

3HE18024AA-AO

Alcatel-Lucent Nokia® 3HE18024AA Compatible TAA 800GBase-2xFR4 QSFP-DD Transceiver (SMF, 1310nm, 2km, 2xCS, DOM, 0 to 70C, CMIS 5.0)

Features:

- Compliant with IEEE 802.3cu-2021: 2x400GBASE-FR4 Optical Interface
- Compliant with QSFP-DD800 MSA HW Rev. 6.01 Type 2A with Dual CS Connector
- Compliant with IEEE 802.3ck-2022: 2x400GAUI-4 C2M Electrical Interface
- 2-Wire Serial Interface with Digital Diagnostic Monitoring
- Class 1 Laser
- Compliant with CMIS 5.0
- RoHS Compliant and Lead-Free
- Operating Temperature: 0 to 70 Celsius



Applications:

- 2x400GBase Ethernet

Product Description

This Alcatel-Lucent Nokia® 3HE18024AA compatible QSFP-DD transceiver provides 800GBase-2xFR4 throughput up to 2km over single-mode fiber (SMF) PAM4 using a wavelength of 1310nm via a 2xCS connector. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows 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.

AddOn's 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."



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Tstg	-40	85	°C
Supply Voltage	V _{CC}	-0.5	3.6	V
Relative Humidity (Non-Condensing)	RH	5	95	%
Data Input Voltage Differential	V _{DIP} -V _{DIN}		1	V
Control Input Voltage	V _I	-0.3	V _{CC} +0.5	V
Control Output Current	I _O	-20	20	mA

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Case Temperature	T _C	0		70	°C
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V
Instantaneous Peak Current at Hot Plug	I _{CC_IP}			7200	mA
Sustained Peak Current at Hot Plug	I _{CC_SP}			5940	mA
Maximum Power Dissipation	PD			18	W
Maximum Power Dissipation (Low-Power Mode)	PD _{LP}			2.5	W
Signaling Speed Per Lane	DRL		53.125		GBd
Control Input Voltage - High	V _{IH}	V _{CC} *0.7		V _{CC} +0.3	V
Control Input Voltage - Low	V _{IL}	-0.3		V _{CC} *0.3	V
2-Wire Serial Interface Clock Rate				400	kHz
Power Supply Noise (1kHz to 1MHz, Pk-Pk)				66	mVp-p
Operating Distance		2		2000	m

Electrical Characteristics - High-Speed Signal (Compliant with IEEE 802.3ck C2M)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter (Module Input, TP1)						
Differential Pk-Pk Input Voltage Tolerance (TP1a)		750			mV	
Pk-Pk AC Common-Mode Voltage Tolerance	Low-Frequency (VCMLF)	32			mV	
	Full-Band (VCMFB)	80			mV	
Differential-Mode to Common-Mode Return Loss	RLcd	802.3ck 120G-2			dB	
Effective Return Loss	ERL	8.5			dB	
Differential Termination Mismatch				10	%	
Single-Ended Voltage Tolerance Range		-0.4		3.3	V	
DC Common-Mode Voltage Tolerance		-0.35		2.85	V	
Receiver (Module Output, TP4)						
Pk-Pk AC Common-Mode Voltage	Low-Frequency (VCMLF)			32	mV	
	Full-Band (VCMFB)			80	mV	
Differential Pk-Pk Output Voltage	Short-Mode			600	mV	
	Long-Mode			845	mV	
Eye Height	EH	15			mV	
Vertical Eye Closure	VEC			12	dB	
Common-Mode to Differential-Mode Return Loss	RLDc	802.3ck 120G-1			dB	
Effective Return Loss	ERL	8.5			dB	
Differential Termination Mismatch				10	%	
Transition Time		8.5			ps	
DC Common-Mode Voltage Tolerance		-0.35		2.85	V	

Electrical Characteristics - Low-Speed Control and Sense Signals (Compliant with QSFP-DD HW Rev. 6.01 Table 14)

Parameter	Symbol	Min.	Max.	Unit
Module Output SCL and SDA	VOL	0	0.4	V
Module Input SCL and SDA	VIL	-0.3	V _{cc} *0.3	V
	VIH	V _{cc} *0.7	V _{cc} +0.5	V
InitMode, ResetL, and ModSelL	VIL	-0.3	0.8	V
	VIH	2	V _{cc} +0.3	V
IntL	VOL	0	0.4	V
	VOH	V _{cc} -0.5	V _{cc} +0.3	V

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Wavelength L0, L4		$\lambda_{C0}, \lambda_{C4}$	1264.5	1271	1277.5	nm	
Wavelength L1, L5		$\lambda_{C1}, \lambda_{C5}$	1284.5	1291	1297.5	nm	
Wavelength L2, L6		$\lambda_{C2}, \lambda_{C6}$	1304.5	1311	1317.5	nm	
Wavelength L3, L7		$\lambda_{C3}, \lambda_{C7}$	1324.5	1331	1337.5	nm	
Side-Mode Suppression Ratio		SMSR	30			dB	
Total Average Launch Power		AOP _T			10.4	dBm	
Average Launch Power Per Lane		AOP _L	-3.2		4.4	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}) Per Lane	For TDECQ < 1.4dB	T _{OMA}	-0.2		3.7	dBm	
	For 1.4dB ≤ TDECQ ≤ 3.4dB		-1.6 + TDECQ				
Difference in Launch Power Between Any Two Lanes (OMA _{outer})		AOP _d			3.9	dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane		TDECQ			3.4	dB	
Transmitter Eye Closure for PAM4 (TECQ) Per Lane		TECQ			3.4	dB	
TDECQ – TECQ					2.5	dB	
Over/Under-Shoot					22	%	
Transmitter Power Excursion					1.8	dBm	
Average Launch Power of Off Transmitter Per Lane		T _{OFF}			-16	dBm	
Extinction Ratio		ER	3.5			dB	
Transmitter Transition Time (Maximum)		Tr			17	ps	
RIN _{17,1} OMA (Maximum)		RIN			-136	dB/Hz	
Optical Return Loss Tolerance		ORLT			17.1	dB	
Transmitter Reflectance		T _R			-26	dB	2
Receiver							
Wavelength L0, L4		$\lambda_{C0}, \lambda_{C4}$	1264.5	1271	1277.5	nm	
Wavelength L1, L5		$\lambda_{C1}, \lambda_{C5}$	1284.5	1291	1297.5	nm	
Wavelength L2, L6		$\lambda_{C2}, \lambda_{C6}$	1304.5	1311	1317.5	nm	
Wavelength L3, L7		$\lambda_{C3}, \lambda_{C7}$	1324.5	1331	1337.5	nm	
Damage Threshold Per Lane		AOP _D	5.4			dBm	
Average Receive Power Per Lane		AOP _R	-7.2		4.4	dBm	
Receive Power (OMA _{outer}) Per Lane		OMA _R			3.7	dBm	
Difference in Receive Power Between Any Two Lanes (OMA _{outer}) (Maximum)		AOP _g			4.1	dB	
Receiver Reflectance		RR			-26	dB	
Receiver Sensitivity (OMA _{outer}) Per Lane	For TECQ<1.4dB	SOMA			-4.6	dBm	
	For 1.4dB≤TECQ≤3.4dB				-6 + TECQ		

Stressed Receiver Sensitivity (OMA _{outer}) Per Lane	SRS			-2.6	dBm	3
Conditions of Stressed Receiver Sensitivity Test						
Stressed Eye Closure for PAM4 (SECQ) Per Lane Under Test			3.4		dB	
OMA _{outer} of Each Aggressor Lane			1.4		dBm	

Notes:

1. Average launch power, per lane (minimum), is informative and not the principal indicator of signal strength.
2. Transmitter reflectance is defined looking into the transmitter.
3. Measured with conformance test signal at TP3 for the BER = 2.4×10^{-4} .

Digital Diagnostics

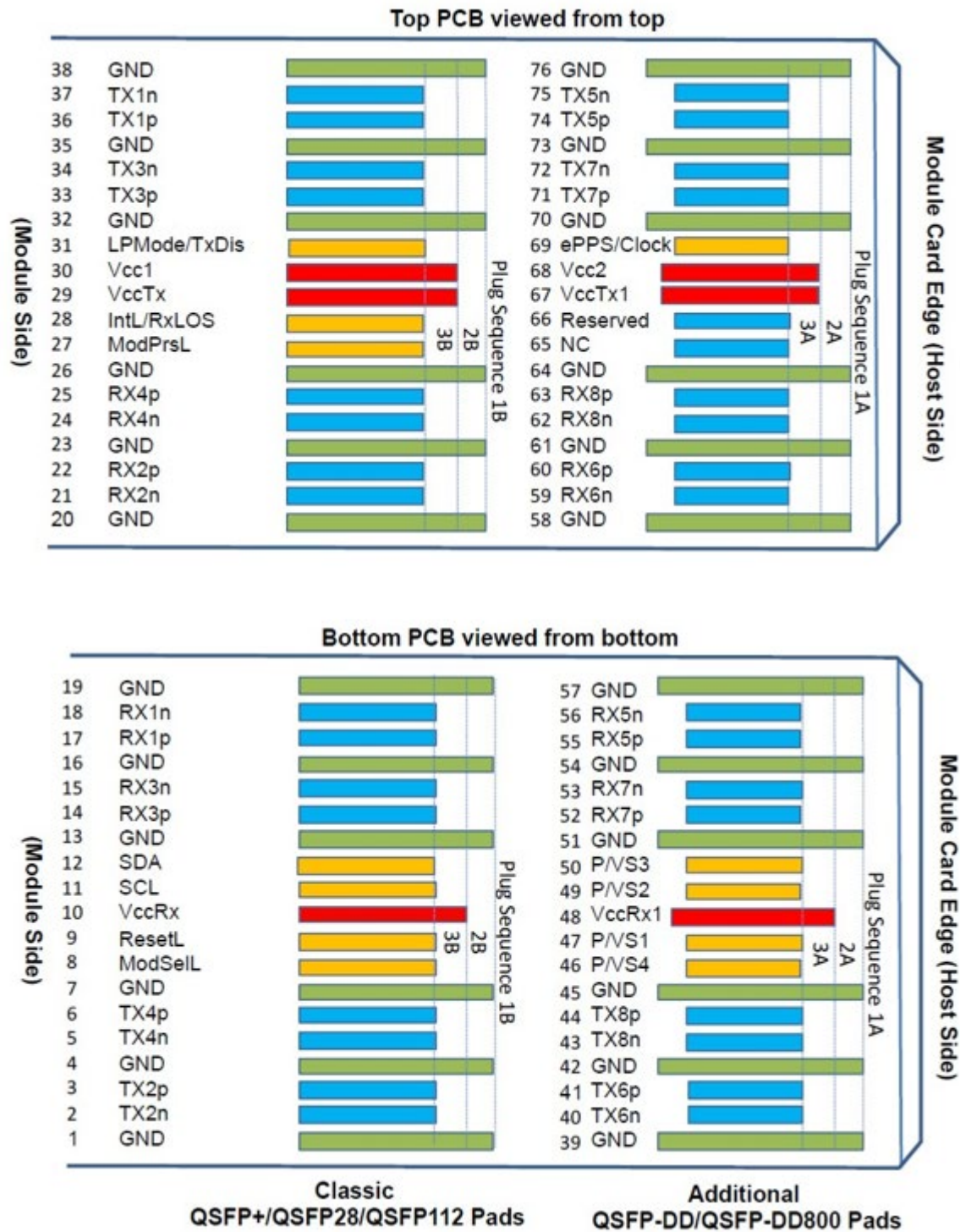
Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	°C	Internal
Voltage	0 to V _{cc}	0.1	V	Internal
Tx Bias Current (Per Lane)	0 to 100	10%	mA	Internal
Tx Output Power (Per Lane)	-3.2 to +4.4	±3	dB	Internal
Rx Receive Power (Per Lane)	-7.2 to +4.4	±3	dB	Internal

Pin Descriptions

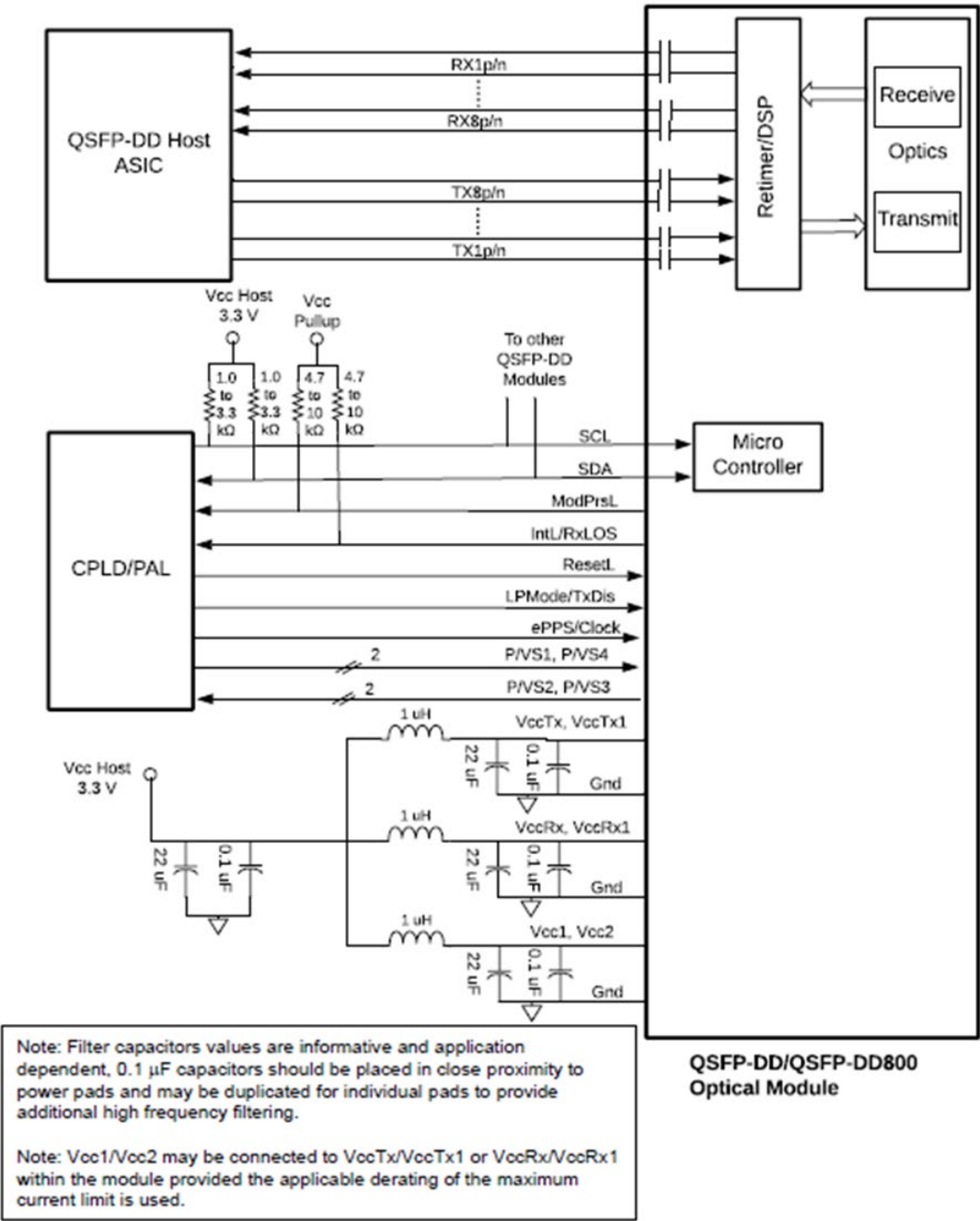
Pin	Symbol	Logic	Name/Description
1	GND		Module Ground.
2	Tx2n	CML-I	Transmitter Inverted Data Input.
3	Tx2p	CML-I	Transmitter Non-Inverted Data Input.
4	GND		Module Ground.
5	Tx4n	CML-I	Transmitter Inverted Data Input.
6	Tx4p	CML-I	Transmitter Non-Inverted Data Input.
7	GND		Module Ground.
8	ModSelL	LVTTL-I	Module Select.
9	ResetL	LVTTL-I	Module Reset.
10	VccRx		+3.3V Receiver Power Supply.
11	SCL	LVC MOS-I/O	2-Wire Serial Interface Clock.
12	SDA	LVC MOS-I/O	2-Wire Serial Interface Data.
13	GND		Module Ground.
14	Rx3p	CML-O	Receiver Non-Inverted Data Output.
15	Rx3n	CML-O	Receiver Inverted Data Output.
16	GND		Module Ground.
17	Rx1p	CML-O	Receiver Non-Inverted Data Output.
18	Rx1n	CML-O	Receiver Inverted Data Output.
19	GND		Module Ground.
20	GND		Module Ground.
21	Rx2n	CML-O	Receiver Inverted Data Output.
22	Rx2p	CML-O	Receiver Non-Inverted Data Output.
23	GND		Module Ground.
24	Rx4n	CML-O	Receiver Inverted Data Output.
25	Rx4p	CML-O	Receiver Non-Inverted Data Output.
26	GND		Module Ground.
27	ModPrsL	LVTTL-O	Module Present.
28	IntL/RxLOS	LVTTL-O	Interrupt. Optionally RxLOS.
29	VccTx		+3.3V Transmitter Power Supply.
30	Vcc1		+3.3V Power Supply.
31	LPMoDe/TxDis	LVTTL-I	Low-Power Mode. Optionally Tx_Disable.
32	GND		Module Ground.
33	Tx3p	CML-I	Transmitter Non-Inverted Data Input.
34	Tx3n	CML-I	Transmitter Inverted Data Input.
35	GND		Module Ground.
36	Tx1p	CML-I	Transmitter Non-Inverted Data Input.
37	Tx1n	CML-I	Transmitter Inverted Data Input.
38	GND		Module Ground.
39	GND		Module Ground.
40	Tx6n	CML-I	Transmitter Inverted Data Input.

41	Tx6p	CML-I	Transmitter Non-Inverted Data Input.
42	GND		Module Ground.
43	Tx8n	CML-I	Transmitter Inverted Data Input.
44	Tx8p	CML-I	Transmitter Non-Inverted Data Input.
45	GND		Module Ground.
46	P/VS4	LVC MOS/CML-I	Programmable. Module Vendor-Specific 4.
47	P/VS1	LVC MOS/CML-I	Programmable. Module Vendor-Specific 1.
48	VccRx1		+3.3V Receiver Power Supply.
49	P/VS2	LVC MOS/CML-O	Programmable. Module Vendor-Specific 2.
50	P/VS3	LVC MOS/CML-O	Programmable. Module Vendor-Specific 3.
51	GND		Module Ground.
52	Rx7p	CML-O	Receiver Non-Inverted Data Output.
53	Rx7n	CML-O	Receiver Inverted Data Output.
54	GND		Module Ground.
55	Rx5p	CML-O	Receiver Non-Inverted Data Output.
56	Rx5n	CML-O	Receiver Inverted Data Output.
57	GND		Module Ground.
58	GND		Module Ground.
59	Rx6n	CML-O	Receiver Inverted Data Output.
60	Rx6p	CML-O	Receiver Non-Inverted Data Output.
61	GND		Module Ground.
62	Rx8n	CML-O	Receiver Inverted Data Output.
63	Rx8p	CML-O	Receiver Non-Inverted Data Output.
64	GND		Module Ground.
65	NC		Not Connected.
66	Reserved		
67	VccTx1		+3.3V Transmitter Power Supply.
68	Vcc2		+3.3V Power Supply.
69	ePPS/Clock	LVC MOS-I	1PPS PTP Clock or Reference Clock Input.
70	GND		Module Ground.
71	Tx7p	CML-I	Transmitter Non-Inverted Data Input.
72	Tx7n	CML-I	Transmitter Inverted Data Input.
73	GND		Module Ground.
74	Tx5p	CML-I	Transmitter Non-Inverted Data Input.
75	Tx5n	CML-I	Transmitter Inverted Data Input.
76	GND		Module Ground.

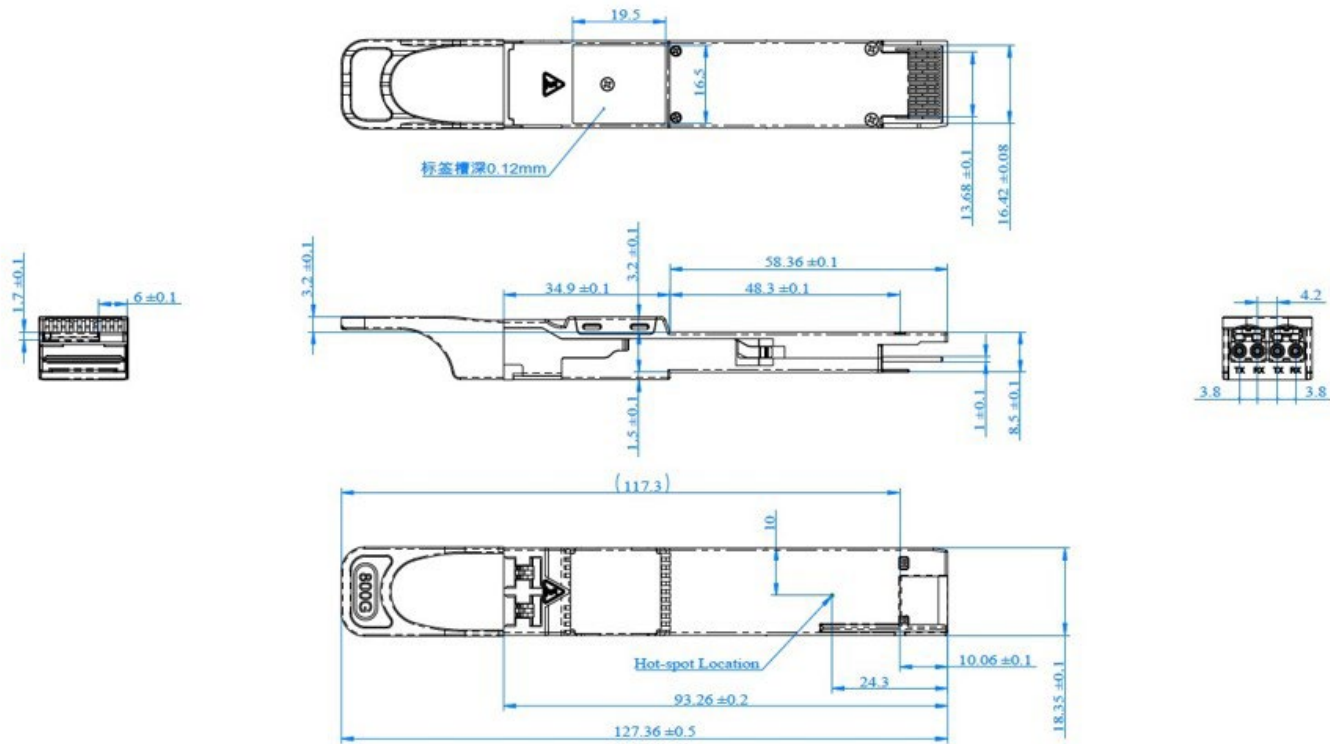
Electrical Pad Layout



Recommended QSFP-DD/QSFP-DD800 Host Board Schematic



Mechanical Specifications



About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications ranging from NEBS Level 3 to ISO 9001:2015 with every new development while maintaining the signature reliability of its products.



U.S. Headquarters

Email: sales@addonnetworks.com

Telephone: +1 877.292.1701

Fax: 949.266.9273

Europe Headquarters

Email: salesemea@addonnetworks.com

Telephone: +44 1285 842070