

# Light Optics

*Building a brighter future*

**LO-SP-10G-3S2-40**  
**10G BIDI SFP+ Transceiver**

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## Product Features

- Electrical interface specifications per SFF-8431
- Management interface specifications per SFF-8431 and SFF-8472
- SFP+ MSA package with Single LC receptacle
- 1330nm DFB Laser, PIN photo-detector
- Up to 10.5G bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature Options
  - (Commercial) 0°C to +70°C
- Up to 40km on 9/125µm SMF
- RoHS Compliant

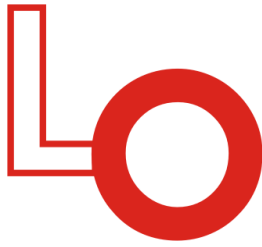
## Applications

- 10GBASE-BX Ethernet
- Other high speed data connections

## Ordering Information

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LO-SP-10G-3S2-40	1330nm DFB	-1 ~ +4dBm	1270nm PIN	< -15dBm	40km	0 ~ 70°C	Available	Compliant

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### Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	$T_S$	-40	85	$^{\circ}\text{C}$
Relative Humidity	RH	5	95	%
Supply Voltage	$V_{CC}$	-0.3	4.0	V

### Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	LO-SP-10G-3S2-40 $T_C$	0	25	70	$^{\circ}\text{C}$
Supply Voltage	$V_{CC}$	3.135	3.3	3.465	V
Data Rate	-	9.95	-	10.52	Gb/s

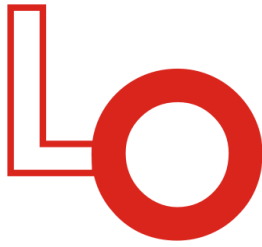
### Transceiver Electrical Characteristics

Table 5. Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes	
Module Supply Current	$I_{CC}$	-	-	450	mA	-	
Power Dissipation	$P_D$	-	-	1200	mW	-	
<b>Transmitter</b>							
Input Differential Impedance	$Z_{IN}$	-	100	-	$\Omega$	-	
Differential Data Input Swing	$V_{IN, P-P}$	180	-	700	mV <sub>P-P</sub>	-	
TX_FAULT	Transmitter Fault	$V_{OH}$	2.0	-	$V_{CCHOST}$	V	-
	Normal Operation	$V_{OL}$	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	$V_{IH}$	2.0	-	$V_{CCHOST}$	V	-
	Transmitter Enable	$V_{IL}$	0	-	0.8	V	-
<b>Receiver</b>							
Output Differential Impedance	$Z_O$	-	100	-	$\Omega$	-	
Differential Data Output Swing	$V_{OUT, P-P}$	400	-	850	mV <sub>P-P</sub>	1	
Data Output Rise Time, Fall Time	$t_r, t_f$	-	-	60	ps	2	
RX_LOS	Loss of signal (LOS)	$V_{OH}$	2.0	-	$V_{CCHOST}$	V	3
	Normal Operation	$V_{OL}$	0	-	0.8	V	3

**Notes:**

- Internally AC coupled, but requires a external 100 $\Omega$  differential load termination.
- 20–80%.
- LOS is an open collector output. Should be pulled up with 4.7K $\Omega$  on the host board.



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## Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P <sub>o</sub>	-1	-	+4	dBm	1
Center Wavelength Range	$\lambda_c$	1323	1330	1337	nm	-
Extinction Ratio	EX	3.5	-	-	dB	2
Optical Modulation Amplitude	OMA	-5.2	-	-	dBm	
Spectral Width (-20dB)	$\Delta\lambda$	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Relative Intensity Noise	RIN			-128	dB/Hz	
P <sub>out</sub> @TX-Disable Asserted	P <sub>off</sub>	-	-	-35	dBm	1

**Notes:**

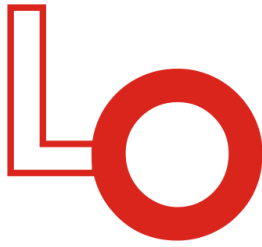
1. The optical power is launched into 9/125 $\mu$ m SMF.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern @10.3125Gbps.

## Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	$\lambda_c$	1263	1270	1277	nm	-
Receiver Sensitivity (P <sub>avg</sub> )	S	-	-	-15	dBm	1
Receiver Overload (P <sub>avg</sub> )	P <sub>OL</sub>	0.5	-	-	dBm	1
Optical Return Loss	ORL	12	-	-	dB	-
LOS De-Assert	LOS <sub>D</sub>	-	-	-17	dBm	-
LOS Assert	LOS <sub>A</sub>	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

**Notes:**

1. Measured with PRBS 2<sup>31</sup>-1 test pattern, 10.3125Gb/s, BER<10<sup>-12</sup>.



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## Mechanical specifications

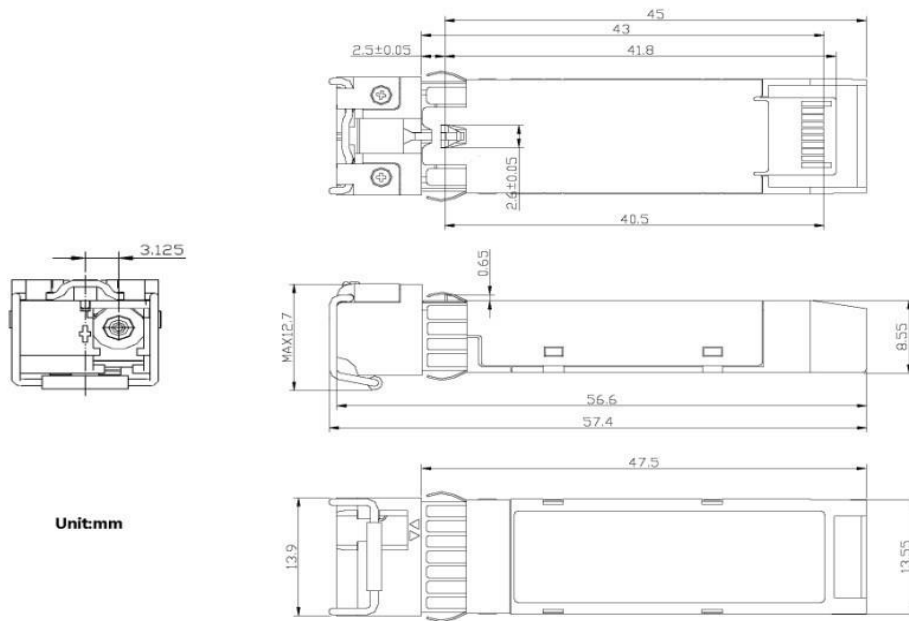


Figure 5. Outline Drawing