DATASHEET

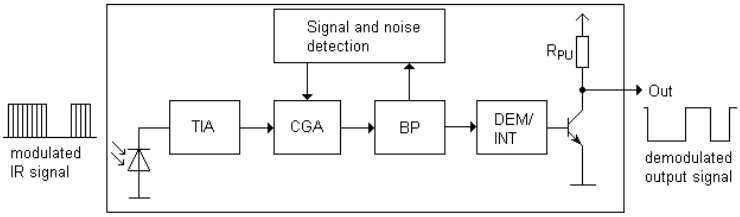
Infrared Receiver Module
IRM-V5xxM2/TR1

1 2 3

Pin Configuration

1. OUT
2. VCC
3. GND

Block Diagram



Features

- High protection ability against EMI
- Circular lens for improved reception characteristics
- Available for various carrier frequencies
- Min burst length: 10 cycles
- Min gap length: 14 cycles
- Low operating voltage and low power consumption
- High immunity against ambient light
- Long reception range
- High sensitivity
- Pb free and RoHS compliant
- Compliance with EU REACH
- Compliance Halogen Free (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)

Descriptions

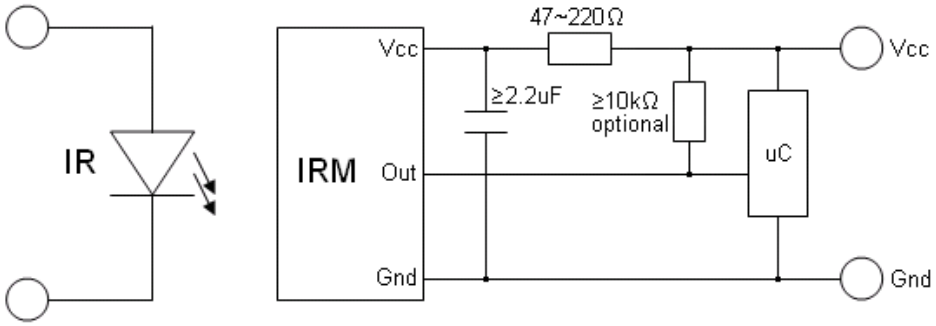
The device is miniature SMD type infrared receiver that has been developed and designed by utilizing the latest IC technology.

The PIN diode and preamplifier are assembled onto a lead frame and molded into an epoxy package which operated an IR filter. The demodulated output signal can directly be decoded by a microprocessor.

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.
- Other devices using IR remote control
- CATV set top boxes
- Multi-media Equipment

Application Circuit



The RC filter must be placed as close as possible to the Vcc and GND pins of the IRM.

Parts Tabl

Model No.	Carrier Frequency
IRM-V536M2/TR1	36 kHz
IRM-V538M2/TR1	38 kHz
IRM-V540M2/TR1	40 kHz

Absolute Maximum Ratings (T_a=25°C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	6	V
Operating Temperature	Topr	-20 ~ +80	℃
Storage Temperature	Tstg	-40 ~ +85	℃
Soldering Temperature *1	Tsol	260	℃

*1 Soldering time≦5 seconds

Electro-Optical Characteristics (Ta=25℃ and Vcc=3.0V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Current Consumption	Icc	-	0.4	0.6	mA	No signal input
Supply Voltage	Vs	2.7	-	5.5	V	
Peak Wavelength	λ_p	-	940	-	nm	
Reception Distance	L_0	8	-	-	m	See chapter ‚Test method' *2
	L_{45}	5	-	-		
Half Angle (Horizontal)	Θ_h	-	±45	-	deg	
Half Angle (Vertical)	Θ_v	-	±45	-	deg	
High Level Pulse Width	T_{WH}	450	-	700	μs	Test signal according to figure 1 *3
Low Level Pulse Width	T_{WL}	500	-	750	μs	
High Level Output Voltage	V_H	Vcc-0.4	-	-	V	I_{SOURCE}≦1μA
Low Level Output Voltage	V_L	-	0.2	0.5	V	I_{SINK}≦2mA
Internal pull up resistor	R_{PU}	85	100	115	kΩ	

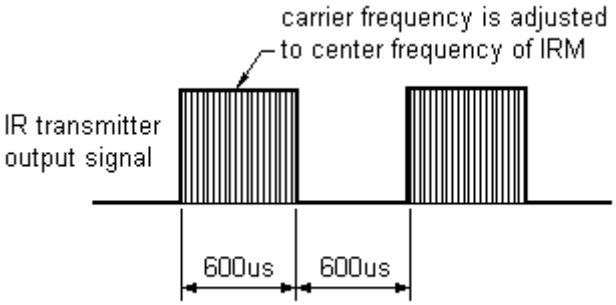
Notes:
*2：The ray receiving surface at a vertex and relation to the ray axis in the range of θ= 0° and θ=45°.
*3：A range from 30cm to the arrival distance. Average value of 50 pulses.

Test Method

The specified electro-optical characteristic is satisfied under the following Conditions:

1. Measurement environment
   A place without extreme light reflected
2. External light
   Ordinary white fluorescent lamps (Light source temperature 2856°K, Ee≦10Lux) without high frequency modulation
3. Standard transmitter
   A transmitter whose output is so adjusted as to **Vo=400mVp-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 λp=940nm,Δλ=50nm. Also, photodiode is used of PD438B (Vr=5V)..
4. Measuring system According to the measuring system shown in Fig.-3

Fig.-1 Transmitter Wave Form



D.U.T output Pulse

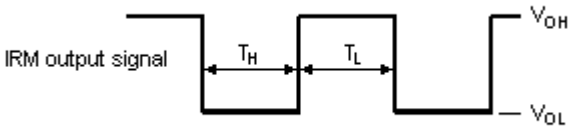


Fig.-2 Measuring Method

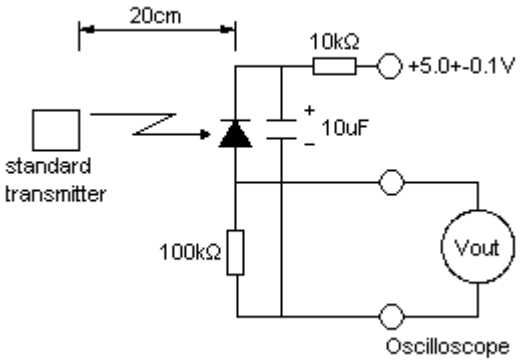
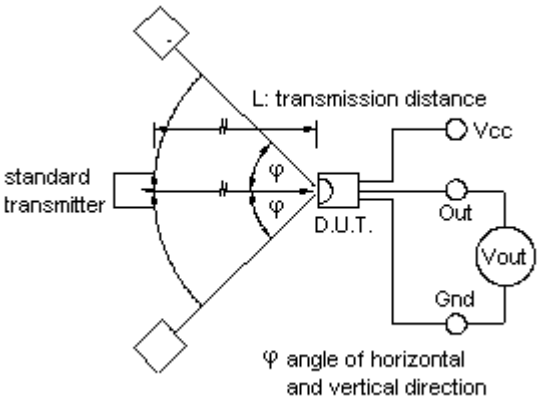


Fig.-3 Measuring System



Typical Performance Curve

Fig.4 Relative Responsibility vs. Wavelength

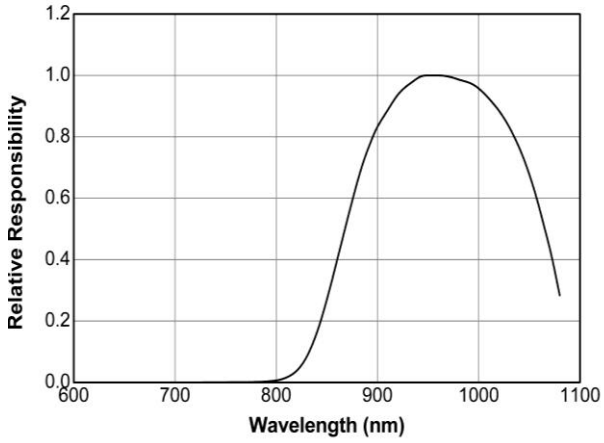


Fig.-5 Relative Sensitivity vs. Angle

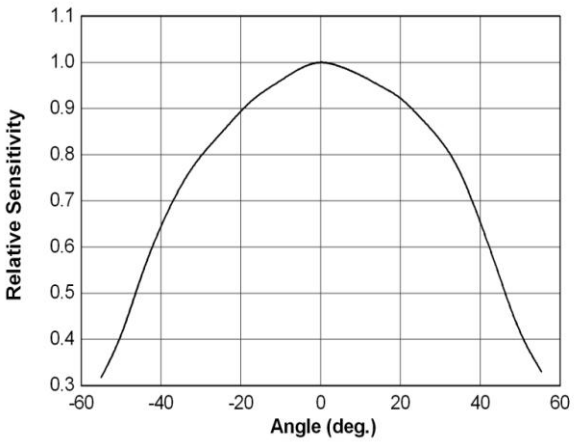


Fig.6 Variation Output Pulse Width vs. Distance

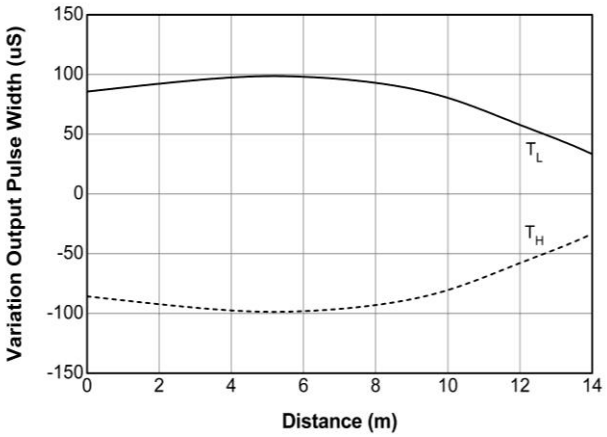


Fig.7 Supply Voltage vs. Distance

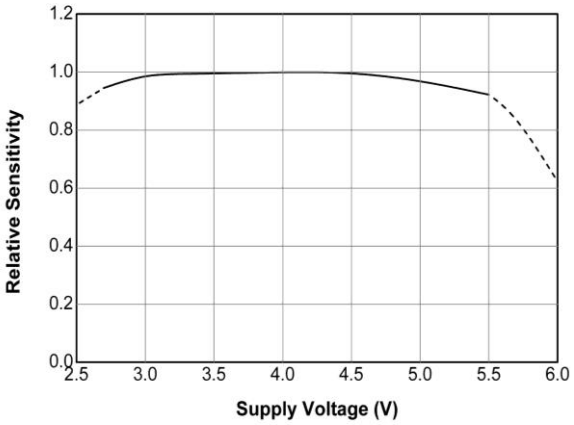
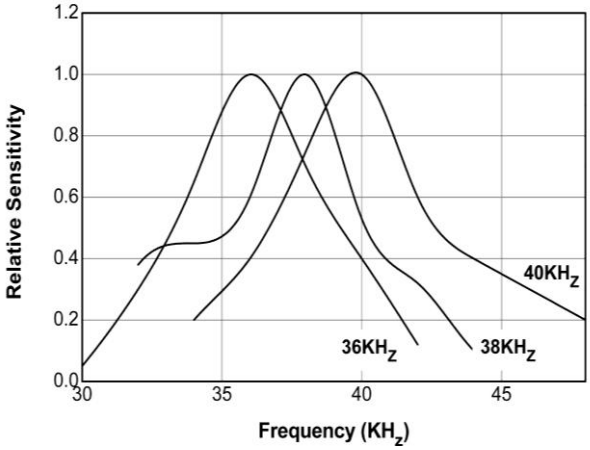
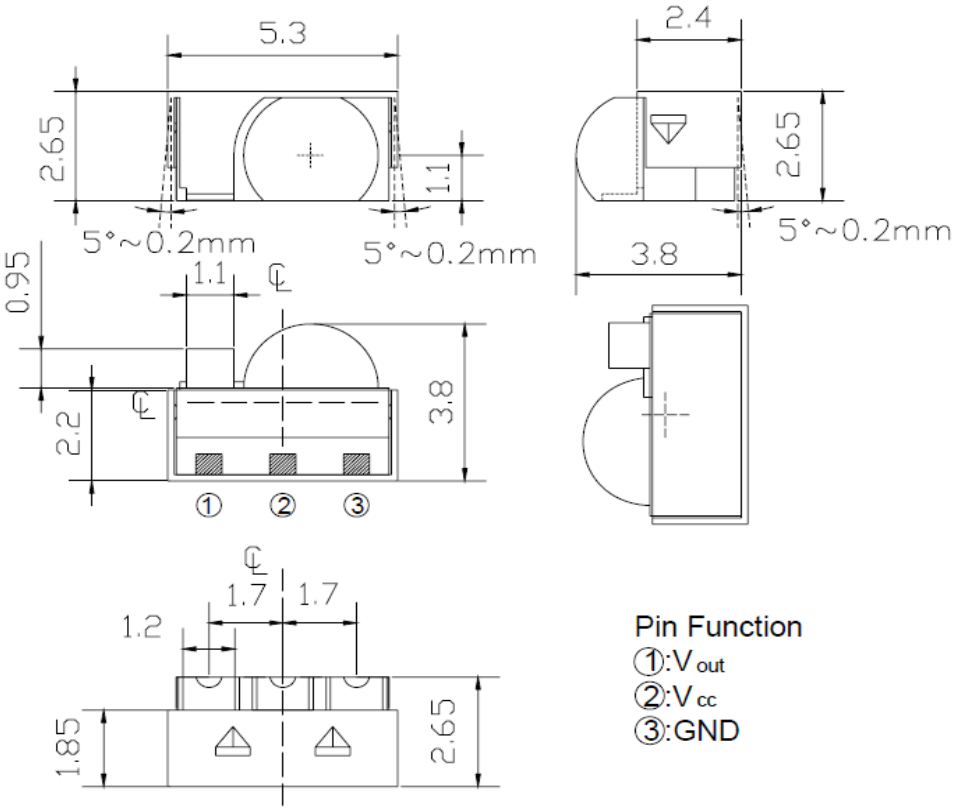


Fig.8 Relative Sensitivity vs. Frequency



Package Dimenstions

(Dimensions in mm)

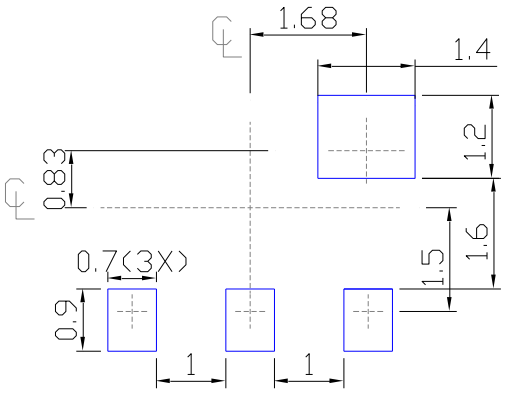


Notes: 1.All dimensions are in millimeters.

2.Tolerances unless dimensions ±0.3mm.

Recommend soldering patterns

The following soldering patterns are recommended for reflow-soldering



Notice: Suggested pad dimension is just for reference only.

Please modify the pad dimension based on individual need.

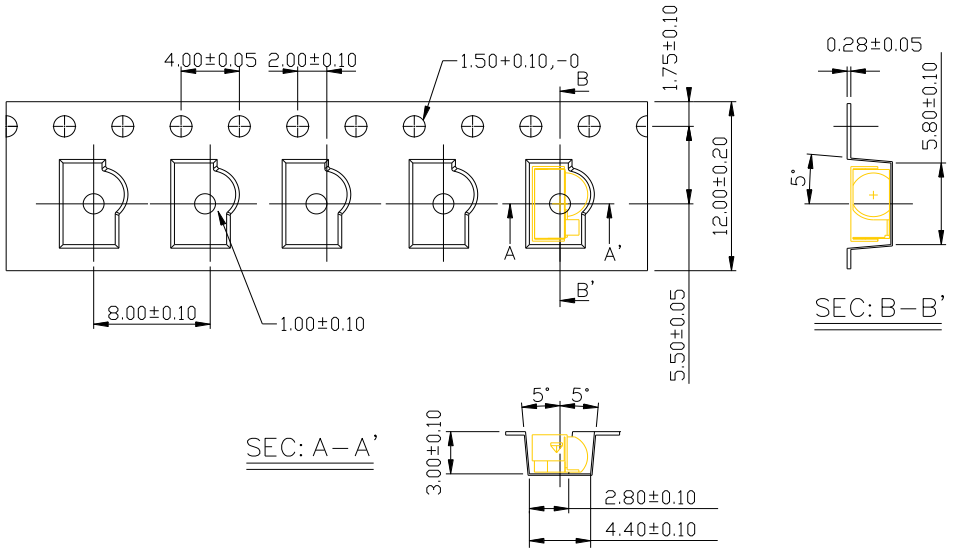
Code information

Protocol	Suitable	Protocol	Suitable
JVC	Yes	RCA	No
Matsushita	No	r-step	No
Mitsubishi	Yes	Sharp	Yes
NEC	Yes	Sony 12 bit [2)]	Yes
Panasonic	Yes	Sony 15 bit	Yes
RC5	Yes	Sony 20 bit	Yes
RC6 [1)]	Yes	Toshiba	Yes
RCMM	No	XMP	No
RCS-80	No	Continuous Code [3)]	Yes

1) Best choice depends on RC6 mode. If data low time is below 22ms, M2 is the best choice, otherwise M3.
2) If only Sony 12 bit version is used, M3 is recommended otherwise M2 is the best choice.
3) Please consider time limits for maximum acceptable burst time 1.2ms.

Tape & Reel Packing Specifications

(Dimensions in mm)

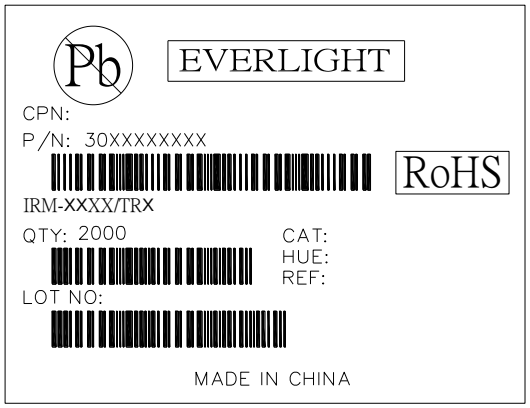


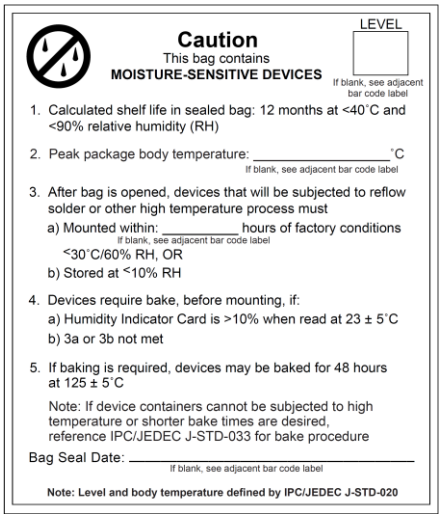
Packing Quantity

2000 pcs / Reel

5 Reels / Carton

Label format





Moisture Classification-storage and used condition label

Recommended method of storage

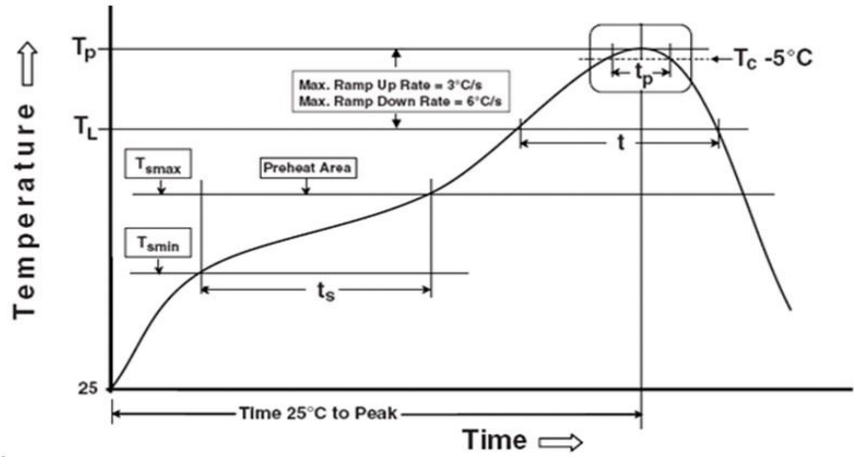
The following are general recommendations for moisture sensitive level (MSL) 4 storage and use:

1. Shelf life in sealed bag from the bag seal date: 12 months at 10℃~30℃ and < 90% relative humidity (RH)
2. After bag is opened, devices that will be subjected to reflow solder or other high temperature process must mounted within 72 hours of factory conditions at 10°C~30°C and 60%RH.
3. If the moisture absorbent material (silica gel) has faded away or the IRM has exceeded the storage time. Baking treatment is required, refer to IPC/JEDEC J-STD-033 for bake procedure or recommend the conditions: 96 hours at 60°C ± 5°C and < 5 % RH.

ESD Precaution

Proper storage and handing procedures should be followed to prevent ESD damage to the devices especially when they are removed from the Anti-static bag. Electro-Static Sensitive Devices warning labels are on the packing.

Solder Reflow Temperature Profile



Note: Reference: IPC/JEDEC J-STD-020D

Preheat	
Temperature min (T_{smin})	150 °C
Temperature max (T_{smax})	200°C
Time (T_{smin} to T_{smax}) (t_s)	60-120 seconds
Average ramp-up rate (T_{smax} to T_p)	3 °C/second max
Other	
Liquidus Temperature (T_L)	217 °C
Time above Liquidus Temperature (t_L)	60-150 sec
Peak Temperature (T_P)	260°C
Time within 5 °C of Actual Peak Temperature: T_P - 5°C	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

Note:
1. Suggest that reflow soldering should not be done more than two times.
2. When soldering, do not put stress on the IRM device during heating.
3. After soldering, do not warp the circuit board.

DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
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