

40 Gb/s QSFP+ BiDi Transceiver 150m

QSFP+ Series

- **40G Link Distances up to 100m over OM3, 150m over OM4**
- **Compliant to the 40GbE XLPPi electrical specification per IEEE 802.3ba-2010**
- **Compliant to QSFP+ SFF-8436 Specification**
- **Aggregate bandwidth of > 40Gbps**
- **QSFP MSA compliant**
- **Single +3.3V power supply operating**
- **RoHS II Compliance**



Ascent's QSFP-AQ-LP-BD-01 Transceiver is a four-channel pluggable LC duplex fiber optic QSFP Transceiver for Gigabit Ethernet Applications. This transceiver is a high-performance module for short range duplex data communication and interconnect applications.

This module integrates four electrical data lanes in each direction into transmission over a single LC duplex fiber optic cable. Each electrical lane operates at 10.3125 Gbps and conforms to the 40GE XLPPi interface.

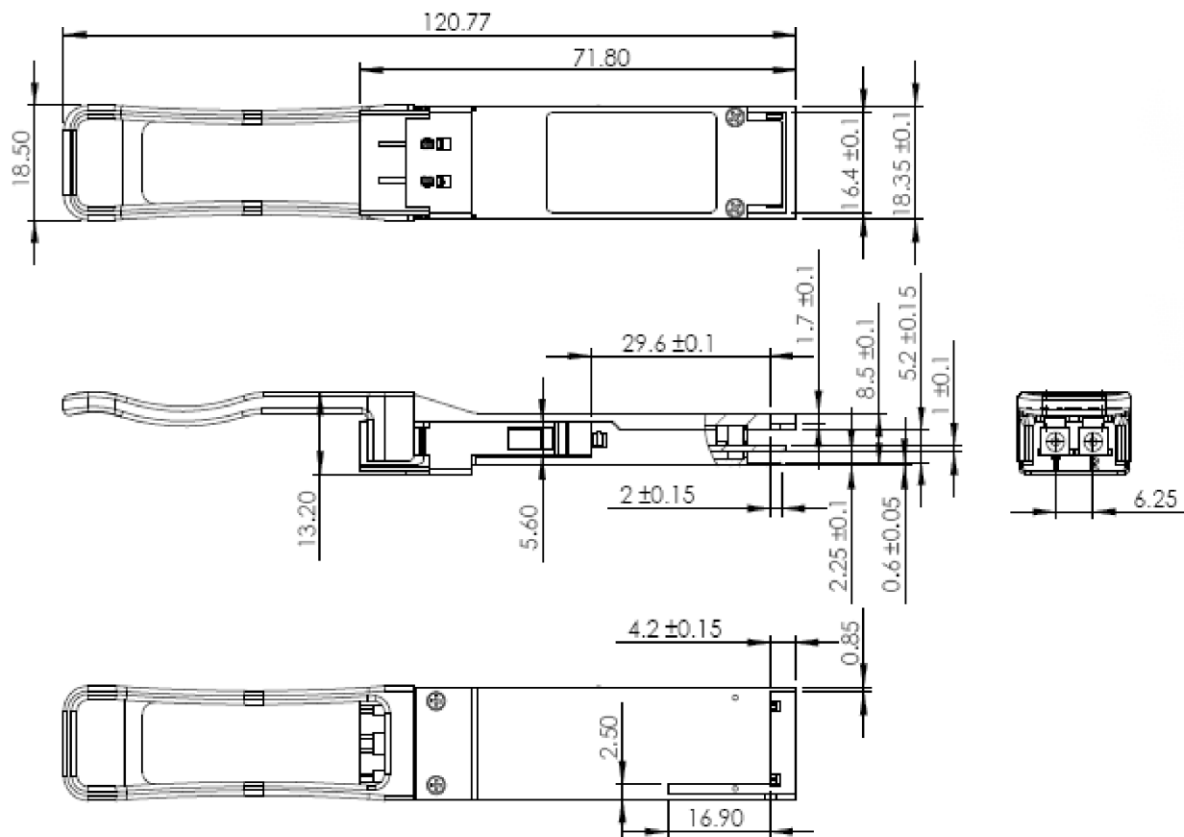
The transceiver internally multiplexes an XLPPi 4x 100G interface into two 20 Gb/s electrical channels transmitting and receiving each optically over one simplex LC fiber using bi-directional optics. This results in an aggregate bandwidth of 40 Gbps into a duplex LC cable. This allows reuse of the installed LC duplex cabling infrastructure for 40 GbE applications.

Link distances up to 100m using OM3 and 150m using OM4 optical fiber are supported. The electrical interface uses a contact QSFP type edge connector. The optical interface uses a conventional LC duplex connector.

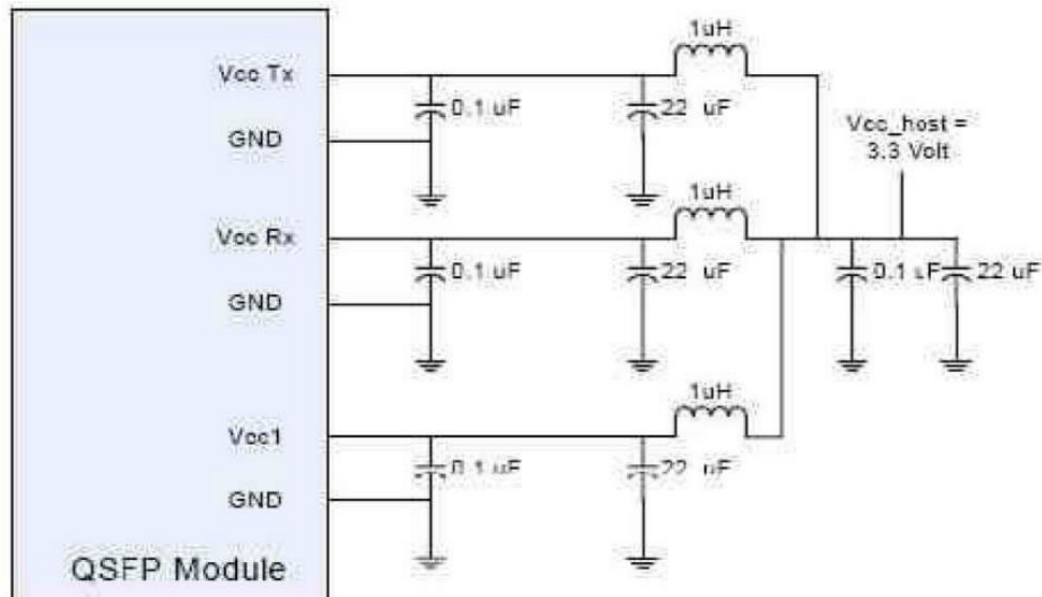
Key Features

- Compliant to the 40GbE XLPPI electrical specification per IEEE 802.3ba-2010
- Compliant to QSFP+ SFF-8436 Specification
- Aggregate bandwidth of > 40Gbps
- Operates at 10.3125 Gbps per electrical channel with 64b/66b encoded data
- QSFP MSA compliant
- Capable of over 100m transmission on OM3 Multimode Fiber (MMF) and 150m on OM4 MMF
- Single +3.3V power supply operating
- With digital diagnostic functions
- Case Operating Temperature: Range: 0 to 70°C
- RoHS Compliant Part
- Utilizes a standard LC duplex fiber cable allowing reuse of existing cable infrastructure

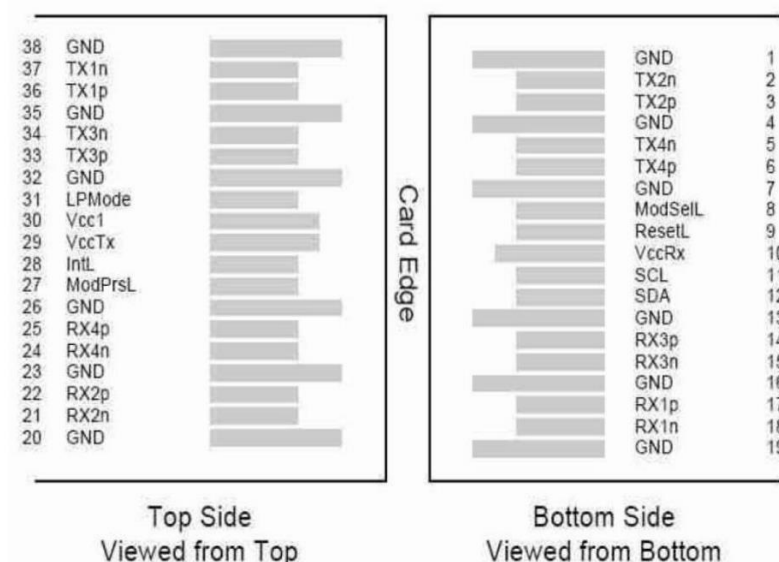
Mechanical Dimensions



Recommend Circuit Schematic



Pin Assignment



Pin	Logic	Symbol	Name/Description	Note
1		GND	Ground	1
2	CMI-I	Tx2n	Transmitter Inverted Data Input	
3	CMI-I	Tx2p	Transmitter Non Inverted Data Input	
4		GND	Ground	1
5	CMI-I	Tx4n	Transmitter Inverted Data Input	
6	CMI-I	Tx4p	Transmitter Non Inverted Data Input	
7		GND	Ground	1
8	LVTTL-I	ModselL	Module Select	
9	LVTTL-I	RetsetL	Module Reset	
10		Vcc Rx	Receiver +3.3V DC Power Supply	2
11	LVC MOS-I/O	SCL	I2C Serial Clock	
12	LVC MOS-I/O	SDA	I2C Serial Data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non Inverted Differential Output	
15	CML-O	Rx3n	Receiver Inverted Differential Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non Inverted Differential Output	
18	CML-O	Rx1n	Receiver Inverted Differential Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Differential Output	
22	CML-O	Rx2p	Receiver Non Inverted Differential Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Differential Output	
25	CML-O	Rx4p	Receiver Non Inverted Differential Output	
26		GND	Ground	1

Pin		Symbol	Name/Description	Note
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		V _{cc} Tx	Transmitter +3.3V DC Power Supply	2
30		V _{cc} 1	+3.3V DC Power Supply	2
31	LVTTL-I	LPM _{od}	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Ground	1

Notes:

1. GND is the symbol for single and supply(power) common for QSFP modules, All are common within the QSFP module and all module voltages are referenced to this potential otherwise noted. Connect these directly to the host board signal common ground plane. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
2. V_{cc}Rx, V_{cc}1 and V_{cc}Tx are the receiver and transmitter power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. V_{cc}Rx, V_{cc}1 and V_{cc}Tx may be internally connected within the QSFP transceiver module in any combination. The connector pins are each rated for maximum current of 500mA.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	Ts	-40		+85	°C
Supply Voltage	VccT, R	-0.5		4	V
Relative Humidity	RH	0		85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Case operating Temperature	Tc	0		+70	°C	
Supply Voltage	VccT, R	+3.13	3.3	+3.47	V	
Supply Current	Icc			1000	mA	
Power Consumption	PD			3.5	W	

Optical Characteristics(TOP = 0 to 70°C, Vcc = 3.0 to 3.6 volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Transmitter						
Optical Wavelength CH1	A	832	850	868	nm	
Optical Wavelength CH2	A	882	900	918	nm	
RMS Spectral Width	Pm		0.5	0.65	nm	
Average Optical Power per Channel	Pavg	-4	-2.5	+5.0	dBm	
Laser Off Power Per Channel	Poff			-30	dBm	
Optical Extinction Ratio	ER	3.5			dB	
Relative Intensity Noise	Rin			-128	dB/HZ	1
Optical Return Loss Tolerance				12	dB	
Receiver						
Optical Center Wavelength CH1	A	882	900	918	nm	
Optical Center Wavelength CH2	A	832	850	868	nm	
Receiver Sensitivity per Channel	R		-6.5		dBm	
Maximum Input Power	Pmax	+3.5			dBm	
Receiver Reflectance	Rrx			-12	dB	
LOS De-Assert	LOSd			-14	dBm	
LOS Assert	LOSa	-30			dBm	
LOS Hysteresis	LOSh	0.5			dB	

Note: 12dB Reflection.

Electrical Characteristics(TOP = 0 to 70°C, Vcc = 3.13 to 3.47 volts)

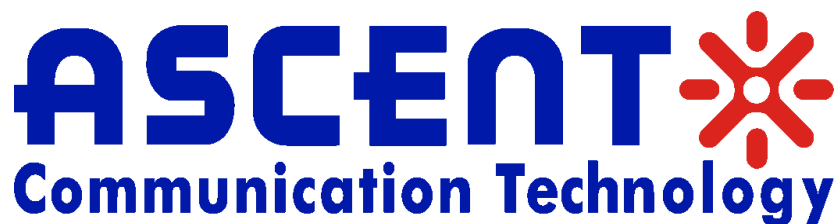
Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Data Rate per Channel		-	10.3125	11.2	Gbps	
Power Consumption		-	2.5	3.5	W	
Supply Current	Icc		0.75	1.0	A	
Control I/O Voltage-High	VIH	2.0		Vcc	V	
Control I/O Voltage-Low	VIL	0		0.7	V	
Inter-Channel Skew	TSK			150	Ps	
RESETL Duration			10		Us	
RESETL De-assert time				100	ms	
Power On Time				100	ms	
Transmitter						
Single Ended Output Voltage Tolerance		0.3		4	V	1
Common mode Voltage Tolerance		15			mV	
Transmit Input Diff Voltage	VI	120		1200	mV	
Transmit Input Diff Impedance	ZIN	80	100	120		
Data Dependent Input Jitter	DDJ			0.1	UI	
Data Input Total Jitter	TJ			0.28	UI	
Receiver						
Single Ended Output Voltage Tolerance		0.3		4	V	
Rx Output Diff Voltage	Vo		600	800	mV	
Rx Output Rise and Fall Voltage	Tr/Tf			35	ps	1
Total Jitter	TJ			0.7	UI	
Deterministic Jitter	DJ			0.42	UI	

Note: 20 to 80%.

Ordering Information

Product Name	Product Description
QSFP-AQ-LP-BD-01	QSFP+ Plug-in, 40Gbps, BiDi, 150m OM4 fiber, MMF, 850nm/900nm, LC

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