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

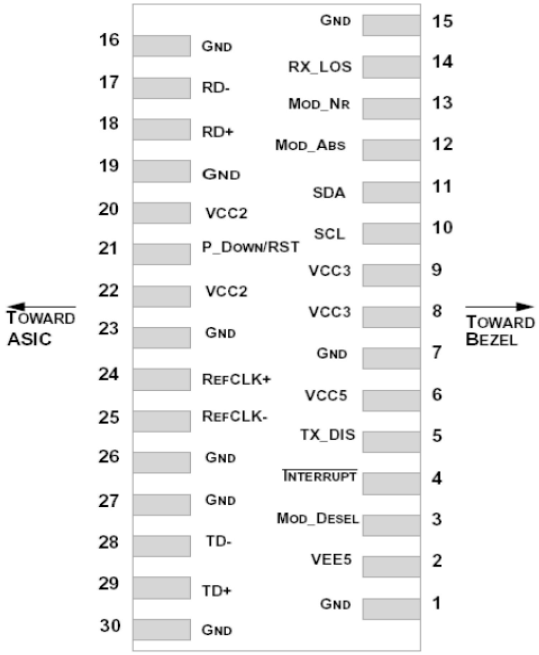
- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.7.
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2.
- Immunity compatible with IEC 61000-4-3.
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B.
- Laser Eye Safety compatible with 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. LVTTL-I	
4	/INTERRUPT	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface. LVTTL-O	2
5	TX_DIS	Transmitter Disable. Logic1 indicates laser output disabled, LVTTL-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. LVTTL-I	2
11	SDA	2-Wire Serial Interface Data Line. LVTTL-I/O	2
12	MOD_Abs	Indicates Module is not present. Grounded in the Module. LVTTL-O	2
13	MOD_NR	Module Not Ready; Indicating Module Operational Fault. Open-collector. LVTTL-O	2
14	RX_LOS	Loss of Signal indication. Logic 1 indicates loss of Signal. Open-collector. LVTTL-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. LVTTL-I Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. LVTTL-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

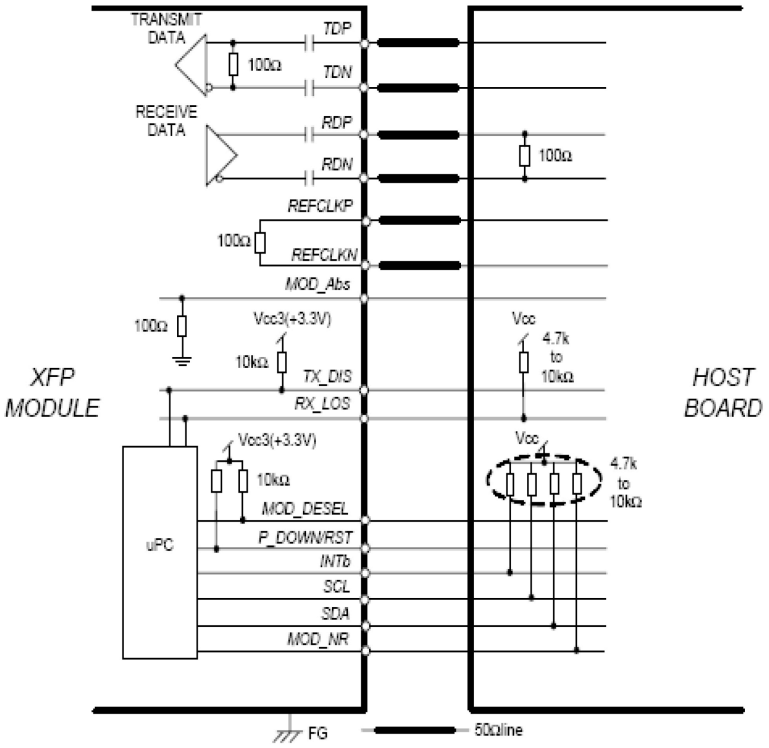
Notes:

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	Vin, pp	120	600	850	mV	
Input differential impedance	Zin	90	100	110	Ω	
Receiver						
Differential data output swing	Vout, pp	300	600	850	mV	
Output Differential Impedance	Zin	90	100	110	Ω	
Transceiver						
Ref-clk Input Swing	Ref, pp	400		2400	mV	
TX Disable-High		2.0		Vcc+0.3	V	
TX Disable-Low		Vee-0.3		0.8	V	
LOS-High		2.0		Vcc+0.3	V	
LOS-Low		Vee-0.3		0.8	V	
MOD_DESEL-High		2.0		Vcc+0.3	V	
MOD_DESEL-Low		Vee-0.3		0.8	V	
MOD_INT-High		2.0		Vcc+0.3	V	
MOD_INT-Low		Vee-0.3		0.8	V	
MOD_NR-High		2.0		Vcc+0.3	V	
MOD_NR-Low		Vee-0.3		0.8	V	
P_DOWN/RST-High		2.0		Vcc+0.3	V	
P_DOWN/RST-Low		Vee-0.3		0.8	V	

Optical Characteristics

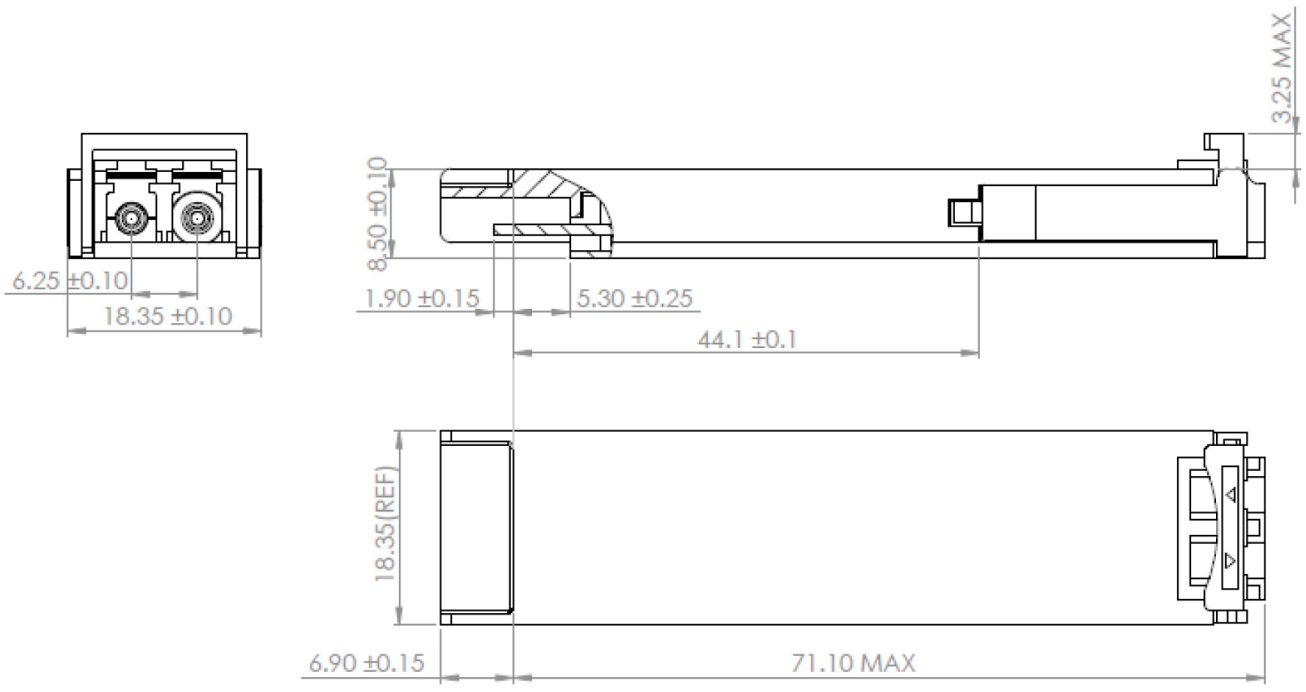
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Opt. Power	AOP	-6		0.5	dBm	1
Optical Modulation Amplitude	P(OMA)	-5.2	-2		dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Average Launch power of OFF TX	Poff			-30	dBm	
Side Mode Suppression Ratio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

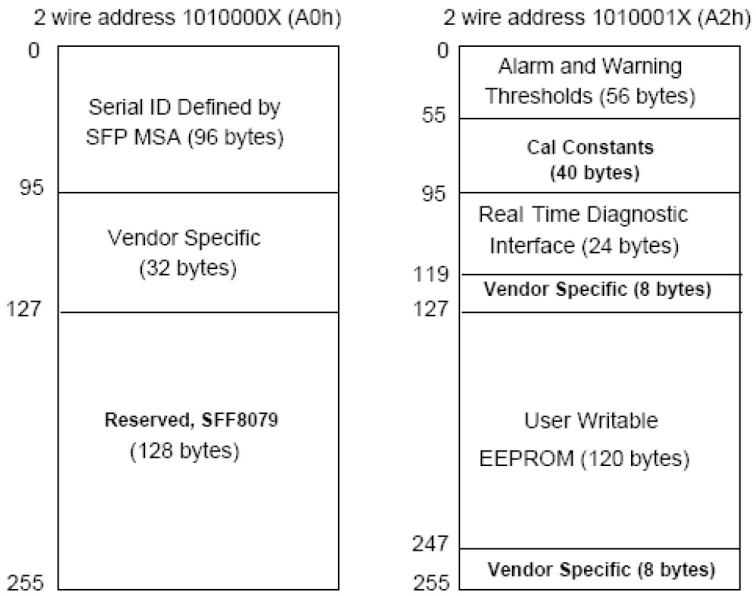
1. BER ≤10-12@PRBS231-1 at 10.3125Gb/s.

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