QSFP28 50GBASE-ER 1310nm 40km Transceiver

QSFP28-ER-50G

Application

- 50GBASE-ER 50G Ethernet
- Data Center

Features

- Supports 50GBASE-ER
- Lane signaling rate 26.5625 Gb/s with PAM4
- Up to 40km transmission on SMF
- QSFP28 MSA package with duplex LC connector
- High speed I/O electrical interface (CAUI-4)
- I2C interface with integrated Digital Diagnostic monitoring
- Cooled TOSA and APD ROSA
- Maximum power consumption 4.5W
- Operating case temperature: 0 ~ +70℃
- Compliant to SFF-8636 and SFF-8679
- RoHS-6 complaint

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Storage Temperature	Ts	-40		+85	° C	
Operating Relative Humidity	RH			+85	%	
Supply Voltage	Vcc	-0.5		+4.0	V	

II. Recommended Operating Environment

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Operating Case Temperature	Tc	0		+70	℃	
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc			1.3	A	
Maximum Power Dissipation	P_D			4.5	W	
Data Rate (optical)	DR_O		53.125		Gb/s	
Data Rate (Electrical)	DRe		26.5625		Gb/s	
Transmission Distance	TD			40	km	Over SMF

III. Optical Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Transmitter						
Center Wavelength	CW	1304.5	1311	1317.5	nm	

Average Launch Power	P_{TX}	0.4		6.6	dBm	1
Outer Optical Modulation Amplitude	OMA	3.4		7.4	dBm	1
Launch Power in OMA Minus TDECQ (min)	OMA-TDECQ	2			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) (max)	TDECQ			3.2	dBm	
Average Output Power (Laser Turn off)	$P_{OUT-OFF}$			-30	dBm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	6			dB	
RIN OMA	RIN			-132	dB/Hz	
Transmitter Reflectance	T_{ref}			-26	dB	
Optical Return Loss Tolerance	ORLT			20	dB	
		Receiver				
Center Wavelength	CW	1304.5	1311	1317.5	nm	
Damage Threshold	Pdamage	-6			dBm	
Average Rx Power	P_{RX}	-17.6		-7	dBm	2
Receive Power _OMA	P_{OMA}			-2.6	dBm	2

Receiver Sensitivity _OMA	SEN $_{\_OMA}$			-15.1	dBm	2,3
Reflectance	Ref			-26	dB	
Stressed Receiver Sensitivity _OMA	SRS			-13.3	dBm	2,3
Conditions of Stressed Receiver Sensitivity Test						
Stressed Eye Closure for PAM4 (SECQ)	SECQ			3.2	dB	4

Notes:

1.The optical power is launched into SMF.

2.Receiver sensitivity (OMA), each lane (max) is informative. Measured with test pattern PRBS2^31-1.

3.Measured with a PRBS2^31-1@26.5625G/s, BER≤2.4E-4.

4.These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

IV. Electrical Characteristics

High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3bm Annex 83E)

Low-Speed Signal: Compliant to QSFP-8679.

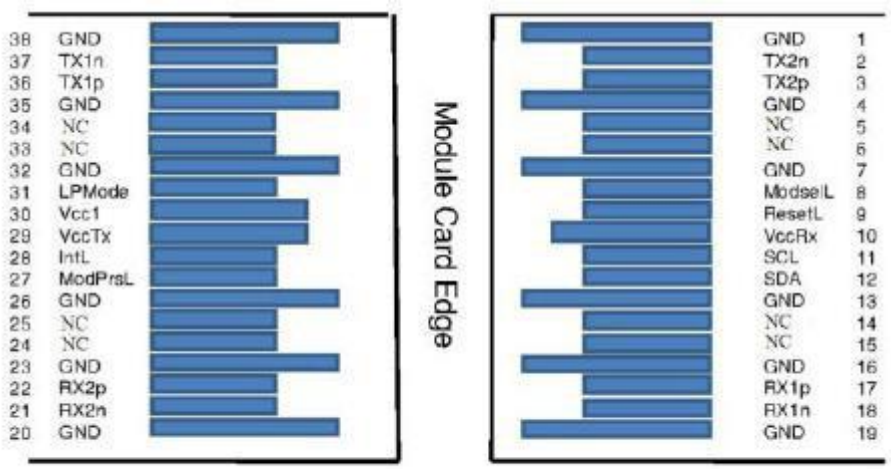
Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Transmitter (Module Input)						
Input Differential Impedance	Rin		100		Ohm	
Differential Data Input Amplitude	$V_{IN,P-P}$	80		900	mVpp	
Differential Termination Mismatch (max)	D-mismatch			10%		
DC Common-Mode Input Voltage		-0.3		2.8	V	
Transition Time(20%~80%)	Tr Tf	10			ps	

LPMode, Reset and ModSelL / Tx dis	V_{IL}	-0.3		0.8	V	
LPMode, Reset and ModSelL / Tx dis	V_{IH}	2.0		V_{CC}+0.3	V	
Receiver (Output)						
Output Differential Impedance	Rout		100		Ohm	
Differential Data Output Amplitude	$V_{OUT,P-P}$			900	mVpp	
Differential Termination Mismatch (max)	D-mismatch			10	%	
Transition Time, 20% to 80%	Tr Tf	12			ps	
ModPrsL and IntL/ Rx Los	V_{OL}	0		0.4	V	
ModPrsL and IntL/ Rx Los	V_{OH}	V_{CC}-0.5		V_{CC}+0.3	V	

V. Digital Diagnostic Monitoring Information

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	ºC	Internal
Voltage	0 to V_{CC}	0.1	V	Internal
Tx Bias Current	0 to 100	10%	mA	Internal
Tx Output Power	-4.5 to 4.2	±3	dBm	Internal
Rx Power	-10.8 to 4.2	±3	dBm	Internal

VI. Pin Assignment



Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

Pin	Logic	Symbol	Description	Plug Sequence4	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	3	
4		GND	Ground	1	1
5		NC		3	
6		NC		3	
7		GND	Ground	1	1
8	LVTLL-I	ModSelL	Module Select	3	
9	LVTLL-I	ResetL	Module Reset	3	

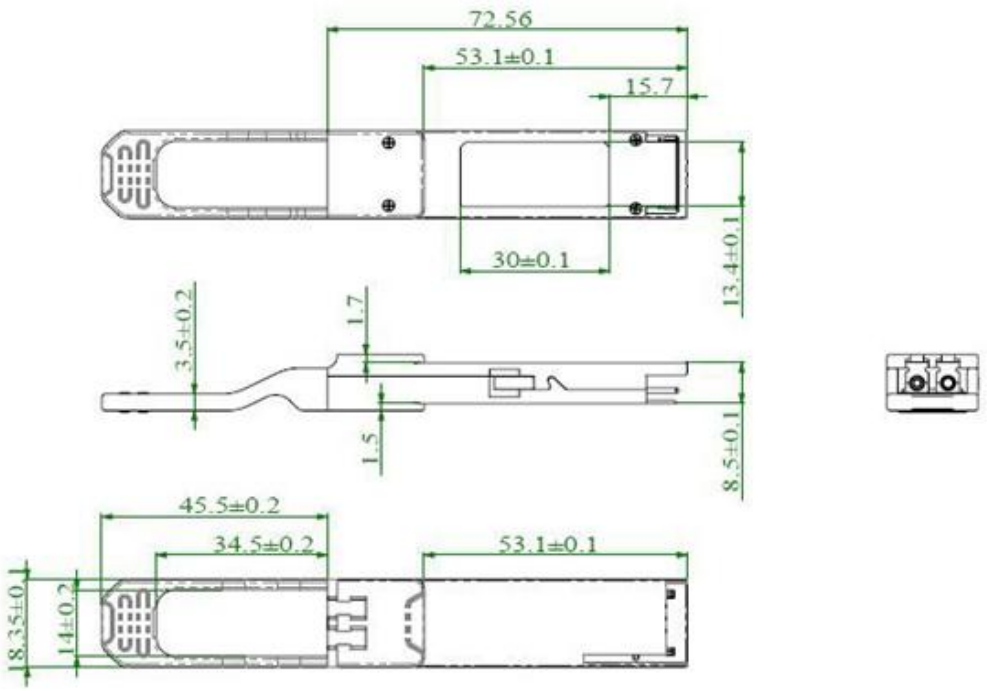
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	
14		NC		3	
15		NC		3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24		NC		3	
25		NC		3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3 V Power Supply Transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2
31	LVTTL-I	LPMode	Low Power Mode	3	
32		GND	Ground	1	1

33		NC		3	
34		NC		3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Output	3	
38		GND	Ground	1	1

Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. 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 groundplane.
2. Vcc Rx, Vcc1 and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Requirements defined for the host side of the Host Edge Card Connector are listed in MSA. The connector APDs are each rated for a maximum current of 1000mA.

VII. Mechanical Dimension



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

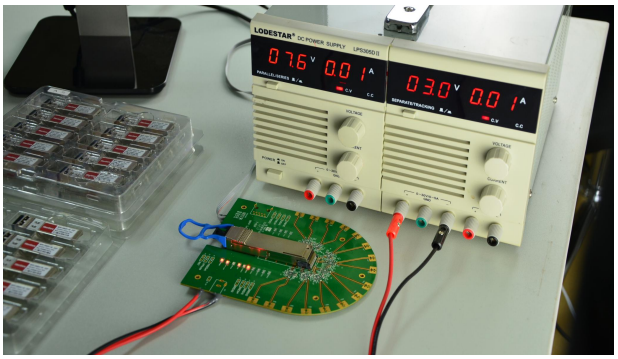

Dell N4032F

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	Description
QSFP28-LR-50G	QSFP28 50GBASE-LR 1310nm 10km Transceiver
QSFP28-ER-50G	QSFP28 50GBASE-ER 1310nm 40km Transceiver

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