



100G DUAL PORT FIBER BYPASS MODULE

Product Description

The 1310nm 100G Dual QSFP+ LR4 quad port bypass module is designed as alternative 100Gbps dual QSFP+ LR4 transceiver. Its innovated design able the fiber bypass function become selectable within single PCI card. The 1310nm 100G Dual QSFP+ LR4 quad port bypass module is design expressly for Intrusion Prevention System (IPS) provides complete visibility to network traffic, It also introduces a point of failure should the IPS lose power, cable fail or application freeze.

This interconnecting system include dual ways transceivers offers 4 channels and maximum bandwidth of 100Gbps. It integrates four data lanes in each direction with 100 Gbps aggregate bandwidth. Each lane can operate at 103.1 Gbps up to 10Km using Single Mode fiber(SMF). The optical interface uses a Dual-LC connector.



Features

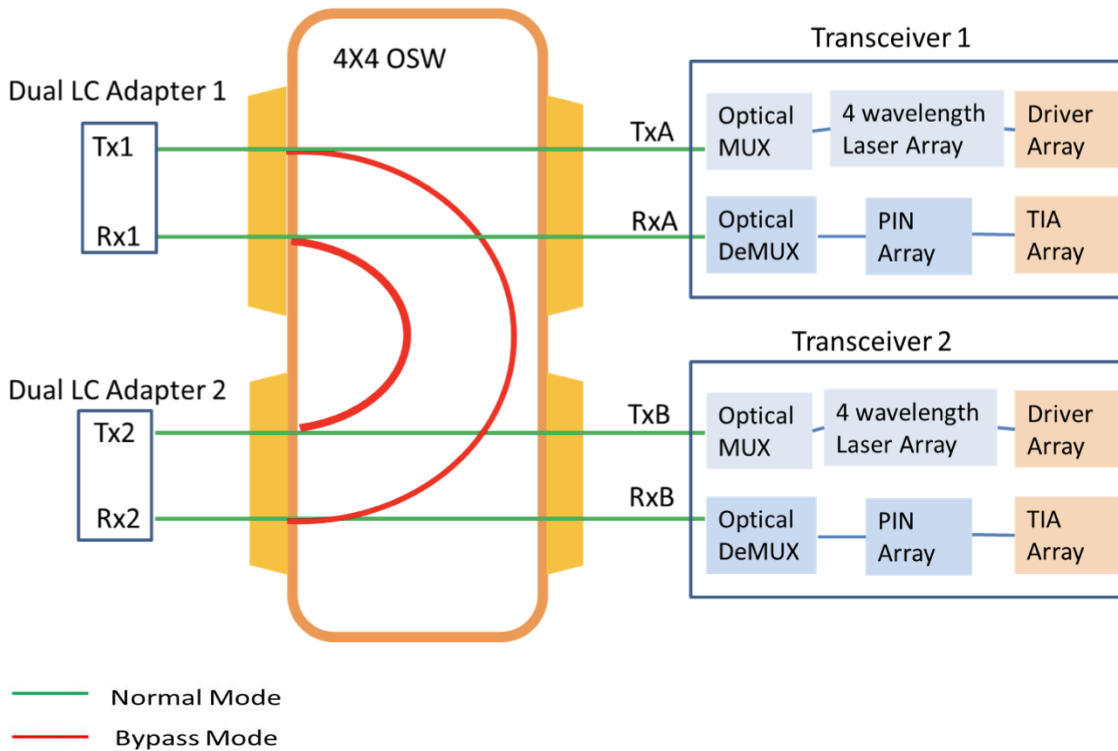
- Compliant with 100G Ethernet
- IEEE 802.3ba 100GBASE-LR4 standards
- Compliant with SFF-8436 QSFP+ specification Revision 3.5
- Unretimed XLPP electrical interface
- Utilizes a standard optical fiber with Dual-LC optical connector
- Link up to 10Km using Single Mode Fiber (SMF).
- Laser Class 1 Product with comply with Requirements of IEC 60825-1 and IEC 60825-2

Applications

- Client-side 100G Telecom connections
- STTA/SAS Storage
- In-Line Security
- Web Acceleration Appliances

100G Dual QSFP+ LR Dual Port Bypass Module – Optical Path

Bypass Mode Between 100G Segment 1 and 100G Segment 2



Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|--|------------|------|------|---------|------|------------|
| Storage Temperature | Ts | -40 | | 85 | °C | |
| 3.3V Supply Voltage | Vcc3(3.3V) | -0.5 | | 3.6 | V | Vcc3(3.3V) |
| Relative Humidity | — | 5 | | 85 | % | 2 |
| Data Input Voltage — Single Endes | | -0.5 | | Vcc+0.5 | V | |
| Transceiver Rx damage Threshold / Lane | DT | 3.4 | | | dBm | |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------------|-----------|------|----------|------|------|-------------|
| Case Operation Temperature | Ts | 0 | 40 | 70 | °C | 1 |
| 3.3V Supply Voltage | Vcc(3.3V) | 3.14 | 3.3 | 3.46 | V | Vcc (3.3V) |
| 3.3V Supply Current | Icc | | 1420 | 1500 | mA | Icc (Total) |
| Data Rate per Channel | bps | | 25.78125 | | Gbps | |

Note :

1. Consuming Temperature
2. Non Condensation



Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|--|------|--------------|----------------------|-------|------------|
| 3.3V Supply Voltage (Include Vcc1, Vcc2, VccTX1, VccTR2 VccRx1, VccRx2) | Vcc3(3.3V) | 3.14 | 3.3 | 3.46 | V | |
| Data Rate per Lane | bps | | 25.781 25 | | Gbps | |
| Control Input Voltage High | V _{IH} | 2.4 | | V _{cc} +0.3 | V | |
| Control Input Voltage Low | V _{IL} | -0.3 | | 0.8 | V | |
| Two Wire serial(TWS) Interface Clock Rate | | | | 400 | KHz | |
| Transmitter Differential input Impedance | Z _d | | 100 | | Ω | 1 |
| Receiver Differential Output Impedance | Z _d | | 100 | | Ω | 2 |
| Link distance on OM2 MMF | | 0.5 | | 30 | m | |
| Link distance on OM3 MMF | | 0.5 | | 100 | m | |
| Link distance on OM4 MMF | | 0.5 | | 150 | m | |
| Transmitter | | | | | | |
| TRx Power-On Initiation Time | | | | 2000 | mS | 3 |
| Data Differential Input Voltage Swing | V _{DIFF} | 200 | | 1200 | mV | 1 |
| Differential Input Voltage | V _{DT} | 0.5 | | 2.4 | V | 1 |
| Differential Input Return Loss | Per IEEE 802.3ba Section 86A.4.1.1 | | | | dB | 4 |
| Differential to Command Mode Input Return Loss | | 10 | | | dB | 4 |
| J2 Jitter Tolerance | Jt2 | 0.17 | | | UI | |
| J9 Jitter Tolerance | Jt9 | 0.29 | | | UI | |
| Eye Mask Coordinate : X1, X2, X3; Y1, Y2, Y3 | Specification Value : 0.3, 0.38, 0.45; 0.35, 0.41, 0.5 | | | | UI;mV | |
| Receiver | | | | | | |
| Data Differential Output Voltage Swing | V _{DIFF} | 200 | | 900 | mV | 2 |
| Output Transition Time 20% to 80% | Tr, Tf | 28 | | | pS | |
| Differential Output Return Loss | Per IEEE 802.3b Section 86A.4.2.1 | | | | dB | 4 |
| Differential to Command Mode Output Return Loss | Per IEEE 802.3ba Section 86A.4.2.2 | | | | dB | 4 |
| J2 Jitter Output | Jo2 | | | 0.42 | UI | |
| J9 Jitter Output | Jo9 | | | 0.95 | UI | |
| Eye Mask Coordinate : X1, X2, X3; Y1, Y2, Y3 | Specification Value : 0.28, 0.5, 0.5; 0.33, 0.33, 0.4 | | | | UI;mV | |
| Optical Bypass Switch | | | | | | |
| Optical Switch Supply Voltage | Vcc5(5V) | 4.5 | 5.0 | 5.5 | V | 3.3V to 5V |
| Operation Current (Total) | I _{SW} | | | 240 | mA | |
| Latching Voltage-High | V _{LATH} | 4.5 | 5.0 | 5.5 | V | |
| Latching Voltage-Low | V _{LATL} | 0 | | 0.8 | V | |



| | | | | | | |
|--|-----------|--|-----|-----|----------|------------|
| Latching Resistance | R_{LAT} | | 125 | | Ω | $\pm 10\%$ |
| Switching Time (Input Pulse $\geq 20\text{ms}$) | t_{ST} | | | 5.0 | msec | |

Note :

1. Internally AC couples and terminated to 100-Ohms differential load.
2. Internally AC coupled, but requires a 100-Ohms differential termination at or internal to Serializer/Deserializer.
3. "Initialization Time" is the time from when the supply voltage hot swap time reach and remain above the minimum "Recommended Operating Conditions" to the time when the module enables TWS access. The module at that point is fully functional.
4. Hit ratio= 5×10^{-5} per sample.

Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|--|-------------|---|------|--|-------|------|
| Transmitter | | | | | | |
| Lane center Wavelengths(range) | λ_c | | | 1294.53-1296.59 1299.02-1301.09 1303.54-1305.63 1308.09-1310.19 | nm | |
| Total Average Launch Power | P_{out} | | | 10.5 | dBm | |
| Average Launch Power, each lane | TXP_x | -4.3 | | 4.5 | dBm | 1,6 |
| Optical Extinction Ratio | ER | 4 | | | dB | |
| Output Optical Modulation Amplitude,per lane | $TxOMA$ | -1.3 | | 4.5 | dBm | 1 |
| Difference in Power between any Two Lanes in OMA | | | | 5 | dB | 1 |
| Transmitter and Dispersion Penalty,each lane | TDP | -2.3 | | 2.2 | dBm | |
| Relative Intensity Noise | RIN | | | -130 | dB/Hz | 7 |
| Disable Output Optical Power | P_{O-OFF} | | | -30 | dB | |
| Sidemode Suppression Ratio | SSRmin | 30 | | | dB | |
| Optical Return Loss Tolerance | | | | 20 | dB | |
| Transmitter Reflectance | R_t | | | -12 | dB | |
| Eye Mask Coordinate : X1, X2, X3; Y1, Y2, Y3 | | Specification Value : 0.25, 0.4, 0.45; 0.25, 0.28, 0.4 | | | UI | 2 |
| Receiver | | | | | | |
| Center Wavelength, each lane | λ_c | | | 1294.53-1296.59 1299.02-1301.09 1303.54-1305.63 1308.09-1310.19 | nm | |
| Damage threshold | | | | 3.4 | dBm | |
| Average Receiver Power, each lane | P_{in} | -10.6 | | 4.5 | dBm | 3,8 |
| Stressed Sensitivity (OMA) | | | | -6.8 | dBm | 3 |



| | | | | | | |
|--|-----------------|------|-----|-------|-----|---|
| Receiver Sensitivity (OMA),each lane | | | | -8.6 | dBm | |
| LOS Assert | P _A | -24 | | -13.6 | dBm | |
| LOS De-Assert | P _D | | | -11.6 | dBm | |
| LOS Hysteresis | | | 1.5 | | dB | |
| Total Average Receiver Power | P _{in} | | | 8.3 | dBm | |
| Receiver Power (OMA) per Lane | | | | 4.5 | dBm | |
| Return Loss | | | | -26 | dB | |
| Vertical eye closure penalty, per lane | | | | 1.9 | dB | |
| Receive electrical 3 dB upper cutoff frequency, per lane | | | | 31 | GHz | |
| Optical Bypass Switch | | | | | | |
| Center Wavelength | λ _c | 1260 | | 1335 | nm | |
| Insertion Loss (Normal Mode) | IRL | -4.0 | | 0 | dB | 4 |
| Insertion Loss (Bypass Mode) | IRL | -4.0 | | 0 | dB | 5 |
| Return Loss (Bypass Mode) | ORL | 50 | | | dB | |

Note :

1. Output power is power couples into a 9/125um Single-mode fiber (SMF).
2. Hit ratio= 5×10E-5 per sample.
3. Measured with 25.78125Gbps of PRBS-31 at 10-12 BER.
4. Normal Mode (Bypass Mode Off).
5. Bypass Mode (Normal Mode Off).
6. Minimum value is informative.
7. RIN is scaled by 10*log(10/4) to maintain SNR outside of transmitter.
8. Minimum value is informative, equals min TxOMA with infinite ER and max channel insertion loss.

