IR Receiver Modules for Remote Control Systems

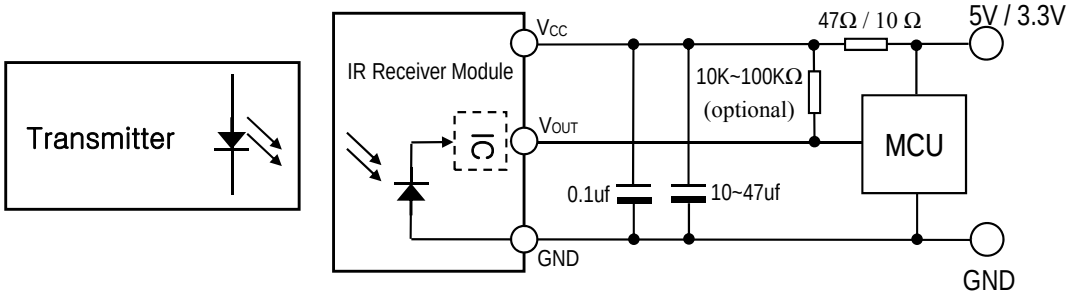
Description

The **FM-9038LM-5DW** is a CMOS IC for use in infrared remote control system.
Small-sized, light-weight, and low current consumption. modules have been achieved by using resin mold.
The demodulated output signal can directly be decoded by a microprocessor. The main benefit is the reliable function even in disturbed ambient and the protection against uncontrolled output pulses.

Features

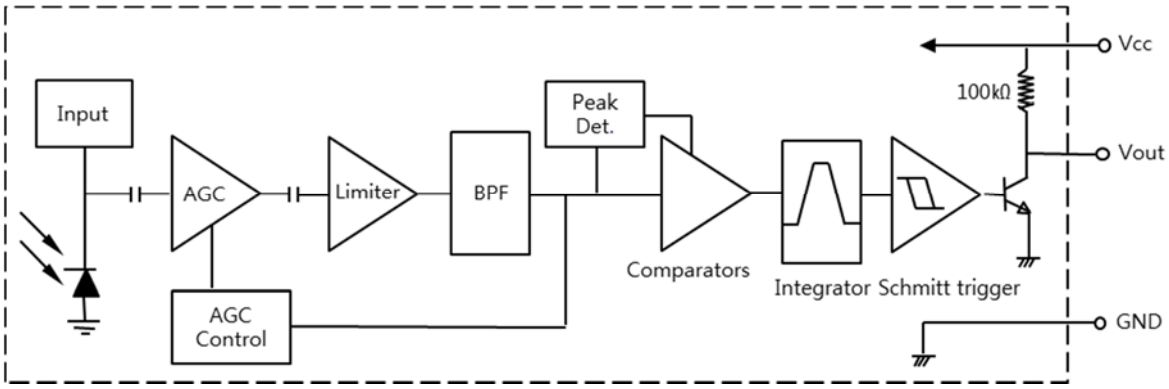
- Supply Voltage Range: 2.7V to 5.5V
- Supply Current : 0.4mA
- TTL and CMOS compatibility
- Photo detector and preamplifier in one package.
- Internal filter for PCM frequency
- Enhanced Immunity against all kinds of disturbance light
- Operation with short burst possible (> 6 pulses / burst)
- Meet RoHS

Application Circuit



R-C filter recommended to suppress power supply disturbances.
R-C filter should be connected closely between Vcc pin and GND pin.

Block Diagram



Suitable Data Format

NEC code	◆	RCS-80 code	◆	Sony 20-bit code	◇
RC5 code	◆	R-2000 code	◆	Zenith code	◆
RC6 code	◆	RCA code	◆	Toshiba code	◆
r-step code	◆	Sharp code	◆	r-step code	◆
RCMM code	◆	Sony 12-bit code	◆	High data rate code	◆
XMP code	◆	Sony 15-bit code	◆	Disturbance suppression	◆

Note： ◆ ：Suitable for this IR code ；◇ ：Not recommended

Absolute Maximum Ratings

(Ta = 25℃)

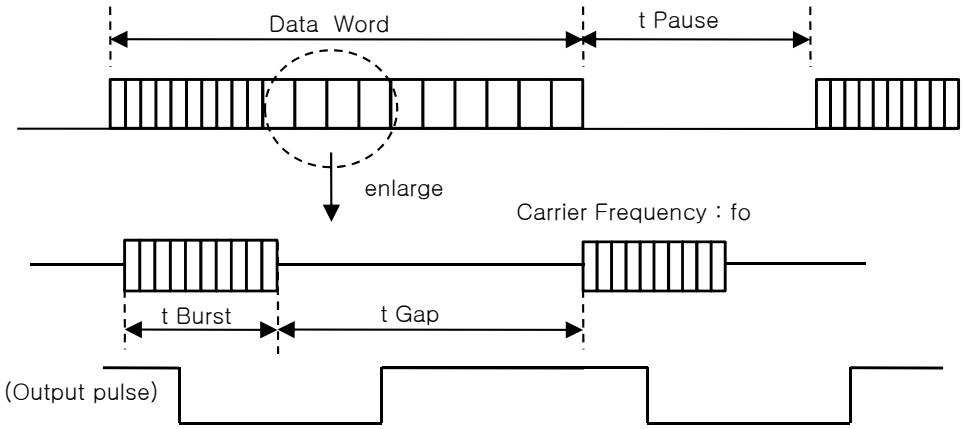
Parameter	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	6.5	V
Output Current	I_{sink}	2.5	mA
Operating Temperature	T_{opr}	-20 ~ +80	℃
Storage Temperature	T_{stg}	-30 ~ +85	℃
Soldering Temperature	T_{sd}	260℃, Max 5 sec	℃

Electro-optical Characteristics

(Ta = 25℃)

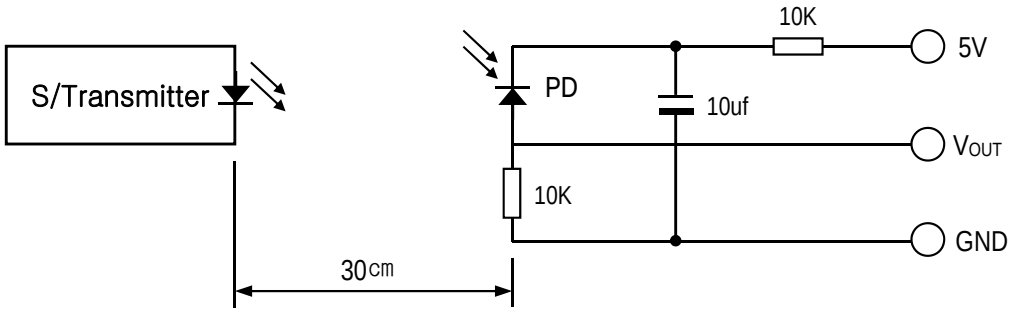
Parameter	Symbol		Min.	Typ.	Max.	Unit	Conditions
Supply Current	ICC		0.25	0.4	0.5	mA	No signal
Output Voltage	Voh		Vcc-0.5	-	-	V	
	Vol		-	0.2	0.4	V	
Peak Wave Length	λp		-	940	-	nm	
Internal Pull-up Resistor	Rpul		-	100	-	kΩ	
BPF frequency	fc		-	37.9	-	KHz	
Arrival Distance	L	±0°	-	20	-	m	Fig 1,2,3
		±30°	-	15	-	m	
		±45°	-	10	-	m	
Output Pulse width	Tpw		150	200	300	us	Burst Wave =600us Period = 1.2ms

[Fig.1] Data Signal diagram



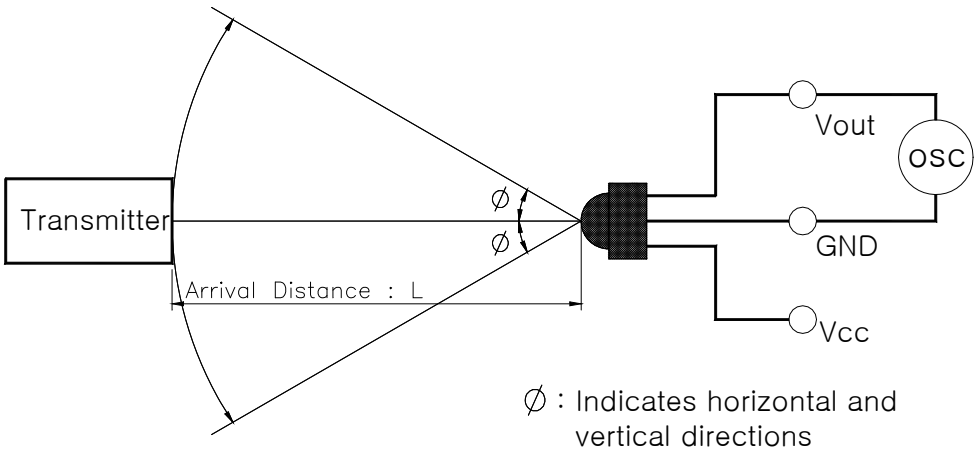
- t Gap : Signal gap time between two burst in pulses of carrier. Minimum Gap Time ≧ 300us
- t Burst : Length of a burst in pulses of the carrier frequency. Minimum Burst ≧ 150us
- t pause : Data pause between two data words. Minimum Data Pause Time ≧ 5ms

[Fig.2] Transmitter



※ The specifications shall be satisfied under the following conditions. The standard transmitter shall be specified of the burst wave form adjusted to VOUT 200mVp-p upon Po measuring circuit Standard Transmitter

[Fig.3] Test condition of arrival distance



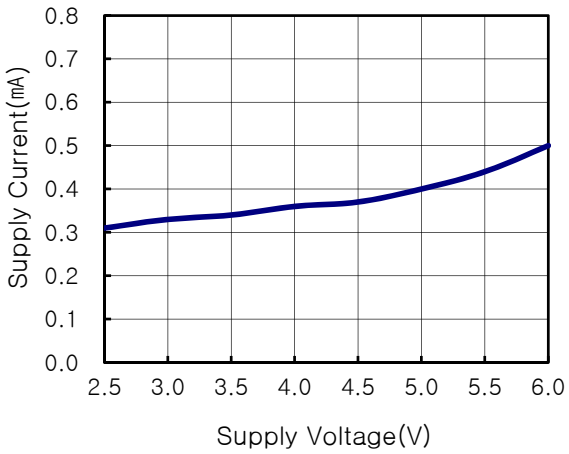
∅ : Indicates horizontal and vertical directions

[Measurement condition for arrival distance]

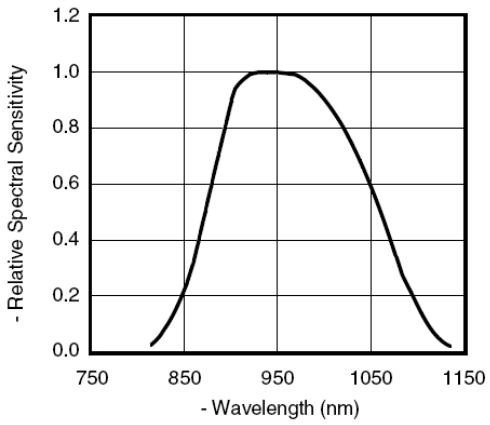
☞ Ambient light source : Detecting surface illumination shall be irradiate 200±50Lux under ordinary white fluorescence lamp without high frequency lighting

Electrical/Optical Characteristics

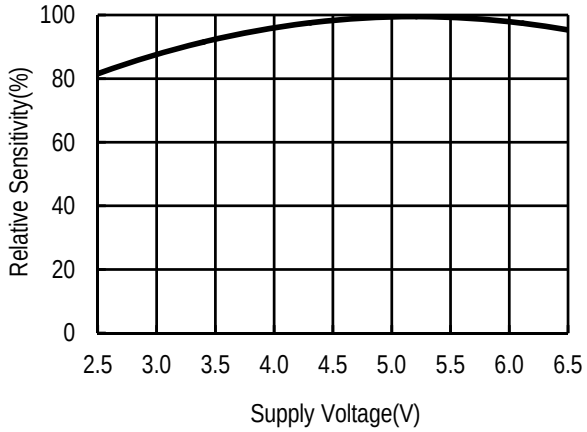
[Fig.4] Supply Current vs. Voltage



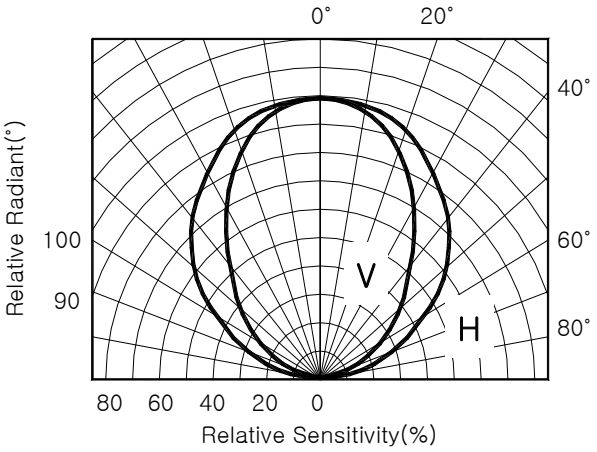
[Fig.5] Relative Spectral Sensitivity vs. Wavelength



[Fig.6] Sensitivity vs. Supply Voltage



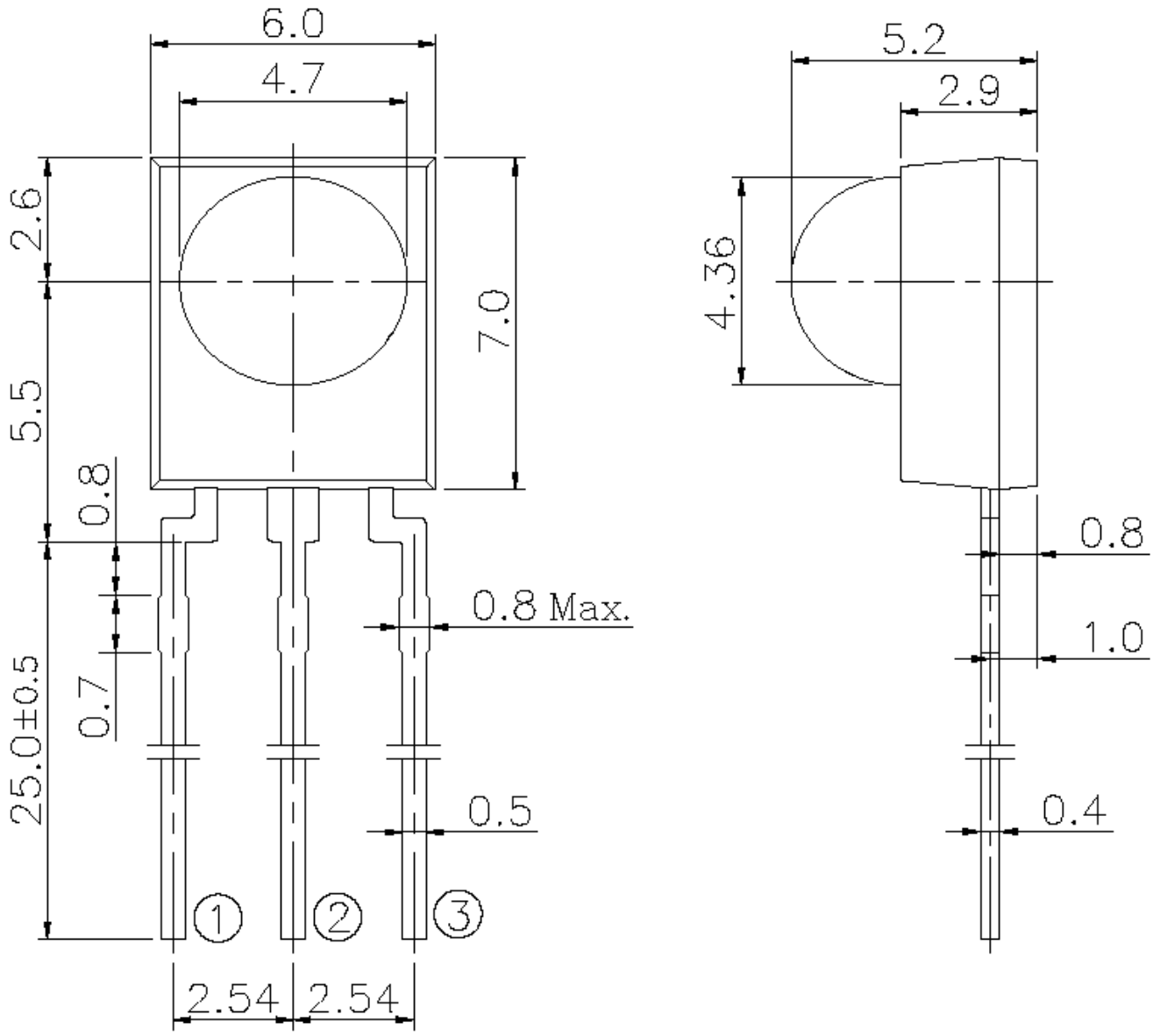
[Fig.7] Directivity (Horizontal/Vertical)

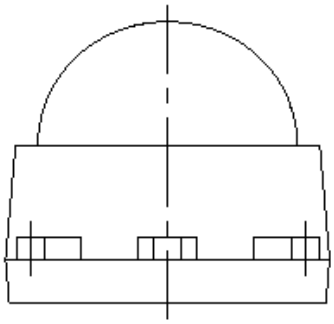


ESD Test Results

Parameter	Conditions	Specification	Results
Machine Model	C=200pF R=0Ω	Min ±200V	>±200V
Human Body Model	C=100pf R=1.5KΩ	Min ±2000V	>±2000V

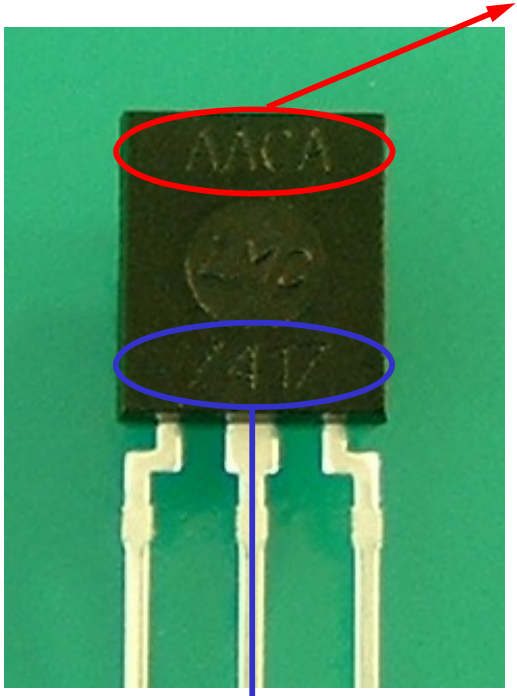
Package Dimension (Unit : mm)





1. Pin Config.
   ① Vout
   ② GND
   ③ Vcc
2. G.T : ±0.3

Laser Marking Code



X X X X

(Device Code Marking)		
Mode	LM	A
	TM2	
	LN	C
	TN2	
	SM	F
	SN	

Freq.	32.7	A
	36.7	B
	37.9	C
	40.0	D
	56.7	E

Series	90	A
	91	B
	30	C
	32	D

Chip	5DN	J
	5DR	S
	5DW	G

X X X X

(Production Code Marking)	
Date	01 ~ 31
Month	1~9 , A=10 , B=11 , C=12
Year	0 ~ 9

Example

	Chip	Series	Freq.	Mode		Year	Month	Data	
FM-9038LM-5DN	J	A	C	A	2015/09/22	5	9	2	2
FM-9040LN-5DR	S	A	D	C	2015/10/14	5	A	1	4
FM-9036TM2-5DW	G	A	B	A	2016/05/17	6	5	1	7

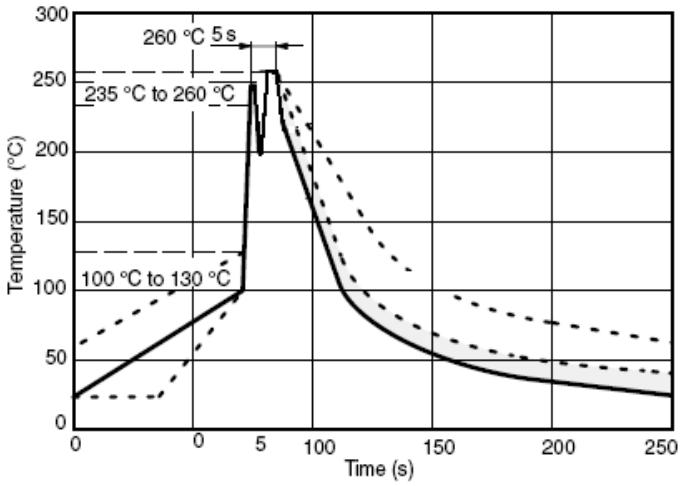
Recommended soldering conditions (Lead frame type)

- Not to apply high temperature exceeding the maximum storage temperature to the epoxy resin.
- Not to apply any force to the epoxy resin at high temperature.
- Soldering process.

1) The distance between holes should be the same as that of between terminal leads of the component to avoid any stress during the soldering process.
   Also, lead forming should be done before soldering process not to apply stress to the inside of the epoxy resin.
2) Not apply any stress to the component during the soldering process.

Wave soldering

1) Following soldering Bar & Wire recommended.
   Melting temperature : 245 ~ 260℃
   Composition : Pb-Free



Wave soldering

Manual Soldering

1) Use the Pb-Free solder or the solder containing silver.
2) Soldering iron below 320℃ within 3 seconds.

1. Packing unit for Remote control module

Package	Device	Packing Method	Units / Bag	Poly Bag / Inner Box	Max Devices / Inner Box	Max Inner Box / Outer Box	Partial Shipment of Outer Box
Transfer mold Type		Poly Bag	200	5 (Inner Box #1)	1000 (Inner Box #1)	10 (Outer Box #2)	(Outer Box #3)

(Unit：mm)
Inner Box #1 with Opto-Sensor Logo (170*240*65)
Outer Box #2 with Opto-Sensor Logo (365*360*270)
Outer Box #3 with Opto-Sensor Logo (385*750*300)

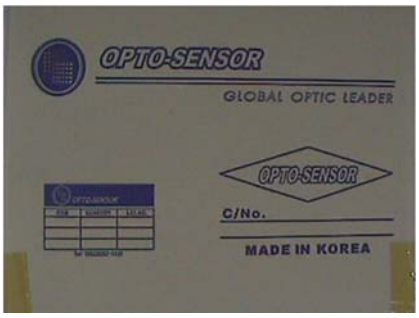
2. Packing method

1) Input max 200 units to one Poly bag and label should be attached middle of it.

2) Input 5 poly bags to one inner box and label should be attached as below.

<Inner Box # 1>

3) Input 10 inner boxes to outer box.



<Outer Box # 2>

4) Input 2 outer boxes into Box #3.

<Outer Box # 3>