IrDA infrared communication IC (SIR / ASK compatible)
RPM-800CB Series

The RPM-800CB series is an infrared communication IC that is compatible with the IrDA1.0 and ASK communication systems. The infrared LED, PIN photodiode, and modulator circuit are combined onto a single package, and connection to a UART requires just three lines (transmit, receive, and control).

●Applications
Cellular phones, pagers, PDA, PHS, notebook PCs, and printers

●Features
1) Infrared emitting, receiver, and modulator / demodulator on the chip.
2) Switchable modes.
   • IrDA mode
   • ASK mode
3) 2.4 to 115.2kbps communication rate.
4) Built-in powerdown mode
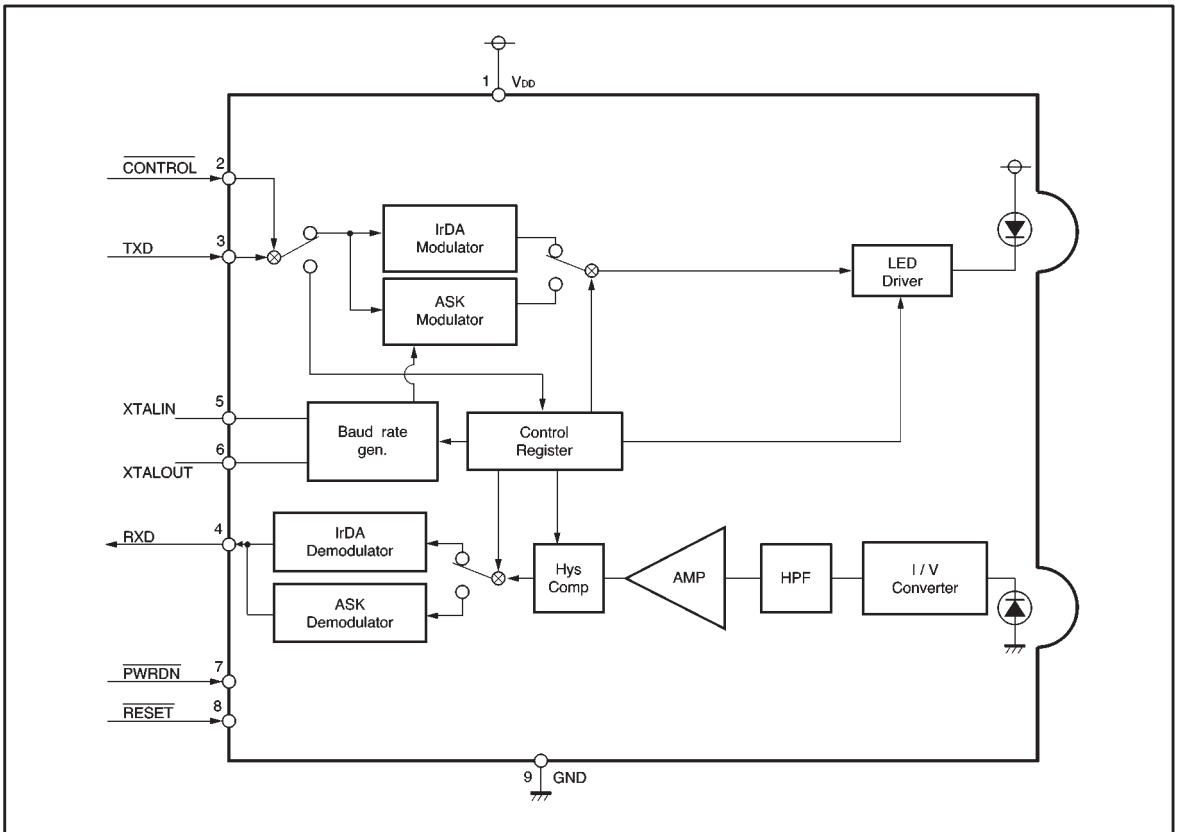5) Power supply voltage input range 2.7 to 5.5V.

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	$-0.3\sim+7.0$	V
Operating temperature	Topr	$0\sim+60$	℃
Storage temperature	Tstg	$-20\sim+85$	℃

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{DD}	2.7	3.0	5.5	V

ROHM

●Block diagram

●Pin descriptions

Pin No.	Pin name	Function
1	V$_{DD}$	Power supply
2	$\overline{CONTROL}$	Register write control pin Transmit: High, Register set: Low
3	TXD	Transmit / register write data input pin Data1: High, Data 0: Low
4	RXD	Receive data output pin Data1: High, Data 0: Low
5	XTALIN	Crystal oscillator connection pin (3.6864MHz)
6	XTALOUT	Crystal oscillator connection pin (3.6864MHz)
7	$\overline{PWRDN}$	Power down control pin Power down: Low
8	$\overline{RESET}$	Internal register reset pin Reset: Low
9	GND	Ground

●Input / output circuits

Pin No.	Pin name	Function	Equivalent circuit
1	V_{DD}	Power supply	—
2	CONTROL	Register write control pin Transmit: High, Register set: Low	
3	TXD	Transmit / register write data input pin Data 1: High, Data 0: Low	
4	RXD	Receive data output pin Data 1: High, Data 0: Low	
5	XTALIN	Crystal oscillator connection pin (3.6864MHz)	
6	XTALOUT	Crystal oscillator connection pin (3.6864MHz)	
7	PWRDN	Power down control pin Power down: Low	
8	RESET	Internal register reset pin Reset: Low	
9	GND	Ground	—

●Electrical characteristics (unless otherwise noted, Ta = 25°C and V_{DD} = 3V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Power supply current 1	I_{DD1}	—	—	3.5	mA	Stand-by for receiving
Power supply current 2	I_{DD2}	—	—	10	μA	Power down,No ambient light
Power supply current 3	I_{DD3}	—	—	300	mA	With max. LED current drive
Control input high voltage	V_{IH}	V_{DD}−0.5	—	—	V	—
Control input low voltage	V_{IL}	—	—	0.8	V	—
Control input high current	I_{IH}	—	—	−2.0	μA	—
Control input low current	I_{IL}	—	—	2.0	μA	—
TXD input high voltage	V_{IH}	V_{DD}−0.5	—	—	V	—
TXD input low voltage	V_{IL}	—	—	0.8	V	—
TXD input high current	I_{IH}	—	—	−2.0	μA	—
TXD input low current	I_{IL}	—	—	2.0	μA	—
XTALIN input high voltage	V_{IH}	V_{DD}−0.5	—	—	V	—
XTALIN input low voltage	V_{IL}	—	—	0.8	V	—
XTALIN input high current	I_{IH}	—	—	−10.0	μA	—
XTALIN input low current	I_{IL}	—	—	10.0	μA	—
PWRDN input high voltage	V_{IH}	V_{DD}−0.5	—	—	V	—
PWRDN input low voltage	V_{IL}	—	—	0.8	V	—
PWRDN input high current	I_{IH}	—	—	−2.0	μA	—
PWRDN input low current	I_{IL}	—	—	2.0	μA	—
RESET input high voltage	V_{IH}	V_{DD}−0.5	—	—	V	—
RESET input low voltage	V_{IL}	—	—	0.8	V	—
RESET input high current	I_{IH}	—	—	−2.0	μA	—
RESET input low current	I_{IL}	—	—	2.0	μA	—
XTALOUT output high voltage	V_{OH}	V_{DD}−0.5	—	—	V	I_{OH}=−0.2mA
XTALOUT output low voltage	V_{OL}	—	—	0.5	V	I_{OL}=0.2mA
RXD output high voltage	V_{OH}	V_{DD}−0.5	—	—	V	I_{OH}=−2.0mA
RXD output low voltage	V_{OL}	—	—	0.5	V	I_{OL}=2.0mA

●Circuit operation
IrDA format

A : 1 / baud rate
B : 1 / baud rate ＊ 3 / 16
C : 1.41 μsec～1 / baud rate ＊ 3 / 16
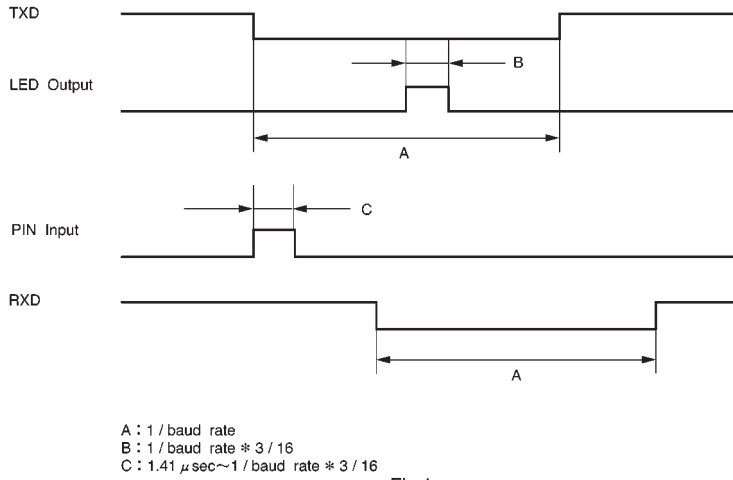
Fig.1

ASK format

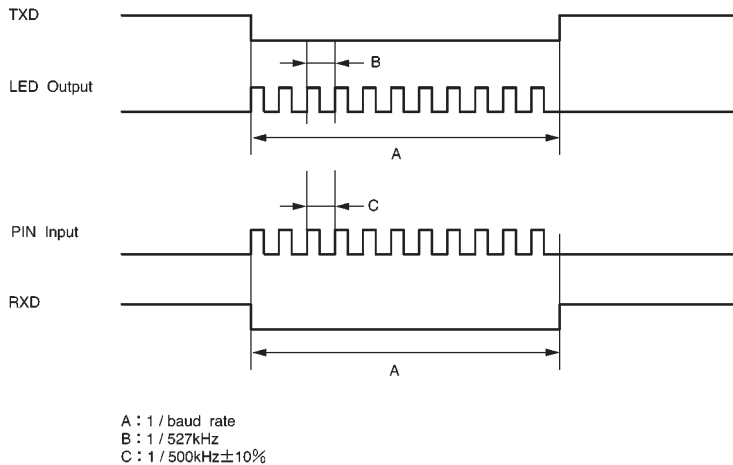A : 1 / baud rate
B : 1 / 527kHz
C : 1 / 500kHz±10％

Fig.2

Register function
Control character format
As shown in the Fig.3, the control character is made up of four address bits, four data bits, a start bit and a stop bit.
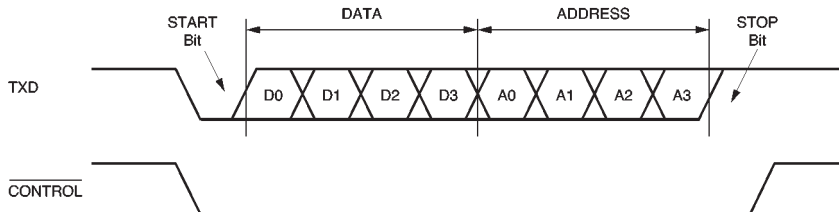

Fig.3

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Explanation of the registers
Register table

No.	Address	Function
1	0000	Control register 1
2	0010	LED drive current control register
3	0011	Baud rate register
4	0100	Mode register
5	0101	Control register 2

1) Control register 1

D3	D2	D1	D0
ECHO	ECAN	RXEN	TXEN
Reset 0	0	0	0

ECHO 0 No control character echo back
    1 Control character echo back
ECAN 0 Does not cancel reception of transmitted (self emitted) data
    1 Cancels reception of transmitted (self emitted) data
RXEN 0 Receiver OFF
    1 Receiver ON
TXEN 0 Transmitter OFF
    1 Transmitter ON

2) LED drive current control register

D3	D2	D1	D0
0	LP2	LP1	LP0
Reset 0	0	0	0

0000 H
0001 M
0010 L

3) Baud rate register

D3	D2	D1	D0
0	BR2	BR1	BR0
Reset 0	0	1	0

0000   2.4Kbps
0001   4.8Kbps
0010   9.6Kbps
0011   19.2Kbps   (when the clock is 3.6864MHz)
0100   38.4Kbps
0101   57.6Kbps
0110   115.2Kbps

4) Mode register

D3	D2	D1	D0
0	0	0	MD
Reset 0	0	0	0

0000 IrDA
0001 ASK   When V_{DD} = 5V and ASK is used, set the LED drive control register to M or L.

5) Control register 2

D3	D2	D1	D0
0	0	0	LOAD
Reset 0	0	0	0

LOAD   0   Do not load the baud rate counter value
          1   Load the baud rate counter value

* The load bit automatically returns to 0 after the counter value is loaded.
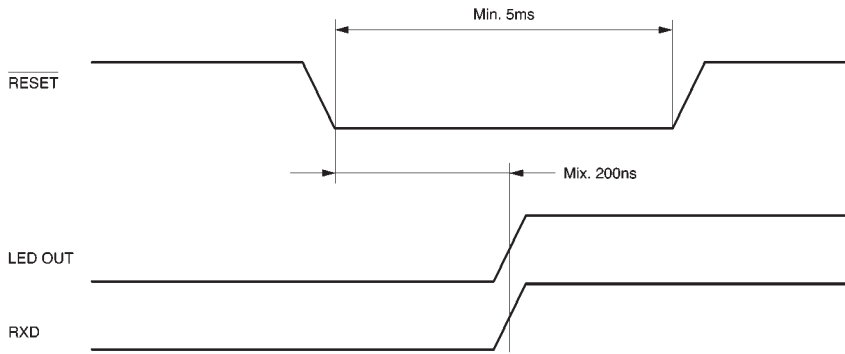
Timing chart
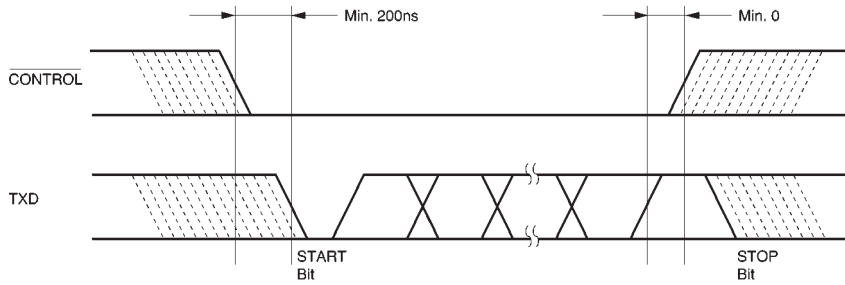1) Reset operation
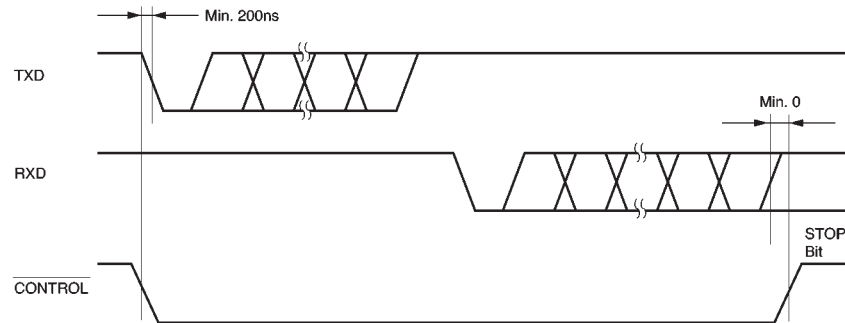

Fig.4

2) Register write

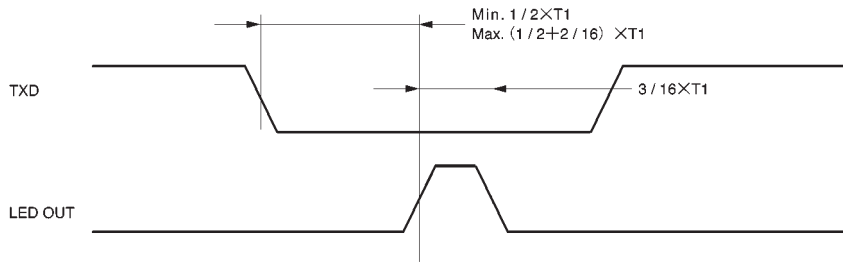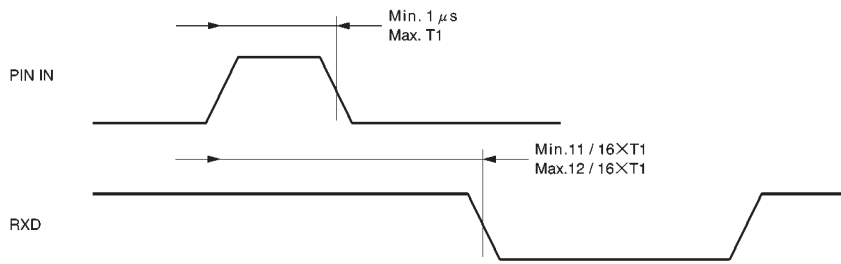Fig.5

3) Echo back

Fig.6

4) Transmit

TXD

Min. 1 / 2×T1
Max. (1 / 2＋2 / 16) ×T1

3 / 16×T1

LED OUT

Fig.7

5) Receive

PIN IN

Min. 1 μs
Max. T1

RXD

Min.11 / 16×T1
Max.12 / 16×T1

Fig.8

6) Echo cancel

TXD

Max. 1 / 2×T1

Max. T1

Echo cancel period

PIN IN invalidly

Fig.9

7) Power down

PWRDN

Max. 100 μs

Max. T1

Power down period

Operation stopped period
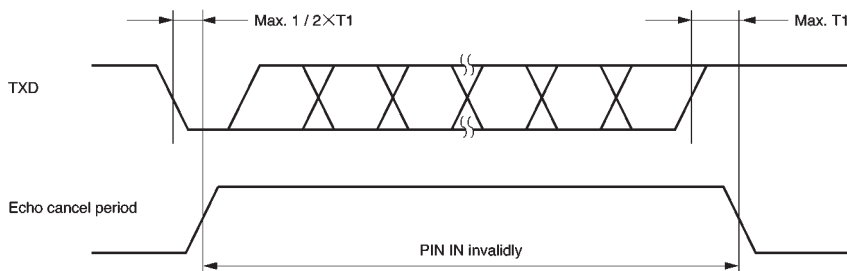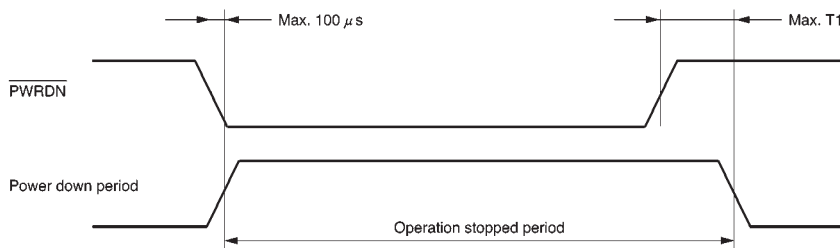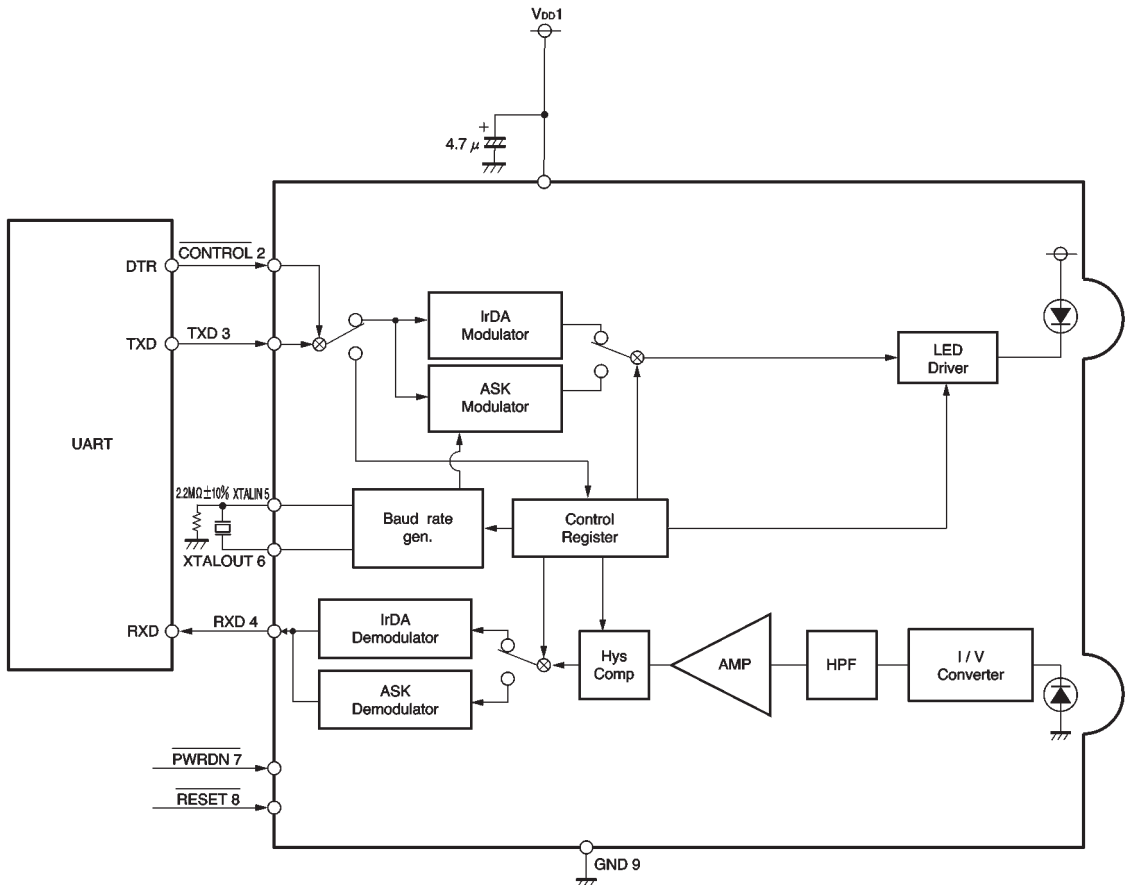
Fig.10

＊ T1＝1 / baud rate

●Application example

Fig.11

●Operation notes

(1) Use a shield when there is a possibility of influence due to electromagnetic noise.

(2) The baud rate is set to 9600bps after the power is applied, or the IC is reset.

(3) The setting in the baud rate register becomes effective when the LOAD bit of control register 2 is set to 1.

(4) Avoid using together with strong light sources.

(5) We recommend to use crystal oscillator.

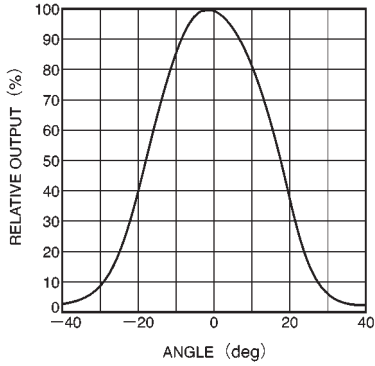●Electrical characteristics curves
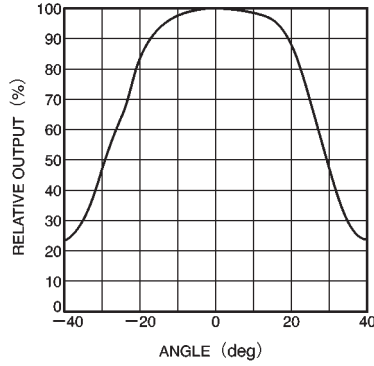

Fig.12 Light transmitter characteristics

Fig.13 Light receiver characteristics

●External dimensions (Units: mm)

RZIP-9

RSIP-9

RSIP-9 (V1)