40G QSFP+ to 4x10G SFP+ Breakout Active Optical Cable

Features

- Four-channel full-duplex active optical cable with breakout from QSFP+ to four SFP+
- 10.3125 G/s per channel
- Reliable VCSEL array technology using multi-mode fiber
- Hot pluggable
- Single 3.3V power supply, Low power consumption
- 0 to 70°C case temperature operating range
- RoHS-6 compliant (lead-free)
- Metal enclosure for low EMI

Applications

- Datacom/Telecom Switch & Router connections
- High speed multi-channel parallel data connections
- High performance computing, server and data storage

Compliance

- Compliant with SFF-8436(QSFP+)、SFF-8431(4xSFP+)
- Compliant with IEEE 802.3ae

Absolute Maximum Ratings

Table1-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Relative Humidity	RH	0		85	%	
Storage Temperature	TSTG	-40	-	+85	°C	
Operating Temperature	Top	0		70	°C	
3.3V Supply Voltage	VCC	-0.5	-	+3.6	V	

Recommended Operating Conditions

Table2-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Case Temperature	T_C	0	-	+70	°C	
Power Supply Voltage	V_{cc}	3.14	3.3	3.47	V	
Power Dissipation per QSFP+	Pd	-	-	1.5	W	1
Power Dissipation per SFP+	Pd			1		
Bit Rate	BR	-	10.3125	-	Gbps	Per lane

Note:

[1] Per terminal

Characteristics

Table3-Electrical Characteristics

Parameter	Symbol	Unit	Min.	Typical	Max.	Ref
Supply Voltage	Vcc1,VccTx,VccRx	V	3.15		3.45	
Supply Current	Icc	mA			350(QSFP) 250(SFP+)	
Link Turn-On Time						
Transmit Turn-On Time		ms			2000	1
Transmitter(per Lane)						
Differential data input swing	Vin,pp	mVpp	180		1200(QSFP) 700(SFP+)	2
Differential input threshold		mV		50-		
Receiver(Per Lane)						
Differential data output swing	Vout,pp	mVpp	0		850	3.4
Power Supply Ripple Tolerance	PSR	mVpp	50			

Note:

1. From power-on and end of any fault conditions.
2. AC coupled internally. See Figure 2 for input eye mask requirements. Self-biasing 100œ differential input.
3. AC coupled with 100œ differential output impedance. See Figure 3 for output eye mask.
4. Settable in 4 discrete steps. See Figure 5 for Vo settings

Recommended Interface

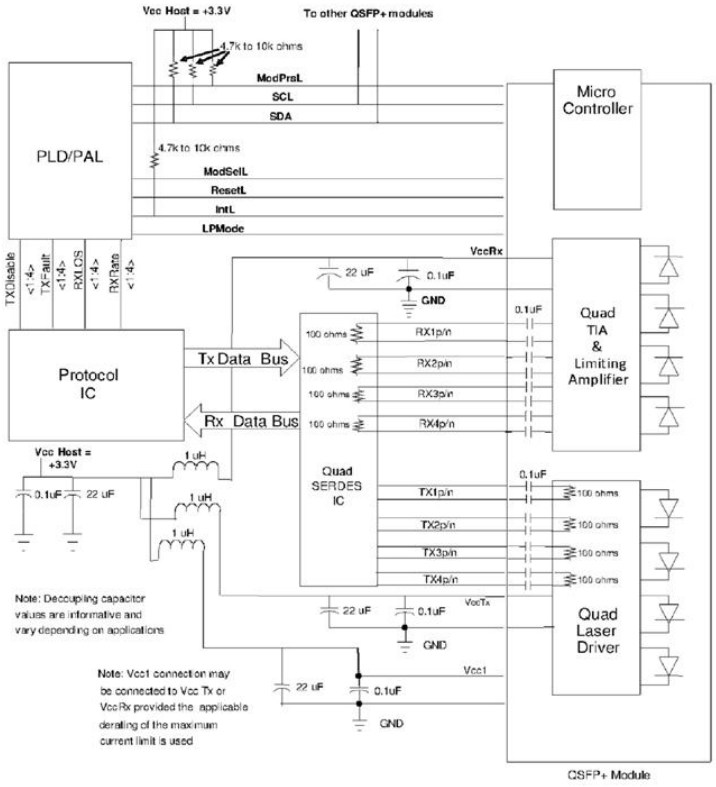

Figure 1 Recommended Interface Circuit for QSFP+

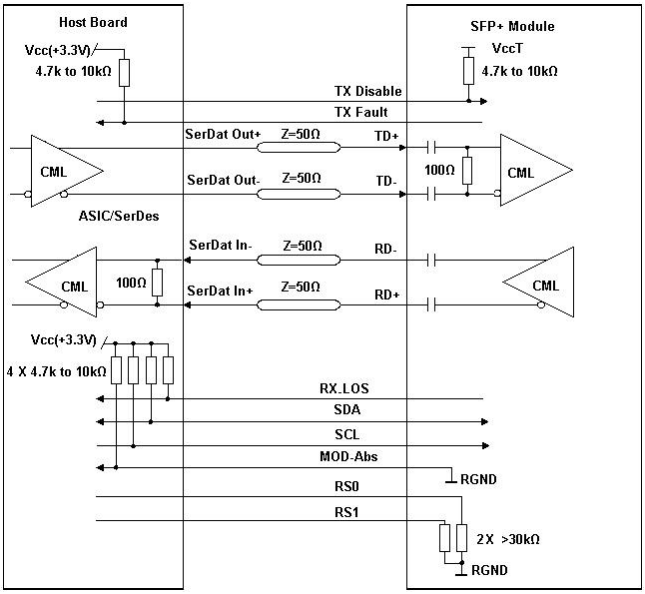

Figure 2 Recommended Interface Circuit for SFP+

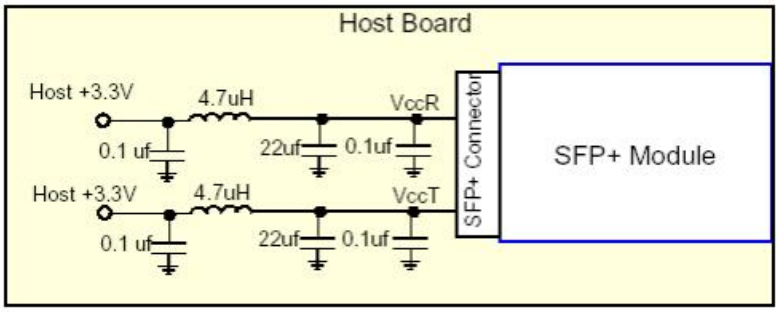

Figure 3 Recommended Host Board Power Supply Circuit for SFP+

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)		
	130-131 Application Code Entry 0		
	132-133 Application Code Entry 1		
	134-253 other entries		176-223 Channel Thresholds
192-223 Extended ID			224 Tx EQ & Rx Emphasis Magnitude ID
224-255 Vendor Specific ID			225 RX output amplitude indicators
			226-241 Channel Controls
			242-251 Channel Monitor Masks
	254-255 Application Code Entry TL		252-255 Reserved

Figure 4 Monitoring Specification

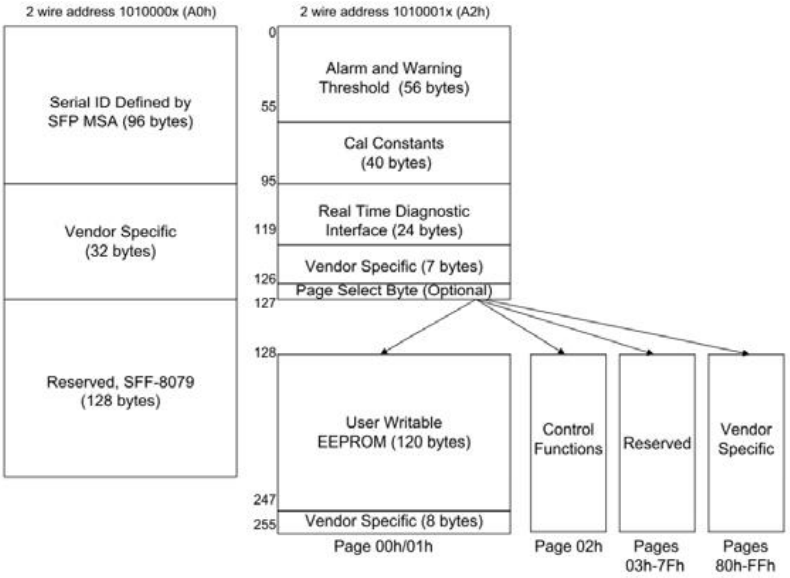

Figure 5 Memory Map for SFP+

Pin Assignment

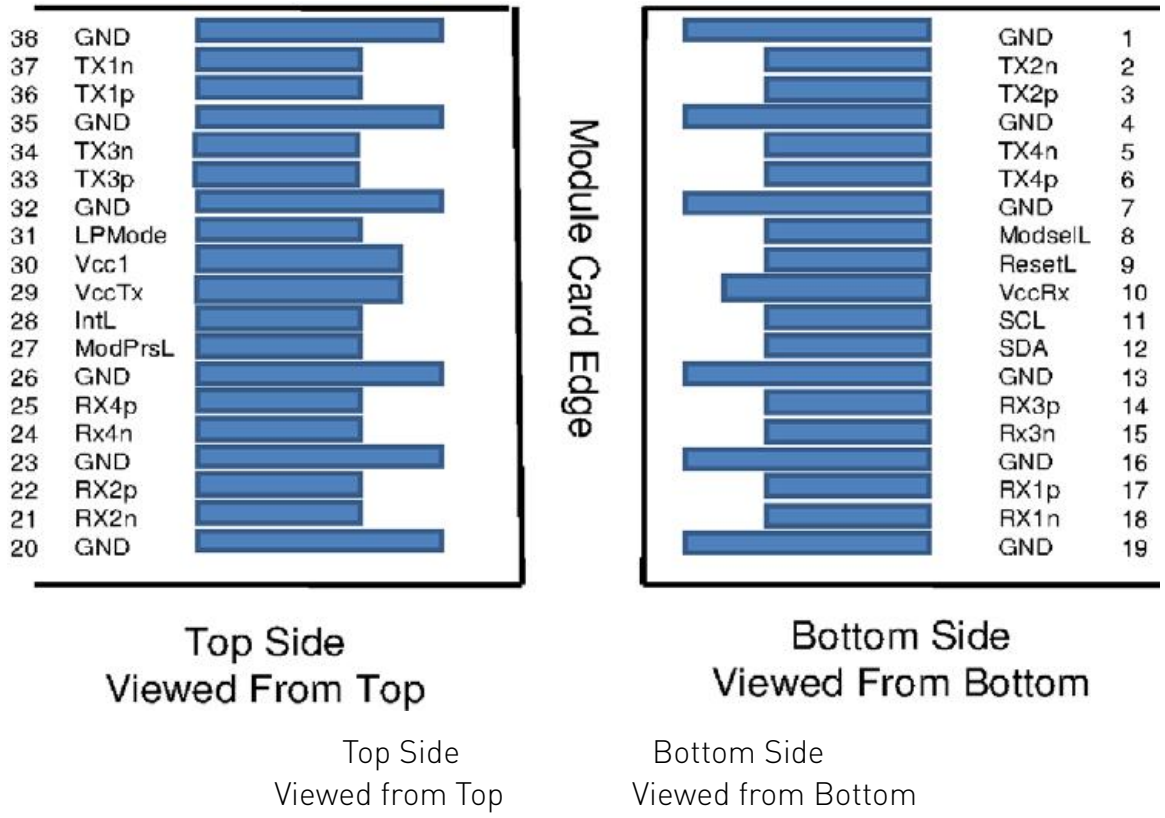

Figure 6 QSFP+ MSA-compliant 38-pin connector

Pin Descriptions

Table4- QSFP+ Pin Function Definitions

Pin	Symbol	Description	
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
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	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	
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	
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	

Notes：

1、Circuit ground is internally isolated from chassis ground

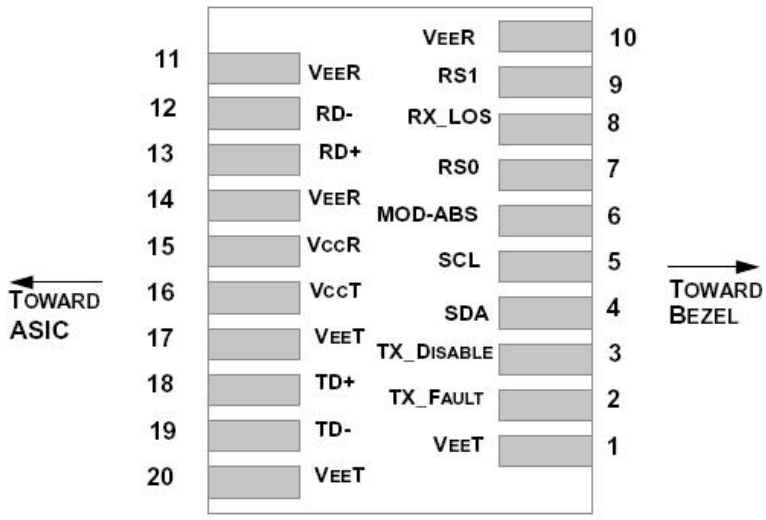

Figure 7—SFP+ MSA-compliant 20-pin connector

Table5- SFP+ Pin Function Definitions

Pin	Symbol	Description	Ref
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	No connection required	
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	RSI	No connection required	
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Mechanical

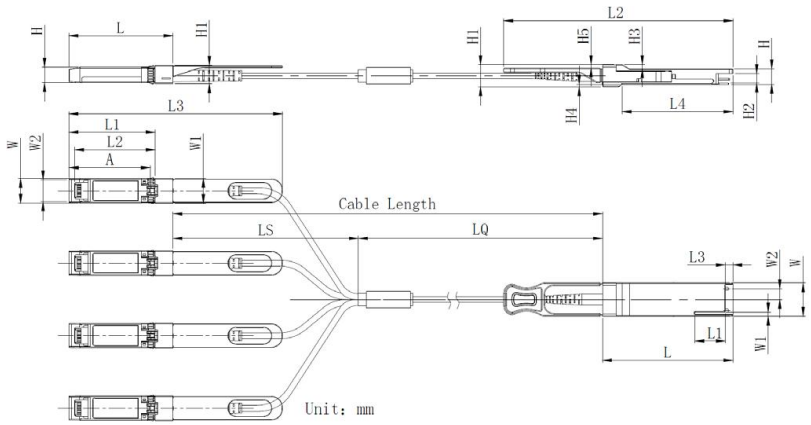

Figure 8 Mechanical Diagram

Unit mm

QSFP+	L	L1	L2	L3	L4	W	W1	W2	H	H1	H2	H3	H4	H5
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
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

SFP+	L	L1	L2	L3	W	W1	W2	H	H1	A
Max	57.6	47.7	44.55	119.9	13.8	14.0	12.3	8.7	10.3	45.25
Type	57.4	47.5	44.35	117.9	13.55	13.8	12.1	8.5	10.1	45
Min	57.2	47.3	44.15	115.9	13.3	13.6	11.9	8.4	9.9	44.65

Table6- Cable Length

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length ⩽ 1 m : +5 /-0	cm
	1 m ⩽ length ⩽ 4.5 m: +15 / -0	cm
	5 m ⩽ length ⩽14.5 m: +30 / -0	cm
	Length⩾15.0 m +2% / -0	m
Cable color	Orange(OM2),Aqua(OM3),Magenta(OM4)	

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.

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1. We are committed to continuous product improvement and feature upgrades, and the contents contained in this manual are subject to change without notice.

2. Nothing herein should be construed as constituting an additional warranty.

3. NADDOD assumes no responsibility for the use or reliability of equipment or software not provided by NADDOD.