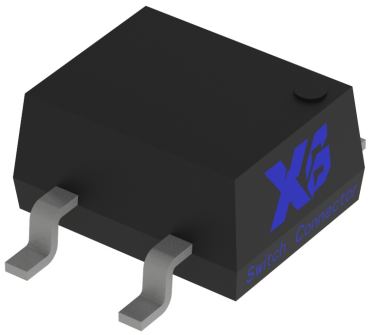
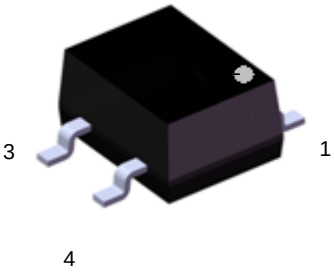
Infrared Receiver Module
IRM-H9XXM3/TR2 Series

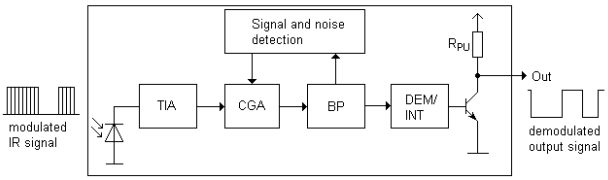




Pin Configuration

1. GND
2. GND
3. OUT
4. Vcc

Block Diagram



Features

- High protection ability against EMI
- Circular lens for improved reception characteristics
- Available for various carrier frequencies
- min burst length: 12 cycles
- min gap length: 16 cycles
- Low operating voltage and low power consumption
- High immunity against ambient light
- High immunity against TFT backlight
- 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.

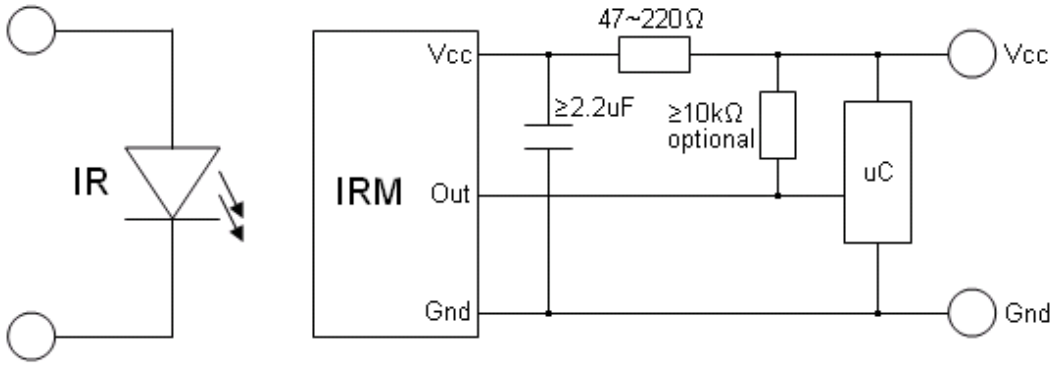
The PIN diode and preamplifier are assembled onto a lead frame and molded into a black epoxy package which operates as an IR filter.

The demodulated output signal can directly be decoded by a microprocessor

Applications

- AV instruments such as Audio, TV, VCR, CD, MD, etc
- Toy applications
- CATV set top boxes
- Multi-media Equipment
- Other devices using IR remote control

Application Circuit



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

Parts Number Table

Model No.	Carrier Frequency
IRM-H936M3/TR2	36 kHz
IRM-H938M3/TR2	38 kHz

Absolute Maximum Ratings (Ta=25˚C) [*1]

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{cc}	6	V
Operating Temperature	T_{opr}	-20 ~ +80	˚C
Storage Temperature	T_{stg}	-40 ~ +85	˚C
Soldering Temperature [*2]	T_{sol}	260	˚C

[*1] Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

[*2] Soldering time≦5 seconds

Electro-Optical Characteristics (T_a=25˚C, V_{cc}=3V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Current consumption	Icc	---	0.4	0.6	mA	No input signal
Supply voltage	V_{CC}	2.7	---	5.5	V	
Peak wavelength	λ_p	---	940	---	nm	
Reception range	L_0	8	---	---	m	See chapter 'Test method' [*3]
	L_{45}	5	---	---		
Half angle(horizontal)	φ_h	---	±45	---	deg	
Half angle(vertical)	φ_v	---	±45	---	deg	
High level pulse width	T_H	400	---	800	μs	Test signal according to figure 1 [*4]
Low level pulse width	T_L	400	---	800	μs	
High level output voltage	V_{OH}	Vcc-0.4	---	---	V	I_{SOURCE}≦1μA
Low level output voltage	V_{OL}	---	0.2	0.5	V	I_{SINK}≦2mA

[*3] The ray receiving surface at a vertex and relation to the ray axis in the range of θ=0° and θ=45°.

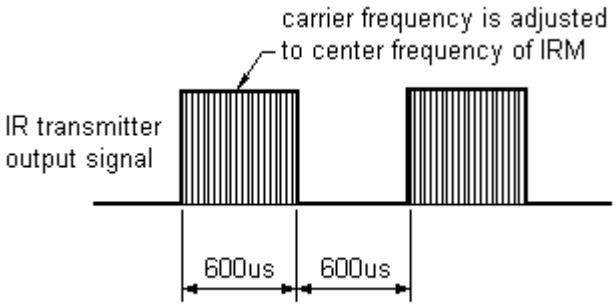
[*4] A range from 30cm to the arrival distance. Average value of 50 pulses.

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
   The test transmitter is calibrated by using the circuit shown in figure 2. The radiation intensity of the transmitter is adjusted until **Vo=400mVp-p.** Both the test transmitter and the photo diode have the peak wavelength of 940nm. The photo diode for calibration is PD438B (λp=940nm, Vr=5V).
4. Measuring system According to the measuring system shown in Fig.-3

Fig.-1 Transmitter Wave Form



D.U.T output Pulse

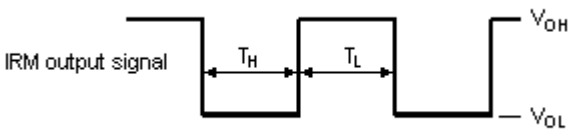


Fig.-2 Standard transmitter calibration

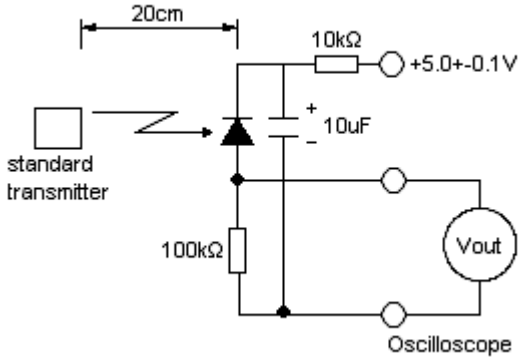
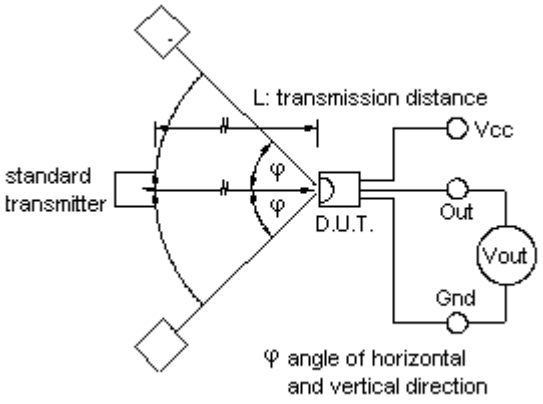


Fig.-3 Measuring System



Typical Performance Curves

Fig.4 Relative Responsibility vs. Wavelength

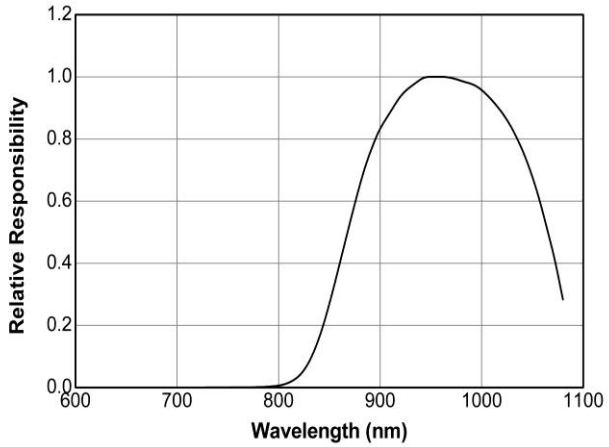


Fig.-5 Relative Transmission Distance vs. Direction

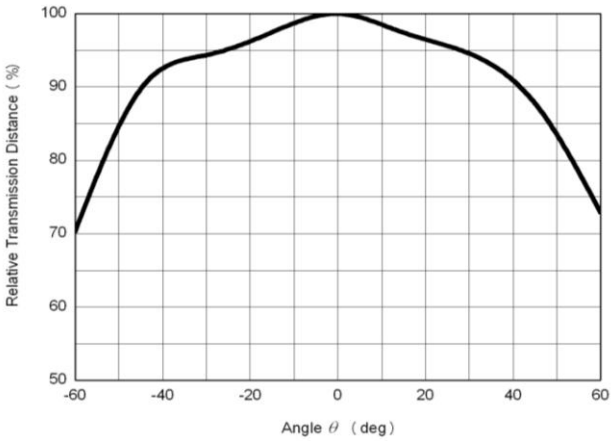


Fig.6 Variation Output Pulse Width vs. Distance

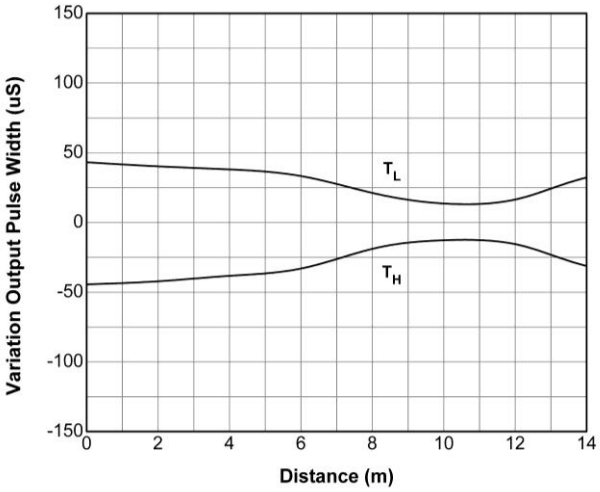


Fig.7 Relative Sensitivity vs. Supply Voltage

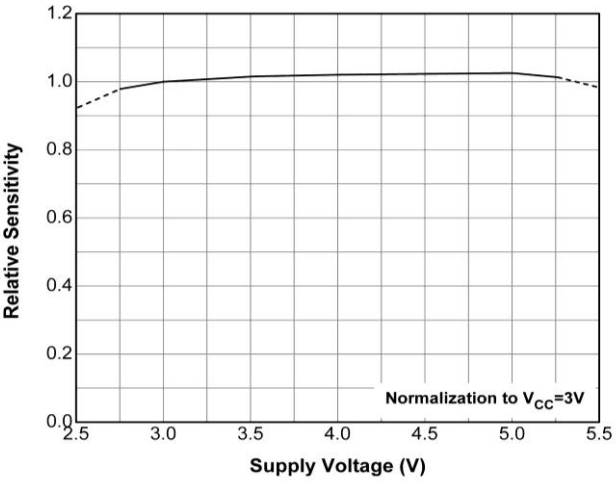
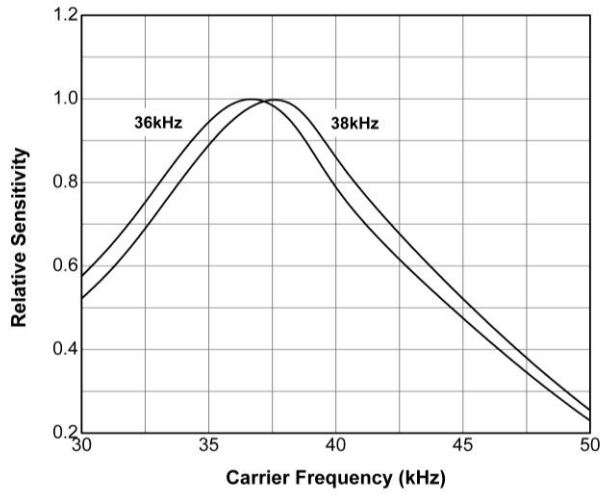
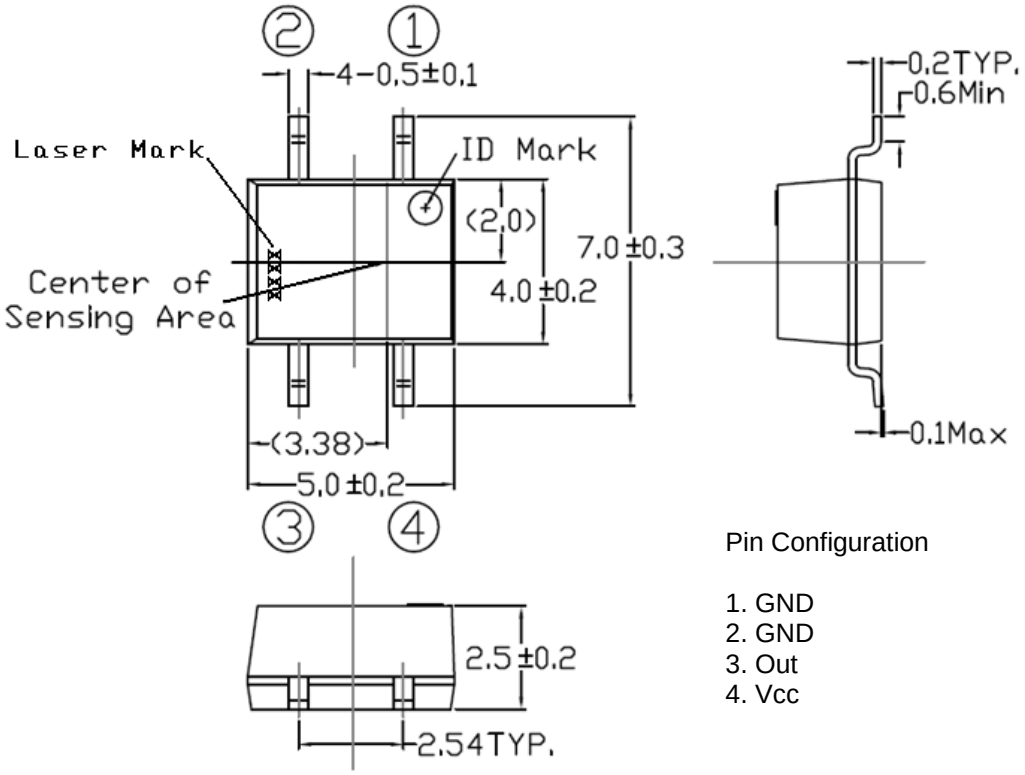


Fig.8 Relative Sensitivity vs. Carrier Frequency



Package Dimenstions

(Dimensions in mm)



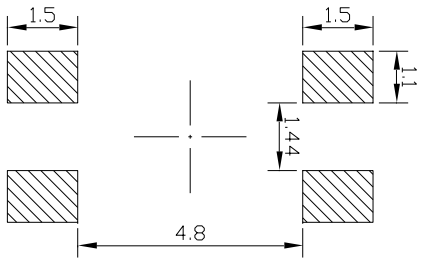
Pin Configuration

1. GND
2. GND
3. Out
4. Vcc

Note: Tolerances unless otherwise mentioned ±0.5mm.

Recommend soldering patterns

The following soldering patterns are recommended for reflow-soldering



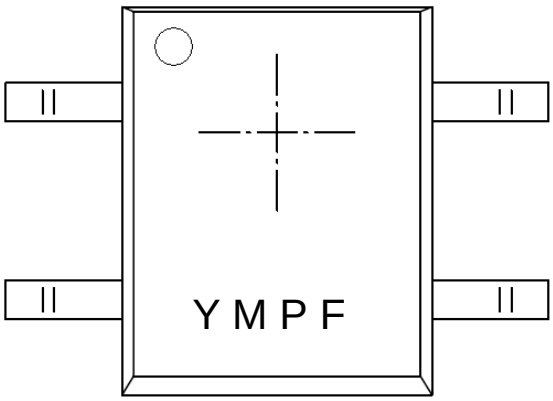
Notice: Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

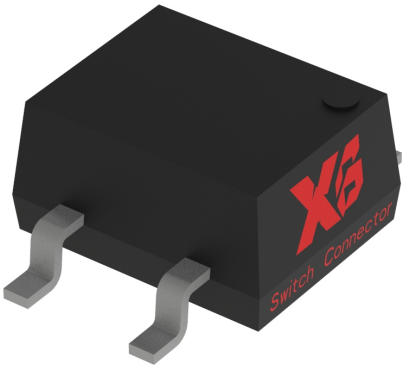
Code information

Protocol	Suitable	Protocol	Suitable
JVC	Yes	Sharp	Yes
Matsushita	Yes	Sony 12 bit[2)]	Yes
Mitsubishi	No	Sony 15 bit	No
NEC	Yes	Sony 20 bit	No
RC5	Yes	Toshiba	Yes
RC6[1)]	Yes	Continuous Code	No
RCA	No		

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.

Device Marking

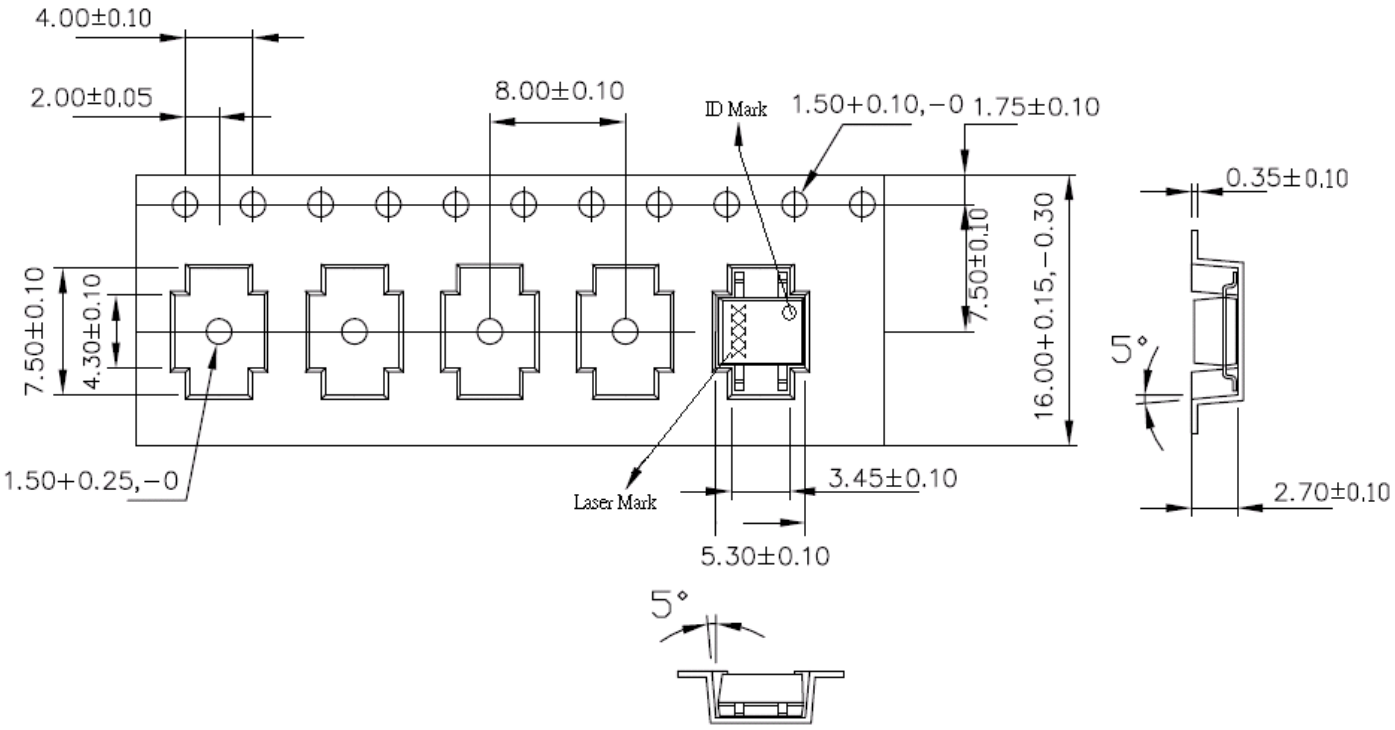




Notes

Y denotes Years code
M denotes Month code
P denotes Device number
F denotes Carrier frequency

Tape & Reel Packing Specifications



Packing Quantity

2000 pcs / Reel

5 Reels / Carton

Recommended method of storage

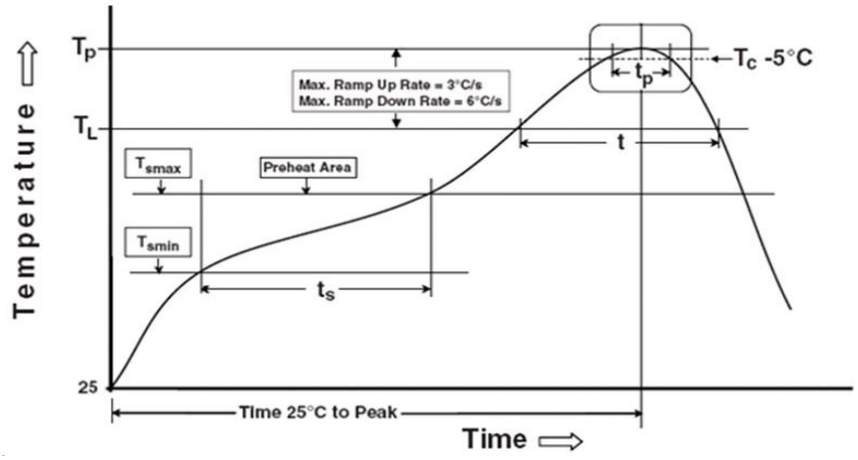
The following are general recommendations for moisture sensitive level (MSL) 4 storage and use:

1. Shelf life in sealed bag from the bag seal date: 12 months at < 40 °C 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 < 30 °C/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: 60±5°C for 96 hours.

ESD Precaution

Proper storage and hand 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)	60-100sec
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	2 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. XI BNANG reserves the right(s) on the adjustment of product material mix for the specification.
2. The product meets XI BNANG 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. XI BNANG 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.
5. These specification sheets include materials protected under copyright of XI BNANG. Reproduction in any form is prohibited without obtaining XI BNANG's prior consent.
6. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized XI BNANG sales agent for special application request.