FS.COM | Optical Communication System

Datasheet

QSFP28 100GBASE-SR4 850nm 100m Transceiver

QSFP28-SR4-100G

Features

- Hot Pluggable QSFP28 form factor
- Supports 103.1Gb/s aggregate bit rate
- Maximum link length of 100m on OM4 Multimode Fiber (MMF)
- Single MPO12 receptacle
- Single 3.3V power supply
- Power dissipation <3.5W
- 4x25Gb/s 850mm VCSEL-based transmitter
- 4x25G electrical interface
- Commercial operating case temperature range: 0° C to 70° C
- I2C management interface
- RoHS-6 compliant

Application

- 100GBASE-SR4 100G Ethernet

Description

100G QSFP28 transceiver modules are designed for use in100 Gigabit Ethernet links over multimode fiber. They are compliant with the QSFP28 MSA and IEEE 802.3bm 100GBASE-SR4 and CAUI-4. Digital diagnostics functions are available via the I2C interface, as specified by the QSFP28 MSA1and Finisar Application Note AN-2141. The transceiver is RoHS-6 compliant per Directive2011/65/EU.

Product Specifications

I. General Product Characteristics

Parameter	Symbol	Min	Typ.	Max	Units	Ref.
Bit Rate (all wavelengths combined)	BR			103.1	Gb/s	1
Bit Error Ratio	BER			$5x10^{-5}$		2
OM3 MMF	Lmax1			70	m	3
OM4 MMF	Lmax2			100	m	3

Notes:
1. Supports 100GBASE-SR4 per IEEE 802.3bm.
2. Tested with a 2^{31}-1 PRBS .
3. Requires FEC on the host to support maximum distance, per 100GBASE-SR4.

II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		4.0	V	
Storage Temperature	Ts	-40		85	° C	
Case Operating Temperature	Top	-5		75	° C	1
Relative Humidity	RH	15		85	%	2
Receiver Damage Threshold, per Lane	P_{Rdmg}	3.4			dBm	

Note:
1. 48-hour excursions, maximum
2. Non-condensing

III. Electrical Characteristics (EOL, TOP = 0 to 70℃, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current	Icc			1.5	A	
Module total power	P			3.5	W	1
Transmitter						
Signaling rate per lane		25.78125 ± 100ppm			Gb/s	
Differential pk-pk input voltage tolerance	Vin,pp,diff			900	mV	
Single-ended voltage tolerance	Vin,pp	-0.35		+3.3	V	
Module stress input test		Per Section 83E.3.4.1, IEEE 802.3bm				

Receiver						
Signaling rate per lane		25.78125 ± 100ppm			Gb/s	
Differential data output swing	Vout,pp	100		400	mVpp	2
		300		600		
		400	600	800		
		600		1200		
Eye width		0.57			UI	
Eye height, differential		228			mV	
Vertical eye closure	VEC	5.5			dB	
Transition time (20% to 80%)	tr,tf	12			ps	

Notes:

1. Maximum total power value is specified across the full operational temperature and voltage range when CDRs are locked or a lack of input signal results in squelch being activated. If incorrect frequencies cause the CDRs to continuously attempt to lock, maximum power dissipation may reach 4.5 W.
2. Output voltage is settable in 4 discrete ranges via I2C. Default range is Range 2 (400 – 800 mV).

IV. Optical Characteristics (EOL, TOP = 0 to 70℃, VCC = 3.15 to 3.45 Volts)

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Transmitter						
Signaling Speed per Lane			25.78125 ± 100ppm		Gb/s	1
Center wavelengths		840	850	860	nm	
RMS Spectral Width	SW			0.6	nm	
Average Launch Power per Lane	TXPx	-8.4		2.4	dBm	
Transmit OMA per Lane	TxOMA	-6.4		3	dBm	
Launch Power (OMA) minus TDEC per Lane	TDEC	-7.3			dBm	
TDEC per Lane	TDEC			4.3	dBm	
Optical Extinction Ratio	ER	2			dB	
Optical Return Loss Tolerance	ORL			12	dB	
Encircled Flux	FLX	> 86% at 19 um < 30% at 4.5 um			dBm	
Average launch power of OFF transmitter, per lane				-30	dBm	
Transmitter Eye mask definition {X1,X2, X3, Y1, Y2, Y3}		{0.3,0.38,0.45,0.35,0.41,0.5}				2

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Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
Receiver						
Signaling Speed per Lane			25.78125 ± 100ppm		GBd	3
Center wavelengths		840		860	nm	
Damage Threshold	DT	3.4			dBm	
Receive Power (OMA) per Lane	RxOMA			3	dBm	
Average Receive Power per Lane	RXPx	-10.3		2.4	dBm	4
Stressed Receiver Sensitivity (OMA) per Lane	SRS			-5.2	dBm	
Receiver Reflectance	Rfl			-12	dB	
Stressed Eye Closure	SEC		4.3		dB	
Stressed Eye J2 Jitter	J2		0.39		UI	
Stressed eye J4 jitter	J4		0.53		UI	
OMA of each aggressor lane			3		dBm	
Stressed Receiver Eye MaskDefinition {X1, X2, X3, Y1, Y2, Y3}			{0.28,0.5,0.5,0.33,0.33,0.4}			5
LOS De-Assert	LOSD			-13	dBm	

LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5	2		dB	

Notes:

1. Transmitter consists of 4 lasers operating at a maximum speed of 25.78125Gb/s ±100ppm each.
2. Hit Ratio 1.5 x 10^{-3} hits/sample.
3. Receiver consists of 4 photodetectors operating at a maximum speed of 25.78125Gb/s ±100ppm each.
4. Minimum value is informative only and not the principal indicator of signal strength.
5. Hit Ratio 5 x 10^{-5} hits/sample.

V. Pin Description

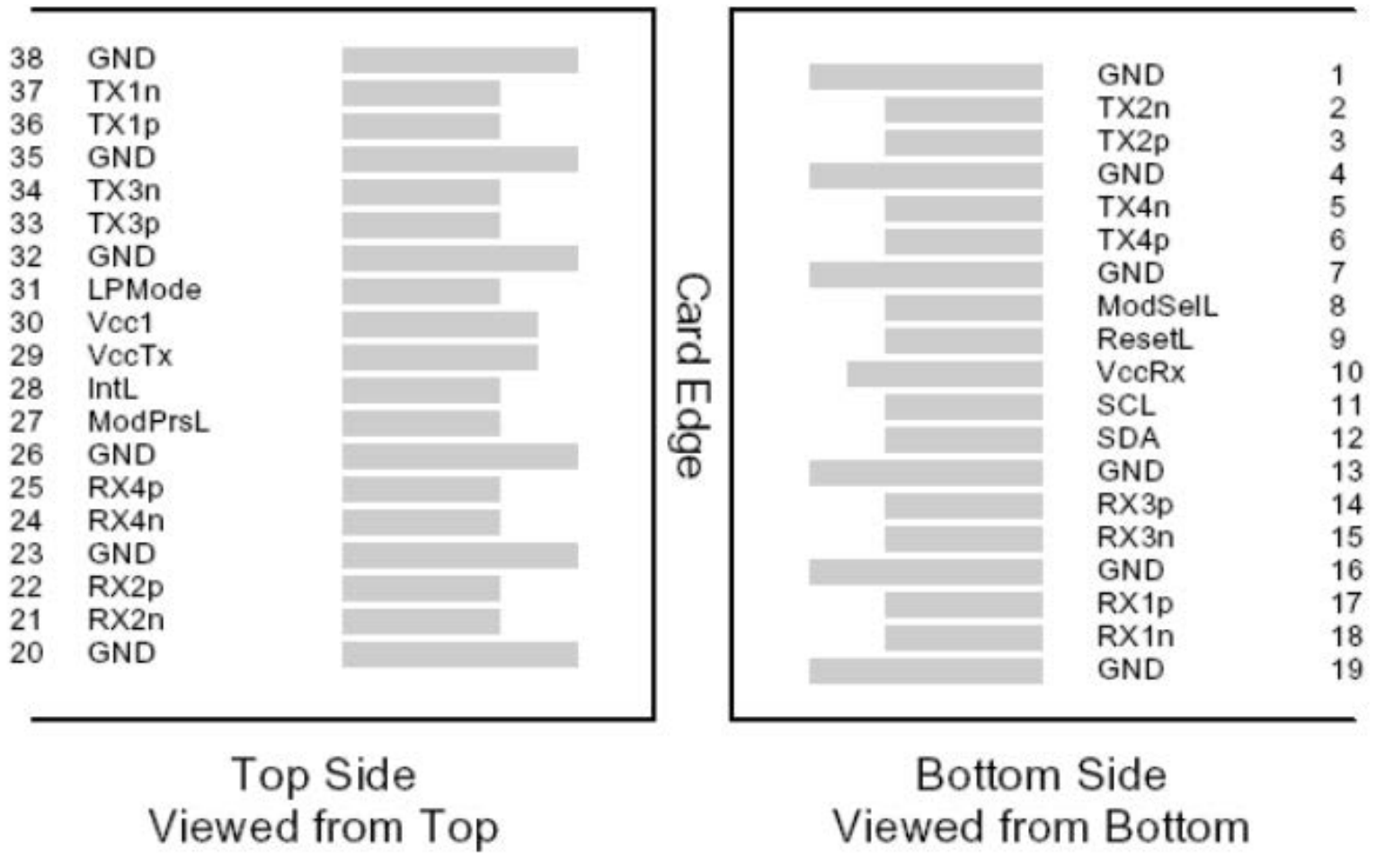


Figure 1 – QSFP28-compliant 38-pin connector (per SFF-8679)

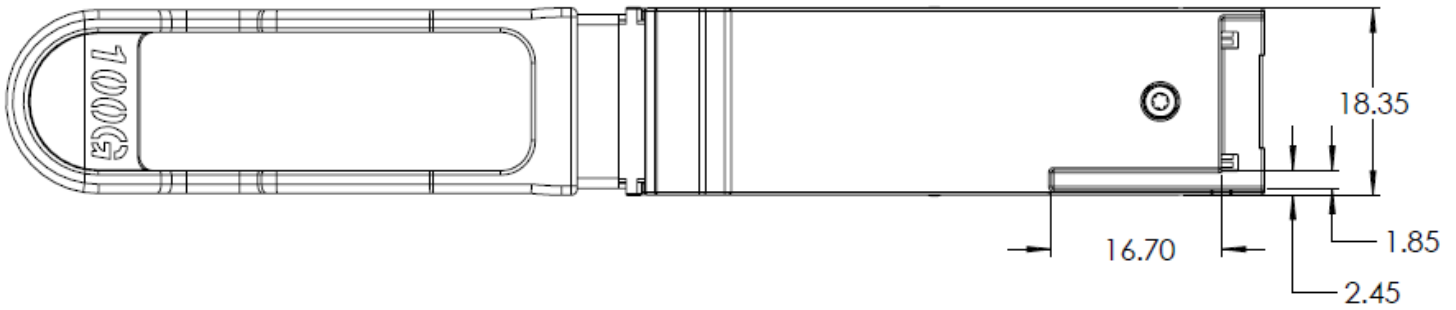
Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3 V Power supply receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1

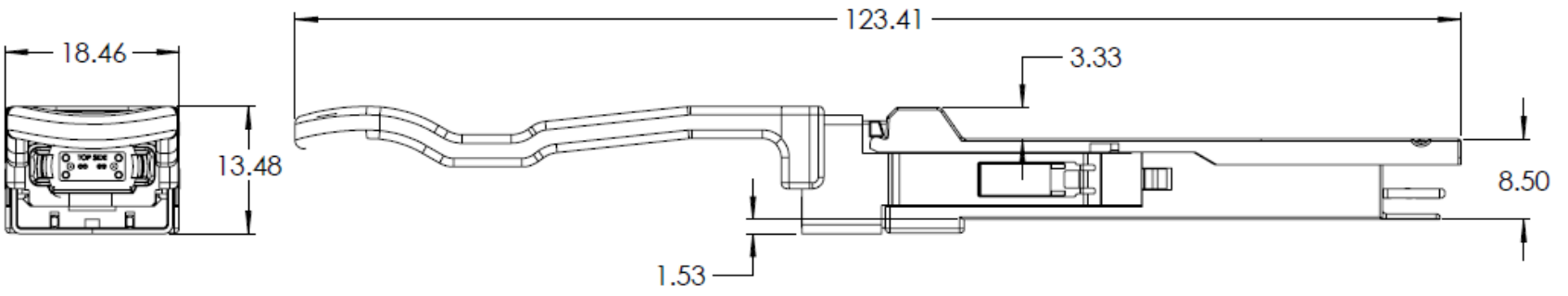
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3 V Power supply transmitter	
30	Vcc1	+3.3 V Power Supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Note:
1. Circuit ground is internally isolated from chassis ground.

VI. Mechanical Specifications

The mechanical specifications are compliant to the QSFP28 transceiver module specifications.





Test Center

Only when quality and 100% compatibility is verified and proved do our modules enter the market. This depends on FS.COM'S test center which is supported by a variety of mainstream original brand switches and professional staff. We are proud of this test center and believe all of these devices worth the investments, because it brings the best to our customers.

The original switches could be found nowhere but at FS.COM'S 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

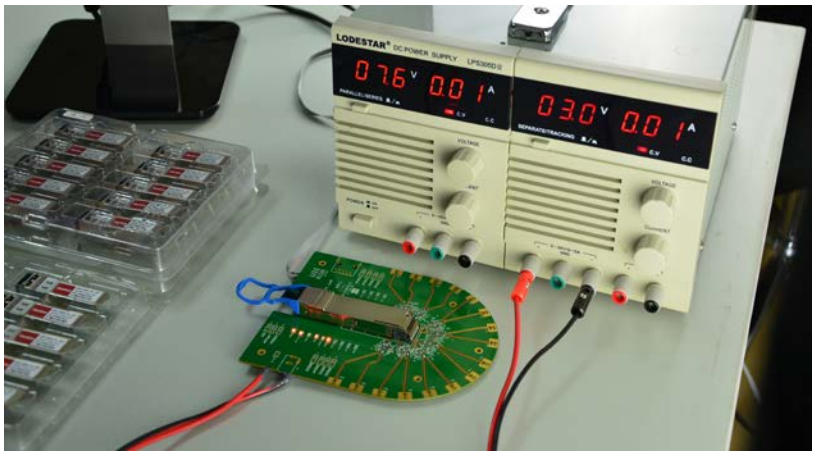
HP 5406R ZL2 V3(J9996A)

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-SR4-100G	QSFP28 100GBASE-SR4 850nm 100m Transceiver
QSFP28-LR4-100G	QSFP28 100GBASE-LR4 1310nm 10km Transceiver

Note:
Every transceiver is individually tested on corresponding equipment, walks through the testing challenges and 100% compatible with Cisco, Arista, Juniper, Dell, Brocade and other brands.

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