

SV-QSFP-40G-LR4F

40Gbps module with DDM, 40GBase aggregating 4 x CWDM ,SM , distance up to 10km



Features

- Compliant with 40G Ethernet IEEE802.3ba and 40GBASE-LR4 Standard
- QSFP+ MSA compliant
- Compliant with QDR/DDR Infiniband data rates
- Up to 11.2Gb/s data rate per wavelength
- 4 CWDM lanes MUX/DEMUX design
- Up to 10km transmission on single mode fiber (SMF)
- Operating case temperature: 0~70oC
- Maximum power consumption 3.5W
- LC duplex connector
- RoHS compliant

Applications

- 40GBASE-LR4 Ethernet Links
- Infiniband QDR and DDR interconnects
- Client-side 40G Telecom connections

Ordering Information

| Part number | Description |
|------------------|--|
| SV-QSFP-40G-LR4F | Starview QSFP+ 40Gbps module 40GBase aggregating 4 x duplex CWDM (1270/1290/ 1310/ 1330nm) wavelengths SM (LC) with Digital Diagnostic Monitoring (DDM), distance up to 10km, supporting 40GE, Infiniband QDR, DDR and OTU-3 |

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--------------------------------------|-----------------|------|------|------|------|
| Storage Temperature | T _s | -40 | | 85 | °C |
| Operating Case Temperature | T _{OP} | 0 | | 70 | °C |
| Power Supply Voltage | V _{CC} | -0.5 | | 3.6 | V |
| Relative Humidity (non-condensation) | RH | 0 | | 85 | % |
| Damage Threshold, each Lane | TH _d | 3.3 | | | dBm |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------------------|-----------------|-------|---------|-----------------|------|
| Operating Case Temperature | T _{OP} | 0 | | 70 | °C |
| Power Supply Voltage | V _{CC} | 3.135 | 3.3 | 3.465 | V |
| Data Rate, each Lane | | | 10.3125 | 11.2 | Gb/s |
| Control Input Voltage High | | 2 | | V _{CC} | V |
| Control Input Voltage Low | | 0 | | 0.8 | V |
| Link Distance with G652 | D | 0.002 | | 10 | km |

Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|--------------------|---------------------------|------|------|------------------|--------------------------------|
| Power Consumption | | | | 3.5 | W | |
| Supply Current | I _{CC} | | | 1.1 | A | |
| Transceiver Power-on Initialization Time | | | | 2000 | ms | 1 |
| Transmitter(each lane) | | | | | | |
| Single-ended Input Voltage Tolerance (Note 2) | | -0.3 | | 4.0 | V | Referred to TP1 signal common |
| AC Common Mode Input Voltage Tolerance (RMS) | | 15 | | | mV | |
| Differential Input Voltage Swing Threshold | | 50 | | | mV _{pp} | LOSA Threshold |
| Differential Input Voltage Swing | V _{in,pp} | 190 | | 700 | mV _{pp} | |
| Differential Input Impedance | Z _{in} | 90 | 100 | 110 | Ω | |
| Differential Input Return Loss | | See IEEE 802.3ba 86A.4.11 | | | dB | 10MHz-11.1GHz |
| J2 Jitter Tolerance | Jt2 | 0.17 | | | UI | |
| J9 Jitter Tolerance | Jt9 | 0.29 | | | UI | |
| Data Dependent Pulse Width Shrinkage (DDPWS) Tolerance | | 0.07 | | | UI | |
| Eye Mask Coordinates {X1, X2 Y1, Y2} | | 0.11, 0.31 95, 350 | | | UI mV | Hit Ratio = 5x10 ⁻⁵ |
| Receiver(each lane) | | | | | | |
| Single-ended Output Voltage | | -0.3 | | 4.0 | V | Referred to signal common |
| AC Common Mode Output Voltage (RMS) | | | | 7.5 | mV | |

| | | | | | |
|--------------------------------------|---------|----------------------------|-----|----------|-----------------------------------|
| Differential Output Voltage Swing | Vout,pp | 300 | 850 | mVpp | |
| Differential Output Impedance | Zout | 90 | 100 | 110 | ohm |
| Termination Mismatch at 1MHz | | | | 5 | % |
| Differential Output Return Loss | | See IEEE 802.3ba 86A.4.2.1 | | dB | 10MHz-11.1GHz |
| Common Mode Output Return Loss | | See IEEE 802.3ba 86A.4.2.2 | | dB | 10MHz-11.1GHz |
| Output Transition Time | | 28 | | ps | 20% to 80% |
| J2 Jitter Output | Jo2 | | | 0.42 | UI |
| J9 Jitter Output | Jo9 | | | 0.65 | UI |
| Eye Mask Coordinates {X1, X2 Y1, Y2} | | 0.29, 0.5 150, 425 | | UI mV | Hit Ratio = 5x10 ⁻⁵ |

Note(1): Power-on initialization time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fully functional.

Note(2): The single ended input voltage tolerance is the allowable range of the instantaneous input signals

Optical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|----------------------|-------------------------------|------|--------|-------|-----------------|
| Wavelength Assignment | L0 | 1264.5 | 1271 | 1277.5 | nm | |
| | L1 | 1284.5 | 1291 | 1297.5 | nm | |
| | L2 | 1304.5 | 1311 | 1317.5 | nm | |
| | L3 | 1324.5 | 1331 | 1337.5 | nm | |
| Transmitter | | | | | | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Total Average Launch Power | P _T | | | 8.3 | dBm | |
| Average Launch Power, each Lane | P _{AVG} | -7 | | 2.3 | dBm | |
| Optical Modulation Amplitude (OMA), each Lane | P _{OMA} | -4 | | 3.5 | dBm | 1 |
| Difference in Launch Power between any Two Lanes (OMA) | P _{tx,diff} | | | 6.5 | dB | |
| Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane | OMA-TDP | -4.8 | | | dBm | |
| TDP, each Lane | TDP | | | 2.6 | dB | |
| Extinction Ratio | ER | 3.5 | | | dB | |
| Relative Intensity Noise | RIN | | | -128 | dB/Hz | 12dB reflection |
| Optical Return Loss Tolerance | TOL | | | 20 | dB | |
| Transmitter Reflectance | R _T | | | -12 | dB | |
| Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3} | | {0.25,0.4,0.45,0.25,0.28,0.4} | | | | |
| Average Launch Power OFF Transmitter, each Lane | P _{off} | | | -30 | dBm | |
| Receiver | | | | | | |
| Damage Threshold, each Lane | TH _d | 3.3 | | | dBm | 2 |
| Total Average Receiver Power | | | | 8.3 | | |

| | | | | | |
|--|----------------|-------|-------|-----|---|
| Average Power at Receiver Input, each Lane | | -13.7 | 2.3 | dBm | |
| Receiver Reflectance | R _R | | -26 | dB | |
| Receive Power (OMA), each Lane | | | 3.5 | dBm | |
| Receiver Sensitivity (OMA), each Lane | SEN | | -11.5 | dBm | |
| Stressed Receiver Sensitivity (OMA), each Lane | | | -9.6 | dBm | 3 |
| Difference in Receive Power between any Two Lanes (OMA) | Prx,diff | | 7.5 | dB | |
| LOS Assert | LOSA | -28 | | dBm | |
| LOS Deassert | LOSD | | -15 | dBm | |
| LOS Hysteresis | LOSH | 0.5 | | dB | |
| Receiver Electrical 3 dB upper Cutoff Frequency, each Lane | F _c | | 12.3 | GHz | |
| Conditions of Stress Receiver Sensitivity Test (Note 4) | | | | | |
| Vertical Eye Closure Penalty, each Lane | | | 1.9 | dB | |
| Stressed Eye J2 Jitter, each Lane | | | 0.3 | UI | |
| Stressed Eye J9 Jitter, each Lane | | | 0.47 | UI | |

Note(1): Even if the TDP < 0.8 dB, the OMA min must exceed the minimum value specified here.

Note(2): The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.

Note(3): Measured with conformance test signal at receiver input for BER = 1x10⁻¹².

Note(4): Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Digital Diagnostic Functions

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|---|--------------|------|------|------|----------------------|
| Temperature monitor absolute error | DMI_Temp | -3 | 3 | degC | Over operating temp |
| Supply voltage monitor absolute error | DMI_VCC | -0.1 | 0.1 | V | Full operating range |
| Channel RX power monitor absolute error | DMI_RX_Ch | -2 | 2 | dB | 1 |
| Channel Bias current monitor | DMI_Ibias_Ch | -10% | 10% | mA | Ch1-Ch4 |
| Channel TX power monitor absolute error | DMI_TX_Ch | -2 | 2 | dB | 1 |

Note(1): Due to measurement accuracy of different multi-mode fibers, there could be an additional +/- 1 dB fluctuation, or a +/- 3 dB total accuracy.