

#### QDD400GBDCOZRP4DBM-HW-ST01-C

Huawei® Compatible TAA 400GBase-Open ZR+ Coherent QSFP-DD Transceiver (SMF, Tunable, 120km, LC, DOM, 4dBm)

#### **Features:**

- Hot Pluggable QSFP-DD Footprint (Type 2A)
- Supports 400/300/200/100Gbps
- Duplex LC Connector
- Tunable C-Band Transmitter
- Coherent Receivers
- Power Dissipation is 22.5W
- Operating Case Temperature: 15 to 75 Celsius
- Tunable Power, max TX power +4dBm at 193.7THz +1dBm at C band
- Supports both CFEC and oFEC RoHS Compliant and Lead Free
- Up to 40KM reach without amplification & Up to 120KM reach with amplification



- 400GBase Ethernet
- Open ZR+

### **Product Description**

This Huawei® QSFP-DD transceiver provides 400GBase-Open ZR+ throughput up to 120km over single-mode fiber (SMF) using a tunable wavelength via an LC connector. It is guaranteed to be 100% compatible with the equivalent Huawei® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."





**Applications Supported** 

Description	<b>Host Format</b>	Modulation	Modulation FEC R	Range	DAC-Rate	C	D
						Min	Max
OIF 400ZR app code 0x001	1 x 400GAUI-8	16QAM	CFEC	120km	1x1.50	-2400	2400
OpenZR+ MSA	1 x 400GAUI-8	16QAM	oFEC	450km	1x1.50	-26000	26000
Open ZR+ MSA	4 x 100GAUI-2	16QAM	oFEC	450km	1x1.25	-26000	26000
Open ZR+ MSA	4 x 100GAUI-2	16QAM	oFEC	450km	1x1.50	-26000	26000
Open ZR+ MSA	3 x 100GAUI-2	8QAM	oFEC	600km	1x1.50	-50000	50000
OpenZR+ MSA	2 x 100GAUI-2	QPSK	oFEC	1000km	1x1.50	-50000	50000
Open ZR+ Extension	2 x 100GAUI-2	8QAM	oFEC	2000km	1x1.25	-50000	50000
Open ZR+ Extension	2 x 100GAUI-2	16QAM	oFEC	2000km	1x1.25	-50000	50000
OpenZR+ MSA	1 x 100GAUI-2	QPSK	oFEC	2000km	1x1.50	-80000	80000

## Note:

1. Amplified: -10dBm to +1dBm output power @ C-band.

**Absolute Maximum Ratings** 

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.3	3.3	3.6	V	Not damaged
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Тс	0		70	°C	
Storage Relative Humidity	RH	5		85	%	Non-condensing
Operating Relative Humidity	RH	15		85	%	
Receiver Damage Threshold	PRdmg	10			dBm	Total optical power
ESD Sensitivity				1000	V	

# **Recommended Operating Conditions**

Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
Operating Case Temperature	TC	0		70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
	ICC			7.2	Α	
Maximum Sustained Peak Current (<500ms)				7.4	А	
Maximum Instantaneous Peak Current (<50us)				9	А	
Electro-Static Discharge	ESD			1000	V	
Power Consumption	PD		22	22.5	W	1

Relative Humidity		RH	15		85	%	
				1 x 400GAUI-8			
	400G (400ZR)			4 x 100GAUI-2			
				1 x 400GAUI-8			
	400G (400ZR+)			4 x 100GAUI-2			
Client Mode	300G (300ZR+)		3 x 100GAUI-2				
			2 x 100GAUI-2				
	200G (200ZR+)		2 x CAUI-4				
			1 x 100GAUI-2				
	100G (100ZR+)		1 x CAUI-4				
	400G (400ZR)				120	km	
	400G (400ZR+)				450	km	
Transmission Distance	300G (300ZR+)				600	km	
Distance	200G (200ZR+)				1000	km	
	100G (100ZR+)				2000	km	
		Vrip			1%	DC-1MHz	
Power Supply Noise	Power Supply Noise				2%	1-10MHz	

## **Notes:**

1. In 400GbE mode, the typical power consumption is 22W and the maximum power consumption is 22.5W. When switching to 4×100GbE mode, the typical power consumption will be 23W and the maximum power consumption will be 23.5W, the current will also change accordingly.

High-Speed Electrical Characteristics 400GAUI-8 C2M and 100GAUI-2 C2M

Parameter	Symbol	Min.	Max.	Unit	Notes
Transmitter					
Signaling Rate, Each Lane		26.562	5 ± 100 ppm	GBd	PAM-4
AC Common-Mode Output Voltage (RMS)	RMS		17.5		
Differential Voltage Pk-Pk	Vin, pp	750	900	mV	
Near-end ESMW (Eye Symmetry Mask Width)			0.265		Non-condensing
Near-end Eye Height, Differential		70		mV	
Far-end ESMW		0.2		UI	Total optical power
Far-end Eye Height, Differential		30		mV	
Far-end Pre-Cursor ISI Ratio		-4.5	2.5	%	
Differential Output Return Loss		Equation (83E-2)			IEEE Std 802.3-2018 Annex 120E
Common to Differential Mode Conversion Return Loss		Equation (83E-3)			IEEE Std 802.3-2018 Annex 120E
Differential Termination Mismatch			10	%	At 1 MHz

Transition Time (20% to 80%)	Trise/Tfall	9.5		Ps	20% to 80%				
DC Common Mode Voltage	Vcm	-350	2850	mV					
Receiver									
Signaling Rate Per Lane		26.5625	± 100 ppm	GBd	PAM-4				
Differential Pk-Pk Input Voltage Tolerance	Vout, pp	900		mV					
Differential Input Return Loss (min)		Equation	ı (83E–5)		IEEE Std 802.3-2018 Annex 120E				
Differential to Common-Mode Input Return Loss (min)		Equation	n (83E–6)		IEEE Std 802.3-2018 Annex 120E				
Differential Termination Mismatch			10	%					
Module Stressed Input Test		See 120E.3.4.1			IEEE Std 802.3-2018 Annex 120E				
Single-Ended Voltage Tolerance Range (min)		-0.4 3.3		V					
DC common mode voltage(min)		-350	2850	mV	_				

# **High-Speed Electrical Characteristics CAUI-4 C2M**

Parameter	Symbol	Min.	Max.	Unit	Notes
Transmitter					
Signaling Rate, Each Lane		25.78125	± 100 ppm	GBd	NRZ
AC Common-Mode Output Voltage (RMS)	RMS		17.5	mV	
Differential Voltage Pk-Pk	Vin, pp	750	900	mV	
Eye Width		0.57		UI	
Eye Height, Differential		228		mV	
Vertical Eye Closure		5.5		dB	
Differential Output Return Loss		Equation (83E-2)			IEEE Std 802.3-2018 Annex 120E
Common to Differential Mode Conversion Return Loss		Equation	n (83E-3)		IEEE Std 802.3-2018 Annex 120E
Differential Termination Mismatch			10	%	At 1 MHz
Transition Time (20% to 80%)	Trise/Tfall	9.5		Ps	20% to 80%
DC Common Mode Voltage	Vcm	-350	2850	mV	
Receiver					
Signaling Rate Per Lane		25.78125	± 100 ppm	GBd	NRZ
Differential Pk-Pk Input Voltage Tolerance	Vout, pp	900		mV	
Differential Input Return Loss (min)		Equation (83E–5)			IEEE Std 802.3-2018 Annex 120E
Differential to Common-Mode Input Return Loss (min)		Equation (83E–6)			IEEE Std 802.3-2018 Annex 120E
Differential Termination Mismatch			10	%	

Module Stressed Input Test		See 83	E.3.4.1		
Single-Ended Voltage Tolerance - Range (min)		-0.4	3.3	V	
DC common mode voltage(min)		-350	2850	mV	

# **Low-Speed Electrical Characteristics**

Parameter	Symbol	Min.	Max.	Unit	Notes
SCL and SDA	VOL	0	0.4	V	1
	VOH	Vcc-0.5	Vcc+0.3	V	
SCL and SDA	VIL	-0.3	Vcc*0.3	V	
	VIH	VCC*0.7	Vcc+0.5	V	
Capacitance for SCL and SDA I/O Signal	Ci		14	pF	
Total Bus Capacitive Load for SCL and	Cb		100	pF	2
SDA	Cb		200	pF	3
InitMode, ResetL and ModSelL IntL	VIL	-0.3	0.8	V	
	VIH	2	VCC+0.3	V	
	lin		360	uA	0V <vin<vcc< td=""></vin<vcc<>
	VOL	0	0.4	V	IOL=2.0mA
	VOH	VCC-0.5	VCC+0.3	V	10k ohms pull up to Host Vcc
ModPrsL	VOL	0	0.4	V	IOL=2.0mA
	VOH				4

- 1. IOL(max)=3mA for fast mode, 20ma for Fast-mode plus.
- 2. For 400kHz clock rate use 3.0 k Ohms Pullup resistor, max. For 1000kHz clock rate refer to Figure 45 (QSFP-DD-Hardware-rev5p0).
- 3. For 400kHz clock rate use 1.6 k Ohms pullup resistor, max. For 1000kHz clock rate refer to Figure 45 (QSFP-DD-Hardware-rev5p0)
- 4. ModPrsL can be implemented as a short-circuit to GND on the module.

# **Optical Characteristics**

Parameter		Min.	Тур.	Max.	Unit	Notes			
Transmitter									
		Z	R400-CFEC-16QAN	<u></u>		CFEC FEC, NCG 10.8dB			
	400G	ZI	R400-OFEC-16QAN	M					
Modulation Format	300G	Z	R300-OFEC-8QAN	1					
Format	200G	7	ZR200-OFEC-QPSK			OFEC FEC, NCG 11.6dB			
	100G	7	ZR100-OFEC-QPSK						
		59	.843750000±20pp	m	GBd				
	400G	60	.138546798±20pp	m	GBd				
Baud Rate	300G	60	.138546798±20pp	m	GBd				
	200G	60	.138546798±20pp	GBd					
	100G	30	.069273399±20pp	m	n GBd				
Transmitter Freque	ncy Range	191.3		196.1	THz				
Flexible DWDM Gri	Flexible DWDM Grid				GHz				
Frequency Fine Tuning Range		-5		5	GHz	Bright tuning			
Frequency Fine Tun	Frequency Fine Tuning Step				GHz				
Laser Frequency Ac	curacy	-1.8		1.8	GHz				
TX Spectral Upper I	Vlask			(30.0, 0.0) (37.0,-1 0.0) (39.2,-1 5.0) (40.4,-2 0.0)	(GHz,d B)	1			
TX Spectral Lower I		(30.0,-9.0) (31.3,-2 0.0) (31.3,-3 5.0)			(GHz,d B)	2			
Transmitter Laser D				100	ms				
Transmitter Wavele	ength Switching			60	S				
Transmitter Laser E	nable Time			10	S				
Transmit Output Po		-10		1	dBm	3			
Transmit Output Po		0.1			dB				
Optical Power Setti		-1		1	dB	4			
Output Power Mon	itor Accuracy	-1 -0.5		1	dB				
Power Stability	Power Stability			0.5	dB	At fixed wavelength, room temperature			
Total Output Power	with Tx	-1		-20	dB dBm	3			
Total Output Powe Wavelength Switch				-20	dBm				
Transmitter Reflect				-20	dB	Looking into the Tx			

Inband (IB) OSNR		38			dB		
Lorentzian Linewidth				300	kHz	Tx and LO	
Relative Intensity Noi	se			-140	dB/Hz		
Mean I-Q Amplitude	Imbalance			1	dB		
Transmitter Polarizat Power	ion Dependent			1.5	dB		
DC I-Q Offset (Mean per				-26	dB		
Polarization) I-O Instantaneous Off	I-Q Instantaneous Offset			-20	dB		
Receiver							
- Nederver		7	D400 CEEC 1COAN	4		CEEC EEC	NCC 10 0dp
	400G		R400-CFEC-16QAN			CFEC FEC,	NCG 10.8dB
Modulation Format			R400-OFEC-16QAN			OFEC FEC	, Net Coding
	300G	Z	ZR300-OFEC-8QAN	1		Gain(NCG	) 11.6dB,
	200G	,	ZR200-OFEC-QPSK	· ·		Thretical I	Max PreFEC BER
	100G		ZR100-OFEC-QPSK			Z.UE-Z	
	400G	59.843750000±20ppm			GBd	400ZR,SFF-8024 Media ID 3Eh/3Fh	
Baud Rate	4000	60	.138546798±20pp	m	GBd	400ZR+, SFF-8024 Media ID 46h	
	300G		.138546798±20pp		GBd	ID 47h	FF-8024 Media
	200G	60	.138546798±20pp	m	GBd	200ZR+, S ID 48h	FF-8024 Media
	100G	30	.069273399±20pp	m	GBd	100ZR+, S ID 49h	FF-8024 Media
Frequency Offset Bet Carrier and LO	ween Received	-3.6		+3.6	GHz		
	400G	-12		0	dBm	Signal pov OSNR>26	
	4000	-12		0	dBm	Signal pov OSNR>24	ver, dB,400ZR+
Input Power Range	300G	-15		0	dBm	Signal pov OSNR>21	ver, dB,300ZR+
	200G	-18		0	dBm		dB,200ZR+
	100G	-18		0	dBm	i	ver, .5dB,100ZR+
	400G			26	dB/0.1nm	400ZR	
				24	dB/0.1nm	400ZR+	Measured back-to-back
OSNR Tolerance	300G			21	dB/0.1nm	300ZR+	with short
	200G 100G			16 12.5	dB/0.1nm dB/0.1nm	200ZR+ 100ZR+	optical channel
RX Sensitivity	400G	-20		12.3	dB/0.1nm	400ZR	Inband (IB)
AA Selisitivity 4000		-20			UDITI	400ZN	OSNR ≥34dB
Non-damaging Input Power				10	dBm	Total pow	er
Optical Input Power I	Monitor	-2		2	dB	Total pow	er
MAX FEC Pre Ber		0.017		0.020			

				2,400	ps/nm	400ZR	Tolerance to
	400G			20,000	ps/nm	400ZR+	CD with ≤0.5 dB penalty to
Chromatic Dispersion	300G			40,000	ps/nm	300ZR+	OSNR
Tolerance	200G			50,000	ps/nm	200ZR+	sensitivity when change
	100G			100,000	ps/nm	100ZR+	in SOP is ≤1 rad/ms
CD Monitor Accuracy		-200		200	ps/nm		
	4000	33			ps	400ZR	
	400G	66			ps	400ZR+	1
DGD Tolerance	300G	83			ps	300ZR+	OSNR - penalty<0.5dB
	200G	83			ps	200ZR+	
	100G	100			ps	100ZR+	
DGD Monitor Accura	DGD Monitor Accuracy			15	ps	6	•
Peak PDL Tolerance				3.0	dB	7	
				3.5	dB	8	
Tolerance to Change	e in SOP	50			krad/s	9	
Optical Return Loss		20			dB	Optical re	eflectance at Rx r input.
	400G	-20	-18	-16	dBm		
Optical Rx_LOS	300G	-23	-21	-19	dBm		
Assert Threshold	200G	-26	-24	-22	dBm		
	100G	-26	-24	-22	dBm		
Optical Rx_LOS Hysteresis		1	1.5	2.5	dB		
Optical Input Power Transient Tolerance		-2		2	dB		
Service Recovery Ti	me			40	ms		

- Refer to OIF-400ZR-02.0 13.3.201b.
   Refer to openzrplus\_2p0 11.4.10.
- Refer to OIF-400ZR-02.0 13.3.201b.
   Refer to openzrplus\_2p0 11.4.10.
- 3. The absolute accuracy is ±1dB.
- 4. Difference between setting and reporting.
- 5. At fixed wavelength, environment temperature.
- 6. 0~40ps for 400ZR 0~100ps for 400/300/200/100ZR+
- 7. Tolerance to peak PDL with  $\leq$ 1.3dB additional OSNR penalty when change in SOP is  $\leq$ 1 rad/ms.
- 8. Tolerance to peak PDL with  $\leq$ 1.8dB additional OSNR penalty when change in SOP is  $\leq$ 1 rad/ms.
- 9. With  $\leq$  0.5 dB additional OSNR penalty over all PMD and PDL values.
- 10. Tolerance to change in input power with < 0.5 dB penalty to OSNR tolerance. The 20% to 80% rise/fall times for the input power change shall be no faster than 50  $\mu$ s.

11. The transmitter and receiver comply with the 400GAUI-8 C2M and CEI-56G-VSR-PAM4 electrical specification, Electrical interface definitions see IEEE Std 802.3-2018 Annex 120E. The data lines are AC-coupled and terminated in the module per the following figure from the QSFP-DD MSA.

### **Control and Status I/O Timing Characteristics**

Parameter	Symbol	Min.	Max.	Unit	Notes
MgmtInitDuration	Max MgmtInit		2000	ms	1
ResetL Assert Time	t_reset_init	10		us	2
IntL Assert Time	ton_IntL		200	ms	3
IntL De-assert Time	toff_IntL		500	us	4
Rx LOS Assert Time	ton_los		100	ms	5
Rx LOS Assert Time (Optional Fast Mode)	ton_losf		10	ms	6
Rx LOS De-assert Time	toff_los		100	ms	
Tx Fault Assert Time	ton_Txfault		200	ms	7
Flag Assert Time	ton_flag		200	ms	8
Mask Assert Time	ton_mask		100	ms	9
Mask De-assert Time	toff_mask		100	ms	10
High Power Up State			180	S	
Software TX Disable Assert Time			100	ms	
Software TX Disable De-assert Time			10	S	

- 1. Time from power on, hot plug or rising edge of reset until completion of the MgmtInit State.
- 2. Minimum pulse time on the ResetL signal to initiate a module reset.
- 3. Time from occurrence of condition triggering IntL until Vout:IntL=Vol.
- 4. Time from clear on read operation of associated flag until Vout:IntL=Voh. This includes de-assert times for Rx LOS, Tx Fault and other flag bits.
- 5. Time from Rx LOS condition present to Rx LOS bit set (value = 1b) and IntL asserted.
- 6. Time from Rx LOS state to Rx LOS bit set (value = 1b) and IntL asserted.
- 7. Time from Tx Fault state to Tx Fault bit set (value=1b) and IntL asserted.
- 8. Time from occurrence of condition triggering flag to associated flag bit set (value=1b) and IntL asserted.
- 9. Time from mask bit set (value=1b) until associated IntL assertion is inhibited.
- 10. Time from mask bit cleared (value=0b) until associated IntL operation resumes.

# **Pin Descriptions**

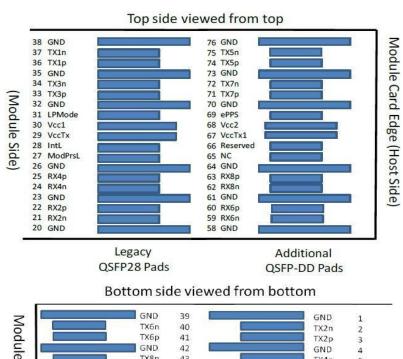
Pin	Logic	Symbol	Name/Description	Plug Sequence	Notes
1		GND	Ground		1
1	CNALL			1B	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3B	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3B	
4		GND	Ground	1B	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3B	
6	CML-I	Тх4р	Transmitter Non-Inverted Data Input	3B	
7		GND	Ground	1B	1
8	LVTTL-I	ModSelL	Module Select	3B	
9	LVTTL-I	ResetL	Module Reset	3B	
10		VccRx	+3.3V Power Supply Receiver	2B	2
11	LVCMOS-I/O	SCL	2-wire serial interface clock	3B	
12	LVCMOS-I/O	SDA	2-wire serial interface data	3B	
13		GND	Ground	1B	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3B	
15	CML-O	Rx3n	Receiver Inverted Data Output	3B	
16		GND	Ground	1B	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3B	
18	CML-O	Rx1n	Receiver Inverted Data Output	3B	
19		GND	Ground	1B	1
20		GND	Ground	1B	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3B	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3B	
23		GND	Ground	1B	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3B	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3B	
26		GND	Ground	1B	1
27	LVTTL-O	ModPrsL	Module Present	3B	
28	LVTTL-O	IntL	Interrupt	3B	
29		VccTx	+3.3V Power supply transmitter	2B	2
30		Vcc1	+3.3V Power supply	2B	2
31	LVTTL-I	LPMode	Low Power mode;	3B	
32		GND	Ground	1B	1
33	CML-I	Тх3р	Transmitter Non-Inverted Data Input	3B	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3B	
35		GND	Ground	1B	1

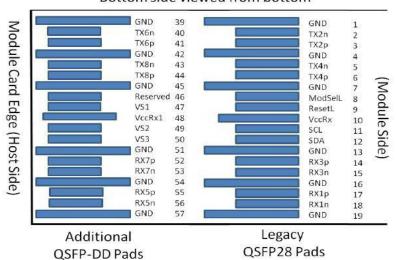
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3B	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3B	
38		GND	Ground	1B	1
39		GND	Ground	1A	1
40	CML-I	Tx6n	Transmitter Inverted Data Input	3A	
41	CML-I	Тх6р	Transmitter Non-Inverted Data Input	3A	
42		GND	Ground	1A	1
43	CML-I	Tx8n	Transmitter Inverted Data Input	3A	
44	CML-I	Тх8р	Transmitter Non-Inverted Data Input	3A	
45		GND	Ground	1A	1
46		Reserved	For future use	3A	3
47		VS1	Module Vendor Specific 1	3A	3
48		VccRx1	3.3V Power Supply	2A	2
49		VS2	Module Vendor Specific 2	3A	3
50		VS3	Module Vendor Specific 3	3A	3
51		GND	Ground	1A	1
52	CML-O	Rx7p	Receiver Non-Inverted Data Output	3A	
53	CML-O	Rx7n	Receiver Inverted Data Output	3A	
54		GND	Ground	1A	1
55	CML-O	Rx5p	Receiver Non-Inverted Data Output	3A	
56	CML-O	Rx5n	Receiver Inverted Data Output	3A	
57		GND	Ground	1A	1
58		GND	Ground	1A	1
59	CML-O	Rx6n	Receiver Inverted Data Output	3A	
60	CML-O	Rx6p	Receiver Non-Inverted Data Output	3A	
61		GND	Ground	1A	1
62	CML-O	Rx8n	Receiver Inverted Data Output	3A	
63	CML-O	Rx8p	Receiver Non-Inverted Data Output	3A	
64		GND	Ground	1A	1
65		NC	No Connect	3A	3
66		Reserved	For future use	3A	3
67		VccTx1	3.3V Power Supply	2A	2
68		Vcc2	3.3V Power Supply	2A	2
69	LVTTL-I	ePPS	Precision Time Protocol (PTP) reference clock input. Not used	3A	3
70		GND	Ground	1A	1
71	CML-I	Тх7р	Transmitter Non-Inverted Data Input	3A	
72	CML-I	Tx7n	Transmitter Inverted Data Input	3A	

73		GND	Ground	1A	1
74	CML-I	Тх5р	Transmitter Non-Inverted Data Input	3A	
75	CML-I	Tx5n	Transmitter Inverted Data Input	3A	
76		GND	Ground	1A	1

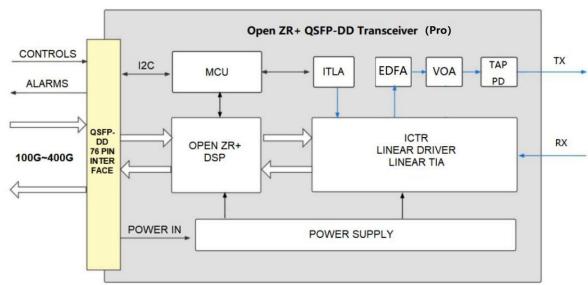
- 1. QSFP-DD uses common ground (GND)for all signals and supply (power). All are common within the QSFP-DD module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
- 2. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 shall be applied concurrently. Requirements defined for the host side of the Host Card Edge Connector. VccRx, VccRx1, Vcc1, Vcc2, VccTx and VccTx1 may be internally connected within the module in any combination. The connector Vcc pins are each rated for a maximum current of 1500 mA.
- 3. All Vendor Specific, Reserved and No Connect pins may be terminated with 50ohms to ground on the host. Pad 65 (No Connect) shall be left unconnected within the module. Vendor specific and Reserved pads shall have an impedance to GND that is greater than 10K ohms and less than 100pF.
- 4. Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1A, 2A, 3A, 1B, 2B, 3B. (see Figure 2 for pad locations) Contact sequence A will make, then break contact with additional QSFP-DD pads. Sequence 1A, 1B will then occur simultaneously, followed by 2A, 2B, followed by 3A, 3B.

## **Electrical Pad Layout**

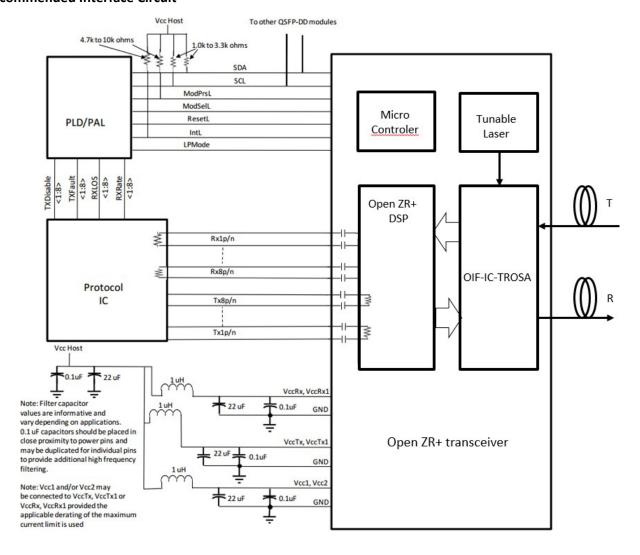




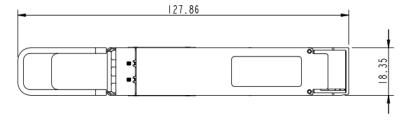
## **Block Diagram**

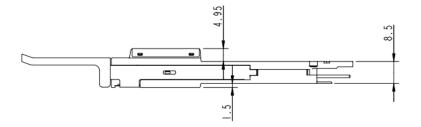


## **Recommended Interface Circuit**

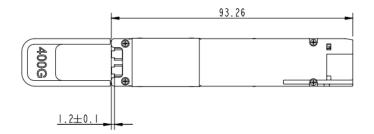


# **Mechanical Specifications**









#### **About ProLabs**

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

### **Complete Portfolio of Network Solutions**

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

#### **Trusted Partner**

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.















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