

Photo IC for optical link



S13174-01SR

Receiver photo IC for DC to 10 Mbps optical link

The S13174-01SR is a receiver photo IC for plastic optical fiber (POF) communication. It has monolithically integrated PIN photodiode and signal processing circuit. It features small size and strong resistance to electromagnetic induction noise. High-speed optical communication is possible over a wide range from DC up to 10 Mbps. It provides CMOS-compatible digital output.

Features

- ➔ Receiver photo IC
- ➔ DC to 10 Mbps data communications
- ➔ Monolithic photo IC featuring strong resistance to electromagnetic induction noise
- ➔ Digital output (CMOS)

Applications

- ➔ Data transmission in harsh, noisy environments, such as in FA, OA, and digital audio
- ➔ High-speed, short-distance data transmission
- ➔ Highly bursty data transmission

Absolute maximum ratings (Ta=25 °C, unless otherwise noted)

Parameter	Symbol	Condition	Value	Unit
Supply voltage	Vcc		-0.5 to +4.0	V
Output voltage	Vo		-0.5 to Vcc + 0.5	V
Power dissipation*1	Pmax		250	mW
Operating temperature	Topr	No dew condensation*2	-20 to +85	°C
Storage temperature	Tstg	No dew condensation*2	-40 to +85	°C
Soldering conditions	Tsol		230 °C, within 5 s, at least 1.5 mm away from lead roots	-

*1: Power dissipation decreases at a rate of 1.75 mW/°C above Ta=25 °C.

*2: When there is a temperature difference between a product and the surrounding area in high humidity environment, dew condensation may occur on the product surface. Dew condensation on the product may cause deterioration in characteristics and reliability.

Note: Exceeding the absolute maximum ratings even momentarily may cause a drop in product quality. Always be sure to use the product within the absolute maximum ratings.

Recommended operating conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Vcc	3.135	3.3	3.465	V
High level output current	Ioh	-4	-	0	mA
Low level output current	Iol	0	-	4	

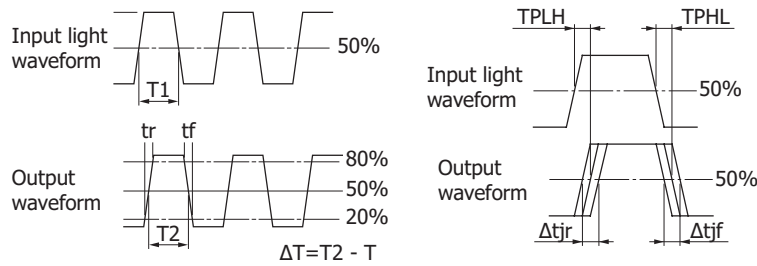
Electrical and optical characteristics (Ta=25 °C, Vcc=3.135 to 3.465 V, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Data rate	fD	Biphase signal (NRZ conversion)	DC	-	10	Mbps
Current consumption	Icc	No optical input	-	-	40	mA
Maximum reception level	Pi max	Peak value*3	0	-	-	dBm
Minimum reception level	Pi min	Peak value, Pe=10 ⁻⁷ *3	-	-	-24	dBm
Output voltage	High level output voltage	Voh Ioh=-150 μA	2.7	-	-	V
	Low level output voltage	Vol Iol=1.6 mA	-	-	0.4	V
	Rise time	tr 20% to 80%*4 *5	-	-	20	ns
	Fall time	tf 20% to 80%*4 *5	-	-	20	ns
Pulse width distortion	Δt	*3 *4 *5	-25	-	+25	ns
Jitter	Δtj	*3 *4 *5	-	-	20	ns

*3: A signal generated by a Hamamatsu’s standard signal generator is assumed for the optical input signal.

*4: For the input signal, a 10 Mbps pseudo-random biphase signal is assumed.

*5: CL=5 pF (including parasitic capacitance of probe, connector, and printed circuit board)

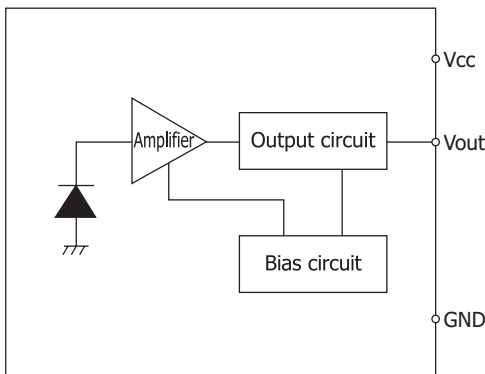


Parameter	Symbol	Measurement method
Rising edge jitter	Δtjr	Set the trigger to PPG CLK, and measure the jitter in the rising edge of the output.
Falling edge jitter	Δtjf	Set the trigger to PPG CLK, and measure the jitter in the falling edge of the output.
Jitter	Δtj	Set Δtj to the larger of the two jitter values: Δtjr and Δtjf.

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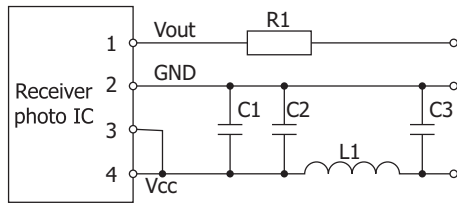
Note: Connect a 0.1 μF bypass capacitor within 3 mm of this element’s lead (between Vcc and GND). In addition, connect a 10 μF capacitor.
 · Align the center axes of the fiber and package lens, and make the gap between the fiber and the optical reference plane of the lens surface 0.1 mm.

Block diagram



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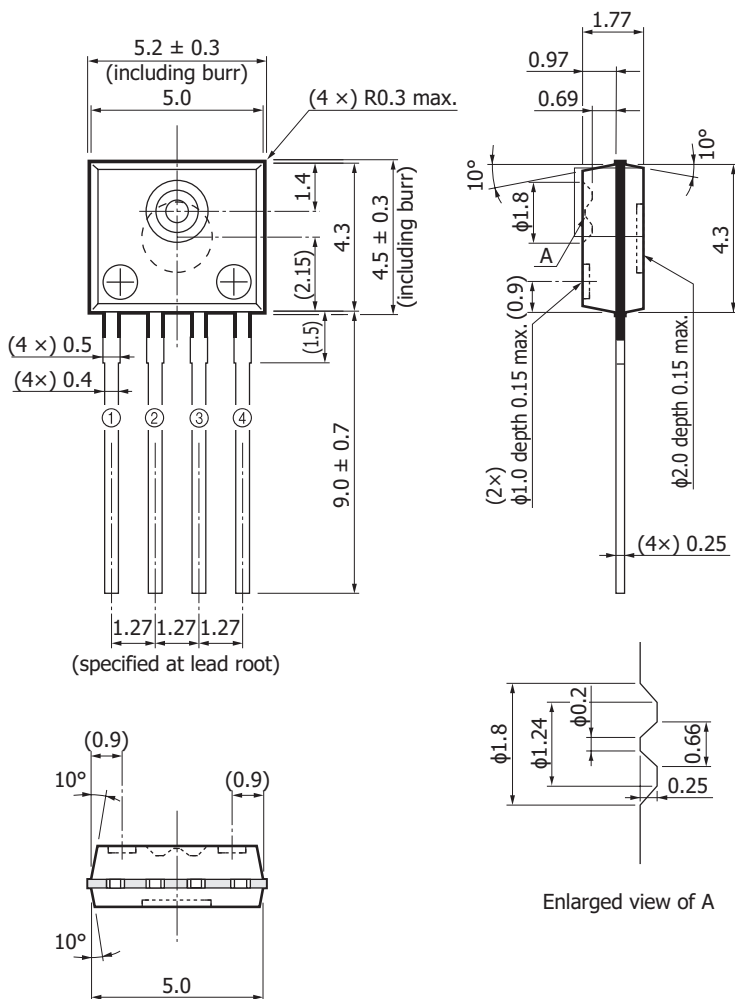
Connection example



Symbol	Component	Constant	Rating	Remarks
R1	Resistor	50 Ω to 150 Ω	60 mW or more	For overcurrent protection
L1	Inductance	0.1 μH	50 mA or more	
C1	Capacitor	0.1 μF	10 V or more	Bypass capacitor for noise suppression Connect near the lead (3 mm or less).
C2	Capacitor	10 μF	10 V or more	Bypass capacitor for noise suppression
C3	Capacitor	10 μF	10 V or more	Bypass capacitor for noise suppression

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Dimensional outline (unit: mm)



Pin no.	S13174-01SR
①	Vout
②	GND
③	Vcc
④	Vcc

Tolerance unless otherwise noted: ±0.1, ±2°
 Shaded area indicates burr.
 Values in parentheses indicate reference values.

Standard packing type
 Plastic tray (100 pcs/tray)
 Material: PVC (conductive)

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Related information

www.hamamatsu.com/sp/ssd/doc_en.html

■ Precautions

- Disclaimer
- Metal, ceramic, plastic products

Information described in this material is current as of July 2018.

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