IrDA wireless communication transceiver IC (supports Ver.1.0) RPM851A Series

The RPM851A series is an IC that supports IrDA Ver 1.0, and is ideal for wireless communications. An infrared LED, a pin-photo diode, and a receiver frequency formation LSI are all contained in a single package. Also equipped with low power consumption and power down functions making this IC perfect for mobile sets.

Applications

Personal computers, PDAs, DVCs, digital cameras, printers, cellular phones, PHS systems, hand-held terminals, and others

Features

- 1) Supports IrDA Ver. 1.0
- 2) Low power consumption while standing by for reception (typ. 220µA).
- 3) A power-down function is perfect for battery applications.
- 4) Supports a broad power supply voltage range from 2.7V to 5.5V.
- 5) The package supports mounting on both the upper and side surfaces.
- 6) Integrated shield case (RPM851A-H6)

Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	-0.3~+7.0	V
Operating temperature	Topr	-20~+70	ΰ
Storage temperature	Tstg	-25~+85	ΰ
LED peak current	FP*	300	mA

•Absolute maximum ratings (Ta = 25° C)

* The LED peak current value is less than 90 µs, with an ON duty of less than 20%.

•Recommended operating conditions (Ta = 25° C)

Parameter	Symbol	Min.	Тур.	Max.	Unit
Power supply voltage	Vcc	2.7	3.0	5.5	V

Series

Туре	Shield Case	Vertical Mount	Horizontal Mount
RPM851A	—	0	0
RPM851A-H6	Integrated	×	×

Block diagram





Pin descriptions

Pin No.	Pin name	Equivalent circuit	Function
1, 7	GND		GND
2	LED ANODE		LED ANODE Terminal
3	LED DRIVER		LED Driver Output Terminal Please LED Current Restriction Resister between PIN2
5	LEDVcc		Power for LED DRIVER and MOS
6	TXD		Transmitting Data Input Terminal CMOS logic level input
9	POWER DOWN CONTROL	30K	Power-down Control Terminal LOW: POWERDOWN CMOS logic level input When input is LOW, it will stop the receiving circuit as well as Pin-PD current.
10	RXDSIR		SIR Logic Level Output Terminal CMOS logic level output High-z at PWDOWN=0V
11	BIAS		AMP Bias Terminal
12	Vcc		Power for Receiver
13	PINVcc		Power for Pin PD



Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Consumption current 1	Icc1	-	220	330	μA	Stand-by for receiving At no input light
Consumption current 2	ICC2	—	0.01	10	μA	PWDOWN PIN Low At no input light
Transmission rate	_	2.4	_	115.2	kbps	—
〈Transmitter〉						-
TXD input high voltage	Vін	VLEDVCC-0.5	_	_	V	-
TXD input low voltage	Vı∟	_	_	0.5	V	-
TXD input high current	Ін	-5.0	0	5.0	μA	TXD=Vcc (V)
TXD input low current	١L	-5.0	0	5.0	μA	TXD=0 (V)
LED ANODE voltage	VLEDA	1.15	1.40	1.65	V	ILED=50mA
〈Receiver〉						
RXDSIR output high voltage	Vosн	Vcc-0.5	-	_	V	Iosн=-30 µ А
RXDSIR output low voltage	Vosl	-	-	0.5	V	IosL=30 μ A
RXDSIR output rise time	tee	-	200	500	ns	CL=15pF
RXDSIR output fall time	tFR	_	30	75	ns	CL=15pF

●Electrical characteristics (unless otherwise noted, LEDVcc = Vcc = PINVcc = 3V, Ta = 25°C)

●Optical characteristics (unless otherwise noted, LEDVcc = Vcc = PDVcc = 3V, Ta = 25°C)

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Peak wavelength	λP	850	870	900	nm	-
Intensity 1	le1	40	_	500	mW / Sr	$R_L=5.6\Omega, -15^\circ \leq \theta \leq 15^\circ$
Intensity 2	IE2	—	—	40	mW / Sr	$R_L=5.6\Omega$, $\theta \perp \leq -30^\circ$, $30^\circ \leq \theta \perp$
Half-Angle	θL/2	—	±18	—	deg	-
Rise time / Fall time	Tr / Tf	_	_	100	ns	R∟=5.6Ω, 10%~90%
Optical overshoot	—	—	-	25	%	RL=5.6Ω
Edge jitter	Tj	-40	-	40	ns	RL=5.6Ω
Irradiance in angular	Ee	0.004	_	500	mW / cm²	$-15^{\circ} \leq \theta \leq 15^{\circ}$
Input Harf-Angular	θ d/2	±15	_	_	deg	_

 $\ensuremath{\mathbb{O}}$ This product is not designed for protection against radioactive rays.

1. This product dose not include laser transmitter.

2. This product includes one PIN photo diode.

3. This product dose not include optical load.

Communication ICs



Recommended values (at Vcc = 3V)

Part symbol	Recommed value	Caution
R1	5.6Ω \pm 5%, 1/4W (SIR)	More than 100cm distance, more than 4(μ W/cm ²) at detecting side
	100 $\Omega \pm 5\%$, 1/8W (Low Power)	More than 20cm distance, more than 9(μ W/cm ²) at detecting side
R2	47Ω±5%, 1/8W	_
C1	3300pF±10%, Ceramic	Recommended to use capacitor with less leak current
C2	$0.33 \mu\text{F}\pm20\%$, Ceramic	Recommended to place capacitor around pin 12 and 7. Bigger capacitance is recommended with much noise from power supply.
C4	4.7 μF, Tantalum EX.) TCFGA1A475M8R (ROHM PRODUCT)	Bigger capacitor is recommended with much noise from power supply.

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:Vled(V) necessary d(cm) (Including LED'S distribution within ± 15deg)

 $R1 = T * (Vled - 1.36/d^2 - 3(\Omega))$

lled=Duty * (Vled-1.36) / (3+R1) [A]

Duty: LED duty at emitting

T: 24420(Low Power), 55000(SIR)

*Please set up to be Iled<50 [mA] moreover Iled/Duty<250 [mA]



Communication ICs

Operation notes

- 1) LEDVcc (pin5), Vcc (pin122) and PINVcc (pin13)
- Other power source can be used within \pm 0.2 [V] voltage difference between LEDVcc and Vcc. Vcc and PINVcc should be supplied from the same source.
- 2) Caution in designing board lay-out
- Pin1 is radiaton pin from LED as well. Wider pattern is better.
- The line of RXDSIR (pin10) should be connected at backside via through hole close to RPM851A pin lead. Better not to be close to photo diode side (pin13).

 \rightarrow This is to minimize feedback supplied to photo diode from RXDSIR.

• Capacitors for pin12 (Vcc) and pin13 (PINVcc) should be placed close to RPM851A.

- Better to be placed more than 1.0cm in radius from photo diode (pin13) and also away from the parts which generates noise, such as DC / DC converter. Digital signal line, such as clock pulse, bus etc, are also away more than 1.0cm in radius from photo diode.
- As for C1, C2 and, GND should be close to pin7 and placed close to pins11, 12 and 13 (within 5mm).
- 3) Please be sure to set up the TXD (pin6) input to be "L" (under 0.5 [V]) except transmitting data (for < 90 μ s. ON Duty < 20%).
- 4) Powerdown current might increase if exposed by strong light (ex. direct sunlight) at powerdown mode.
- 5) Please use by the signal form which is specified by IrDA Ver1.0. There might be on error if used by different signal form.



External dimensions (Units: mm)