

IR Receiver Modules for Remote Control Systems

Description

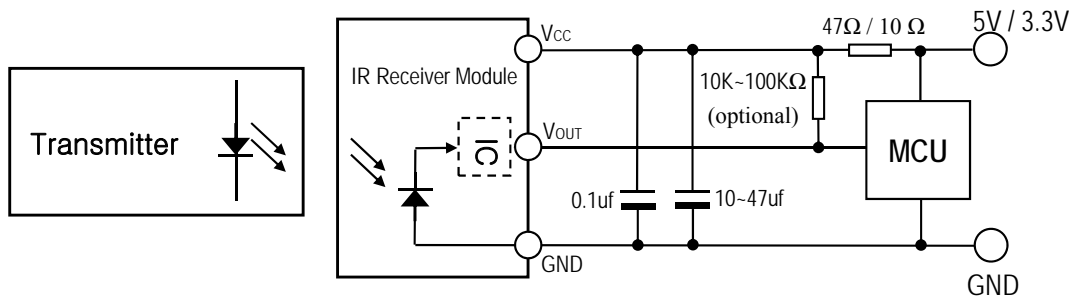
The FM-90□□□□-5DN is miniaturized receiver for infrared remote control system.

The PIN Photodiode and preamplifier are assembled on lead frame. The epoxy package is designed as IR filter. The module has excellent performance even in disturbed ambient light application and provides protection against uncontrolled output pulses.

Features

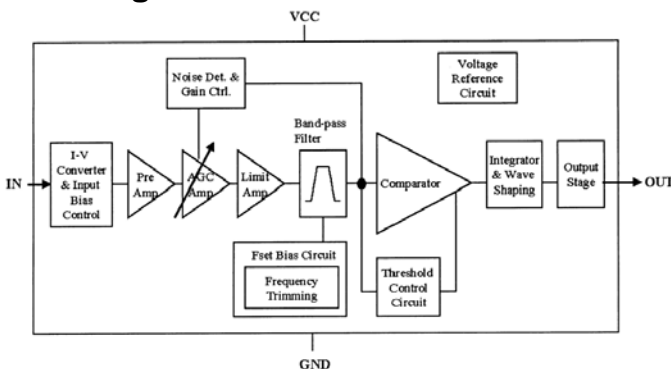
- Transfer Mold Package.
- Supply Voltage Range: 2.7V to 5.5 V
- Supply Current : 0.4mA
- Epoxy IR filter characteristic : 940nm
- Maximum interference safety against optical and electrical disturbance.
- Internal filter for a high frequency lighting fluorescent lamp.
- Internal Pull-Up output.
- Meet 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



B.P.F Center Frequency

Model No.	Carrier Frequency (fo)
FM-9036□□-5DN	36 kHz
FM-9038□□-5DN	38 kHz
FM-9040□□-5DN	40 kHz
FM-9056□□-5DN	56 kHz

Suitable Data Format

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

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

The data signal should full-fill the following condition :

- Carrier frequency should be close to center frequency of the band-pass.
- Burst length should be 300us/burst or longer.
- After each burst a gap time of at least 300us is necessary.
- The data format should not make a continuous signal transmission.
- There must be a Signal Gap Time (longer than 23 ms) at least each 100 ms, or each data command.

Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{cc}	6.5	V
Supply Current	I _{cc}	3.0	mA
Output Current	I _{sink}	2.5	mA
Operating Temperature	T _{opr}	-20 ~ +80	°C
Storage Temperature	T _{stg}	-30 ~ +85	°C
Soldering Temperature	T _{sd}	260°C, Max 5 sec	°C

Electro-optical Characteristics

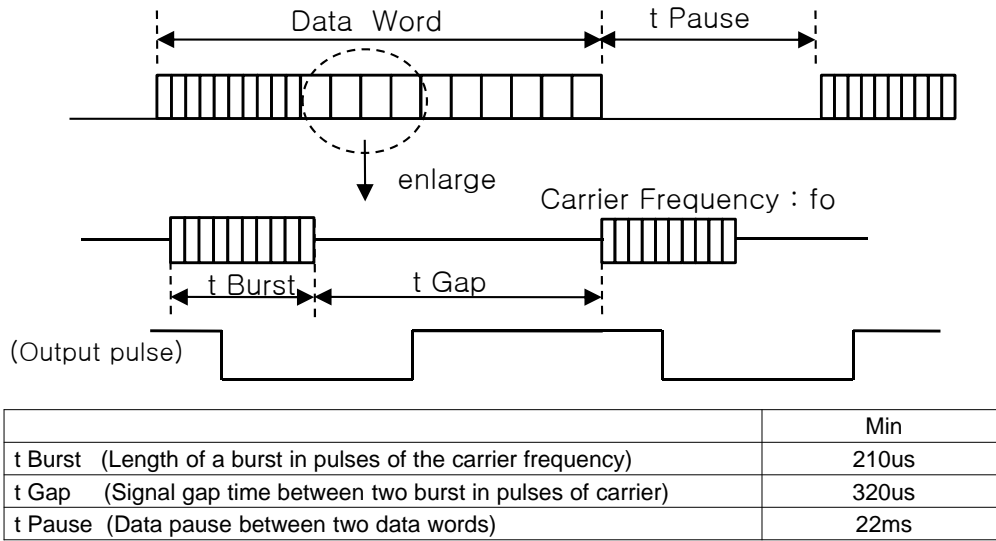
(Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
Supply Current	ICC	0.25	0.37	0.50	mA	No signal	
Output Voltage	V _{oh}	V _{cc} -0.5	-	-	V		
	V _{ol}	-	0.2	0.4	V		
Peak Wave Length	λ _p	-	940	-	nm		
Internal Pull-up Resistor	R _{pul}	-	40	-	kΩ		
BPF Bandwidth	fbw	2.5	4.5	6.5	KHz	-3dB Bandwidth	
Arrival Distance	L	±0°	20	-	-	m	Fig 1,2,3
		±30°	15	-	-	m	
		±45°	10	-	-	m	
Output Pulse width	T _{pw}	400	600	800	us	Burst Wave =600us Period = 1.2ms	

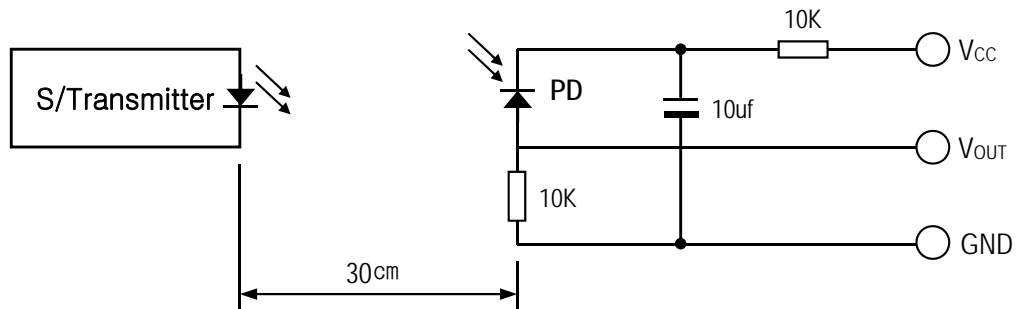
Note :

- 1) Arrival Distance Effected by Environment
- 2) While the device is operational across the temperature range, functionality will vary with temperature.
Specifications are stated only at 25°C unless otherwise noted.
- 3) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device.
These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.
Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

[Fig.1] Data Signal diagram

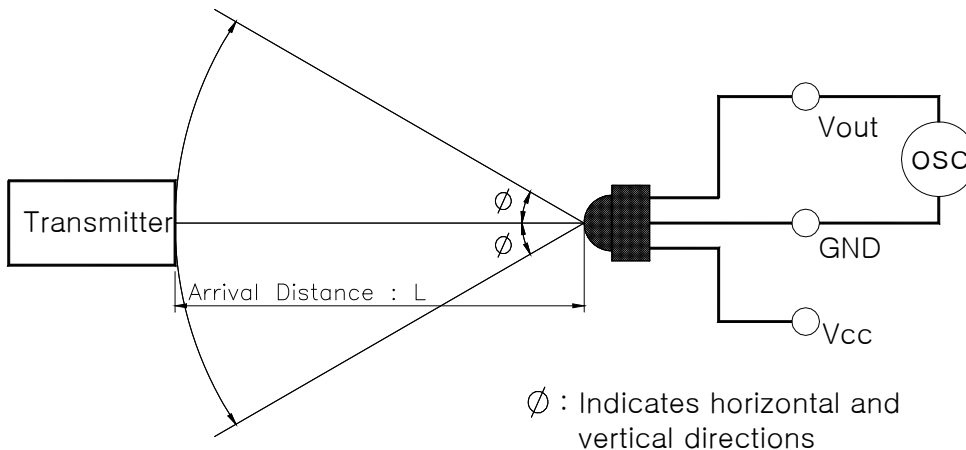


[Fig.2] Transmitter



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

[Fig.3] Test condition of arrival distance

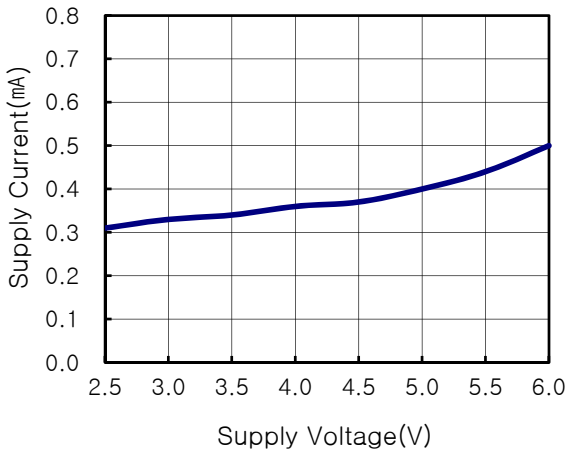


[Measurement condition for arrival distance]

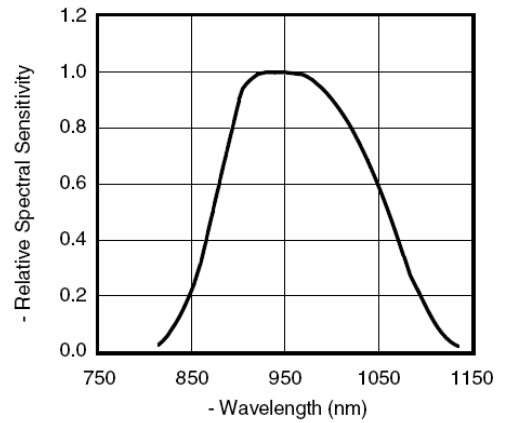
☞ Ambient light source : Detecting surface illumination shall be irradiate 200 ± 50 Lux under ordinary white fluorescence lamp without high frequency lighting

Electrical/Optical Characteristics

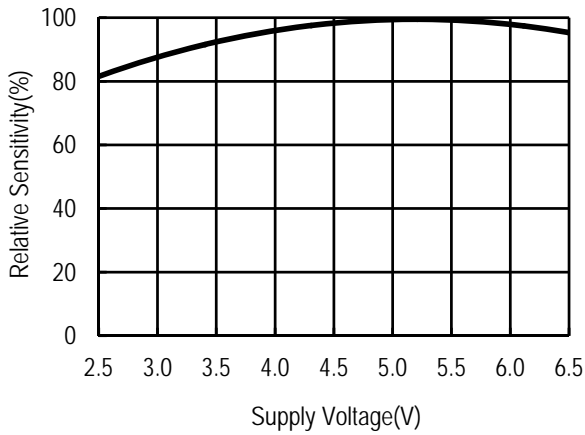
[Fig.4] Supply Current vs. Voltage



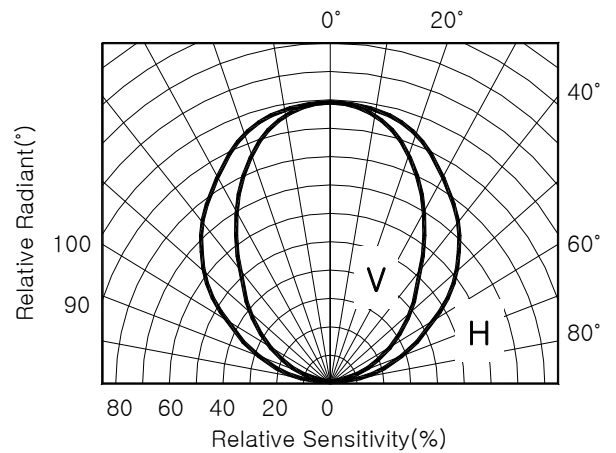
[Fig.5] Relative Spectral Sensitivity vs. Wavelength



[Fig.6] Sensitivity vs. Supply Voltage



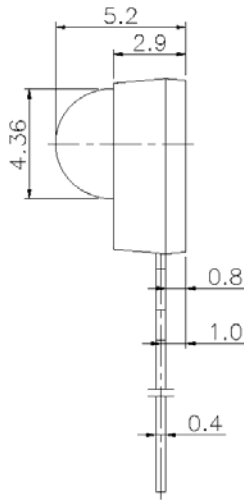
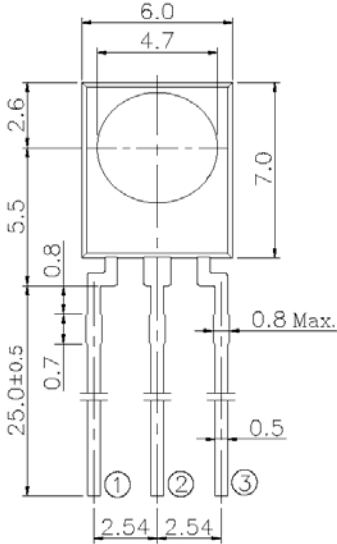
[Fig.7] Directivity (Horizontal/Vertical)



ESD Test Results

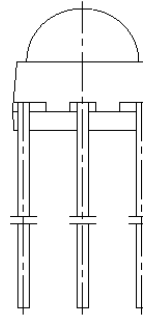
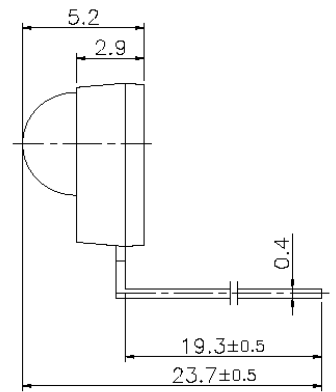
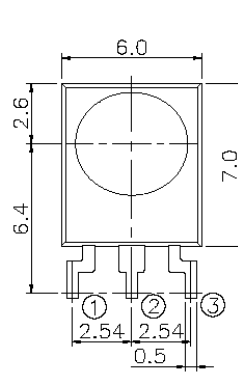
Parameter	Conditions	Specification	Results
Machine Model	C=200pF R=0Ω	Min ±200V	>±200V
Human Body Model	C=100pf R=1.5KΩ	Min ±2000V	>±2000V

FM-90□□LM-5DN



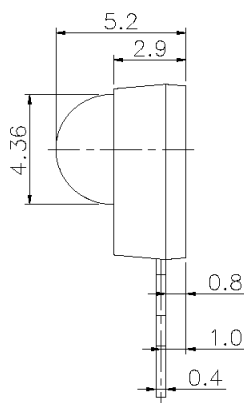
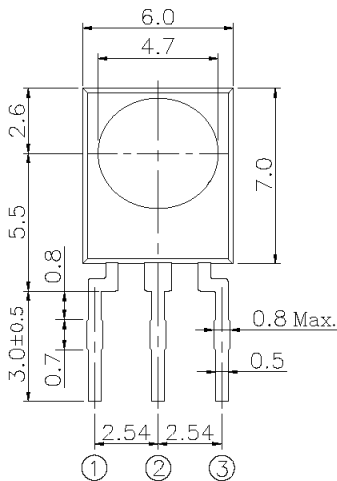
NOTE:
 1.PIN CONFIG
 ①Vout
 ②GND
 ③Vcc
 2.G.T±0.3
 3.Internal metal Shielding
 (UNIT: mm)

FM-90□□TM2-5DN



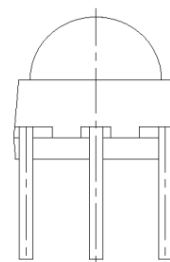
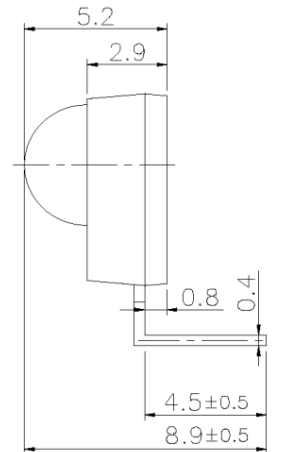
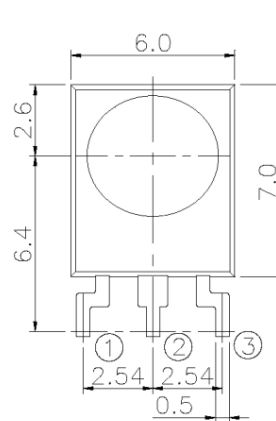
NOTE:
 1.PIN CONFIG
 ①Vout
 ②GND
 ③Vcc
 2.G.T±0.3
 3.Internal metal Shielding
 (UNIT: mm)

FM-90□□SM3-5DN



NOTE:
 1.PIN CONFIG
 ①Vout
 ②GND
 ③Vcc
 2.G.T±0.3
 3.Internal metal Shielding
 (UNIT: mm)

FM-90□□TM2S2-5DN



NOTE:
 1.PIN CONFIG
 ①Vout
 ②GND
 ③Vcc
 2.G.T±0.3
 3.Internal metal Shielding
 (UNIT: mm)