

# IrDA wireless communication transceiver IC (supports Ver. 1.2 Low Power)

## RPM870-H7

The RPM870-H7 is an Module that supports IrDA Ver. 1.2 (Low Power), and is ideal for wireless communications. An infrared LED, a pin-photo diode, and a receiver frequency formation LSI are all contained in a very small single package. It is also equipped with low power consumption and power down functions making this IC perfect for mobile sets.

### ●Features

- 1) Supports IrDA Ver. 1.2. (Low Power)
- 2) Low power consumption while standing by for receiving (75 $\mu$ A Typ.).
- 3) A power-down function is perfect for battery applications.
- 4) Supports a board power supply voltage range from 2.6V to 3.6V.
- 5) Only 1 external capacitor required.

### ●Applications

Mobile phones, PDAs, and others

### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V <sub>CC</sub>	7.0	V
Input voltage	V <sub>in</sub>	-0.3~V <sub>CC</sub> +0.3	V
Operating temperature	T <sub>opr</sub>	-20~+85	°C
Storage temperature	T <sub>stg</sub>	-30~+100	°C
LED peak current	I <sub>fp</sub>	120 *1	mA
Power dissipation	P <sub>d</sub>	100	mW

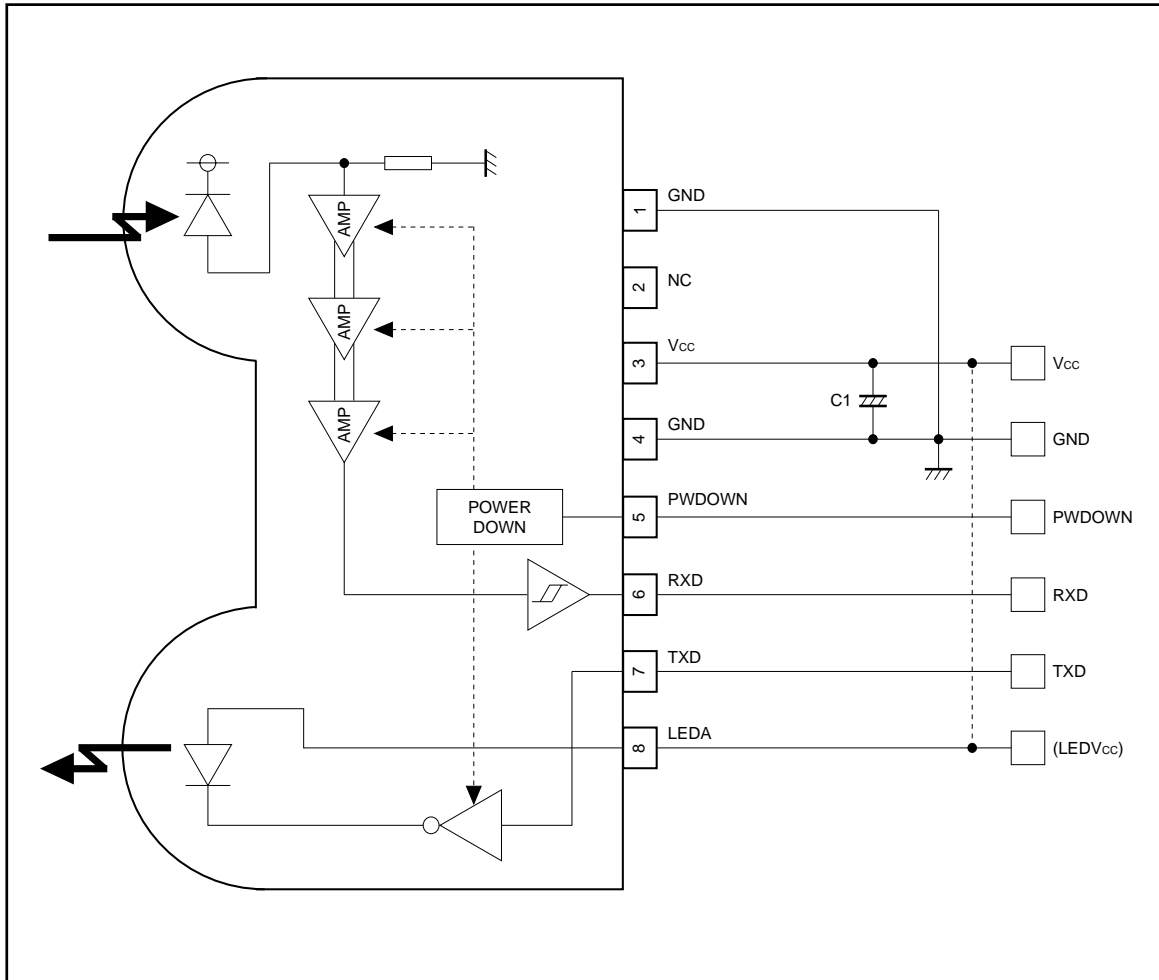
\*1 LED peak current : <90 $\mu$ sec, on duty < 20%

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

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V <sub>CC</sub>	2.6	3.0	3.6	V
	V <sub>LEDA</sub>	2.6	3.0	5.5	V

Photo Link Module

●Block diagram and application circuit



Recommended values

Part symbol	Recommended value	Notice
C1	1 $\mu$ F, tantalum Ex.) TCFGA1A105M8R (ROHM)	Bigger capacitance is recommended with much noise from power supply

## Photo Link Module

## ● Terminal description

Pin No	Terminal	Circuit	Function
1, 4	GND		GND
2	NC		This terminal must be left open.
3	Vcc		Vcc For preventing from ripple noise. connect a capacitor between Vcc (3pin) and GND (4pin).
5	PWDOWN		Power-down control terminal H : POWERDOWN L : OPERATION CMOS logic level input When input is L, it will stop the receiving circuit, Pin-PD current and transmitting LED operation.
6	RXD		Receiving data output terminal CMOS logic level input When PWDOWN (5pin) = H, the RXD output will be pulled up to Vcc at approximately 300kΩ.
7	TXD		Transmitting data input terminal H : LED Drive (PWDOWN = L) CMOS logic level output Holding TXD = "H" status, LED will be turn off approximately 48μsec.
8	LEDA		LED ANODE terminal Other power source can be used difference between LEDVcc and Vcc.

## Photo Link Module

●Electrical characteristics (Unless otherwise noted,  $V_{CC}=3V$ ,  $V_{LEDV_{CC}}=3V$ ,  $T_a = 25^{\circ}C$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Consumption Current 1	I <sub>cc1</sub>	–	75	99	μA	Stand-by for receiving, no input light.
Consumption Current 2	I <sub>cc2</sub>	–	0.01	0.2	μA	PWDOWN = V <sub>CC</sub> [V], no input light.
Transmission rate		2.4	–	115.2	kbps	
PWDOWN INPUT High Voltage	VPDH	V <sub>CC</sub> -0.5	–	–	V	
PWDOWN INPUT Low Voltage	VPDL	–	–	0.5	V	
PWDOWN INPUT High Current	IPDH	-1.0	0	1.0	μA	PWDOWN = V <sub>CC</sub> [V]
PWDOWN INPUT Low Current	IPDL	-1.0	0	1.0	μA	PWDOWN = 0 [V]
<Transmitter>						
TXD INPUT High Voltage	VTXH	V <sub>CC</sub> -0.5	–	–	V	
TXD INPUT Low Voltage	VTXL	–	–	0.5	V	
TXD INPUT High Current	ITXH	7.5	15	30	μA	TXD = V <sub>CC</sub> [V]
TXD INPUT Low Current	ITXL	-1.0	0	1.0	μA	TXD = 0 [V]
LED ANODE Current	I <sub>LEDA</sub>	–	30.5	–	mA	
<Receiver>						
RXD OUTPUT High Voltage	VRXH	V <sub>CC</sub> -0.5	–	–	V	IRXH = -50μA
RXD OUTPUT Low Voltage	VRXL	–	–	0.5	V	IRXL = 200μA
RXD OUTPUT Rise Time	t <sub>RR</sub>	–	40	–	nsec	C <sub>L</sub> = 15pF
RXD OUTPUT Fall Time	t <sub>FR</sub>	–	20	–	nsec	C <sub>L</sub> = 15pF
RXD OUTPUT Pulse Width	tw <sub>RXD</sub>	1.5	2.3	3.6	μsec	C <sub>L</sub> = 15pF, 2.4~115.2Kbps
Receiver Latency Time	t <sub>RT</sub>	–	100	300	μsec	

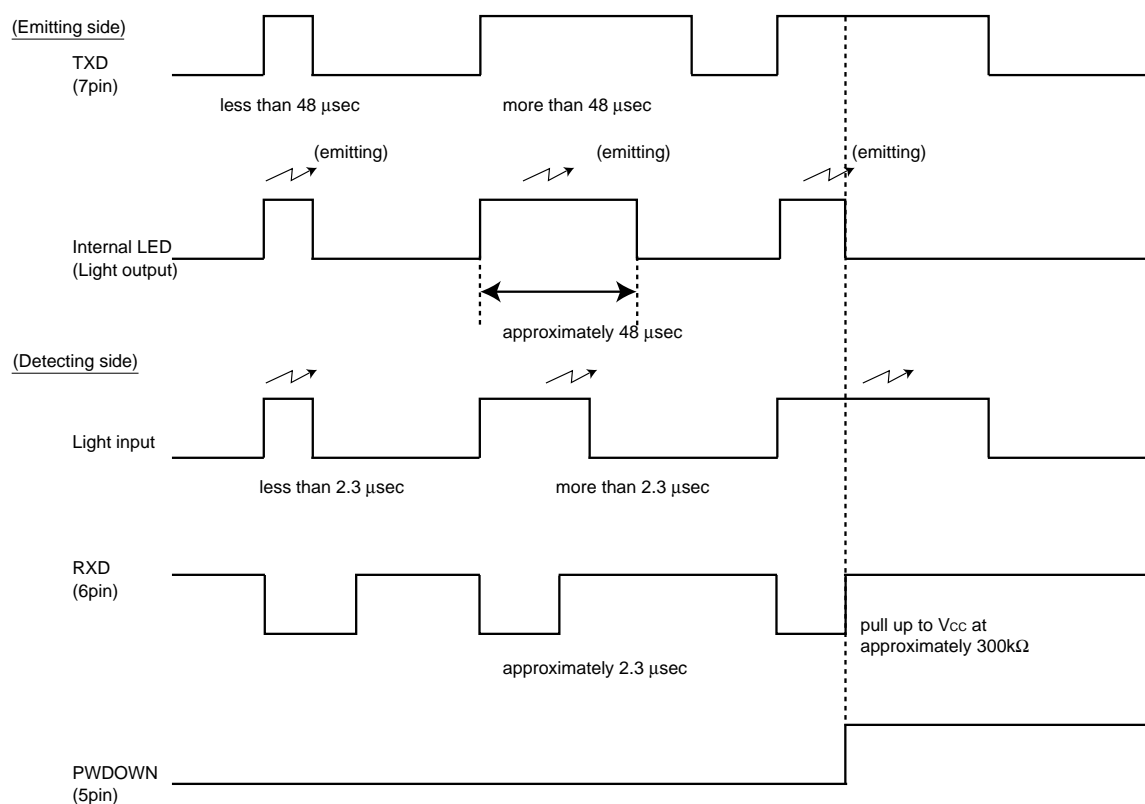
●Optical characteristics (Unless otherwise noted,  $V_{CC}=3V$ ,  $V_{LEDV_{CC}}=3V$ ,  $T_a = 25^{\circ}C$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Peak wave length	λ <sub>P</sub>	850	870	900	nm	
Intensity 1	IE1	4.0	10	26	mW / Sr	-15° ≤ θ <sub>L</sub> ≤ 15°
Intensity 2	IE2	–	–	3.6	mW / Sr	θ <sub>L</sub> ≤ -30°, 30° ≤ θ <sub>L</sub>
Half-Angle	θ <sub>L</sub> / 2	–	±18	–	deg	
Rise time / Fall time	T <sub>r</sub> / T <sub>f</sub>	–	–	100	nsec	10%~90%
Optical over shoot		–	–	25	%	
Edge jitter	T <sub>j</sub>	-40	–	40	nsec	
Irradiance in angular	E <sub>e</sub>	0.0068	–	500	mW / cm <sup>2</sup>	-15° ≤ θ <sub>L</sub> ≤ 15°
INPUT Half-Angular	θ <sub>D</sub> / 2	±15	–	–	deg	
Maximum Emitting Time	T <sub>LEDmax</sub>	16	48	90	μsec	TXD=V <sub>CC</sub>

- 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.

## Photo Link Module

## ● Timing chart



## ● Notes

1) LEDV<sub>CC</sub> (8pin) and V<sub>CC</sub> (3pin)

- Other power source can be used difference between LEDV<sub>CC</sub> and V<sub>CC</sub>.

## 2) Caution in designing board lay-out

To get maximum potential from RPM870-H7, please keep in mind following instruction.

- The line of RXD (6pin) should be connected at backside via through hole close to RPM870-H7 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 RPM870-H7.
- 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 0.5V) except transmitting data (for < 90μsec. 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.

## 4) Eye Safe

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

Photo Link Module

●External dimensions (Units : mm)

