

Infrared Receiver Module IRM-V5XXT/TR1 Series



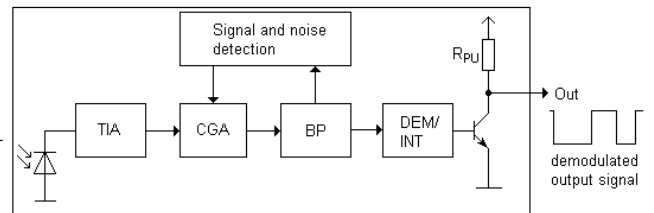
1 2 3

Pin Configuration

1. OUT
2. Vcc
3. GND



Block Diagram



Features

- High shielding against electric field disturbance.
- 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.
- Side-received SMD.
- Suitable burst length ≥ 10 pulses/burst.
- 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.

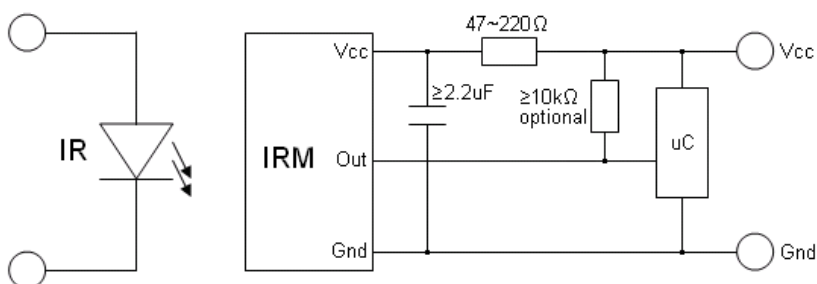
The PIN diode and preamplifier are assembled onto a lead frame and molded into an epoxy package which operates as an IR filter.

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



Parts Table

Model No.	Carrier Frequency
IRM-V538T/TR1	38 kHz

Absolute Maximum Ratings (T_a=25°C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V _{cc}	6	V
Operating Temperature	T _{opr}	-20 ~ +80	°C
Storage Temperature ^{*1}	T _{stg}	-40 ~ +85	°C
Soldering Temperature ^{*1}	T _{sol}	260	°C

^{*1} Soldering time ≤ 5 seconds

Electro-Optical Characteristics (T_a=25°C and V_{cc}=3.0V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Current Consumption	I _{cc}	-	1.0	1.2	mA	No signal input
Supply Voltage	V _{cc}	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}	400	-	800	μs	Test signal according to figure 1 *3
Low Level Pulse Width	T _{WL}	400	-	800	μs	
High Level Output Voltage	V _H	2.7	-	-	V	
Low Level Output Voltage	V _L	-	0.2	0.5	V	

Notes:

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

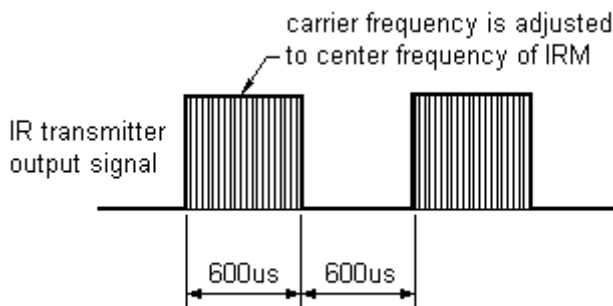
*3 : A range from 30cm to the arrival distance. Average value of 50 pulses.

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, $E_e \leq 10\text{Lux}$) 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 $V_o=400\text{mVp-p}$. Both, the test transmitter and the photo diode, have a peak wavelength of 940nm. The photo diode for calibration is PD438B ($\lambda_p=940\text{nm}$, $V_r=5\text{V}$).
4. Measuring system According to the measuring system shown in Fig.-3

Fig.-1 Transmitter Wave Form



D.U.T output Pulse

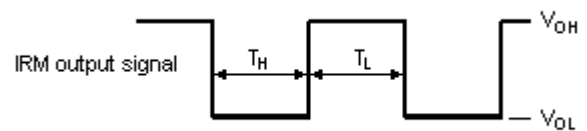


Fig.-2 Measuring Method

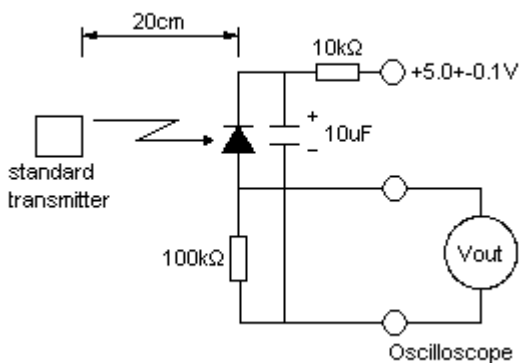
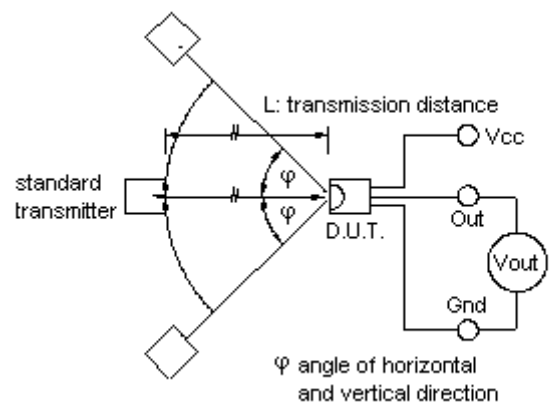


Fig.-3 Measuring System



Typical Performance Curves

Fig.-4 Relative Spectral Sensitivity vs. Wavelength

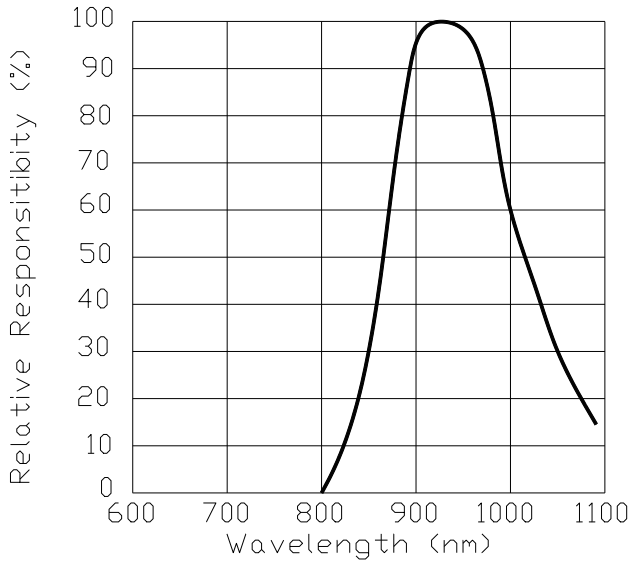


Fig.-5 Relative Transmission Distance vs. Direction

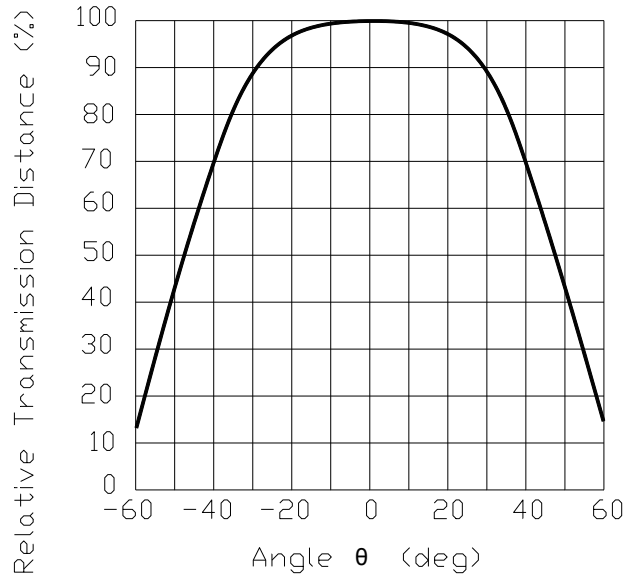


Fig.-6 Output Pulse Length vs. Arrival Distance

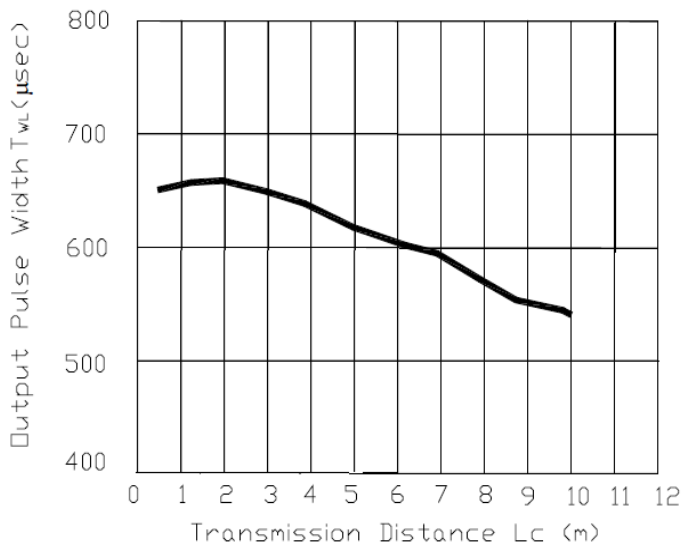


Fig.-7 Arrival Distance vs. Supply Voltage

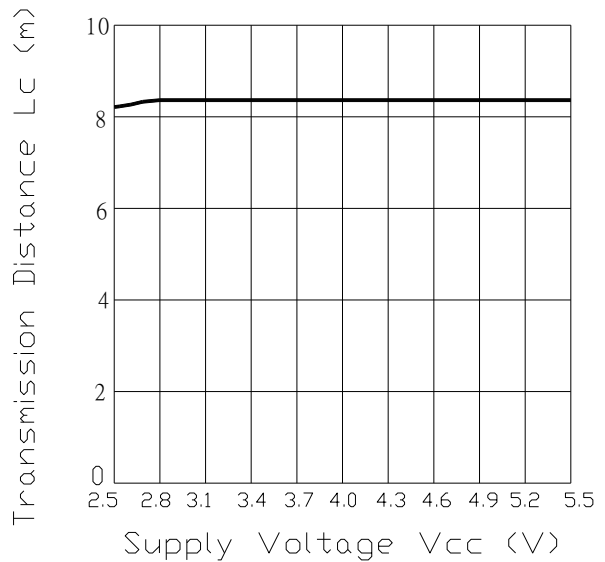
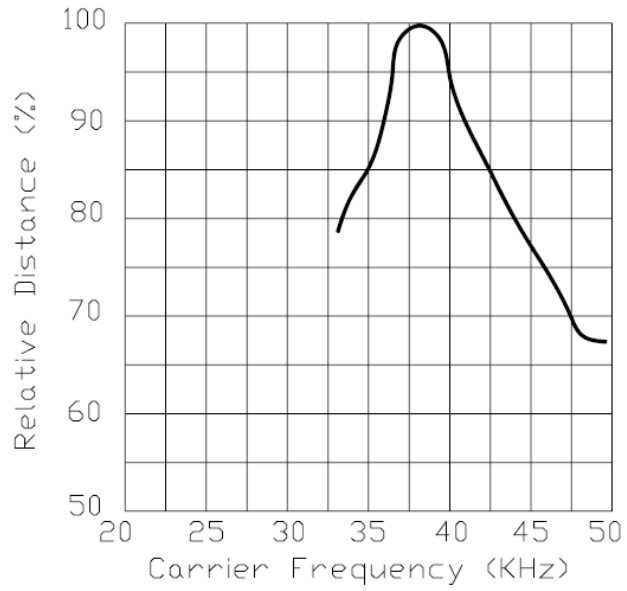
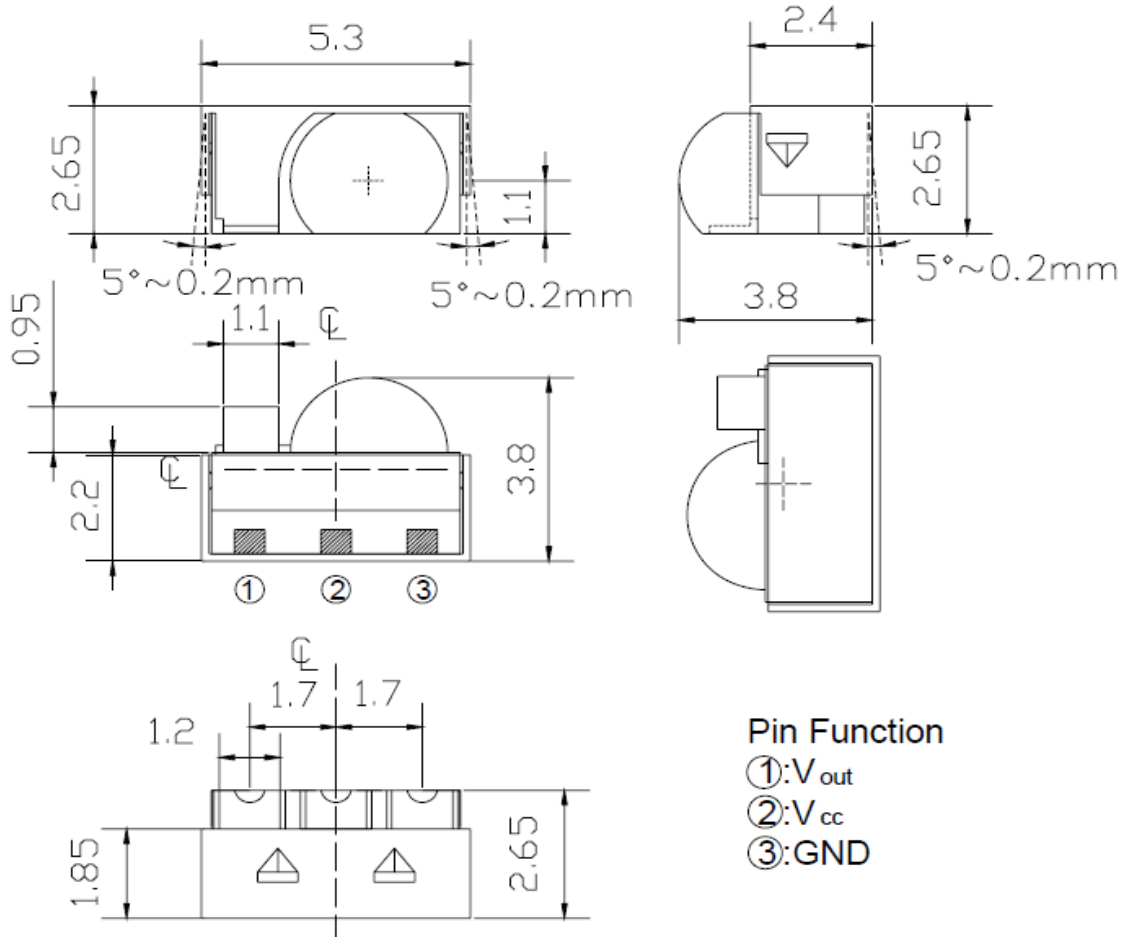


Fig.-8 Relative Transmission Distance vs. Center Carrier
Frequency



Package Dimensions

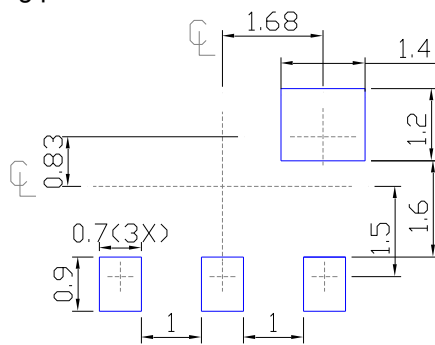
(Dimensions in mm)



- Notes:**
1. All dimensions are in millimeters.
 2. Tolerances unless otherwise mentioned $\pm 0.3\text{mm}$.

Recommend soldering patterns

The following soldering patterns are recommended for reflow-soldering



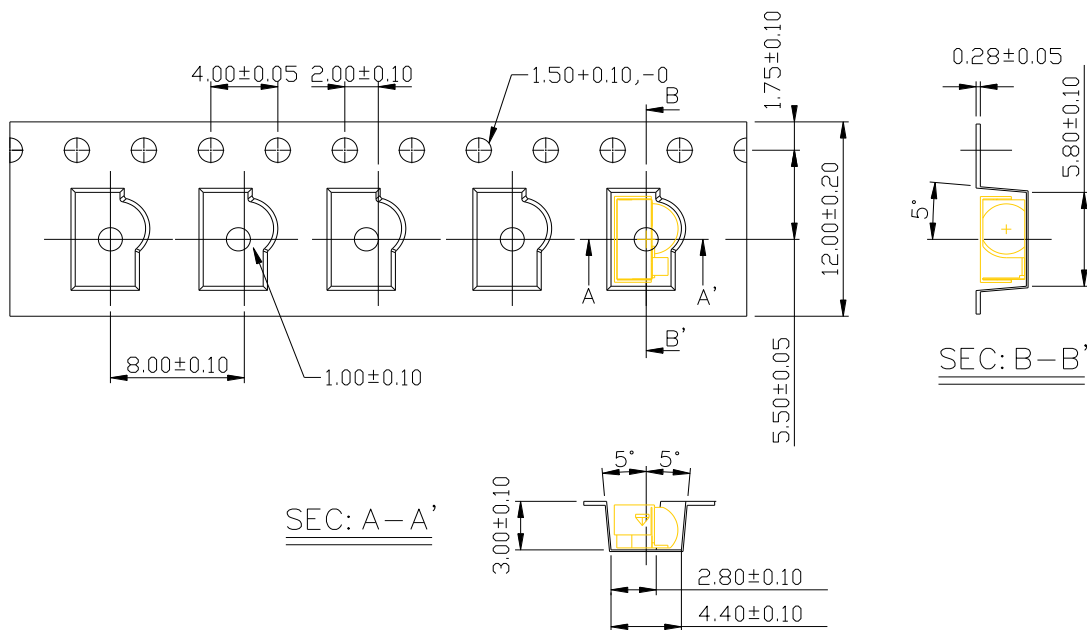
Notice: Suggested pad dimension is just for reference only.
 Please modify the pad dimension based on individual need.

Code information

Protocol	Suitable	Protocol	Suitable
JVC	No	Sharp	Yes
Matsushita	Yes	Sony 12 bit	Yes
Mitsubishi	No	Sony 15 bit	No
NEC	Yes	Sony 20 bit	No
RC5	Yes	Toshiba	Yes
RC6 ¹⁾	Yes	XMP	No
RCMM	No	Zenith	Yes
RCS-80	No	Continuous Code	No
RCA	No		

1) RC6 is only compatible if the data low time is 25ms or more.

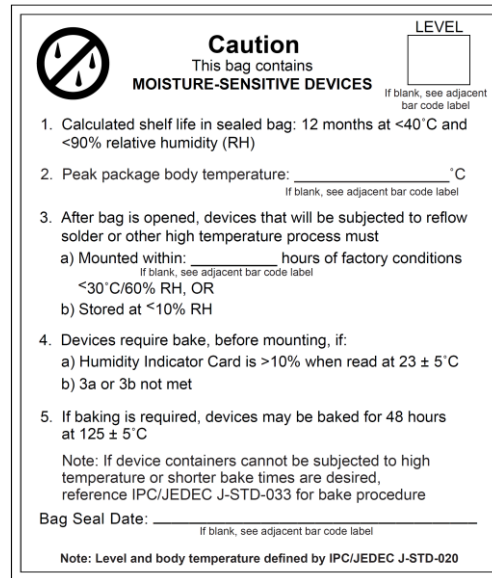
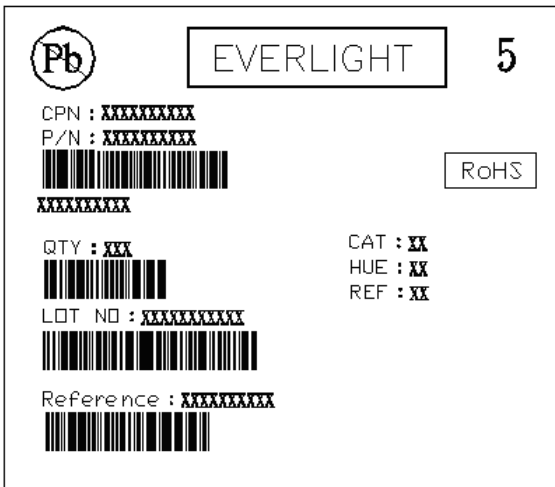
**Tape & Reel Packing Specifications
(Dimensions in mm)**



Packing Quantity

2000 PCS / Reel
5 Reels / Carton

Label format



Moisture Classification-storage and used condition label

Recommended method of storage

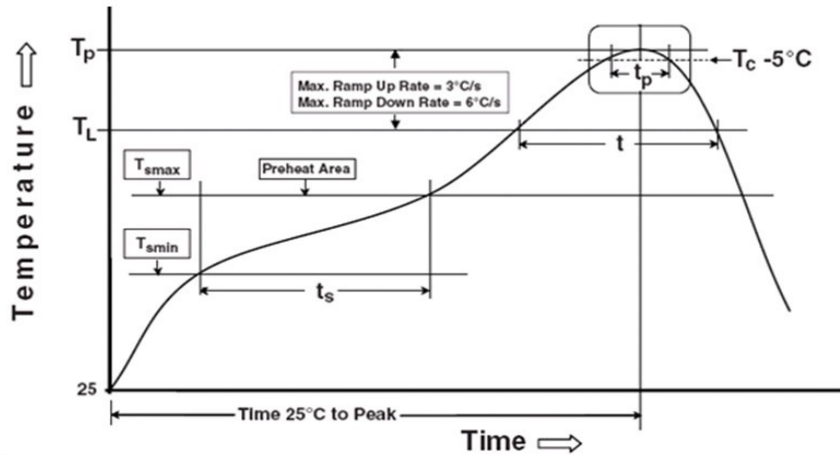
The following are general recommendations for moisture sensitive level (MSL) 4 storage and use:

1. Shelf life in sealed bag from the bag seal date: 12 months at $10^{\circ}\text{C}\sim 30^{\circ}\text{C}$ 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 at $10^{\circ}\text{C}\sim 30^{\circ}\text{C}$ 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 $60^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 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: $T_p - 5^\circ\text{C}$	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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