

Features

- 4 Parallel lanes design
- Up to 11.2Gb/s data rate per channel
- Aggregate Bandwidth of up to 44.0G
- QSFP+ MSA compliant
- Up to 10km transmission on single mode fiber (SMF),
- Maximum power consumption 3.5W
- Single +3.3V power supply
- Operating case temperature: 0~70°C
- RoHS-6 compliant



Applications

- 40G Ethernet
- Infiniband QDR, DDR and SDR
- Datacenter and Enterprise networking

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T _s	-40	85	degC
Operating Case Temperature	T _{OP}	0	70	degC
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	Typical	Max	Unit
Operating Case Temperature	T _{OP}	0		70	degC
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			10	km

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
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	J _{t2}	0.17			UI	
J9 Jitter Tolerance	J _{t9}	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	V _{out,pp}	300		850	mV _{pp}	
Differential Output Impedance	Z _{out}	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

Notes:

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.
2. The single ended input voltage tolerance is the allowable range of the instantaneous input signals

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_c	1260	1310	1355	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each Lane	P _{AVG}	-6		1.5	dBm	1
Optical Modulation Amplitude (OMA), each Lane	P _{OMA}	-4.5		3.0	dBm	2
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	-5.5			dBm	
TDP, each Lane	TDP			3.2	dB	
Extinction Ratio	ER	3.5			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	

Optical Return Loss Tolerance	TOL			12	dB	
Transmitter Reflectance	R _T			-12	dB	
Average Launch Power OFF Transmitter, each Lane	P _{off}			-30	dBm	
Transmitter Eye Mask Definition (X1, X2, X3, Y1, Y2, Y3)		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Receiver						
Center Wavelength	λ _C	1260	1310	1355	nm	
Damage Threshold, each Lane	TH _d	3.3			dBm	3
Average Power at Receiver Input, each Lane		-12.7		2.3	dBm	
Receiver Reflectance	R _R			-12	dB	
Receiver Sensitivity in OMA, each Lane	SEN			-12.6	dBm	Infor-mative
Difference in Receive Power between any Two Lanes (OMA)	Prx,diff			7.5	dB	
LOS Assert	LOSA	-30			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	

Notes:

1. The maximum transmitter average optical power of 1.5 dBm is well within the guardband of receiver overload specifications of commercially available 10GBASE-LR SFP+ transceivers offered by Starview and other vendors.
2. Even if the TDP < 1 dB, the OMA min must exceed the minimum value specified here.
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.

Digital Diagnostic Functions

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	degC	Over operating temperature
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	
Channel TX power monitor absolute error	DMI_TX_Ch	-2	2	dB	1

Notes:

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

Ordering Information

Part number	Description
SV-QSFP-40G-PLR4	Starview QSFP+ 41.25Gbps module with Digital Diagnostic Monitoring (DDM), 40GBase aggregating 4 x 1310nm SM wavelengths (MPO-12), distance up to 10km