MMS1V70-CM-AO-V2

NVIDIA® MMS1V70-CM Compatible TAA Compliant 100GBase-DR QSFP28 Single Lambda Transceiver (SMF, 1310nm, 500m, LC, DOM, with FEC)

Features:

- QSFP28 MSA Compliance
- Single-mode Fiber
- Duplex LC Connector
- Hot Pluggable
- Metal with Lower EMI
- Commercial Temperature 0 to 70 Celsius
- RoHS Compliant and Lead-Free
- Excellent ESD Protection



Applications:

- 100GBase-DR Ethernet
- Access and Enterprise

Product Description

This NVIDIA® MMS1V70-CM compatible QSFP28 transceiver provides 100GBase-DR throughput up to 500m 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. 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."

TAA COMPLIANT

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5		3.6	V	
Storage Temperature	Tstg	-40		+85	℃	
Operating Case Temperature	Tc	0		70	℃	
Relative Humidity (Non-Condensing)	RH	0		85	%	
Damage Threshold	THd	5			dBm	
Data Input Voltage Differential (Pk-Pk)	Vpp	100		900	mV	
Power Supply Noise	Vn			66	mV	
Electrical Data Rate Per Lane (NRZ)			25.78125		Gbps	
Optical Data Rate (PAM4)			53.125		GBd	
Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio				$2.4x10^{-4}$		
Post-FEC Bit Error Ratio				$1x10^{-12}$		1
Control Input Voltage - High		2		Vcc	V	
Control Input Voltage - Low		0		0.8	V	
Link Distance with G.652	D	.002		500	m	2

Notes:

1. FEC feature is embedded in the module.

2. FEC is required to be turned on to support the maximum transmission distance.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Consumption				3.5	W	
Supply Current	Icc			1.06	A	
Power Supply Ripple				15	mV	
Transmitter (Per Lane)						
Overload Differential Voltage (Pk-Pk)	TP1a	900			mV	
Common-Mode Voltage (Vcm)	TP1	-350		2850	mV	1
Differential Termination Resistance Mismatch	TP1			10	%	At 1MHz
Differential Return Loss (SDD11)	TP1			See CEI- 28G-VSR Equation 13-19	dB	
Common-Mode to Differential Conversion and Differential to Common-Mode Conversion (SDC11, SCD11)	TP1			See CEI- 28G-VSR Equation 13-20	dB	
Stressed Input Test	TP1a	See CEI- 28G-VSR Section 3.3.11.2.1				
Input AC Coupling Capacitor	TP1a		0.1		µF	
Receiver (Per Lane)						
Differential Voltage (Pk-Pk)	TP4			900	mV	
Differential Load	TP4		100		Ω	
Common-Mode Voltage (Vcm)	TP4	-350		2850	mV	1
Common-Mode Noise (RMS)	TP4			17.5	mV	
Differential Termination Resistance Mismatch	TP4			10	%	At 1MHz
Differential Return Loss (SDD22)	TP4			See CEI- 28G-VSR Equation 13-19	dB	
Common-Mode to Differential Conversion and Differential to Common-Mode Conversion (SDC22, SCD22)	TP4			See CEI- 28G-VSR Equation 13-21	dB	
Common-Mode Return Loss (SCC22)	TP4			-2	dB	2
Transition Time (20-80%)	TP4	12			ps	
Vertical Eye Closure (VEC)	TP4			5.5	dB	
Eye Width at 10^{-15} Probability (EW15)	TP4	0.57			UI	
Eye Height at 10^{-15} Probability (EH15)	TP4	228			mV	
Output AC Coupling Capacitor	TP4		0.1		µF	

Notes:

1. Vcm is generated by the host. Specification includes the effects of ground offset voltage.
2. From 250MHz to 30GHz.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λT	1304.5		1317.5	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	P_{avg}	-2.4		4	dBm	1
Outer Optical Modulation Amplitude (OMAouter)	POMA	-0.8		4.2	dBm	2
Launch Power in OMA_{outer} Minus TDECQ **For ER≥5dB** **For ER<5dB**		 -2.2 -1.9			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ)	TDECQ			3.4	dB	
TDECQ – $10*log_{10}(C_{eq})$				3.4	dB	3
Extinction Ratio	ER	3.5			dB	
$RIN_{15.5}OMA$	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	TOL			15.5	dB	
Transmitter Reflectance	R_T			-26	dB	
Transmitter Transition Time				17	ps	
Average Launch Power of Off Transmitter	Poff			-15	dBm	
LOS Assert Level	LOSA		50		mV	4
LOS De-Assert Level	LOSD		100		mV	
Receiver						
Center Wavelength	λR	1304.5		1317.5	nm	
Damage Threshold	TH_d	5			dBm	5
Average Receive Power		-5.9		4	dBm	6
Receive Power (OMA_{outer})				4.2	dBm	
Receiver Sensitivity (OMA_{outer})	SEN			Equation (1)	dBm	7
Stressed Receiver Sensitivity (OMA_{outer})	SRS			-1.9	dBm	8
Receiver Reflectance	R_R			-26	dB	
LOS Assert	LOSA	-15			dBm	9
LOS De-Assert	LOSD			-8.9	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Conditions of Stressed Receiver Sensitivity Test (Note 8)						
Stressed Eye Closure for PAM4 (SECQ)			3.4		dB	
SECQ – $10*log_{10}(C_{eq})$				3.4	dB	

Notes:

1. Average launch power (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<1.4dB for an extinction ratio of ≥5dB or TDECQ<1.1dB for an extinction ratio of <5dB, the OMAouter (minimum) must exceed the minimum value specified here.
3. Ceq is a coefficient defined in IEEE Std 802.3-2018 Clause 121.8.5.3 which accounts for reference equalizer noise enhancement.
4. Average receive power (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. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power.
6. Receiver sensitivity (OMAouter) (maximum) is informative and is defined for a transmitter with a value of SECQ up to 3.4dB. It should meet Equation (1), which is illustrated in the figure below:

$$RS = \max(-3.9, SECQ - 5.3)\ dBm \quad (1)$$

Where:

RS is the receiver sensitivity, and
SECQ is the SECQ of the transmitter used to measure the receiver sensitivity.

7. Measured with conformance test signal at TP3 for the BER equal to 2.4×10^{-4}.
8. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

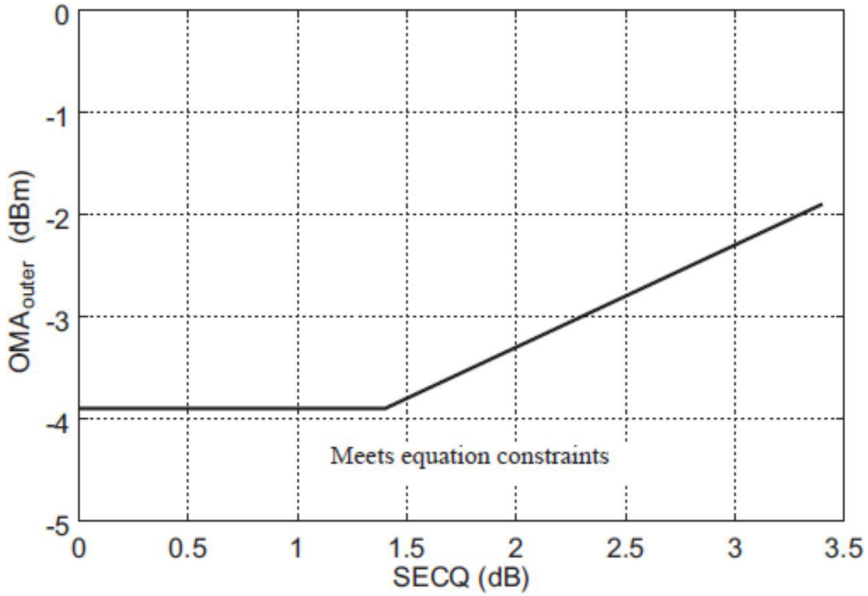


Illustration of Receiver Sensitivity Mask for 100G-DR

Pin Descriptions

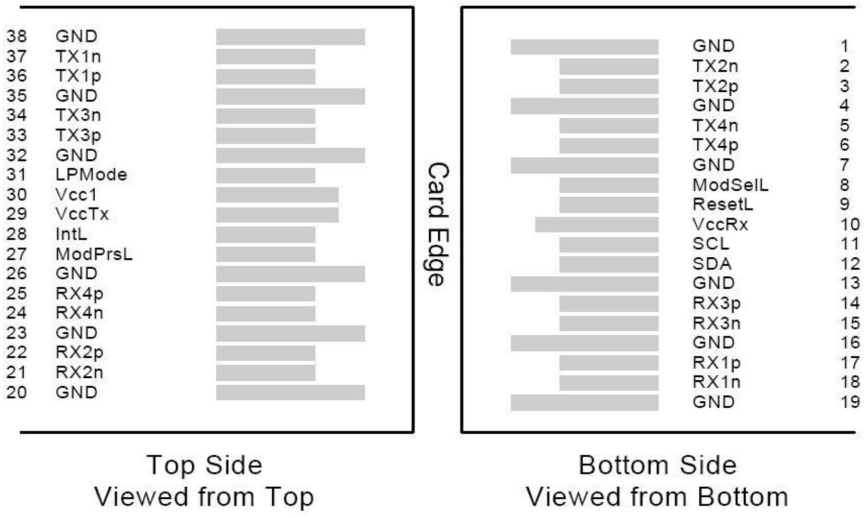
Pin	Logic	Symbol	Name/Description	Notes
1		GND	Module Ground.	1
2	CML-I	Tx2-	Transmitter Inverted Data Input.	
3	CML-I	Tx2+	Transmitter Non-Inverted Data Input.	
4		GND	Module Ground.	1
5	CML-I	Tx4-	Transmitter Inverted Data Input.	
6	CML-I	Tx4+	Transmitter Non-Inverted Data Input.	
7		GND	Module Ground.	1
8	LVTTL-I	ModSelL	Module Select.	
9	LVTTL-I	ResetL	Module Reset.	
10		VccRx	+3.3V Receiver Power Supply.	2
11	LVCMOS-I	SCL	2-Wire Serial Interface Clock.	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data.	
13		GND	Module Ground.	1
14	CML-O	Rx3+	Receiver Non-Inverted Data Output.	
15	CML-O	Rx3-	Receiver Inverted Data Output.	
16		GND	Module Ground.	1
17	CML-O	Rx1+	Receiver Non-Inverted Data Output.	
18	CML-O	Rx1-	Receiver Inverted Data Output.	
19		GND	Module Ground.	1
20		GND	Module Ground.	1
21	CML-O	Rx2-	Receiver Inverted Data Output.	
22	CML-O	Rx2+	Receiver Non-Inverted Data Output.	
23		GND	Module Ground.	1
24	CML-O	Rx4-	Receiver Inverted Data Output.	
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.	
26		GND	Module Ground.	1
27	LVTTL-O	ModPrsL	Module Present. Internally pulled down to the GND.	
28	LVTTL-O	IntL	Interrupt Output. Should be pulled up on the host board.	
29		VccTx	+3.3V Transmitter Power Supply.	2
30		Vcc1	+3.3V Power Supply.	2
31	LVTTL-I	LPMode	Low-Power Mode.	
32		GND	Module Ground.	1
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.	
34	CML-I	Tx3-	Transmitter Inverted Data Input.	
35		GND	Module Ground.	1

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

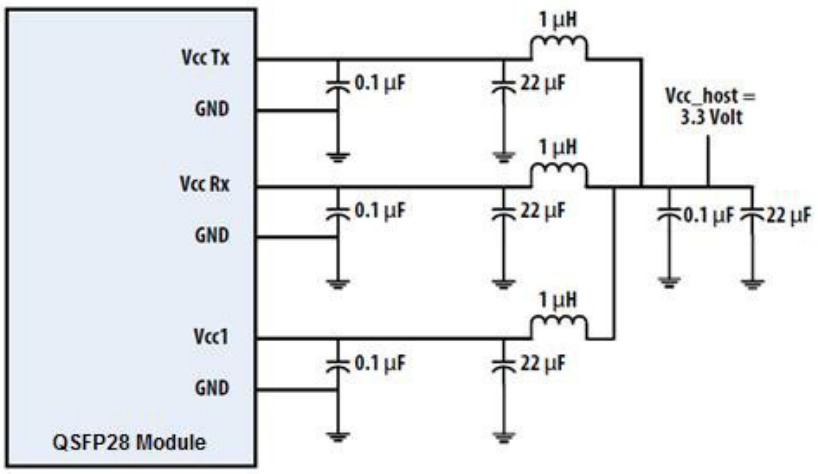
Notes:

1. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the QSFP28 module, and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane. Open collector. Should be pulled up with 4.7kΩ to 10kΩ on the host board to a voltage between 3.15V and 3.6V.
2. VccRx, Vcc1, and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. VccRx, Vcc1, and VccTx may be internally connected within the QSFP28 module in any combination. The connector pins are each rated for a maximum current of 1000mA.

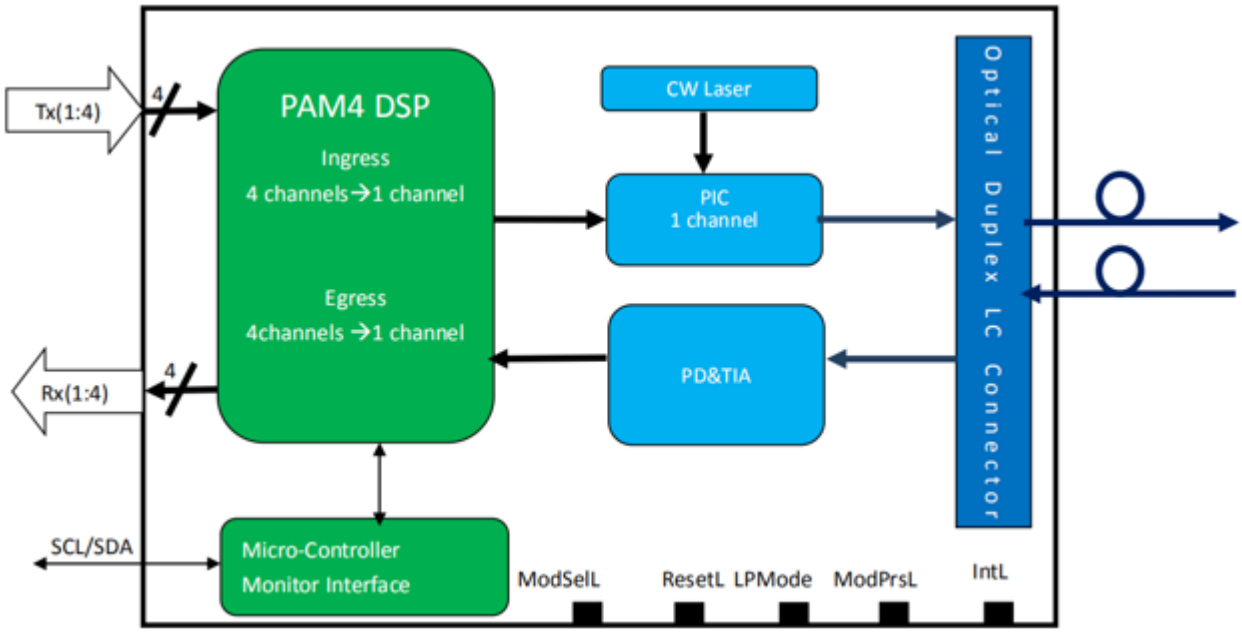
Electrical Pin-Out Details



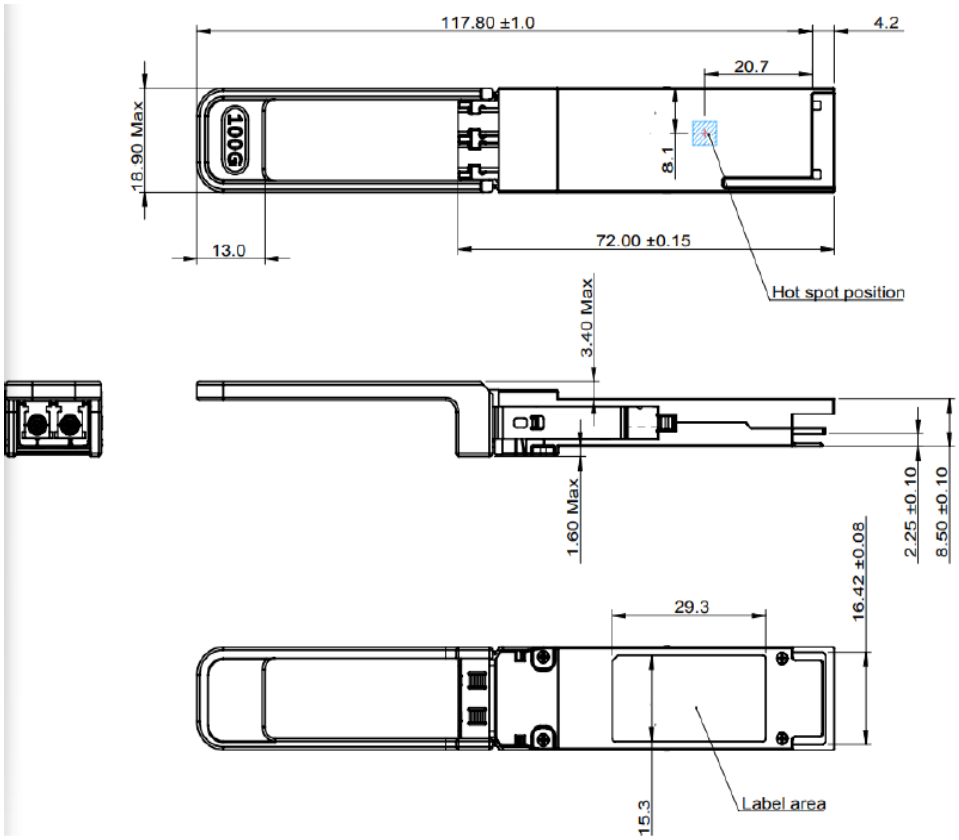
Recommended Power Supply Filter



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.



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