

1.25Gb/s SFP CWDM 20km Optical Transceiver

Module HC-GE-CXXL-20D

Features

- Up to 1.25 Gbps
- Hot pluggable
- +3.3V power supply
- Up to 20km transmission on SMF
- Power consumption less than 1.0W
- Operating case temperature: 0~+70°C
- CWDM DFB laser and PIN receiver
- Very low EMI and excellent ESD protection
- 2-Wire interface for integrated Digital Diagnostic monitoring



Applications

- Computer cluster cross-connect
- Custom high-speed data pipes
- High-speed storage area networks

Technical Specification

Absolute Maximum Ratings					
Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Temperature	T _s	-40	+85	°C	
Supply Voltage	V _{CC3}	0	3.6	V	
Relative Humidity	RH	5	+85	%	Note1
Rx Input Average Power	P _{max}	-	+1	dBm	

Condensing State

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_C	0	25	+70	°C
Power Supply Voltage	V_{CC3}	3.13	3.3	3.47	V
Total Supply Current	I_{CC3}	-	-	300	mA
Power Dissipation	P_D	-	-	1.0	W
Data Rate			1.25		Gbps

Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Centre Wavelength	λ_c		CWDM		nm	
Spectral Width	$\Delta\lambda$			1	nm	DFB
Average Optical Power	P_{avg}	-9	-	-3	dBm	
Laser Off Power	P_{off}	-	-	-40	dBm	
Extinction Ratio	ER	8.2	-	-	dB	
Operating Data Rate		-	1.25	-	Gbps	
Optical Eye Mask	Complies with IEEE802.3z eye masks when filtered					
Tx Input Diff. Voltage	V_I	500	-	2400	mV	
Tx Fault Output Voltage -- Low	V_{oL}	-0.3	-	0.4	V	
Tx Fault Output Voltage -- High	V_{oH}	2.4	-	$V_{CC}+0.3$	V	

Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ_r	-6.5	CWDM	+6.5	nm	
Receive Sensitivity In Average Power	Psen	-	-	-22	dBm	
Los Assert	LosA	-35	-	-	dBm	
Los Dessert	LosD	-	-	-26	dBm	
Los Hysteresis	LosH	0.5	-	6	dB	
Overload	Psat	-	-	-3	dBm	
Rx Output Diff Voltage	Vo	370	-	2000	mV	
Operating Data Rate	-	-	1.25	-	Gbps	

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max.	Unit	Note
Temperature monitor absolute error	DMI_Temp	-3	3	℃	Over operating temp
Laser power monitor absolute error	DMI_TX	-3	3	dB	
RX power monitor absolute error	DMI_RX	-3	3	dB	
Supply voltage monitor absolute error	DMI_VCC	-3%	+3%	V	
Bias current monitor absolute error	DMI_Ibias	-10%	10%	mA	

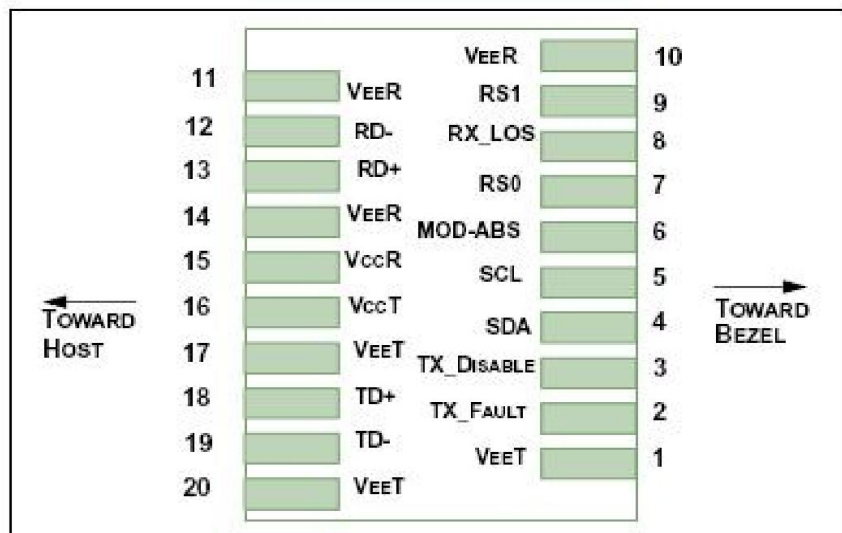
Control and Status I/O Timing Characteristics

Parameter	Symbol	Min.	Max.	Unit	Note
TX Disable Assert Time	t_off	-	100	μs	Note1
TX Disable Negate Time	t_on	-	2	ms	Note2
Time to initialize including reset of TX_Fault	t_init	-	300	ms	Note3
TX Fault Assert Time	t_fault_on	-	1	ms	Note4
TX Fault Reset Time	t_reset	10	-	μs	Note5
LOS Assert Time	t_loss_on	-	100	μs	Note6
LOS Deassert Time	t_loss_off	-	100	μs	Note7

Notes:

- [1] Time from rising edge of TX Disable to when the optical output falls below 10% of nominal
- [2] Time from falling edge of TX Disable to when the modulated optical output rises above 90% of nominal
- [3] From power on or negation of TX Fault using TX Disable
- [4] Time from fault to TX fault on
- [5] Time from TX fault to TX nominal
- [6] Time from LOS state to RX LOS assert
- [7] Time from non-LOS state to RX LOS deassert.

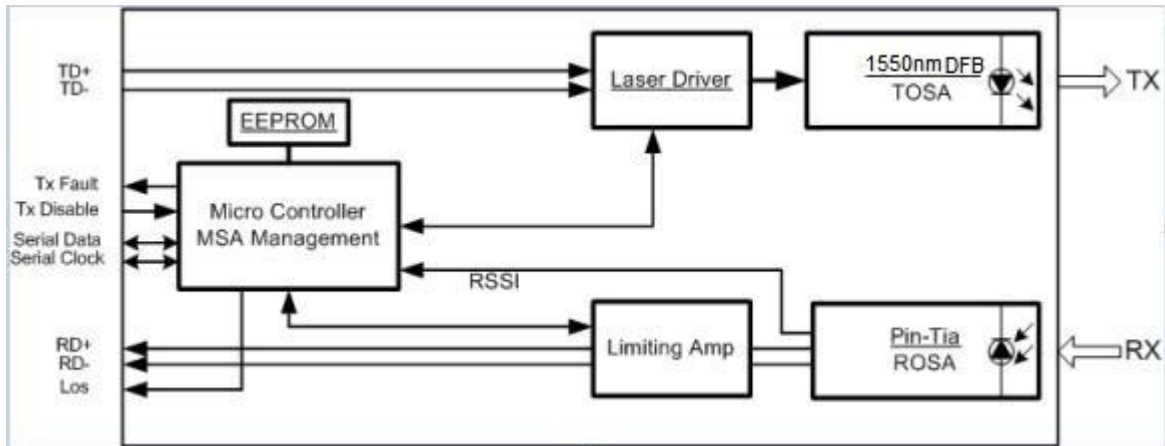
Pin-out Definition



Pin Assignment

Pin	Logic	Symbol	Name/Description	Note
1		VeeT	Module Transmitter Ground	
2	LVTTL-O	TX_Fault	Module Transmitter Fault	
3	LVTTL-I	TX_Disable	Transmitter Disable; Turns off transmitter laser output	
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)	
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)	
6		MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	
7	LVTTL-I	RS0	Not used	
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)	
9	LVTTL-I	RS1	Not used	
10		VeeR	Module Receiver Ground	
11		VeeR	Module Receiver Ground	
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	
14		VeeR	Module Receiver Ground	
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Transmitter 3.3 V Supply	
17		VeeT	Module Transmitter Ground	
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	

Block Diagram of Transceiver

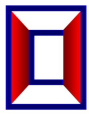


Transmitter Section

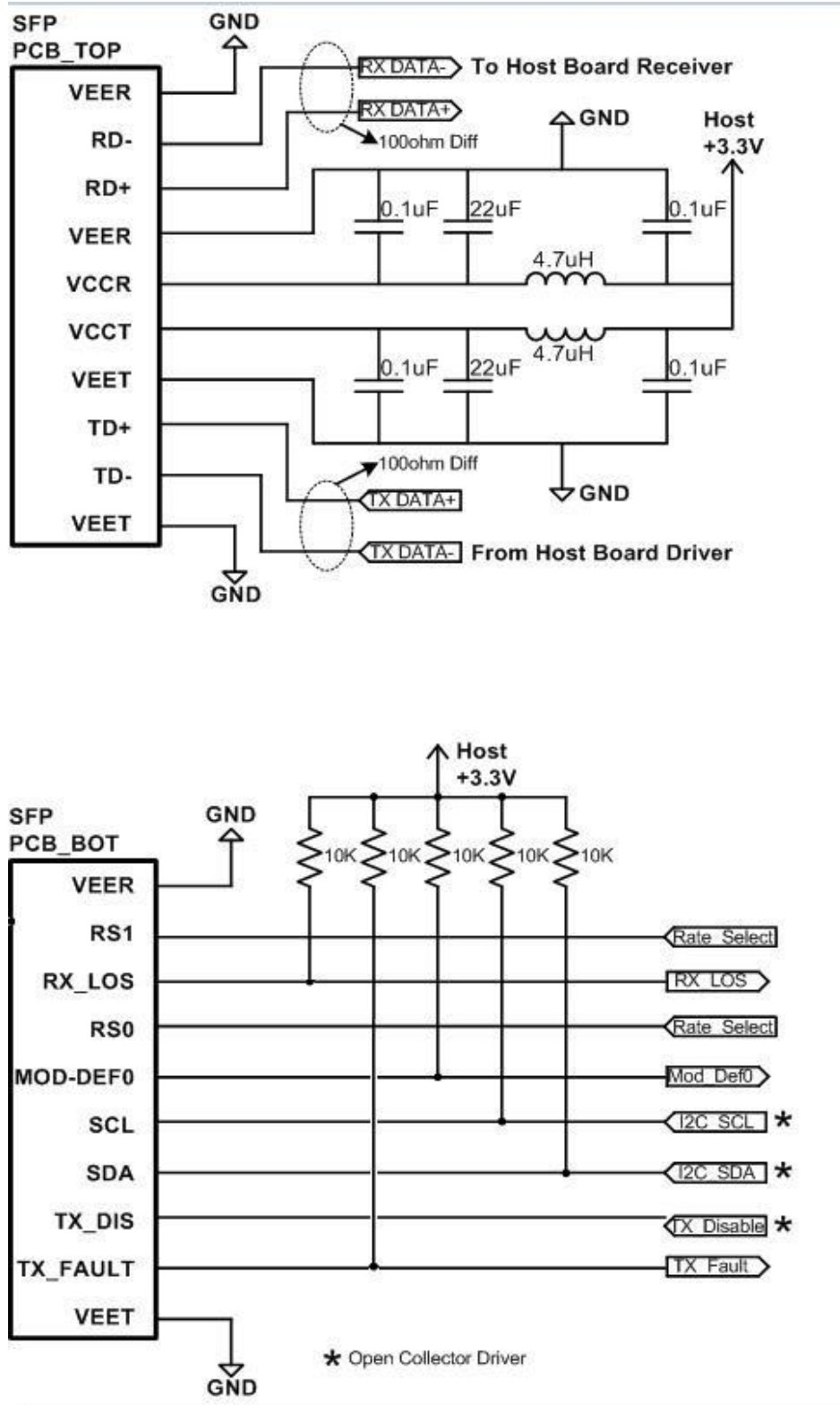
The transmitter converts 1.25Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 1000BASE-ZX standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. A logic "1," or no connection on this pin will disable the laser from transmitting. A logic "0" on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supply voltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is a module output contact that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Host in the host with a resistor in the range 4.7-10 k Ω . TX_Disable is a module input contact. When TX_Disable is asserted high or left open, the SFP module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 k Ω to 10 k Ω resistor.

Receiver Section

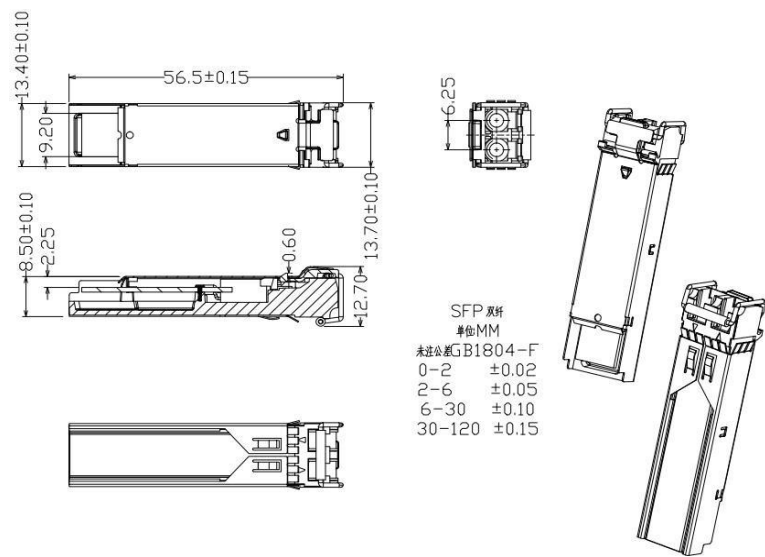
The receiver converts 1.25Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to Vcc_Host in the host with a resistor in the range 4.7-10 k Ω , or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the SFP is installed that the received signal strength is below the specified range. Such an indication typically points to non-installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.



Recommended Interface Circuit



Dimensions(mm)



Digital Diagnostic Memory Map

