

XKSSF4-M5PY

400 Gbps QSFP-DD DR4 500 m
Optical Transceiver



Applications

- 400G Ethernet
- Data Center Interconnect
- Infiniband Interconnect
- Enterprise Networking

Features

- Compliant with IEEE Std 802.3bs
- Compliant with 400G-DR4 optical specifications
- Compliant with QSFP-DD MSA
- Compliant with CMIS4.0 Management interface specifications
- 8x53.125Gb/s electrical interface (400GAUI-8)
- Up to 0.5 km transmission on single mode fiber (SMF) with FEC
- Parallel 4 optical lanes
- Maximum power consumption 9.5 W
- Single +3.3 V power supply
- RoHS compatible
- Operating case temperature 0 °C to +70 °C (Standard)

Description

This product is a 400 Gb/s QSFP-DD optical module designed for 0.5 km optical communication applications. The module converts 8 channels of 50 Gb/s (PAM4) electrical input data to 4 channels of parallel optical signals, each capable of 100 Gb/s operation for an aggregate data rate of 400 Gb/s.

On the receiver side, the module converts 4 channels of parallel optical signals of 100 Gb/s each channel for an aggregate data rate of 400 Gb/s into 8 channels of 50 Gb/s (PAM4) electrical output data.

An optical fiber cable with an MTP/MPO-12 connector can be plugged into the QSFP-DD DR4 module receptacle. Host FEC is required to support up to 0.5 km fiber transmission.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T _{STG}	-40	85	°C
Relative Humidity non-condensing	RH	10	90	%
Supply Voltage	V _{CC}	0	4	V

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Operating Case Temperature	T _{CASE}	0	70	°C
Supply Voltage	V _{CC}	3.14	3.46	V
Power Consumption	P _{DISS}		9.5	W
Pre-FEC Bit Error Rate			2.4x10 ⁻⁴	
Post-FEC Bit Error Ratio			1x10 ⁻¹²	
Link Distance		2	500	m

Transmitter Optical Specifications

Parameter	Min	Typical	Max	Units
Lane Wavelength Range	1304.5		1317.5	nm
Modulation Format	PAM4			
Average Optical Power per lane	-2.9		4	dBm
Outer Optical Modulation Amplitude (OMA _{outer}), each lane	-0.8		4.2	dBm
Average Launch Power per Lane @ TX Off State			-15	dBm
Launch Power in OMA _{outer} minus TDECQ, each Lane	-2.2			dB
Transmitter and Dispersion Eye Closure for PAM4, each Lane			3.4	dB
Extinction Ratio	3.5			dB
Relative Intensity Noise (OMA)			-136	dB/Hz
Side-Mode Suppression Ration (SMSR)	30			dB
Optical Return Loss Tolerance			21.4	dB
Transmitter Reflectance			-26	dB

Receiver Optical Specifications

Parameter	Min	Typical	Max	Units
Lane Wavelength Range	1304.5		1317.5	nm
Modulation Format	PAM4			
Damage Threshold	5.0			dBm
Average Receive Power, each lane	-5.9		4.0	dBm
Receiver Power, each lane (OMA)			4.2	dBm
Receiver Reflectance			-26.0	dB
Receiver Sensitivity, each lane (OMA _{OUTER})			-4.4	dBm
Stressed Receiver Sensitivity (OMA _{OUTER}), each			-1.9	dBm
Stressed Conditions for Stress Receiver Sensitivity				
Stressed Eye Closure for PAM4 (SECQ) Lane under Test		3.4		dB
OMA _{outer} of each Aggressor Line		4.2		dBm

Receiver Output Power Thresholds for Loss of Signal (LOS)

Parameter	Minimum	Typical	Maximum	Unit
RX_LOS_Assert Min/Max	-15.0			dBm
RX_LOS_De-Assert Min/Max			8.9	dBm
RX_LOS_Hysteresis		1.5		dB

Electrical Specifications

Parameter	Minimum	Typical	Max	Unit	Notes
Receiver electrical output characteristic at TP4					
Signaling rate per lane		26.5625		GBd	
AC common-mode output voltage (RMS)			17.5	mV	
Differential peak-to-peak output Voltage			900	mV	
Near-end ESMW (Eye symmetry mask width)		0.265		UI	
Near-end Eye height, differential	70			mV	
Far-end ESMW (Eye symmetry mask width)		0.2		UI	
Far-end Eye height, differential	30			mV	
Far-end pre-cursor ISI ratio	-4.5		2.5	%	
Differential output return loss	9.5-0.37f			dB	1
	4.75-7.4log ₁₀ (f/14)			dB	2
Common to differential mode conversion return loss	22-20(f/25.78)			dB	3
	15-6log ₁₀ (f/25.78)				4
Differential termination mismatch			10	%	
Transition time (min, 20% to 80%)	9.5			ps	
DC common mode voltage	-350		2850	mV	
Transmitter electrical output characteristic at TP1					
Signaling rate, per lane		26.5625		GBd	
Differential pk-pk input voltage tolerance	900			mV	
Differential input return loss	9.5-0.37f			dB	1
	4.75-7.4log ₁₀ (f/14)			dB	2
Differential to common mode input return loss	22-20(f/25.78)			dB	3
	15-6log ₁₀ (f/25.78)			dB	4
Differential termination mismatch			10	%	
Module stressed input test	Per Section 120E.3.4.1, IEEE802.3bs				
Single-ended voltage tolerance range	-0.4		3.3	V	
Common-mode voltage	-350		2850	mV	

Notes

1. 0.01-8 GHz
2. 8-19 GHz
3. 0.01-12.89 GHz
4. 12.89-19 GJz

Ordering information¹

Part number	Product Description
XKSSF4-M5PY	QSFP-DD DR4 400G Transceiver, 5 km, MPO, 0-70°C, DDM

Notes

¹ For accurate order specification please contact XenOpt reseller before placing an order. The content of this document is subject to change without notice. XenOpt does not guarantee errorless or outdated information.

Please specify any compatibility requirements at time of ordering. Standard MSA compatible pluggable components may not work or some function of these components may not be available in devices that require customized compatible devices. Pluggable components compatible with one type of communications equipment may not work in other type of communications equipment.

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