



100-Gbps QSFP+ SR4 Optical Transceiver

Features:

- Hot pluggable QSFP28 MSA form factor
- Support 100GBASE-SR4/100G Fiber Channel application
- Compliant with QSFP28 Electrical MSA SFF-8636
- Multi rate of up to 25.78125Gbps
- Transmission distance up to 100m (OM4)
- +3.3V single power supply
- Low power consumption
- Operating case temp
- Commercial: 0°C to +70 °C
- RoHS compliant

Applications:

- 100GBASE-SR4 at 25.78125Gbps per lane
- InfiniBand QDR, EDR
- Other optical links

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc3	-0.5	-	+3.6	V	
Storage Temperature	Ts	-10	-	+85	°C	
Operating Humidity	RH	+5	-	+85	%	1
Receiver Damage Threshold per Lane	PIND	+4	-	-	dBm	

Notes: Non-condensing

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	0	-	+70	°C	
Power Supply Voltage	Vcc	3.14	3.3	3.47	V	
Power Dissipation	Pd	-	-	2.5	W	
Bit Rate	BR	10.3125	25.78125	-	Gbps	

Electrical Characteristics

Parameter	Symbol	Min	Typ.	Max.	Units	Notes
Input Logic Level High	VIH	2.5	-	VCC+0.3	V	
Input Logic Level Low	VIL	0	-	0.8	V	
Output Logic Level High	VOH	2.4	-	VCC	V	
Output Logic Level Low	VOL	0	-	0.4	V	

Transmitter

Differential Data Input Swing	V _{in,P-P}	200	-	1600	mVPP	
Input Differential Impedance	Z _{IN}	90	100	110	Ω	

Receiver

Differential Data Output Swing	V _{out}	200	-	1000	mV	
Output Differential Impedance	Z _D	90	100	110	Ω	

Optical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Optical transmitter Characteristics						
Bit Rate	BR	Gbps	10.3125	25.78125	-	
Center Wavelength Range	λ_c	nm	830	850	870	
RMS Spectral Width	$\Delta\lambda$	nm	-	-	0.65	
Average Launch power Tx_off	P _{off}	dBm	-	-	-30	
Launch Optical Power	P ₀	dBm	-6.0			1
Extinction Ratio	ER	dB	2	-	-	
Optical Receiver Characteristics						
Bit Rate	BR	Gbps	10.3125	25.78125	-	
Sensitivity@BER=E-12	BER	dBm	-	-	-5.2	
Sensitivity@BER=5E-5	BER	dBm	-	-	- 10.3	
Overload Input Optical Power	PIN	dBm	2.5	-	-	2
Center Wavelength Range	λ_c	nm	820	-	880	
LOS Assert	-	dBm	-30	-	-	
LOS De-Assert	-	dBm	-	-	-12	
LOS Hysteresis	-	dB	0.5	-	-	

Notes:

1. Coupled into 50/125 MMF.
2. Measured with PRBS 2³¹-1 test pattern @25.78125Gbps.BER=E-12

Recommended Interface Circuit

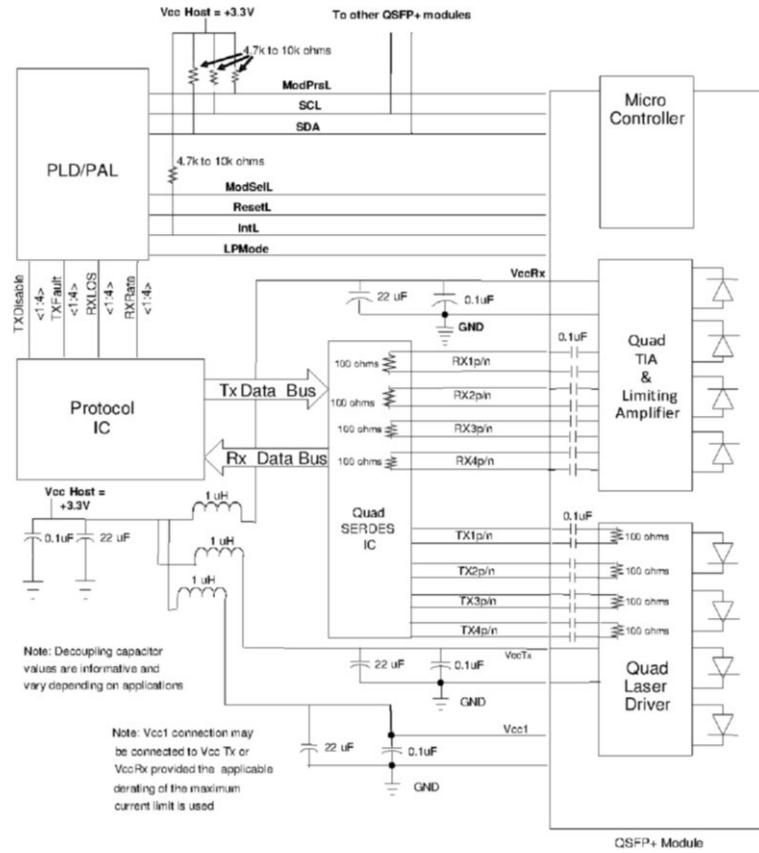


Figure 1. Recommended Interface Circuit

Pin Assignment and Description

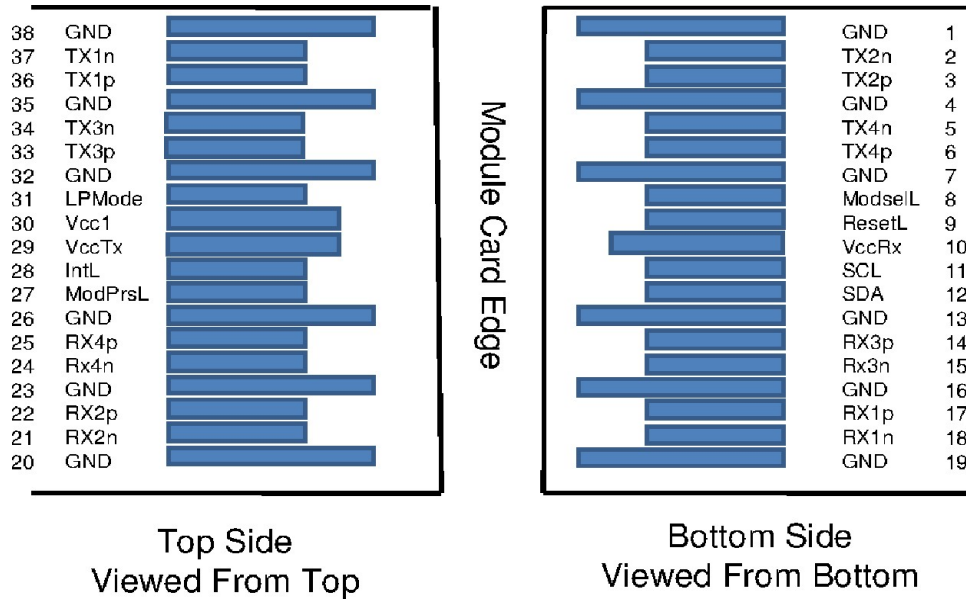


Figure 2. Pin View

Pin Definition

Pin	Symbol	Name/Description	Notes
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3V Power Supply Receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	

25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3V Power supply transmitter	
30	Vcc1	+3.3V Power supply	
31	LPMODE	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

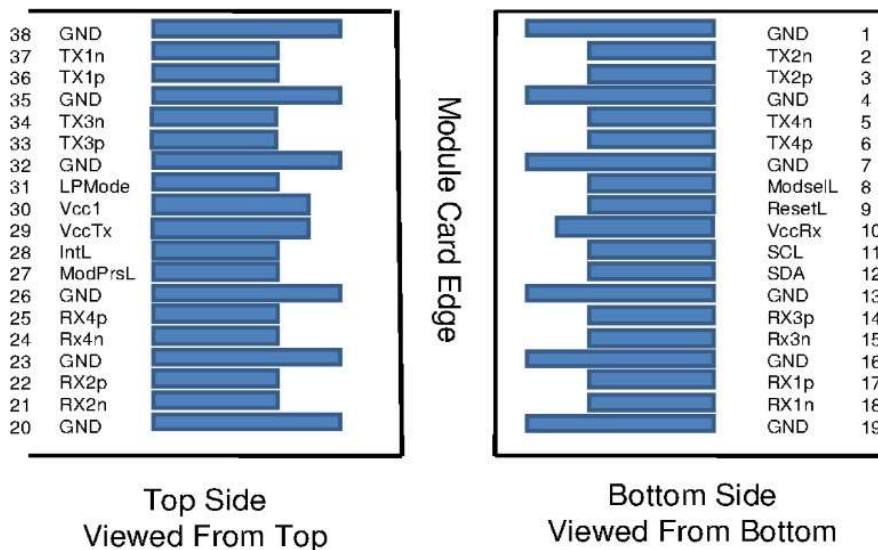
Electrical Characteristics (T=25°C, unless noted)

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Differential Input Impedance		90	100	110	Ω	
Differential Input Swing		200		900	mV	
TP1/TP1a Interface	Compliant with IEEE 802.3ba XLPP1					
Receiver						
Differential Output Impedance		90	100	110	Ω	
Differential Output Swing		200		900	mV	
TP4 Interface	Compliant with IEEE 802.3ba XLPP1					

Digital Diagnostic Monitor Functions

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	°C	Over operating temp
Supply voltage monitor absolute error	DMI_VCC	-0.15	0.15	V	Full operating range
Channel RX power monitor absolute error	DMI_RX_Ch	-3	3	dB	Ch1 ~ Ch4
Channel Bias current monitor	DMI_Ibias_Ch	-10%	10%	mA	Ch1 ~ Ch4
Channel TX power monitor absolute error	DMI_TX_Ch	-3	3	dB	Ch1 ~ Ch4

Pin Assignment



Pin Description

PIN	Logic	Symbol	Name/Description	Note
1		GND	Ground	
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	+ 3.3V Power Supply Receiver	
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock	

12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	
20		GND	Ground	
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3 V Power Supply transmitter	
30		Vcc1	+3.3 V Power Supply	
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	
35		GND	Ground	
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	

Optical interface arrangement

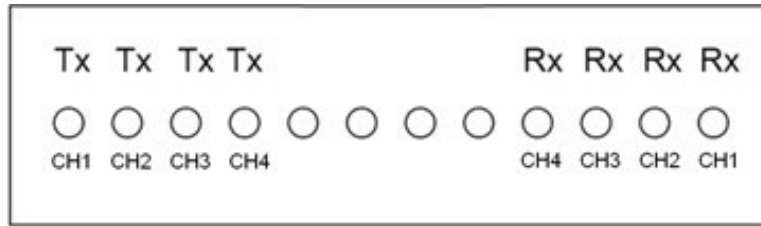


Figure 3. Optical interface arrangement. Lens upwards.

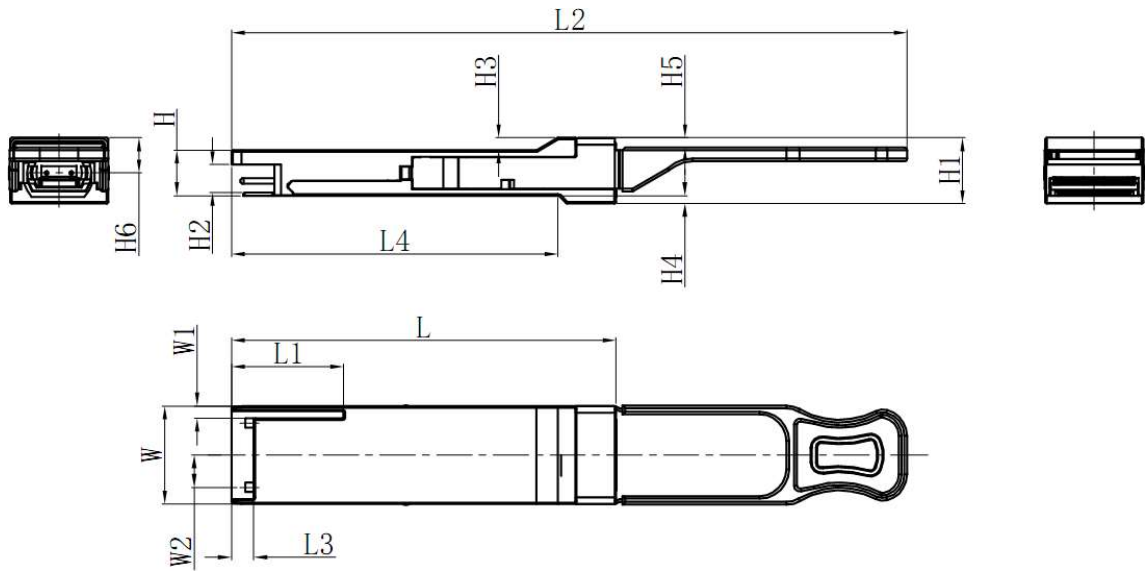
Monitoring Specification

2-Wire Serial Address 1010000x			
Lower Page 00h			
0	Identifier		
1- 2	Status		
3- 21	Interrupt Flags		
22- 33	Free Side Device Monitors		
34- 81	Channel Monitors		
82- 85	Reserved		
86- 98	Control		
99	Reserved		
100-104	Hardware Interrupt Pin Masks		
105-106	Vendor Specific		
107	Reserved		
108-110	Free Side Device Properties		
111-112	Assigned for use by PCI Express		
113	Free Side Device Properties		
114-118	Reserved		
119-122	Password Change Entry Area (Optional)		
123-126	Password Entry Area (Optional)		
127	Page Select Byte		

Upper Page 00h	Optional Page 01h	Optional Page 02h	Optional Page 03h	
128 Identifier	128 CC_APPS	128-255 User EEPROM Data	128-175 Free Side Device Thresholds	
129-191 Base ID Fields	129 AST Table Length (TL)		176-223 Channel Thresholds	
	130-131 Application Code Entry 0			224 Tx EQ & Rx Emphasis Magnitude ID
	132-133 Application Code Entry 1			
	134-253 other entries			225 RX output amplitude indicators
192-223 Extended ID	254-255 Application Code Entry TL	226-241 Channel Controls	242-251 Channel Monitor Masks	
224-255 Vendor Specific ID		252-255 Reserved		

Figure 4. Memory Map

Mechanical Design Diagram



Unit: mm

	L	L1	L2	L3	L4	W	W1	W2	H	H1	H2	H3	H4	H5	H6
Max	72.2	-	128	4.35	61.4	18.45	-	6.2	8.6	12.4	5.35	2.5	1.6	2.0	-
Type	72.0	-	-	4.20	61.2	18.35	-	-	8.5	12.2	5.2	2.3	1.5	1.8	6.55
Min	68.8	16.5	124	4.05	61.0	18.25	2.2	5.8	8.4	12.0	5.05	2.1	1.3	1.6	-

Sum Up

Part No	Specification									
	Package	Data rate per Lane	Laser	Optical Power	Detector	Max. Receive Sensitivity (OMA)	Temp	Reach	Other	Application code
EGS-QS28-SR4-C	QSFP28	25.78 Gbps	850nm	-6~ +4.5 each Channel	PIN	-5.2dBm (BER=5E-5) each Channel	0~70°C	100m	DDM RoHS	InfiniBand QDR, EDR