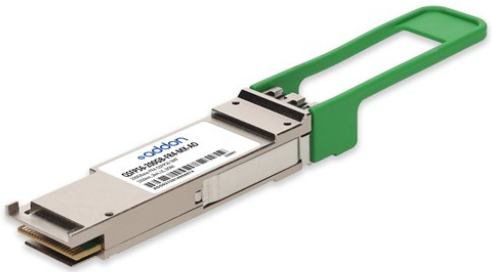
QSFP56-200GB-FR4-MX-AO

NVIDIA® Compatible TAA 200GBase-FR4 QSFP56 Transceiver (SMF, 1310nm, 2km, LC, DOM, CMIS 4.0)

Features:

- SFF-8661 Rev. 2.5 Compliant
- IEEE Std 802.3-2018 Section 8 200GAUI-4 Compliant
- IEEE Std 802.3cn-2019 200GBASE-FR4 Compliant
- Cooled EA-DFB-LDs at Each CWDM 1.3µm Wavelength
- 4x PIN-PDs with TIA
- 4x26.5625 GBd PAM4 Electrical Lanes into Optical Channels
- Duplex LC Connector
- Single-Mode Fiber
- CMIS 4.0 Management Interface
- Power Consumption is
- Commercial Temperature 0 to 70 Celsius
- RoHS Compliant and Lead-Free



Applications:

- 200GBase Ethernet
- Access and Enterprise

Product Description

This NVIDIA® compatible QSFP56 transceiver provides 200GBase-FR4 throughput up to 2km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent NVIDIA® transceiver. 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."

TAA COMPLIANT

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	0		3.6	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0	25	70	°C	

Notes:

1. Stresses in excess of the Absolute Maximum Ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those provided. Exposure to Absolute Maximum Ratings will cause permanent damage and/or adversely affect device reliability.

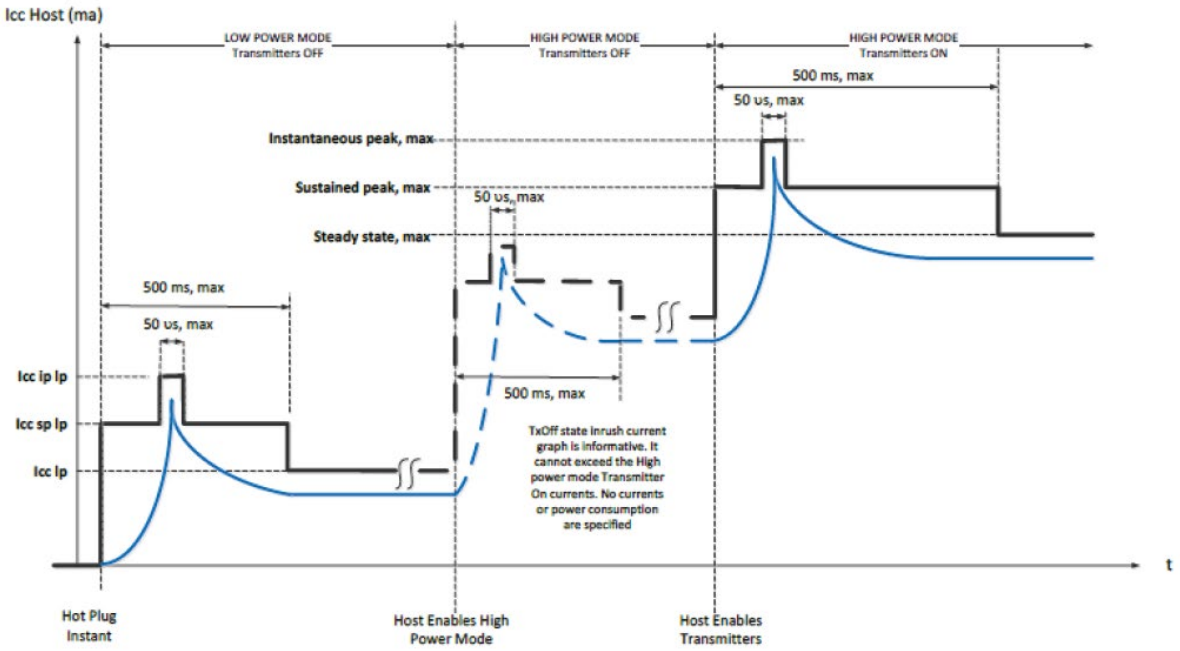
Electrical Characteristics

Parameter	Symbol / Test Point	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Module Power Supply Noise Tolerance	$PSNR_{mod}$			66	mV	1
Power Consumption	PD			6.5	W	
Instantaneous Peak Current	Icc_ip			2600	mA	2
Sustained Peak Current	Icc_sp			2145.2	mA	2
Supply Current	Icc			2073.4	mA	3
Transmitter Per Lane						
Signaling Rate Per Lane (Range)	TP4	26.5625 ± 100ppm			GBd	4
AC Common-Mode Output Voltage (RMS)	TP4			17.5	mV	
Differential Pk-Pk Output Voltage	TP4			900	mV	
Near-End Eye Symmetry Mask Width (ESMW)	TP4	0.265			UI	
Near-End Eye Height Differential	TP4	70			mV	
Far-End Eye Symmetry Mask Width (ESMW)	TP4	0.2			UI	
Far-End Eye Height Differential	TP4	30			mV	
Far-End Pre-Cursor ISI Ratio	TP4	-4.5		2.5	%	
Differential Output Return Loss	TP4	Equation (83E-2)			dB	5
Common to Differential Mode Conversion Return Loss	TP4	Equation (83E-3)			dB	5
Differential Termination Mismatch	TP4			10	%	
Transition Time (20-80%)	TP4	9.5			ps	
DC Common-Mode Voltage	TP4	-350		2850	mV	

Receiver Per Lane						
Signaling Speed Per Lane (Range)		26.5625 ± 100ppm			GBd	
Differential Pk-Pk Input Voltage Tolerance	TP1a	900			mV	
Differential Input Return Loss	TP1	Equation (83E-5)			dB	5
Differential to Common-Mode Input Return Loss	TP1	Equation (83E-6)			dB	5
Differential Termination Mismatch	TP1			10	%	
Eye Symmetry Mask Width (ESMW)	TP1a	0.22			UI	
Eye Width	TP1a	0.22			UI	
Applied Pk-Pk Sinusoidal Jitter	TP1a	Table 120E-6			MHz, UI	
Eye Height	TP1a	32			mV	
Single-Ended Input Voltage Tolerance Range	TP1a	-0.4		3.3	V	
DC Common-Mode Voltage	TP1	-350		2850	mV	

Notes:

1. 10Hz to 10MHz.
2. Instantaneous and sustained peak currents for Icc host.



3. Steady state.
4. Electrical module output is squelched for loss of optical input signal.
5. IEEE Std 802.3-2018 Section 6.

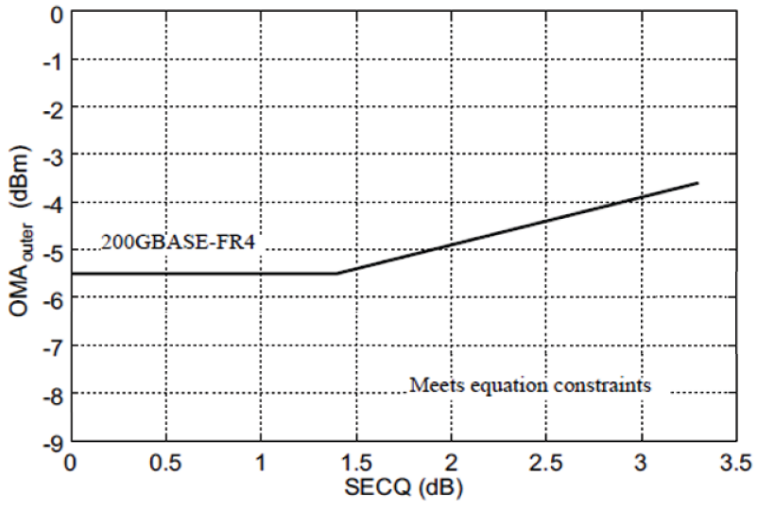
Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Channel Data Rate		fDC		53.125		Gbps	
Signaling Rate Per Lane		fSG		26.5625		GBd	1
Signal Speed Variation from Nominal Per Lane		fSG	-100		100	ppm	
Optical Receiver Input					+5.7	dBm	2
Lane Wavelengths (Range)	**Lane 0**	λC0	1264.5		1277.5	nm	
	Lane 1	λC1	1284.5		1297.5	nm	
	Lane 2	λC2	1304.5		1317.5	nm	
	Lane 3	λC3	1324.5		1337.5	nm	
Transmitter							
Side-Mode Suppression Ratio		SMSR	30			dB	
Total Average Launch Power					10.7	dBm	
Average Launch Power Per Lane			-4.2		4.7	dBm	3
Outer Optical Modulation Amplitude (OMAouter) Per Lane			-1.2		4.5	dBm	4
Difference in Launch Power Between Any Two Lanes (OMAouter)					4	dB	
Launch Power in OMAouter Minus TDECQ Per Lane	**For ER≥4.5dB**		-2.6			dBm	
	For ER<4.5dB		-2.5			dBm	
Transmitter and Dispersion Eye Closure for PAM4 Per Lane		TDECQ			3.1	dB	
TDECQ – 10log$_{10}$(Ceq) Per Lane					3.1	dB	5
Average Launch Power of Off Transmitter Per Lane		Poff			-30	dBm	
Extinction Ratio Per Lane		ER	3.5			dB	
RIN$_{15.6}$OMA					-132	dB/Hz	
Optical Return Loss Tolerance					17.1	dB	
Transmitter Reflectance					-26	dB	6
Receiver							
Average Receive Power Per Lane			-8.2		4.7	dBm	7
Receive Power (OMAouter) Per Lane					4.5	dBm	
Difference in Receive Power Between Any Two Lanes (OMAouter)					4.1	dB	
Receiver Reflectance					-26	dB	
Receiver Sensitivity (OMAouter) Per Lane				Max. (-5.5, SECQ – 6.9)		dBm	8, 9, 10
Stressed Receiver Sensitivity (OMAouter) Per Lane					-3.8	dBm	8, 11
Receiver Loss of Signal Indicator Assert Level		Rx_LOS	-30		-11.2	dBm	12
Receiver Loss of Signal Indicator De-Assert Level		Rx_LOS			-8.2	dBm	12

Hysteresis	Rx_LOS	0.5			dB	
Conditions of Stressed Receiver Sensitivity Test						
Stressed Eye Closure For PAM4 Per Lane Under Test	SECQ	3.1			dB	13
SECQ – $10\log_{10}$(Ceq) Per Lane Under Test		3.1			dB	5, 13
OMAouter of Each Aggressor Lane		0.3			dBm	13

Notes:

1. PAM4.
2. Average per lane.
3. Average launch power, per lane (minimum), is informative and not the principal indicator of signal strength. A transmitter and launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
4. Even if the TDECQ<1.4dB for an extinction ratio of ≥4.5dB or TDECQ<1.3dB for an extinction ratio of <4.5dB, the OMAouter (minimum) must exceed this value.
5. Ceq is a coefficient defined in IEEE Std 802.3-2018 Clause 121.8.5.3 which accounts for reference equalizer noise enhancement.
6. Transmitter reflectance is defined looking into the transmitter.
7. Average receive power, per lane (minimum), is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
8. For when pre-FEC BER is 2.4×10^{-4}.
9. Receiver sensitivity (OMAouter), per lane (maximum), is informative and is defined for a transmitter with a value of SECQ up to 3.1dB.
10. Illustration of receiver sensitivity for 200GBASE-FR4:



11. Measured with conformance test signal at TP3 (see IEEE Std 802.3-2018 Clause 122.8.9) for the BER specified in IEEE Std 802.3-2018 Clause 122.1.1.
12. Average power.
13. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Pin Descriptions

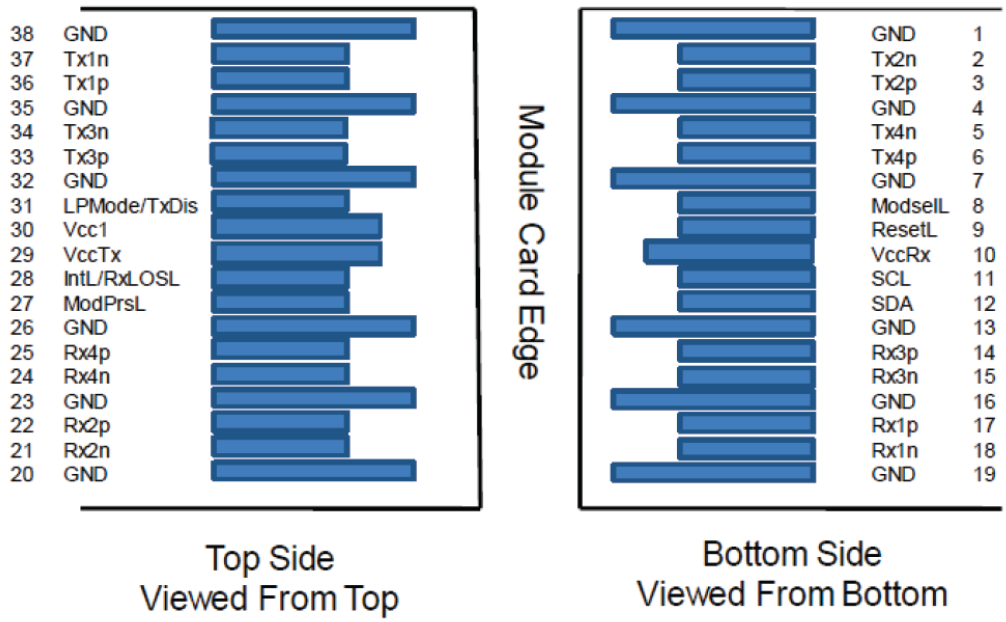
Pin	Logic	Symbol	Name/Description	Plug Sequence	Notes
1		GND	Module Ground.	1	1
2	CML-I	Tx2-	Transmitter Inverted Data Input.	3	
3	CML-I	Tx2+	Transmitter Non-Inverted Data Input.	3	
4		GND	Module Ground.	1	1
5	CML-I	Tx4-	Transmitter Inverted Data Input.	3	
6	CML-I	Tx4+	Transmitter Non-Inverted Data Input.	3	
7		GND	Module Ground.	1	1
8	LVTTL-I	ModSelL	Module Select.	3	
9	LVTTL-I	ResetL	Module Reset.	3	
10		VccRx	+3.3V Receiver Power Supply.	2	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	3	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	3	
13		GND	Module Ground.	1	1
14	CML-O	Rx3+	Receiver Non-Inverted Data Output.	3	
15	CML-O	Rx3-	Receiver Inverted Data Output.	3	
16		GND	Module Ground.	1	1
17	CML-O	Rx1+	Receiver Non-Inverted Data Output.	3	
18	CML-O	Rx1-	Receiver Inverted Data Output.	3	
19		GND	Module Ground.	1	1
20		GND	Module Ground.	1	1
21	CML-O	Rx2-	Receiver Inverted Data Output.	3	
22	CML-O	Rx2+	Receiver Non-Inverted Data Output.	3	
23		GND	Module Ground.	1	1
24	CML-O	Rx4-	Receiver Inverted Data Output.	3	
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.	3	
26		GND	Module Ground.	1	1
27	LVTTL-O	ModPrsL	Module Present.	3	
28	LVTTL-O	IntL/RxLOSL	Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636).	3	
29		VccTx	+3.3V Transmitter Power Supply.	2	2
30		Vcc1	+3.3V Power Supply.	2	2
31	LVTTL-I	LPMode/TxDis	Low-Power Mode. Optionally configurable as TxDis via the management interface (SFF-8636).	3	
32		GND	Module Ground.	1	1
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.	3	
34	CML-I	Tx3-	Transmitter Inverted Data Input.	3	

35		GND	Module Ground.	1	1
36	CML-I	Tx1+	Transmitter Non-Inverted Data Input.	3	
37	CML-I	Tx1-	Transmitter Inverted Data Input.	3	
38		GND	Module Ground.	1	1

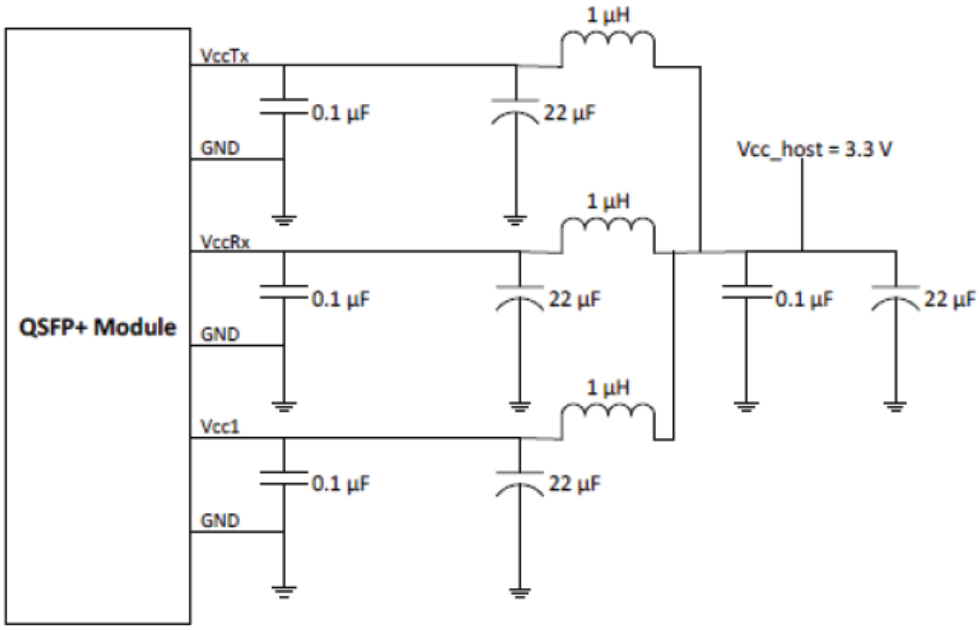
Notes:

1. GND is the symbol for signal and supply (power) common for the module. All are common within the module, and all module voltages are referenced to this potential unless otherwise noted. Connect them directly to the host board signal-common ground plane.
2. VccRx, Vcc1, and VccTx are applied concurrently and may be internally connected within the module in any combination. Vcc contacts in SFF-8662 and SFF-8672 each have a steady state current rating of 1A.

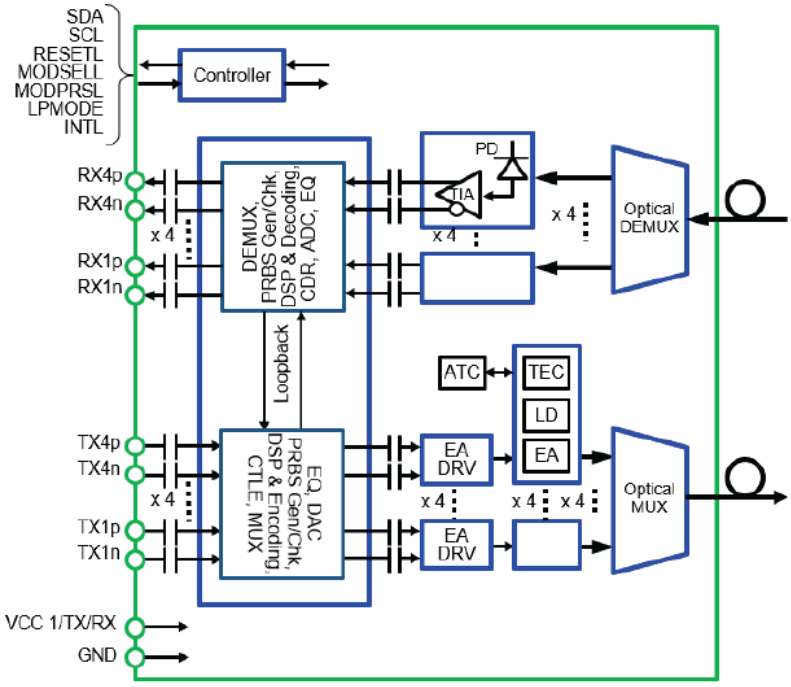
Electrical Pin-Out Details



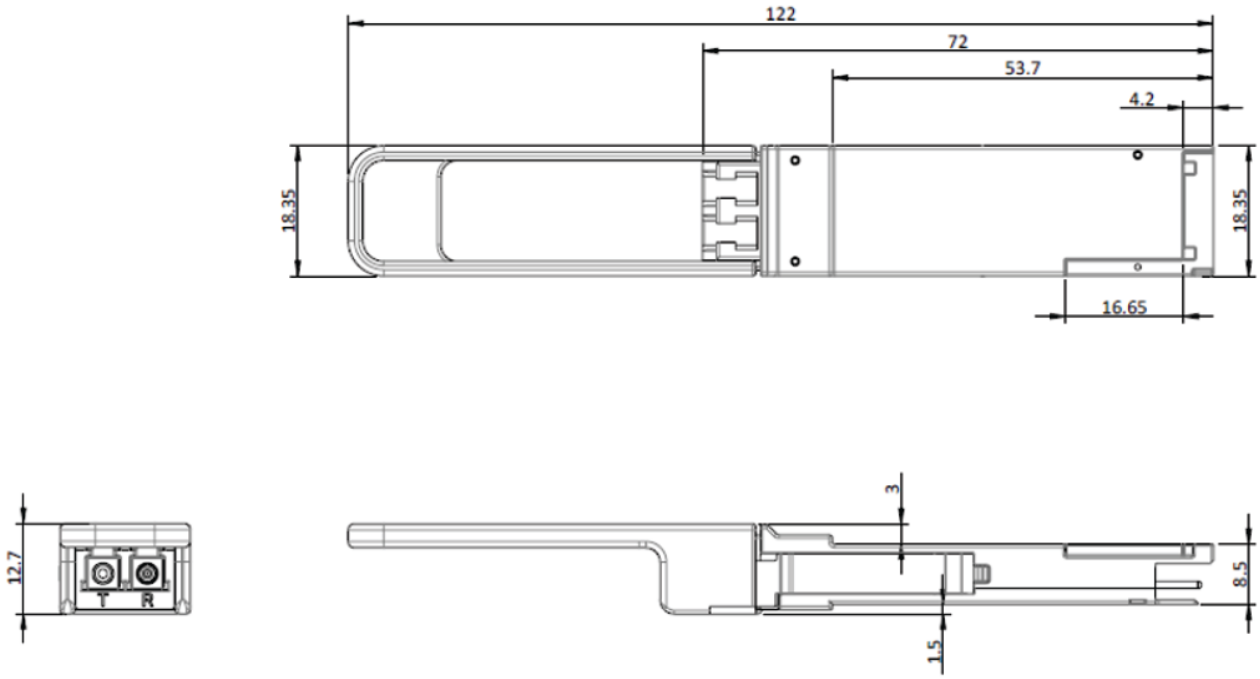
Recommended Host Board Power Supply Filtering



Functional Block Diagram



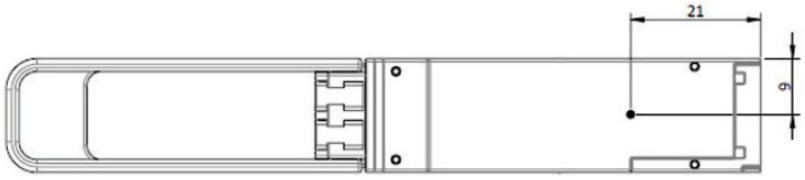
Mechanical Specifications



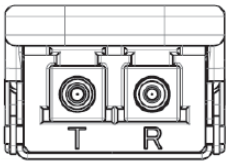
Notes:

1. All dimensions are measured in mm.
2. Green pull tab.

Case Temperature Measurement Point



Optical Interface



Notes:

1. Looking into the connector, the transmitter is on the left.

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.



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