100G QSFP28 Active Optical Cable (AOC)

Application

- 100G Ethernet
- Infiniband EDR

Features

- 4 independent full-duplex channels
- Up to 25.78Gb/s data rate per channel
- QSFP MSA compliant
- Up to 100m OM4 MMF transmission
- Operating case temperature: 0 to 70oC
- Single 3.3V power supply
- Maximum power consumption 3.5W each terminal
- RoHS-6 compliant

Description

This product is a high data rate parallel active optical cable (AOC), to overcome the bandwidth limitation of traditional copper cable. This product converts the parallel electrical input signals into parallel optical signals (light), by a driven Vertical Cavity Surface Emitting Laser (VCSEL) array. The light propagates through the ribbon fiber individually, and be captured by the photo diode array. The optical signals are converted into parallel electrical signals and outputted. Consequently, each terminal of the cable has 8 ports, 4 for data transmission and 4 for data receiving, to provide totally 100Gb/s data exchange.

The AOC offers 4 independent data transmission channels and 4 data receiving channels via the multimode ribbon fibers, each capable of 25Gb/s operation. Consequently, an aggregate data rate of 100Gb/s over 100 meters transmission can be achieved by this product, to support the ultra-fast computing data exchange.

The product is designed with form factor, optical/electrical connection according to the QSFP Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

Product Specifications

I. Absolute Maximum Ratings

The operation in excesso fanyabsolutemaximumratingsmight cause permanent damage to this module.

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Storage Temperature	TST	-40		85	℃	
Relativeumidity (non-condensing)	RH	0		85	%	
Operating Case Temperature	TOPC	0		70	℃	
Supply Voltage	VCC	-0.3		3.6	V	
Input Voltage	Vin	-0.3		Vcc+0.3	V	

II. Recommended Operating Environment

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Operating Case Temperature	TOP	0		70	℃	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	

Data Rate, each Lane			25.78125		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	

III. Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating temperature and supply voltage unless otherwise specified.

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
PowerConsumption, each Terminal				3.5	W	
Supply Current, each Terminal	Icc			1060	mA	
Transceiver Power-on Initialization Time				2000	ms	1
Transmitter (each Lane)						
Single Ended Input Voltage Tolerance (Note 2)		-0.3		3.6	V	
AC Common Mode Input Voltage Tolerance		15			mV	RMS
Differential Input Voltage Swing Threshold		50			mVpp	LOSA Threshod
Differential Input Voltage Swing	Vin,pp	180		1000	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Total Jitter				0.40	UI	
Deterministic Jitter				0.15	UI	
Receiver (each Lane)						
Single Ended Output Voltage		-0.3		4	V	
AC Common Mode Output Voltage				7.5	mV	RMS

Differential Output Voltage Swing	Vout,pp	300		1000	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Total Jitter				0.3	UI	
Deterministic Jitter				0.15	UI	

Notes:

1.Power-on Initialization Time is the time from when the power supply voltages reach and remain above the minimum recommended operating supply voltages to the time when the module is fullfunctional.

2.The single ended input voltage tolerance is the allowable range of the instantaneous input signals.

IV. Pin Assignment

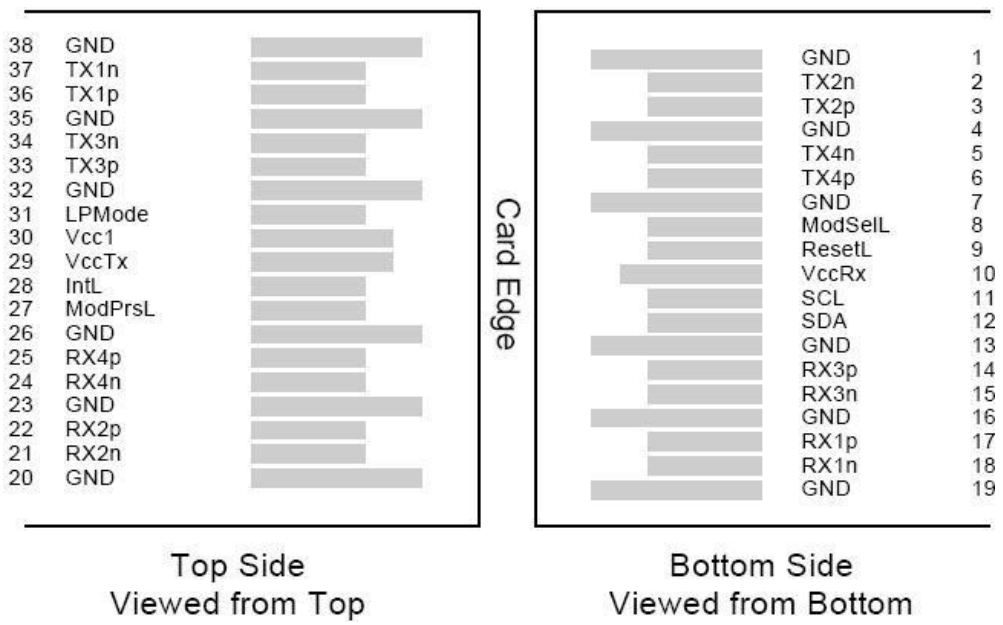


Figure – MSA compliant Connector

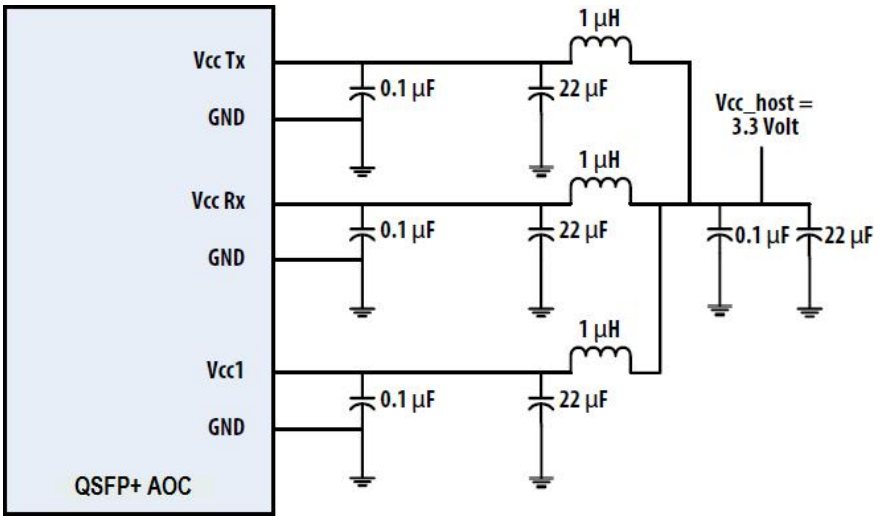
Pin	Logic	Symbol	Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3 V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-wire serial interface clock	
12	LVCMOS-I/O	SDA	2-wire serial interface data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	

26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3V Power supply transmitter	2
30		Vcc1	+3.3V Power supply	2
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	1

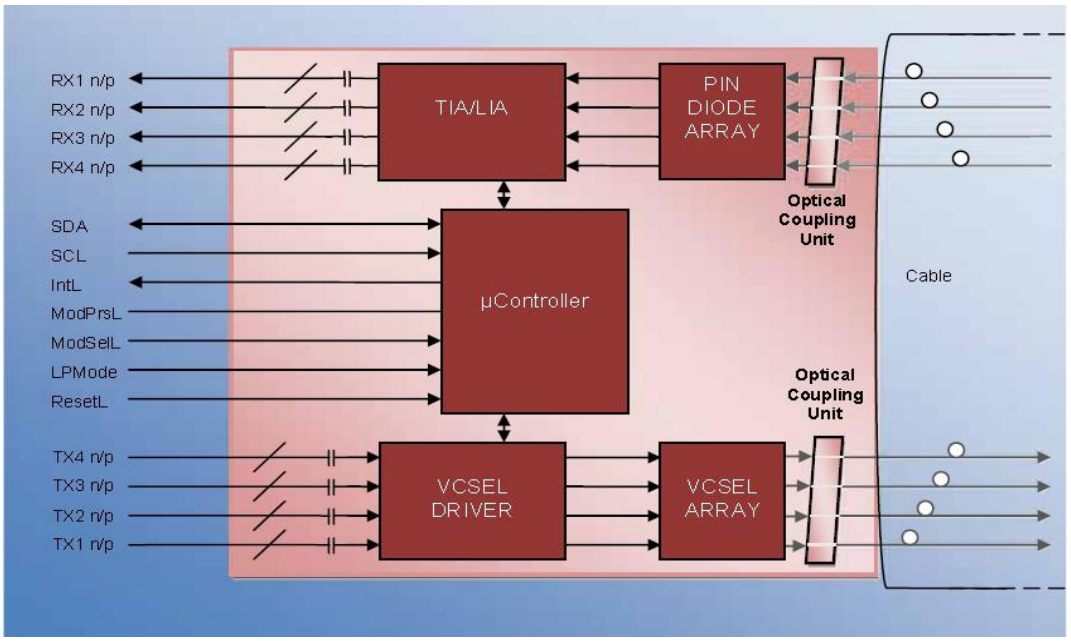
Notes:

1. GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown in Figure 3 below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

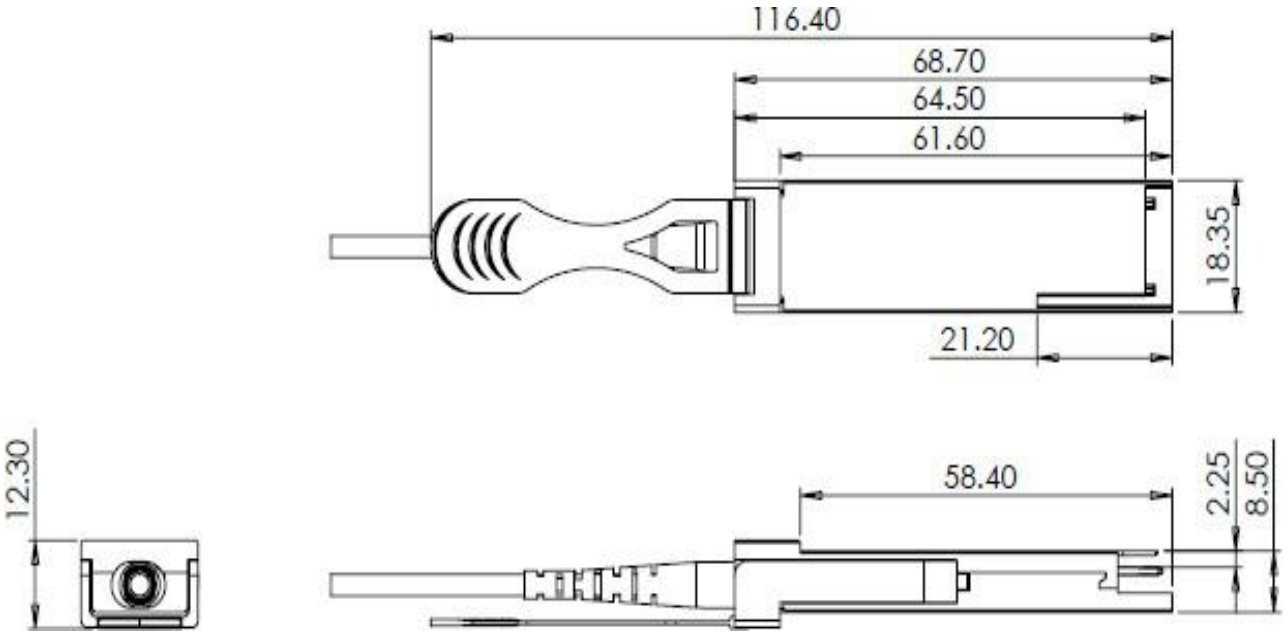
V. Recommended Power Supply Filter



VI. Optical Module Block Diagram



VII. Diagram Mechanical Drawing



VIII. ESD

This transceiverisspecifiedas ESD threshold 1KV for high speed datapins and 2KV for all others electricalinputpins,testedperMIL-STD-883,Method3015.4/JESD22-A114-A(H BM).However,normalESDprecautionsarestillrequiredduringthehandlingofthismodule.This transceive risshippedinESDprotectivepackaging.Itshouldberemovedfromthepackagingandhandledonlyinan ESD protecte denvironment.

Test Center

FS.COM transceivers are tested to ensure connectivity and compatibility in our test center before shipped out. FS.COM test center is supported by a variety of mainstream original brand switches and groups of professional staff, helping our customers make the most efficient use of our products in their systems, network designs and deployments.

The original switches could be found nowhere but at FS.COM test center, eg: Juniper MX960 & EX 4300 series, Cisco Nexus 9396PX & Cisco ASR 9000 Series, HP 5900 Series & HP 5406R ZL2 V3(J9996A), Arista 7050S-64, Brocade ICX7750-26Q & ICX6610-48, Avaya VSP 7000 MDA 2, etc.

Cisco ASR 9000 Series(A9K-MPA-1X40GE)


ARISTA 7050S-64(DCS-7050S-64)

Juniper MX960


Brocade ICX 7750-26Q

Extreme Networks X670V VIM-40G4X

Mellanox M3601Q


Dell N4032F

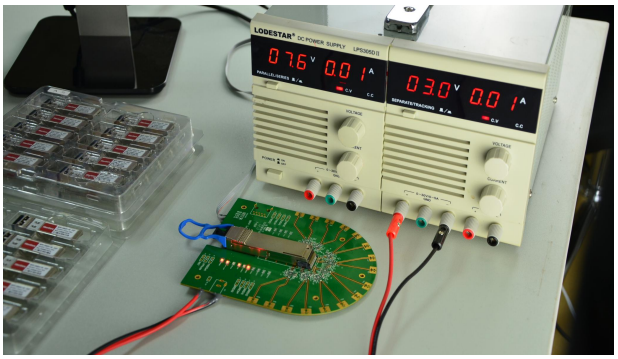
HP 5406R ZL2 V3(J9996A)

AVAYA 7024XLS(7002QQ-MDA)

Test Assured Program

FS.COM truly understands the value of compatibility and interoperability to each optics. Every module FS.COM provides must run through programming and an extensive series of platform diagnostic tests to prove its performance and compatibility. In our test center, we care of every detail from staff to facilities—professionally trained staff, advanced test facilities and comprehensive original-brand switches, to ensure our customers to receive the optics with superior quality.

Our smart data system allows effective product management and quality control according to the unique serial number, properly tracing the order, shipment and every part.



Our in-house coding facility programs all of our parts to standard OEM specs for compatibility on all major vendors and systems such as Cisco, Juniper, Brocade, HP, Dell, Arista and so on.

With a comprehensive line of original-brand switches, we can recreate an environment and test each optics in practical application to ensure quality and distance.

The last test assured step to ensure our products to be shipped with perfect package.

Order Information

Part Number	Data Rate	Length	Wire Gauge	Connector Type	Temp.Range	Cable Jacket
Q28-AO005	Up to 100G	0.5m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO01	Up to 100G	1m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO02	Up to 100G	2m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO03	Up to 100G	3m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO05	Up to 100G	5m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO07	Up to 100G	7m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO10	Up to 100G	10m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO15	Up to 100G	15m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO20	Up to 100G	20m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO25	Up to 100G	25m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP
Q28-AO30	Up to 100G	30m	QSFP28 to QSFP28	AOC Cable	0-70℃	OFNP

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