LQP40-CSR4

QSFP+ 40Gb/s SR4 (100~400)m DDM

PRODUCT FEATURES

- Multi rate capability: 1.06Gb/s to 10.5Gb/s per channel
- Reliable VCSEL array technology
- Maximum link length of 300m on OM3 Multimode Fiber(MMF) and 400m ON OM4 MMF
- Hot-pluggable QSFP+ footprint
- Single 1x12 MPO receptacle
- Maximum power dissipation<1W
- Four-channel full-duplex transceiver module
- RoHS-6 compliant and lead-free
- Support Digital Diagnostic Monitor interface
- Un retimed XLPPI electrical interface
- Case operating temperature Commercial: 0°C to +70°C

APPLICATIONS

- 40GBASE-SR4 40G Ethernet
- Breakout to10GBASE-SR Ethernet
- Proprietary interconnections

Compliance

- QSFP+ MSA.
- IEEE802.3ba
- SFF-8436
- RoHS

PRODUCT DESCRIPTION

LQP40-CSR4 are designed for use in 40 Gigabit per second links over multimode fiber. They are compliant with the QSFP+ MSA and IEEE 802.3ba 40GBASE-SR4.Module-level digital diagnostic functions are available via an I^2C interface, as specified by the QSFP+ MSA. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

Ordering information

Package	Product part NO.	Data Rate(Gbps)	Media	Wavelength(nm)	TransmissionDistance(m)	Temperature Range（℃）	
QSFP+	LQP40-CSR4	42.0	multi-mode fiber	850	100~400	0~70	Commercial

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Storage Temperature	T_S	-40		85	ºC	
Storage Ambient Relative Humidity	H_A	0		85	%	
Maximum Supply Voltage	$V_{CC}1$, $V_{CC}T_X$, $V_{CC}R_X$	-0.5		3.6	V	
Signal Input Voltage		Vcc-0.3		Vcc+0.3	V	
Receiver Damage Threshold		+3.4			dBm	
Lead Soldering Temperature/Time	TSOLD			260/10	ºC/sec	1
Lead Soldering Temperature/Time	TSOLD			360/10	ºC/sec	2

Note:

1. Suitable for wave soldering.

2. Only for soldering by iron.

II. General Product Characteristics

Parameter	Value	Unit	Ref.
Module Form Factor	QSFP+		
Number of Lanes	4 Tx and 4 Rx		
Maximum Aggregate Data Rate	42.0	Gb/s	
Maximum Data Rate per Lane	10.5	Gb/s	Higher bit rates may be supported. Please contact Lightrend
Protocols Supported	Typical applications include 40G Ethernet, Infiniband, Fibre Channel, SATA/SAS3		
Management Interface	Serial,I2c-based,400kHz maximum		As defined by the QSFP+ MSA

	frequency					
Data Rate Spcifications	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Ref.**
Bit Rate per Lane	BR	1062		10500	Mb/s	1
Bit Error Ratiio	BER			10^{-12}		2
Link distance on OM3 MMF	d			300	meters	3
Link distance on OM4 MMF	d			400	meters	3

Notes:

1. Compliant with 40G Ethernet. Compatible with 1/10 Gigabit Ethernet and 1/2/4/8/10G Fibre Channel.

2. Tested with a PRBS 231-1 test pattern.

3. Per 40GBASE-SR4, IEEE 802.3ba.

III. Optical Characteristics

Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Ref.**
Transmitter(per Lane)						
Average Output Power	POUT	-7.6		2.4	dBm	
Transmit OMA per Lane	TxOMA	-5.6		3.0	dBm	1
Extinction Ratio	ER	3.0			dB	
Center Wavelength	λC	840	850	860	nm	
RMS Spectral Width	σ			0.65	nm	
Transmitter and Dispersion Penalty	TDP			3.5	dB	
Transmitter OFF Output Power	POff			-30	dBm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter eye mask definition {X1,X2,X3,Y1,Y2,Y3}		0.23,0.34,0.43,0.27,0.35,0.4				
Receiver(per Lane)						
Input Optical Wavelength	λIN	840	850	860	nm	
Rx Sensitivity per lane	RSENS			-9.5	dBm	
InputSaturation Power (Overload)	PSAT	+2.4			dBm	
Receiver Reflectance	Rfl			-12	dBm	
Loss of Signal Assert	PA	-30			dBm	
Loss of Signal De-assert	PD			-12	dBm	
LOS Hysteresis	PD - PA	0.5		6	dB	

Note:

1. Even if TDP is <0.9dB, the OMA min must exceed this value.

IV. Memory Map and Control Registers

Compatiable with SFF-8436Rev.4.8(QSFP+).

V. Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Supply Voltage	VCC1, VCCTX, VCCRX	3.15		3.45	V	
Supply Current	ICC			300	mA	
Transmitter(per Lane)						
Input different impedance	Rin	90	100	110	Ω	1
Single ended input voltage tolerance	VinT	-0.3		4.0	V	
Single ended data input swing	Vin,pp	180		1200	mV	2
Receiver (per Lane)						
Output different impedance	Rout	90	100	110	Ω	1
Single ended data output swing	Vout,pp	0		800	mV	3
Single-ended output voltage		-0.3		4.0	V	
Power Supply Rejection	PSR	50			mVpp	

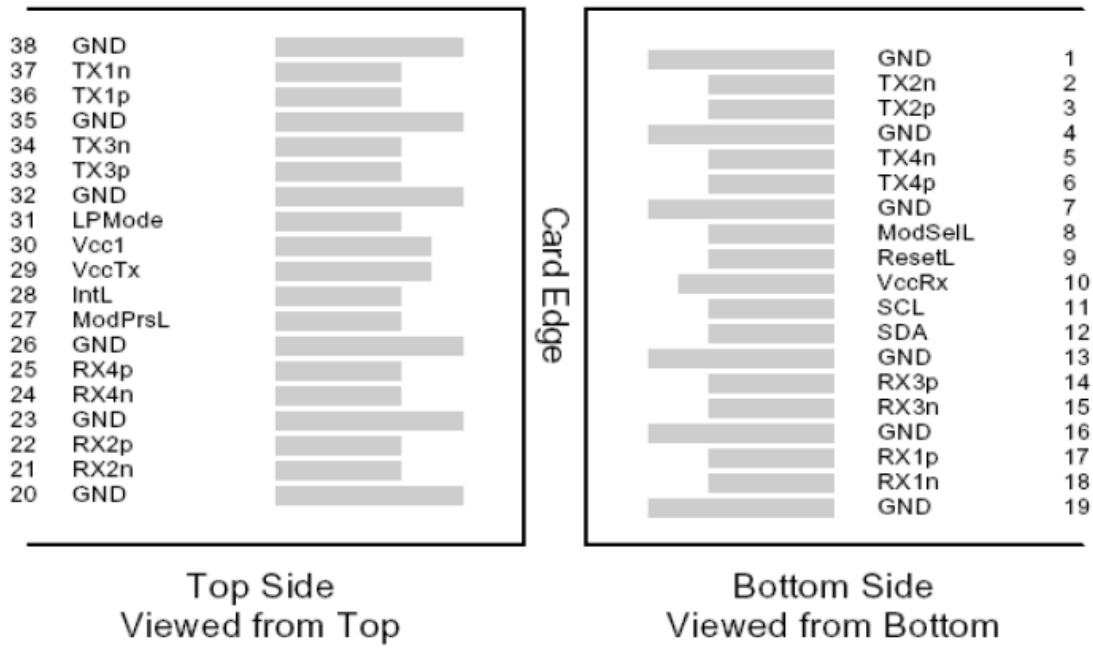
Note :

1.Connected directly to TX data input pins. AC coupled thereafter.

2.After internal AC coupling. Self-biasing 100Ω differential input

3.Into 100Ωdifferential termination.

VI. Pin Diagram



QSFP+ MSA-compliant 38-pin connector

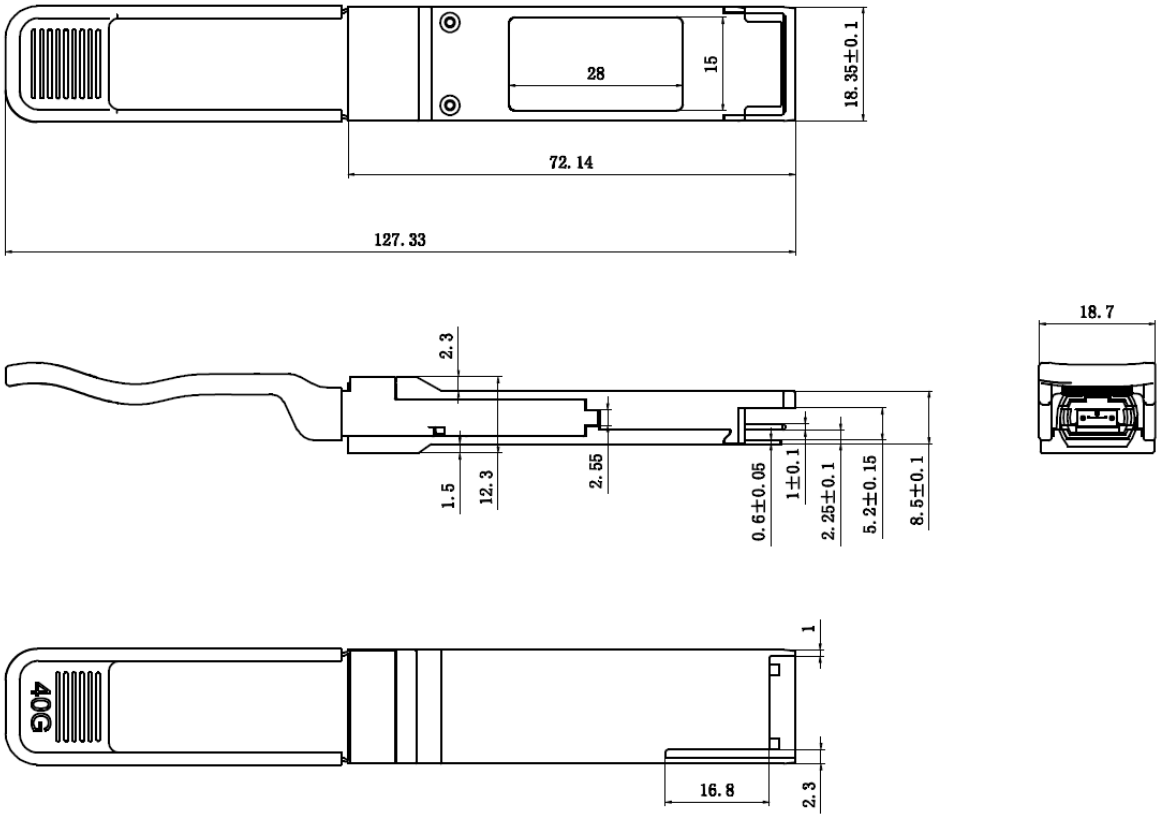
VII. Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSe1L	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power supply receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrSL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power Supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Note：

1. Circuit ground is internally isolated from chassis ground.

VIII.Mechanical Specifications(Unit: mm)



Revision History

Version No.	Date	Description
1.0	June 24, 2020	Preliminary datasheet