

1.25Gbps SFP BIDI 1310/1550nm (1550/1310nm) 20km Transceiver With DDM Function

NNS-3512Bi-20D / NNS-3512Bi-20D

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 ~+70°C or -40°C ~+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 PRBS²³-1.

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 | |

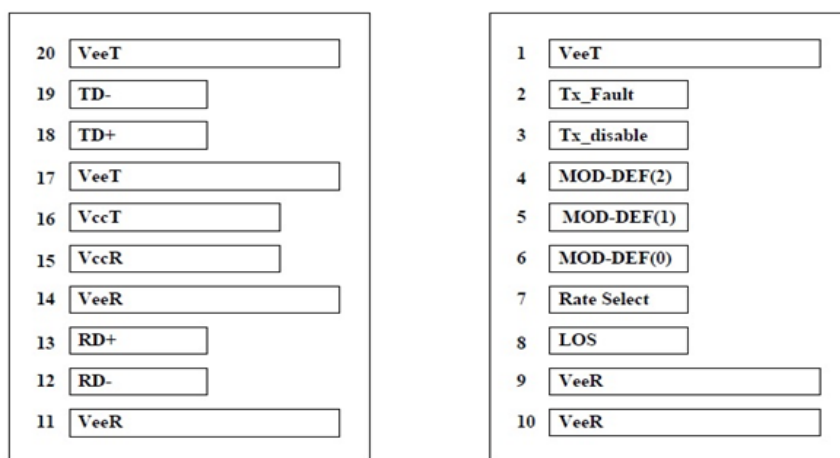
Receiver Specifications

| 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 PRBS²³-1 pattern, @1.25Gbps, ER=9dB, BER=1x10⁻¹².

Pin Definitions



Top of Board

Bottom of Board

As Viewed Through Top of Board

| 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.