



RoHS compliant
TX-1490/RX-1550 nm Single-mode Bi-directional
SFP LC Simplex Connector (160km) DDM
Fiber Channel/155Mbps Ethernet/100Base-BX10-U/ITU-T G.985

Description



- Up to 155Mbps data rate
- Duplex LC receptacle optical interface compliant
- Single +3.3V power supply
- Digital Diagnostic Monitoring function implemented
- External calibration
- Hot-pluggable
- AC coupling of PECL signals
- Receiver Loss of Signal Output
- Transmitter disable input
- Compliant with SFF-8472
- Compliant with IUT-T G.957

Applications

- International Class 1 laser safety certified
- RoHS Compliance
- Fast Ethernet
- OC-3 IR-1 / STM-1 (S-1.1)
- ATM Switches and Routers
- Other Optical Link

Ordering Information

PART NUMBER	TX/RX	INPUT/OUTPUT	SIGNAL DETECT	TEMPERATURE	Distance
CL-SFP-WDM-160-49/155 DD	1490/1550	AC/AC	TTL	-5°C to 70 °C	160km
CL-SFP-WDM-160-49/155 DDi	1490/1550	AC/AC	TTL	-40°C to 85 °C	160km



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Recommended Operating Conditions

Parameter	Symbol	Unit	Min.	Typ.	Max.	Notes
Storage Temperature	T _{STG}	°C	-40	-	85	
Operating Case Temperature	T _{OP}	°C	0	-	70	CL-SFP-WDM-160-49/155 DD
			-40	-	85	CL-SFP-WDM-160-49/155 DDi
Power Supply Voltage	V _{CC}	V	3.1	3.3	3.5	
Data Rate		Mb/s	-	155	-	

Transmitter Specifications

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Average Output Optical Power	P ₀	dBm	1		6	
Transmitter Off Optical Power	P _{OFF}	dBm			-45	
Output Center Wavelength	λ	nm	1470	1490	1510	CL-SFP-WDM-160-49/155 DD
			1530	1550	1570	CL-SFP-WDM-160-55/155 DD
Output Spectrum Width (-20dB)	Δλ	nm	-	-	1.0	
Side Mode Suppression Ratio	SMSR	dB	30			
Extinction Ratio	ER	dB	9			
Optical Rise Time	-	ps			260	
Optical Fall Time	-	ps			260	
Jitter P-P	T _J	UI			0.1	Note 1
Optical Eye Diagram	Compliant with IUT-T G.957					

Note 1: Measured at 155Mbps PRBS2₂₃-1.



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Electrical Characteristics

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Total Supply Current	I _{CC}	mA	-	-	350	
Transmitter						
Single Ended Data Input Swing	V _{PP}	mV	200	-	1200	
Differential Input Impedance	Z _{IN}	ohm	80	100	120	
Tx_Fault Output Voltage- High	V _{OH}	V	2.0	-	V _{CC}	
Tx_Fault Output Voltage- Low	V _{OL}	V	0	-	0.8	
Tx_Dis Input Voltage- High	V _{IH}	V	2.0	-	V _{CC}	
Tx_Dis Input Voltage- Low	V _{IL}	V	0	-	0.8	
Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Receiver						
Single Ended Data Output Swing	V _{PP}	mV	300	-	600	
LOS Output Voltage- High	V _{LOSH}	V	2	-	-	
LOS Output Voltage- Low	V _{LOSL}	V	-	-	0.8	

Receiver Specifications

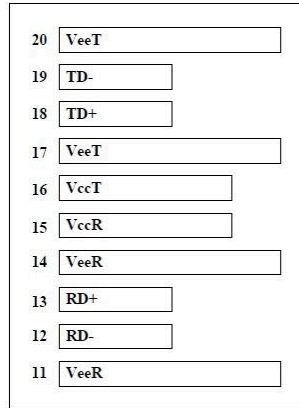
Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Sensitivity	Sen	dBm	-	-	-35	1
Saturation Input Optical Power	Sat	dBm	-8	-	-	
LOS Assert Level	LOSA	dBm	-50	-	-	
LOS Deassert Level	LOSD	dBm	-	-	-36	
LOS Hysteresis	HYS	dB	0.5	-	6	

Note 1: Measured with PRBS2₂₃-1 pattern, @155Mbps, ER=10dB, BER=1x10⁻¹².

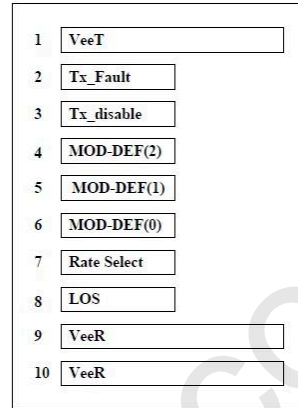


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Pin Definitions



Top of Board



Bottom of Board

As Viewed Through Top of Board

Pin#	Name	Function
1	VeeT	Transmitter Ground
2	TX Fault	Transmitter Fault Indication, Logic 1 indicates Transmitter Fault.
3	TX Disable	Transmitter Disable, Transmitter disables on high or open.
4	MOD-DEF(2)	Module Definition 2. Data line for two wire Serial ID.
5	MOD-DEF(1)	Module Definition 1. Clock line for two wire Serial ID.
6	MOD-DEF(0)	Module Definition 0. Grounded within the module.
7	Rate Select	Not Connected
8	LOS	Loss of Signal indication. Logic 1 indicates Loss of Signal.
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inverse Received Data Out, AC coupled
13	RD+	Received Data Out, AC coupled
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmit Data In, AC coupled
19	TD-	Inverse Transmit Data In, AC coupled
20	VeeT	Transmitter Ground



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Digital Diagnostic Functions

Carelink SFP transceivers support the 2-wire serial communication protocol as defined in the SFP MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, Carelink SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h).

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

Digital diagnostics for the Carelink SFP Transceivers are externally calibrated by default.