

100Gb/s QSFP28 80km Optical Transceiver Module

Features

QSFP28 MSA compliant
Hot pluggable 38 pin electrical interface
4 LAN-WDM lanes MUX/DEMUX design
4x25G electrical interface
Maximum power consumption 6.5W
LC duplex connector
Supports 103.125Gb/s aggregate bit rate
Up to 80km transmission on single mode fiber
Operating case temperature: 0°C to 70°C
Single 3.3V power supply

Application

100GBASE-ZR4 100G Ethernet
Telecom networking

This product is a 100Gb/s transceiver module designed for optical communication applications compliant to Ethernet 100GBASE-ZR4 standard. The module converts 4 input channels of 25Gb/s electrical data to 4 channels of LAN WDM optical signals and then multiplexes them into a single channel for 100Gb/s optical transmission. Reversely on the receiver side, the module de-multiplexes a 100Gb/s optical input into 4 channels of LAN WDM optical signals and then converts them to 4 output channels of electrical data.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	T _s	-40	85	°C	
Power Supply Voltage	V _{CC}	-0.3	4.0	V	

Relative Humidity (non-condensation)	RH	0	85	%	
Damage Threshold	TH _d	-3.0		dBm	

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _{OP}	0		70	°C	commercial
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Data Rate, each Lane			25.78125		Gb/s	
Control Input Voltage High		2		V _{cc}	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			40	km	1

Optical Characteristics

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Lane	λ_0	1294.53		1296.59	nm	
	λ_1	1299.02		1301.09	nm	
	λ_2	1303.54		1305.63	nm	
	λ_3	1308.09		1310.19	nm	
Total Launch Power	P _{ALL}	8.0	-	12.5	dBm	1
Average Launch Power per Lane	P _{TX_LANE}	2	-	6.5	dBm	1
Transmit OMA per Lane	T _{XOMA}	-	-	3	dBm	1
Difference in launch power between lanes	P _{TX_DELTA_LANE}	-	-	3	dB	

Average Output Power (Laser Turn off)	$P_{OUT-OFF}$	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	6	-	-	dB	
Transmitter and Dispersion Penalty	TDP	-	-	2.2	dB	
Optical Return Loss Tolerance	ORLT	-	-	20	dB	
RIN OMA	RIN			-130	dB/Hz	
Optical Eye Mask	Compliant with IEEE 802.3ba					2
Receiver						
Center Wavelength Lane	λ_0	1294.53		1296.59	nm	
	λ_1	1299.02		1301.09	nm	
	λ_2	1303.54		1305.63	nm	
	λ_3	1308.09		1310.19	nm	
Average Receive Power, each Lane	P_{RX_LANE}	-28		-7	dBm	
Receiver Sensitivity (OMA), each Lane				-28	dBm	2
Reflectance	Ref	-	-	-26	dB	2
LOS Assert per lane	LOS_A	-40	-	-	dBm	
LOS De-assert		-	-	-29	dBm	

LOS Hysteresis		0.5	-	-	dB	
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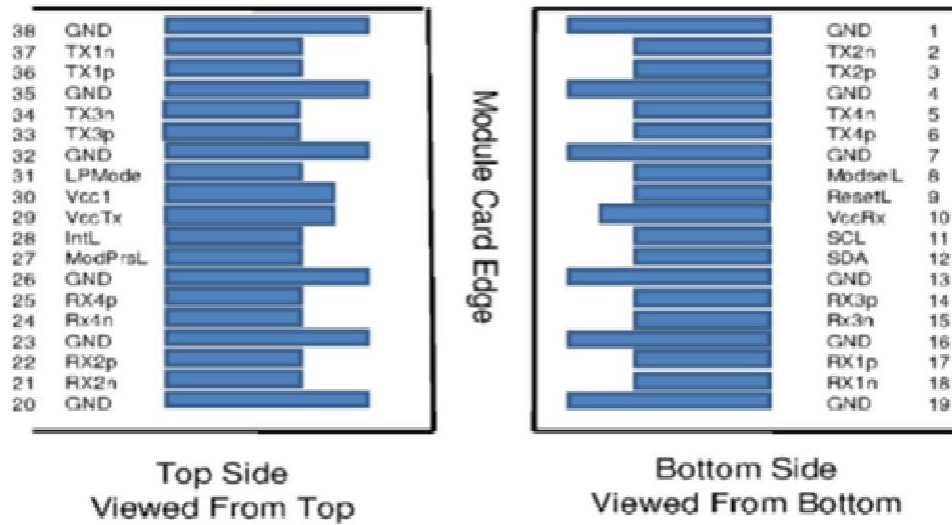
Notes:

1. The optical power is launched into SMF..
2. Sensitivity is specified at BER@5E-5 with FEC

Electrical Characteristics

Transmitter (Module Input)						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Differential Data Input Amplitude	$V_{IN,P-P}$	100	-	1100	mVpp	
Common mode noise (rms)		-	-	17.5	mV	
Differential Termination Mismatch		-	-	10	%	
Receiver (Module Output)						
Differential Data Output Amplitude	$V_{OUT,P-P}$	-	-	900	mVpp	
Common mode noise (rms)		-	-	17.5	mV	
Differential Termination Mismatch		-	-	10	%	
Output Rise/Fall Time,20%~80%	T_R/T_F	10	-	-	ps	

Pin Description



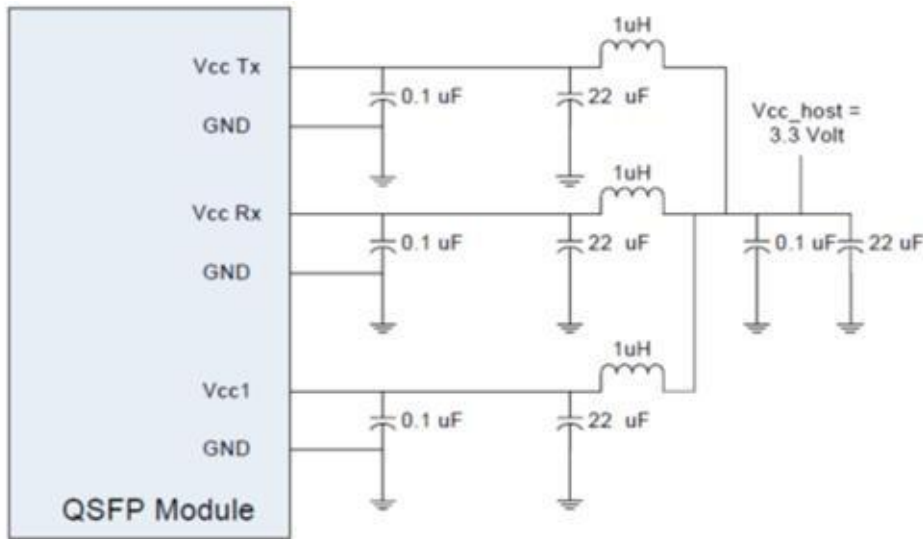
Pin	Name	Logic	Function	Plug Seq.	Notes
1	GND		Ground	1	1
2	Tx2n	CML-I	Transmitter Inverted Data Input	3	
3	Tx2p	CML-I	Transmitter Non-Inverted Data Input	3	
4	GND		Ground	1	1
5	Tx4n	CML-I	Transmitter Inverted Data Input	3	
6	Tx4p	CML-I	Transmitter Non-Inverted Data Input	3	
7	GND		Ground	1	1
8	ModSelL	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

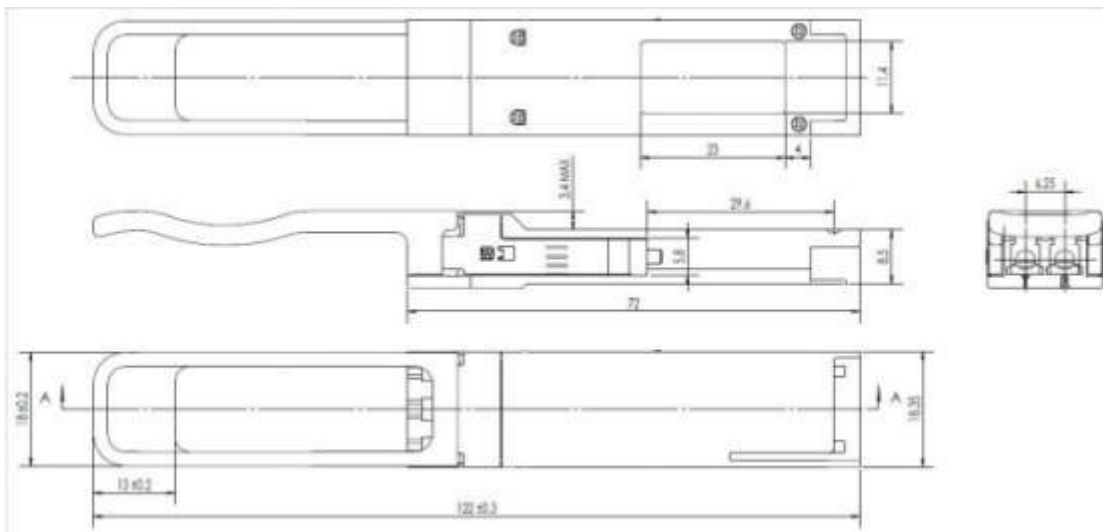
Notes:

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



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: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.