

Infrared Module for Remote Control System

VK4836

● General

Infrared module for remote control system which is PIN diode and preamplifier series are assembled on lead frame, in order to realize the receiving and amplifying the infrared remote controller signal. The type of epoxy package can filter the visual interference. The demodulated output signal can directly be decoded by a microprocessor. It may be used in TV sets, STB, Video recorder, DVD, DVR, PVR, satellite receivers, air conditioners etc.

● Features

- ◆ High reliability
- ◆ Output active low
- ◆ No external parts, Inner shield
- ◆ High sensitivity, Large transmission range
- ◆ Maximum interference safety against external light sources
- ◆ Internal filter for a high frequency lighting fluorescent lamp
- ◆ Low power consumption
- ◆ TTL and CMOS Compatibility
- ◆ Suitable minimum burst length ≥ 10 cycles of carrier
- ◆ Suitable minimum burst gap time ≥ 14 cycles of carrier
- ◆ Suitable minimum data pause time ≥ 30 ms
- ◆ Pb free, Component in accordance to RoHS 2002/95/EC

● Parts Table

Part	Carrier Frequency
VK4836	36kHz

● Absolute Maximum Ratings (Ta=25°C)

Parameters	Symbol	Rated value	Unit
Supply voltage	V _{CC}	6.0	V
Supply Current	I _{CC}	3.0	mA
Output Voltage	V _O	6.0	V
Output Current	I _O	2.5	mA
Operation Temp.	T _{amb}	-25~+85	°C
Storage Temp.	T _{stg}	-25~+85	°C
Power Dissipation	P	50	mW
Soldering Temp. (10s)*	T _{sd}	+260	°C

*Dip up to 2.0~2.5mm from the terminal root

● **Recommended operating conditions (Ta=25°C)**

Parameter	Symbol	Operating conditions	Unit
Supply Voltage	V _{cc}	2.7~5.5	V

● **Opto-electric characteristics (Ta=25°C)**

Parameters	symbol	Test condition	Min.	Typ.	Max.	Unit
Supply current	I _{CC}	V _{cc} =3V E _v =0 E _e =0		0.9	1.5	mA
		V _{cc} =5V E _v =0 E _e =0		1.0	1.5	
Peak wavelength	λ _p			940		nm
High output voltage	V _{OH}	E _e =0.5mw/m ² P _w =600μs Duty=50%	V _{cc} -0.25			V
Low output voltage	V _{OL}				0.25	V
High output pulse width	T _{Wh}		450	600	750	μs
Low output pulse width	T _{wl}		450	600	750	μs
Receiving distance	L	E _e =0.5mw/m ² V _{cc} =5V E _v =(200±50)L _x	15			m
Horizontal half angle	θ _{1/2}	E _e =0.5mw/m ² V _{cc} =5V E _v =(200±50)L _x L=6.5m		45		deg

● **Characteristics Curve (Tamb=25°C)**

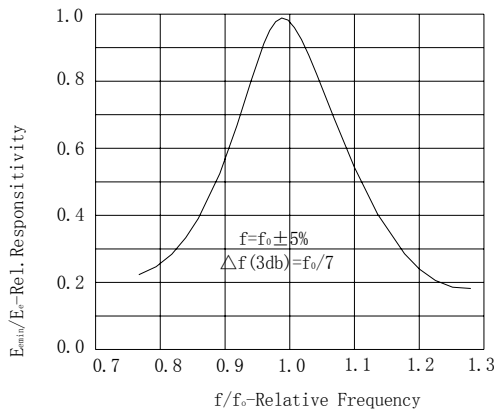


Figure 1. Frequency Dependence of Responsivity

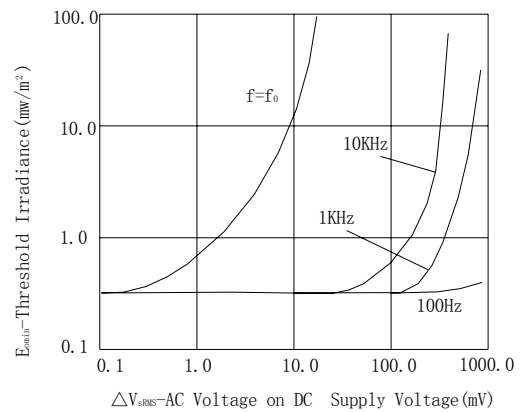


Figure 2. Sensitivity vs. Supply Voltage Disturbances

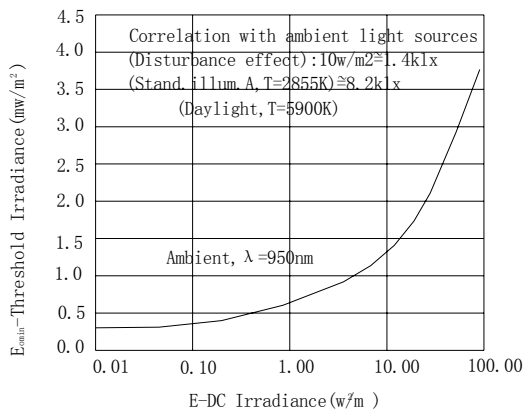


Figure 3. Sensitivity in Bright Ambient

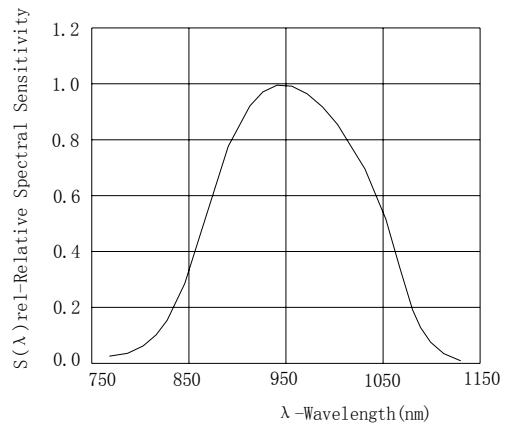


Figure 4. Relative Spectral Sensitivity vs. Wavelength

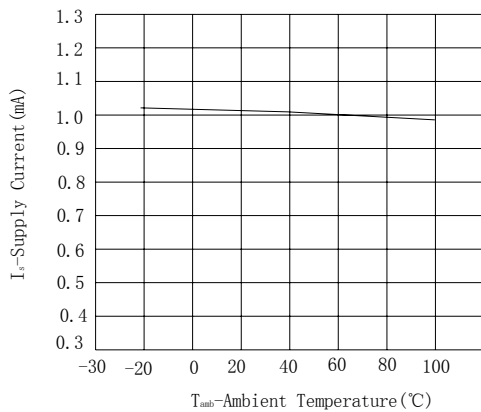


Figure 5. Supply Current vs. Ambient Temperature

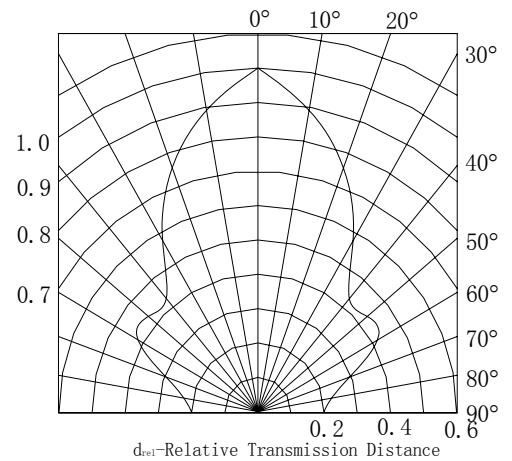
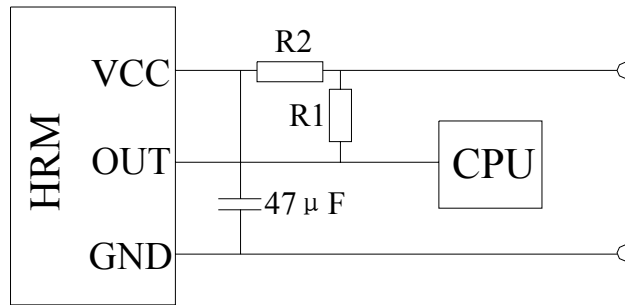


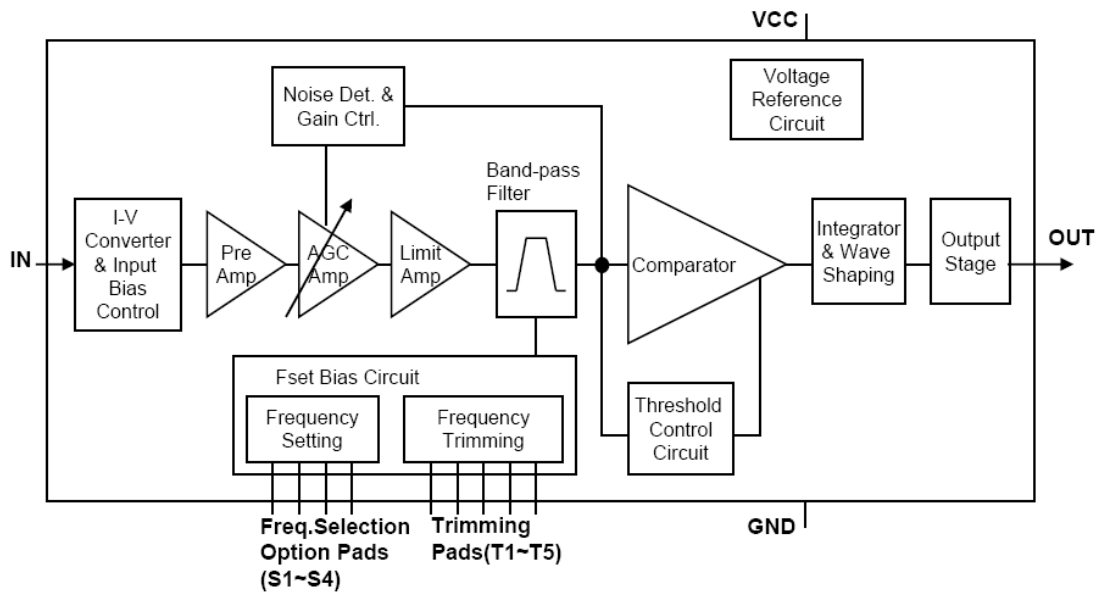
Figure 6. Directivity

● Recommended circuit



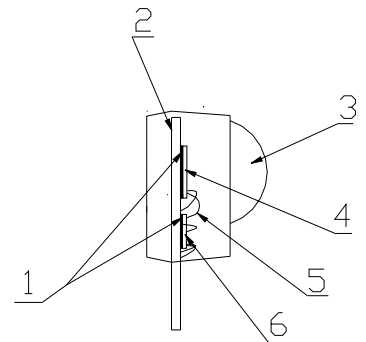
- Note: 1、 When load is $32.4k\Omega$, $1.6k\Omega$ to $8.5k\Omega$ external pull-up resistor(R1) is recommended.
 2、 R1 shall be adjusted with changing of load.
 3、 100Ω for current limited resistor(R2) is recommended, and shall be adjusted after considering the real condition.

● Block diagram

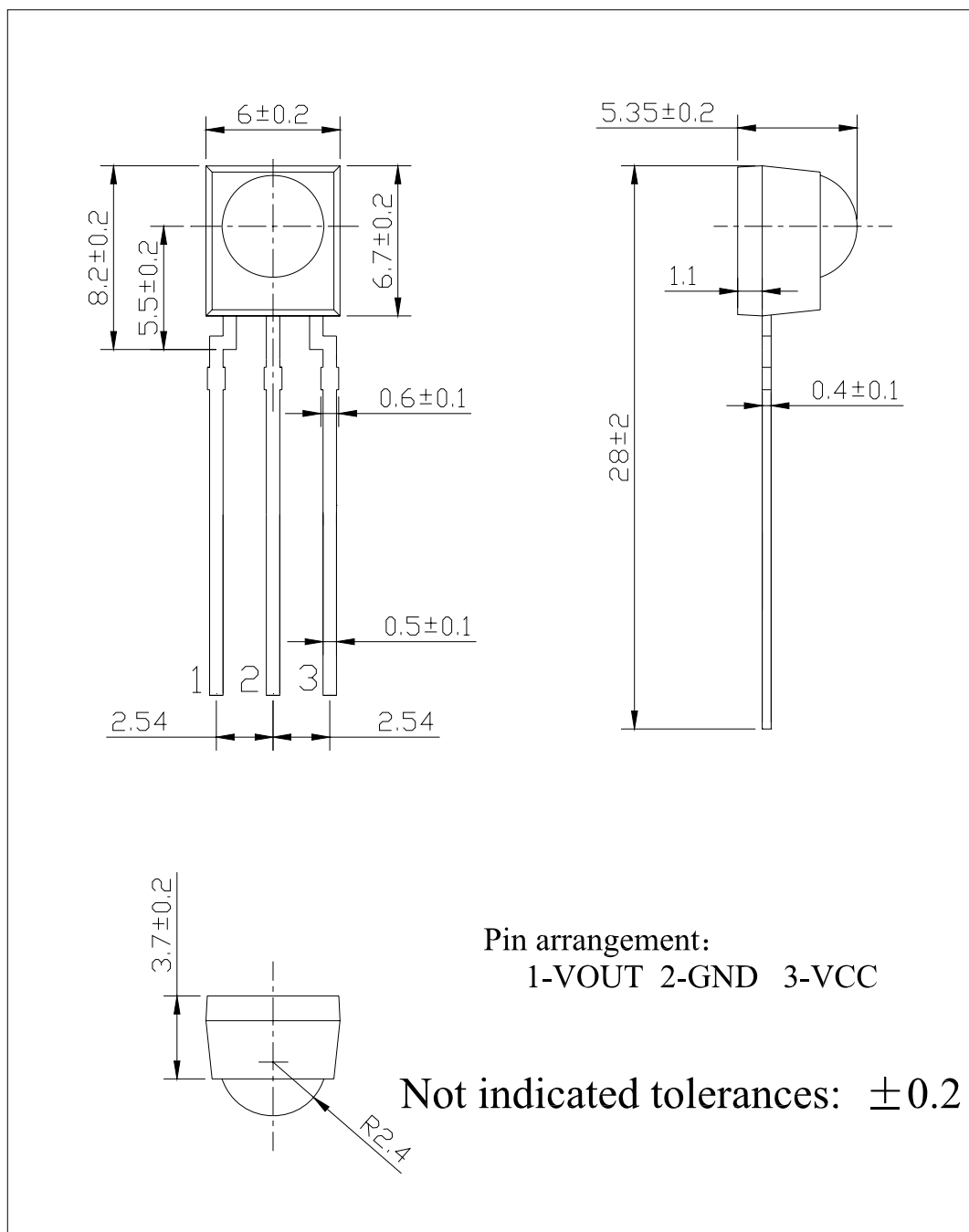


● Construction&Materials

No.	Name	Material
1	Bond	Ag Paste
2	Lead Frame	SPCC-SB
3	Molding	Epoxy Resin
4	Photo diode	Silicon
5	Bond Wire	Au Wire
6	IC chip	Silicon



● Outline(unit: mm)



● Precautions for use

1. Since the device is static sensitive, it is requested that anti-static measures should be taken on human body and all devices (including soldering iron) and equipment, machinery, desk and ground.

2. Do not apply unnecessary stress to lead.

3. Please pay attention to the lens of receivers, It might affect the performance if it gets dirty, don't touch the receiving surface either.

4. Current limited resistor should be added to the peripheral circuit to avoid shock of powerful current.

5. Suitable IR data format: NEC code, RC5 code; Grundig code; R-2000 code; RCA code; Zenith code; Sony 12-bit code;

● Reliability Test

No.	TEST ITEM	TEST CONDITIONS	NUMBER															
1	Resistance to soldering heat	Dip up to 2.0~2.5mm from the terminal root at $260 \pm 5^{\circ}\text{C}$ for 10 ± 1 seconds.	16															
2	Temperature cycles	Repeat the temperature cycles for 10 cycles. <table border="1" data-bbox="683 1249 1225 1545"> <thead> <tr> <th>Order</th> <th>Temperature($^{\circ}\text{C}$)</th> <th>Time (min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>85 ± 5</td> <td>10</td> </tr> <tr> <td>2</td> <td>5~35</td> <td>2~3</td> </tr> <tr> <td>3</td> <td>-25 ± 5</td> <td>10</td> </tr> <tr> <td>4</td> <td>5~35</td> <td>2~3</td> </tr> </tbody> </table>	Order	Temperature($^{\circ}\text{C}$)	Time (min)	1	85 ± 5	10	2	5~35	2~3	3	-25 ± 5	10	4	5~35	2~3	12
Order	Temperature($^{\circ}\text{C}$)	Time (min)																
1	85 ± 5	10																
2	5~35	2~3																
3	-25 ± 5	10																
4	5~35	2~3																
3	The steady state operating life	Continuously impress for 1000hours.	25															
4	High temperature storage	Storage at $85 \pm 5^{\circ}\text{C}$ for 1000hours.	16															
5	Low temperature storage	Storage at $-25 \pm 5^{\circ}\text{C}$ for 168hours.	16															

● **Recommend soldering conditions**

1. Not to apply high temperature exceeding the maximum storage temperature to the epoxy resin.

2. Not to apply any force to the epoxy resin at high temperature.

3. Soldering process

(1) The distance between holes should be the same as that of between terminal lands of the component to avoid any stress during the soldering process. This may lead to the open circuit. Also, lead forming should be done before soldering process not to apply any stress to the insides of the epoxy resin.

(2) Not to apply any stress to the component during the soldering process.

(3) Recommended soldering condition

	condition
Pro-heating & solder bath	Pro-heating: less than 90°C Solder bath: 260°C Soldering area: 3mm away from the bottom of the epoxy resin. Dip time: less than 5 seconds, less than twice.
Soldering iron	Temperature: Less than 350°C, within 3 seconds, 2 times Soldering area: 3mm away from the bottom of the epoxy resin.

(4) Washing

Some chemicals may damage the epoxy resin.

Ethyl alcohol is recommended under the following condition.

Chemical washing	Temperature: less than 45°C Wash time: less than 3 minutes.
Ultrasound washing	Power: less than 15W/L Wash time: Less than 3 minutes