ETU-LINK

Optical Communication System

QSFP28 Series

QSFP28

EQ28510X-3LCD01

100Gb/s QSFP28 SWDM4 MMF 100m with Dual LC

➢ Compliant with QSFP28 MSA
➢ Compliant with SWDM MSA
➢ Compliant with IEEE802.3bm CAUI-4
➢ Hot-pluggable QSFP28 form factor
➢ 4x25Gb/s 850mm VCSEL-based transmitter
➢ Supports 103.1Gbps aggregate bit rate
➢ Power dissipation<3.5W
➢ Maximum link length of 100m on OM4 multimode Fiber
➢ Case temperature range of 0°C to 70°C
➢ Duplex LC receptacles
➢ CAUI-4 electrical interface
➢ RoHS compliant

Applications

➢ 100G Ethernet over Duplex MMF

General Description

The 100G QSFP28 SWDM4 transceiver modules are designed for use in 100G Ethernet links over duplex multimode fiber. Four channels/lanes in the 850-940nm region @ 25.78Gbps to transport the Ethernet signal. Digital diagnostics functions are available via an I2C interface, as specified by the QSFP28 MSA.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Storage Temp Range	Ts	-40	+85	℃
Supply Voltage	Vcc	-0.5	3.6	V
Relative Humidity	RH	15%	85%	

Operating Conditions

Parameter	Symbol	Min	Max	Units
Case Temp-Operating	Tcase	0	70	℃
Supply Voltage	Vcc	3.14	3.46	V
Power Consumption	P		3.5	W
Link Distance on OM3 Fiber			75	M
Link Distance on OM4 Fiber			100	M
Link Distance on OM5 Fiber			150	M

Optical Characteristics

Parameter	Lane	Min	Typical	Max	Units	Notes
Transmitter						
Signaling rate, each lane		25.78125±100ppm			Gb/s	
Lane Wavelength Range	Lane0	844		858	nm	
	Lane1	874		888		
	Lane2	904		918		
	Lane3	934		948		
Modulation Format		NRZ				
Difference in launch power between any two lanes				4.5	dBm	
RMS Spectral width				0.59	nm	1
Optical Modulation Amplitude (OMA), each lane		-5.5		3	dBm	2

Average Launch Power per Lane @ TX Off State				-30	dBm	
Launch Power in OMA minus TDEC	Lane0	-7			dBm	
	Lane1	-7				
	Lane2	-7.4				
	Lane3	-7.7				
Transmitter and Dispersion Eye Closure	Lane0			4	dB	3
	Lane1			4		
	Lane2			4.4		
	Lane3			4.8		
Extinction Ratio		2			dB	
Optical Return Loss Tolerance				12	dB	
Encircled Flux		≥86% at 19 um ≤30% at 4.5 um				4
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 1.5x10-3 hits per sample		{0.3,0.38,0.45,0.35,0.41,0.5}				
Receiver						
Signaling rate, each lane		25.78125±100ppm			Gb/s	
Lane Wavelength Range	Lane0	844		858	nm	
	Lane1	874		888		
	Lane2	904		918		
	Lane3	934		948		
Modulation Format		NRZ				
Damage Threshold		4.4			dBm	
Average Receive Power, each lane	Lane0	-9.5		3.4	dBm	
	Lane1	-9.4				
	Lane2	-9.4				
	Lane3	-9.4				
Receiver Power, each lane (OMA)				3	dBm	
Receiver Reflectance				-12	dB	
unStressed Receiver Sensitivity(OMA)	Lane0			-8.2	dBm	5
	Lane1			-8.4		
	Lane2			-8.6		
	Lane3			-8.8		
RX_Los_Assert		-30			dBm	
RX_Los_De-ASSERT				-12	dBm	
RX_Los_Hysteresis		0.5			dBm	

Notes:

1. RMS spectral width is the standard deviation of the spectrum.

2. The normative lowest value of OMA for a compliant transmitter is 'Launch power in OMA minus TDEC, each lane (min)' plus the actual value of 'TDEC', but with a value of at least 'OMA, each lane (min)'.

3. TDEC is calculated from the measured TDECm using the methods in 3.6. TDECm is measured following the method in IEEE 802.3 clause 95.8.5 using a 12.6 GHz bandwidth reference receiver for all lanes.

4. If measured into type A1a.2 or type A1a.3 50 um fiber in accordance with IEC 61280-1-4.

5. 5.unstressed sensitivity at BER of 5E-5(pre FEC)

Digital Diagnostic Monitoring Specifications

Parameters	Unit	Specification
Temperature Monitor	°C	± 3
Voltage Monitor	V	± 5 %
I_bias Monitor	mA	± 10 %
Received Power (Rx) Monitor	dB	± 3.0
Transmit Power (Tx) Monitor	dB	± 3.0

Electrical Characteristics

Transmitter electrical input signal charactoristics(TP1)	Min	Typical	Max	Units
Signaling rate per lane (range)	25.78125 ± 100 ppm			GBd
Differential input return loss	Equation (83E–5)			dB
Differential to common mode input return loss	Equation (83E–6)			dB
Differential termination mismatch			10	%
Module stressed input test	See 83E3.4.1			
Differential pk-pk input voltage tolerance	900			mV
DC common mode voltage	-350		2850	mV
Single ended voltage tolerance range	-0.4		3.3	V
Receiver electrical output signal charactoristics(TP4)	Min	Typical	Max	Units
Signaling rate per lane (range)	25.78125 ± 100 ppm			GBd
AC common-mode output voltage (RMS)			17.5	mV
Differential output voltage			900	mV

Eye width	0.57			UI
Eye height, differential	228			mV
Vertical eye closure			5.5	dB
Differential output return loss	Equation (83E–2)			dB
Common to differential mode conversion return loss	Equation (83E–3)			dB
Differential termination mismatch			10	%
Transition time (20% to 80%)	12			ps
DC common mode voltage	-350		2850	mV

QSFP28 Connector and Pin out Description
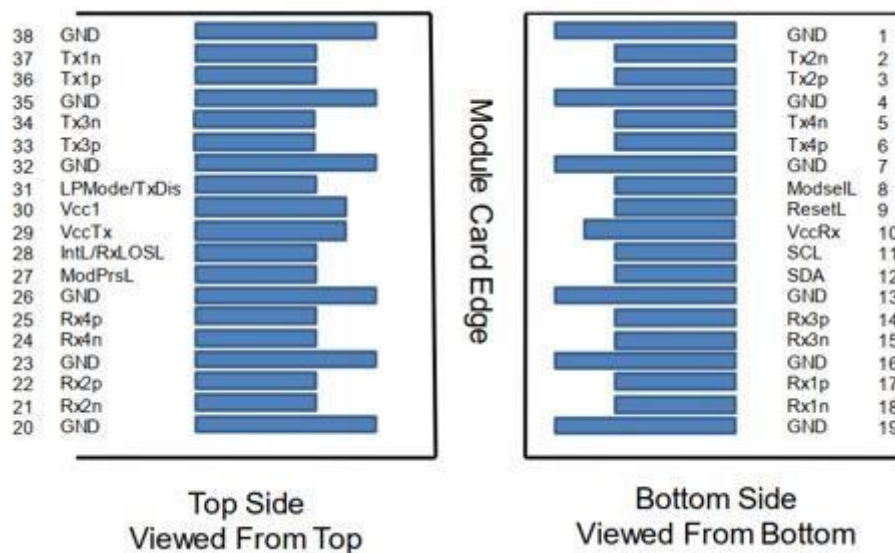
Figure 1. QSFP28-compliant 38-pin Connector

Pin Definition

Pin	Symbol	Name/Description	NOTE
1	GND	Transmitter Ground (Common with Receiver Ground)	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data output	
4	GND	Transmitter Ground (Common with Receiver Ground)	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data output	

7	GND	Transmitter Ground (Common with Receiver Ground)	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	3.3V Power Supply Receiver	2
11	SCL	2-Wire serial Interface Clock	
12	SDA	2-Wire serial Interface Data	
13	GND	Transmitter Ground (Common with Receiver Ground)	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Transmitter Ground (Common with Receiver Ground)	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Transmitter Ground (Common with Receiver Ground)	1
20	GND	Transmitter Ground (Common with Receiver Ground)	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Transmitter Ground (Common with Receiver Ground)	1
24	Rx4n	Receiver Inverted Data Output	1
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Transmitter Ground (Common with Receiver Ground)	1
27	ModPrsl	Module Present	
28	IntL	Interrupt	
29	VccTx	3.3V power supply transmitter	2
30	Vcc1	3.3V power supply	2
31	LPMode	Low Power Mode，not connect	
32	GND	Transmitter Ground (Common with Receiver Ground)	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Output	
35	GND	Transmitter Ground (Common with Receiver Ground)	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Output	
38	GND	Transmitter Ground (Common with Receiver 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 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.
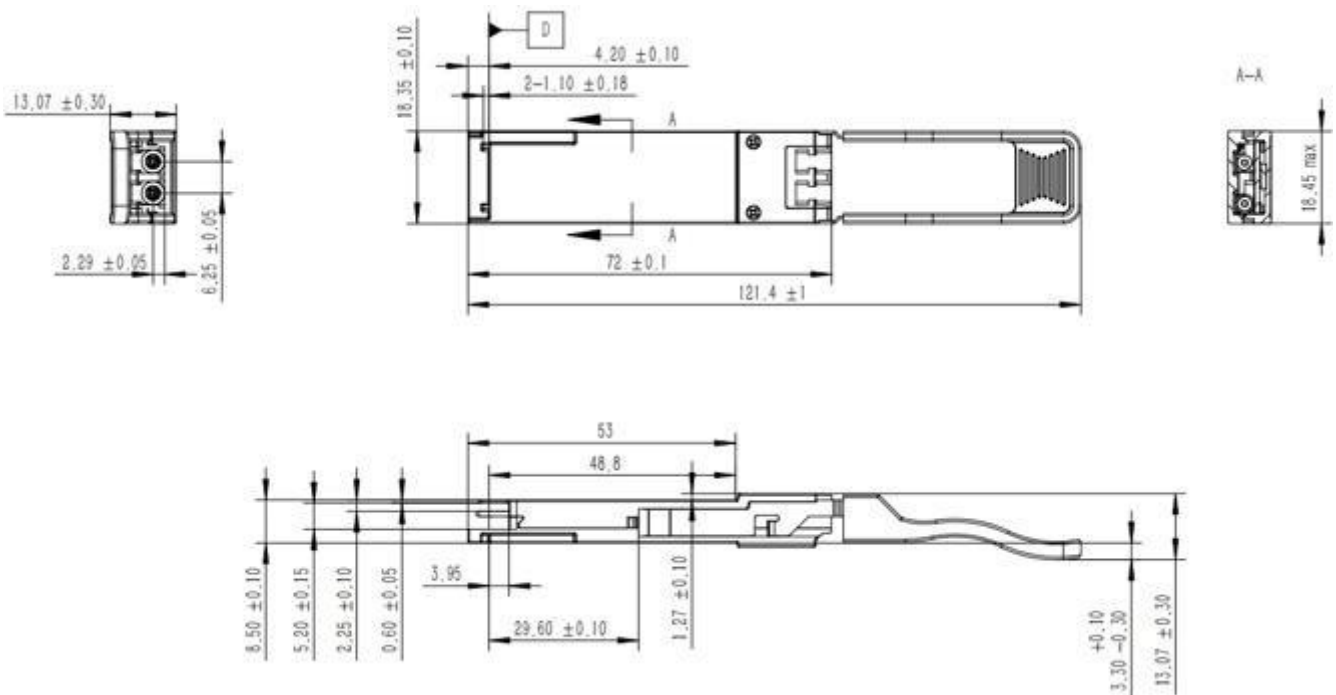
Memory map

Compatible with SFF-8636

Mechanical Dimensions

Unit: mm
Pull tab color: Gray ,Pantone 424U

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.

Laser Safety

This is a Class 1 Laser Product according to EN 60825-1:2014. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Ourmodules 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.
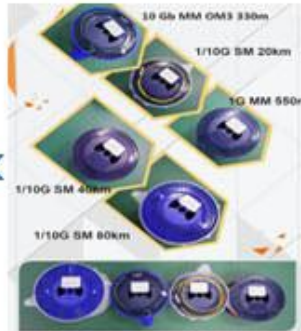
Standardized Production Line → **Professional Welding** → **Assembling**

Aging Testing ← **Distance Testing** ← **Cleaning end face**

Product Initial Test → **Switch Testing** → **Product Final Test**

Packaging

ETU-Link provides two kinds of packaging, 10pcs/Tray and individual package.

Inner Tray

White

10pcs/Tray

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Longhua District, Shenzhen city, GuangDongProvince,China 518109

Tel: +86-755 2328 4603

Address and phone number also have been listed at www.etulinktechnology.com
Please e-mail us at sales@etulinktechnology.com or call us for assistance.