NS-SFP-W35S20D

1.25Gbps SFP Bi-Directional Transceiver, LC 20km
1310nm TX / 1550 nm RX

Features

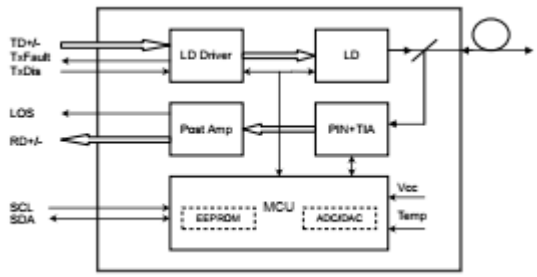
Dual data-rate of 1.25Gbps/1.063Gbps operation
1310nm FP laser and PIN photodetector for 20km transmission
Compliant with SFP MSA and SFF-8472 with simplex LC receptacle
Digital Diagnostic Monitoring:
Internal Calibration or External Calibration
Compatible with SONET OC-24-LR-1
Compatible with RoHS
+3.3V single power supply
Operating case temperature:
Standard : 0 to +70°C

Applications

Gigabit Ethernet
Fiber Channel
Switch to Switch interface
Switched backplane applications
Router/Server interface
Other optical transmission systems

Description

The SFP-BIDI transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 20km transmission distance with SMF.
The transceiver consists of three sections: a FP laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.
The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.



Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Table 2 - Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard	Tc	0	+70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc		300		mA
Data Rate	Gigabit Ethernet		1.25		Gbps

Optical and Electrical Characteristics

Table 3 - Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit
Transmitter					
Centre Wavelength	λc	1260	1310	1360	nm
Spectral Width (RMS)	Δλ		4		nm
Average Output Power	Pout	-9		-3	dBm
Extinction Ratio	ER		9		dB
Optical Rise/Fall Time (20%~80%)	tr/tf		0.26		ns
Data Input Swing Differential	V_{IN}	400		1800	mV
Input Differential Impedance	Z_{IN}	90	100	110	Ω
TX Disable	Disable	2.0		Vcc	V
Enable	0	0		0.8	V
TX Fault	Fault	2.0		Vcc	V
Normal		0		0.8	V
Receiver					
Centre Wavelength	λc	1480	1550	1580	nm
Receiver Sensitivity			-23		dBm
Receiver Overload			-3		dBm
LOS De-Assert	LOS_D		-24		dBm
LOS Assert	LOS_A		-35		dBm
LOS Hysteresis		1		4	dB
Data Output Swing Differential	Vout	400		1800	mV
LOS	High	2.0		Vcc	V
Low	Low	0		0.8	V

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2_7-1 test pattern @1250Mbps, BER ≤$1\times10_{-12}$.
4. Internally AC-coupled.

Timing and Electrical

Table 4 - Timing and Electrical

Parameter	Symbol	Typical	Unit
Tx Disable Negate Time	t_on	1	ms
Tx Disable Assert Time	t_off	10	μs
Time To Initialize, including Reset of Tx Fault	t_init	300	ms
Tx Fault Assert Time	t_fault	100	μs
Tx Disable To Reset	t_reset	10	μs
LOS Assert Time	t_loss_on	100	μs
LOS De-assert Time	t_loss_off	100	μs
Serial ID Clock Rate	f_serial_clock	400	KHz
MOD_DEF (0:2)-High	V_H	2	V
MOD_DEF (0:2)-Low	V_L	0.8	V

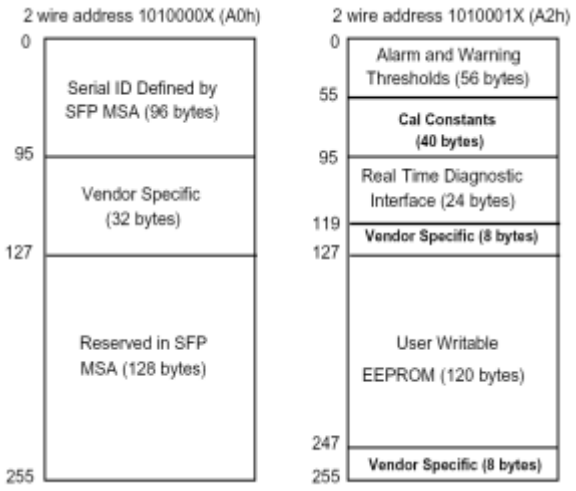
Diagnostics

Table 5 – Diagnostics Specification

Parameter	Range	Unit	Accuracy
Temperature	0 to +70	°C	±3°C
Voltage	3.0 to 3.6	V	±3%
Bias Current	0 to 100	mA	±10%
TX Power	-9 to -3	dBm	±3dB
RX Power	-23 to -3	dBm	±3dB

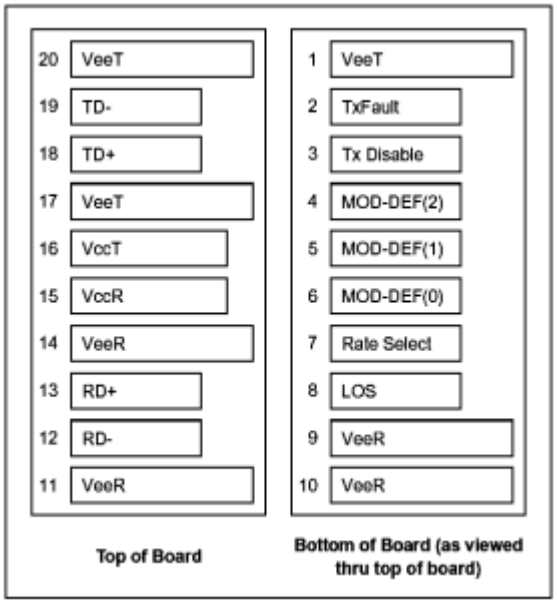
Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.
The digital diagnostic memory map specific data field defines as following.



Pin Definitions

Pin Diagram



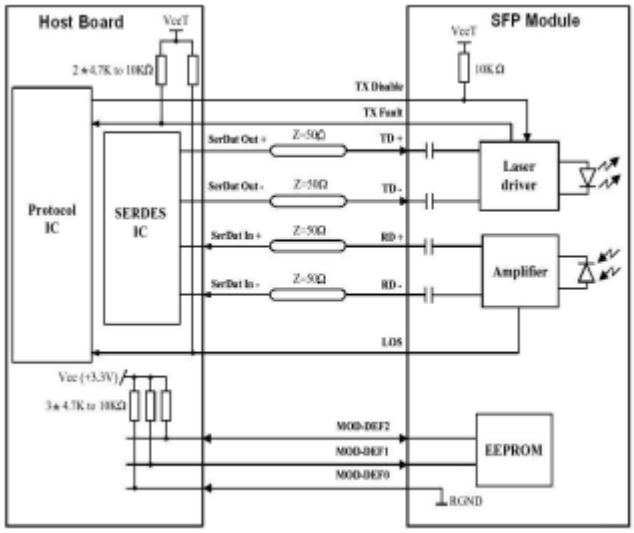
Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V_{EER}	Receiver ground	1	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V_{EET}	Transmitter Ground	1	

Notes:
Plug Seq.: Pin engagement sequence during hot plugging.
1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
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. Its states are:
Low (0 to 0.8V): Transmitter on
(>0.8V, < 2.0V): Undefined
High (2.0 to 3.465V): Transmitter Disabled
Open: Transmitter Disabled
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
4) LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
5) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit



Mechanical Dimensions