SFPDD-XGS-OLT-N1B+-I-AO

MSA and TAA Combo PON OLT SFP-DD Transceiver (SMF, 1577nmTx/1270nmRx and 1490nmTx/1310nmRx, N1/B+, SC, DOM, -40 to 85C)

Features

- Comply with ITU-T G.984.5 (2014)/Amd.2 (10/2020)
- Comply with SFF-8472 Rev 11
- GPON & XGS-PON N1 OPL Class B+
- Single-mode Fiber
- SC Optical Connector
- Comply with SFP-DD Hardware Rev. 4.2
- Hot Pluggable
- Operating Temperature: -40 to 85 Celsius
- RoHS compliant and Lead Free

Applications

- XGS-PON and GPON Combo OLT N2 B+

Product Description

This MSA compliant Combo PON OLT class N1/B+ SFP-DD transceiver provides 9.95Gbs/9.95Gbs and 2.48Gbs/1.24Gbs throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1577nmTx/1270nmRx and 1490nmTx/1310nmRx via a SC connector. It can operate at temperatures between -40 and 85C. This transceiver is Trade Agreements Act (TAA) compliant. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. 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
Power Supply Voltage	Vcc	0		3.6	V	
Storage Ambient Temperature	Ts	-40		+85	°C	
Operating Case Temperature	Tc	-40		85	°C	
Operating Relative Humidity	RH	5		+85	%	
XGS Rx Optical Isolation (From external 1290-1650nm)	ISO	-30			dB	
Reflectance of XGS Rx (1260- 1280nm)				-12	dB	
GPON Rx Optical Isolation (From external 1260-1280nm)	ISO	-30			dB	
GPON Rx Optical Isolation (From external 1342-1650nm)	ISO	-30			dB	
Reflectance of GPON Rx (1290-1330 nm)				-20	dB	
Differential Power Range				20	dB	1

Notes:

1. Power differential between sequential ONU bursts.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Supply Current	Icc			1114	mA	1
Power Consumption				3.5	W	
Transmitter (9.953G)						
Data Input Differential Swing	VIN	200		850	mVp-p	
Input Differential Impedance	ZIN		100		Ω	
Tx_Disable Voltage	VIL	0		0.8	V	
	VIH	2		3.3	V	
Transmitter Fault Voltage - Low	VTF, L	0		0.4	V	
Transmitter Fault Voltage - High	VTF, H	2.4		VCC	V	
Transmitter (2.488G)						
Data Input Differential Swing	VIN	200		850	mVp-p	
Input Differential Impedance	ZIN		100		Ω	
Tx_Disable Voltage	VIL	0		0.8	V	
	VIH	2		3.3	V	
Transmitter Fault Voltage - Low	VTFI, L	0		0.4	V	
Transmitter Fault Voltage - High	VTFI, H	2.4		VCC	V	

Receiver (9.953G)						
Data Output Differential Swing	VOUT	300		800	mVP-P	
Signal Detected Voltage_Low	VSD, L	0		0.4	V	
Signal Detected Voltage_High	VSD, H	2.4		VCC	V	
Signal Detected Assert Time	TSDA			100	ns	
Signal Detected De-assert Time	TSDD			50	ns	
Data Recovery Time	Trec			100	ns	
Receiver (2.488G)						
Data Output Differential Swing	VOUT	300		800	mVP-P	
Signal Detected Voltage_Low	VSD, L	0		0.4	V	
Signal Detected Voltage_High	VSD, H	2.4		VCC	V	
Signal Detected Assert Time	TSDA			50	ns	
Signal Detected De-assert Time	TSDD			12.8	ns	
Data Recovery Time	Trec			25.6	ns	
Receiver (1.244G)						
Data Output Differential Swing	VOUT	300		800	mVP-P	
Signal Detected Voltage_Low	VSD, L	0		0.8	V	
Signal Detected Voltage_High	VSD, H	2		VCC	V	
Signal Detected Assert Time	TSDA			50	ns	
Signal Detected De-assert Time	TSDD			12.8	ns	
Data Recovery Time	Trec			25.6	ns	

Notes:
1. Based on 3.14V

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter (9.953G)						
Centre Wavelength	λC	1575	1577	1580	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	Aop	1		4	dBm	
Average Launch Power-OFF	POFF			-39	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Tolerance to Reflected Power		-15			dB	
Eye Diagram		ITU-T G.9807.1 Compliant				
Transmitter (2.488G)						
Centre Wavelength	λC	1480	1490	1500	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	Aop	1.5		5	dBm	
Average Launch Power-OFF	POFF			-40	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Tolerance to Reflected Power		-15			dB	
Eye Diagram		ITU-T G.984.2 Compliant				
Receiver (9.953G)						
Operating Wavelength	λC	1260	1270	1280	nm	
Sensitivity	PSEN			-25	dBm	1
Saturation	PSAT	-4			dBm	1
Signal Detected De-assert Level	Psdd	-45			dBm	
Signal Detected Assert Level	Psda			-27	dBm	
Max Optical Input	Pdamage			0	dBm	
Receiver (2.488G)						
Operating Wavelength	λC	1260	1270	1280	nm	
Sensitivity	PSEN			-26.5	dBm	2
Saturation	PSAT	-6			dBm	2
Signal Detected De-assert Level	Psdd	-45			dBm	
Signal Detected Assert Level	Psda			-28	dBm	
Max Optical Input	Pdamage			0	dBm	
Receiver (1.244G)						
Operating Wavelength	λC	1290	1310	1330	nm	
Sensitivity	PSEN			-28	dBm	3
Saturation	PSAT	-8			dBm	3

Signal Detected De-assert Level	Psdd	-45			dBm	
Signal Detected Assert Level	Psda			-29	dBm	
Max Optical Input	Pdamage			0	dBm	

Notes:

1. Measured with PRBS 2^{31}-1 test pattern @9.953Gbps and ER=6dB BER =10^{-3}.

2. Measured with PRBS 2^{23}-1 test pattern @2.488Gbps and ER=8.2dB, BER =10^{-4}.

3. Measured with PRBS 2^{23}-1 test pattern @1.244Gbps and ER=8.2dB, BER =10^{-4}.

RSSI Timing

RSSI Timing Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Packet Length		575			ns	
RSSI Trigger Delay	Td	100			ns	
RSSI Trigger Width	Tw	500			ns	
RSSI Sampling Time	TSAMPLE	500			ns	
Delay Before Read	Ts	500			us	

XGSPON RX Burst Timing

Parameters	Symbol	Min	Typ	Max	Units	Notes
Guard Time	Tgd	51.2			ns	
Reset Delay	Trd	0			ns	1
Reset Width	Trw	25.6			ns	
RateSel Setup Time	Trs	5			ns	2
SD Assert Time	Tsda	0		51.2	ns	
SD De-assert Time	Tsdd		100		ns	3
Data Recovery Time	Trec	0	51.2	100	ns	

Notes:
1. Reset pulse is suggested to be fully inside the preamble.
2. The polarity of RateSel signal could be customized, high = 10G rate, low = 2.5G rate by default.
3. Signal detect auto reset function is applied. The signal detects de-assert time forced by auto reset is typically 100ns and could short to about 12.8ns with additional reset pulse.

GPON Rx Burst Timing
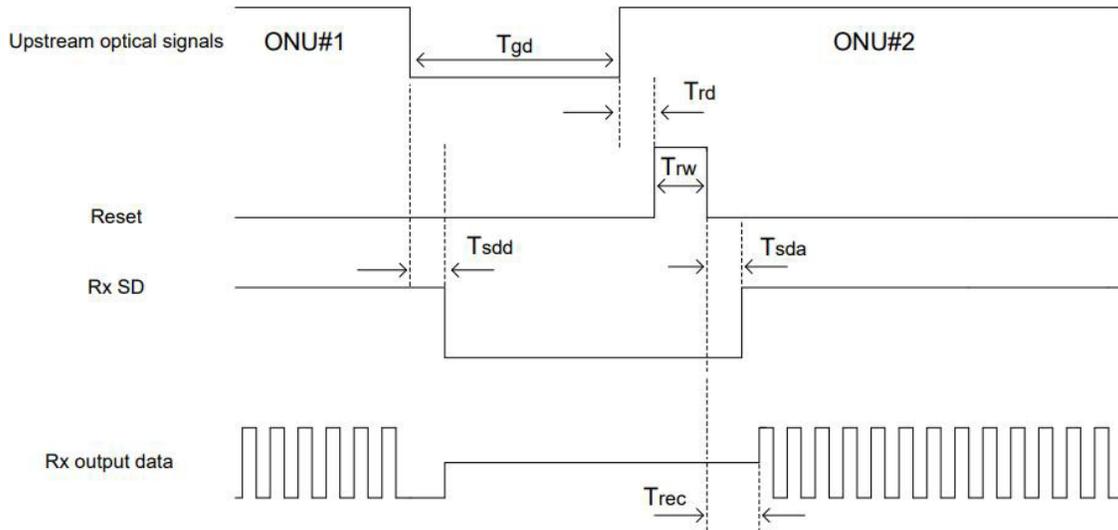
Parameters	Symbol	Min	Typ	Max	Units	Notes
Guard Time	Tgd	25.6			ns	
Reset Delay	Trd	0			ns	1
Reset Width	Trw	12.8			ns	
SD Assert Time	Tsda	0	25.6	51.2	ns	
SD De-assert Time	Tsdd		100		ns	2
Data Recovery Time	Trec	0	25.6	100	ns	

Notes:
1. Reset pulse is suggested to be fully inside the preamble.
2. Signal detect auto reset function is applied. The SD De-assert time forced by auto reset is typically 100ns and could short to about 12.8ns with additional reset pulse.
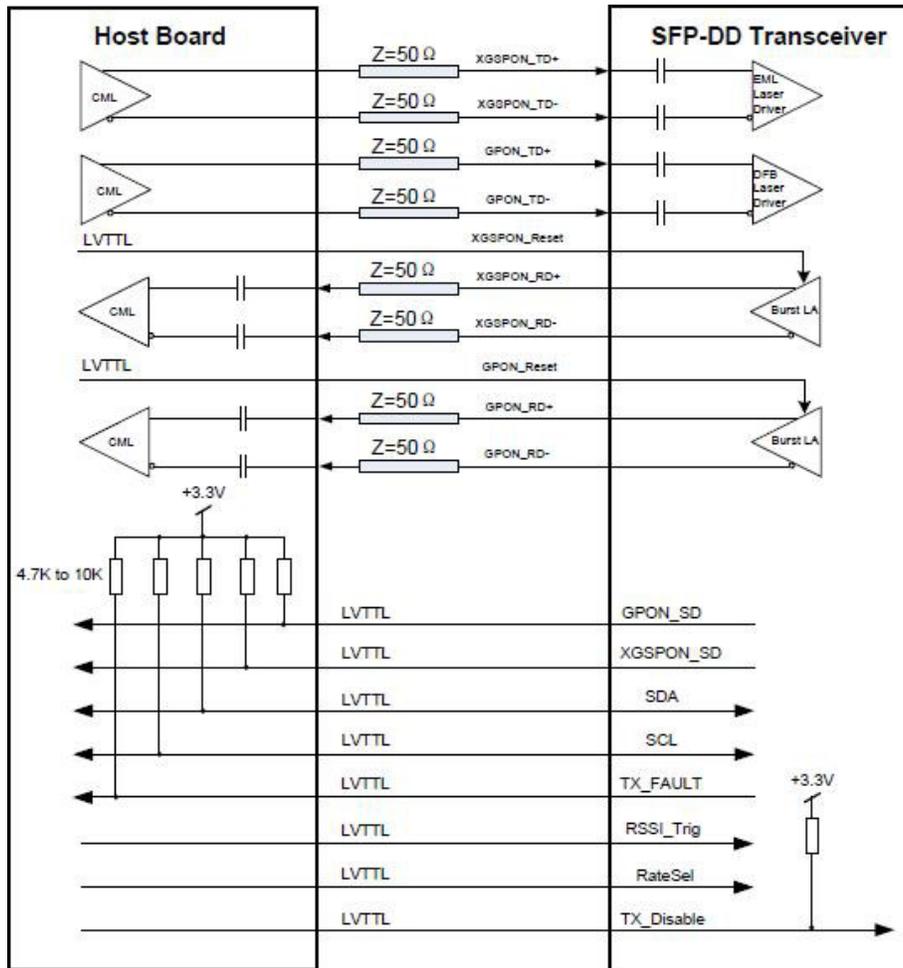
Recommended Host Board Power Supply Filtering Network
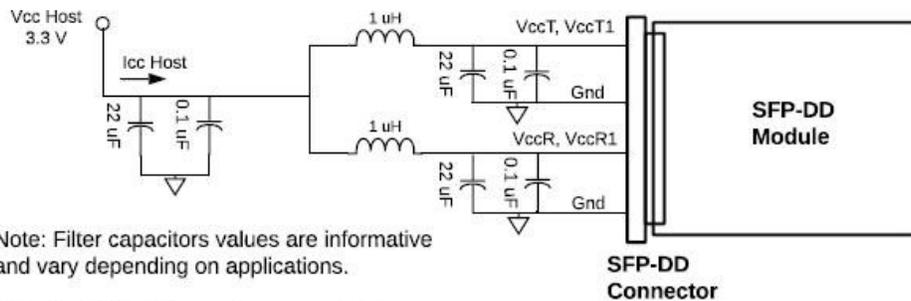
Note: Filter capacitors values are informative and vary depending on applications.

Note: VccT, VccT1 may be connected to VccR, VccR1 provided the applicable derating of the maximum current limit is used.
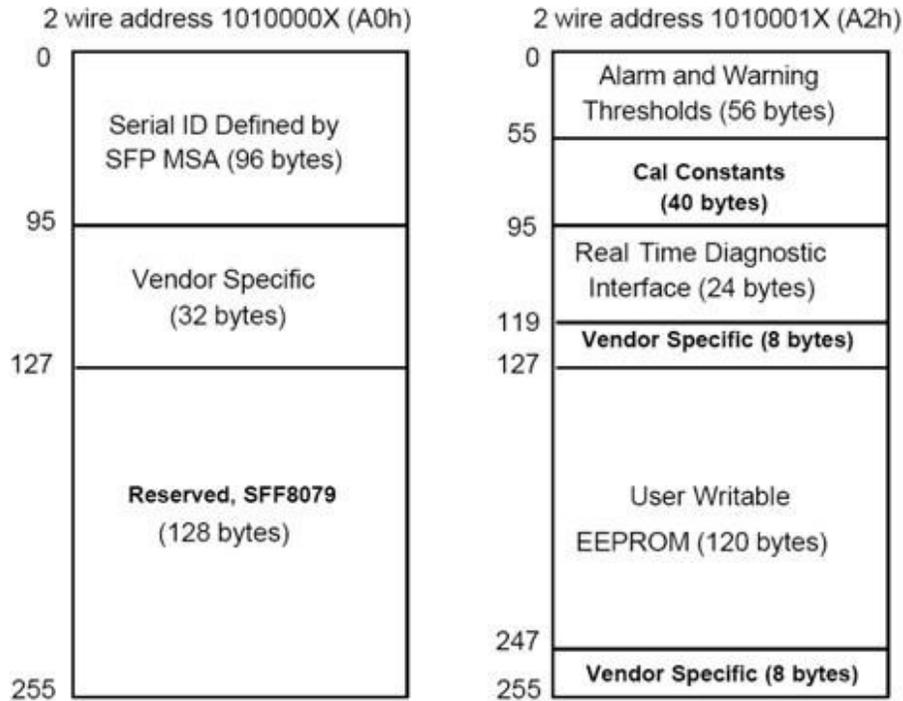
Recommended Host Circuit

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Notes
1	LVTTL-I	Rate_S1	2..488G = Low, 9.953G = High.	
2	LVTTL-O	TX_Fault1	XGS Transmit fault, active high.	
3	LVTTL-I	Tx_Disable1	Active high to disable XGSPON.	
4	LVTTL-I/O	SDA	2-Wire serial interface SDA.	
5	LVTTL-I	SCL	2-Wire serial interface SCL.	
6		MOB_ABS	Module Ground.	
7	LVTTL-I	RESET 1	Reset for XGSPON LA, active High.	
8	LVTTL-O	Rx_SD1	XGS Receiver signal detect, logic 1 indicates normal operation.	
9	LVTTL-I	RSSI_Trigger 1	XGS RSSI trigger input, active high.	
10		GND	Module Ground.	
11		GND	Module Ground.	
12	CML-O	RD1-	Inverted XGSPON received data output, DC coupling.	
13	CML-O	RD1+	XGSPON received data output, DC coupling.	
14		GND	Module Ground.	
15		VCC	+3.3V Power supply.	
16		VCC	+3.3V Power supply.	
17		GND	Module Ground.	
18	CML-I	TD1+	XGS transmit data input, AC coupling.	
19	CML-I	TD1-	Inverted XGS transmit data input, AC coupling.	
20		GND	Module Ground.	
21		GND	Module Ground.	
22	LVTTL-O	TX_Fault2	GPON Transmit fault, active high.	
23	LVTTL-I	Tx_Disable2	Active high to disable GPON.	
24		NC	Reserved.	
25		NC	Reserved.	
26		NC	Reserved.	
27	LVTTL-I	RESET2	Reset for GPON, active High.	
28	LVTTL-O	Rx_SD2	GPON Receiver signal detect, logic 1 indicates normal operation.	
29	LVTTL-I	RSSI_Trigger 2	GPON RSSI trigger input, active high.	
30		GND	Module Ground.	
31		GND	Module Ground.	
32	CML-O	RD2-	Inverted GPON received data output, DC coupling.	
33	CML-O	RD2+	GPON received data output, DC coupling.	
34		GND	Module Ground.	
35		VCC	+3.3V Power supply.	
36		VCC	+3.3V Power supply.	
37		GND	Module Ground.	
38	CML-I	TD2+	GPON transmit data input, AC coupling.	

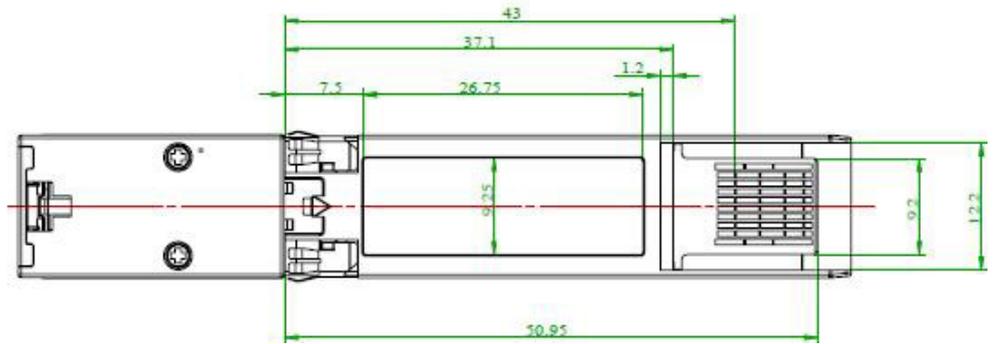| 39	CML-I	TD2-	Inverted GPON transmit data input, AC coupling.	
40		GND	Module Ground.	

EEPROM Definitions

XGSPON Digital Diagnostic Memory Map

2 wire address 1010000X (A0h)

```
0
        Serial ID Defined by
        SFP MSA (96 bytes)
95
        Vendor Specific
        (32 bytes)
127
        Reserved, SFF8079
        (128 bytes)
255
```

2 wire address 1010001X (A2h)

```
0
        Alarm and Warning
55      Thresholds (56 bytes)
        Cal Constants
        (40 bytes)
95
        Real Time Diagnostic
        Interface (24 bytes)
119
        Vendor Specific (8 bytes)
127
        User Writable
        EEPROM (120 bytes)
247
        Vendor Specific (8 bytes)
255
```

GPON Digital Diagnostic Memory Map

2 wire address 1011000X (B0h)

```
0
        Serial ID Defined by
        SFP MSA (96 bytes)
95
        Vendor Specific
        (32 bytes)
127
        Reserved, SFF8079
        (128 bytes)
255
```

2 wire address 1011001X (B2h)

```
0
        Alarm and Warning
55      Thresholds (56 bytes)
        Cal Constants
        (40 bytes)
95
        Real Time Diagnostic
        Interface (24 bytes)
119
        Vendor Specific (8 bytes)
127
        User Writable
        EEPROM (120 bytes)
247
        Vendor Specific (8 bytes)
255
```

Mechanical Specifications
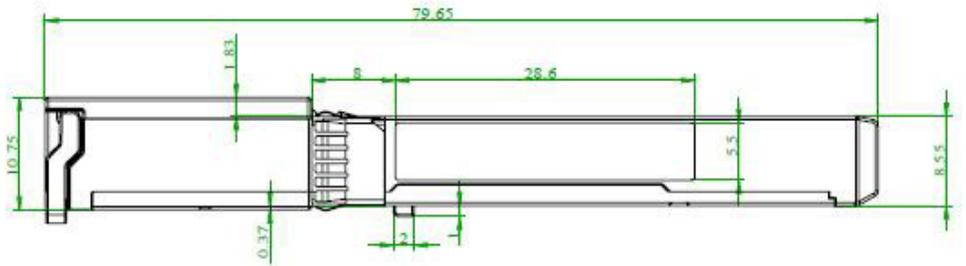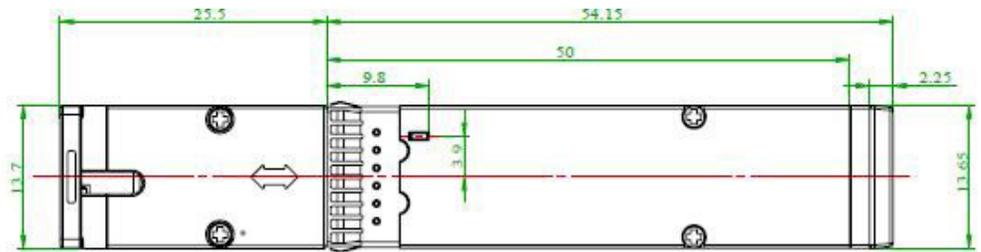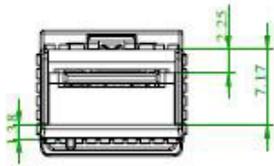
About AddOn Networks

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 in engrained 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 from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.

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