



Light Optics

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Product Features

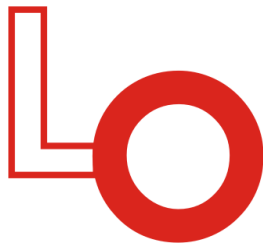
- Compliant with IEEE Std 802.3-2005
10G Ethernet 10GBase-LR/LW
- Electrical interface specifications per SFF-8431
- Management interface specifications per
SFF-8431 and SFF-8472
- SFP+ MSA package with duplex LC connector
- Uncooled 1310nm DFB Laser
- Up to 10.3Gb/s bi-directional data links
- Single +3.3V power supply
- Class 1 laser safety certified
- Operating temperature Options
 - (Commercial) 0°C to +70°C
 - (Industrial) -40°C to +85°C
- Up to 10km on 9/125µm SMF
- RoHS Compliant

Applications

- 10G Ethernet 10GBASE-LR/LW
- 10G Fiber Channel

Ordering information

Part Number	Product Description
LO-SP-10G-LR	SFP+ LR 10Gbs 1310nm LC DDM SMF 10km



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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 Temperature	LO-SP-10G-LR	T_C	0	25	70	°C
	LO-ISP-10G-LR	T_C	-40	25	85	°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}	-	-	290	mA	-
Power Dissipation	P_D	-	-	1000	mW	-

Transmitter

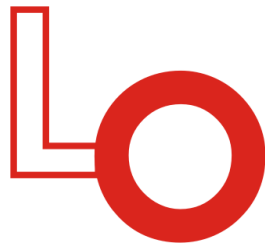
Input Differential Impedance	Z_{IN}	-	100	-	Ω	-	
Differential Data Input Swing	$V_{IN, P-P}$	180	-	700	mV _{P-P}	-	
TX_FAULT	Transmitter Fault	V_{OH}	2.0	-	V_{CCHOST}	V	-
	Normal Operation	V_{OL}	0	-	0.8	V	-
TX_DISABLE	Transmitter Disable	V_{IH}	2.0	-	V_{CCHOST}	V	-
	Transmitter Enable	V_{IL}	0	-	0.8	V	-

Receiver

Output Differential Impedance	Z_O	-	100	-	Ω	-	
Differential Data Output Swing	$V_{OUT, P-P}$	300	-	850	mV _{P-P}	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:

1. Internally AC coupled, but requires a external 100 Ω differential load termination.
2. 20 – 80 %.
3. LOS is an open collector output. Should be pulled up with 4.7k Ω on the host board.



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Transmitter Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Launch Optical Power	P _o	-8.2	-	+0.5	dBm	1
Center Wavelength Range	λ _c	1260	1310	1355	nm	-
Extinction Ratio	EX	3.5	-	-	dB	2
Optical Modulation Amplitude	OMA	-5.2	-	-	dBm	
Spectral Width (-20dB)	Δλ	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	3.2	dB	-
Optical Return Loss Tolerance	ORLT	-	-	12	dB	-
Pout @TX-Disable Asserted	P _{off}	-	-	-30	dBm	1
Eye Diagram	IEEE Std 802.3-2005 10Gb Ethernet 10GBASE-LR compatible					

Notes:

1. The optical power is launched into 9/125μm SMF.
2. Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps.

Receiver Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit	Notes
Center Wavelength	λ _c	1260	1310	1355	nm	-
Receiver Sensitivity (P _{avg})	S	-	-	-14.4	dBm	1
Receiver Sensitivity (OMA)	S _{OMA}	-	-	-12.6	dBm	1
Receiver Overload (P _{avg})	P _{OL}	0.5	-	-	dBm	1
Stressed Sensitivity (OMA)	-	-	-	-10.3	dBm	2
Optical Return Loss	ORL	12	-	-	dB	-
LOS De-Assert	LOS _D	-	-	-17	dBm	-
LOS Assert	LOS _A	-30	-	-	dBm	-
LOS Hysteresis	-	0.5	-	-	dB	-

Notes:

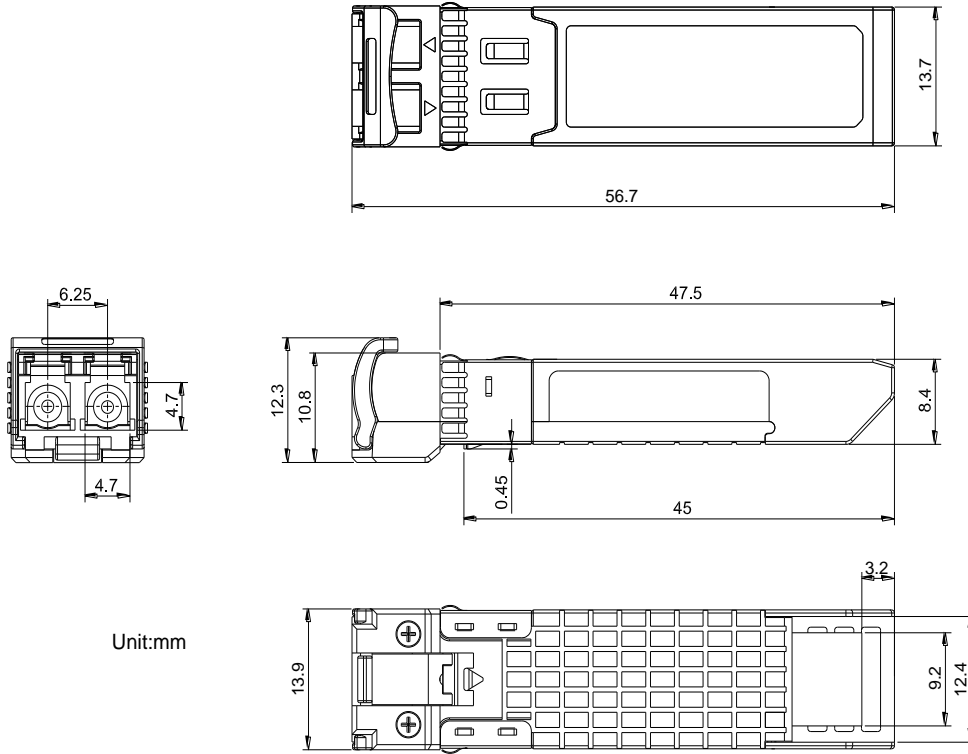
1. Measured with PRBS 2³¹-1 test pattern, 10.3125Gb/s, BER<10⁻¹².
2. Comply with IEEE 802.3-2005.



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Mechanical specifications



Unit:mm