

# SV-QSFP-40G-PESR4

40G Base aggregating 4 x 850nm duplex MM (MPO-12), extended distance to 300m on 50/125um OM3 MM fiber



## Features

- 4 independent full-duplex channels
- Up to 11.2Gb/s data rate per channel
- MTP/MPO optical connector
- QSFP+ MSA compliant
- Digital diagnostic capabilities
- Up to 300m transmission on OM3 multi-mode ribbon fiber
- CML compatible electrical I/O
- Single +3.3V power supply
- Operating case temperature: 0~70 °C
- XLPPI electric interface
- Maximum power consumption 1.5W
- RoHS-6 compliant

## Applications

- Rack to Rack
- Data Center
- Infiniband QDR, DDR and SDR
- 40G Ethernet

Part number	Description
<b>SV-QSFP-40G-PESR4</b>	Starview QSFP+ 40Gbps module 40GBase aggregating 4 x 850nm duplex MM (MPO-12) with Digital Diagnostic Monitoring (DDM), extended distance up to 300m on 50/125um OM3 MM fiber, 400m for 50/125um MM OM4 MM fiber, supporting 40GE, Infiniband QDR, DDR and SDR

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T <sub>s</sub>	-40	85	°C	
Operating Case Temperature	T <sub>OP</sub>	0	70	°C	
Power Supply Voltage	V <sub>CC</sub>	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	0	85	%	
Damage Threshold, each Lane	TH <sub>d</sub>	3.4		dBm	

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	TOP	0		70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate, each Lane			10.3125	11.2	Gb/s	
Control Input Voltage High		2		V <sub>CC</sub>	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (OM3)	D			300	m	

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	$\lambda_C$	840	850	860	nm	1
RMS Spectral Width	$\Delta\lambda_{rms}$			0.45	nm	1
Average Optical Power, each Lane	PAVG	-7.3		1.0	dBm	2
Optical Modulation Amplitude (OMA), each Lane	POMA	-4.3		3.0	dBm	2
Difference in Launch Power between any Two Lanes (OMA)	P <sub>tx,diff</sub>			4.0	dB	
Peak Power, each Lane	PPT			4.0	dBm	
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane	OMA-TDP	-6.5			dBm	
TDP, each Lane				3.5	dB	
Extinction Ratio	ER	3.0			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	12dB reflection
Optical Return Loss Tolerance	TOL			12	dB	
Encircled Flux		≥ 86% at 19 $\mu$ m ≤ 30% at 4.5 $\mu$ m				
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		0.23, 0.34, 0.43, 0.27, 0.35, 0.4				

Average Launch Power OFF Transmitter, each Lane	Poff		-30		dBm	
<b>Receiver</b>						
Center Wavelength	$\lambda$ C	840	850	860	nm	
Damage Threshold, each Lane	THd	3.4			dBm	3
Average Power at Receiver Input, each Lane		-9.9		2.4	dBm	
Receiver Reflectance	RR			-12	dB	
Receive Power (OMA), each Lane				3.0	dBm	
Stressed Receiver Sensitivity (OMA), each Lane				-7.5	dBm	4
Receiver Sensitivity (OMA), each Lane	SEN			-11.1	dBm	
Peak Power, each Lane	PPR			4.0	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Deassert	LOSD			-12	dBm	
LOS Hysteresis	LOSH	0.5			dB	
<b>Conditions of Stress Reliever Sensitivity Test Note(5)</b>						
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	
OMA of each aggressor lane			-0.4		dBm	

Note(1): Trade-offs are available among center wavelength, spectral width, and minimum OMA

Note(2): The maximum transmitter average optical power of 1.0 dBm is well within the guardband of receiver overload specifications of commercially available 10GBASE-SR SFP+ transceivers offered by Starview and other vendors.

Note(3): 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(4): Measured with conformance test signal at receiver input for BER = 1x10<sup>-12</sup>.

Note(5): Vertical eye closure penalty and stressed eye jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

## Digital Diagnostics Functions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Temperature monitor absolute error	DML_Temp	-3		3	°C	Over operating temp
Supply voltage monitor absolute error	DMI_VCC	-0.15		0.15	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	DML_TX_Ch	-2	2	dB	1
---	-----------	----	---	----	---

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

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Consumption				1.5	W	
Supply Current	I <sub>cc</sub>			450	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			mVpp	LOSA Threshold
Differential Input Voltage Swing	V <sub>in,pp</sub>	180		1200	mVpp	
Differential Input Impedance	Z <sub>in</sub>	90	100	110	Ohm	
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 <sup>-5</sup>
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	V <sub>out,pp</sub>	600		800	mVpp	
Differential Output Impedance	Z <sub>out</sub>	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 <sup>-5</sup>

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