SV-QSFP-400G-PLR4

Features

- QSFP-DD MSA compliant
- Parallel 4 Optical Lanes
- 100G Lambda MSA 100G-LR specification compliant
- Up to 10km transmission on single mode fiber (SMF) with FEC
- Operating case temperature: 0 to 70℃
- 8x53.125Gb/s electrical interface (400GAUI-8)
- Data Rate 106.25Gbps (PAM4) per channel.
- Maximum power consumption 12W
- MPO- 12 connector
- RoHS compliant

Features

- 400G Ethernet
- Infiniband interconnects
- Datacenter Enterprise networking

Part number	Description
SV-QSFP-400G-PLR4	Starview QSFP56-DD 400Gbps module 400G-LR4 aggregating 4 x 100Gbps 1310nm SM (MPO 12 APC) with Digital Diagnostic Monitoring (DDM), distance up to 10km

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	TS	-40	85	degC	
Operating Case Temperature	TOP	0	70	degC	
Power Supply Voltage	VCC	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	0	85	%	
Damage Threshold, each Lane	THd	5.5		dBm	

Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Units	Notes
Operating Case Temperature	TOP	0		70	degC	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate, each Lane			26.5625		GBd	PAM4
Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio				$2.4x10^{-4}$		
Post-FEC Bit Error Ratio				$1x10^{-12}$		1
Link Distance	D	0.002		10	km	2

Notes:

1. FEC provided by host system.
2. FEC required on host system to support maximum transmission distance.

Electrical Characteristics

Parameter	Test Point	Min	Typical	Max	Units	Notes
Power Consumption				12	W	
Supply Current	Icc			3.64	A	
Transmitter (each Lane)						
Signaling Rate, each Lane	TP1		26.5625 ± 100 ppm		GBd	
Differential pk-pk Input Voltage Tolerance	TP1a	900			mVpp	1

Differential Termination Mismatch	TP1		10	%	
Differential Input Return Loss	TP1	IEEE 802.3-2015 Equation (83E-5)		dB	
Differential to Common Mode Input Return Loss	TP1	IEEE 802.3-2015 Equation (83E-6)		dB	
Module Stressed Input Test	TP1a	See IEEE 802.3bs 120E.3.4.1			2
Single-ended Voltage Tolerance Range (Min)	TP1a	0.4 to 3.3		V	
DC Common Mode Input Voltage	TP1	-350	2850	mV	3
Receiver (each Lane)					
Signaling Rate, each lane	TP4	26.5625 ± 100 ppm		GBd	
Differential Peak-to-Peak Output Voltage	TP4		900	mVpp	
AC Common Mode Output Voltage, RMS	TP4		17.5	mV	
Differential Termination Mismatch	TP4		10	%	
Differential Output Return Loss	TP4	IEEE 802.3-2015 Equation (83E-2)			
Common to Differential Mode Conversion Return Loss	TP4	IEEE 802.3-2015 Equation (83E-3)			
Transition Time, 20% to 80%	TP4	9.5		ps	
Near-end Eye Symmetry Mask Width (ESMW)	TP4	0.265		UI	
Near-end Eye Height, Differential	TP4	70		mV	
Far-end Eye Symmetry Mask Width (ESMW)	TP4	0.2		UI	
Far-end Eye Height, Differential	TP4	30		mV	
Far-end Pre-cursor ISI Ratio	TP4	-4.5	2.5	%	
Common Mode Output Voltage (Vcm)	TP4	-350	2850	mV	3

Notes:

1. With the exception to IEEE 802.3bs 120E.3.1.2 that the pattern is PRBS31Q or scrambled idle.
2. Meets BER specified in IEEE 802.3bs 120E.1.1.
3. DC common mode voltage generated by the host. Specification includes effects ofground offset voltage.

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Units	Notes
Center Wavelength	λc	1304.5	1310	1317.5	nm	
Transmitter						
Data Rate, each Lane			53.125 ± 100 ppm		GBd	
Modulation Format			PAM4			
Side-mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each Lane	PAVG	-1.4		4.5	dBm	1
Outer Optical Modulation Amplitude (OMAouter), each Lane	POMA	0.7		4.7	dBm	2
Launch Power in OMAouter minus TDECQ, each Lane for ER ≥ 4.5dB for ER < 4.5dB		 -0.7 -0.6			dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each Lane	TDECQ			3.4	dB	
TDECQ – 10*log10(Ceq), each Lane				3.4	dB	3
Extinction Ratio	ER	3.5			dB	
RIN17.1OMA	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	TOL			15.6	dB	
Transmitter Reflectance	RT			-26	dB	
Transmitter Transition Time				17	ps	
Average Launch Power of OFF Transmitter, each Lane	Poff			-15	dBm	
Receiver						
Data Rate, each Lane			53.125 ± 100 ppm		GBd	

Modulation Format			PAM4		
Damage Threshold, each Lane	THd	5.5		dBm	4
Average Receive Power, each Lane		-7.7	4.5	dBm	5
Receive Power (OMAouter), eachLane			4.7	dBm	
Receiver Sensitivity (OMAouter),each Lane	SEN		Equation (1)	dBm	6
Stressed Receiver Sensitivity (OMAouter), each Lane	SRS		-4.1	dBm	7
Receiver Reflectance	RR		-26	dB	
LOS Assert	LOSA	-15		dBm	
LOS De-assert	LOSD		-10.7	dBm	
LOS Hysteresis	LOSH	0.5		dB	
Conditions of Stress Receiver Sensitivity Test (Note 8)					
Stressed Eye Closure for PAM4 (SECQ), Lane under Test			3.4	dB	
SECQ – 10*log10(Ceq), Lane under Test			3.4	dB	

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator ofsignal strength. A transmitter with launch power below this value cannot be compliant;however, a value above this does not ensure compliance.

2. Even if the TDECQ < 1.4dB for an extinction ratio of ≥ 4.5dB or TDECQ < 1.3dB for an extinction ratio of < 4.5dB, the OMA_{outer} (min) must exceed the minimum value specifiedhere.

3. C_{eq} is a coefficient defined in IEEE Std 802.3-2018 clause 121.8.5.3 which accounts forreference equalizer noise enhancement.

4. Average receive power, each lane (min) is informative and not the principal indicator ofsignal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.

5. 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 doesnot have to operate correctly at this input power.

6. Receiver sensitivity (OMA_{outer}) is informative and is defined for a transmitter with a valueof SECQ up to 3.4 dB. Receiver sensitivity should meet Equation (1), which is illustrated in Figure 4.

$$RS = \max(-6.1, SECQ - 7.5)\ dBm \quad (1)$$

Where:

RS is the receiver sensitivity, and

SECQ is the SECQ of the transmitter used to measure the receiversensitivity.

7. Measured with conformance test signal at TP3 for the BER equal to 2.4x10-4 .
8. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

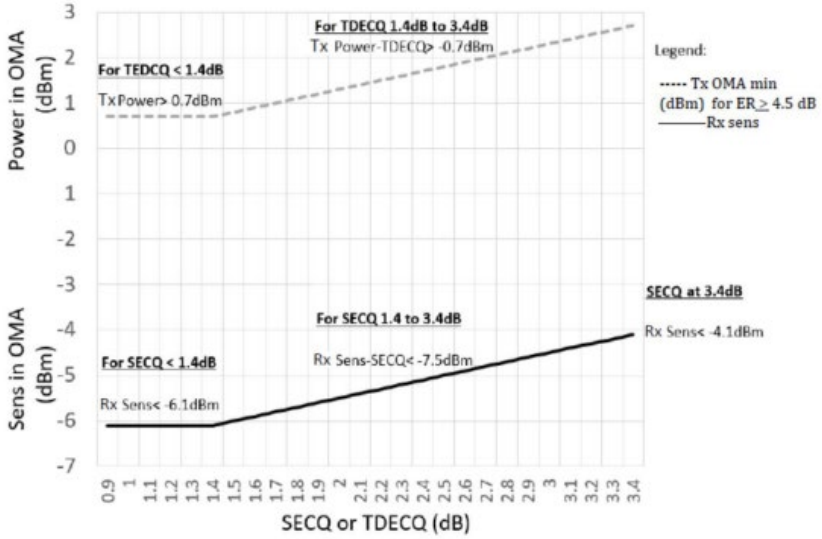

Figure 4. Illustration of Receiver Sensitivity Mask for 4×100G LR