Infrared Receiver Module

IRM1010

SIVAGO® SEMICONDUCTOR

Features

Very low supply current

Photo detector and preamplifier in one package

Internal filter for PCM frequency

Improved shielding against EMI

Supply voltage: 2.5 V to 5.5 V

Improved immunity against ambient light

Insensitive to supply voltage ripple and noise

Material categorization: For definitions of compliance

Application

TV, VCR, AUDIO, SET TOP BOX

Home Appliances

Remote Control Equipment

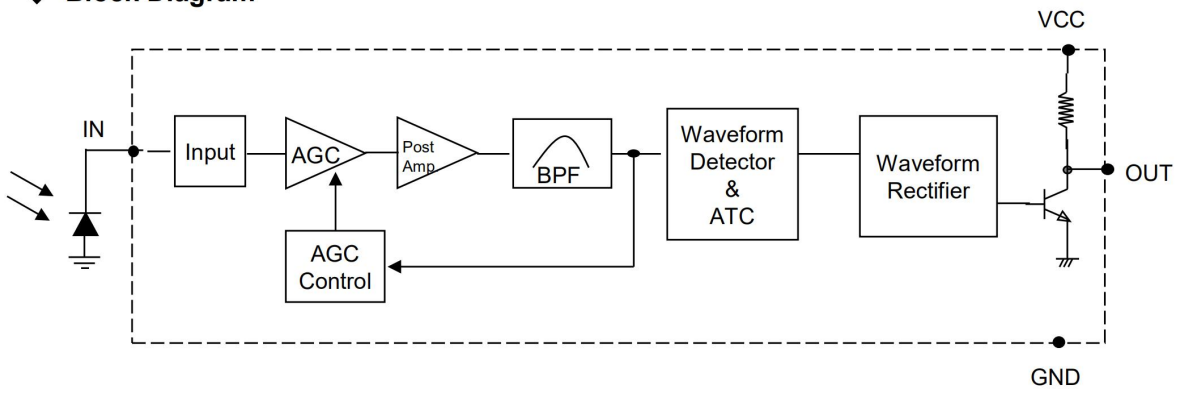
Description

These products are miniaturized receivers for infrared remote control systems. A PIN diode and a preamplifier are assembled on a lead frame, the epoxy package acts as an IR filter.

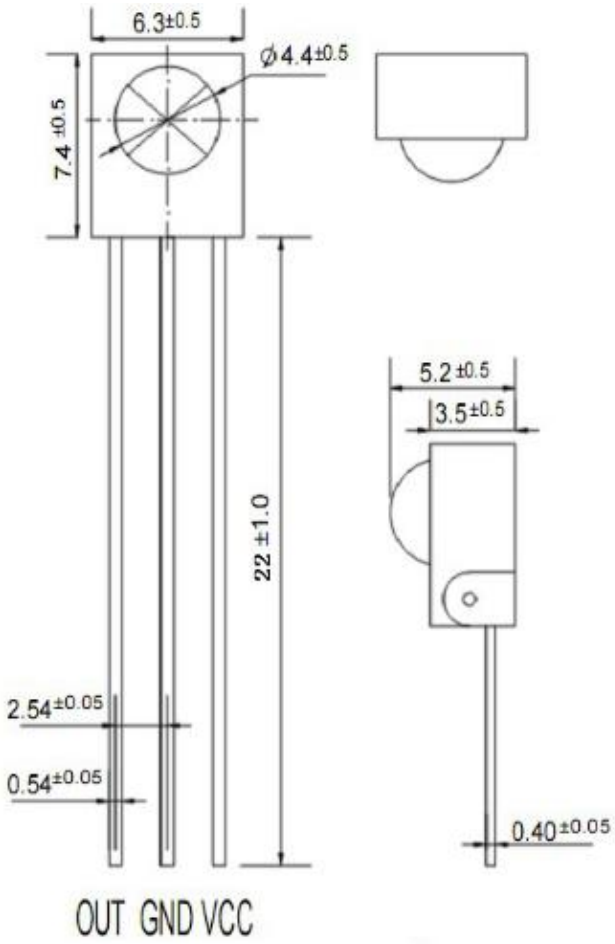
The demodulated output signal can be directly decoded by a microprocessor. The IRM1010 is compatible with all common IR remote control data formats and can suppress almost all spurious pulses from energy saving fluorescent lamps.

This component has not been qualified according to automotive specifications.

◆ Block Diagram



PACKAGE DIMENSIONS



NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.2mm(.010") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.

Absolute Maximum Ratings (T_a=25°C)

Parameter	Symbol	Rating	Unit
Supply Voltage	Vcc	6	V
Operating Temperature	Topr	-25 ~ +85	℃
Storage Temperature	Tstg	-40 ~ +85	℃
Soldering Temperature *1	Tsol	260	℃

*1 4mm from mold body less than 10 seconds

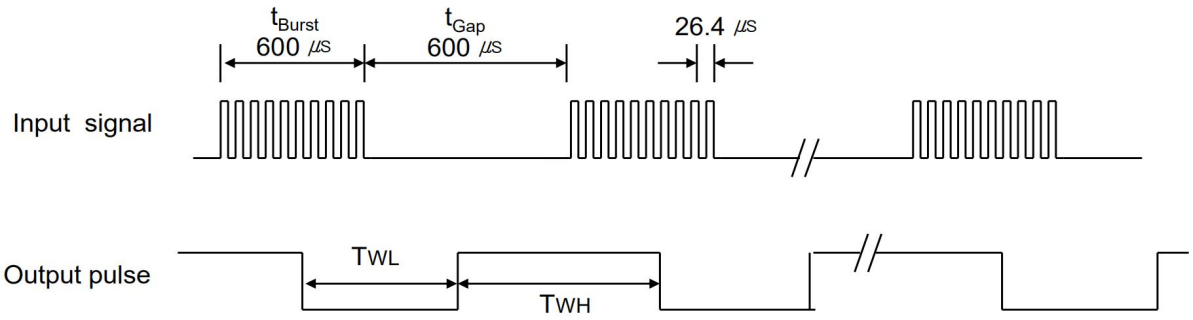
Electro-Optical Characteristics (Ta=25℃ and Vcc=3.0V)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Consumption Current	Icc	---	---	2	mA	No signal input
B.P.F Center Frequency	Fo	---	38	---	KHz	
Peak Wavelength	λ_p	---	940	---	nm	
Reception Distance	L_0	14	---	---	m	At the ray axis Notes 1
	L_{45}	6	---	---		
Half Angle(Horizontal)	Θ_h	---	45	---	deg	
Half Angle(Vertical)	Θ_v	---	45	---	deg	
High Level Pulse Width	T_H	400	---	800	μs	At the ray axis Notes 2
Low Level Pulse Width	T_L	400	---	800	μs	
High Level Output Voltage	V_H	2.7	---	---	V	
Low Level Output Voltage	V_L	---	0.2	0.5	V	

*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.

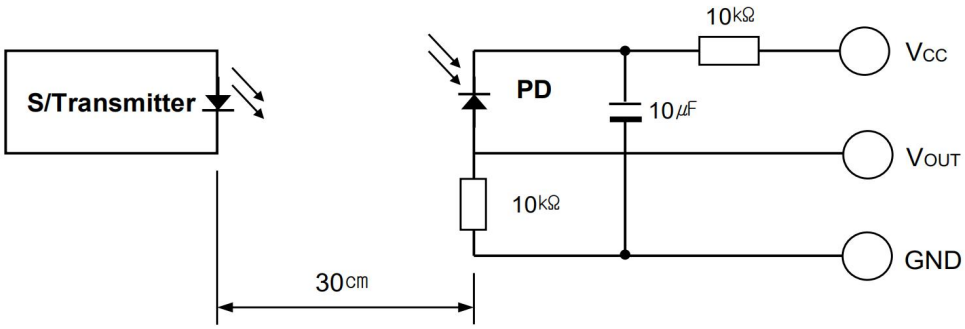
Measurement Conditions (Ta=25°)

[Fig.1] Output Waveform (at freq.=37.9KHz)



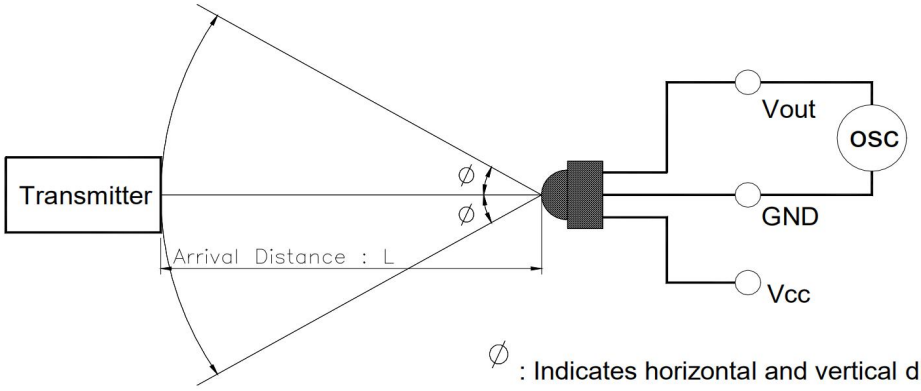
TWL = 400 μs ~ 800 μs , TWH = 400 μs ~ 800μs

[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



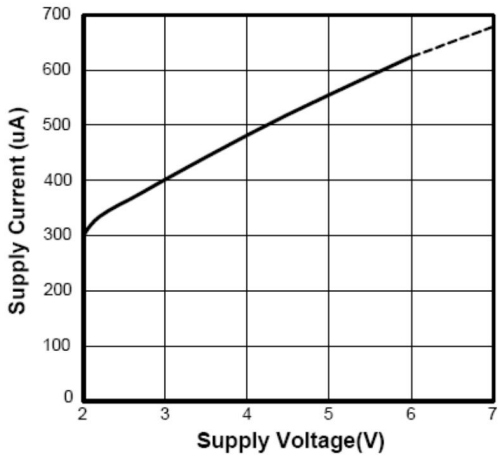
∅ : Indicates horizontal and vertical directions

[Measurement condition for arrival distance]

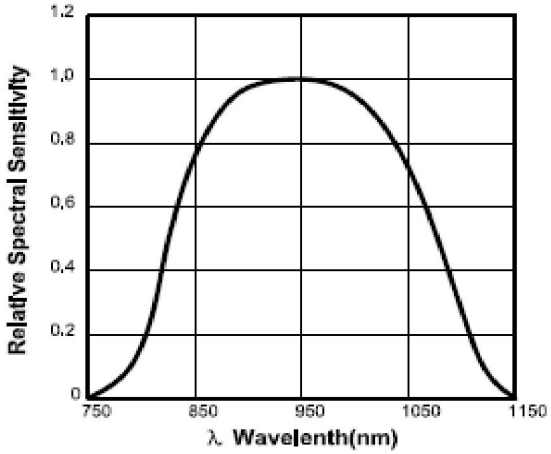
☞ Ambient light source : Detecting surface illumination shall be irradiate 200±50Lux under ordinary white fluorescence lamp without high frequency lighting

Electrical / Optical Characteristics (Ta=25˚)

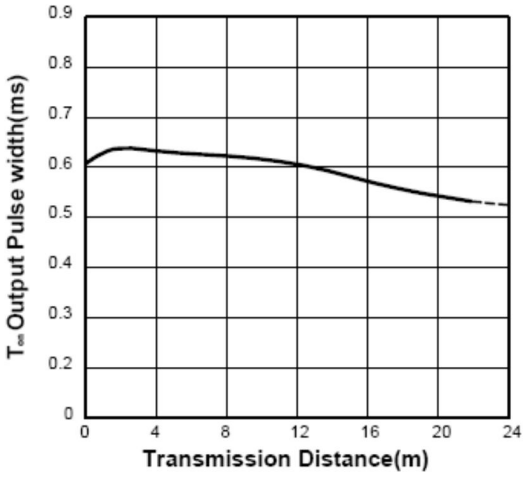
[Fig.4] Supply Current vs. Voltage



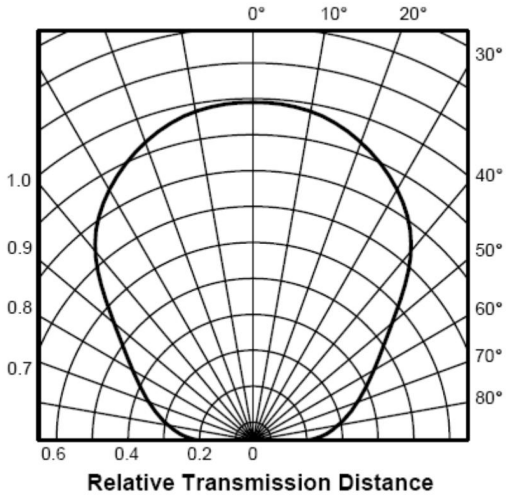
[Fig.5] Relative Spectral Sensitivity



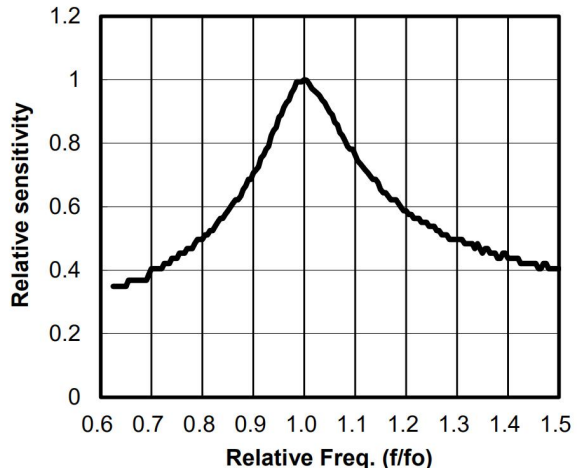
[Fig.6] Output Pulse Width vs. Distance



[Fig.7] Directivity



[Fig.8] B.P.F Fc Curve



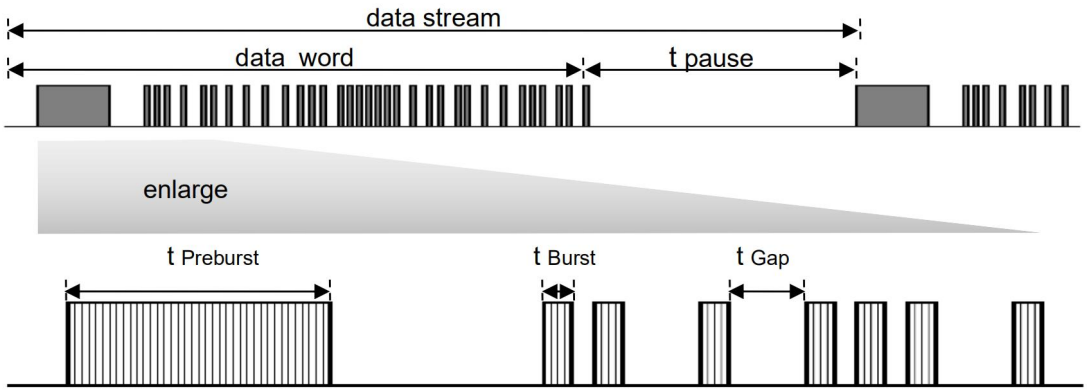
ESD Test Results

Parameter	Specification	Results
Machine Model	Min ±200V	> ±400V
Human Body Model	Min ±2000V	> ±4000V
Charged Device Model	Min ±400V	> ±600V

Item	Symbol	Time
Minimum Data word length	-	Max. 100ms
Minimum Burst length	t_{Burst}	Min. 300us
Minimum Gap Time	t_{Gap}	Min. 350us
Minimum data pause time	t_{Pause}	Min. 50ms
Required data pause time	$t_{Pause} > \{ (\sum tBurst * 2) / 2.5 \} + 30$	

* note 1)
: t_{Pause_min} Could be changed by different data word format.
Therefore, for new application on sets please refer to "Required data pause time(t_{Pause})" on above.

[Fig. 9] Data Signal diagram

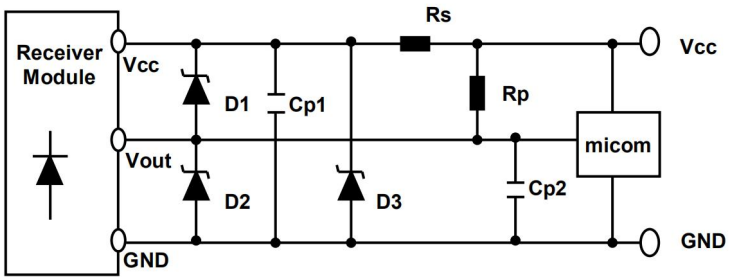


- t Burst ; length of a burst in pulses of the carrier frequency.
- t Gap ; length of the gap between two burst in pulses of carrier.
- t pause ; length of the pause between two data words.
- tPreburst ; lead code of data word

External Application Circuit - Power Noise reduction & ESD Protection

A further influence to the IR receiver modules may come from a supply voltage which is not stable. Such a disturbed supply voltage can caused by switching power supply.
which is not filtered well or by other components in the circuit which produced spikes on the supply line.
This disturbed supply will reduce the sensitivity of receiver modules.
This application circuit will filter the disturbed supply voltage.

[Fig 10] Application for power supply ripple suppression



Component	Recommend
1) Rs	Typ. 100ohm (47 Ω~470Ω)
2) Cp1	Typ. 100uF (47uF~100uF)
3) Rp	Optional (10㏀ or more)
4) Cp2	Typ. 1nF (1nF ~ 10nF)
5) D1~D3	Zener diode or TVS (ESD Protection device)

Reliability Test Items

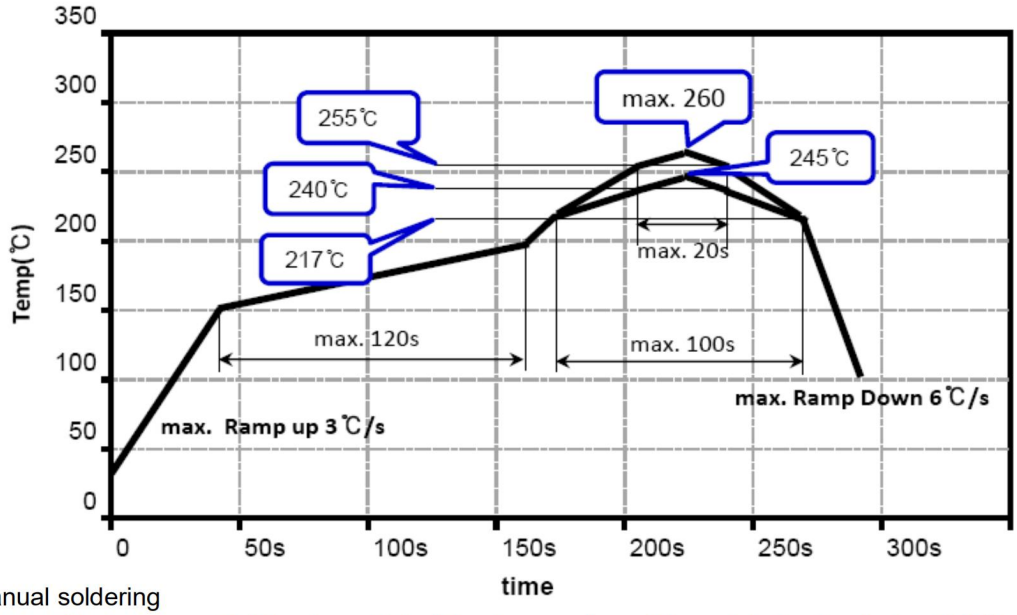
Parameter	Test conditions		Remark
High Temperature	Ta=+85, Vcc=5.0V	t=240h	※1, ※2
Low Temperature	Ta=-30, Vcc=5.0V	t=240h	※1, ※2
High Temp./ High Humidity	Ta=+85℃ 85%RH, Vcc=5.0V	t=240h	※1, ※2
Heat Cycle	Ta=-20℃(0.5h) to +85℃(0.5h)	20 cycle	※2, ※3
Fall Test	Height=75cm, 3 times		※4

※ 1. Supply voltage of load test is 5V.
※ 2. Electro-optical characteristics shall be satisfied after leaving 2 hours in the normal condition.
※ 3. Heat cycle test shall repeat above condition 20 times under no load.
※ 4. The test devices shall be dropped three time on the hard wooden board from a height of 75㎝.

Material Configuration

Parameter	Configuration	Remark
IC	Silicon(99%)	
Photo diode	Silicon(99%)	
Lead frame	Copper(99.5%), Silver(0.5%)	
Epoxy resin	Resin(55.5%), Hardener(45.5%)	
Silver epoxy	Silver(80%), Resin(10%), Hardener(10%)	
Bond wire	Gold(99.99%)	

Lead(Pb)-Free Reflow Solder Profile



※ Manual soldering
Use a soldering iron of 25W or less. Adjust the temperature of the soldering iron below 260℃.

Packing Quantity Specification

1. 250Pcs/1Bag,20 Bag/1Box

2. 4Boxes/1Carton

Label Form Specification

- PRODUCT: Part Number
- CODE NO.: Product Serial Number
- QTY: Packing Quantity
- LOT No: Lot Number
- REMARKS:Remarks

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