

10GBASE-BX SFP+ 1270nmTX/1330nmRX Industrial 10km DOM Transceiver

SFP-10G-BX-I



Application

- 10GBASE-LR/LW
- 10G Ethernet
- OBSAI rates 3.072 Gb/s, 6.144Gb/s
- CPRI rates 2.4576 Gb/s, 4.9152Gb/s, 6.144Gb/s,9.8304 Gb/s

Features

- Compliant to SFP+ MSA
- Fully RoHS compliant
- Operating data rate 2.5 to 10.3Gb/s
- Transmission distance up to 10km
- 1270nm/1330nm DFB laser
- LC single connector
- Hot pluggable 20pin connector
- Wide temperature range
- Low power consumption <1W
- Single +3.3V±5% power supply
- Digital monitoring SFF-8472 Rev 10 compliant

Description

The 1270nm/1330nm 10Gb/s 10km bidirectional transceiver is designed to transmit and receive serial optical data links up from 2.5 to 10.3 Gb/s data rate over G.652 single mode fiber. The transceiver is compliant with SFF-8432, and applicable portions of SFF-8431. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Specifications

I. General Specifications

| Parameter | Symbol | Min | Typ. | Max | Unit |
|----------------------------|-----------|-----|------|------|------|
| Bit Rate | BR | 2.5 | | 10.3 | Gb/s |
| Max. Supported Link Length | L_{max} | | | 10 | km |

II. Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|---------------------------|--------|------|-----|----------|
| Storage Temperature Range | T_s | -40 | +85 | °C |
| Relative Humidity | RH | 5 | 95 | % |
| Supply Voltage | V | -0.3 | 4.0 | V_{CC} |

III. Electrical Characteristics

| Parameter | Symbol | Min | Typ. | Max | Unit | Ref. |
|----------------------------------|-------------|--------------|------|--------------|--------------|------|
| Supply Voltage | V_{CC} | 3.14 | 3.3 | 3.46 | V | |
| Supply Current | I_{CC} | | | 290 | mA | |
| Power Consumption | P_C | | | 1.0 | W | |
| Transmitter | | | | | | |
| Input Differential Impedance | R_{IN} | 80 | 100 | 120 | Ω | 1 |
| Differential Data Input Swing | V_{IN} | 180 | | 700 | mVp-p | |
| Transmit Disable Voltage | V_{DIS} | 2 | | V_{CCHOST} | V | |
| Transmit Enable Voltage | V_{EN} | $V_{EE}-0.3$ | | $V_{EE}+0.4$ | V | |
| Transmit Fault Assert Voltage | V_{FA} | 2 | | V_{CCHOST} | V | |
| Transmit Fault De-Assert Voltage | V_{FDA} | V_{EE} | | $V_{EE}+0.4$ | V | |
| Receiver | | | | | | |
| Differential Data Output Swing | V_{OD} | 450 | 600 | | 850 | |
| Output Rise Time | t_{RISE} | 28 | | | | |
| Output Fall Time | t_{FALL} | 28 | | | | |
| LOS Fault | V_{LOSFT} | 2 | | | V_{CCHOST} | |
| LOS Normal | V_{LOSNR} | V_{EE} | | | $V_{EE}+0.8$ | |

IV. Optical Characteristics

(1270nm DFB & PIN/TIA)

| Parameter | Symbol | Unit | Min | Typ | Max | Ref. |
|--|-----------------------|-------|------|------|---|------|
| Transmitter (Tx) | | | | | | |
| Data Rate | | Gbps | 2.5 | | 10.3 | |
| Transmission Distance | L | km | | | 10 | |
| Center Wavelength | λ | nm | 1260 | 1270 | 1280 | |
| Spectral Width(-20dB) | $\Delta\lambda_{rms}$ | nm | | | 1 | 1 |
| SMSR | | dB | 30 | | | |
| Optical Output Power | PO | dBm | -8.2 | | 0.5 | 2 |
| Average Launch Power of OFFtransmitter | POFF | dBm | | | -30 | |
| Extinction Ratio | ER | dB | 5 | | | |
| Relative Intensity Noise | RIN | dB/Hz | | | -128 | |
| Optical Output Eye | | | | | Compliant with IEEE 802.3ae Optical Output Eye | |
| Receiver (Rx) | | | | | | |
| Data Rate | | Gbps | 2.5 | | 10.3 | |
| Center Wavelength | λ_C | nm | 1320 | 1330 | 1340 | |
| Receiver Sensitivity | R_{SEN} | dBm | | | -14.4 | 3 |
| Receiver Overload | | dBm | 0.5 | | | 3 |
| Receiver Reflectance | R_{REFL} | dB | | | -12 | |

| | | | | | | |
|----------------|-----------------|------|-----|-----|--|-----|
| LOS | Optical Assert | LOSA | dBm | -30 | | |
| | Optical Dessert | LOSD | dBm | | | -15 |
| LOS Hysteresis | - | dB | 0.5 | | | 6 |

(1330nm DFB & PIN/TIA)

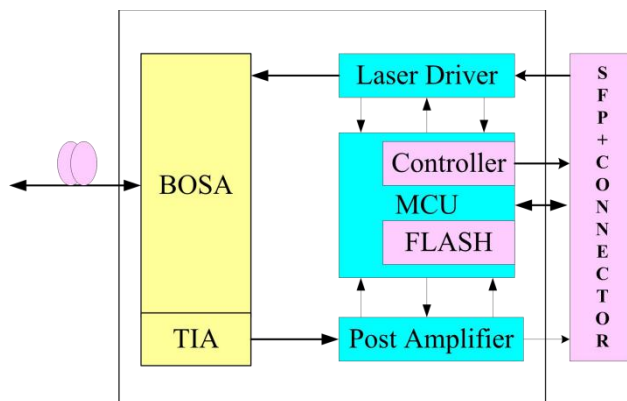
| Parameter | Symbol | Unit | Min | Typ | Max | Ref. |
|--|-----------------------|-------|------|------|---|------|
| Transmitter (Tx) | | | | | | |
| Data Rate | | Gbps | 2.5 | | 10.3 | |
| Transmission Distance | L | km | | | 10 | |
| Center Wavelength | λ | nm | 1320 | 1330 | 1340 | |
| Spectral Width(-20dB) | $\Delta\lambda_{rms}$ | nm | | | 1 | 1 |
| SMSR | | dB | 30 | | | |
| Optical Output Power | PO | dBm | -8.2 | | 0.5 | 2 |
| Average Launch Power of OFFTransmitter | POFF | dBm | | | -30 | |
| Extinction Ratio | ER | dB | 5 | | | |
| Relative Intensity Noise | RIN | dB/Hz | | | -128 | |
| Optical Output Eye | | | | | Compliant with IEEE 802.3ae Optical Output Eye | |

| Receiver (Rx) | | | | | | |
|-----------------------------|-------------|------|------|------|-------|---|
| Data Rate | | Gbps | 2.5 | | 10.3 | |
| Center Wavelength | λ_C | nm | 1260 | 1270 | 1280 | |
| Receiver Sensitivity | R_{SEN} | dBm | | | -14.4 | 3 |
| Receiver Overload | | dBm | 0.5 | | | 3 |
| Receiver Reflectance | R_{REFL} | dB | | | -12 | |

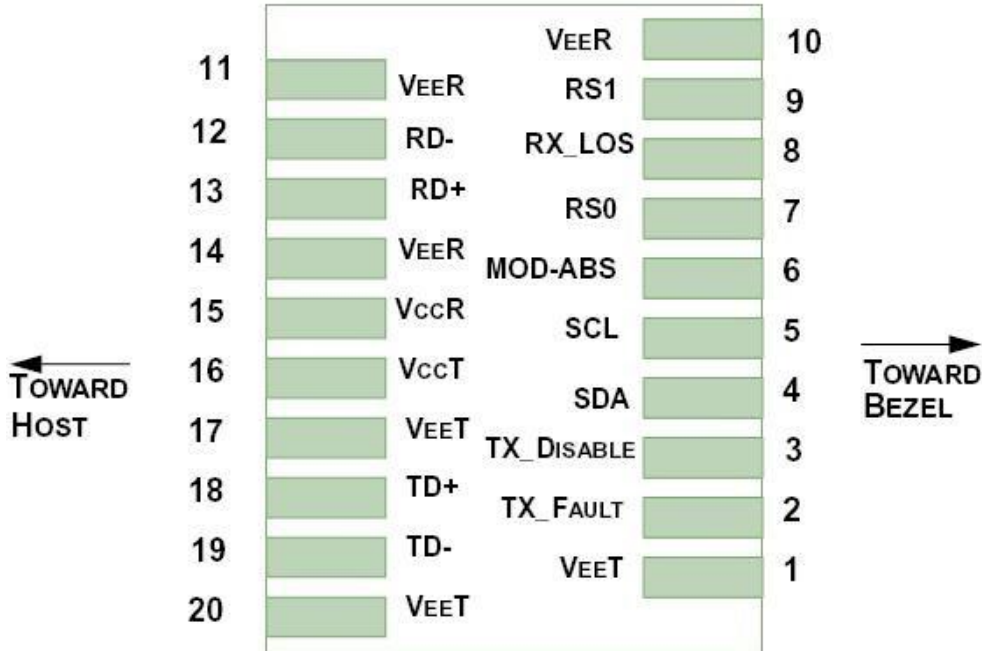
Notes:

1. Spectral width has to be defined over -20dB.
2. Minimum output optical level is at end of life.
3. Sensitivity for PRBS 231-1 and BER better than or equal to 10⁻¹².

V. Principle diagram



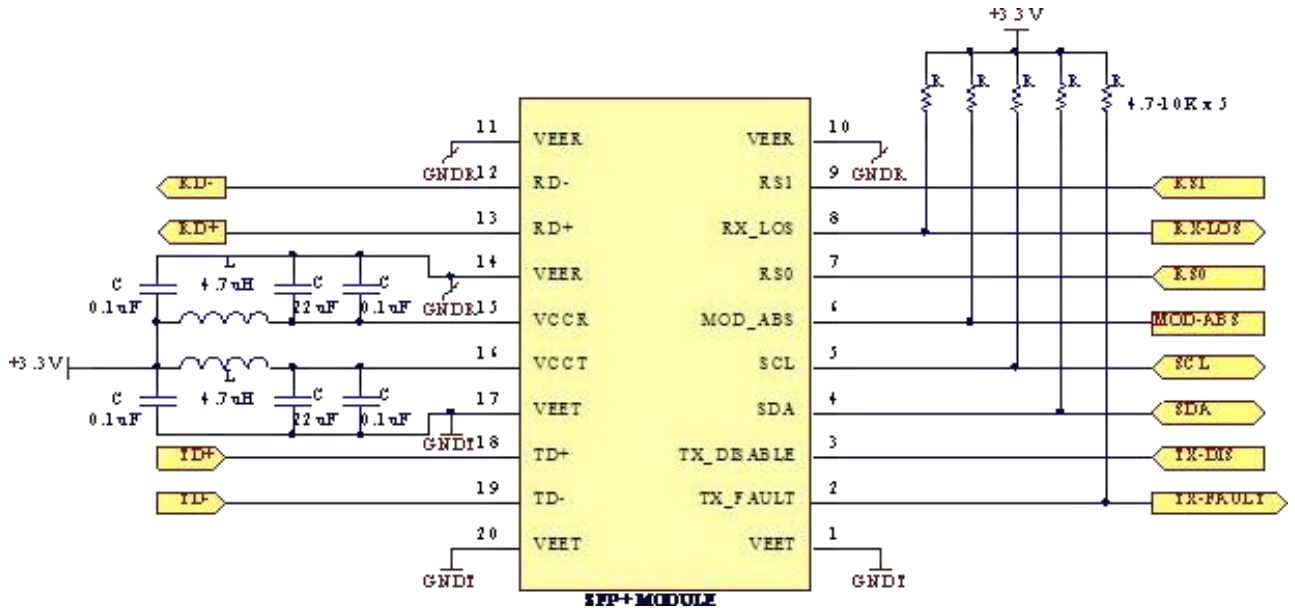
VI. Pin Description



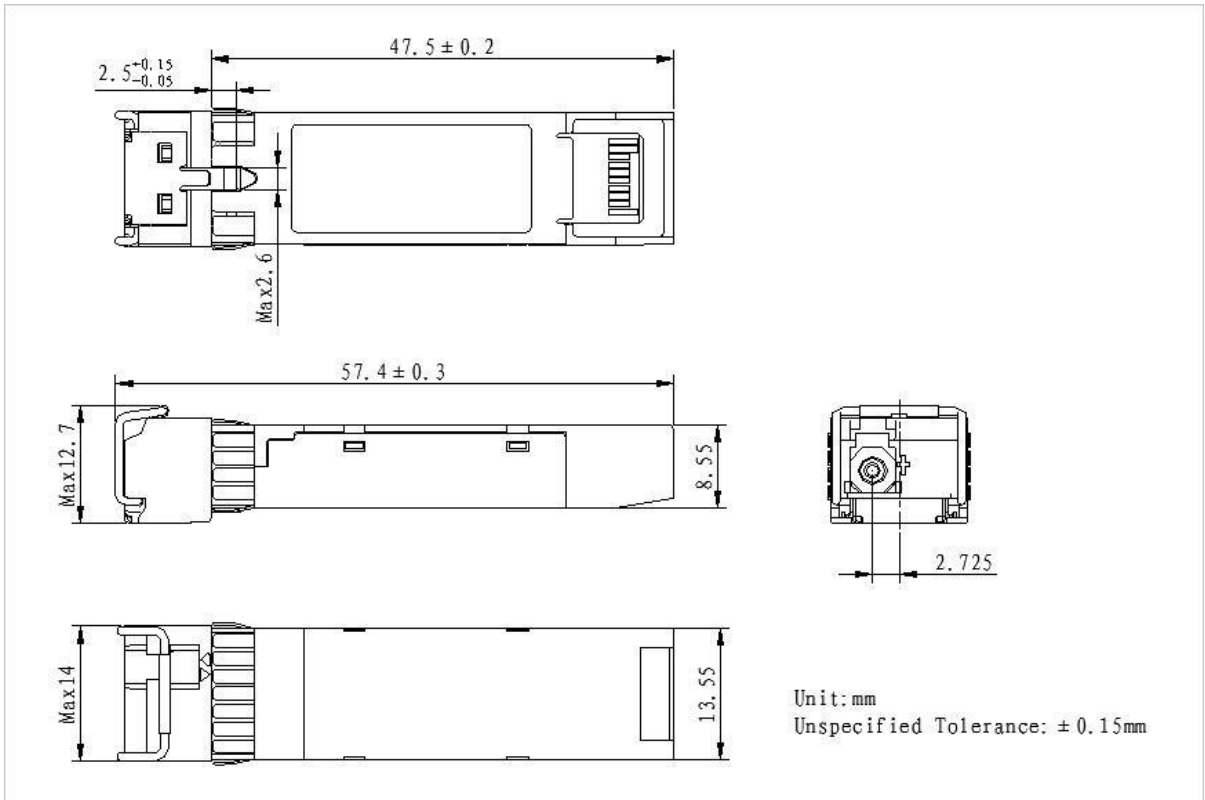
| Pin Num. | Symbol | Name | Description |
|----------|------------|---|--|
| 1,17,20 | VeeT | Transmitter Signal Ground | These pins should be connected to signal ground on the host board. |
| 2 | TX Fault | Transmitter Fault Out (OC) | Logic "1" Output = Laser Fault (Laser off before t_fault). Logic "0" Output = Normal Operation. This pin is open collector compatible, and should be pulled up to Host Vcc with a 10kΩ resistor. |
| 3 | TX Disable | Transmitter Disable In (LVTTTL) | Logic "1" Input (or no connection) = Laser off. Logic "0" Input = Laser on. This pin is internally pulled up to VccT with a 10 kΩ resistor. |
| 4 | SDA | Module Definition Identifiers | Serial ID with SFF 8472 Diagnostics. Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors. |
| 5 | SCL | | |
| 6 | MOD-ABS | | |
| 7 | RS0 | Receiver Rate Select (LVTTTL) Transmitter Rate Select (LVTTTL) | These pins have an internal 33kΩ pull-down to ground. A signal on either of these pins will not affect module performance. |
| 9 | RS1 | | |

| | | | |
|----------|------|------------------------------------|--|
| 8 | LOS | Loss of Signal Out (OC) | Sufficient optical signal for potential BER < 1×10^{-12} = Logic "0" Insufficient optical signal for potential BER < 1×10^{-12} = Logic "1" This pin is open collector compatible, and should be pulled up to Host Vcc with a 10k Ω resistor. |
| 10,11,14 | VeeR | Receiver Signal Ground | These pins should be connected to signal ground on the host board. |
| 12 | RD- | Receiver Negative DATA Out (CML) | Light on = Logic "0" Output Receiver DATA output is internally AC coupled and series terminated with a 50 Ω resistor. |
| 13 | RD+ | Receiver Positive DATA Out (CML) | Light on = Logic "1" Output Receiver DATA output is internally AC coupled and series terminated with a 50 Ω resistor. |
| 15 | VccR | Receiver Power Supply | This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3. Recommended power supply filter. |
| 16 | VccT | Transmitter Power Supply | This pin should be connected to a filtered +3.3V power supply on the host board. See Figure 3. Recommended power supply filter. |
| 18 | TD+ | Transmitter Positive DATA In (CML) | Logic "1" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100 Ω resistor. |
| 19 | TD- | Transmitter Negative DATA In (CML) | Logic "0" Input = Light on Transmitter DATA inputs are internally AC coupled and terminated with a differential 100 Ω resistor. |

VII. Principle diagram



VIII. Package Outline



Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.



Cisco ASR 9000 Series(A9K-MPA-1Y40GE)



ARISTA 7050S-64(DCS-7050S-64)



Juniper MX960



Brocade ICX 7750-26Q



Extreme Networks X670V VIM-40G4X



Mellanox M3601Q



Dell N4032F



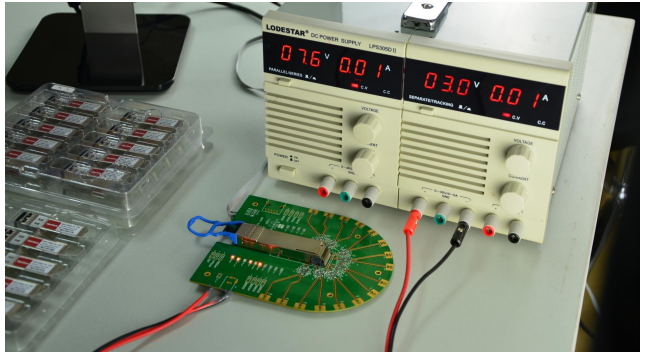
HP 5406R ZL2 V3(J9996A)



AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.



Our smart data system allows effective product management. Our in-house coding facility programs all of our parts to and quality control according to the unique serial number, standard OEM specs for compatibility on all major vendors and properly tracing the order, shipment and every part. systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.



With a comprehensive line of original-brand switches, we can The last test assured step to ensure our products to be shipped recreate an environment and test each optics in practical with perfect package. application to ensure quality and distance.

Order Information

| Part Number | Specifications | | | | | | | | | Application |
|-------------|----------------|------------------------|---------------|------------------|---------------|-------------|--------------|-------|--------|---------------------------------|
| | Package | Data rate | Laser | Optical Power | Detector | Sensitivity | Temp | Reach | Others | |
| RTXM228-461 | SFP+ | 2.5~10.3Gb/1270nm s | 1270nm DFB | -8.2~ +0.5dBm | 1330nm PIN | <-14.4dBm | -40~85oC | 10km | DDM | 10GBASE- LR/LWOBSAI/ CPRI |
| RTXM228-462 | SFP+ | 2.5~10.3Gb/1330nm s | 1330nm DFB | -8.2~ +0.5dBm | 1270nm PIN | <-14.4dBm | -40~85 oC | 10km | DDM | 10GBASE- LR/LWOBSAI/ CPRI |



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