

# 40 Gb/s (4x10 Gb/s), 2 km CWDM LR4, Singlemode QSFP+ Dual LC Package

## Description

OptixCom's 40 Gb/s QSFP+ LR4 optical transceiver is designed to operate with 4x CWDM channels for up to 2 km of transmission distance. The transceiver uses 1271, 1291, 1311, and 1331 nm DFB laser wavelengths, with each wavelength running at 10 Gb/s. They are then multiplexed together into a single channel to achieve 40 Gb/s of data transmission.

On the receiver side, the 40 Gb/s data signal is demultiplexed and converted to the same 4x CWDM channels as the transmitter side. It is compliant with 40G Ethernet standard and QSFP+ Multi-Source Agreement (MSA) SFF-8436 for datacom applications.

The transceiver uses dual LC connector for single mode applications. It is hot pluggable in the z-axis with a 38-pin connector. The product is RoHS compliant. Total power consumption is < 3.5 W.



Lead-Free

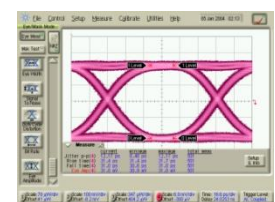
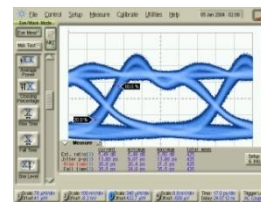
## QFP-40GLR4-AT2K



## Key Features

- 4x CWDM channels 1271, 1291, 1311, and 1331 nm.
- 40 Gb/s, 10 Gb/s for each LR4 wavelength
- 2 km transmission distance for SMF
- Duplex LC singlemode interface connector
- 38-pin Z-axis hot pluggable connector
- Compliant with QSFP+ MSA standard
- Compliant with IEEE 802.3ba, 40GBASE-LR4
- Single 3.3V power supply
- RoHS compliant

10 Gb/s, 2<sup>23</sup>-1 NRZ data eye pattern  
TX RX



## Ordering Information

**Part Number:** QFP-40GLR4-AT2K

### Description:

QSFP+, 4x CWDM LR4, 40 Gb/s, single mode, dual LC fiber optics transceiver, 2 km reach, 0-70°C

## Applications

- ✓ 40G Fiber Channel and Ethernet
- ✓ InfiniBand 4X SDR DDR QDR
- ✓ Data Communication for SAN and LAN
- ✓ Central offices routers and switches
- ✓ Mass storage systems interconnect
- ✓ Computer cluster cross-connect

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate (Each Lane)	---	10.3	11.1	Gb/s
Supply Voltage	3.14	3.3	3.46	V
Supply Current	---	---	900	mA

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Supply Voltage	$V_{cc}$	-0.3	4	V
Input Voltage	$V_{in}$	$V_{cc}-0.3$	$V_{cc}+0.3$	V
Relative Humidity	$R.H.$	5	95	%
Output Current	$I_o$	---	50	mA

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.3	---	1.0	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	ohm
Optical Output Power per Lane <sup>3</sup>	$P_o$	-7	---	0	dBm
Total Optical Power	$P_T$	---	---	8.3	dBm
Optical Wavelength 1	$\lambda_o$	1264.5	1271	1277.5	nm
Optical Wavelength 2	$\lambda_o$	1284.5	1291	1297.5	nm
Optical Wavelength 3	$\lambda_o$	1304.5	1311	1317.5	nm
Optical Wavelength 4	$\lambda_o$	1324.5	1331	1337.5	nm
Side Mode Suppression Ratio	SMSR	30	---	---	dB
Relative Intensity Noise	$RIN$	---	---	-128	dB/Hz
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
Transmitter & Dispersion Penalty	$TDP$	---	---	2.3	dB
TX Disable Asserted	$P_{OFF}$	---	---	-30	dBm
Input Voltage – Logic High	$V_{DH}$	2.0	---	$V_{cc}$	V
Input Voltage – Logic Low	$V_{DL}$	0	---	0.4	V
TX Enabled Assert Time	$T_{TAss}$	---	---	100	ms
TX Disabled Deassert Time	$T_{TDis}$	---	---	400	μs
Reset Initial Assert Time	$T_{RSAss}$	---	---	2	μs

Notes:

1. Module is designed for AC coupling. DC voltage will be filtered by internal capacitors.
2. Single ended will be 50 ohm for each signal line.
3. Output of coupling optical power into 50/125 μm MMF.
4. Refer to OptixCom "QSFP Design Reference Guide" for more design details.

**Transmitter Electro-Optical Characteristics (Cont.)**

Parameter	Symbol	Min.	Typical	Max.	Units
Reset Assert Time	$T_{riass}$	---	---	2000	ms
Time to Initialize	$T_{ini}$	---	---	2000	ms
TX Fault Assert Time	$T_{txass}$	---	---	200	ms
Flag Assert Time	$T_{fgass}$	---	---	200	ms

**Receiver Electro-Optical Characteristics**

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	$\lambda_c$	1250	---	1360	nm
Receiver Overload	$P_{max}$	0	---	---	dBm
Receiver Sensitivity per Lane <sup>1</sup>	$P_I$	---	---	-11.5	dBm
Differential Output Voltage	$\Delta V_o$	0.3	---	0.8	V
Differential Input Impedance <sup>2</sup>	$Z$	---	100	---	Ohm
Receiver Reflectance	$OL$	---	---	-26	dB
Rise/Fall Time (20% - 80%)	$T_r/T_f$	---	---	28	ps
RX Signal Loss – Asserted	$P_{SD+}$	---	---	-12	dBm
RX Signal Loss – Deasserted	$P_{SD-}$	-30	---	---	dBm
Output Voltage – Logic High	$V_{RL+}$	2.0	---	$V_{CC}$	V
Output Voltage – Logic Low	$V_{RL-}$	0	---	0.4	V
RX LOS Assert Time	$T_{RL+}$	---	---	100	ms
RX LOS Deassert Time	$T_{RL-}$	---	---	100	ms
ModSel Assert Time	$T_{ModSelAss}$	---	---	100	$\mu$ s
ModSel Deassert Time	$T_{ModSelDea}$	---	---	100	$\mu$ s

Notes:

1. Test at 10 Gb/s,  $2^{31} - 1$  PRBS data pattern, and  $> 1 \times 10^{-12}$  of Bit-Error-Rate (BER).
2. Single ended will be 50 ohm for each signal line.
3. Refer to OptixCom "QSFP Design Reference Guide" for more design details.