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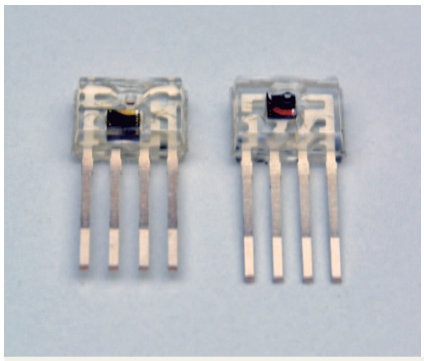
NEW

Photo IC for optical link



L12557-01SR, S12423-01SR

Transmitter/receiver photo IC for DC to 10 Mbps optical link

The L12557-01SR transmitter photo IC combines a 650 nm red LED, which is suitable for plastic optical fiber (POF) communication, and a driver IC. It has a mini molded lens suitable for coupling to the POF. It supports communication speeds ranging from DC to 10 Mbps. The S12423-01SR receiver photo IC has monolithically integrated PIN photodiode and signal processing circuit. It features small size and strong resistance to electromagnetic induction noise. The S12423-01SR generates digital output (CMOS).

Features

L12557-01SR

- **Transmitter photo IC**
- **Peak emission wavelength: 650 nm**
- **Supports DC to 10 Mbps communication**

S12423-01SR

- **Receiver photo IC**
- **Supports DC to 10 Mbps communication**
- **Monolithic photo IC featuring strong resistance to electromagnetic induction noise**
- **Digital output (CMOS)**

Applications

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

Absolute maximum ratings

Parameter		Symbol	Condition	Value	Unit
Supply voltage	L12557-01SR	Vcc		-0.5 to +7.0	V
	S12423-01SR			-0.5 to +4.0	
Input voltage	L12557-01SR	Vin		-0.5 to Vcc+0.5	V
Output voltage	S12423-01SR	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 2 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	L12557-01SR	Vcc	4.75	5.0	5.25	V
	S12423-01SR		3.135	3.3	3.465	
High level input voltage	L12557-01SR	Vih	2	-	Vcc + 0.3	V
Low level input voltage		Vil	-0.3	-	0.8	
High level output current	S12423-01SR	Ioh	-4	-	0	mA
Low level output current		Iol	0	-	4	

L12557-01SR

Electrical and optical characteristics (Ta=25 °C, Vcc=4.75 to 5.25 V, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Current consumption	Icc	Vin=2.0 V	-	-	40	mA
Data transmission rate	fD	Biphase signal (NRZ conversion)	DC	-	10	Mbps
Peak emission wavelength	λp		630	650	670	nm
Temperature coefficient of peak emission wavelength	Tcλ		-	0.13	-	nm/°C
Spectral half width (FWHM)	Δλ		-	20	30	nm
Fiber coupling optical output	Po	Peak value*3	-10.0	-	-1.0	dBm
Rise time	tr	20 to 80%*3 *4 *5	-	-	20	ns
Fall time	tf	80 to 20 %*3 *4 *5	-	-	20	ns
Pulse width distortion	ΔTw	50%*3 *4 *5	-15	-	+15	ns
Jitter	Δtj	*3 *4 *5	-	-	20	ps

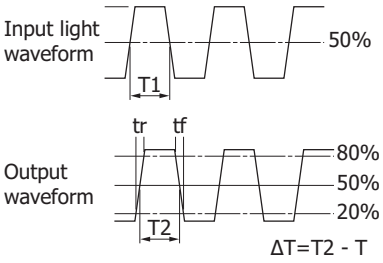
*3: For the fiber, use Mitsubishi Rayon GH4001 (ϕ1 mm, SI-POF, NA=0.5, 1 m).
*4: For the input signal, a 10 Mbps pseudo-random biphase signal is assumed.
*5: Defined using the average at 50% duty ratio

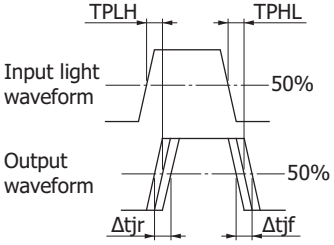
S12423-01SR

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 receiver level		Pi max	Peak value*6	2	-	-	dBm
Minimum receiver level		Pi min	Peak value, Pe=10^{-7}*6	-	-	-20	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 *7	-	-	20	ns
	Fall time	tf	20% to 80%*4 *7	-	-	20	ns
Pulse width distortion		Δt	*4 *6 *7	-25	-	+25	ns
Jitter		Δtj	*4 *6 *7	-	-	20	ns

*6: A signal generated by a Hamamatsu's standard signal generator is assumed for the optical input signal.
*7: CL=5 pF (including parasitic capacitance of probe, connector, and printed circuit board)



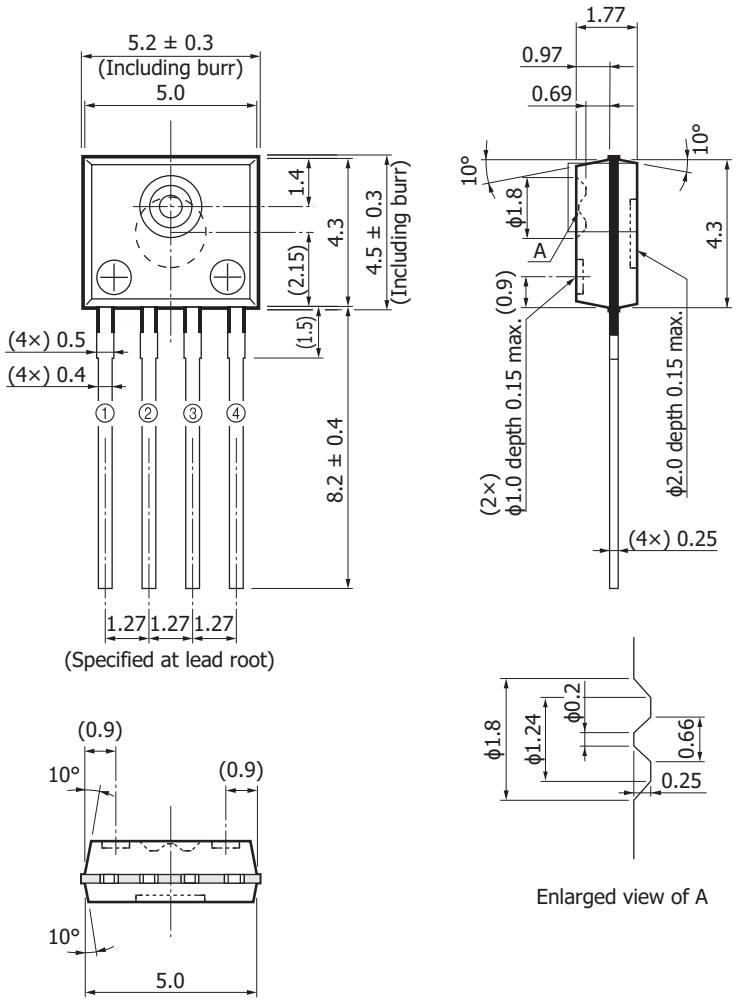


Parameter	Symbol	Measurement method
Rising edge jitter	Δtjr	Set the trigger to the PPG CLK, and measure the jitter in the rising edge of the output.
Falling edge jitter	Δtjf	Set the trigger to PPG CLK, and measure the jitter in the falling edge of the output.
Jitter	Δtj	Set Δtj to the larger of the two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

KPICC0250EA

Note [L12557-01SR, S12423-01SR]:
· Connect a 0.1 μF bypass capacitor within 3 mm of this element's lead (between Vcc and GND). In addition, connect a 4.7 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.

Dimensional outline (unit: mm)



Pin no.	L12557-01SR	S12423-01SR
①	Vin	Vout
②	GND	GND
③	GND	Vcc
④	Vcc	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)

KPICA0096EA

Related information

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

■ Precautions
· Disclaimer
· Metal, ceramic, plastic package products

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