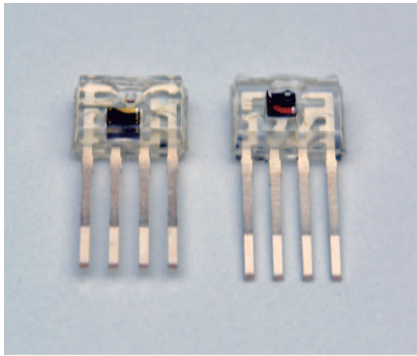


Photo IC for optical link



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	4.75	5.0	5.25	V
	S12423-01SR	3.135	3.3	3.465	
High level input voltage	L12557-01SR	2	-	Vcc + 0.3	V
Low level input voltage		Vih	-0.3	-	
High level output current	S12423-01SR	Ioh	-4	0	mA
Low level output current		Iol	0	-	

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	I _{cc}	V _{in} =2.0 V	-	-	40	mA
Data transmission rate	f _D	Biphase signal (NRZ conversion)	DC	-	10	Mbps
Peak emission wavelength	λ _p		630	650	670	nm
Temperature coefficient of peak emission wavelength	T _c λ		-	0.13	-	nm/°C
Spectral half width (FWHM)	Δλ		-	20	30	nm
Fiber coupling optical output	P _o	Peak value*3	-10.0	-	-1.0	dBm
Rise time	t _r	20 to 80%*3 *4 *5	-	-	20	ns
Fall time	t _f	80 to 20 %*3 *4 *5	-	-	20	ns
Pulse width distortion	ΔT _w	50%*3 *4 *5	-15	-	+15	ns
Jitter	Δt _j	*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

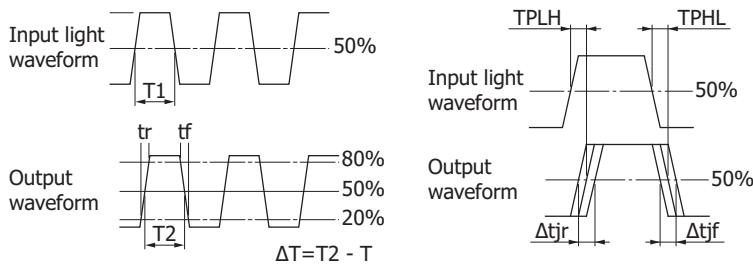
S12423-01SR

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	f _D	Biphase signal (NRZ conversion)	DC	-	10	Mbps	
Current consumption	I _{cc}	No optical input	-	-	40	mA	
Maximum receiver level	P _i max	Peak value*6	2	-	-	dBm	
Minimum receiver level	P _i min	Peak value, P _e =10 ⁻⁷ *6	-	-	-20	dBm	
Output voltage	High level output voltage	V _{oh} I _{oh} =-150 μA	2.7	-	-	V	
	Low level output voltage	V _{ol} I _{ol} =1.6 mA	-	-	0.4	V	
	Rise time	t _r	20% to 80%*4 *7	-	-	20	ns
	Fall time	t _f	20% to 80%*4 *7	-	-	20	ns
Pulse width distortion	Δt	*4 *6 *7	-25	-	+25	ns	
Jitter	Δt _j	*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	Δt _{jr}	Set the trigger to the PPG CLK, and measure the jitter in the rising edge of the output.
Falling edge jitter	Δt _{jf}	Set the trigger to PPG CLK, and measure the jitter in the falling edge of the output.
Jitter	Δt _j	Set Δt _j to the larger of the two jitter values: Δt _{jr} and Δt _{jf} .

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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.

Information described in this material is current as of April, 2015.

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