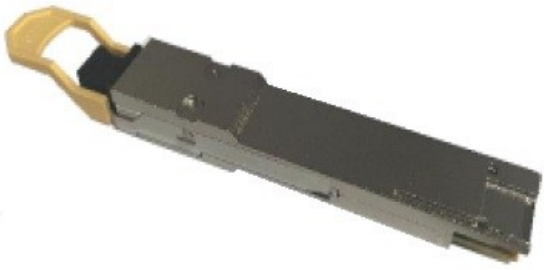
XKM4F4-M1PY-XX

400G QSFP-DD SR4 Optical Transceiver



FEATURES

- Supports data rates of up to 106.25 Gbps per channel using PAM4 modulation
- Integrated 850 nm VCSEL laser array and photodiode (PD) array
- Equipped with an MPO-12 receptacle
- Supports transmission distances of up to 100 m over OM4 multimode fiber
- Implements Digital Diagnostic Monitoring (DDM)
- Hot-pluggable design for flexible deployment
- Operates from a single +3.3 V power supply
- Compliant with QSFP-DD Hardware Revision 6.2
- Compliant with CMIS Revision 5.1
- 4 × 106.25 Gb/s electrical interface (400GAUI-4) Maximum power consumption: 8 W
- Operating case temperature range: 0°C to +70°C
- RoHS 2.0 compliant

APLICATIONS

400G Ethernet

Data Center Interconnect

Enterprise Networking

DESCRIPTION

This product is a 400Gb/s QSFP-DD SR4 optical module designed for optical communication over distances of up to 100 meters. The module converts four channels of 100Gb/s PAM4 electrical input signals into four parallel optical channels, each operating at 100Gb/s, providing an aggregate data rate of 400Gb/s. On the receive side, the module converts four parallel optical channels, each at 100Gb/s, back into four 100Gb/s PAM4 electrical output signals, maintaining a total throughput of 400Gb/s. The module supports connection via an optical fiber cable with a single MPO-12 connector, which plugs directly into the QSFP-DD SR4 receptacle. Host-side forward error correction (FEC) is required to support fiber transmission distances of up to 100 meters.

ABSOLUTE MAXIMUM RATINGS

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Data rate	Laser		Max	Unit
Storage Temperature	Ts	-40	-	+85	°C
Supply Voltage	Vcc	-0.5	-	+	V
Operating Reletive Humidity	RH	-	-	+85	%

RECOMMEND OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	degC	
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Lane Bit Rate			53.125		GBd	With PAM4
Power Consumption	PD			8	W	
Pre-FEC Bit Error Ratio				2.4x10-4		
Link Distance with G.652	TD			100	m	

ELECTRICAL CHARACTERISTICS

Parameter	Min	Typical	Max	Unit	Notes
Receiver electrical output characteristics 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 SMW(Eye symmetry mask width)		0.265		UI	
Near-end Eye height, differential	70			mV	
Far-end ESMW(Eye symmetry mask width)		0.2		%	
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	0.01-8 GHz
	4.75-7.4log 10(f/14)			dB	8-19 GHzGHz
Common to differential mode con-version return loss	22-20(f/25.78)			dB	0.01-12.89 GHz
	15-6log 10(f/25.78)			dB	12.89-19GHz
Differential termination mismatch			10	%	
Transition time (min,20% to 80%)	9.5			ps	
DC common mode voltage	-350		2850	mV	

Transmitter electrical input characteristics 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	0.01-8 GHz
	4.75-7.4lg 10 (f/14)			dB	8-19GHz
Differential to common mode input return loss	22-20(f/25.78)			dB	0.01-12.89GHz
	15-6log 10(f/25.78)			dB	12.89-19GHz
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	

OPTICAL CHARACTERISTICS

Parameter	Min	Typical	Max	Unit	Notes
Transmitter					
Signaling Rate, each lane (range)		53.125±100ppm		GBd	
Modulation Format		PAM4			
Center Wavelength Range		850		nm	
RMS spectral width			0.6	nm	
Average launch power, each lane	-4.6		4	dBm	
Outer Optical Modulation Amplitude (OMAouter), each lane	-2.6		3.5	dBm	TDECQ<1.8
	TDECQ-4.4		3.5		TDECQ>1.8
Transmitter and dispersion eye closure for PAM4 (TDECQ), each lane			4.4	dB	
Extinction ratio, each lane	2.5			dB	
Optical return loss tolerance			12	dB	
Optical Return Loss Tolerance			12	dB	
Average Launch Power per Lane @ TX Off State			-30	dBm	
Relative Intensity Noise12(OMA)			-131	dB/Hz	
Optical Return Loss Tolerance			12	dB	
Receiver					
Signaling Rate, each lane (range)		53.125 100ppm		GBd	
Modulation Format		PAM4			
Center Wavelength Range	840		860	nm	
Damage Threshold	5			dBm	
Average receive power, each lane	-6.4		4	dBm	
Stressed receiver sensitivity (OMAouter), each lane			-2	dBm	
Receive power, each lane (OMAouter)			3.5	dBm	
RX_LOS_Assert	-15.0			dBm	
RX_LOS_De-Assert			-8.9	dBm	
RX_LOS_Hysteresis	0.5			dB	
Receiver sensitivity (OMAouter), each lane		Max(4.6,SECQ-6.4)		dBm	
Stressed eye closure for PAM4 (SECQ), lane under test		4.4		dB	
SECQ – 10log10(Ceq) (ax), lane under test		3.5		dBm	

Receiver					
Signaling Rate, each lane (range)	53.125 100ppm			GBd	
Modulation Format	PAM4				
Center Wavelength Range	840		860	nm	
Damage Threshold	5			dBm	
Average receive power, each lane	-6.4		4	dBm	
Stressed receiver sensitivity (OMAouter), each lane			-2	dBm	
Receive power, each lane (OMAouter)			3.5	dBm	
RX_LOS_Assert	-15.0			dBm	
RX_LOS_De-Assert			-8.9	dBm	
RX_LOS_Hysteresis	0.5			dB	
Receiver sensitivity (OMAouter), each lane	Max(4.6,SECQ-6.4)			dBm	
Stressed eye closure for PAM4 (SECQ), lane under test		4.4		dB	
SECQ – 10log10(Ceq) (ax), lane under test		3.5		dBm	

Digital Diagnostic Monitoring Specifications

Parameter	Unit Unit	Specification
	°C	± 3.0
Supply Voltage Monitor absolute error	%	± 5°C
I_bias Monitor absolute error	%	± 10
Received Power (Rx) Monitor absolute error	dB	± 3.0
Transmit Power (Tx) Monitor absolute error	dB	± 3.0

ORDER INFORMATION

Part number	Data rate	Laser	Fiber type	Distance	Opt. interf.	Temp	DDMI
XKM4F4-M1PY-xx	400 G	VCSEL	MMF	100 m	MPO-12	0~70C	Y

Notes

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.

COMPANY INFORMATION

XENYA d.o.o.
Celovška cesta 172
1000 Ljubljana, SI

CONTACT INFORMATION

info@xenya.si
+386 (0)1 514 06 10
www.xenopt.com

PARTNER INFORMATION