

# SV-CFP4-100G-ER4

100GBase aggregating 4 x duplex LWDM (1295.6 nm, 1300.1 nm, 1304.6 nm, and 1309.1nm) wavelengths SM (LC) with DDM, distance up to 25km



## Features

- Hot pluggable CFP4 MSA form factor
- Compliant to 100GBASE-ER4 Lite and CFP-MSA- HW-Specification
- Supports 103.1Gb/s aggregate bit rate
- Up to 25km reach for G.652 SMF without FEC
- Up to 32km reach for G.652 SMF with FEC
- Single +3.3V power supply
- Operating case temperature: 0-70°C
- Transmitter: cooled 4x25Gb/s LAN WDM EML TOSA (1295.56, 1300.05, 1304.58, 1309.14nm)
- Receiver: 4x25Gb/s APD ROSA
- 4x25G electrical interface (OIF CEI-28G-VSR)
- Maximum power consumption 5.0W
- Duplex LC receptacle
- RoHS-6 compliant

## Applications

- 100GBASE-LR4 Ethernet

## Ordering Information

Part number	Description
SV-CFP4-100G-ER4	Starview CFP4 100Gbps module 100GBase aggregating 4 x duplex CWDM (1270/ 1290/ 1310/ 1330nm) wavelengths SM (LC) with Digital Diagnostic Monitoring (DDM), distance up to 25km

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T <sub>s</sub>	-40		85	°C	
Relative Humidity (non-condensation)	RH			85	%	
Operating Case Temperature	T <sub>OP</sub>	0		70	°C	
Supply Voltage	V <sub>CC</sub>	-0.5		3.6	V	
Voltage on LVTTTL Input	V <sub>ilvttl</sub>	-0.5		V <sub>CC</sub> +0.3	V	
LVTTTL Output Current	I <sub>olvttl</sub>			15	mA	
Voltage on Open Collector Output	V <sub>oco</sub>	0		6	V	
Damage Threshold, each Lane	TH <sub>d</sub>	-3.0			dBm	1

Note(1): PIN receiver

## Recommended Operating Conditions and Supply Requirements

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	T <sub>OP</sub>	0		70	degC	
Power Supply Voltage	V <sub>CC</sub>	3.135	3.3	3.465	V	
Data Rate, each Lane					25.78125	
Data Rate Accuracy		-100		100	ppm	
Control Input Voltage High		2		V <sub>CC</sub>	V	
Control Input Voltage Low		0		0.8	V	
Power Supply Noise	V <sub>rip</sub>			2	%	DC-1MHz
				3	%	1-10MHz
Link Distance with G.652 (without FEC)	D1			25	km	
Link Distance with G.652 (with FEC)	D2			32	km	

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Consumption				5.0	W	
Supply Current	I <sub>CC</sub>			1.51	A	
Low Power Mode Power Dissipation				2	W	
Transmitter (each Lane)						
Overload Differential Voltage pk-pk	TP1a	900			mV	
Common Mode Voltage (V <sub>cm</sub> )	TP1	-350		2850	mV	1
Differential Termination Resistance Mismatch	TP1			10	%	At 1MHz
Differential Return Loss (SDD11)	TP1			See CEI-28G-VSR Equation 13-19	dB	
Common Mode to Differential conversion and Differential to	TP1			See CEI-28G-VSR	dB	

Common Mode conversion (SDC11, SCD11)			Equation 13-20		
Stressed Input Test	TP1a	See CEI-28G-VSR Section 13.3.11.2.1			
<b>Receiver (each Lane)</b>					
Differential Voltage, pk-pk	TP4		900	mV	
Common Mode Voltage (Vcm)	TP4	-350	2850	mV	1
Common Mode Noise, RMS	TP4		17.5	mV	
Differential Termination Resistance Mismatch	TP4		10	%	At 1MHz
Differential Return Loss (SDD22)	TP4		See CEI-28G-VSR Equation 13-19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22)	TP4		See CEI-28G-VSR Equation 13-21	dB	
Common Mode Return Loss (SCC22)	TP4		-2	dB	2
Transition Time, 20 to 80%	TP4	9.5		ps	
Vertical Eye Closure (VEC)	TP4		5.5	dB	
Eye Width at 10 <sup>-15</sup> probability (EW15)	TP4	0.57		UI	
Eye Height at 10 <sup>-15</sup> probability (EH15)	TP4	228		mV	

Note(1): Vcm is generated by the host. Specification includes effects of ground offset voltage.

Note(2): From 250MHz to 30GHz.

## Optical Characteristics

CFP4 100GBASE-LR4						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Lane Wavelength	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
<b>Transmitter</b>						
SMSR	SMSR	30			dB	
Total Average Launch Power	P <sub>T</sub>			10.5	dBm	
Average Launch Power, each Lane	PAVG	-1.9		4.5	dBm	
OMA, each Lane	POMA	0.1		4.5	dBm	1
Difference in Launch Power between any Two Lanes (OMA)	P <sub>tx,diff</sub>			3.6	dB	
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane		-0.65			dBm	
TDP, each Lane	TDP			2.5	dB	
Extinction Ratio	ER	7			dB	
RIN <sub>20OMA</sub>	RIN			-130	dB/Hz	
Optical Return Loss Tolerance	TOL			20	dB	
Transmitter Reflectance	RT			-12	dB	

Average Launch Power OFF Transmitter, each Lane	Poff	-30	dBm	
Eye Mask{X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}		2
<b>Receiver</b>				
Damage Threshold, each Lane	TH <sub>d</sub>	-3.0	dBm	3
Average Receive Power, each Lane		-14.7	-4.9	dBm for 25km Link Distance
Average Receive Power, each Lane		-17.7	-4.9	dBm for 32km Link Distance
Receive Power (OMA), each Lane		-1.9	dBm	
Receiver Sensitivity (OMA), each Lane	SEN1	-13.45	dBm	for BER = 1x10 <sup>-12</sup>
Stressed Receiver Sensitivity (OMA), each Lane		-11.45	dBm	for BER = 1x10 <sup>-12</sup>
Receiver Sensitivity (OMA), each Lane	SEN2	-16.45	dBm	for BER = 5x10 <sup>-5</sup>
Stressed Receiver Sensitivity (OMA), each Lane		-14.45	dBm	for BER = 5x10 <sup>-5</sup>
Receiver reflectance		-26	dB	
Difference in Receive Power between any Two Lanes (Average and OMA)	Prx,diff	3.6	dB	
LOS Assert	LOSA	-26	dBm	
LOS Deassert	LOSD	-24	dBm	
LOS Hysteresis	LOSH	0.5	dB	
Receiver Electrical 3 dB upper Cutoff Frequency, each Lane	Fc	31	GHz	
<b>Conditions of Stress Receiver Sensitivity Test (Note 5)</b>				
Vertical Eye Closure Penalty, each Lane		1.5	dB	
Stressed Eye J2 Jitter, each Lane		0.3	UI	
Stressed Eye J9 Jitter, each Lane		0.47	UI	

Note(1): The minimum average launch power spec is based on ER not exceeding 9.5dB and transmitter OMA higher than 0.1dBm.

Note(2): Even if the TDP < 0.75 dB, the OMA min must exceed the minimum value specified here.

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): Vertical eye closure penalty, stressed eye J2 jitter, and stressed eye J9 jitter are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver

## Digital Diagnostic Functions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Temperature monitor absolute error	DMI_Temp	-3		3	°C	Over operating temperature range
Supply voltage monitor absolute error	DMI_VCC	-0.1		0.1	V	Over 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 single mode fibers, there could be an additional +/-1 dB fluctuation, or a +/- 3 dB total accuracy