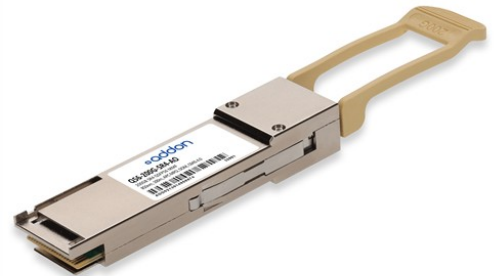


Q56-200G-SR4-AO

Dell® QSFP-200G-SR4 Compatible 200GBase-SR4 QSFP56 Transceiver (MMF, 850nm, 100m, APC MPO, DOM, CMIS 4.0)

Features:

- QSFP56 MSA Compliant
- Compliant to IEEE 802.3bs Specification
- 4 Parallel Lanes on 850nm Center Wavelength
- 4x53.125Gbps Electrical Interface (200GAUI-4)
- Data Rate: 53.125Gbps (PAM4) Per Channel
- Up to 100m Transmission on Multi-Mode Fiber (MMF) OM3 with FEC
- MPO-12 APC connector
- Maximum Power Consumption: 5W
- RoHS Compliant and Lead-Free
- Operating Temperature: 0 to 70 Celsius



Applications:

- 200GBase Ethernet

Product Description

This Dell® QSFP-200G-SR4 compatible QSFP56 transceiver provides 200GBase-SR4 throughput up to 100m over multi-mode fiber (MMF) using a wavelength of 850nm via an APC MPO connector. It is guaranteed to be 100% compatible with the equivalent Dell® 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.

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.	Typ.	Max.	Unit	Notes
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Power Supply Voltage	Vcc	-0.5		3.6	V	
Relative Humidity (Non-Condensing)	RH	0		85	%	

Notes:

1. It has to be noted that the operation in excess of any individual Absolute Maximum Ratings might cause permanent damage to this module.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	Tc	0		70	°C	
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Data Rate Per Lane			26.5625		GBd	1
Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio				2.4×10^{-4}		
Post-FEC Bit Error Ratio				1×10^{-12}		2
Link Distance with OM3	D	0.5		100	m	3

Notes:

1. PAM4.
2. FEC provided by host system.
3. FEC is required on the host system to support the maximum distance.

Electrical Characteristics

Parameter	Symbol/Test Point	Min.	Typ.	Max.	Unit	Notes
Power Consumption				5	W	
Supply Current	I _{cc}			1.52	A	
Transmitter						
Signaling Rate Per Lane	TP1	26.5625 ± 100ppm			GBd	
Differential Pk-Pk Input Voltage Tolerance	TP1a	900			mVp-p	1
Differential Termination Mismatch	TP1			10	%	
Differential Input Return Loss	TP1	IEEE 802.3-2015 Equation (83E-5)			dB	
Differential- to Common-Mode Input Return Loss	TP1	IEEE 802.3-2015 Equation (83E-6)			dB	
Module Stressed Input Test	TP1a	See IEEE 802.3bs 120E.3.4.1				2
Single-Ended Voltage Tolerance Range Minimum	TP1a	-0.4 to 3.3			V	
DC Common-Mode Input Voltage	TP1	-350		2850	mV	3
Receiver						
Signaling Rate Per Lane	TP4	26.5625 ± 100ppm			GBd	
Differential Pk-Pk Output Voltage	TP4			900	mVp-p	
Common-Mode Voltage	TP4	-350		2850	mV	
AC Common-Mode Output Voltage (RMS)	TP4			17.5	mV	
Differential Termination Mismatch	TP4			10	%	
Differential Output Return Loss	TP4	IEEE 802.3-2015 Equation (83E-2)				
Common- to Differential-Mode Conversion Return Loss	TP4	IEEE 802.3-2015 Equation (83E-3)				
Transition Time (20-80%)	TP4	9.5			ps	
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	%	
Common-Mode Output Voltage (V _{cm})	TP4	-350		2850	mV	3

Notes:

1. With the exception to IEEE 802.3bs 120E.3.1.2 that the pattern is PRBS31Q or scrambled idle.
2. Meets BER specified in IEEE 802.3bs 120E.1.1.
3. DC common-mode voltage is generated by the host. Specification includes the effects of ground offset voltage.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	840	850	860	nm	
Data Rate Per Lane		26.5625 ± 100ppm			GBd	
Modulation Format		PAM4				
RMS Spectral Width (Modulated)	$\Delta\lambda_{rms}$			0.6	nm	
Average Launch Power Per Lane	PAVG	-6.5		4	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}) Per Lane	POMA	-4.5		3	dBm	2
Launch Power in OMA _{outer} Minus TDECQ Per Lane		-5.9			dB	
Transmitter and Dispersion Eye Closure for PAM4 Per Lane	TDECQ			4.5	dB	
Extinction Ratio	ER	3			dB	
Optical Return Loss Tolerance	TOL			12	dB	
Average Launch Power of Off Transmitter Per Lane	P _{off}			-30	dBm	
Encircled Flux		≥ 86% at 19μm ≤ 30% at 4.5μm				
Receiver						
Center Wavelength	λ_C	840	850	860	nm	
Data Rate Per Lane		26.5625 ± 100ppm			GBd	
Modulation Format		PAM4				
Damage Threshold Per Lane	THd	5			dBm	3
Average Receive Power Per Lane		-8.4		4	dBm	4
Receive Power (OMA _{outer}), Per Lane				3	dBm	
Receiver Sensitivity (OMA _{outer}) Per Lane	SEN			Equation 1	dBm	7
Stressed Receiver Sensitivity (OMA _{outer}) Per Lane	SRS			-3.4	dBm	5
Receiver Reflectance	RR			-12	dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-12	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Stressed Conditions for Stressed Receiver Sensitivity (Note 6)						
Stressed Eye Closure for PAM4 (SECQ) Per Lane Under Test			4.5		dB	
SECQ – 10log ₁₀ (Ceq)f Maximum Per Lane Under Test			4.5		dB	
OMA _{outer} of Each Aggressor Lane			3		dBm	

Notes:

1. Average launch power, per lane minimum, is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Even if the TDECQ < 1dB, the OMA_{outer} minimum must exceed the minimum value specified here.
3. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.
4. 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.
5. Measured with conformance test signal at receiver input for the BER of 2.4×10^{-4} .
6. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.
7. Receiver sensitivity is informative and is defined for a transmitter with a value of SECQ up to 4.5dB. Receiver sensitivity should meet Equation (1), which is illustrated below.

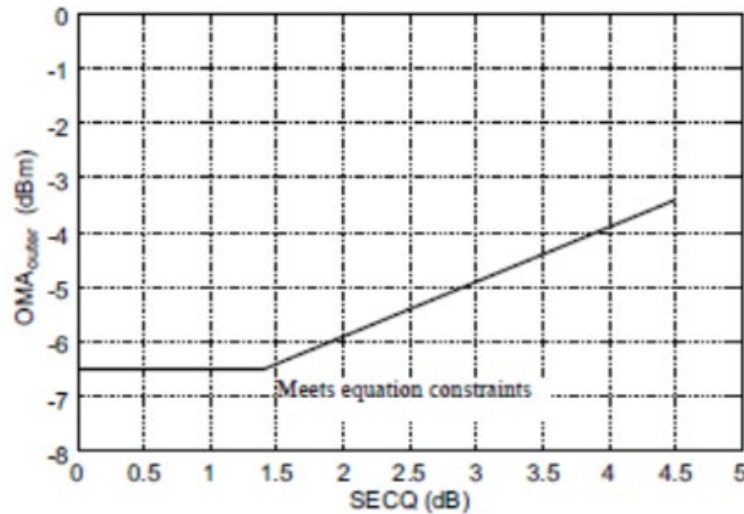
$$RS = \max(-6.5, \text{SECQ} - 7.9) \text{ (dBm)} \text{ (Equation 1)}$$

Where:

RS is the receiver sensitivity.

SECQ is the SECQ of the transmitter used to measure the receiver sensitivity.

The normative requirement for receivers is stressed receiver sensitivity.



Digital Diagnostic Functions

Parameter	Symbol	Min.	Max.	Unit	Notes
Temperature Monitor Absolute Error	DMI_Temp	-3	3	°C	1
Supply Voltage Monitor Absolute Error	DMI_VCC	-0.1	0.1	V	2
Channel Rx Power Monitor Absolute Error	DMI_RX_Ch	-2	2	dB	3
Channel Bias Current Monitor	DMI_Ibias_Ch	-10%	10%	mA	
Channel Tx Power Monitor Absolute Error	DMI_TX_Ch	-2	2	dB	3

Notes:

1. Over operating temperature range.
2. Over full operating range.
3. Due to measurement accuracy of different fibers, there could be an additional +/- 1dB fluctuation, or a +/- 3dB total accuracy.

Pin Descriptions

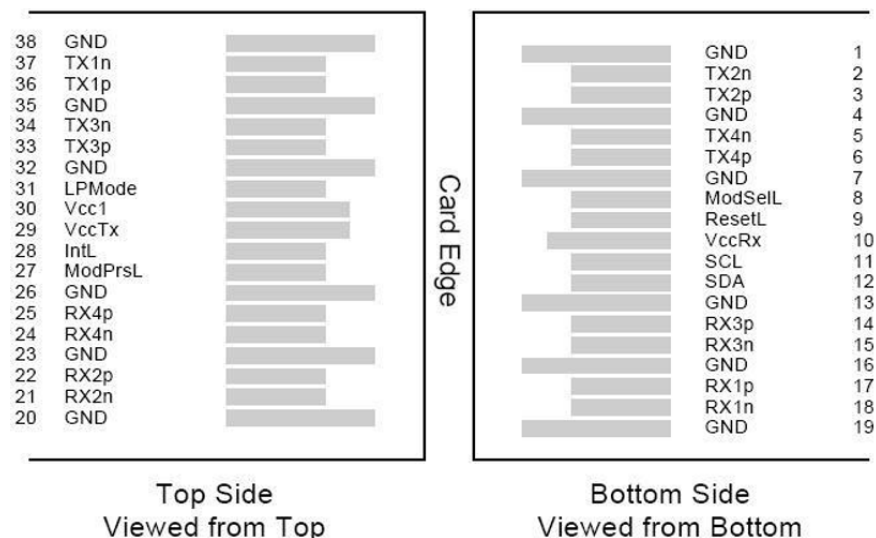
Pin	Symbol	Logic	Name/Description	Notes
1	GND		Ground.	1
2	Tx2n	CML-I	Transmitter Inverted Data Input.	
3	Tx2p	CML-I	Transmitter Non-Inverted Data Input.	
4	GND		Ground.	1
5	Tx4n	CML-I	Transmitter Inverted Data Input.	
6	Tx4p	CML-I	Transmitter Non-Inverted Data Input.	
7	GND		Ground.	1
8	ModSelL	LVTTLL-I	Module Select.	
9	ResetL	LVTTLL-I	Module Reset.	
10	VccRx		+3.3V Power Supply Receiver.	2
11	SCL	LVCNOS-I/O	2-Wire Serial Interface Clock.	
12	SDA	LVCNOS-I/O	2-Wire Serial Interface Data.	
13	GND		Ground.	
14	Rx3p	CML-O	Receiver Non-Inverted Data Output.	
15	Rx3n	CML-O	Receiver Inverted Data Output.	
16	GND		Ground.	1
17	Rx1p	CML-O	Receiver Non-Inverted Data Output.	
18	Rx1n	CML-O	Receiver Inverted Data Output.	
19	GND		Ground.	1
20	GND		Ground.	1
21	Rx2n	CML-O	Receiver Inverted Data Output.	
22	Rx2p	CML-O	Receiver Non-Inverted Data Output.	
23	GND		Ground.	1

24	Rx4n	CML-O	Receiver Inverted Data Output.	1
25	Rx4p	CML-O	Receiver Non-Inverted Data Output.	
26	GND		Ground.	1
27	ModPrsL	LVTTL-O	Module Present.	
28	IntL	LVTTL-O	Interrupt.	
29	VccTx		+3.3 V Power Supply Transmitter.	2
30	Vcc1		+3.3 V Power Supply.	2
31	LPMode	LVTTL-I	Low-Power Mode.	
32	GND		Ground.	1
33	Tx3p	CML-I	Transmitter Non-Inverted Data Input.	
34	Tx3n	CML-I	Transmitter Inverted Data Input.	
35	GND		Ground.	1
36	Tx1p	CML-I	Transmitter Non-Inverted Data Input.	
37	Tx1n	CML-I	Transmitter Inverted Data Input.	
38	GND		Ground.	1

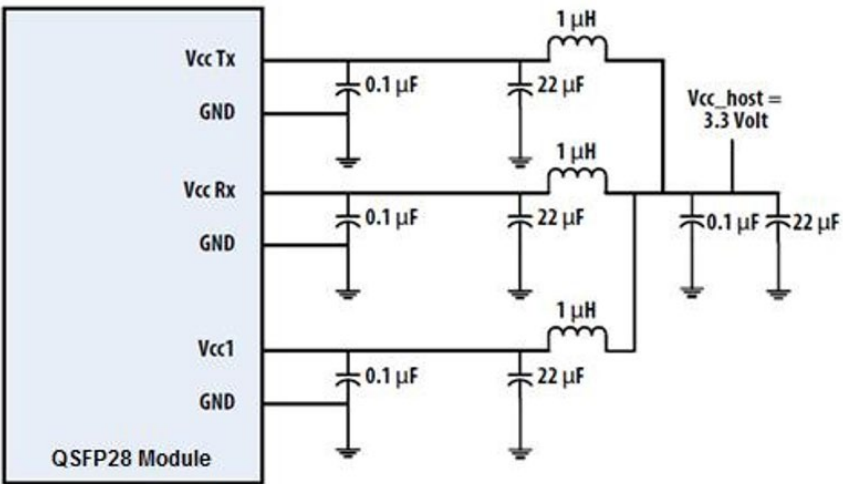
Notes:

1. GND is the symbol for signal and supply (power) common for QSFP56 modules. All are common within the QSFP56 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, Vcc1, and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. VccRx, Vcc1, and Vcc Tx may be internally connected within the QSFP56 transceiver module in any combination. The connector pins are each rated for a maximum current of 1000mA.

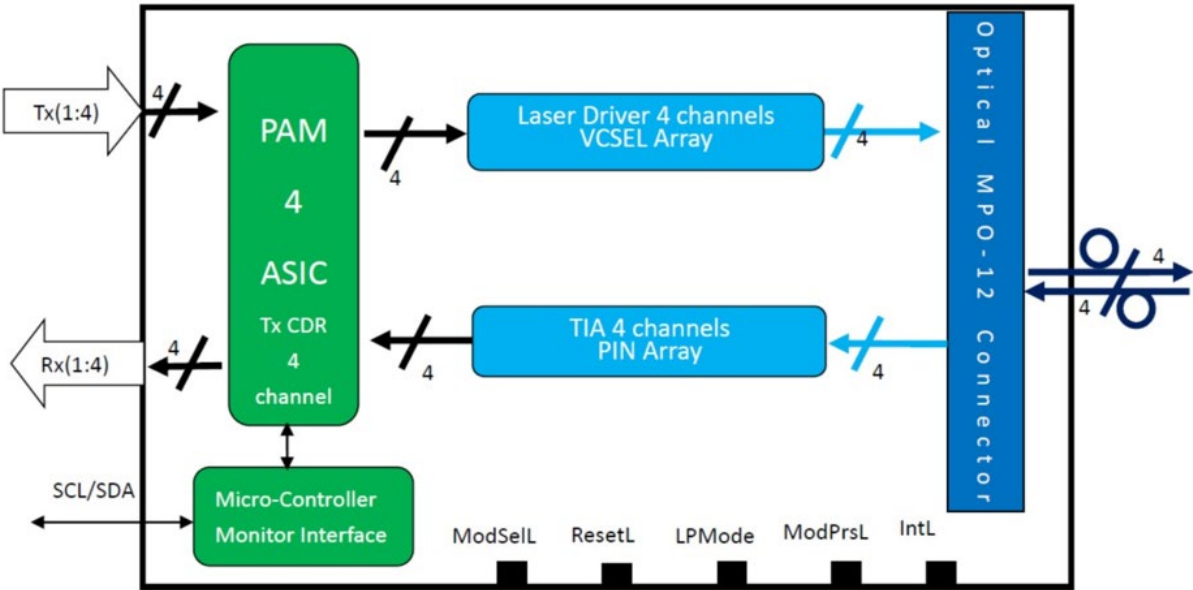
Pin Assignment



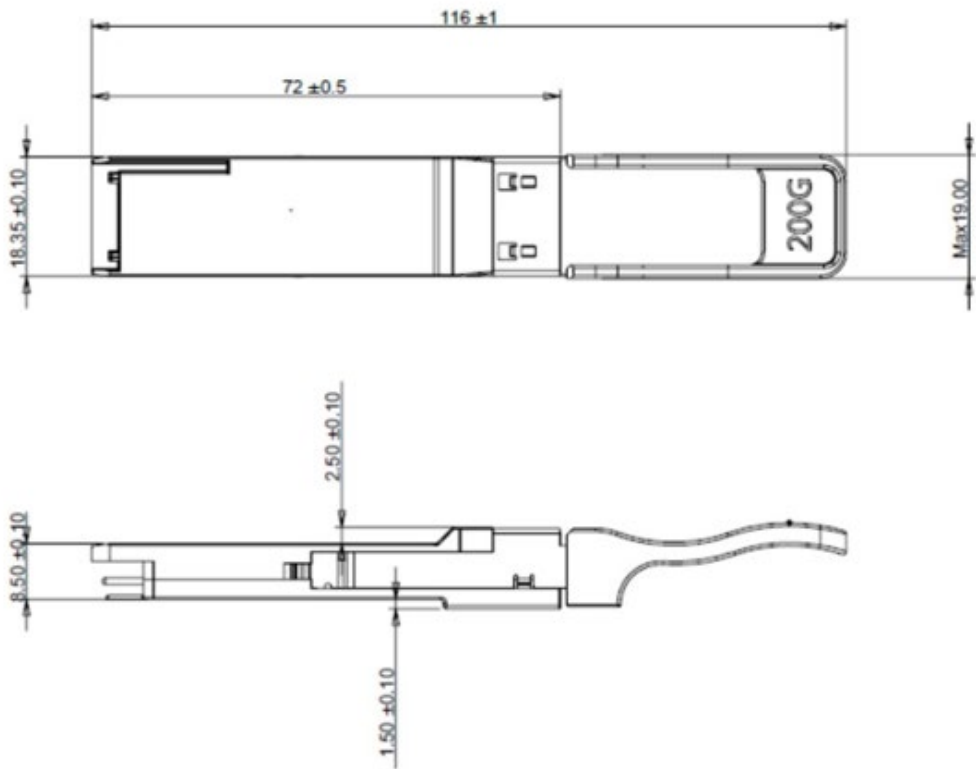
Recommended Power Supply Filter



Transceiver Block Diagram



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.



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