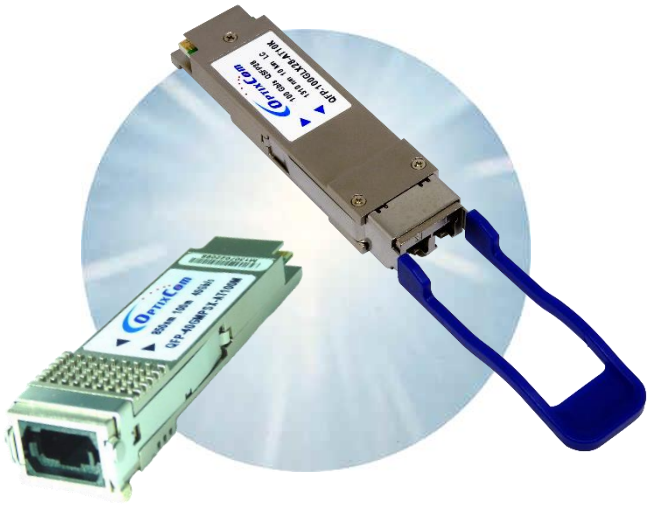
40/100G Four-Channel Small Form (QSFP) Optical Transceivers

OptixCom
Connect with Light

Features

- 40 Gb/s QSFP+ and 100 Gb/s QSFP28 package
- 850 nm SX and 4x CWDM LR4 channels
- Four channels of 10.3 Gb/s for 40 Gb/s
- Four channels of 25 Gb/s for 100 Gb/s
- QSFP+ and QSFP28 MSA compliant
- 40/100GBASE Ethernet IEEE 802.3ba/m compliant
- Single MPO or dual LC optical connector
- 38-pin connector z-axis hot pluggable



Applications

- ✓ 40 and 100 Gigabit Ethernet
- ✓ Datacenter interconnects
- ✓ Infiniband QDR and Fiber Channel
- ✓ Data Communication for SAN and LAN
- ✓ Routers and switches, computer cluster cross-connect

Products Selection Guide

Part Number	Wavelength	Data Rate	Power Budget	Distance*	Temp. Range
40 Gb/s, 850 nm, Multimode Applications					
QFP-40GSR4-AT300M	4x 850 nm	40 Gb/s	>2 dB	300 m	0 – 70°C
40 Gb/s, 4x10G CWDM LR4, Single Mode Applications					
QFP-40GLR4-AT2K	4x CWDM	40 Gb/s	>5 dB	2 km	0 – 70°C
QFP-40GLR4-AT10K	4x CWDM	40 Gb/s	>5 dB	10 km	0 – 70°C
100 Gb/s, 4x25G, 850 nm, Multimode Applications					
QFP-100GSR4-AT100M	4x 850 nm	100 Gb/s	>4 dB	100 m	0 – 70°C
100 Gb/s, 4x25G CWDM LR4, Single Mode Applications					
QFP-100GLR4-AT2K	4x CWDM	100 Gb/s	>4 dB	2 km	0 – 70°C
QFP-100GLR4-AT10K	4x CWDM	100 Gb/s	>6 dB	10 km	0 – 70°C

*: The indicated distance is for reference only, not guaranteed specifications. The actual transmission distance depends on system configuration and power budget. For single mode fibers, the typical loss is 0.25 dB/km @ 1550 nm and 0.35 dB/km @ 1310 nm.

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Tel: +49 (0)681 4013-5172

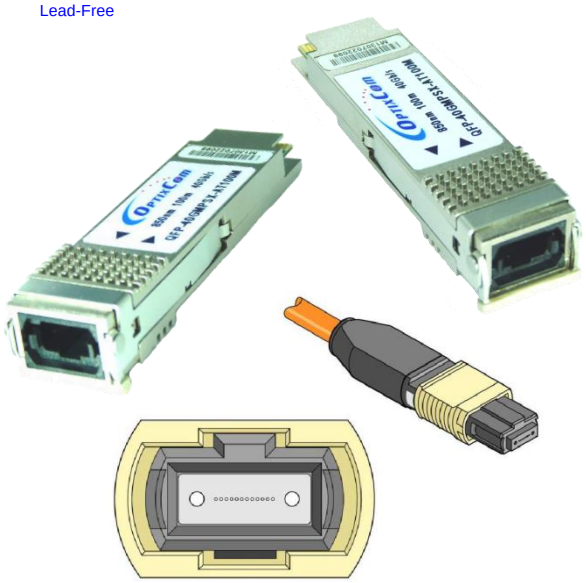
Description

OptixCom's 40 Gb/s QSFP+ is a 4-lanel parallel pluggable fiber optics transceiver designed with advanced 850 nm VCSEL laser arrays and high speed electronics to achieve the optimum performance for optical interconnect applications. It is compliant with 40G Ethernet standard and QSFP+ Multi-Source Agreement (MSA) SFF-8436 for datacom applications.

The transceiver uses an 8-fiber MPO multimode connector interface to transmit and receive 4 lanes of 10 Gb/s optical data respectively. It is hot pluggable in the z-axis with a 38-pin connector. The transceiver has 3-11 dB of power budget and reaches up to 300 meters of transmission distance with OM3 multimode fibers. The product is RoHS compliant. Total power consumption is < 0.7W.

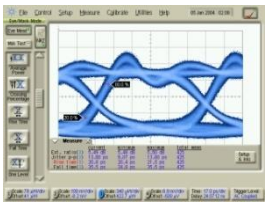
Lead-Free

QFP-40GSR4-AT300M

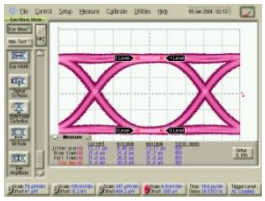


10 Gb/s, 2^{23}-1 NRZ data eye pattern

TX



RX



Key Features

- 850 nm multimode, 40 Gb/s data rate
- 4-channel duplex transceiver; 10 Gb/s each lane
- 300 m with OM3 MMF and 400 m with OM4 MMF
- 3-11 dB power budget
- Single 8-fiber MPO connector optical interface
- 38-pin Z-axis hot pluggable connector
- Compliant with QSFP+ MSA standard
- Compliant with IEEE 802.3ba, 40GBASE-SR
- Single 3.3V power supply
- RoHS compliant

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

Ordering Information

Part Number: QFP-40GSR4-AT300M

Description:

QSFP+, 850 nm 40 Gb/s, multimode MPO fiber optics transceiver, 300 m reach, 0-70°C

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	---	---	200	mA

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	*Tst*	-40	85	°C
Supply Voltage	*Vcc*	-0.3	4	V
Input Voltage	*VIN*	*Vcc*-0.3	*Vcc* +0.3	V
Relative Humidity	*R.H.*	5	95	%
Output Current	*Io*	---	50	mA

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	*ΔVi*	0.3	---	1.0	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Optical Output Power [3]	*Po*	-7.5	---	1.0	dBm
Optical Power Difference BTW Lanes (OMA)	*Pod*	---	---	4	dBm
Transmitter & Dispersion Penalty	*TDP*	---	---	3.5	dB
Optical Wavelength	*λo*	840	850	860	nm
Extinction Ratio	*ET*	3	---	---	dB
Spectral Width (rms)	*Δλ*	---	---	0.65	nm
Skew	*Tsw*	---	---	300	ps
TX Disable Asserted	*POFF*	---	---	-30	dBm
Input Voltage – Logic High	*VDH*	2.0	---	*Vcc*	V
Input Voltage – Logic Low	*VDL*	0	---	0.4	V
Reset Initial Assert Time	*Trsass*	---	---	2	μs
Reset Assert Time	*Triass*	---	---	2000	ms
Time to Initialize	*Tini*	---	---	2000	ms
TX Fault Assert Time	*Ttxass*	---	---	200	ms
Flag Assert Time	*Tfgass*	---	---	200	ms

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.

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_C	840	---	860	nm
Receiver Overload	P_{max}	2.4	---	---	dBm
Receiver Sensitivity [1]	P_I	---	---	-10	dBm
Stressed Receiver Sensitivity in OMA	P_{IS}	---	---	-5.4	dBm
LOS Hysteresis	L_{hs}	0.5	---	---	dB
Differential Output Voltage	ΔV_O	0.3	---	0.8	V
Differential Input Impedance [2]	Z	---	100	---	Ohm
Optical Return Loss	OL	12	---	---	dB
Rise/Fall Time (20% - 80%)	T_r/T_f	---	---	40	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
ModSelL Assert Time	$T_{ModSelAss}$	---	---	100	µs
ModSelL Deassert Time	$T_{ModSelDea}$	---	---	100	µs

Notes:

1. Test at 10 Gb/s, 2^{31} – 1 PRBS data pattern, and > $1x10^{-12}$ 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.

Typical Transmission Distance for Multimode Fibers @ 850 nm

Data Rate	Fiber Type	Distance (m)	Data Rate	Fiber Type	Distance (m)
10 Gb/s	OM4: 50 µm, 3500 MHz*km	400	25 Gb/s	OM4: 50 µm, 3500 MHz*km	150
	OM3: 50 µm, 1500 MHz*km	300		OM3: 50 µm, 1500 MHz*km	100
	OM1: 50 µm, 500 MHz*km	82		OM1: 50 µm, 500 MHz*km	---
	OM1: 62.5 µm, 200 MHz*km	33		OM1: 62.5 µm, 200 MHz*km	---

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 demutiplexed 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.

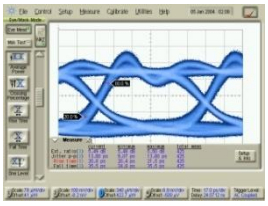
The transceiver uses dual LC connector for single mode applications. It is hot pluggable in the z-axis with a 38-pin connector. The product is RoHS compliant. Total power consumption is < 3.5 W.

Lead-Free

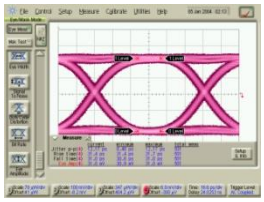
QFP-40GLR4-AT2K

10 Gb/s, 2^{23}-1 NRZ data eye pattern

TX



RX



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

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	*Tst*	-40	85	°C
Supply Voltage	*Vcc*	-0.3	4	V
Input Voltage	*VIN*	*Vcc*-0.3	*Vcc* +0.3	V
Relative Humidity	*R.H.*	5	95	%
Output Current	*Io*	---	50	mA

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	ΔVi	0.3	---	1.0	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Optical Output Power per Lane [3]	*Po*	-7	---	0	dBm
Total Optical Power	*PT*	---	---	8.3	dBm
Optical Wavelength 1	λo	1264.5	1271	1277.5	nm
Optical Wavelength 2	λo	1284.5	1291	1297.5	nm
Optical Wavelength 3	λo	1304.5	1311	1317.5	nm
Optical Wavelength 4	λo	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	*POFF*	---	---	-30	dBm
Input Voltage – Logic High	*VDH*	2.0	---	*Vcc*	V
Input Voltage – Logic Low	*VDL*	0	---	0.4	V
TX Enabled Assert Time	*TTAss*	---	---	100	ms
TX Disabled Deassert Time	*TTDis*	---	---	400	µs
Reset Initial Assert Time	*Trsass*	---	---	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	λ_C	1250	---	1360	nm
Receiver Overload	P_{max}	0	---	---	dBm
Receiver Sensitivity per Lane [1]	P_I	---	---	-11.5	dBm
Differential Output Voltage	ΔV_O	0.3	---	0.8	V
Differential Input Impedance [2]	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
ModSelL Assert Time	$T_{ModSelAss}$	---	---	100	µs
ModSelL Deassert Time	$T_{ModSelDea}$	---	---	100	µs

Notes:

1. Test at 10 Gb/s, $2^{31} - 1$ PRBS data pattern, and > $1x10^{-12}$ 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.

Description

OptixCom's 40 Gb/s QSFP+ LR4 optical transceiver is designed to operate with 4x CWDM channels for up to 10 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 demutiplexed 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.

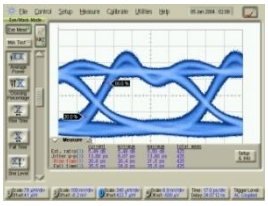
The transceiver uses dual LC connector for single mode applications. It is hot pluggable in the z-axis with a 38-pin connector. The product is RoHS compliant. Total power consumption is < 3.5 W.

Lead-Free

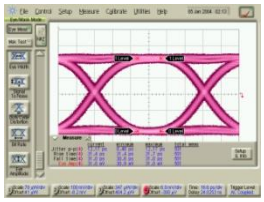
QFP-40GLR4-AT10K

10 Gb/s, 2^{23}-1 NRZ data eye pattern

TX



RX



Key Features

- 4x CWDM channels 1271, 1291, 1311, and 1331 nm.
- 40 Gb/s, 10 Gb/s for each LR4 wavelength
- 10 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

Ordering Information

Part Number: QFP-40GLR4-AT10K

Description:

QSFP+, 4x CWDM LR4, 40 Gb/s, single mode, dual LC fiber optics transceiver, 10 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	*Tst*	-40	85	°C
Supply Voltage	*Vcc*	-0.3	4	V
Input Voltage	*VIN*	*Vcc*-0.3	*Vcc* +0.3	V
Relative Humidity	*R.H.*	5	95	%
Output Current	*Io*	---	50	mA

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	ΔVi	0.3	---	1.0	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Optical Output Power per Lane [3]	*Po*	-7	---	2.3	dBm
Total Optical Power	*PT*	---	---	8.3	dBm
Optical Wavelength 1	λo	1264.5	1271	1277.5	nm
Optical Wavelength 2	λo	1284.5	1291	1297.5	nm
Optical Wavelength 3	λo	1304.5	1311	1317.5	nm
Optical Wavelength 4	λo	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	*POFF*	---	---	-30	dBm
Input Voltage – Logic High	*VDH*	2.0	---	*Vcc*	V
Input Voltage – Logic Low	*VDL*	0	---	0.4	V
TX Enabled Assert Time	*TTAss*	---	---	100	ms
TX Disabled Deassert Time	*TTDis*	---	---	400	µs
Reset Initial Assert Time	*Trsass*	---	---	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	λ_C	1250	---	1360	nm
Receiver Overload	P_{max}	2.3	---	---	dBm
Receiver Sensitivity per Lane [1]	P_I	---	---	-11.5	dBm
Differential Output Voltage	ΔV_O	0.3	---	0.8	V
Differential Input Impedance [2]	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
ModSelL Assert Time	$T_{ModSelAss}$	---	---	100	µs
ModSelL Deassert Time	$T_{ModSelDea}$	---	---	100	µs

Notes:

1. Test at 10 Gb/s, $2^{31} - 1$ PRBS data pattern, and > $1x10^{-12}$ 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.

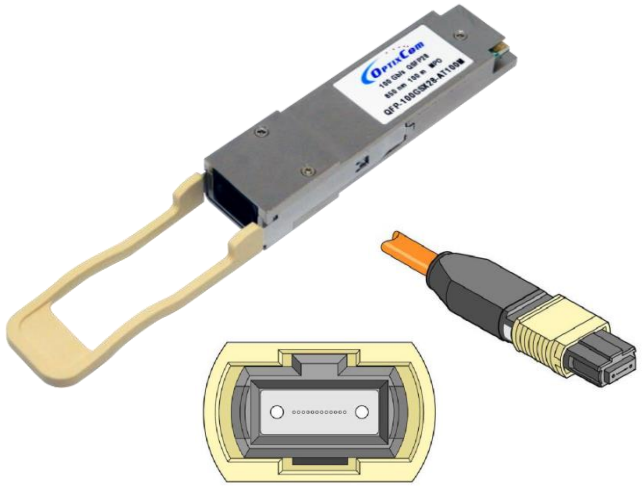
Description

OptixCom's 100 Gb/s QSFP28 is a 4-lanel parallel pluggable fiber optics transceiver designed with advanced 850 nm VCSEL laser arrays and high speed electronics to achieve the optimum performance for optical interconnect applications. It is compliant with 100G Ethernet standard and QSFP28 Multi-Source Agreement (MSA) SFF-8436 for datacom applications.

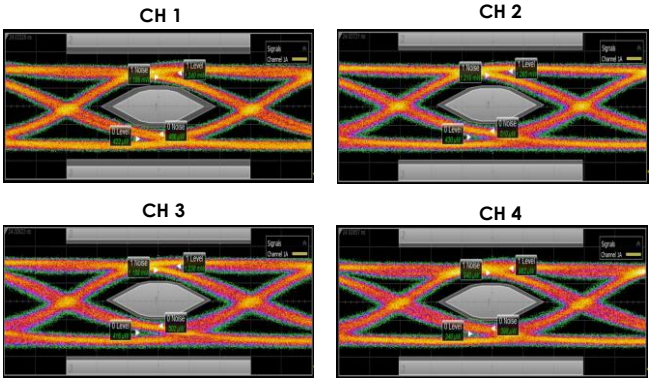
The transceiver uses an 8-fiber MPO multimode connector interface to transmit and receive 4 lanes of 25 Gb/s optical data respectively. It is hot pluggable in the z-axis with a 38-pin connector. The transceiver has 2-11 dB of power budget and reaches up to 100 meters of transmission distance with OM3 multimode fibers. The product is RoHS compliant. Total power consumption is < 2.5W.

Lead-Free

QFP-100GSR4-AT100M



4 x 25 Gb/s Channels, 2^{31}-1 NRZ Data Eye Pattern



Key Features

- 850 nm multimode, 100 Gb/s data rate
- 4-channel duplex transceiver; 28 Gb/s each lane
- 100 m with OM3 MMF
- 2-12 dB power budget
- Single 8-fiber MPO connector optical interface
- 38-pin Z-axis hot pluggable connector
- Compliant with QSFP+ MSA standard
- Compliant with IEEE 802.3bm, 100GBASE-SR
- Single 3.3V power supply
- RoHS compliant

Applications

- ✓ 100G 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

Ordering Information

Part Number: QFP-100GSR4-AT100M

Description:

QSFP28, 850 nm 100 Gb/s, multimode MPO fiber optics transceiver, 100 m reach, 0-70°C

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	103	---	112	Gb/s
Supply Voltage	3.14	3.3	3.46	V
Supply Current	---	---	750	mA

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	*Tst*	-40	85	°C
Supply Voltage	*Vcc*	-0.3	4	V
Input Voltage	*VIN*	*Vcc*-0.3	*Vcc* +0.3	V
Relative Humidity	*R.H.*	5	95	%
Output Current	*Io*	---	50	mA

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	*ΔVi*	0.3	---	1.0	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Optical Output Power Per Lane[3]	*Po*	-8.4	---	2.4	dBm
Spectral Width (rms)	*Δλ*	---	---	0.6	nm
Transmitter & Dispersion Penalty	*TDP*	---	---	4.3	dB
Optical Wavelength	*λo*	840	850	860	nm
Extinction Ratio	*ET*	2	---	---	dB
TX Disable Asserted	*POFF*	---	---	-30	dBm
Input Voltage – Logic High	*VDH*	2.0	---	*Vcc*	V
Input Voltage – Logic Low	*VDL*	0	---	0.4	V
Reset Initial Assert Time	*Trsass*	---	---	2	μs
Reset Assert Time	*Triass*	---	---	2000	ms
Time to Initialize	*Tini*	---	---	2000	ms
TX Enabled Assert Time	*TTAss*	---	---	100	ms
TX Disabled Deassert Time	*TTDis*	---	---	400	μs
TX Fault Assert Time	*Ttxass*	---	---	200	ms
Flag Assert Time	*Tfgass*	---	---	200	ms

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.

Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Operating Wavelength	λ_C	840	---	860	nm
Receiver Overload	P_{max}	2.4	---	---	dBm
Receiver Sensitivity [1]	P_I	---	---	-10	dBm
Differential Output Voltage	ΔV_O	0.3	---	0.8	V
Differential Input Impedance [2]	Z	---	100	---	Ohm
Optical Return Loss	OL	12	---	---	dB
Rise/Fall Time (20% - 80%)	Tr/Tf	---	---	40	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
ModSelL Assert Time	$T_{ModSelAss}$	---	---	100	µs
ModSelL Deassert Time	$T_{ModSelDea}$	---	---	100	µs

Notes:

1. Test at 25 Gb/s, 2^{31} – 1 PRBS data pattern, and > $1x10^{-12}$ 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.

Typical Transmission Distance for Multimode Fibers @ 850 nm

Data Rate	Fiber Type	Distance (m)	Data Rate	Fiber Type	Distance (m)
10 Gb/s	OM4: 50 µm, 3500 MHz*km	400	25 Gb/s	OM4: 50 µm, 3500 MHz*km	150
	OM3: 50 µm, 1500 MHz*km	300		OM3: 50 µm, 1500 MHz*km	100
	OM1: 50 µm, 500 MHz*km	82		OM1: 50 µm, 500 MHz*km	---
	OM1: 62.5 µm, 200 MHz*km	33		OM1: 62.5 µm, 200 MHz*km	---

Description

OptixCom's 100 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 25 Gb/s. They are then multiplexed together into a single channel to achieve 100 Gb/s of data transmission.

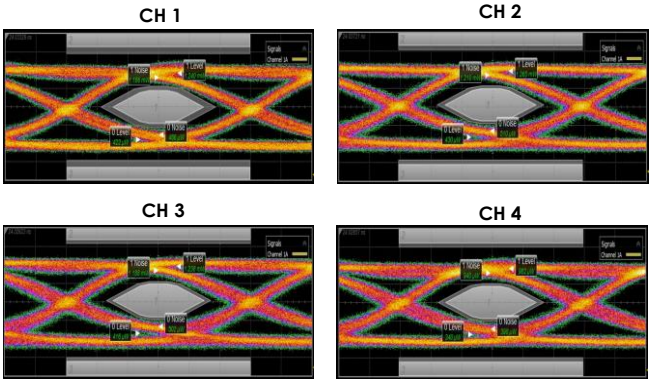
On the receiver side, the 100 Gb/s data signal is demutiplexed and converted to the same 4x CWDM channels as the transmitter side. It is compliant with 100G Ethernet standard and QSFP28 Multi-Source Agreement (MSA) SFF-8436 for datacom applications.

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 < 3.5W.

Lead-Free

QFP-100GLR4-AT2K

4 x 25 Gb/s Channels, 2^{31}-1 NRZ Data Eye Pattern



Key Features

- 4x CWDM channels 1271, 1291, 1311, and 1331 nm.
- 100 Gb/s, 25 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, 100GBASE-LR4
- Single 3.3V power supply
- RoHS compliant

Applications

- ✓ 100G 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

Ordering Information

Part Number: QFP-100GLR4-AT2K

Description:

QSF28, 4x CWDM LR4, 100 Gb/s, single mode, dual LC fiber optics transceiver, 2 km reach, 0-70°C

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	103	---	112	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	*Tst*	-40	85	°C
Supply Voltage	*Vcc*	-0.3	4	V
Input Voltage	*VIN*	*Vcc*-0.3	*Vcc* +0.3	V
Relative Humidity	*R.H.*	5	95	%
Output Current	*Io*	---	50	mA

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	*ΔVi*	0.3	---	1.0	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Optical Output Power per Lane [3]	*Po*	-6.5	---	2.5	dBm
Total Optical Power	*PT*	---	---	8.5	dBm
Transmitter & Dispersion Penalty	*TDP*	---	---	3.5	dB
Optical Wavelength 1	*λo*	1264.5	1271	1277.5	nm
Optical Wavelength 2	*λo*	1284.5	1291	1297.5	nm
Optical Wavelength 3	*λo*	1304.5	1311	1317.5	nm
Optical Wavelength 4	*λo*	1324.5	1331	1337.5	nm
Side Mode Suppression Ratio	*SMSR*	30	---	---	dB
Relative Intensity Noise	*RIN*	---	---	-128	dB/Hz
Spectral Width (-20 dB)	*Δλ*	---	---	1	nm
Extinction Ratio	*ET*	4	---	---	dB
TX Disable Asserted	*POFF*	---	---	-30	dBm
TX Enabled Assert Time	*TTAss*	---	---	100	ms
TX Disabled Deassert Time	*TTDis*	---	---	400	µs
Input Voltage – Logic High	*VDH*	2.0	---	*Vcc*	V
Input Voltage – Logic Low	*VDL*	0	---	0.4	V
Reset Initial Assert Time	*Trsass*	---	---	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	λ_C	1250	---	1360	nm
Receiver Overload	P_{max}	2.5	---	---	dBm
Receiver Sensitivity per Lane [1]	P_I	---	---	-10	dBm
Differential Output Voltage	ΔV_O	0.3	---	0.8	V
Differential Input Impedance [2]	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
ModSelL Assert Time	$T_{ModSelAss}$	---	---	100	µs
ModSelL Deassert Time	$T_{ModSelDea}$	---	---	100	µs

Notes:

1. Test at 25 Gb/s, $2^{31} - 1$ PRBS data pattern, and > $1x10^{-12}$ 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.

Description

OptixCom's 100 Gb/s QSFP+ LR4 optical transceiver is designed to operate with 4x CWDM channels for up to 10 km of transmission distance. The transceiver uses 1296, 1300, 1305 and 1309 nm DFB laser wavelengths, with each wavelength running at 25 Gb/s. They are then multiplexed together into a single channel to achieve 100 Gb/s of data transmission.

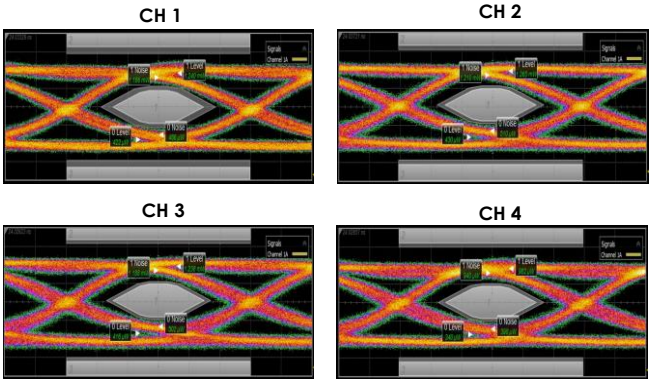
On the receiver side, the 100 Gb/s data signal is demutiplexed and converted to the same 4x CWDM channels as the transmitter side. It is compliant with 100G Ethernet standard and QSFP28 Multi-Source Agreement (MSA) SFF-8436 for datacom applications.

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 < 3.5W.

Lead-Free

QFP-100GLR4-AT10K

4 x 25 Gb/s Channels, 2^{31}-1 NRZ Data Eye Pattern



Key Features

- 4x CWDM channels 1296, 1300, 1305 and 1309 nm.
- 100 Gb/s, 25 Gb/s for each LR4 wavelength
- 10 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/bm, 100GBASE-LR4
- Single 3.3V power supply
- RoHS compliant

Applications

- ✓ 100G 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

Ordering Information

Part Number: QFP-100GLR4-AT10K

Description:

QSFP28, 4x CWDM LR4, 100 Gb/s, single mode, dual LC fiber optics transceiver, 10 km reach, 0-70°C

Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	103	---	112	Gb/s
Supply Voltage	3.14	3.3	3.46	V
Supply Current	---	---	1060	mA

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	*Tst*	-40	85	°C
Supply Voltage	*Vcc*	-0.3	4	V
Input Voltage	*VIN*	*Vcc*-0.3	*Vcc* +0.3	V
Relative Humidity	*R.H.*	5	95	%
Output Current	*Io*	---	50	mA

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage [1]	*ΔVi*	0.3	---	1.0	V
Differential Input Impedance [2]	*Z*	---	100	---	ohm
Optical Output Power per Lane [3]	*Po*	-4.3	---	4.5	dBm
Total Optical Power	*PT*	---	---	10.5	dBm
Transmitter & Dispersion Penalty	*TDP*	---	---	3.5	dB
Optical Wavelength 1	*λo*	1294.53	1295.56	1296.59	nm
Optical Wavelength 2	*λo*	1299.02	1300.05	1301.09	nm
Optical Wavelength 3	*λo*	1303.54	1304.58	1305.63	nm
Optical Wavelength 4	*λo*	1308.09	1309.14	1310.19	nm
Side Mode Suppression Ratio	*SMSR*	30	---	---	dB
Relative Intensity Noise	*RIN*	---	---	-128	dB/Hz
Spectral Width (-20 dB)	*Δλ*	---	---	1	nm
Extinction Ratio	*ET*	4	---	---	dB
TX Disable Asserted	*POFF*	---	---	-30	dBm
TX Enabled Assert Time	*TTAss*	---	---	100	ms
TX Disabled Deassert Time	*TTDis*	---	---	400	µs
Input Voltage – Logic High	*VDH*	2.0	---	*Vcc*	V
Input Voltage – Logic Low	*VDL*	0	---	0.4	V
Reset Initial Assert Time	*Trsass*	---	---	2	µs

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	λ_C	1250	---	1360	nm
Receiver Overload	P_{max}	4.5	---	---	dBm
Receiver Sensitivity per Lane [1]	P_I	---	---	-10.6	dBm
Differential Output Voltage	ΔV_O	0.3	---	0.8	V
Differential Input Impedance [2]	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
ModSelL Assert Time	$T_{ModSelAss}$	---	---	100	µs
ModSelL Deassert Time	$T_{ModSelDea}$	---	---	100	µs

Notes:

1. Test at 25 Gb/s, $2^{31} - 1$ PRBS data pattern, and > $1x10^{-12}$ 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.