

409-10007-LEG
DELL 10GBASE-LR XFP SMF
1550NM 10KM REACH LC DOM



409-10007-LEG

10Gbs XFP Transceiver

Features

- Duplex LC connector
- Support hot-pluggable
- Metal with lower EMI
- Excellent ESD protection
- XFP MSA Compliant
- Distance up to 10km for single mode fiber
- +3.3V power supply and power dissipation <3.5W
- GR-253-CORE compliant
- RoHS Compliant and Lead-Free
- Compliant with IEEE 802.3ae
- Compliant with XFP MSA
- Digital diagnostic compatible with SFF-847 Rev11.0



Applications

- 10GBASE-LR/LW
- 10G Fibre Channel
- Other optical link

Product Description

Transport Optics 409-10007-LEG transceivers are compatible with the XFP Multi-Sourcing Agreement (MSA). The XFP transceivers are high performance, cost effective modules supporting dual data-rate of 10Gbps and support distance up to 40km with SMF.

Transport Optics XFP transceivers are RoHS compliant and lead-free

Regulatory Compliance

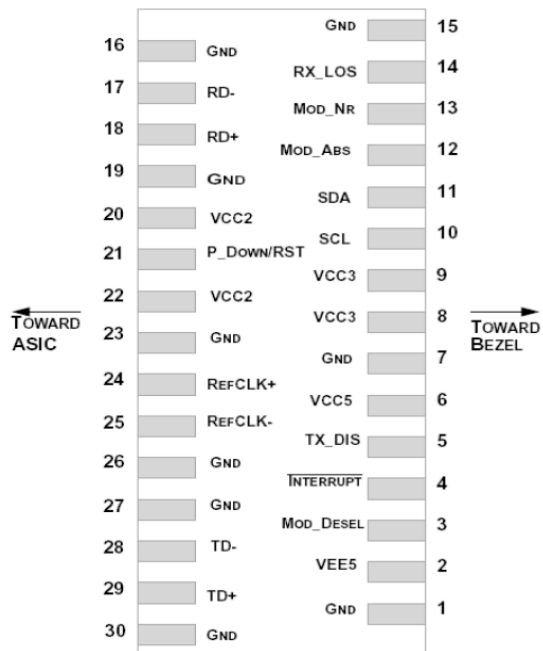
- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.7.
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2.
- Immunity compatible with IEC 61000-4-3.
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B.
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2.
- RoHS compliant with 2002/95/EC 4.1&4.2 2005/747/EC.

Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	GND	Module Ground	
2	Vee5	(not required)	
3	MOD_DESEL	Module De-select; When Held low allows the module to respond to 2-wire serial interface. LVTTTL-I	
4	/INTERRUPT	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface. LVTTTL-O	2
5	TX_DIS	Transmitter Disable. Logic1 indicates laser output disabled, LVTTTL-I	
6	VCC5	+5V Power Supply (Not required)	
7	GND	Module Ground	1
8	VCC3	+3.3V Power Supply	
9	VCC3	+3.3V Power Supply	
10	SCL	2-Wire Serial Interface Clock. LVTTTL-I	2
11	SDA	2-Wire Serial Interface Data Line. LVTTTL-I/O	2
12	MOD_Abs	Indicates Module is not present. Grounded in the Module. LVTTTL-O	2
13	MOD_NR	Module Not Ready; Indicating Module Operational Fault. Open-collector. LVTTTL-O	2
14	RX_LOS	Loss of Signal indication. Logic 1 indicates loss of Signal. Open-collector. LVTTTL-O	2
15	GND	Module Ground	1
16	GND	Module Ground	1
17	RD-	Receiver Inverted Data Output. CML-O	
18	RD+	Receiver Non-Inverted Data Output. CML-O	
19	GND	Module Ground	1
20	VCC2	+1.8V Power Supply (Not required).	3
21	P_DOWN/RST	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. LVTTTL-I	
		Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. LVTTTL-I	
22	VCC2	+1.8V Power Supply (Not required)	3
23	GND	Module Ground	1
24	REFCLK+	Reference Clock (Not required)	
25	REFCLK-	Reference Clock (Not required)	
26	GND	Module Ground	1
27	GND	Module Ground	1
28	TD-	Transmitter Inverted Data Input. CML-I	
29	TD+	Transmitter Non-Inverted Data Input. CML-I	
30	GND	Module Ground	1

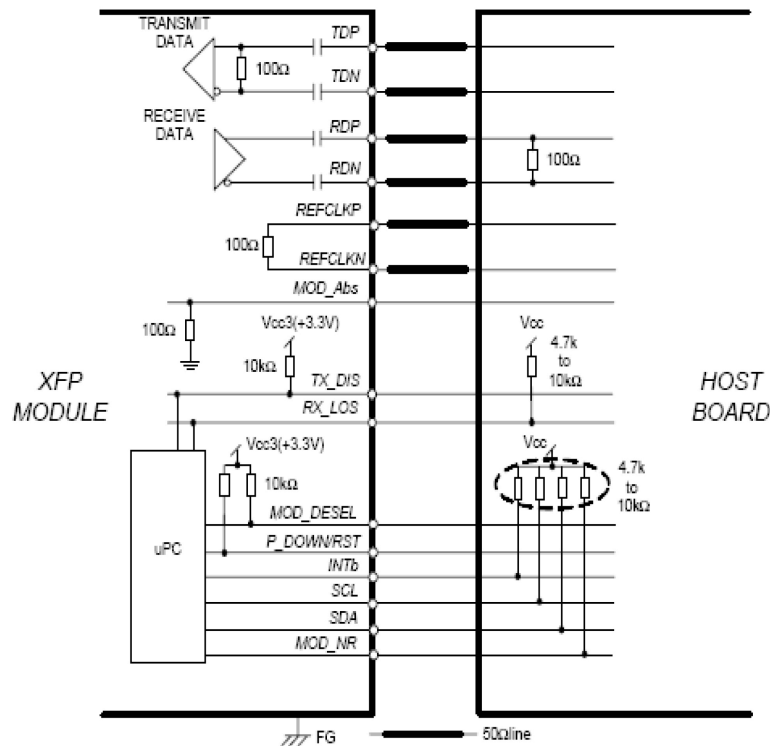
Notes:

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Open collector; should be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.6V on the host board.
3. The pins are open within module.



Pin-out of connector Block on Host board

Recommend Circuit Schematic



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Maximum Supply Voltage	Vcc3	-0.5	4.0	V
Storage Temperature	TS	-40	85	°C
Operating Humidity	RH	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	Vcc3	3.13	3.30	3.47	V
Power Supply Current	Icc3			650	mA
Case Operating Temperature – Commercial	Tc	-5		70	°C
Case Operating Temperature – Industrial	Tc	-40		85	°C
Data Rate		9.95	10.3	10.5	Gbps
50/125µm MMF (OM3)	Lmax			10	km

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Differential data input swing	V _{in} , pp	120	600	850	mV	
Input differential impedance	Z _{in}	90	100	110	Ω	
Receiver						
Differential data output swing	V _{out} , pp	300	600	850	mV	
Output Differential Impedance	Z _{in}	90	100	110	Ω	
Transceiver						
Ref-clk Input Swing	Ref, pp	400		2400	mV	
TX Disable-High		2.0		V _{cc} +0.3	V	
TX Disable-Low		V _{ee} -0.3		0.8	V	
LOS-High		2.0		V _{cc} +0.3	V	
LOS-Low		V _{ee} -0.3		0.8	V	
MOD_DESEL-High		2.0		V _{cc} +0.3	V	
MOD_DESEL-Low		V _{ee} -0.3		0.8	V	
MOD_INT-High		2.0		V _{cc} +0.3	V	
MOD_INT-Low		V _{ee} -0.3		0.8	V	
MOD_NR-High		2.0		V _{cc} +0.3	V	
MOD_NR-Low		V _{ee} -0.3		0.8	V	
P_DOWN/RST-High		2.0		V _{cc} +0.3	V	
P_DOWN/RST-Low		V _{ee} -0.3		0.8	V	

Optical Characteristics

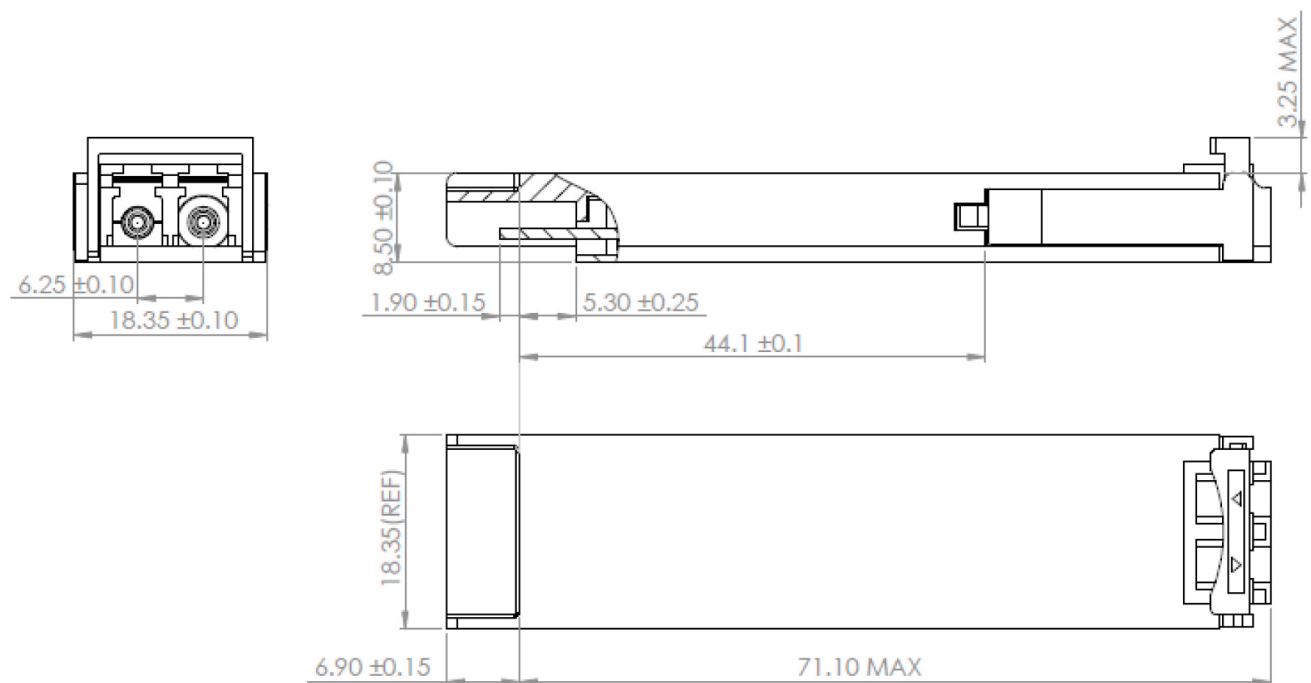
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Opt. Power	AOP	-6		0.5	dBm	1
Optical Modulation Amplitude	P(OMA)	-5.2	-2		dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Launch power of OFF TX	P _{off}			-30	dBm	
Side Mode Suppression Ratio	SMSR	30			dB	

Optical Wavelength	λ	1260	1310	1355	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Return Loss Tolerance	ORLT			12	dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Reflectance				-12	dB	
Eye Diagram	IEEE802.3ae-2005					
Receiver						
Overload		0.5			dBm	
Receiver Reflectance				-12	dB	
Optical Center Wavelength	λ_C	1260		1610	nm	
LOS De-Assert	LOSD			-15	dBm	1
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5		5	dB	
Receiver Sensitivity	PIN			-14.4	dBm	1

Notes:

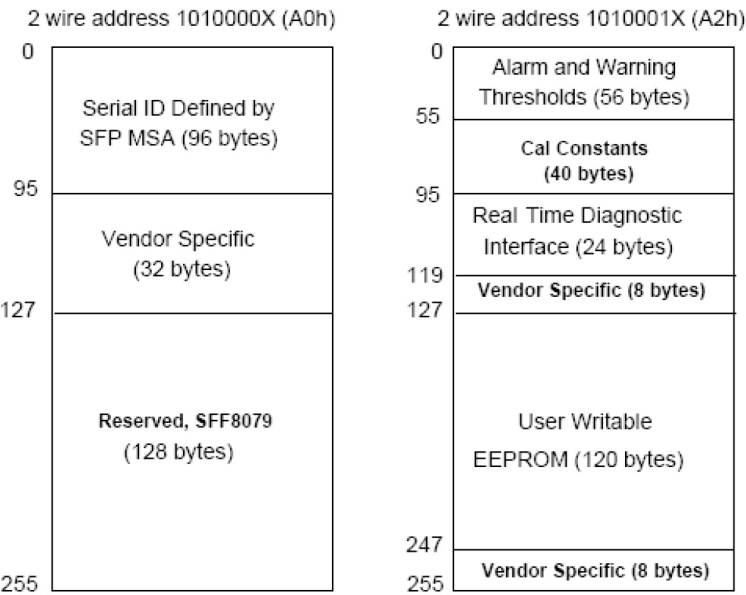
1. BER $\leq$ 10⁻¹² @ PRBS231-1 at 10.3125Gb/s.

Mechanical Specifications



EEPROM Information

EEPROM memory map specific data field description is as below:



Digital Diagnostic Monitoring Interface

The digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM, which makes use of the 8 bi address 1010001X (A2h). The monitoring specification of this product is described in this table.

Parameter	Range	Accuracy	Calibration
Temperature	-5 to +85°C	±3°C	Internal
	-40 to +95°C	±3°C	
Voltage	2.97V to 3.63V	±3%	Internal
Bias Current	0mA to 100mA	±10%	Internal
TX Power	-6 to +0.5dBm	±2dB	Internal
RX Power	-14.4 to 0.5dBm	±2dB	Internal



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