

1.25Gbps 1310nm 40km duplex SFP Transceiver BN-GLC-EX-SM

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Features

- ◆ Up to 1.25Gbps data rate
- ◆ Duplex LC receptacle optical interface compliant
- ◆ Single +3.3V power supply
- ◆ DDMI function available with internally calibrated mode
- ◆ Hot-pluggable
- ◆ Receiver loss of signal output
- ◆ Transmitter disable input
- ◆ International Class1 laser safety certified
- ◆ Operating temperature range: Commercial: -5°C~70°C Industrial: -40°C~85°C
- ◆ RoHS Compliant

Application

- ◆ Gigabit Ethernet
- ◆ 1x Fiber Channel
- ◆ Switch to Switch Interface
- ◆ Other Optical Links



Standard

- ◆ Compliant with SFP MSA (INF-8074i)
- ◆ Compliant with SFF-8472
- ◆ Compliant with IEEE 802.3z

Ordering Information

Part Number	Specifications					
	Package	Data Rate (Gbps)	Wavelength (nm)	Temperature (°C)	Reach (km)	
GTS-L1312-40C	SFP	1.25	1310	-5~70	40	N
GTS-L1312-40I	SFP	1.25	1310	-40~85	40	N
GTS-L1312-40DC	SFP	1.25	1310	-5~70	40	Y
GTS-L1312-40DI	SFP	1.25	1310	-40~85	40	Y

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	°C
Power Supply Voltage	VCC	0	3.6	V
Relative Humidity	RH	5	95	%

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Recommended Operating Conditions						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _c	-5		70	°C	GTS-L1312-40xC
		-40		85		GTS-L1312-40xI
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Data Rate			1.25		Gbps	
Fiber Length 9/125μm core SMF				40	km	

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Total Supply Current	ICC			300	mA	
Transmitter						
Transmitter Differential Input Voltage		400		2400	mV	
Tx_Fault Output Voltage - High	VOH	2.4		Vcc	V	LVTTL
Tx_Fault Output Voltage - Low	VOL	0		0.4	V	LVTTL
Tx_Disable Input Voltage - High	VIH	2		Vcc	V	LVTTL
Tx_Disable Input Voltage - Low	VIL	0		0.8	V	LVTTL
Input Differential Impedance		90	100	110	Ω	

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver						
Receiver Differential Output Voltage		600		1600	mV	
LOS Output Voltage - High	VOH	2.4		Vcc	V	LVTTL
LOS Output Voltage - Low	VOL	0		0.4	V	LVTTL
Output Differential Impedance		90	100	110	Ω	

Optical Transmitter Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Output Power	POUT	-5		0	dBm	
Center Wavelength	λ _c	1260	1310	1360	nm	
Spectral Width	Δλ			3.5	nm	
Extinction Ratio	ER	9			dB	
Transmitter OFF Power	POFF			-45	dBm	
Jitter P-P	T _j			0.1	UI	
Output Eye Diagram	Complies with IEEE 802.3z					

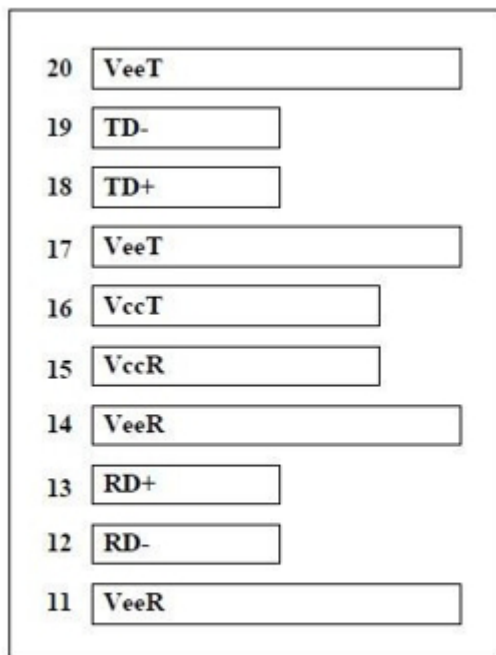
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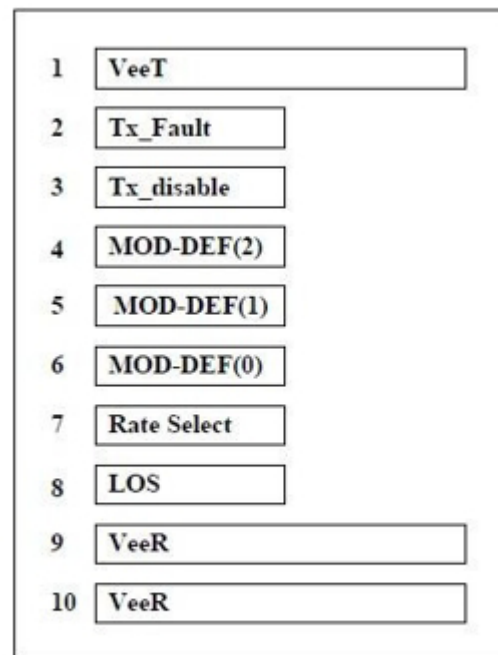
Optical Receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Center Wavelength	λ_c	1260		1610	nm	
Receiver Sensitivity	PSEN			-24	dBm	1
Input Saturation Power (Overload)	PSAT	0			dBm	
LOS De-assert Level	LOSD			-25	dBm	
LOS Assert Level	LOSA	-38			dBm	
LOS hysteresis	HYS	0.5		6	dB	

Note 1. Measured with PRBS27-1 pattern, @1.25Gbps, ER=9dB, BER=1x10-12.

Pin Definition



Top of Board



Bottom of Board

As Viewed Through Top of Board

Pin No	Symbol	Name/Description	Power Seq.	Notes
1	VeeT	Transmitter Ground	1st	
2	TX_Fault	Transmitter Fault Indication, Logic 1 indicates Transmitter Fault.	3rd	1
3	TX_Disable	Transmitter Disable, Transmitter disables on high or open.	3rd	2
4	MOD-DEF(2)	Module Definition 2. Data line for two wire Serial ID.	3rd	3
5	MOD-DEF(1)	Module Definition 1. Clock line for two wire Serial ID.	3rd	3 ⁴

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6	MOD-DEF(0)	Module Definition 0. Grounded within the module.	3rd	3
7	Rate Select	Not Connected	3rd	
8	LOS	Loss of Signal indication. Logic 1 indicates Loss of Signal.	3rd	4
9	VeeR	Receiver Ground	1st	
10	VeeR	Receiver Ground	1st	
11	VeeR	Receiver Ground	1st	
12	RD-	Inverse Received Data Out, AC coupled	3rd	
13	RD+	Received Data Out, AC coupled	3rd	
14	VeeR	Receiver Ground	1st	
15	VccR	Receiver Power	2nd	
16	VccT	Transmitter Power	2nd	

Pin No	Symbol	Name/Description	Power Seq.	Notes
17	VeeT	Transmitter Ground	1st	
18	TD+	Transmit Data In, AC coupled	3rd	
19	TD-	Inverse Transmit Data In, AC coupled	3rd	
20	VeeT	Transmitter Ground	1st	

Note 1. TX Fault is open collector/drain output which should be pulled up externally with a 4.7k - 10kΩ resistor on the host board. Pull up voltage between 2.0V and VccT/R+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.

Note 2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k - 10kΩ resistor. It's states are:

Low (0 - 0.8V): Transmitter on
 (0.8 - 2.0V): Undefined
 High (2.0 - 3.465V): Transmitter Disabled
 Open: Transmitter Disabled

Note 3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k - 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

Mod-Def 0 is grounded by the module to indicate that the module is present

Mod-Def 1 is the clock line of two wire serial interface for serial ID

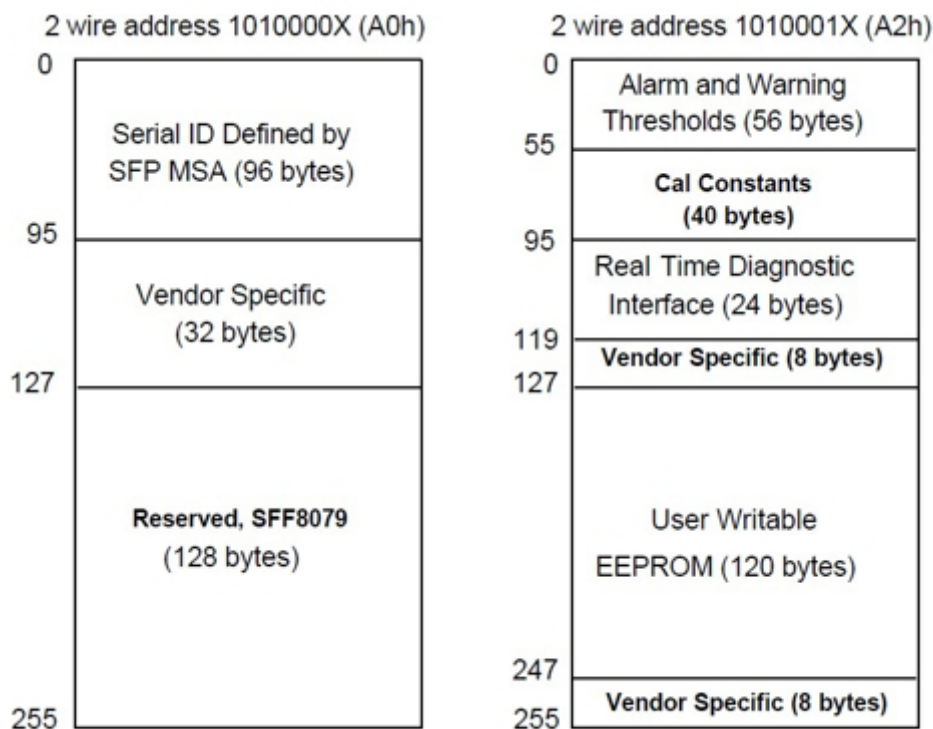
Mod-Def 2 is the data line of two wire serial interface for serial ID

Note 4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7k - 10kΩ resistor. Pull up voltage between 2.0V and VccT/R+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.

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The schematic diagram illustrates the internal connections of an SFP module. It features a **Protocol IC** on the left, which interfaces with a **SerDes IC** and a **PLD/PAL**. The **SerDes IC** is connected to a **Laser Driver** and an **Amplifier**. The **Laser Driver** is connected to a **Laser Diode**, and the **Amplifier** is connected to a **Photo Diode**. The **PLD/PAL** is connected to an **EEPROM** via **Mod def 2**, **Mod def 1**, and **Mod def 0** signals. The diagram also shows power supply rails (**VCC**, **VccT**, **VccR**), control signals (**Tx_Disable**, **Tx_Fault**, **Rx_LOS**), and various passive components like resistors (**RES1**, **10K**, **100 Ohm**) and capacitors (**10uF**, **0.1uF**). A note at the bottom states: *** Depends on SerDes IC used**.

Digital Diagnostic Memory Map



EEPROM Serial ID Memory Contents

The optical transceiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP transceiver. 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.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 - 95 at wire serial bus address A2h. The digital diagnostic memory map specific data fields define as following.

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Package Outline

Dimensions are in millimeters. All dimensions are ± 0.1 mm unless otherwise specified. (Unit: mm)

