

## XQX5A70 QSFP+ 40G-LR4

10 km Reach Optimized for Data Center

The **QSFP+ 40G-LR4** module is a highly integrated 4x10G transceiver focused on reach, bandwidth, density and cost for 40GE applications. The module incorporates four independent channels, on ITU G.694.2 CWDM (near 1300nm) wavelength grid, operating between 9.95 and 11.318Gbs per channel. The transmitter path incorporates four laser drivers and DML lasers together with an optical multiplexer. On the receiver path, an optical demux is coupled with 4-channel photodiodes and limiting TIAs.

This product is built on the **LightScale®2** platform.

Leveraging its novel hybrid integration technology, **Kaiam** is able to design and produce high-speed optical modules for high bandwidth applications such as router and data center interconnect. All of **Kaiam's** products allow for superior performance at 40Gb/s and beyond with duplex single mode fiber.

### KEY FEATURES

- Supports 40G operation
- 10 km reach via SMF
- Optical link budget:  
-4dBm min Tx OMA and  
-11.5 dBm max Rx sensitivity
- Single 3.3 V power supply
- Uncooled CWDM DFB lasers,  
directly modulated
- Electrical interface: compliant  
with 40G Ethernet IEEE 802.3ba  
(XLPP1)
- SMF LC duplex connector
- MSA-compliant performance  
monitoring via I2C interface
- Receiver monitoring, RSSI, for  
link diagnostics and loopback
- Transmitter optical power  
monitoring (TPM) for laser  
power calibration and link  
diagnostics
- Hot pluggable
- 0–70°C transceiver operating  
case temperature
- Power dissipation < 3.5W



**OPTICAL TRANSMITTER PERFORMANCE**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	
Channel Wavelength	Ch0	$\lambda_0$	1264.5	1271	1277.5	nm
	Ch1	$\lambda_1$	1284.5	1291	1297.5	
	Ch2	$\lambda_2$	1304.5	1311	1317.5	
	Ch3	$\lambda_3$	1324.5	1331	1337.5	
Bit Rate per Channel	B	9.95328	10.3125	11.318	Gb/s	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average launch power, each lane	Pavg	-4.0		2.3	dBm	
Optical Modulation Amplitude, each lane	OMA	-4.0		3.5	dBm	
Launch power in OMA minus TDP, each lane	OMA-TDP	-4.8			dBm	
Transmission & dispersion penalty, each lane	TDP			2.6	dB	
RIN <sub>20 OMA</sub>				-128	dB/Hz	
Transmitter Reflectance				-12	dB	
Extinction Ratio	ER	3.5			dB	
Transmitter Optical Mask	MM	Compliant with 40GBASE-LR4				

**OPTICAL RECEIVER PERFORMANCE**

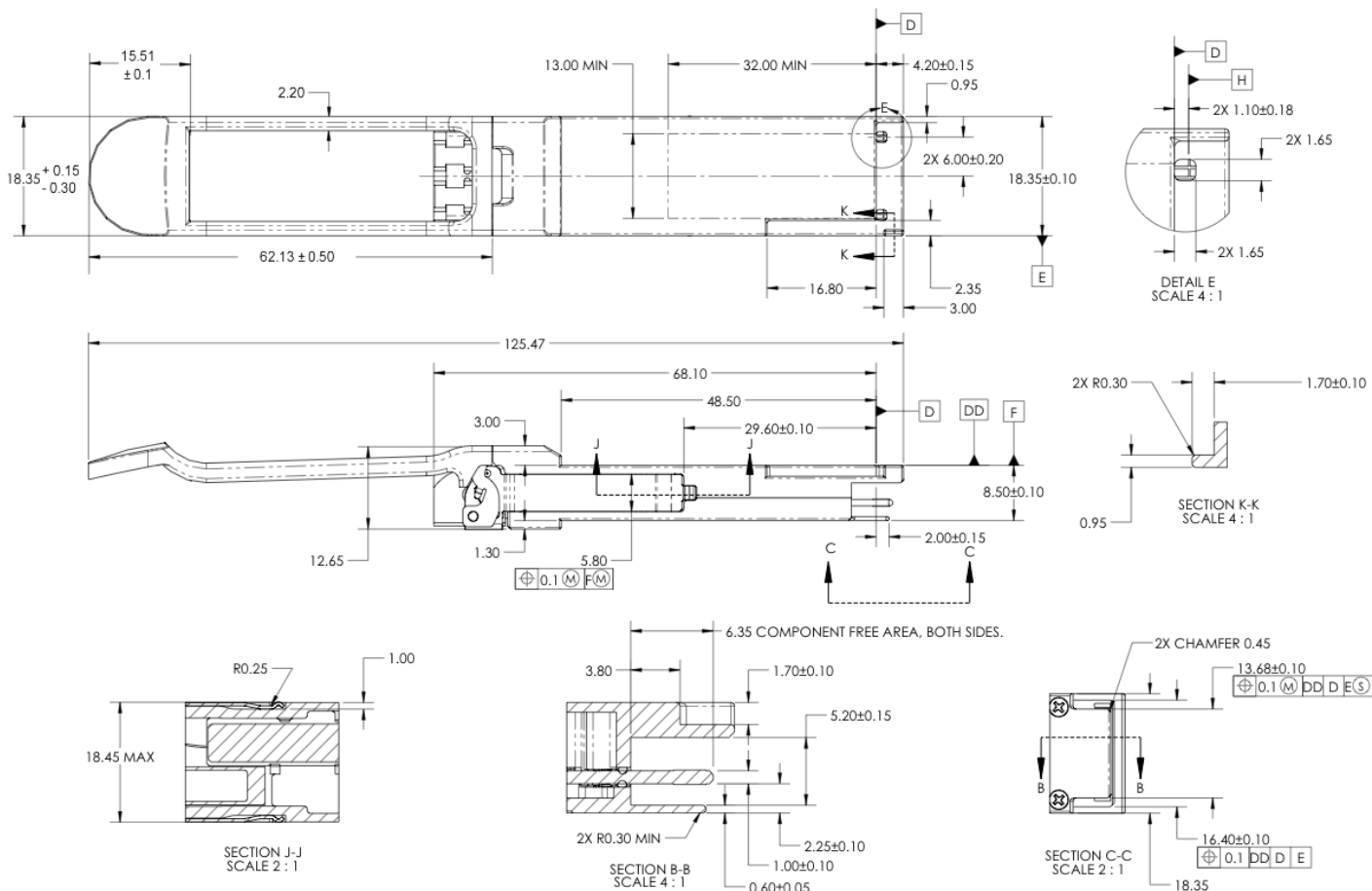
PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS
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	Ch2	$\lambda_2$	1304.5	1311	1317.5	
	Ch3	$\lambda_3$	1324.5	1331	1337.5	
Average Receive Power, each lane (BER=5x10 <sup>-5</sup> , PRBS=2 <sup>31</sup> - 1)			-13.7		2.3	dBm
Receiver Sensitivity (OMA) per channel		OMA <sub>in</sub>		-13.5	-11.5	dBm
Stressed Receiver Sensitivity (OMA)		OMA <sub>in,str</sub>			-9.6	dBm
Receiver Reflectance		ORL			-26	dB
Vertical eye closure penalty, each lane		VECP		2.6		dB
Stressed eye J2 Jitter, each lane		J2		0.33		UI
Stressed eye J9 Jitter, each lane		J9		0.48		UI
SRS eye mask				{0.39,0.5, 0.5, 0.39, 0.39, 0.4}		

**NOMINAL OPERATING CONDITIONS**

PARAMETER	MIN	TYP	MAX	UNITS	NOTES
Operating Case Temperature	0		+70	°C	
Supply Voltage	3.135	3.3	3.465	V	+/- 5%
Supply Current			1000	mA	
IIC Clock Frequency		100	400	kHz	
IIC Clock Stretching			500	µs	
IIC Data Hold Time			900	ns	

**QSFP28 MODULE MECHANICAL OUTLINE**

(all dimensions in mm)



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