1.25Gbps SFP BIDI 1310/1550nm (1550/1310nm) 40km Transceiver With DDM Function

NNS-3512Bi-40D / NNS-3512Bi-40D

Features:

- Up to 1.25Gbps data rate
- Bi-Directional LC receptacle optical interface compliant
- Single +3.3V power supply
- Digital Diagnostic Monitoring function implemented
- External calibration
- Hot-pluggable
- AC coupling of PECL signals
- Receiver Loss of Signal Output
- Transmitter disable input
- Compliant with SFF-8472
- Compliant with IEEE802.3
- International Class 1 laser safety certified
- Operating temperature range: $0°C \sim +70°C$ or $-40°C \sim +85°C$
- RoHS Compliance

Application

- Fast Ethernet
- Router/Server Interface
- Switch to Switch Interface
- Switched Backplane Applications
- Other Optical Links

Recommended Operating Conditions:

Parameter	Symbol	Unit	Min.	Typ.	Max.	Notes
Storage Temperature	T_{STG}	°C	-40		85	
Operating Case Temperature	T_{OP}	°C	0		70	
			-40		85	
Power Supply Voltage	V_{CC}	V	3.1	3.3	3.5	
Data Rate		Gb/s		1.25		

Transmitter Specifications

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Average Output Optical Power	P_0	dBm	-5		-3	
Transmitter Off Optical Power	P_{OFF}	dBm			-45	
Output Center Wavelength	λ_{OUT}	nm	1260	1310	1360	
			1500	1550	1570	
Spectrum Width (RMS)	$\Delta\lambda$	nm			3.5	
					1	
Side Mode Suppression Ratio	SMSR	dB	30			
Extinction Ratio	ER	dB	9			
Jitter P-P	T_J	UI			0.1	Note 1
Optical Eye Diagram	Compliant with IEEE Std 802.3					

Note 1: Measured at 1.25Gbps PRBS2^{23}-1.

Electrical Characteristics

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Total Supply Current	I_{CC}	mA	-	-	300	
Transmitter						
Single Ended Data Input Swing	V_{PP}	mV	200	-	1200	
Differential Input Impedance	Z_{IN}	ohm	80	100	120	
Tx_Fault Output Voltage- High	V_{OH}	V	2.0	-	Vcc	
Tx_Fault Output Voltage- Low	V_{OL}	V	0	-	0.8	
Tx_Dis Input Voltage- High	V_{IH}	V	2.0	-	Vcc	
Tx_Dis Input Voltage- Low	V_{IL}	V	0	-	0.8	
Receiver						
Single Ended Data Output Swing	V_{PP}	mV	300	-	600	

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
LOS Output Voltage- High	V_{LOSH}	V	2	-	-	
LOS Output Voltage- Low	V_{LOSL}	V	-	-	0.8	

Receiver Specifications

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Output Center Wavelength	λ_{IN}	nm	1500	1550	1570	
			1260	1310	1360	
Sensitivity	Sen	dBm			-23	Note 1

Parameter	Symbol	Units	Min.	Typ.	Max.	Notes
Saturation Input Optical Power	Sat	dBm	-3			
LOS Assert Level	LOSA	dBm	-39			
LOS Deassert Level	LOSD	dBm			-24	
LOS Hysteresis	HYS	dB	0.5		6	

Note 1: Measured with PRBS2^{23}-1 pattern, @1.25Gbps, ER=9dB, BER=1x10^{-12}.

Pin Definitions
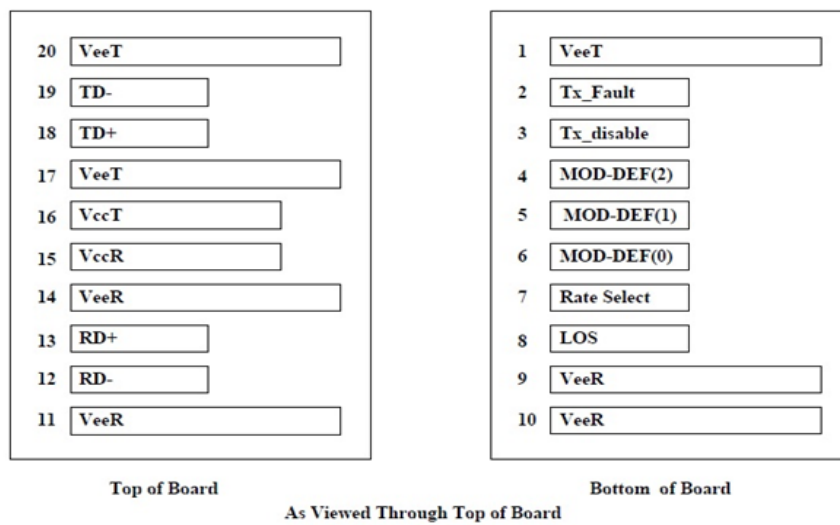
Pin#	Name	Function
1	VeeT	TRANSMITTER GROUND
2	TX Fault	TRANSMITTER FAULT INDICATION, LOGIC 1 INDICATES TRANSMITTER FAULT.
3	TX Disable	Transmitter Disable, Transmitter disables on high or open.
4	MOD-DEF(2)	Module Definition 2. Data line for two wire Serial ID.
5	MOD-DEF(1)	Module Definition 1. Clock line for two wire Serial ID.
6	MOD-DEF(0)	Module Definition 0. Grounded within the module.
7	Rate Select	NOT CONNECTED
8	LOS	Loss of Signal indication. Logic 1 indicates Loss of Signal.
9	VeeR	RECEIVER GROUND
10	VeeR	RECEIVER GROUND
11	VeeR	RECEIVER GROUND
12	RD-	Inverse Received Data Out, AC coupled

Pin#	Name	Function
13	RD+	Received Data Out, AC coupled
14	VeeR	RECEIVER GROUND
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	TRANSMITTER GROUND
18	TD+	Transmit Data In, AC coupled
19	TD-	Inverse Transmit Data In, AC coupled
20	VeeT	TRANSMITTER GROUND

Digital Diagnostic Functions

This SFP transceivers support the 2-wire serial communication protocol as defined in the SFP MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h).

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. 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.