IrDA infrared communication module

RPM872-H14

RPM872-H14 is an infrared communication module for IrDA Ver. 1.2 (Low Power). The infrared LED, PIN photo diode, and waveform shaping LSI are all integrated into one single package. This module is designed for low power consumption. The very small package makes it a perfect fit for mobile devices.

●Features

1) Applied to IrDA Ver. 1.2. (Low Power)
2) Designed for low power consumption at waiting mode (75μA).
3) Low operating voltage
   V_{CC}=2.0V to 3.6V
   VIO=1.5V to 3.6V
   VLED=2.6V to 5.5V
4) Small package.
5) Power down function.

●Applications

Cellular phones, PDA, Digital still camera, Handy terminals, and other portable equipments.

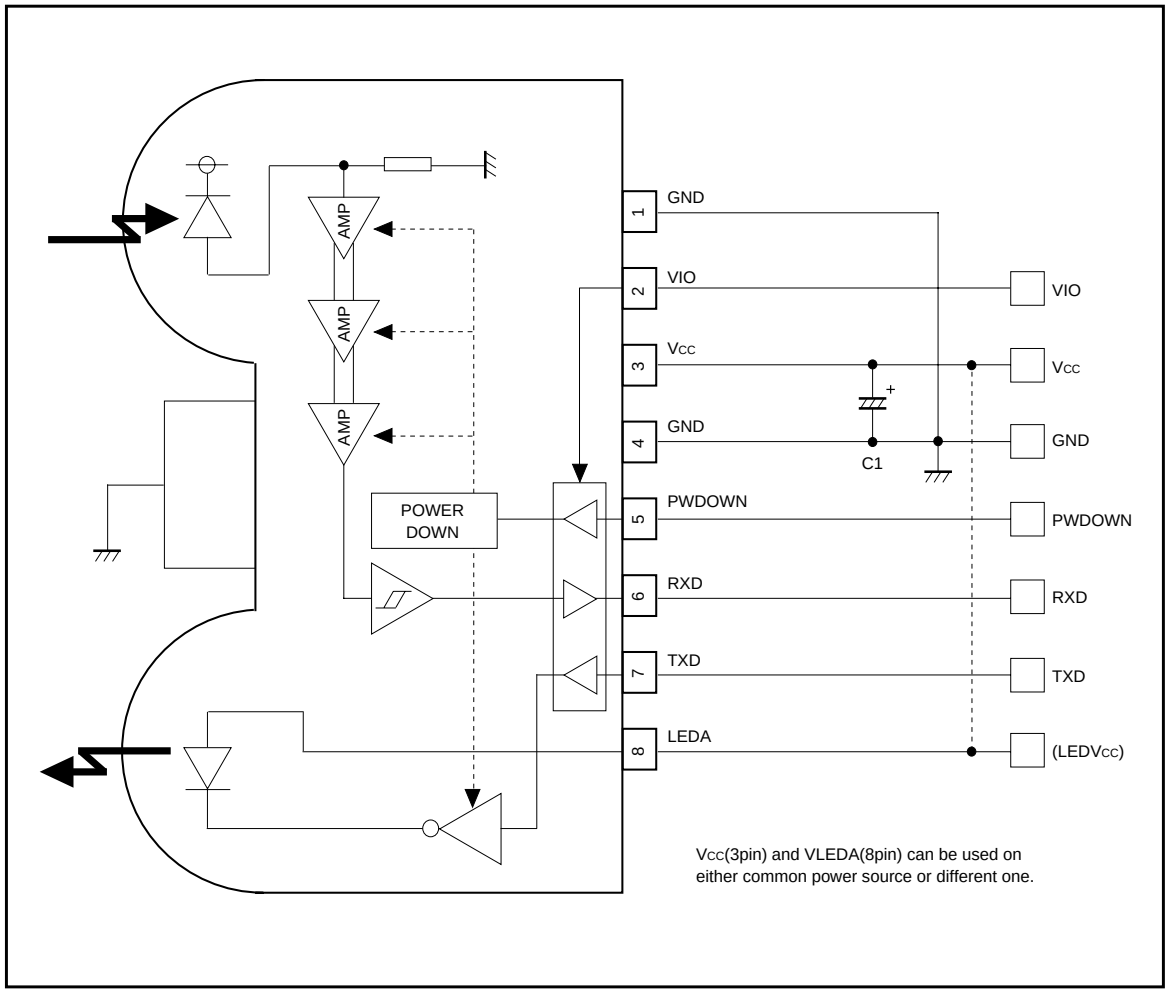
●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	7.0	V
Power dissipation	Pd	100	mW
Operating temperature	Topr	−30 to +85	˚C
Storage temperature	Tstg	−30 to +100	˚C

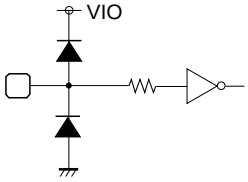
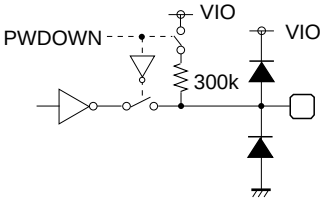
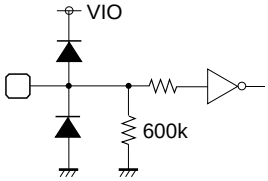
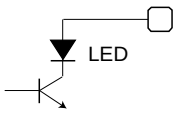
●Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	2.0	3.0	3.6	V
	VLEDA	2.6	3.0	5.5	V
	VIO	1.5	3.0	V_{CC}	V

●**Block diagram and application circuit**



●**Terminal description**

Pin No	Terminal	Circuit	Function
1, 4	GND		GND Pin1 and Pin4 must be connected to the ground.
2	VIO		VIO Supply voltage for I/O pins (PWDOWN, RXD, TXD)
3	V_{CC}		V_{CC} Supply voltage for Transceiver circuits. For preventing from infection, connect a capacitor between V_{CC}(3pin) and GND(4pin).
5	PWDOWN		Power-down Control Terminal H : POWERDOWN MODE L : OPERATING MODE CMOS logic level input When input is H, it will stop the receiving circuit, Pin-PD current and transmitting LED operation.
6	RXD		Receiving Data Output Terminal CMOS logic level output When PWDOWN (5pin) = H, the RXD output will be pulled up to VIO at approximately 300kΩ.
7	TXD		Transmitting Data Input Terminal H : LED (PWDOWN = L) CMOS logic level input Holding TXD = "H"status, LED will be turn off approximately 48μs.
8	LEDA		LED ANODE Terminal Other power source can be used difference between LEDV_{CC} and V_{CC}. This can be connected to battery kinds of unregulated voltage source by internal constant current driver.
–	Shield Case		Connect to Ground.

●**Electrical characteristics** (Unless otherwise noted, V_{CC}=3V, VLEDA=3V, VIO=3V, Ta=25°C)

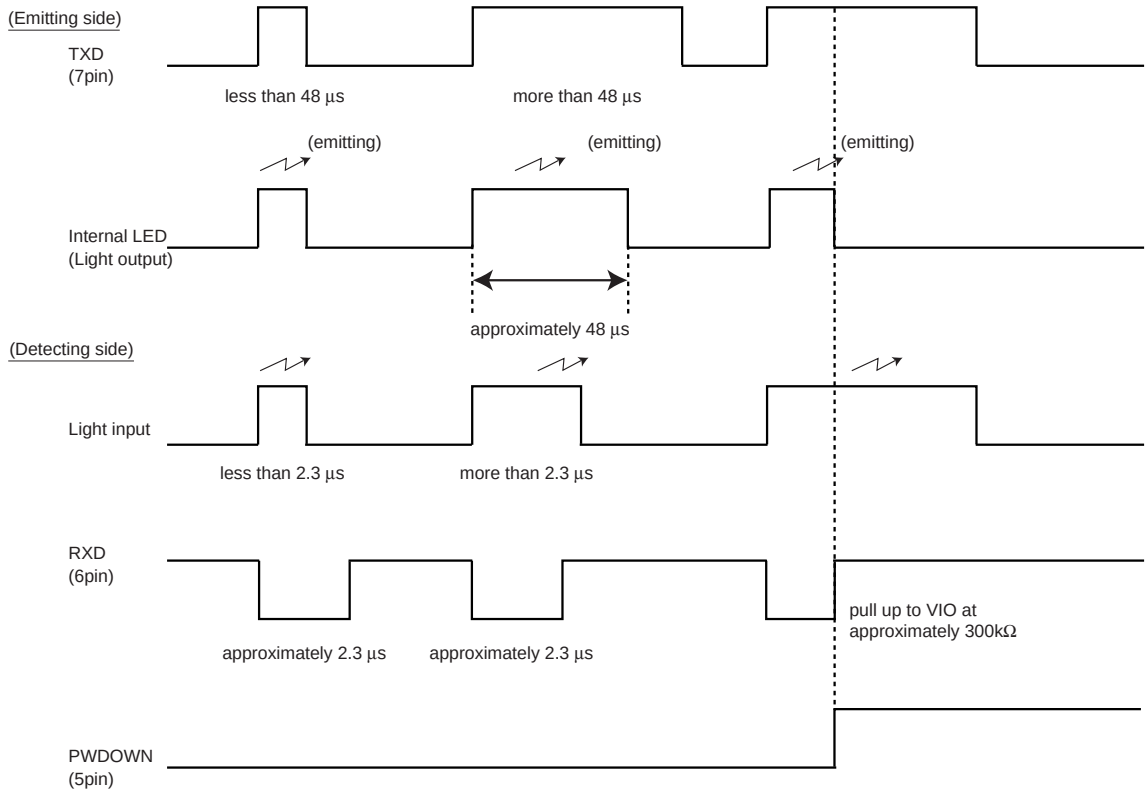
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Consumption Current 1	$I_{CC}1$	–	75	99	μA	VPWDOWN = 0V. At no input light
Consumption Current 2	$I_{CC}2$	–	0.01	0.2	μA	VPWDOWN = VIO. At no input light
Transmission rate		2.4	–	115.2	kbps	
PWDOWN INPUT High Voltage	VPDH	2/3∗VIO	–	VIO	V	VIO = 1.8 to 3.6 [V]
		1.2				VIO = 1.5 to 1.8 [V]
PWDOWN INPUT Low Voltage	VPDL	0	–	1/3∗VIO	V	VIO = 1.8 to 3.6 [V]
				VIO–1.2		VIO = 1.5 to 1.8 [V]
PWDOWN INPUT High Current	IPDH	–1.0	0	1.0	μA	PWDOWN = VIO [V]
PWDOWN INPUT Low Current	IPDL	–1.0	0	1.0	μA	PWDOWN = 0 [V]
<Transmitter>						
TXD INPUT High Voltage	VTXH	2/3∗VIO	–	VIO	V	VIO = 1.8 to 3.6 [V]
		1.2				VIO = 1.5 to 1.8 [V]
TXD INPUT Low Voltage	VTXL	0	–	1/3∗VIO	V	VIO = 1.8 to 3.6 [V]
				VIO–1.2		VIO = 1.5 to 1.8 [V]
TXD INPUT High Current	ITXH	2.5	5	10	μA	TXD = VIO [V]
TXD INPUT Low Current	ITXL	–1.0	0	1.0	μA	TXD = 0 [V]
LED ANODE Current	ILEDA	–	30.5	–	mA	
<Receiver>						
RXD OUTPUT High Voltage	VRXH	VIO–0.4	–	VIO	V	IRXH = –200μA
RXD OUTPUT Low Voltage	VRXL	0	–	0.4	V	IRXL = 200μA
RXD OUTPUT Rise Time	tRR	–	35	–	ns	C_L = 15pF
RXD OUTPUT Fall Time	tFR	–	35	–	ns	C_L = 15pF
RXD OUTPUT Pulse Width	twRXD	1.5	2.3	4.2	μs	C_L = 15pF, 2.4 to 115.2kbps
Receiver Latency Time	tRT	–	100	200	μs	

●**Optical characteristics** (Unless otherwise noted, V_{CC}=3V, VLEDA=3V, VIO=3V, Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Peak wave length	λP	850	870	900	nm	
Intensity 1	IE1	4.0	10	26	mW / Sr	$-15^\circ \le \theta_L \le 15^\circ$
Half-Angle	θL / 2	–	±18	±30	deg	
Optical pulse width	TWLED	1.42	1.63	2.02	μs	TXD=1.63μs pulse input
Rise time / Fall time	Tr / Tf	–	–	100	ns	10% to 90%
Optical over shoot		–	–	25	%	
Edge jitter	Tj	–40	–	40	ns	
Irradiance in angular	Ee	0.0068	–	500	mW / cm^2	$-15^\circ \le \theta_L \le 15^\circ$
INPUT Half-Angular	θD / 2	±15	–	–	deg	
Maximum Emitting Time	TLEDmax	10	48	120	μs	TXD=VIO

1.This product is not designed for protection against radioactive rays.
2.This product dose not include laser transmitter.
3.This product includes one pin photo diode.
4.This product dose not include optical load.

●Timing chart



●Recommended values

Part symbol	Recommended value	Notice
C1	1µF, tantalum or ceramic Ex.) TCFGA1A105M8R (ROHM)	Bigger capacitance is recommended with much noise from power supply

●Notes

1) VLEDA(8pin), V_{CC}(3pin) and VIO(2pin)
- Other power source can be used difference between VLEDA and V_{CC} and VIO. (VIO < V_{CC} +0.3V)

2) Caution in designing board lay-out

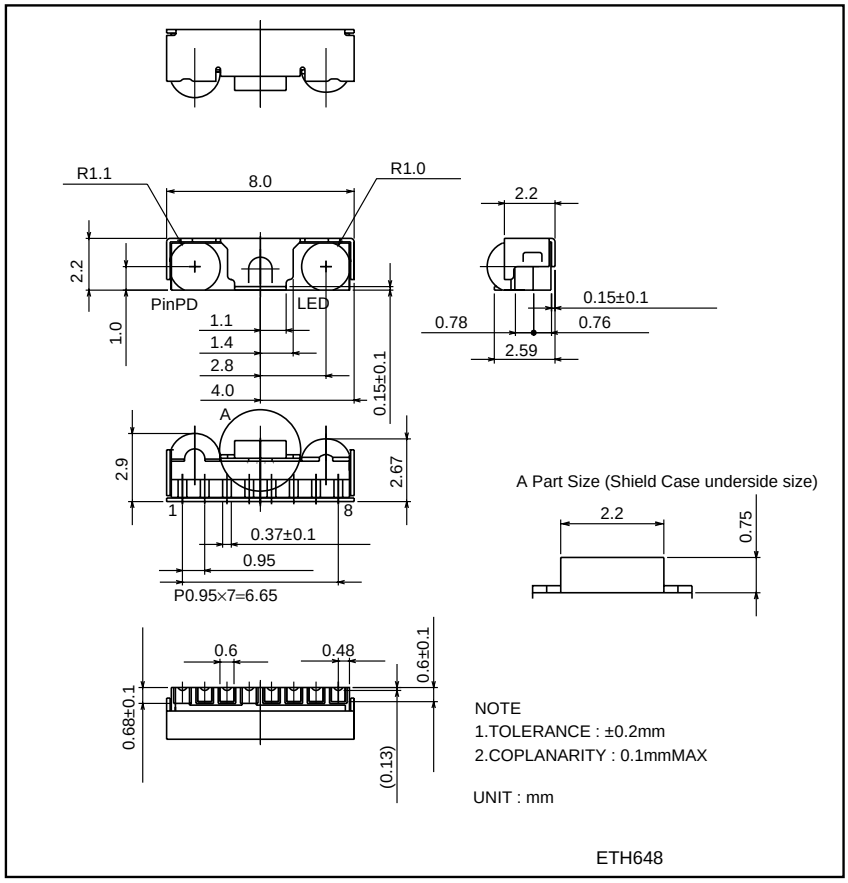
To get maximum potential from RPM872-H14, please keep in mind following instruction.
- The line of RXD (6pin) should be connected at backside via through hole close to RPM872-H14 pin lead. Better not to be close to photo diode side (1pin).

⇒This is to minimize feedback supplied to photo diode from RXD.
- As for C1 between 3-4 pin should be placed close to RPM872-H14.
- Better to be placed more than 1.0cm in radius from photo diode (pin1 side) and also away from the parts which generates noise, such as DC / DC converter.

3) Others
- Please be sure to set up the TXD (7pin) input to be "L" (under 0.3V) except transmitting data (for < 90μs. On duty < 20%).
- Powerdown current might increase if exposed by strong light (ex. direct sunlight) at powerdown mode.
- Please use by the signal format which is specified by IrDA Ver1.2 (Low Power). There might be on error if used by different signal format.
- Dust or dirt on lens portion may affect the characteristics, so pay sufficient attention.

4) Eye Safe
- IEC825-1 (EN60825-1) Class 1 Eye Safe.

●External dimensions (Unit : mm)



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