Photo Link Module

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	Vcc / LEDVcc	6.5 *1	V
Input Voltage	Vin(2, 3, 4pin)	−0.3 to Vcc+0.3	V
Operation Temperature	Topr	−30 to 85	°C
Storage Temperature	Tstg	−40 to 100	°C
LED Peak Current	Ifp	250 *2	mA

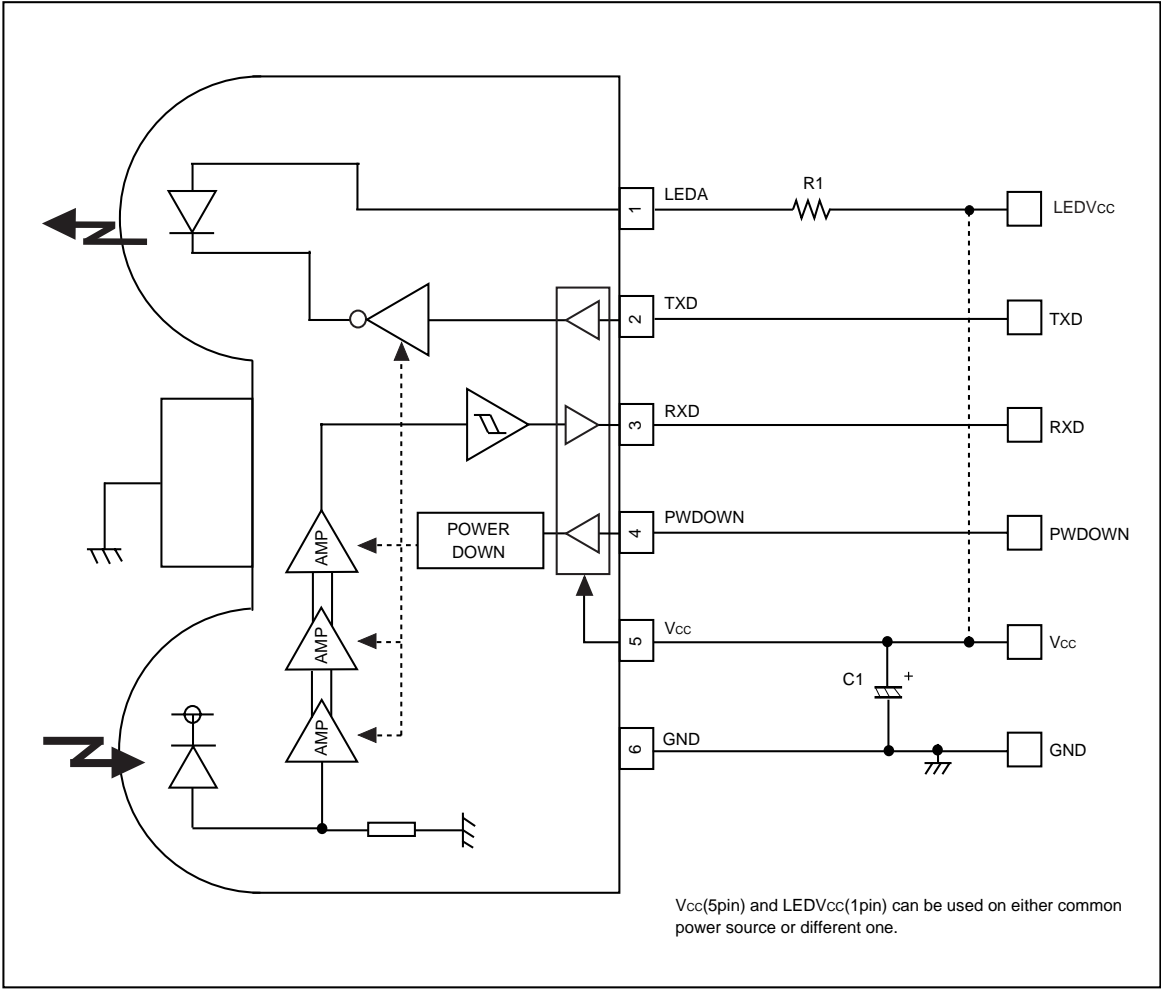*1) This applies to all pins on the basis of ground pin (6pin).
*2) LED Peak Current : < 90 μs, On duty < 25%

●**Recommended operating conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Vcc	2.4	3.0	3.6	V
	LEDVcc	2.7	3.0	5.5	V

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● **Block diagram and application circuit**

Vcc(5pin) and LEDVcc(1pin) can be used on either common power source or different one.

● **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 Ie1 [mW/sr]
(Recommended value : Ie1=25mW/sr, Including LED's distribution within ±15deg)

$R1=139 \times (VLEDVcc-1.31) / Ie1-7.2$
$ILED=Duty \times (VLEDVcc-1.31) / (R1+5.8)$

　　　Duty : LED duty at emitting

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

(Reference) In case of using R1, typical intensity (Ie1typ) and maximum intensity (Ie1max) on axis are described as below.

$Ie1typ = 260 \times (VLEDVcc-1.31) / (R1+5.8)$
$Ie1max = 615 \times (VLEDVcc-1.31) / (R1+5.8)$

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●**Terminal description**

Pin No	Terminal	Circuit	Function
1	LEDA		**LED Anode Terminal** Other power source can be used difference between LEDVcc and Vcc. 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 (PWDOWN='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 PWDOWN(4pin)='H', the RXD output will be pulled up to PWDOWN at approximately 260 kΩ.
4	PWDOWN		**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	Vcc		**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**

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Consumption current 1	Icc1	600	900	1200	µA	PWDOWN=0V, At no input light
Consumption current 2	Icc2	–	0.5	4.5	µA	PWDOWN=1.8V, At no input light
Transmission rate		9.6	–	1152	kbps	
PWDOWN input high voltage	VPDH	1.4	–	Vcc	V	V_{CC} = 2.4 to 2.86 V
		1.5				V_{CC} = 2.86 to 3.6 V
PWDOWN input low voltage	VPDL	0	–	0.5	V	V_{CC} = 2.4 to 3.6 V
PWDOWN input high current	IPDH	−1.0	0	1.0	µA	PWDOWN=1.8V
PWDOWN input low current	IPDL	−1.0	0	1.0	µA	PWDOWN=0V
< Transmitter >						
TXD input high voltage	VTXH	1.4	–	Vcc	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	ILED1	–	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	tRR	–	100	300	ns	C$_L$=15pF
RXD output fall time	tFR	–	–	50	ns	C$_L$=15pF
RXD output pulse width	twRXD	190	300	532	ns	C$_L$=15pF, 9.6k to 1.152 Mbps
RXD output pulse edge jitter	Tjrxd	–	–	±70	ns	1.152 Mbps
Receiver latency time	tRT	–	40	200	µs	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Peak wave length	λP	850	888	900	nm	
Intensity1	IE1	25	55	130	mW / sr	−15 deg ≤ θ L ≤ 15 deg, R1=2.2Ω
Half−angle	θL / 2	±15	–	–	deg	
Rise time / Fall time	Tr / Tf	–	–	40	ns	10% to 90%
Optical over shoot		–	–	25	%	
Edge jitter	Tj	−25	–	25	ns	
Optical pulse width	Twe	172	217	256	ns	tTXD=217 ns, VTHX / VTXL=1.8V / 0V
Minimum irradiance in angular	Eemin	–	11	18	µW / cm^2	−15 deg ≤ θ L ≤ 15 deg
Maximum irradiance in augular	Eemax	500	–	–	mW / cm^2	−15 deg ≤ θ L ≤ 15 deg
Input half−angle	θD / 2	±15	–	–	deg	
Maximum emitting time	TLEDmax	20.5	48	96	µs	VTHX / VTXL=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.

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●**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 $< 90\mu$ 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)

NOTE
1.TOLERANCE:±0.2
UNIT:mm
ETH679
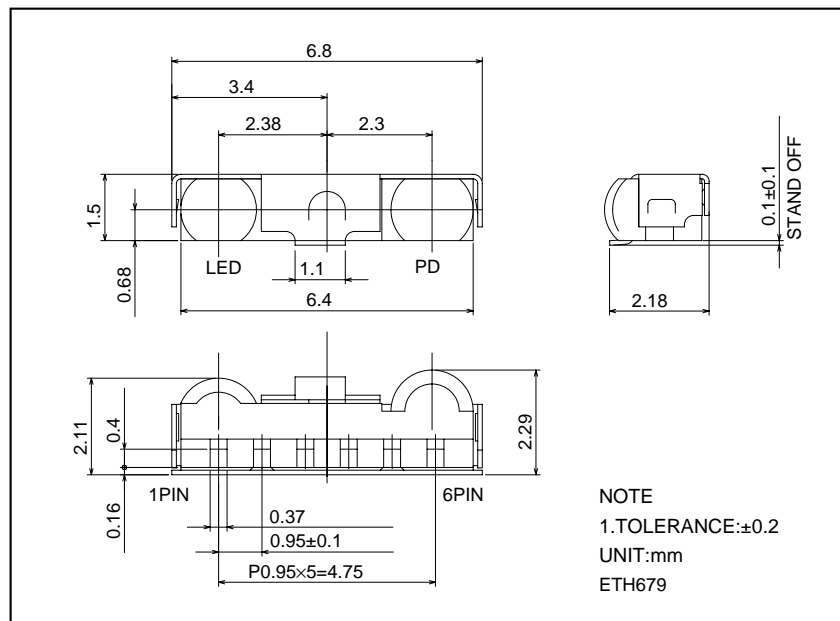
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