

Mini-GBIC (SFP)

Tx1270nm/1330nm DFB, WDM, 10GBase SFP+ Transceiver

- Distance: 20km, 40km
- Standard Operating Temperature: -10°C ~ 70°C
- Wide Operating Temperature: -40°C ~ 85°C



OVERVIEW

Lantech 10GBase Small Form Factor Pluggable SFP+ transceivers are compliant with the current SFP+ Multi-Source Agreement (MSA) Specification. The high performance

1270nm/1330nm DFB transmitter and high sensitive PIN receiver provide superior performance for 10GBase Ethernet applications up to 40km optical links.

FEATURES & BENEFITS

- Compliant with IEEE802.3ae 10GBase-BX Ethernet Standard
- Compliant with SFP8472 diagnostic monitoring interface
- Compliant with SFP+ MSA
- Hot Pluggable
- 1270nm/1330nm DFB laser transmitter
- Duplex LC connector
- 2-wire interface for management and diagnostic monitor
- Single +3.3V power supply voltage
- Transmission distance of 40KM over single mode fiber
- RoHS Compliant

SPECIFICATION

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	Ts	-40	+85	°C	
Supply Voltage	VccT, VccR	-0.5	4.0	V	
Storage Relative Humidity	RH	5	95	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Top	-10		70	°C	
Supply Voltage	Vcc	+3.15	+3.3	+3.46	V	
Supply Current	Icc		250	300	mA	

Transmitter Electro-Optical Interface

Vcc=3.15V to 3.46V, Top=-10°C to 70°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Operating Data Rate	DR	9.953	10.3125	10.50	Gb/s		
Bit Error Rate	BER			10 ⁻¹²			
Optical Launch Power	Po	1270nm 20km	-3		+2	dBm	1
		1330nm 20km	-3		+2		
		1270nm 40km	0		+5		
		1330nm 40km	0		+5		
Center Wavelength	λc	1270nm 20km	1260	1270	1280	nm	
		1330nm 20km	1320	1330	1340		
		1270nm 40km	1260	1270	1280		
		1330nm 40km	1320	1330	1340		
Spectral Width (-20dB)	Δλ			1	nm		
Side Mode Suppression Ratio	SMSR	30			dB		
Optical Extinction Ratio	ER	3.5			dB		

Dispersion Penalty	DP			3.2	dB	
Average Launch Power of OFF Transmitter	P _{OFF}			-30	dBm	
Optical Eye Mask			IEEE802.3ae			
Relative Intensity Noise	RIN			-128	dB/Hz	
Differential Data Input Voltage	V _{DIFF}	120		1200	mV	
Transmit Disable Voltage	V _{DIS}	2.0		V _{CC}	V	
Transmit Enable Voltage	V _{EN}	V _{EE}		V _{EE} +0.8	V	

Notes: 1. The optical power is launched into a 9/125µm single-mode fiber.

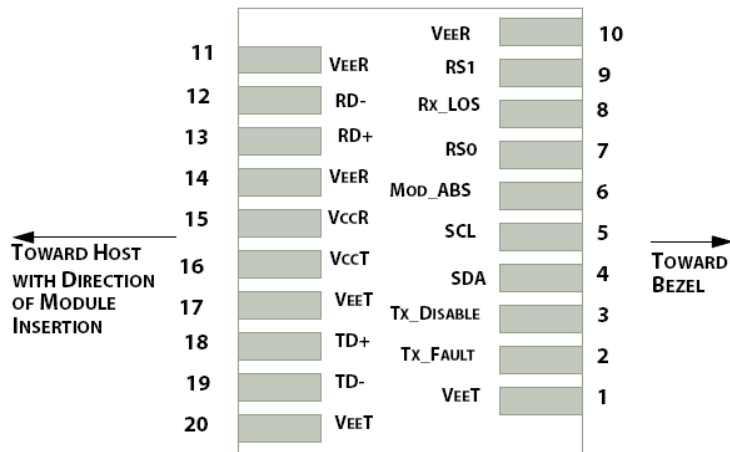
Receiver Electro-Optical Interface

V_{CC}=3.15V to 3.46V, T_{OP}= -10°C to 70°C

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate	DR	9.953	10.3125	10.50	Gb/s	
Receiver Sensitivity	P _{INMIN}	1270nm 20km		-15	dBm	1
		1330nm 20km		-15		
		1270nm 40km		-16		
		1330nm 40km		-16		
Maximum Input Power	P _{INMAX}			+0.5	dBm	1
Operating Center Wavelength	λ _C	1270nm 20km	1320	1330	1340	nm
		1330nm 20km	1260	1270	1280	
		1270nm 40km	1320	1330	1340	
		1330nm 40km	1260	1270	1280	
Receiver Reflectance	RR			-14	dB	
LOS De-Assert	LOS _D	1270nm 20km		-15	dBm	
		1330nm 20km		-15		
		1270nm 40km		-17		
		1330nm 40km		-17		
LOS Assert	LOS _A	-30			dBm	
LOS Hysteresis	LOS _{VHY}	0.5			dB	
Differential Data Output Voltage	V _{OUT, PP}	500		800	mV	
Data Output Rise/Fall Time (20%~80%)	T _R /T _F			30	ps	
Receiver LOS Signal Output Voltage-Low	LOS _{V_L}	V _{EE}		0.5	V	
Receiver LOS Signal Output Voltage-High	LOS _{V_H}	2.4		V _{CC}	V	

Notes: 1. Measured with a PRBS 2³¹-1 test pattern @ 10.3125Gbps BER <10⁻¹²

Pin Assignment



Host PCB SFP+ pad assignment top view

Pin Description

Pin	Name	Function / Description
1	VeeT	Transmitter Ground
2	TX_Fault	Transmitter Fault Indication (1)
3	TX_Disable	Transmission Disable – Module disables on high or open (2)
4	SDA	2-wire Serial Interface Data Line (SDA: Serial Data Signal) (3)
5	SCL	2-wire Serial Interface Clock (SCL: Serial Clock Signal) (3)

6	Mod_ABS	Module Absent, connected to VeeT or VeeR in the module (3)
7	RS0	Rate Select 0, optionally controls SFP+ module receiver (5)
8	Rx_LOS	Receiver Loss of Signal Indication (4)
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter (5)
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inverse Received Data output, Differential LVPECL, AC coupled
13	RD+	Receiver Non-Inverted Data output, Differential LVPECL, AC coupled
14	VeeR	Receiver Ground
15	VccR	Receiver 3.3V Power Supply
16	VccT	Transmitter 3.3V Power Supply
17	VeeT	Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input, Differential LVPECL, AC coupled
19	TD-	Transmitter Inverted Data Input, Differential LVPECL, AC coupled
20	Veet	Transmitter Ground

Note1: TX Fault is open collector/drain output which should be pulled up externally with a 4.7K~ 10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

Note2: TX Disable input is used to shut down the laser output per the state table below. It is pulled up within the module with a 4.7K~10KΩ resistor.

1)Low(0~0.8V): Transmitter on; 2)Between(0.8V and 2V): Undefined; 3)High (2.0~ VccT): Transmitter Disabled; 4)Open: Transmitter Disabled

Note3: These are the module definition pins. They should be pulled up with a 4.7K~10KΩ resistor on the host board to supply less than VccT+0.3V or VccR+0.3V. Mod-ABS is grounded by the module to indicate that the module is present.

Note4: LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K~10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V. When high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

Note5: No connect on this module.

Digital Diagnostic Functions

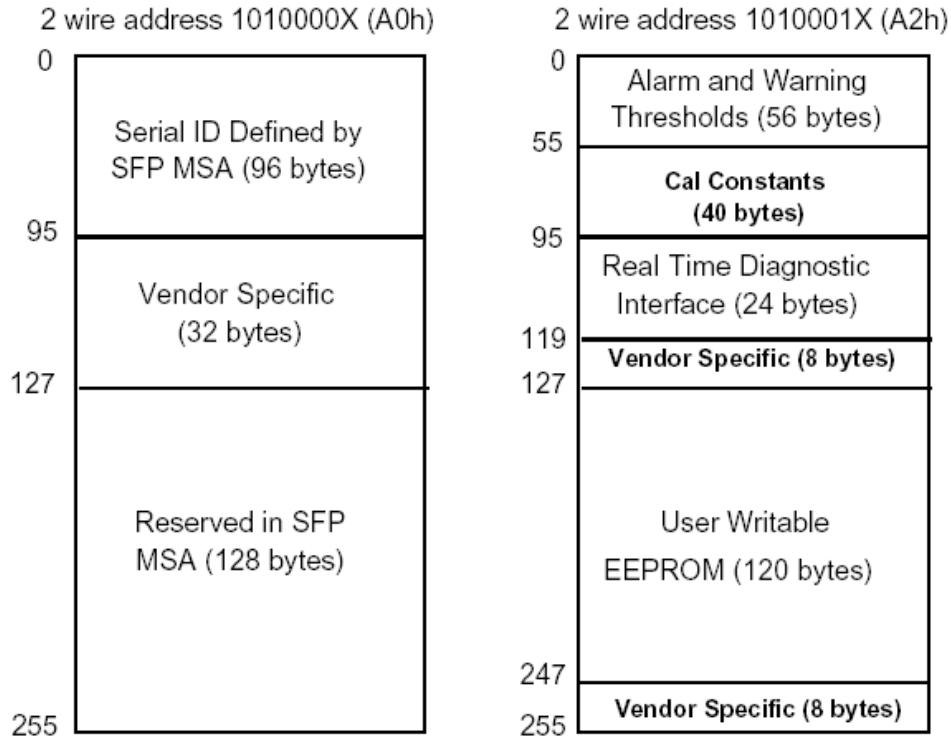
As defined by the SFP MSA (SFF-8472) Lantech's SFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

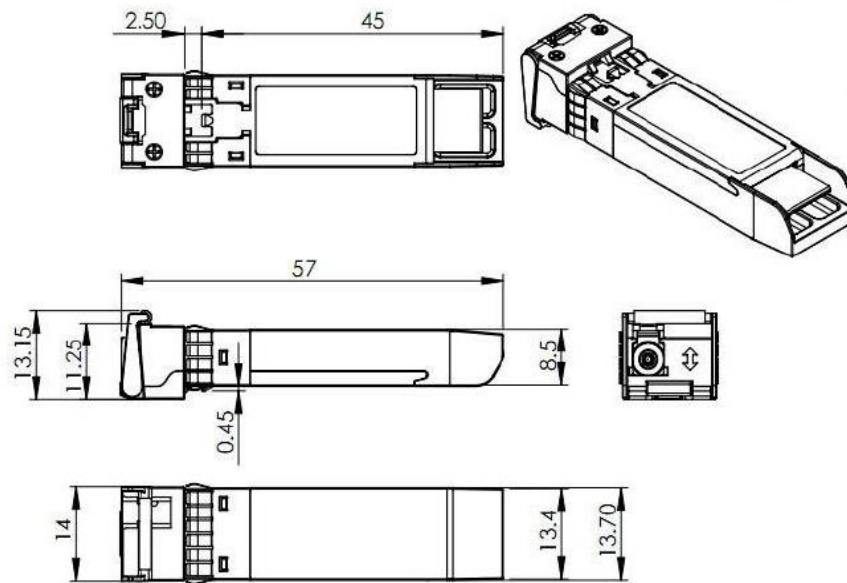
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Controller (DDC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA pin) 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 Diagnostic Memory Map



Digital Diagnostic Monitoring Characteristics

Parameter	Accuracy	Unit	Note
Temperature	±3	°C	
Supply Voltage	±0.1	V	
TX Bias Current	±5	mA	
TX Output Power	±3	dB	
RX Received Optical Power	±3	dB	

DIMENSIONS (unit=mm)
*All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified
ORDERING INFORMATION

Part Number	TX	RX	Link	DDM	Temp.
8330-200D	1270nm	1330nm	20km	Yes	-10~70°C
8330-200D-E	1270nm	1330nm	20km	Yes	-40~85°C
8330-201D	1330nm	1270nm	20km	Yes	-10~70°C
8330-201D-E	1330nm	1270nm	20km	Yes	-40~85°C
8330-202D	1270nm	1330nm	40km	Yes	-10~70°C
8330-202D-E	1270nm	1330nm	40km	Yes	-40~85°C
8330-203D	1330nm	1270nm	40km	Yes	-10~70°C
8330-203D-E	1330nm	1270nm	40km	Yes	-40~85°C

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