

Mini-GBIC (SFP)

1Gbps Gigabit Ethernet/ 1000Base-X/ Fiber Channel SFP Transceiver

- Distance: 0.5km, 2km, 10km, 30km, 40km, 50km, 60km, 80km, 120km
- Standard Operating Temperature: -10°C ~ 70°C
- Wide Operating Temperature: -40°C ~ 85°C



OVERVIEW

Lantech 1Gbps Small Form Factor Pluggable (SFP) transceiver module series is specifically designed for the high performance integrated duplex data link over single-mode or multi-mode optical fiber. These transceiver modules are compliant with the SFP

Multisource Agreement (MSA). With the hot-swap ability, these modules offer an easy way to be installed into SFP MSA compliant ports at any time without the interruption of the host equipments operating online.

FEATURES & BENEFITS

- SFP Multi-Source Agreement
- Serial ID functionality support
- 1Gbps Gigabit Ethernet compliant
- Single +3.3V Power Supply
- LC duplex receptacle
- Class 1 laser safety standard IEC 60825 compliant
- Low power dissipation

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	Tc	-10		70	°C	
Supply Voltage	Vcc	3.1	3.3	3.5	V	
Supply Current	0.5km	I _{TX} + I _{RX}		160	300	mA
	2km			160		
	10km			180		
	30km			180		
	40km			180		
	50km			180		
	60km			180		
	80km			180		
120km		180				

Transmitter Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Transmitter Differential Input Voltage	TD +/-	400		2400	mV	Max. 2000 for 50km	
Tx_Fault - High	VFault_H	2		Vcc	V		
Tx_Fault - Low	VFault_L	Vee		Vee+0.8	V		
Tx_Disable - High	VDisable_H	2		Vcc	V		
Tx_Disable - Low	VDisable_L	Vee		Vee+0.8	V		
Optical Output Power	Po	0.5km		-9.5	-4	dBm	1
		2km		-9	-1		1
		10km		-9.5	-3		2
		30km	1	-2	+3		2
		40km	1	-2	+3		2
		50km		-4	+1		2
		60km		-2	+3		2
		80km		0	+5		2
		120km		0	+5		2
Optical Extinction Ratio	ER	9			dB		
Center Wavelength	λ_c	0.5km	830	850	860	nm	
		2km	1270	1310	1355		
		10km	1285	1310	1343		
		30km	1270	1310	1355		
		40km	1270	1310	1355		
		50km	1530	1550	1570		
		60km	1520	1550	1580		
		80km	1520	1550	1580		
		120km	1520	1550	1580		
Spectral Width	$\Delta\lambda$	0.5km			0.85	nm	
		2km			4		
		10km			2.8		
		30km			1		
		40km			1		
		50km			1		
		60km			1		
		80km			1		
		120km			1		
Optical Rise / Fall Timet	tr / tf			260	ps	3	
Total Contributed Jitter	TJ			227	ps		

Notes: 1. Coupling into a 50/125 μ m multimode fiber. 2. Coupling into a 9/125 μ m single-mode fiber. 3. 20% to 80% value

Receiver Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Receiver Differential Output Voltage	RD +/-	400		2000	mV		
Receiver Overload	PINMAX	0.5km			-3		1
		2km			-1		
		10km			-3		
		30km			-2		
		40km			-2		
		50km			-3		
		60km			-1		
		80km			-1		
		120km			-9		
Receiver Sensitivity	PINMIN	0.5km			-17	dBm	1
		2km			-19		
		10km			-20		
		30km			-23		
		40km			-23		
		50km			-23		
		60km			-23		
		80km			-24		
		120km			-30		
Operating Center Wavelength	λ_c	0.5km	770		860	nm	
		2km					
		10km					
		30km			1620		
		40km					
		50km	1260		1610		
		60km					
		80km			1620		
		120km					
Receiver Loss of Signal - TTL Low	PRX_LOSD	0.5km			-17.5	dBm	
		2km			-19		
		10km			-20		
		30km			-23		
		40km			-23		
		50km			-24		
		60km			-24		

	80km				-24	
	120km				-30	
Receiver Loss of Signal - TTL High		PRX_LOSA	-35			dBm
Receiver Loss of Signal - Hysteresis		PRX_LOSH	0.5			dB

Notes: 1. With BER better than or equal to 1×10^{-12} , measured in the center of the eye opening with $2^7 - 1$ PRBS

MTBF

	60% Confidence Level, 25°C		90% Confidence Level, 25°C	
	MTBF	FIT	MTBF	FIT
0.5km	813526	1229	325410	3073
2km	813526	1229	325410	3073
10km	813526	1229	325410	3073
30km	813526	1229	325410	3073
40km	813526	1229	325410	3073
50km	813526	1229	325410	3073
60km	813526	1229	325410	3073
80km	813526	1229	325410	3073
120km	813526	1229	325410	3073

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:

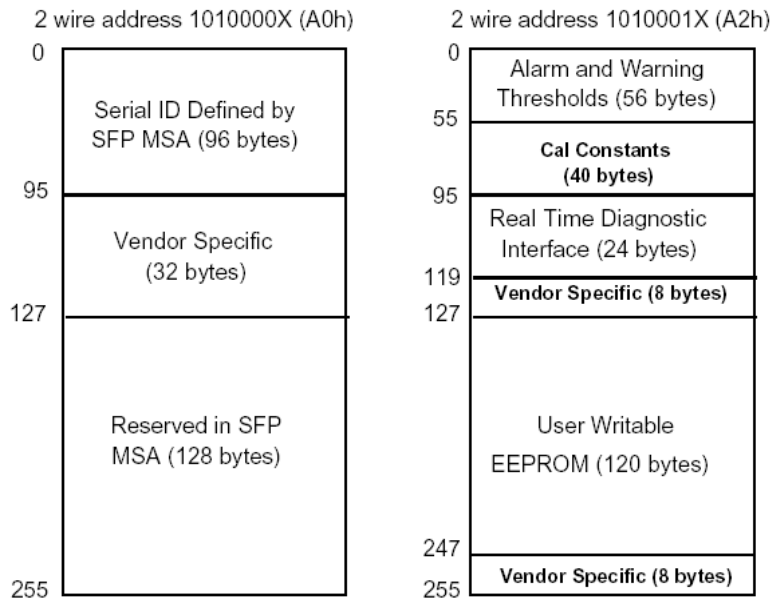
- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

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.

For more detailed information including memory map definitions, please see the SFP MSA (SFF-8472) Specification.

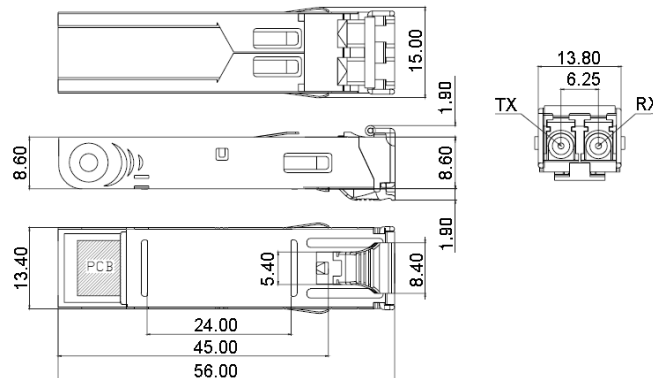
Digital Diagnostic Memory Map



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 ±0.2mm unless otherwise specified

ORDERING INFORMATION

Part Number	Wavelength	LD	IO	LOS	Mode	Link	Temp.
8330-162X	850 nm	VCSEL	AC/AC	TTL	Multi-mode	550m	-10~70°C
8330-162X-E	850 nm	VCSEL				550m	-40~85°C
8330-163X	1310 nm	FP				2km	-10~70°C
8330-163X-E	1310 nm	FP				2km	-40~85°C
8330-165X	1310 nm	FP			Single-mode	10km	-10~70°C
8330-165X-E	1310 nm	FP				10km	-40~85°C
8330-164	1310nm	DFB				30km	-10~70°C
8330-164-E	1310nm	DFB				30km	-40~85°C
8340-0591	1310 nm	DFB				40km	-10~70°C
8340-0591-E	1310 nm	DFB				40km	-40~85°C
8330-166	1550 nm	DFB				50km	-10~70°C
8330-166-E	1550 nm	DFB				50km	-40~85°C
8330-169	1550 nm	DFB				60km	-10~70°C
8330-169-E	1550 nm	DFB				60km	-40~85°C
8330-167	1550 nm	DFB				80km	-10~70°C
8330-167-E	1550 nm	DFB				80km	-40~85°C
8330-170	1550 nm	DFB				120km	-10~70°C
8330-170-E	1550 nm	DFB				120km	-40~85°C

All SFP P/N# ended with D are with DDM function

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