ETU-LINK®
Optical Communication System

QSFP28 Series

QSFP28

EQ2A10X-33CDxx

100Gbps QSFP28 to QSFP28 Active Optical Cables

- Four-channel full-duplex active optical cable
- Transmission data rate up to 26Gbit/s per channel
- Reliable VCSEL array technology using multimode fiber
- Available in standard lengths of 3, 5, 10, 15, 20, 30, 50,70m
- Low power consumption <3.5W
- Operating case temperature 0°C to +70°C
- 3.3V power supply voltage
- RoHS 6 compliant
- Hot Pluggable QSFP form factor

Applications

- 100G Ethernet
- Data center
- Infiniband QDR/DDR/SDR
- 4G/8G/10G Fibre Channel

Description

The ETU-LINK QSFP28 active optic cables are a high performance, low power consumption,long reach interconnect solution supporting 100G Ethernet ,or Infini Band QDR/DDR/SDR,12.5G/10G/8G/4G/2G fiber channel ,PCIe and SAS. It is compliant with the QSFP MSA and IEEE P802.3ba. QSFP AOC is an assembly of 4 full-duplex lanes, where each laneis capable of transmitting data at rates up to 25.78125Gb/s, providing an aggregated rateof 104Gb/s. ETU-LINK QSFP28 AOC is one kind of parallel transceiver which provide sincreased port density and total system cost savings.

Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	TST	-40	85	degC	
Relative Humidity(non-condensing)	RH	0	85	%	
Operating Case Temperature	TOPC	0	70	degC	
Supply Voltage	VCC	-0.3	3.6	V	
Input Voltage	Vin	-0.3	Vcc+0.3	V	

Recommended Operating Conditions and Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	TOPC	0		70	degC
Power Supply Voltage	VCC	3.13	3.3	3.47	V
Power Consumption		-		3.5	W
Data Rate	DR		25.78125		Gbps
Data Speed Tolerance	ΔDR	-100		+100	ppm
Link Distance with OM3 fiber	D	0		70	m

Electrical Specifications

Differential input impedance	Zin	90	100	110	ohm
Differential Output impedance	Zout	90	100	110	ohm
Differential input voltage amplitude	ΔVin	300		1100	mVp-p
Differential output voltage amplitude	ΔVout	500		800	mVp-p
Bit Error Rate	BR			E-12	
Input Logic Level High	VIH	2.0		VCC	V
Input Logic Level Low	VIL	0		0.8	V
Output Logic Level High	VOH	VCC-0.5		VCC	V
Output Logic Level Low	VOL	0		0.4	V

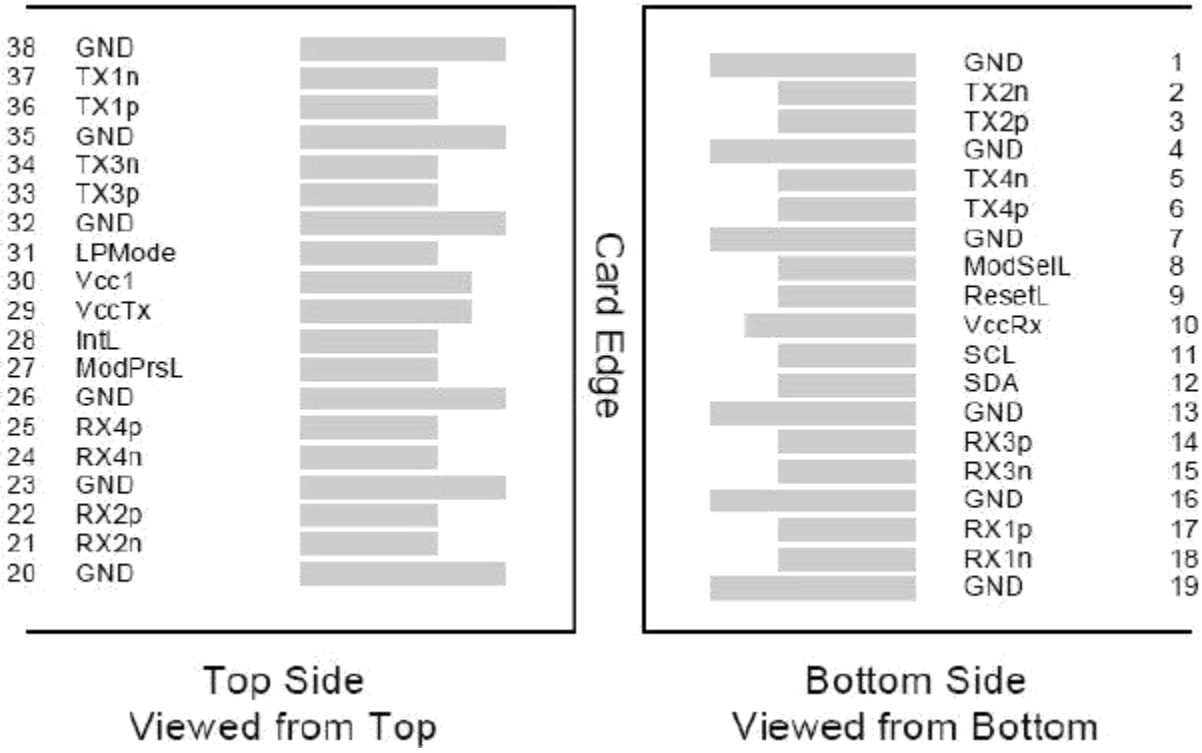
Pin Descriptions

PIN	Logic	Symbol	Name/Description	Note
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	+ 3.3V 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	
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	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V 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

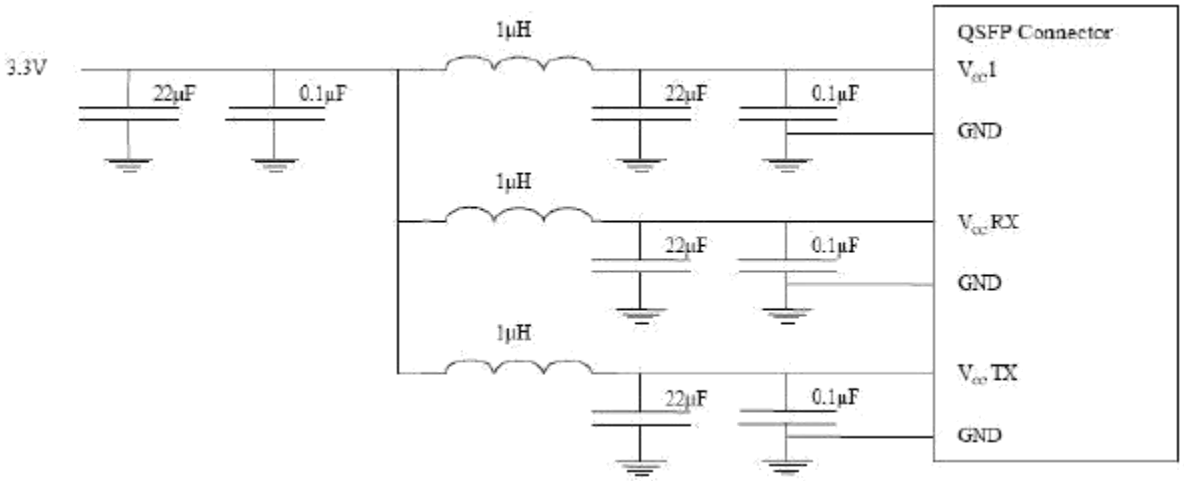
Notes:

1. Module circuit ground is isolated from module chassis ground within the module. GND is the symbol for signal and supply (power) common for QSFP modules.
2. The connector pins are each rated for a maximum current of 500mA.



Power Supply Filtering

The host board should use the power supply filtering shown in Figure1.



EEPROM Serial ID Memory Contents

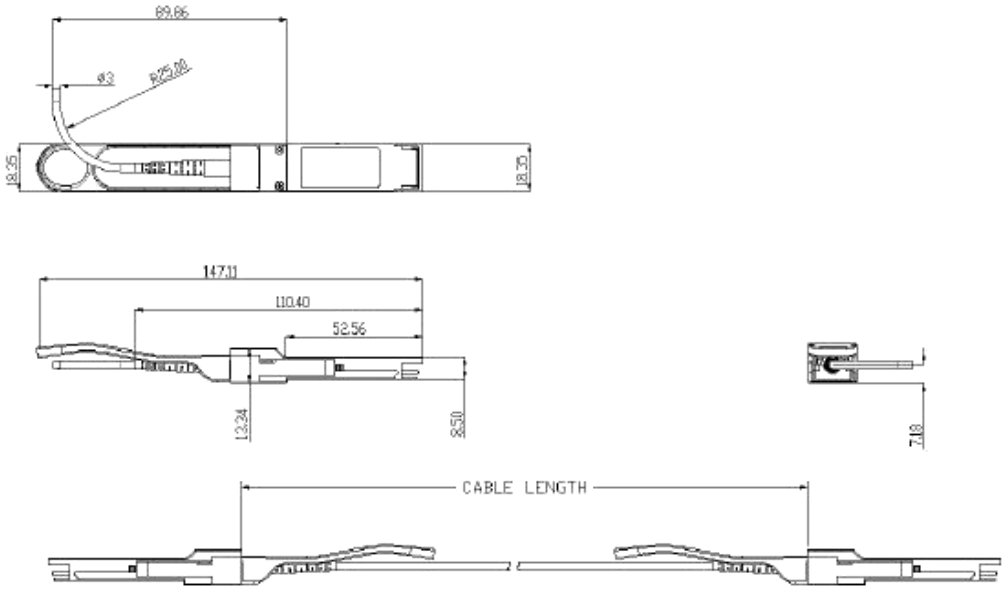
Address	Size (Bytes)	Name	Description of Base ID Field	Optical Module
128	1	Identifier	Identifier Type of serial Module	R
129	1	Ext. Identifier	Extended Identifier of Serial Module	R
130	1	Connector	Code for connector type	R
131-138	8	Specification compliance	Code for electronic compatibility or optical compatibility	R
139	1	Encoding	Code for serial encoding algorithm	R
140	1	BR, nominal	Nominal bit rate, units of 100 MBits/s	R
141	1	Extended Rate select Compliance	Tags for extended rate select compliance	R
142	1	Length(SMF)	Link length supported for SMF fiber in km (note 1)	R
143	1	Length(OM3 50 um)	Link length supported for EBW 50/125 um fiber (OM3), units of 2m (note 1)	R
144	1	Length(OM2 50 um)	Link length supported for 50/125 um fiber (OM2), units of 1m (note 1)	R
145	1	Length(OM1 62.5 um)	Link length supported for 62.5/125 um fiber (OM1), units of 1m (note 1)	R
146	1	Length (Copper)	Link length of copper or active cable, units of 1 m (note 1)Link length	R
147	1	Device tech	Device technology	R
148-163	16	Vendor name	QSFP28 vendor name(ASCII)	R
164	1	Extended Module	Extended Module codes for InfiniBand	R
165-167	3	Vendor OUI	QSFP28 vendor IEEE company ID	R
168-183	16	Vendor PN	Part number provided by QSFP28 vendor(ASCII)	R
184-185	2	Vendor rev	Revision level for part number provided by vendor(ASCII)	R
186-187	2	Wave length or Copper cable Attenuation	Nominal laser wavelength (wavelength=value/20 in nm) or copper cable attenuation in dB at 2.5GHz (Adrs 186) and 5.0GHz (Adrs 187)	R

188-189	2	Wavelength tolerance	Guaranteed range of laser wavelength(+/- value) from nominal wavelength.(wavelength Tol.=value/200 in nm)	R
190	1	Max case temp.	Maximum case temperature in degrees C	R
191	1	CC_BASE	Check code for base ID	R
192-195	4	Options	Rate Select, TX Disable, TX Fault, LOS, Warning indicators for: Temperature, VCC, RX power, TX Bias	R
196-211	16	Vendor SN	Serial number provided by vendor (ASCII)	R
212-219	8	Date Code	Vendor's manufacturing	R
220	1	Diagnostic Monitoring Type	Indicates which types of diagnostic monitoring are implemented (if any) in the Module. Bit 1,0 Reserved	R
221	1	Enhanced Options	Indicates which optional enhanced features are implemented in the Module.	R
222	1	Reserved		
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)	R

Vendor Specific ID Fields

224-255 32 Vendor Specific EEPROM

Mechanical Dimensions



Dimensions in Millimeters

ESD

This transceiver is specified as ESD threshold 1KV for high speed data pins and 2KV for All Others Electrical Input pins,Tested Per MIL-STD-883,Method 3015.4/JESD22-A114-A (HBM).However, normal ESD precautions are still required during

the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Order information

Part Number	Product Description
EQ2A10X-33CDxx	100Gb/s QSFP28 Active Optical Cable

Notes:

where "xx" denotes cable length in meters. Examples are as follows:

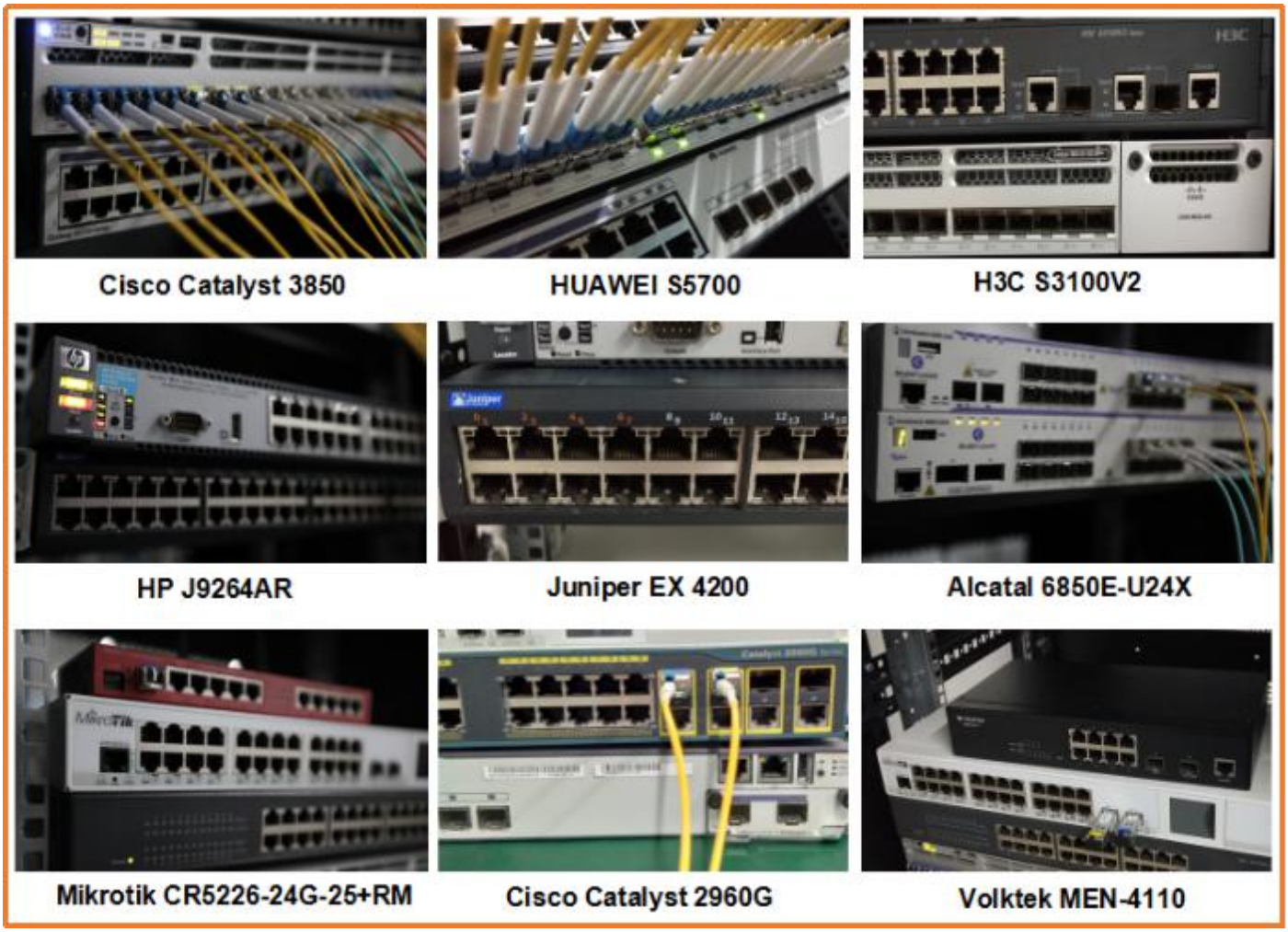
xx = 03 for 3m,xx = 10 for 10m,xx = 50 for 50m,xx = A0 for 100m

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by ETU-LINK before they become applicable to any particular order or contract. In accordance with the ETU-LINK policy of continuous improvement specifications may change without notice. The publication of information in this data sheet does not imply freedom from patent or other protective rights of ETU-LINK or others. Further details are available from any ETU-LINK sales representative.

Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Our modules can compatible with many mainstream brand switches, such as Cisco, Juniper, Extreme, Brocade, IBM, H3C, HP, Huawei, D-Link, Mikrotik, ZTE, TP-Link...

Our test equipment: VOLKTEK MEN-4110, HP 2530-8G, CRS226-24G-25+RM, Catalyst 2960G Series, Catalyst 3850 XS 10G SFP+, Catalyst 3750-E Series, HUAWEI S5700Series, H3C S3100V2 Series, Juniper-EX4200, etc.



Cisco Catalyst 3850 | HUAWEI S5700 | H3C S3100V2

HP J9264AR | Juniper EX 4200 | Alcatal 6850E-U24X

Mikrotik CR5226-24G-25+RM | Cisco Catalyst 2960G | Volktek MEN-4110

Product Production Process

Quality Assurance

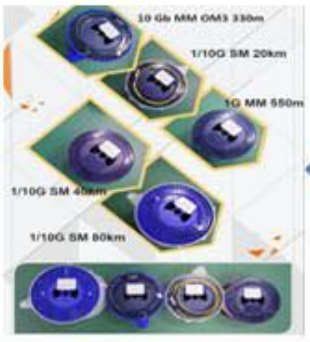
Continuous introduction of new equipment, produced by strict standards, strict quality inspection, to guarantee the high quality standard of each product.

Standardized Production Line

Professional Welding

Assembling

Cleaning end face



Distance Testing

Aging Testing

Product Initial Test

Switch Testing

Product Final Test

Packaging

Individual package.

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