QSFP28-100G-LR4

100Gbps QSFP28 LR4 Transceiver, Single Mode, 10km Reach

Product Features

- Supports103.1Gb/s, each lane bit rate 25.78 Gb/s
- Up to 10km transmission on SMF
- LAN WDM DFB laser and PIN receiver
- I2C interface with integrated Digital Diagnostic monitoring
- QSFP28 MSA package with duplex LC connector
- Single +3.3V power supply

- Maximum power consumption 4W
- Operating case temperature: 0 to +70° C
- Complies with EU Directive 2011/65/EU (RoHS 6/6)

Applications

- 100GBASE-LR4 100G Ethernet

Description

The QSFP28 transceiver module is designed for use in 100 Gigabit Ethernet links on up to 10km of single mode fiber. It is compliant with the QSFP28 MSA, IEEE 802.3ba 100GBASE-LR4 and IEEE 802.3bm CAUI-4. Digital diagnostics function is available via the I2C interface, as specified by the QSFP+ MSA.

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

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	-	-	1.15	A	
Maximum Power Dissipation	PD	-	-	4	W	
Aggregate Bit Rate	BRAVE	-	103.125	-	Gb/s	
Lane Bit Rate	BRLANE	-	25.78	-	Gb/s	
Transmission Distance	TD		-	10	km	Over SMF

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Center Wavelength Lane 0	λ0	1294.53	1295.56	1296.59	nm	
Center Wavelength Lane 1	λ1	1299.02	1300.05	1301.09	nm	
Center Wavelength Lane 2	λ2	1303.54	1304.58	1305.63	nm	
Center Wavelength Lane 3	λ3	1308.09	1309.14	1310.19	nm	
Total Launch Power	PALL	-	-	10.5	dBm	1
Average Launch Power per Lane	PTX_LANE	-4.3	-	4.5	dBm	1
Transmit OMA per Lane	TxOMA	-1.3	-	4.5	dBm	1
Difference in launch power between lanes	PTX_Delta_LANE	-	-	5	dB	
Average Output Power (Laser Turn off)	POUT-OFF	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	4	-	-	dB	
Transmitter and Dispersion Penalty	TDP	-	-	2.2	dB	2
Optical Return Loss Tolerance	ORLT	-	-	20	dB	
Optical Eye Mask	Compliant with IEEE 802.3ba					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	
Average Rx Powerper Lane	PRx _LANe	-10.6		4.5	dBm	2
OMA Sensitivity per Lane	SenOMA	-	-	-8.6	dBm	2
Receiver Overload	PIN-OL	4.5	-	-	dBm	
Reflectance	Ref	-	-	-26	dB	
LOS Assert per lane	LOSA	-25	-	-	dBm	
LOS De-assert	LOSD	-	-	-11.6	dBm	
LOS Hysteresis	LOSH	0.5	-	4.0	dB	

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS 231-1 test pattern @25.78125 Gb/s.

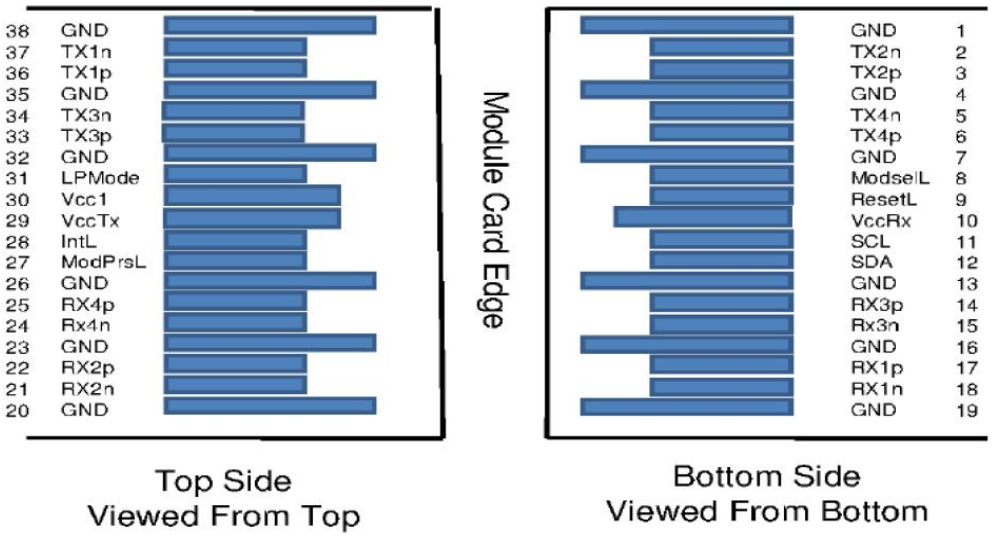
Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter (Module Input)						
Differential Data Input Amplitude	VIN,P-P	100	-	1100	mVpp	
Input Impedance (Differential)	ZIN	85	100	115	Ohms	
Differential Termination Mismatch		-	-	10	%	
Receiver (Module Output)						
Differential Data Output Amplitude	VOUT,P-P	200	-	900	mVpp	
Output Impedance (Differential)	ZOUT	85	100	115	Ohms	
Differential Termination Mismatch		-	-	10	%	
Output Rise/Fall Time, 20%~80%	TR/TF	12	-	-	ps	

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	to 2.9	±3	dBm	Internal
Rx Power (Each Lane)	-21 to 5	±3	dBm	Internal

Pin Description



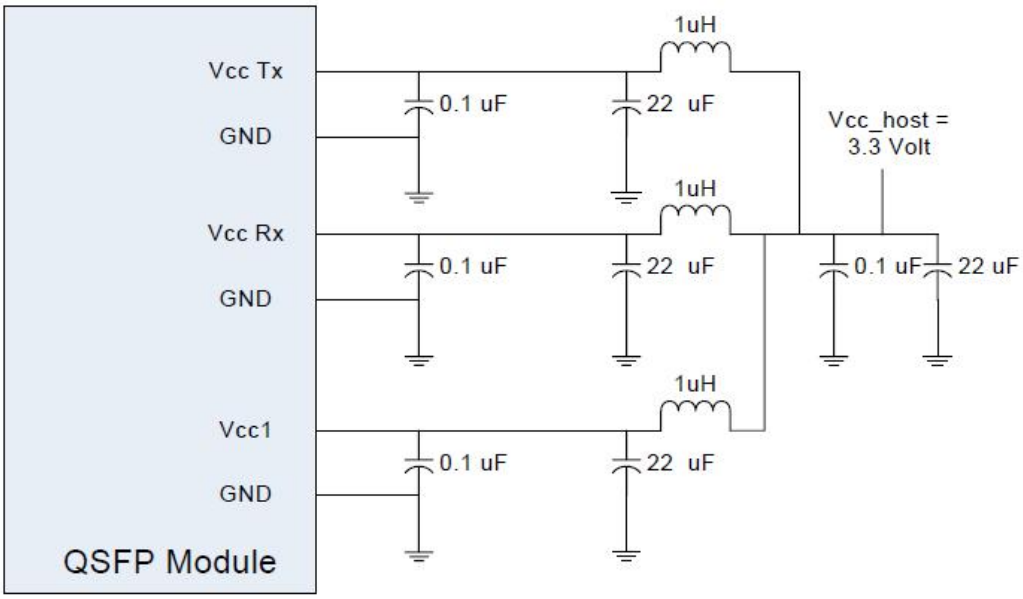
Pin	Name	Logic	Function	Plug Seq.	Notes
1	GND		Ground	1	1
2	Tx2n	CML-I	Transmitter Inverted Data Input	3	
3	Tx2p	CML-I	Transmitter Non-Inverted Data Input	3	
4	GND		Ground	1	1
5	Tx4n	CML-I	Transmitter Inverted Data Input	3	
6	Tx4p	CML-I	Transmitter Non-Inverted Data Input	3	
7	GND		Ground	1	1
8	ModSelL	LVTTL-I	Module Select	3	
9	ResetL	LVTTL-I	Module Reset	3	
10	VccRx		+3.3V Power Supply Receiver	2	2
11	SCL	LVCMOS-I/O	2-wire serial interface clock	3	
12	SDA	LVCMOS-I/O	2-wire serial interface data	3	
13	GND		Ground	1	
14	Rx3p	CML-O	Receiver Non-Inverted Data Output	3	
15	Rx3n	CML-O	Receiver Inverted Data Output	3	
16	GND		Ground	1	1
17	Rx1p	CML-O	Receiver Non-Inverted Data Output	3	

18	Rx1n	CML-O	Receiver Inverted Data Output	3	
19	GND		Ground	1	1
20	GND		Ground	1	1
21	Rx2n	CML-O	Receiver Inverted Data Output	3	
22	Rx2p	CML-O	Receiver Non-Inverted Data Output	3	
23	GND		Ground	1	1
24	Rx4n	CML-O	Receiver Inverted Data Output	3	
25	Rx4p	CML-O	Receiver Non-Inverted Data Output	3	
26	GND		Ground	1	1
27	ModPrsL	LVTTL-O	Module Present	3	
28	IntL	LVTTL-O	Interrupt	3	
29	VccTx		+3.3V Power supply transmitter	2	2
30	Vcc1		+3.3V Power supply	2	2
31	LPMode	LVTTL-I	Low Power Mode	3	
32	GND		Ground	1	1
33	Tx3p	CML-I	Transmitter Non-Inverted Data Input	3	
34	Tx3n	CML-I	Transmitter Inverted Data Input	3	
35	GND		Ground	1	1
36	Tx1p	CML-I	Transmitter Non-Inverted Data Input	3	
37	Tx1n	CML-I	Transmitter Inverted Data Input	3	
38	GND		Ground	1	1

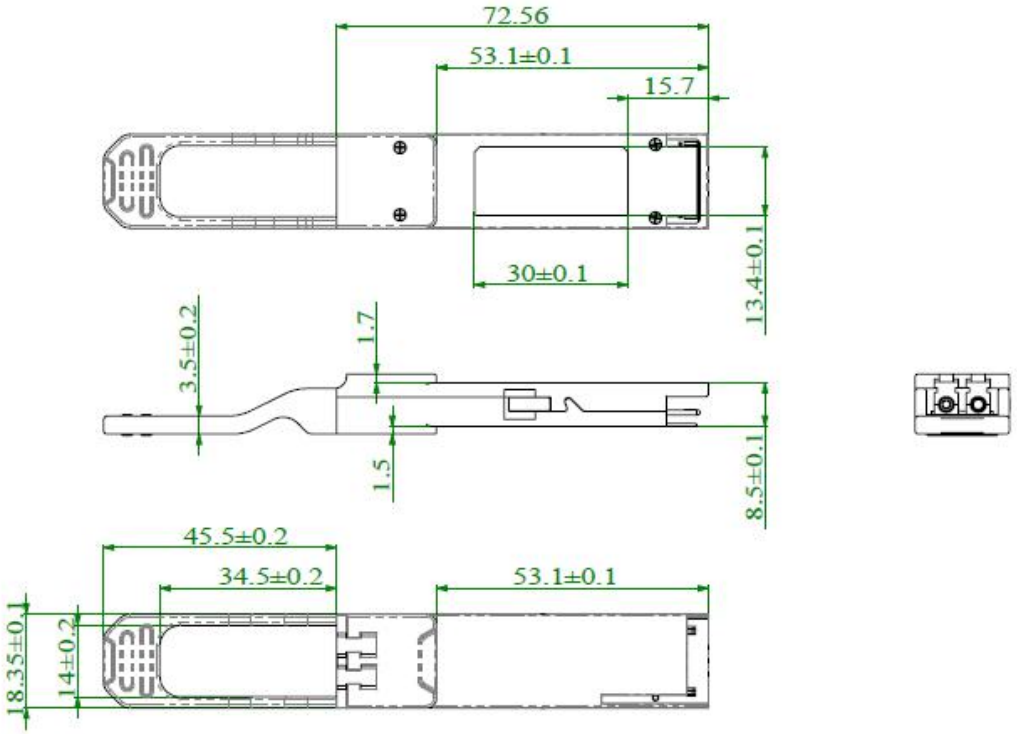
Notes:

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. Connected there directly to the host board signal-common ground plane.
2. VccRx, Vcc1 and VccTx 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 QSFP MSA. VccRx, Vcc1 and VccTx may be internally connected within the QSFP28 in any combination. The connector pins are each rated for a maximum current of 500mA.

Recommended Host Board Power Supply Circuit



Mechanical Dimension



Ordering Information

Part Number	Product Description
QSFP28-100G-LR4	100G QSFP28 LR4 Transceiver,LAN WDM, LC, 10km, 0°C~+70°C, with DDM