

# Light Optics

## Building a brighter future

### Ordering information

Part Number	Product Description
<b>LO-SP-10G-ER</b>	SFP+ ER 10Gbs 1550nm LC DDM SMF 40km

### Product Features

- 10G Ethernet 10GBase-ER/EW
- Electrical interface specifications per SFF-8431
- Management interface specifications per SFF-8431 and SFF-8472
- SFP+ MSA package with duplex LC connector
- Cooled 1550nm EML Laser
- Up to 10.3Gb/s bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature Options:
  - (Commercial) -5°C to +70°C
- Up to 40km on 9/125µm SMF
- RoHS Compliant

### Applications

- 10G Ethernet 10GBASE-ER/EW

Part Number	Transmitter	Output Power	Receiver	Sensitivity	Reach	Temp	DDM	RoHS
LX4003CDR	1550nm EML	-4.7 ~ +4dBm	PIN	< -15.8dBm	40km	-5 ~ 70 °C	Available	Compliant

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### Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Unit
Storage Temperature	$T_S$	-40	85	°C
Relative Humidity	RH	5	95	%
Supply Voltage	$V_{CC}$	-0.5	4.0	V

### Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	$T_C$	0	25	70	°C
Supply Voltage	$V_{CC}$	3.135	3.3	3.465	V
Data Rate	-	-	10.3125	-	Gb/s

### Transceiver Electrical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes	
Module Supply Current	$I_{CC}$	-	-	450	mA	-	
Power Dissipation	$P_D$	-	-	1500	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	$V_{OUT, P-P}$	300	-	850	mV <sub>P-P</sub>	1	
Data Output Rise Time, Fall Time	$t_r, t_f$	28	-	-	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>	-4.7	-	+4.0	dBm	1
Center Wavelength Range	λ <sub>c</sub>	1530	1550	1565	nm	-
Extinction Ratio	EX	5.0	-	-	dB	2
Optical Modulation Amplitude	OMA	-2.1	-	-	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	3.0	dB	-
Relative Intensity Noise	RIN			-128	dB/Hz	
Optical Return Loss Tolerance	ORLT	-	-	21	dB	-
Pout @TX-Disable Asserted	P <sub>off</sub>	-	-	-30	dBm	1
Eye Diagram	IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-ER compatible					

**Notes:**

1. The optical power is launched into 9/125μm 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	λ <sub>c</sub>	1530	-	1565	nm	-
Receiver Sensitivity (P <sub>avg</sub> )	S	-	-	-15.8	dBm	1
Receiver Sensitivity (OMA)	S <sub>OMA</sub>	-	-	-14.1	dBm	1
Receiver Overload (P <sub>avg</sub> )	P <sub>OL</sub>	-1.0	-	-	dBm	1
Stressed Sensitivity (OMA)	-	-	-	-11.3	dBm	2
Optical Return Loss	ORL	26	-	-	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>.
2. Comply with IEEE 802.3-2005.

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**Mechanical specifications**

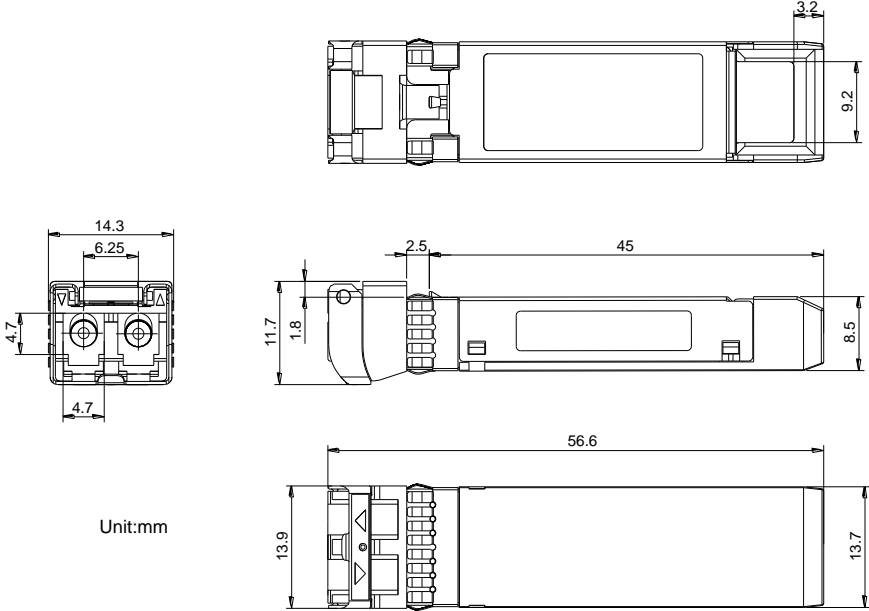


Figure 5. Outline Drawing