

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

## RPM870-H14

The RPM870-H14 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 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) Applied to IrDA Ver. 1.2. (Low Power)
- 2) Low power consumption while waiting mode. (90 $\mu$ 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)

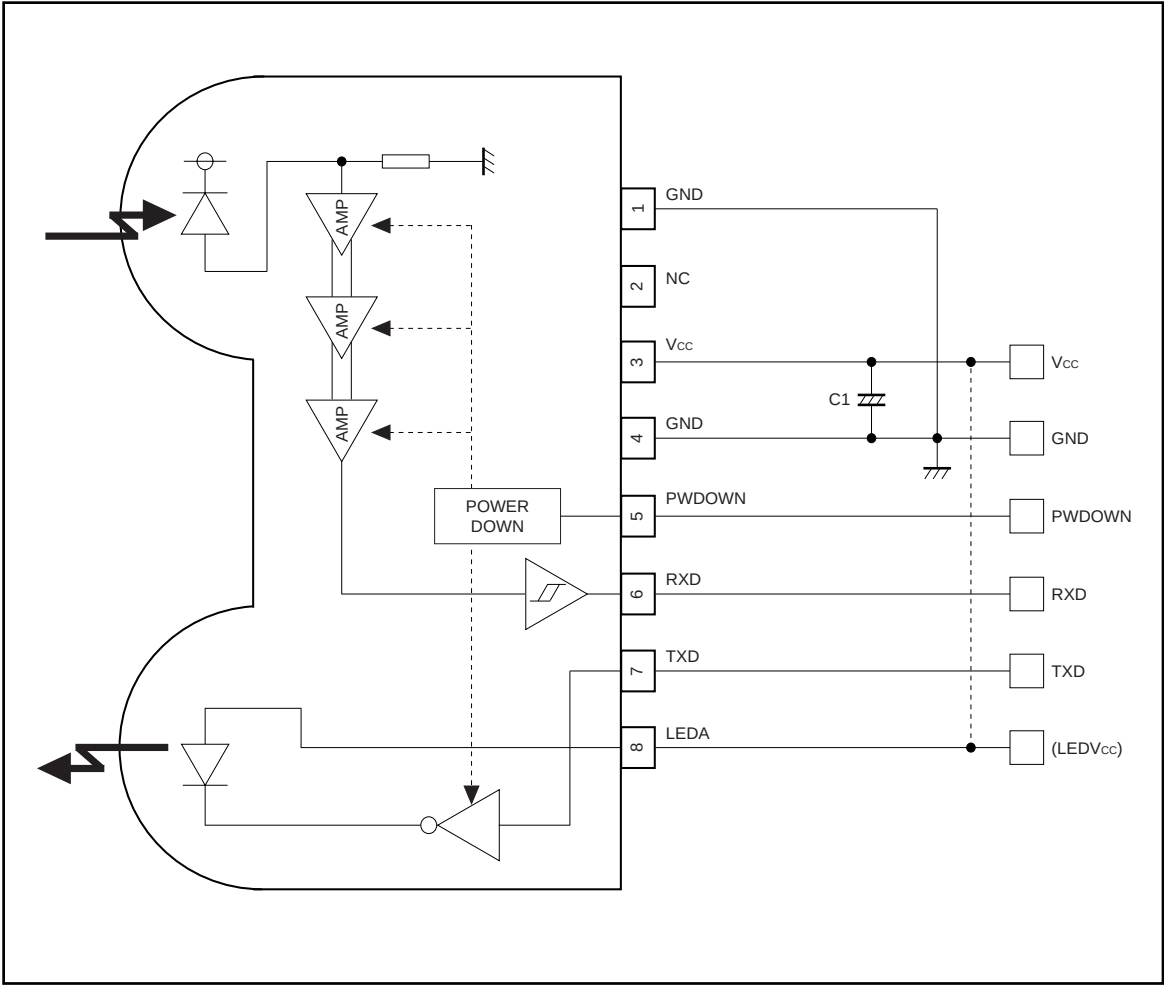
| Parameter             | Symbol           | Limits                       | Unit |
|-----------------------|------------------|------------------------------|------|
| Supply voltage        | V <sub>CC</sub>  | 7.0                          | V    |
| Input voltage         | V <sub>in</sub>  | -0.3 to V <sub>CC</sub> +0.3 | V    |
| Operating temperature | T <sub>opr</sub> | -20 to +85                   | °C   |
| Storage temperature   | T <sub>stg</sub> | -30 to +100                  | °C   |
| Power dissipation     | P <sub>d</sub>   | 100                          | mW   |

### ●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

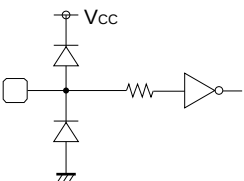
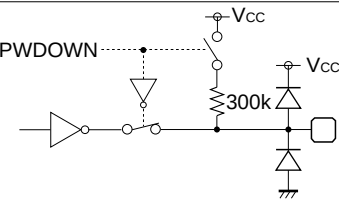
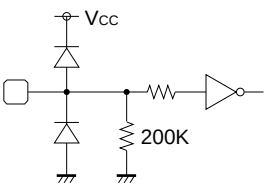
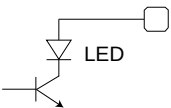


Recommended values

| Part symbol | Recommended value                          | Notice                                                              |
|-------------|--------------------------------------------|---------------------------------------------------------------------|
| C1          | 1μF, tantalum<br>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      | V <sub>CC</sub> |                                                                                     | V <sub>CC</sub><br>For preventing from ripple noise.<br>connect a capacitor between<br>V <sub>CC</sub> (3pin) and GND (4pin).                                                                        |
| 5      | PWDOWN          |    | Power-down control terminal<br>H : POWERDOWN<br>L : OPERATION<br>CMOS logic level input<br>When input is H, it will stop<br>the receiving circuit, Pin-PD<br>current and transmitting LED operation. |
| 6      | RXD             |   | Receiving data output terminal<br>CMOS logic level input<br>When PWDOWN (5pin) = H, the RXD<br>output will be pulled up to<br>V <sub>CC</sub> at approximately 300kΩ.                                |
| 7      | TXD             |  | Transmitting data input terminal<br>H : LED Drive (PWDOWN = L)<br>CMOS logic level output<br>Holding TXD = "H" status, LED will<br>be turn off approximately 48μsec.                                 |
| 8      | LEDA            |  | LED ANODE terminal<br>Other power source can be used<br>difference between LEDV <sub>CC</sub> and V <sub>CC</sub> .                                                                                  |

## Photo Link Module

●Electrical characteristics (Unless otherwise noted, V<sub>CC</sub>=3V, V<sub>LED</sub>V<sub>CC</sub>=3V, Ta=25°C)

| Parameter                 | Symbol            | Min.                  | Typ. | Max.  | Unit | Conditions                                   |
|---------------------------|-------------------|-----------------------|------|-------|------|----------------------------------------------|
| Consumption Current 1     | I <sub>CC1</sub>  | –                     | 90   | 120   | μA   | Waiting mode, 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              | –                     | –    | 0.55  | 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> –0.55 | –    | –     | V    |                                              |
| TXD INPUT Low Voltage     | VTXL              | –                     | –    | 0.55  | 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> | –                     | 50   | –     | mA   |                                              |
| <Receiver>                |                   |                       |      |       |      |                                              |
| RXD OUTPUT High Voltage   | VRXH              | V <sub>CC</sub> –0.5  | –    | –     | V    | IRXH=–50μA                                   |
| RXD OUTPUT Low Voltage    | VRXL              | –                     | –    | 0.4   | V    | IRXL=200μA                                   |
| RXD OUTPUT Rise Time      | t <sub>RR</sub>   | –                     | 70   | –     | nsec | C <sub>L</sub> =15pF                         |
| RXD OUTPUT Fall Time      | t <sub>FR</sub>   | –                     | 30   | –     | nsec | C <sub>L</sub> =15pF                         |
| RXD OUTPUT Pulse Width    | t <sub>WRXD</sub> | 1.5                   | 2.3  | 3.6   | μsec | C <sub>L</sub> =15pF, 2.4 to 115.2Kbps       |
| Receiver Latency Time     | t <sub>RT</sub>   | –                     | 100  | 200   | μsec |                                              |

●Optical characteristics (Unless otherwise noted, V<sub>CC</sub>=3V, V<sub>LED</sub>V<sub>CC</sub>=3V, Ta=25°C)

| Parameter             | Symbol                          | Min.   | Typ. | Max. | Unit                 | Conditions                  |
|-----------------------|---------------------------------|--------|------|------|----------------------|-----------------------------|
| Peak wave length      | λ <sub>P</sub>                  | 850    | 870  | 900  | nm                   |                             |
| Intensity             | IE1                             | 4.0    | 10   | 26   | mW / sr              | –15° ≤ θ <sub>L</sub> ≤ 15° |
| Half-Angle            | θ <sub>L</sub> / 2              | ±15    | –    | –    | deg                  |                             |
| Rise time / Fall time | T <sub>r</sub> / T <sub>f</sub> | –      | –    | 100  | nsec                 | 10% to 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   | 96   | μsec                 | TXD=V <sub>CC</sub>         |

1.This product is not designed for protection against radioactive rays.

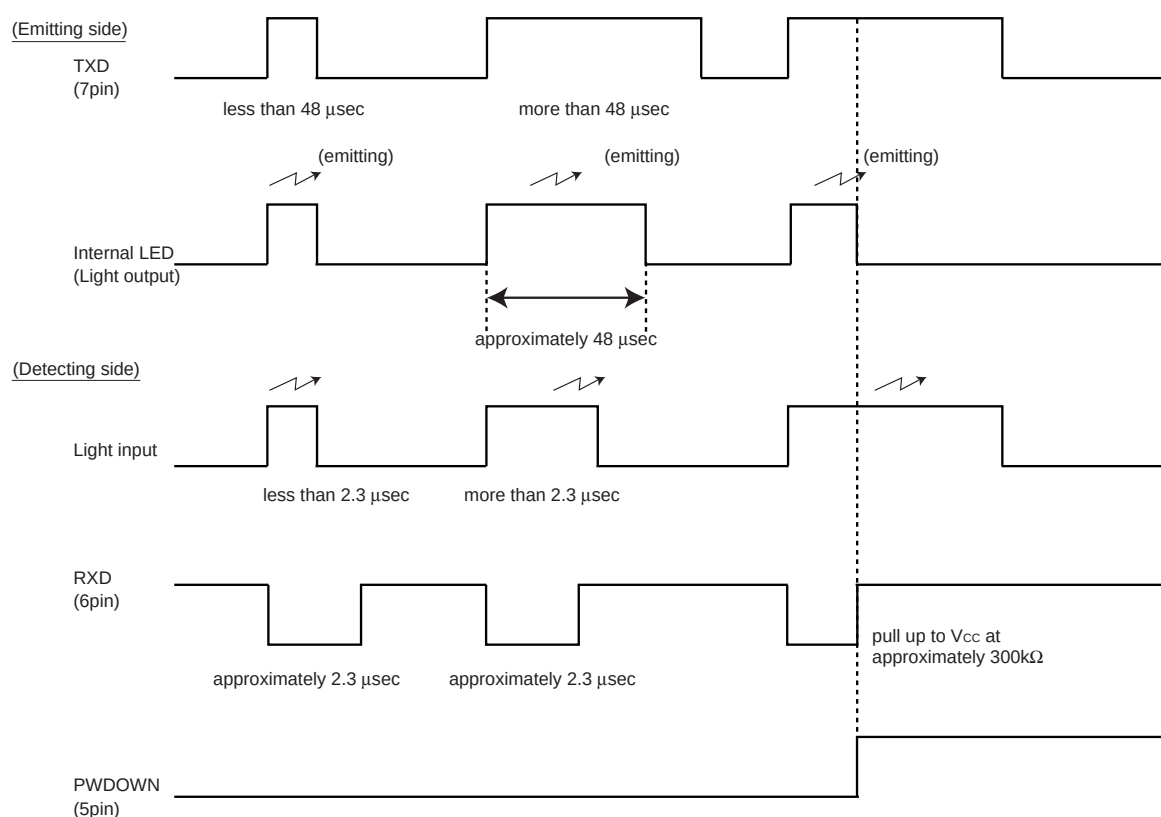
2.This product dose not include laser transmitter.

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-H14, please keep in mind following instruction.

- The line of RXD (6pin) should be connected at backside via through hole close to RPM870-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 RPM870-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 0.5V) except transmitting data (for < 90 $\mu\text{sec}$ . 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.
- Please pay attention to the lens carefully. Dusts of scratch on the lens may effect the characteristics of product. Please handle it with care.

## 4) Eye Safe

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

The drawing shows the mechanical specifications for the ETH839 shield case. It includes three main views: a top view, a side view, and a bottom view.

- Top View:** Shows the overall dimensions of the case. The total width is 8.0 mm. The distance from the left edge to the center of the PinPD is 1.1 mm, and the distance from the center of the PinPD to the center of the LED is 1.4 mm. The distance from the center of the LED to the right edge is 2.8 mm. The total distance from the left edge to the right edge is 4.0 mm. The thickness of the case is 2.2 mm. The radius of the top corners is R1.1, and the radius of the bottom corners is R1.0. The distance from the bottom edge to the center of the PinPD is 1.0 mm. The distance from the bottom edge to the center of the LED is 0.15±0.1 mm.
- Side View:** Shows the profile of the case. The total height is 2.67 mm. The distance from the bottom edge to the top of the case is 2.9 mm. The distance from the bottom edge to the center of the PinPD is 0.37±0.1 mm. The distance from the bottom edge to the center of the LED is 0.95 mm. The total distance from the bottom edge to the top of the case is 0.95×7=6.65 mm.
- Bottom View:** Shows the underside of the case. The total width is 8.0 mm. The distance from the left edge to the center of the PinPD is 0.6 mm, and the distance from the center of the PinPD to the center of the LED is 0.48 mm. The distance from the center of the LED to the right edge is 0.6±0.1 mm. The thickness of the case is 0.68±0.1 mm. The distance from the bottom edge to the center of the PinPD is 0.13 mm.

**NOTE**  
 1.TOLERANCE : ±0.2mm  
 2.COPLANARITY : 0.1mmMAX

**UNIT : mm**

**ETH839**

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