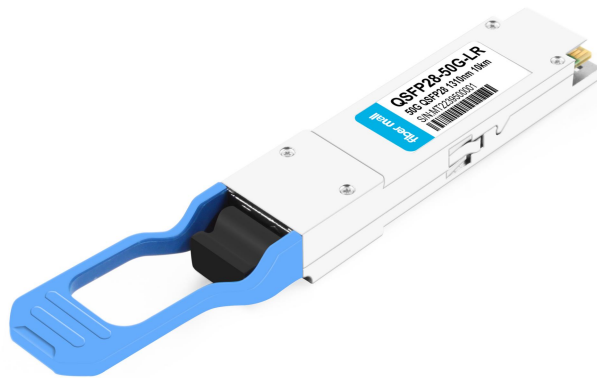


QSFP28-50G-LR

50Gbps QSFP28 Transceiver, Single Mode, 10km Reach



Product Features

- ❖ Supports 50GBASE-LR;
- ❖ Lane signaling rate 26.5625 Gb/s with PAM4;
- ❖ Up to 10km transmission on SMF;
- ❖ DML TOSA and PIN ROSA;
- ❖ High speed I/O electrical interface ;
- ❖ I2C interface with integrated Digital Diagnostic monitoring;
- ❖ QSFP28 MSA package with duplex LC connector;
- ❖ Single +3.3V power supply;

- ❖ Support HW TX_DIS and RX_LOS for telecom application;
- ❖ Maximum power consumption 3.5 W;
- ❖ Operating case temperature: 0 to +70 °C;
- ❖ Compliant to IEEE 802.3cd;
- ❖ Compliant to SFF-8636 and SFF-8679;
- ❖ Complies with EU Directive 2015/863/EU

Applications

- ❖ 50GBASE-LR

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit
Storage Temperature	T _s	-40		+85	°C
Supply Voltage	V _{cc}	-0.5		+4.0	V
Operating Relative Humidity	RH			85	%

Recommended Operating Environment

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T _c	0	-	+70	°C	
Power Supply Voltage	V _{cc}	3.13	3.3	3.47	V	
Power Supply Current	I _{cc}	-	-	1.01	A	
Maximum Power Dissipation	P _D	-	-	3.5	W	
Data Rate(optical)	DR _o	-	53.125	-	Gb/s	
Data Rate(Electrical)	DR _e	-	26.5625	-	Gb/s	
Transmission Distance	TD		-	10	km	Over SMF

Optical Parameters

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Center Wavelength	CW	1304.5	1311	1317.5	nm	
Average Launch Power	P _{TX}	-4.5	-	4.2	dBm	1
Outer Optical Modulation Amplitude	OMA	-1.5	-	4	dBm	1
Launch power in OMA minus TDECQ(min)	OMA-TDECQ	-2.9	-	-	dBm	
Transmitter and dispersion eye closure for PAM4 (TDECQ) (max)	TDECQ	-	-	3.2	dBm	
Average Output Power (Laser Turn off)	P _{OUT-OFF}	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	3.5	-	-	dB	
Receiver						
Center Wavelength	CW	1304.5	1311	1317.5	nm	
Damage threshold	P _{damage}	-	-	5.2	dBm	
Average Rx Power	P _{RX}	-10.8	-	4.2	dBm	2
Receive power _OMA	P _{OMA}	-	-	4	dBm	2
Receiver sensitivity _OMA	SEN _{_OMA}	-	-	-8.4	dBm	2,3
Stressed receiver sensitivity _OMA	SRS	-	-	-6.6	dBm	2,3
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ)	SECQ	-	-	3.2	dB	4
SECQ – 10log10(Ceq)f (max)		-	-	3.2	dB	4

Notes:

1. The optical power is launched into SMF.
2. Receiver sensitivity(OMA), each lane(max) is informative. Measured with test pattern PRBS2^31-1.
3. Measured with a PRBS2^31-1 @26.5625G/s, BER≤2.4E-4.
4. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Electrical Characteristics

High-Speed Signal: Compliant to CAUI-4 (IEEE 802.3bm Annex 83E)

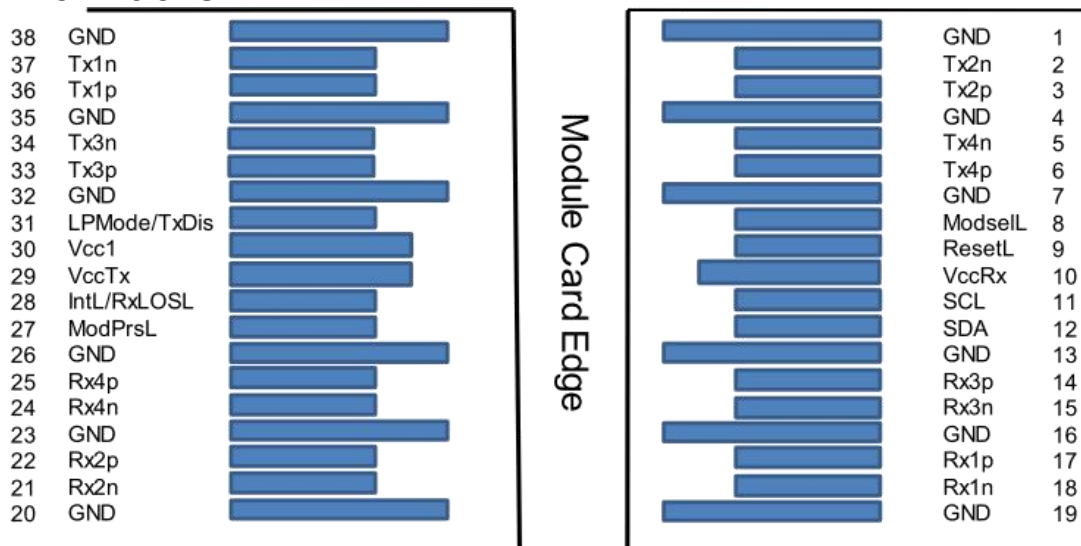
Low-Speed Signal: Compliant to QSFP-8679.

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter (Module Input)						
Input Differential Impedance	Rin	-	100	-	Ohm	
Differential Data Input Amplitude	V _{IN,P-P}	80	-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10%		
DC common-mode input voltage		-0.3	-	2.8	V	
Transition time(20%~80%)	Tr Tf	10	-	-	ps	
LPMode, Reset and ModSelL / Tx dis	V _{IL}	-0.3	-	0.8	V	
LPMode, Reset and ModSelL / Tx dis	V _{IH}	2.0	-	V _{CC} +0.3	V	
Receiver (Module Output)						
Output Differential Impedance	Rout	-	100	-	Ohm	
Differential Data Output Amplitude	V _{OUT,P-P}	-	-	900	mVpp	
Differential termination mismatch (max)	D-mismatch	-	-	10	%	
Transition time, 20% to 80%	Tr Tf	12	-		ps	
ModPrsL and IntL/ Rx los	V _{OL}	0	-	0.4	V	
ModPrsL and IntL/ Rx los	V _{OH}	V _{CC} -0.5	-	V _{CC} +0.3	V	

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to V _{cc}	0.1	V	Internal
Tx Bias Current	0 to 100	10%	mA	Internal
Tx Output Power	-4.5 to 4.2	±3	dBm	Internal
Rx Power	-10.8 to 4.2	±3	dBm	Internal

Pin Definitions



Top Side
Viewed From Top

Bottom Side
Viewed From Bottom

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

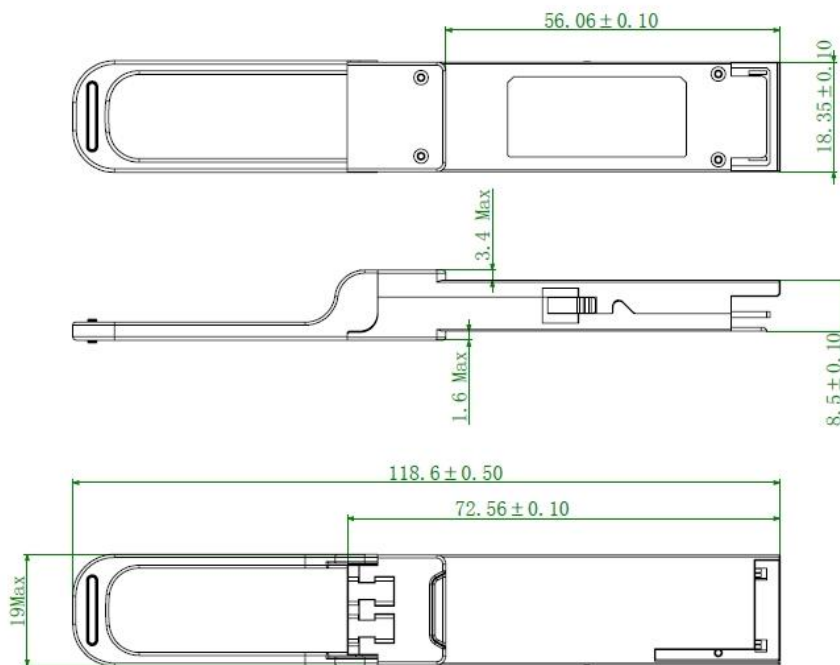
5		NC		3	
6		NC		3	
7		GND	Ground	1	1
8	LVTTLL-I	ModSelL	Module Select	3	
9	LVTTLL-I	ResetL	Module Reset	3	
10		VccRx	+ 3.3V Power Supply Receiver	2	2
11	LVCNOS-I/O	SCL	2-Wire Serial Interface Clock	3	
12	LVCNOS-I/O	SDA	2-Wire Serial Interface Data	3	
13		GND	Ground	1	
14		NC		3	
15		NC		3	
16		GND	Ground	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		NC		3	
25		NC		3	
26		GND	Ground	1	1
27	LVTTLL-O	ModPrsL	Module Present	3	
28	LVTTLL-O	IntL	Interrupt	3	
29		VccTx	+3.3 V Power Supply transmitter	2	2
30		Vcc1	+3.3 V Power Supply	2	2

31	LVTTTL-I	LPMODE	Low Power Mode	3	
32		GND	Ground	1	1
33		NC		3	
34		NC		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 Dimensions



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.

Ordering Information

Part Number	Product Description
QSFP28-50G-LR	1310nm, 50Gbps, LC, 10km, 0°C~+70°C, with DDM