

SMF 100GBASE-LR4 QSFP28 Transceiver Data Sheet

Features

- Hot pluggable QSFP28 MSA form factor
- Compliant to IEEE 802.3ba 100GBASE-LR4
- Up to 10km reach for G.652 SMF
- Single 3.3V Power Supply and Power dissipation < 3.5W
- Operating case temperature: 0~70℃
- Four 25Gbps DML LAN-WDM channels on transmitter side
- PIN and TIA array on the receiver side
- 4x25G electrical interface
- Duplex LC receptacles
- I2C interface with integrated Digital Diagnostic Monitoring
- RoHS-6 compliant



Applications

- 100GBASE-LR4 Ethernet

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Maximum Supply Voltage	VCC	-0.5	3.6	V
Operating Relative Humidity	RH	5	85	%

*Exceeding any one of these values may destroy the device immediately

Recommended Operating Conditions

Parameter	Symbol		Min.	Typ.	Max.	Unit
Operating Case Temperature	Tc	OS-QS1H-3110D	0		+70	°C
Power Supply Voltage	Vcc		3.2	3.3	3.4	V
Power dissipation	P				3.5	W

Performance Specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Differential Input amplitude		150		1200	mVpp	
Input Impedance (Differential)	Zin	85	100	115	ohms	Rin > 100 kohms @ DC
Receiver						
Output Amplitude (Differential)	Vout	200		1100	mVpp	
Output Impedance (Differential)	Zin	85	100	115	ohms	
Output Rise/Fall Time	tr/ff		12		ps	10%~90%

Optical and Electrical Characteristics

100GBASE-LR4 Operation

Parameter	Symbol	Min.	Typ.	Max.	Unit
Transmitter					
Signaling Speed per Lane	BRAVE		25.78		Gbps
Data Rate Variation		-100		+100	Ppm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1296.56	1296.59	nm
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Total Average Output Power*(Note1)	Po			10.5	dBm
Average Launch Power per Lane	Peach	-4.3		4.5	dBm
Average launch power of OFF transmitter per lane				-30	dBm
Optical modulation amplitude	Poma	-1.3		4.5	dBm
Optical Return Loss Tolerance				20	dB
Extinction Ratio*(Note2)	ER	4			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}*(Note3)		IEEE 802.3 Clause 88 100Gbase-LR4			
Receiver					
Signaling Speed per Lane	BRAVE		25.78		Gbps
Data Rate Variation		-100		+100	Ppm
Damage threshold	Rdam	4.5			dBm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1296.56	1296.59	nm

Lane_1 Center Wavelength	λC1	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λC2	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λC3	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane	Rpow	-10.6		4.5	dBm
Receive Sensitivity in OMA per Lane*(Note3)	Pmin			-8.6	dBm
Optical Return Loss	ORL			-26	dB
LOS Assert	LOSA		-18		dBm
LOS De-Assert	LOSD		-15		dBm
LOS Hysteresis		0.5			dB

Note1: Output is coupled into a 9/125μm single-mode fiber.

Note2: Filtered, measured with a PRBS 2³¹-1 test pattern @25.78Gbps

Note3: Minimum average optical power measured at BER less than 1E-12, with a 2³¹-1 PRBS.

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000V)
Electrostatic Discharge to the enclosure	EN 55024:2010+A1:2015 IEC-61000-4-2 GR-1089-CORE	Compliant with standards
Electromagnetic Interference (EMI)	FCC 47CFR Part 15 Class B EN55032:2015 CISPR 22B :2006 VCCI Class B	Compliant with standards Noise frequency range: 0.15MHz to 6GHz. Good system EMI design practice required to achieve Class B margins. System margins are dependent on customer host board and chassis design.
Immunity	EN 55024:1998+A1+A2 IEC 61000-4-3	Compliant with standards. 1KHz sine-wave, 80% AM, from 80MHz to 1GHz. No effect on transmitter/receiver performance is detectable between these limits.
Component Recognition	UL and CUL EN60950-1:2006	UL file E317337 TÜV Certificate No. 50135086(CB scheme)
RoHS6	2002/95/EC 4.1&4.2 5&7&13 2005/747/EC	Compliant with standards*(Note4)

Note4: For update of the equipments and strict control of raw materials, the ability to supply the customized products since Jan 1, 2007, which meet the requirements of RoHS6 (Restrictions on use of certain Hazardous Substances) of European Union. In light of item 5 in RoHS exemption list of RoHS Directive 2002/95/EC, Item 5: Lead in glass of cathode ray tubes, electronic components and fluorescent tubes. In light of item 13 in RoHS exemption list of RoHS Directive 2005/747/EC, Item13: Lead and cadmium in optical and filter glass. The three exemptions are being concerned for transceivers, because Ousent's transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Laser Safety:

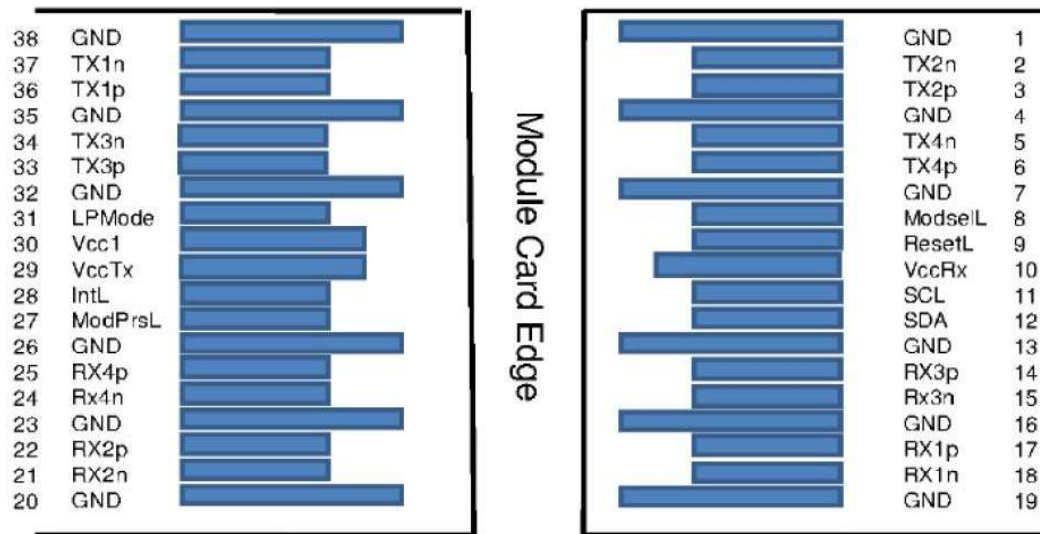
All transceivers are Class 1 Laser products per

FDA/CDRH and IEC-60825 standards. They must be

operated under specified operating conditions



QSFP28 Transceiver Electrical Pad Layout

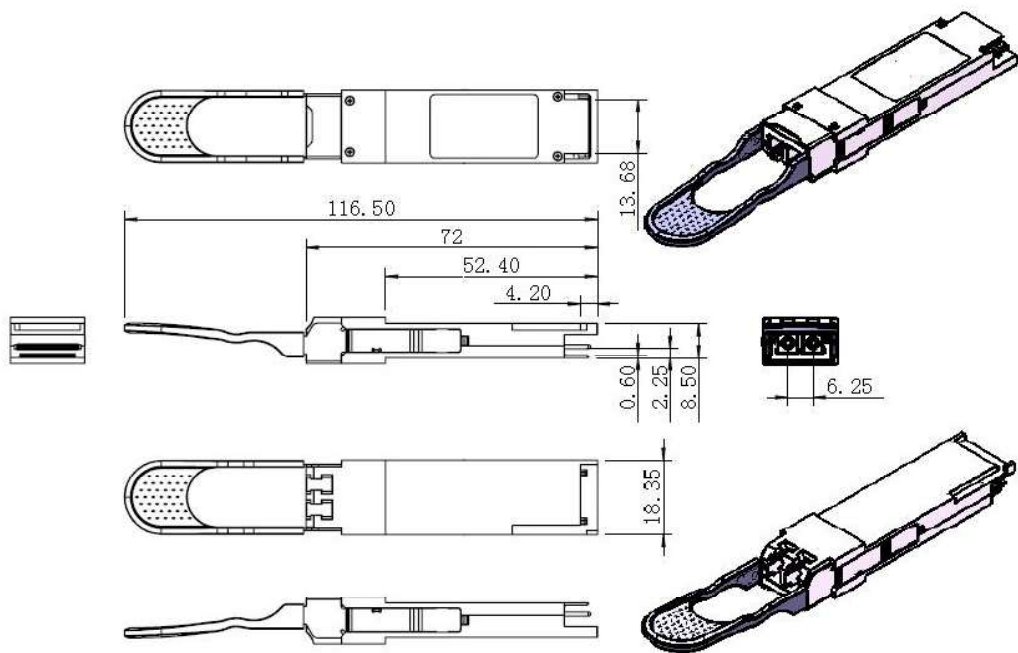


Pin Arrangement and Definition

Pin	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-1	Tx2n	Transmitter Inverted Data Input	3	
3	CML-1	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-1	Tx4n	Transmitter Inverted Data Input	3	
6	CML-1	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-1	ModSelL	Module Select	3	
9	LVTTL-1	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVC MOS-I/O	SCL	2-wire serial interface clock	3	
12	LVC MOS-I/O	SDA	2-wire serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	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	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL	Interrupt	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-1	LPMode	Low Power Mode	3	
32		GND	Ground	1	1
33	CML-1	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-1	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-1	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-1	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Mechanical Specifications



Order Information

Part No.	Data Rate	Fiber	Distance	Interface	Temp.	DDMI
	103Gbps	SMF	10km	LC	0℃~70℃	Yes

Notice:

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