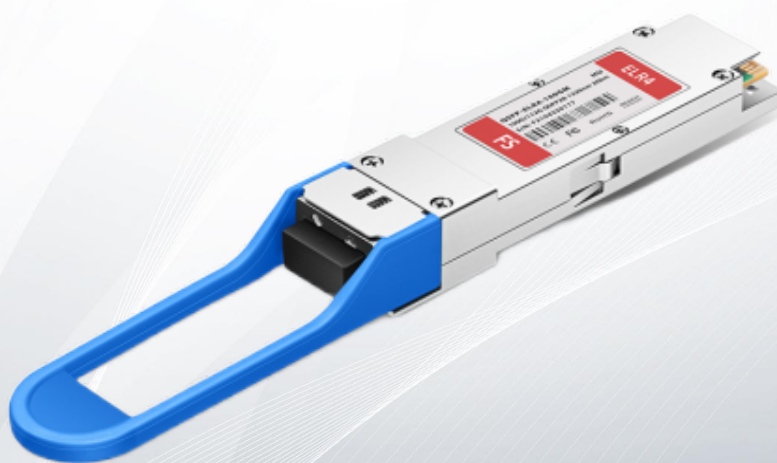


100GBASE-LR4 and 112GBASE-OTU4 QSFP28 Dual Rate 1310nm 20km DOM Transceiver

QSFP-ELR4-100GM



Application

- Transmission over 20km
- Ethernet / OTN OTU4

Features

- Support dual data rate: 100GE and OTU4
- Compliant with QSFP28 Standard: SFF-8636 Rev 2.10a
- Compliant with IEEE802.3cu-2021 standard: 100GBASE-LR1 optical interface
- Compliant with IEEE802.3 and OIF standards:
- CAUI-4 electrical interface
- CEI-28G-VSR electrical interface
- Single 3.3V Supply Voltage
- Maximum power consumption 4.5W
- Class 1 Laser
- 0-70 °C Case Operating Temperature
- 1311nm EML laser and PIN Receiver
- Hermetically sealed TO Based design
- QSFP28 MSA package with duplex LC connector
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- KP4 FEC termination inside module
- Complies with EU Directive 2011/65/EU (RoHS compliant)

Description

The QSFP28 Dual Rate Optical Transceiver Module is designed for use in 100GBASE Ethernet and 4x28G OTN client interfaces throughput up to 40km over single mode fiber (SMF) using a wavelength of 1310nm via duplex LC connectors. Taking BOX+FPC+PCBA separate design, it has great reliability, airtightness and heat dissipation performance. This transceiver is compliant with IEEE 802.3ba 100GBASE-ER4 and OTU4 411-9D1F standard. Digital diagnostics functions are also available via the I2C interface, as specified by the QSFP28 MSA, to allow access to real-time operating parameters. With these features, this easy to install, hot swappable transceiver is suitable to be used in various applications, such as 100G Ethernet, 112G OTN OTU4, telecom, service provider applications and 5G wireless network.

Product Specifications

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40		+85	°C	
Supply Voltage	V _{CC}	-0.3		3.6	V	
Relative Humidity (Non-condensing)	RH	5		95	%	
Data Input Voltage Differential	IVDIP-VDINI			1.0	V	
Control Input Voltage	VI	-0.3		V _{CC} +0.3	V	
Control Output Current	IO	-20		20	mA	

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TOPR	0		70	°C	
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Instantaneous Peak Current at Hot Plug	ICC_IP			1800	mA	
Sustained Peak Current at Hot Plug	ICC_SP			1485	mA	
Maximum Power Dissipation	PD			4.5	W	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Maximum Power Dissipation, Low Power Mode	PDLP			1.5	W	
Signalling Rate	SR		53.125	55.91	GBd	PAM4
Control Input Voltage High	VIH	V _{CC} *0.7		V _{CC} +0.3	V	
Control Input Voltage Low	VIL	-0.3		V _{CC} *0.3	V	
Two Wire Serial Interface Clock Rate				400	kHz	
Power Supply Noise				66	mVpp	10Hz-10MHz
Rx Differential Data Output Load			100		ohms	
Operating Distance		2		20000	m	

III. Transmitter Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Wavelength	λ_c	1304.5	1311	1317.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Launch Power	P _{OUT}	-1.9		4.8	dBm	1
Average Launch Power of OFF Transmitter	P _{OUT_OFF}			-15	dBm	
Extinction Ratio---100GE	ER	3.5			dB	
Extinction Ratio---OTU4	ER	TBD			dB	
Outer Optical Modulation Amplitude (OMA _{outer})---100GE	OMA _{outer}			5	dBm	
Outer Optical Modulation Amplitude (OMA _{outer})---OTU4	OMA _{outer}	TBD		TBD	dBm	
Outer Optical Modulation Amplitude (OMA _{outer})---100GE for TDECQ <1.4 dBfor 1.4 dB ≤TDECQ ≤3.4 dB	OMA _{outer}	1.1-0.3+TDECQ			dBm	
Transmitter and Dispersion Eye Closure---100GE	TDECQ			3.4	dB	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter and Dispersion Eye Closure---OTU4	TDECQ			TBD	dB	
Transmitter Eye Closure for PAM4 (Tecq) ---100ge	TECQ			3.4	dB	
Transmitter Eye Closure for PAM4 (Tecq) ---OTU4	TECQ			TBD	dB	
TDECQ - TECQ ---100GE				2.5	dB	
TDECQ - TECQ ---OTU4				TBD	dB	
Over/under-shoot---100GE				22	%	
Over/under-shoot---OTU4				TBD	%	
Transmitter Power Excursion				2.8	dBm	
RIN15.6OMA	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORLT			15.6	dB	
Transmitter Transition Time				17	ps	
Transmitter Reflectance	TR			-26	dB	

Notes: Average launch power is informative and not the principal indicator of signal strength.

IV. Receiver Optical Characteristics

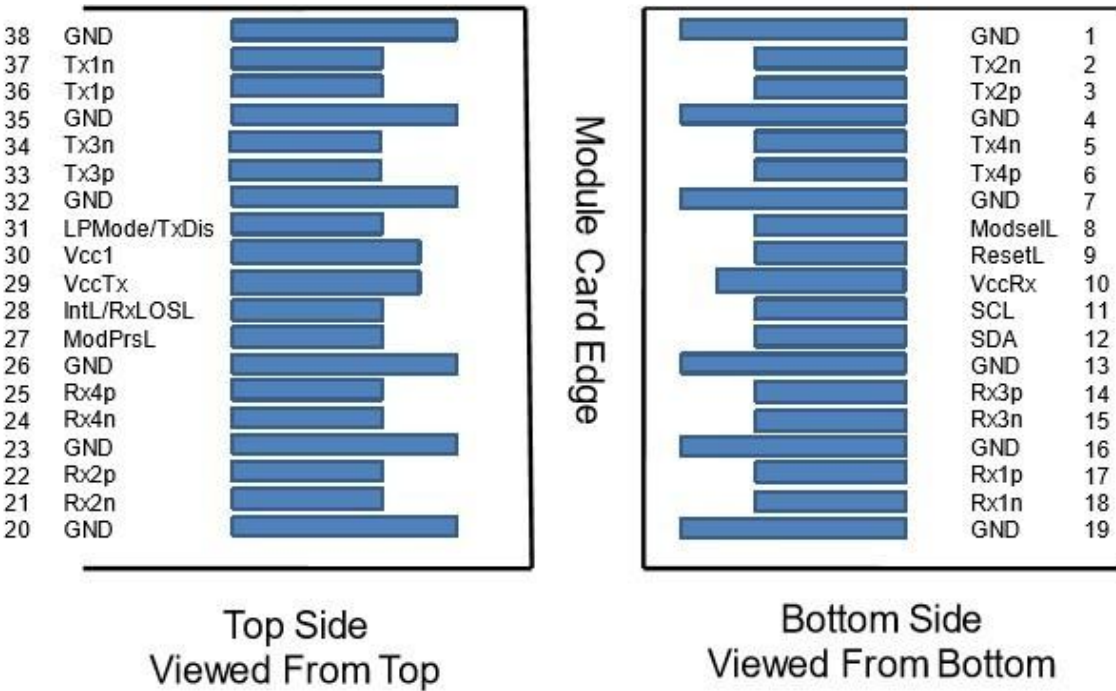
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Wavelength	λ_c	1304.5	1311	1317.5	nm	
Damage Threshold		5.8			dBm	
Average Receive Power		-8.2		4.8	dBm	1
Receive Power (OMAouter)---100GE	RP			5	dBm	
Receive Power (OMAouter)---OTU4	RP			TBD	dBm	

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMA _{outer})—100GE for TECQ < 1.4 dBfor 1.4 dB≤ TECQ ≤3.4 dB	RS			-6.1-7.5+TECQ	dBm	
Receiver Sensitivity (OMA _{outer})—OTU4	RS			TBD	dBm	
Stressed Receiver Sensitivity—100GE	SRS			-4.1	dBm	2
Stressed Receiver Sensitivity—OTU4	SRS			TBD	dBm	2

V. Electriscal Characteristic

Parameter	Symbol	Min.	Max.	Unit	Condition
Module Output SCL and SDA	V _{OL}	0	0.4	V	
	V _{OH}	V _{CC} -0.5	V _{CC} +0.3	V	
Module Input SCL and SDA	V _{IL}	-0.3	V _{CC} *0.3	V	
	V _{IH}	V _{CC} *0.7	V _{CC} +0.5	V	
LPMode/TxDis, ResetL and ModSelL	V _{IL}	-0.3	0.8	V	
	V _{IH}	2	V _{CC} +0.3	V	
ModPrsL and IntL/RxLOSL	V _{OL}	0	0.4	V	
	VOH	V _{CC} -0.5	V _{CC} +0.3	V	

VI. Pin Function Definitions



Pin	Logic	Symbol	Description	Plug Sequence	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTTL-I	ModselL	Module Select	3	
9	LVTTTL-I	ResetL	Module Reset	3	
10		Vcc Rx	+3.3V Power Supply Receiver	2	2

Pin	Logic	Symbol	Description	Plug Sequence	Notes
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/RxLOSL	Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636). Interrupt.Optionally configurable as RxLOSL via the management interface (SFF-8636).	3	
29		Vcc Tx	+3.3V Power Supply Transmitter	2	2
30		Vcc1	+3.3V Power Supply	2	2
31	LVTTL-I	LPMode/Tx Dis	Low Power Mode. Optionally Configurable as TxDis via the Management Interface (SFF-8636).	3	

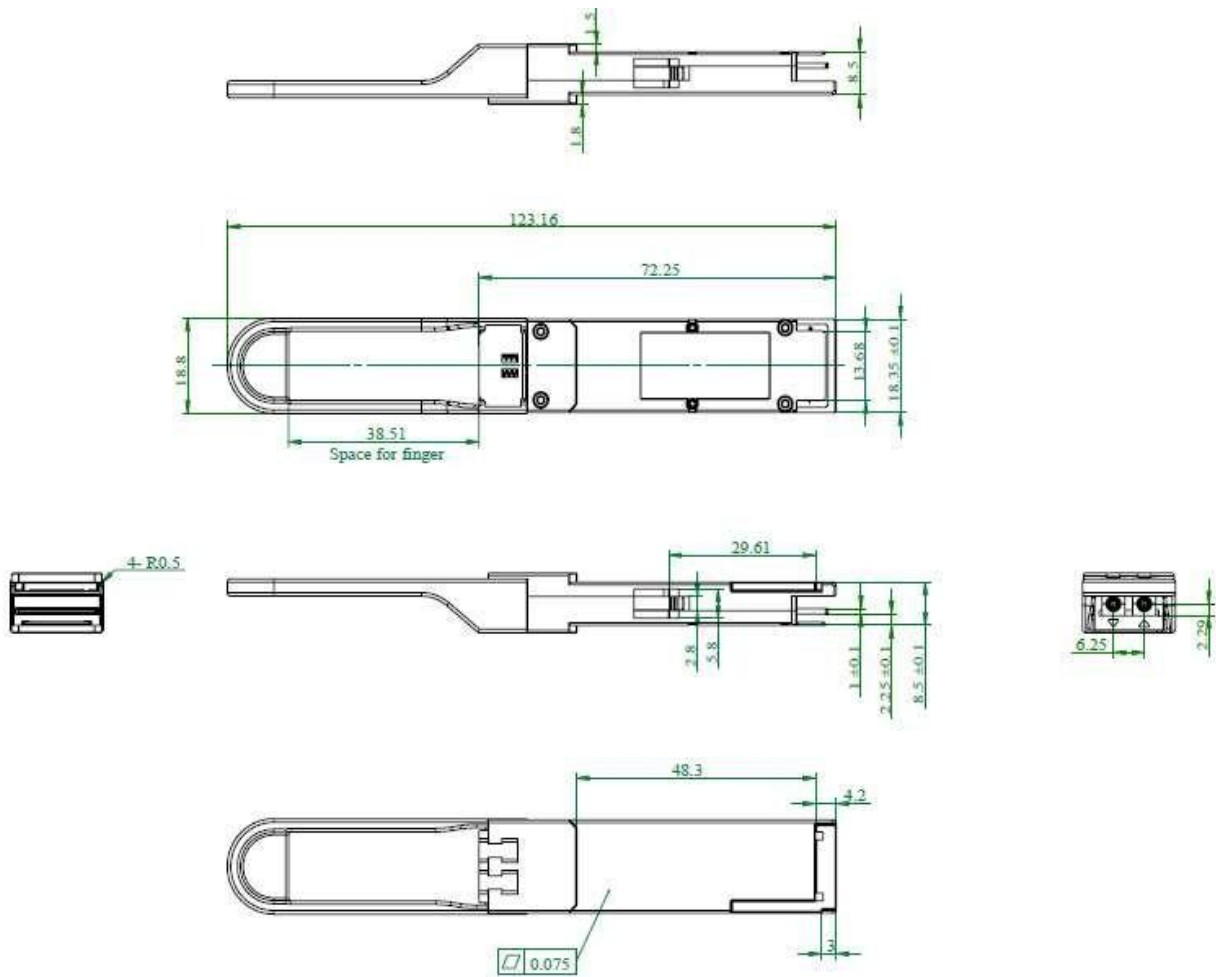
Pin	Logic	Symbol	Description	Plug Sequence	Notes
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Note

1: GND is the symbol for signal and supply (power) common for the module. All are common within the 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 applied concurrently and may be internally connected within the module in any combination. Vcc contacts in SFF-8662 and SFF-8672 each have a steady state current rating of 1 A.

VII. Mechanical Diagram



VIII. Order Information

Part Number	Description
QSFP-ER4-100GM	100GBASE-LR4 and 112GBASE-OTU4 QSFP28 Dual Rate 1310nm 20km DOM Transceiver