

# Optical transceiver

P16671-01AS



## For 1.25 Gbps optical fiber communications

This optical transceiver is capable of serial data communication at data rate of 150 Mbps to 1.25 Gbps. The standardized optical connector shape enables connection of POF, HPCF, and large diameter glass optical fiber. Using a large diameter glass optical fiber, communication up to 100 m is possible. This product has a built-in transmitter and receiver. The transmitter consists of an 850 nm VCSEL, and a drive IC that is compatible with the CML interface. The drive IC has a temperature compensation function which corrects for temperature fluctuations in the VCSEL's emission power to emit light with stable power. The receiver consists of a PIN photodiode and a signal processing IC, realizing high sensitivity.

### Features

- Transmission speeds: 150 Mbps to 1.25 Gbps
- Maximum transmission distance: 100 m
- CML interface
- Compatible with optical fiber connectors F07 type (JIS C5976), PN type (IEC61754-16)
- 850 nm VCSEL (laser class 1)
- High reliability

### Applications

- Short-range communication inside devices
- Medium to long-range communication between devices

### Absolute maximum ratings

Parameter	Symbol	Value	Unit
Supply voltage	IC	-0.4 to +3.6	V
	Photodiode	-0.4 to +7.0	
Input voltage	Vin	-0.85 to +1.85	V
Operating temperature	Topr	-10 to +70	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering temperature*1	Tsol	260 (10 s)	°C

\*1: Excludes Case\_GND (pin no. 13, 14).

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	Condition	Min.	Typ.	Max.	Unit
Supply voltage	IC	Vcc	3.135	3.3	3.465	V
	Photodiode	Vpd	4.75	5	5.25	
Data rate	DR	PRBS 2 <sup>7</sup> - 1, NRZ	150	-	1250	Mbps
Transmission distance*2	d	SI-POF*3 (980/1000 μm, NA=0.51)	-	-	2	m
		SI-HPCF*4 (200/230 μm, NA=0.41)	-	-	10	
		Large diameter glass optical fiber (185/250 μm, NA=0.28)	-	-	100	
Receiver output load	RL	Differential	-	100	-	Ω

\*2: 1.25 Gbps

\*3: Step index type plastic optical fiber

\*4: Step index type hard plastic clad fiber

### Electrical and optical characteristics (Ta=-10 to +70 °C, Vcc=3.135 to 3.465 V, unless otherwise noted)

#### Transmitter

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Current consumption	Icc		-	17	25	mA
Differential input voltage*5	Vid	AC coupling, peak to peak	400	-	1600	mV
Input differential impedance	Rin	AC coupling	-	100	-	Ω
Optical output power*6	Po	SI-POF (980/1000 μm, NA=0.51), 1 m	-7.5	-	-2.5	dBm
		SI-HPCF (200/230 μm, NA=0.41), 1 m	-8	-	0	
		Large diameter glass optical fiber (185/250 μm, NA=0.28), 1 m	-8	-	0	
Extinction ratio	ER		10	-	-	dB
Center emission wavelength	λc		-	850	-	nm
Optical output rise time*7	tr	20 to 80%	-	150	-	ps
Optical output fall time*7	tf	80 to 20%	-	150	-	ps
Optical output eye opening width	Teyetx	When there is electrical signal input without jitter	0.8	-	-	UI

\*5: Optical output becomes unstable below 400 mV.

\*6: 150 Mbps, PRBS 2<sup>7</sup> - 1, average value

\*7: 1.25 Gbps, SI-HPCF 1 m

## ■ Receiver

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Current consumption	I <sub>cc</sub>	1.25 Gbps	-	55	70	mA
	I <sub>pd</sub>	When 1.25 Gbps, Pin=0 dBm	-	400	600	μA
Differential output voltage	V <sub>od</sub>	AC coupling, differential load=100 Ω	300	-	1600	mV
Output rise time	t <sub>r</sub>	20 to 80%	-	150	-	ps
Output fall time	t <sub>f</sub>	80 to 20%	-	150	-	ps
Optical input power* <sup>8</sup> * <sup>9</sup>	P <sub>in</sub>	SI-POF (980/1000 μm, NA=0.51)	-12	-	0	dBm
		SI-HPCF (200/230 μm, NA=0.41)	-14	-	0	
		Large diameter glass optical fiber (185/250 μm, NA=0.28)	-14	-	0	
Output eye opening width	T <sub>eyex</sub>	When there is electrical signal input without jitter	0.6	-	-	UI
Signal detection input power* <sup>8</sup> * <sup>10</sup>	P <sub>sd_on</sub>	SI-POF (980/1000 μm, NA=0.51)	-	-	-20	dBm
Signal detection time* <sup>11</sup>	T <sub>sd_on</sub>		-	-	100	μs

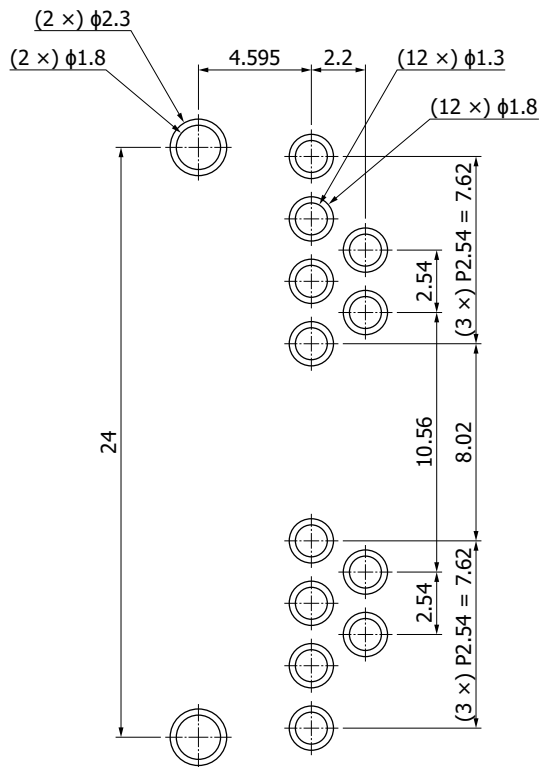
\*<sup>8</sup>: 1.25 Gbps, PRBS 2<sup>7</sup> - 1, average value

\*<sup>9</sup>: Input power is defined by the average optical power at the fiber end.

\*<sup>10</sup>: When it is lower than the signal detection input power, the outputs of RD+ and RD- are fixed at the high level.

\*<sup>11</sup>: Time from optical signal input to stable output operation



**Recommended land pattern (unit: mm)**

KPIC0379EA

**Related information**

[www.hamamatsu.com/sp/ssd/doc\\_en.html](http://www.hamamatsu.com/sp/ssd/doc_en.html)

## ■ Precautions

- Disclaimer
- Metal, ceramic, plastic package products

## Evaluation kit M16974-01 for optical transceiver

We offer an evaluation kit for the optical transceiver P16671-01AS. Contact us for detailed information.

### Structure

- Evaluation board with optical transceiver P16671-01AS (×2)
- Power cable
- Optical fiber



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HAMAMATSU PHOTONICS K.K., Solid State Division

1126-1 Ichino-cho, Higashi-ku, Hamamatsu City, 435-8558 Japan, Telephone: (81)53-434-3311, Fax: (81)53-434-5184

U.S.A.: HAMAMATSU CORPORATION: 360 Foothill Road, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218

Germany: HAMAMATSU PHOTONICS DEUTSCHLAND GMBH: Arzbergerstr. 10, 82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: [info@hamamatsu.de](mailto:info@hamamatsu.de)

France: HAMAMATSU PHOTONICS FRANCE S.A.R.L.: 19 Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: [infos@hamamatsu.fr](mailto:infos@hamamatsu.fr)

United Kingdom: HAMAMATSU PHOTONICS UK LIMITED: 2 Howard Court, 10 Tewin Road, Welwyn Garden City, Hertfordshire, AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: [info@hamamatsu.co.uk](mailto:info@hamamatsu.co.uk)

North Europe: HAMAMATSU PHOTONICS NORDEN AB: Torshamnsgatan 35, 16440 Kista, Sweden, Telephone: (46)8-509-031-00, Fax: (46)8-509-031-01 E-mail: [info@hamamatsu.se](mailto:info@hamamatsu.se)

Italy: HAMAMATSU PHOTONICS ITALIA S.R.L.: Strada della Moia, 1 int. 6 20044 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: [info@hamamatsu.it](mailto:info@hamamatsu.it)

China: HAMAMATSU PHOTONICS (CHINA) CO., LTD.: 1201, Tower B, Jiaming Center, 27 Dongsanhuan Bellu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: [hpc@hamamatsu.com.cn](mailto:hpc@hamamatsu.com.cn)

Taiwan: HAMAMATSU PHOTONICS TAIWAN CO., LTD.: 8F-3, No.158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: [info@hamamatsu.com.tw](mailto:info@hamamatsu.com.tw)