

TS-Q8-311H-40DC

100G QSFP28 ER4

Features

- Supports 100GBASE(103.1Gb/s) aggregate
- Lane bit rate 25.78 Gb/s 100GE
- Up to 40km transmission on SMF
- LAN WDM DML laser and APD receiver
- High speed I/O electrical interface (CAUI-4)
- I2C interface with integrated Digital Diagnostic monitoring
- QSFP28 MSA package with duplex LC connector
- Single +3.3V power supply
- Maximum power consumption 5 W
- Operating case temperature: 0 to +70 °C
- Compliant to IEEE 802.3bm
- Compliant to SFF-8665 and SFF-8679
- Complies with EU Directive 2015/863/EU



Application

100GBASE-ER4 Lite

Order Information

Table 1- order information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
TS-Q8-311H-40DC	103.1Gbps	LWDM	SMF	40km	LC	0~70C	Y

Absolute Maximum Ratings

Table 2-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40	-	+85	°C	
Supply Voltage	VCC	-0.5	-	+4.0	V	
Operating Relative Humidity	RH	-	-	+85	%	

Recommended Operating Conditions

Table 3-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	0	-	+70	°C	
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current	ICC	-	-	1.5	A	

Maximum Power Dissipation	PD	-	-	5	W	
Aggregate Bit Rate	BRAVE	-	103.125	-	Gb/s	
Lane Bit Rate	BRLANE	-	25.78	-	Gb/s	
Transmission Distance	TD	-	-	30	km	Over SMF
Transmission Distance	TD	-	-	40	km	With FEC Over SMF

Optical Characteristics

Table 4-Optical Characteristics

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Total Launch Power, 100GE	PALL	-	-	10	dBm	1
Average Launch Power per Lane, 100GE	PTX_LANE	-2.5	-	4.5	dBm	1
OMA per Lane, 100GE	OMA	0.5	-	4.5	dBm	1
Average Output Power (Laser Turn off)	P0UT-OFF	-	-	-30	dBm	
Difference in launch power between lanes	PTX_DELTA_LANE	-	-	3	dB	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio, 100GE	ER	4.5	-	-	dB	
Launch power in OMA minus TDP, per lane	OMA - TDP	-0.5	-	-	dBm	
Transmitter and Dispersion Penalty	TDP	-	-	3	dB	2
Optical Eye Mask, 100GE	Compliant with 4WDM-40 MSA {0.25, 0.4, 0.45, 0.25, 0.28, 0.4}					2
Receiver						
Center Wavelength Lane 0	λ_0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ_1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ_2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ_3	1308.09	1309.14	1310.19	nm	
Damage threshold	Pdamage	-	-	-2.5	dBm	
Average Rx Power per Lane, 100GE	PRX_LANE	-20.5	-	-3.5	dBm	3
OMA Sensitivity per Lane, 100GE	POMA_LANE	-	-	-18.5	dBm	3
Los Assert	LosA	-35	-	-	dBm	
Los De-Assert	LosDA	-	-	-22	dBm	
Los Hystersis	LosH	0.5	-	5	dB	

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS 231-1 test pattern @25.78125 Gb/s, Hit ratio $\leq$ 5E-5.
3. Measured with a PRBS 2³¹-1 test pattern @25.78125 Gb/s, BER $\leq$ 5E-5, pre-FEC.

Electrical Characteristics

High-Speed Signal: Compliant to CAUI-4 (IEEE

802.3bm) Low-Speed Signal: Compliant to QSFP-8679.

Table 5-Electrical Characteristics

Transmitter (Module Input)						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential Data Input Amplitude	VIN,P-P	85	-	900	mVpp	
Differential Termination Mismatch		-	-	10	%	
LPMode, Reset and ModSelL, V in low	VIL	-0.3	-	0.8	V	
LPMode, Reset and ModSelL, V in high	VIH	2.0	-	VCC+0.3	V	
Receiver (Module Output)						
Differential Data Output Amplitude	VOUT,P-P	200	-	900	mVpp	
Differential Termination Mismatch		-	-	10	%	
Transition time, 20% to 80%	Tr Tf	12			ps	
ModPrsL and IntL, V out low	VOL	0	-	0.4	V	
ModPrsL and IntL, V out high	VOH	VCC-0.5	-	VCC+0.3	V	

Digital Diagnostics

Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to VCC	0.1	V	Internal
Tx Bias Current Per Lane	0 to 100	10%	mA	Internal
Tx Output Power Per Lane	-2.5 to 6.5	±3	dBm	Internal
Rx Power (Each Lane)	-20.5 to -3.5	±3	dBm	Internal

Pin Definitions

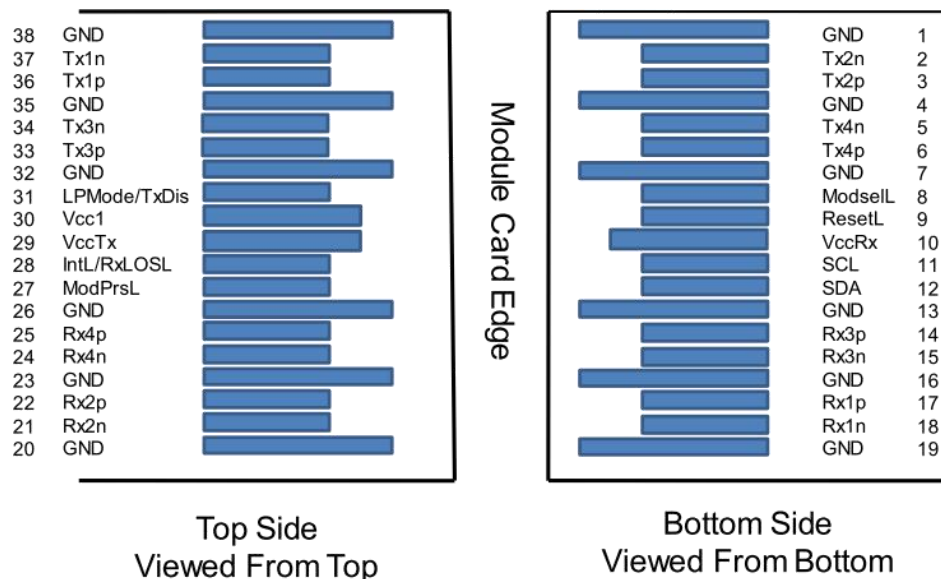


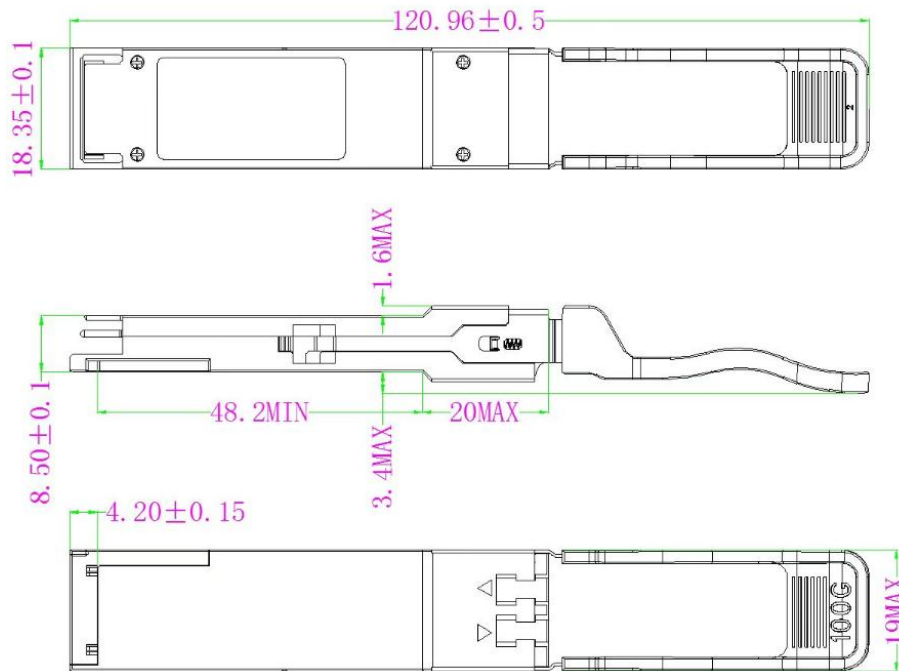
FIGURE 5-1 MODULE PAD LAYOUT

PIN	Logic	Symbol	Description	Plug Seq.	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	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	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	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	
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/ RxLOSL	3	
29		VccTx	+3.3 V Power Supply transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2
31	LVTTL-I	LPMode/TxDis	Low Power Mode/Tx Disable	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Output	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

Note 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 ground plane.

Note 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 pins are each rated for a maximum current of 1000 mA.

Mechanical Dimension



Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Transcom transceiver uses a semiconductor laser system and is a laser class1 product acc. FDA, complies with 21CFR1040.10 and 1040.11. Also this product is a laser class1 product acc. IEC 60825-1.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.