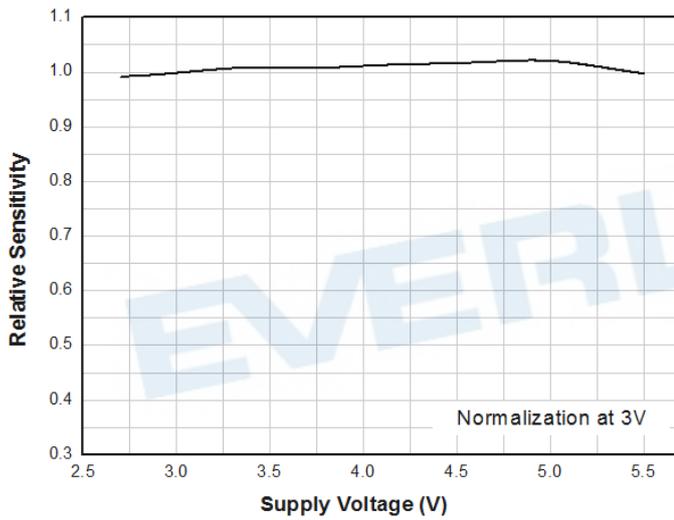
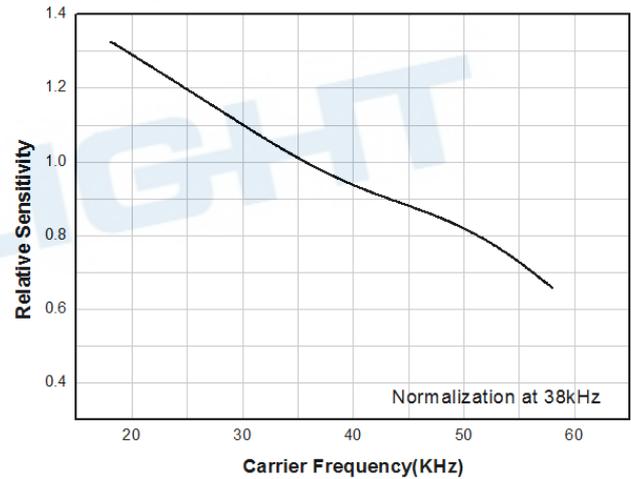


Fig.-7 Relative Sensitivity vs. Carrier Frequency



Application considerations

IRM IR receiver modules are high gain analog components to reach a long reception range. However, due to the high gain, they are also sensitive to noise from the power supply like V_{cc} ripple. Noise on the power supply can reduce the reception range of the IRM or cause output glitches and corrupted data. To protect the IRM receiver from power supply noise, a RC filter must be connected as close as possible to the V_{cc} and GND pins of the IRM. The circuit below in figure 9 shows the configuration of the RC filter and the required values. Ceramic or tantalum capacitor should be used, as standard electrolytic capacitors are only suitable for low frequencies and might not be able to filter noise in the frequency range of the IRM. The IRM receiver is most sensitive to noise which is at the carrier frequency or close to the carrier frequency. When using a switching mode power supply, the switching frequency must not be the same as the carrier frequency of the IRM. A gap of at least 20kHz between the switching frequency of the power supply and the IRM carrier frequency is recommended.

If the trace from the IRM output pin to the decoder IC on the PCB is long, the parasitic capacitance might be high causing slow rise times of the IRM output signal. In such case, an additional pull up resistor of 10kOhm or higher can be added at the IRM output to reduce the influence of parasitic trace capacitance.

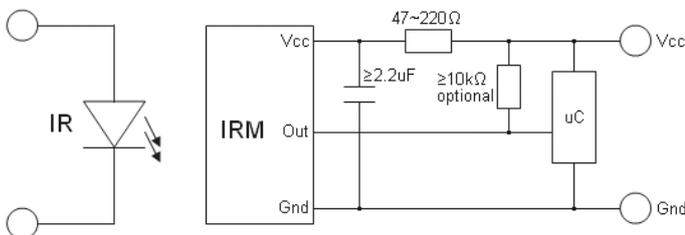


Fig.9: application circuit

Code compatibility

The IRM-3600JW receiver modules are mainly designed for IR code learning and IR repeater applications. Hence the IR code compatibility is matched for the most common IR protocols. To guarantee a proper data signal reception, a few points need to be taken into consideration.

The signal transmission must be carried out in data packages with limited length followed by a data pause time of a certain length. Continuous data transmission is not applicable as such kind of signal will be judged as noise and suppressed after a short time. Table1 below shows the compatibility to most commonly used IR protocols. If an IR protocol is not listed in this table, the compatibility needs to be checked according to the burst times, gap times, data package length and data pause time. The required limits for these items are shown in table 2 "acceptable IR signal timings".

Protocol	Suitable	Protocol	Suitable	Protocol	Suitable
JVC	No	RC6	Yes	Sharp	Yes
Matsushita	No	RCMM	Yes	Sony 12 Bit	No
Mitsubishi	Yes	RCA	Yes	Sony 15 Bit	No
NEC	Yes	RCS-80	Yes	Sony 20 Bit	No
Panasonic	No	r-step 38kHz	Yes	Toshiba	Yes
RC5	Yes	r-step 56kHz	No	XMP-1	Yes

Table 1: IR protocol compatibility

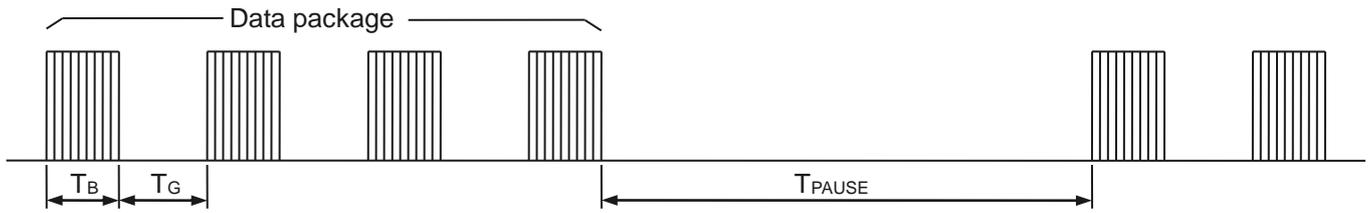


Fig.10: general IR data structure

	IRM-3600JW
Min burst length T_B	>200us
Min gap length T_G	>330us

Table 2: acceptable IR timings

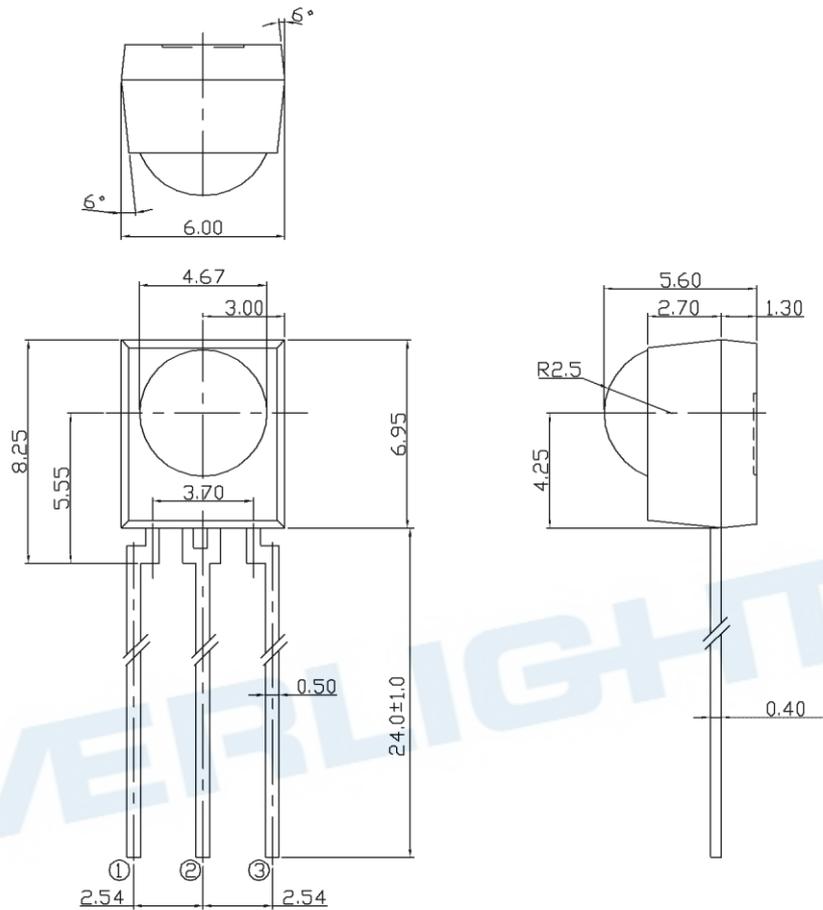
Operation under noisy environment

The IRM-3600JW receiver has built in noise suppression functions, but because it can receive a wide frequency range and provides a modulated output signal, it might also receive some noise signals. The presence of noise can cause shorter reception distance or corrupted output signal.

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Package Dimension

(Dimensions in mm)



Notes:

1. Tolerances unless mentioned $\pm 0.5\text{mm}$. Unit: mm

Packing Quantity

1500 pcs / Box
10 Boxes / Carton

Application Restrictions

1. EVERLIGHT reserves the right(s) on the adjustment of product material mix for the specification.
2. The product meets EVERLIGHT published specification for a period of twelve (12) months from date of shipment.
3. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
4. 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 the 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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