

IrDA Infrared Communication Module

RPM922-H11

RPM922-H11 is an infrared communication module for IrDA Ver. 1.3 (Low Power). The infrared LED, PIN photo diode, and 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) Infrared LED, PIN photo diode, LED driver and receiver frequency formation circuit built in.
Improvement of EMI noise protection because of Shield Case.
- 2) Applied to SIR (9.6k to 115.2kbps) and MIR (0.576,1.152Mbps).
- 3) Surface mounting type.
- 4) Power down function built in.
- 5) Adjustable transmission distance by LED load resistance value.
- 6) Super small package (W=6.8mm, D=2.29mm, H=1.5mm)

●Applications

Mobile phone, PDA, DVC, Digital still camera, Printer, Handy terminal and etc.

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply Voltage	V _{cc} / LEDV _{cc}	6.5 *1	V
Input Voltage	V _{in} (2, 3, 4pin)	-0.3 to V _{cc} +0.3	V
Operation Temperature	T _{opr}	-30 to 85	°C
Storage Temperature	T _{stg}	-40 to 100	°C
LED Peak Current	I _{fp}	250 *2	mA

*1) This applies to all pins on the basis of ground pin (6pin).

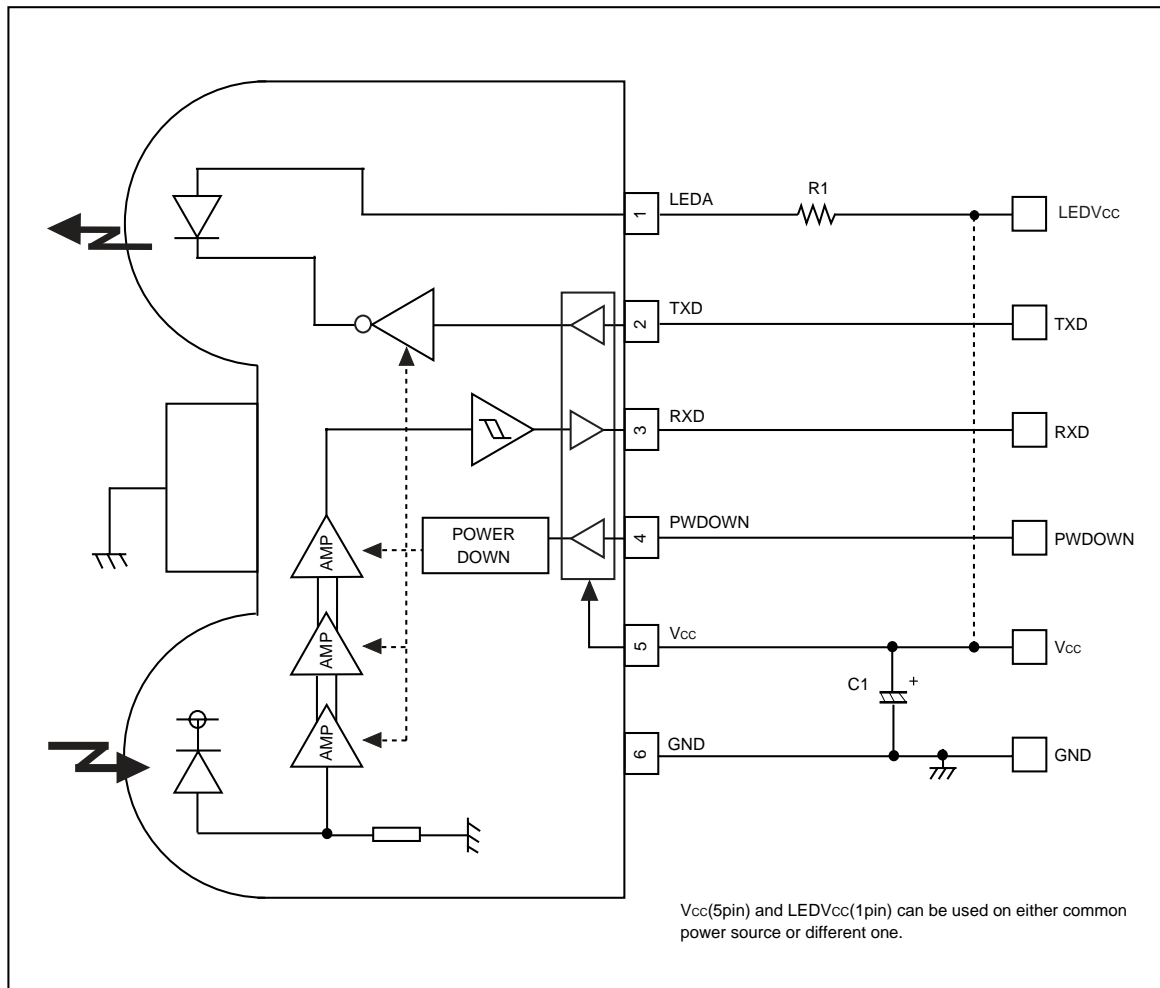
*2) LED Peak Current : < 90 μs, On duty < 25%

●Recommended operating conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V _{cc}	2.4	3.0	3.6	V
	LEDV _{cc}	2.7	3.0	5.5	V

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●Block diagram and application circuit



●Recommended values

Part symbol	Recommended value	Notice
C1	1μF, Ceramic or tantalum Ex.) TCFGA1A685M8R (ROHM)	Bigger capacitance is recommended with much noise from power supply.
R1	2.2Ω ±5%, 1/8 W(LEDVcc=3.0V)	at LED Emitting Duty ≤ 25%

[LED current set-up]

In case of using R1 with different condition from the above, formula is as follows :
 LED resistance value : R1[Ω], LED average consumption current : ILED[mA], Supply voltage : VLEDVcc[V],
 minimum necessary of irradiant intensity Iel [mW/sr]
 (Recommended value : Iel=25mW/sr, Including LED's distribution within ±15deg)

$$R1 = 139 \times (VLEDVcc - 1.31) / Iel - 7.2$$

$$ILED = \text{Duty} \times (VLEDVcc - 1.31) / (R1 + 5.8)$$

Duty : LED duty at emitting

* Please set up to be ILED < 250 [mA] (Duty ≤ 25%)

(Reference) In case of using R1, typical intensity (Ieltp) and maximum intensity (Ielmax) on axis are described as below.

$$Ieltp = 260 \times (VLEDVcc - 1.31) / (R1 + 5.8)$$

$$Ielmax = 615 \times (VLEDVcc - 1.31) / (R1 + 5.8)$$

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●Terminal description

Pin No	Terminal	Circuit	Function
1	LEDA		LED Anode Terminal Other power source can be used difference between LEDV _{CC} and V _{CC} . LED current depends on LED load resistance value. Include internal current limiter (max.250mA).
2	TXD		Transmitting Data Input Terminal for IrDA H:LED radiant (PDOWN=L) CMOS Logic Level Input. Holding TXD="H" status, LED will be turned off at approximately 48 μs.
3	RXD		Receiving Data Output Terminal When PDOWN(4pin)=H', the RXD output will be pulled up to PDOWN at approximately 260 kΩ.
4	PDOWN		Power-down Control Terminal H: POWERDOWN L : OPERATION CMOS Logic Level Input. When input is "H", it will stop the receiving circuit, Pin-PD current and transmitting LED operation.
5	V _{CC}		Power Supply Terminal Supply voltage for Transceiver circuits. For preventing from infection, connect a capacitor between GND(6pin).
6	GND		GROUND Terminal
-	Shield Case		Connect to Ground

Photo Link Module

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Consumption current 1	I _{cc1}	600	900	1200	μA	PWDOWN=0V, At no input light
Consumption current 2	I _{cc2}	–	0.5	4.5	μA	PWDOWN=1.8V, At no input light
Transmission rate		9.6	–	1152	kbps	
PDOWN input high voltage	VPDH	1.4	–	V _{cc}	V	V _{cc} = 2.4 to 2.86 V
		1.5				V _{cc} = 2.86 to 3.6 V
PDOWN input low voltage	VPDL	0	–	0.5	V	V _{cc} = 2.4 to 3.6 V
PDOWN input high current	IPDH	–1.0	0	1.0	μA	PWDOWN=1.8V
PDOWN input low current	IPDL	–1.0	0	1.0	μA	PWDOWN=0V
< Transmitter >						
TXD input high voltage	VTXH	1.4	–	V _{cc}	V	V _{cc} = 2.4 to 2.86 V
		1.5				V _{cc} = 2.86 to 3.6 V
TXD input low voltage	VTXL	0	–	0.5	V	V _{cc} = 2.4 to 3.6 V
TXD input high current	ITXH	3.2	7.5	15	μA	TXD=1.8V
TXD input low current	ITXL	–1.0	0	1.0	μA	TXD=0 V
LED anode current 1	I _{LED1}	–	211	249	mA	R1=2.2Ω
< Receiver >						
RXD output high voltage	VRXH	1.55	1.8	1.9	V	IRXH=–100μA, C _L =15pF
RXD output low voltage	VRXL	0	–	0.4	V	IRXL=200μA, C _L =15pF
RXD output rise time	t _{RR}	–	100	300	ns	C _L =15pF
RXD output fall time	t _{FR}	–	–	50	ns	C _L =15pF
RXD output pulse width	tw _{RXD}	190	300	532	ns	C _L =15pF, 9.6k to 1.152 Mbps
RXD output pulse edge jitter	T _{jrx}	–	–	±70	ns	1.152 Mbps
Receiver latency time	t _{RT}	–	40	200	μs	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Peak wave length	λ _P	850	888	900	nm	
Intensity ¹	IE ₁	25	55	130	mW / sr	–15 deg ≤ θ _L ≤ 15 deg R1=2.2Ω
Half-angle	θ _L / 2	±15	–	–	deg	
Rise time / Fall time	T _r / T _f	–	–	40	ns	10% to 90%
Optical over shoot		–	–	25	%	
Edge jitter	T _j	–25	–	25	ns	
Optical pulse width	T _{we}	172	217	256	ns	t _{TXD} =217 ns, V _{THX} / V _{TXL} =1.8V / 0V
Minimum irradiance in angular	E _{emin}	–	11	18	μW / cm ²	–15 deg ≤ θ _L ≤ 15 deg
Maximum irradiance in angular	E _{emax}	500	–	–	mW / cm ²	–15 deg ≤ θ _L ≤ 15 deg
Input half-angle	θ _D / 2	±15	–	–	deg	
Maximum emitting time	T _{LEDmax}	20.5	48	96	μs	V _{THX} / V _{TXL} =1.8V / 0V

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

●Notes

1) LEDV_{CC} (1pin), V_{CC} (5pin)

- Other power source can be used difference between LEDV_{CC} and V_{CC}.

2) Caution in designing board lay-out

To get maximum potential from RPM922-H11, please keep in mind following instruction.

- The line of RXD (3pin) should be connected at backside via through hole close to RPM922-H11 pin lead. Better not to be close to photo diode side (6pin side).

⇒This is to minimize feedback supplied to photo diode from RXD.

- Better to be placed at more than 1.0cm radius from photo diode (6pin side) and also away from the parts which generate noise, such as DC / DC converter.

- As for C1 between 5-6 pins, it should be placed close to RPM922-H11.

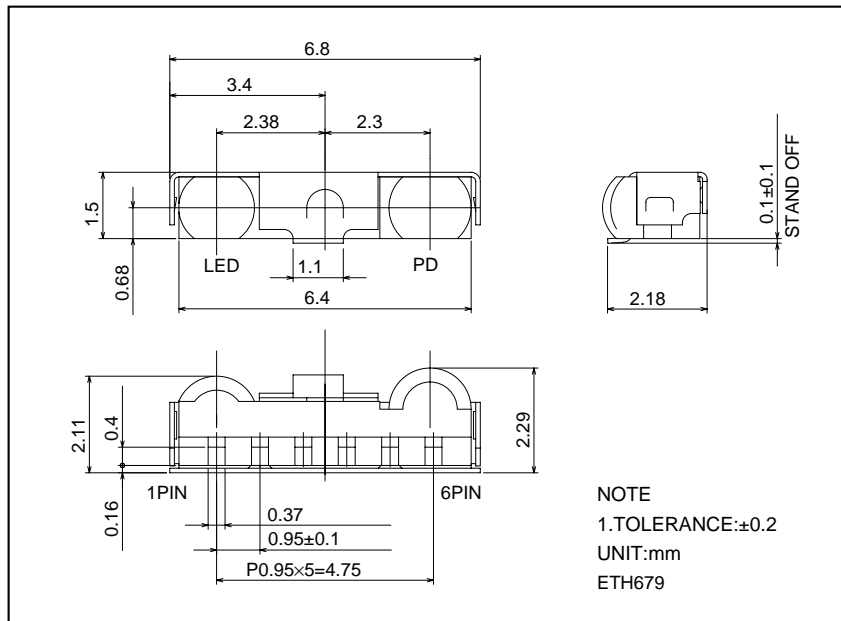
3) Notes

- Please be sure to set up the TXD (2pin) input to be "L" (under 0.3V) except transmitting data.
(For < 90 μ sec. ON duty < 25%).
- 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 Ver1.3 (Low Power) except 4 Mbps.
There might be on error if used by different signal format.
- Dusts or scratch on the lens may effect the characteristics of product, Please handle it with care.

4) Eye safe

- EN60825-1 (IEC60825-1 amendment2), Class1 Eye safe.

●External dimensions (Unit : mm)



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