

3FE47581AF-C

Alcatel-Lucent Nokia® GPON OLT SFP B+ Transceiver (1490nmTx/1310nmRx, 2.5Gbps/1.25Gbps, 29.5dBm, SC, -40 to 85C)

Features:

- Comply with ITU-T G.984.5 (2014)/Amd.2 (10/2020)
- GPON & XGS-PON N1 OPL Class B+
- Comply with SFF-8472 Rev 11.0
- Comply with SFP-DD Hardware Rev. 4.2
- Single-mode Fiber
- SC Optical Connector
- Operating Temperature: -40 to 85 Celsius
- Hot Pluggable
- RoHS compliant and Lead Free



Applications:

- GPON
- Access and Enterprise

Product Description

This Alcatel-Lucent Nokia® Compatible GPON OLT 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 1490nmTx/1310nmRx via a SC connector. It can operate at temperatures between -40 and 85C. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' 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

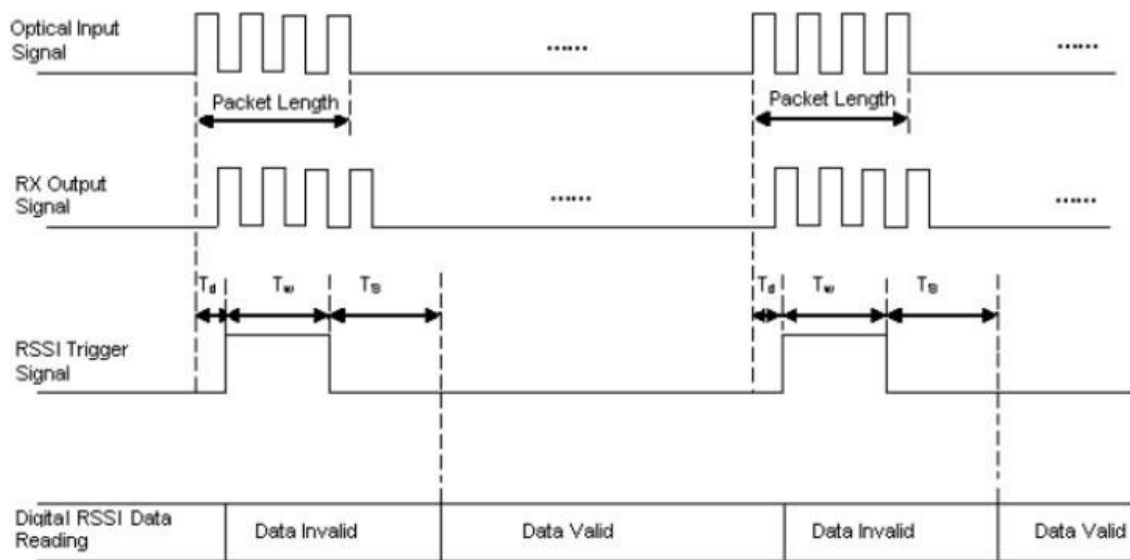
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter (9.953G)						
Centre Wavelength	λC	1575	1577	1580	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	Aop	1		4	dBm	
Average Launch Power-OFF	POFF			-39	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Tolerance to Reflected Power		-15			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} .

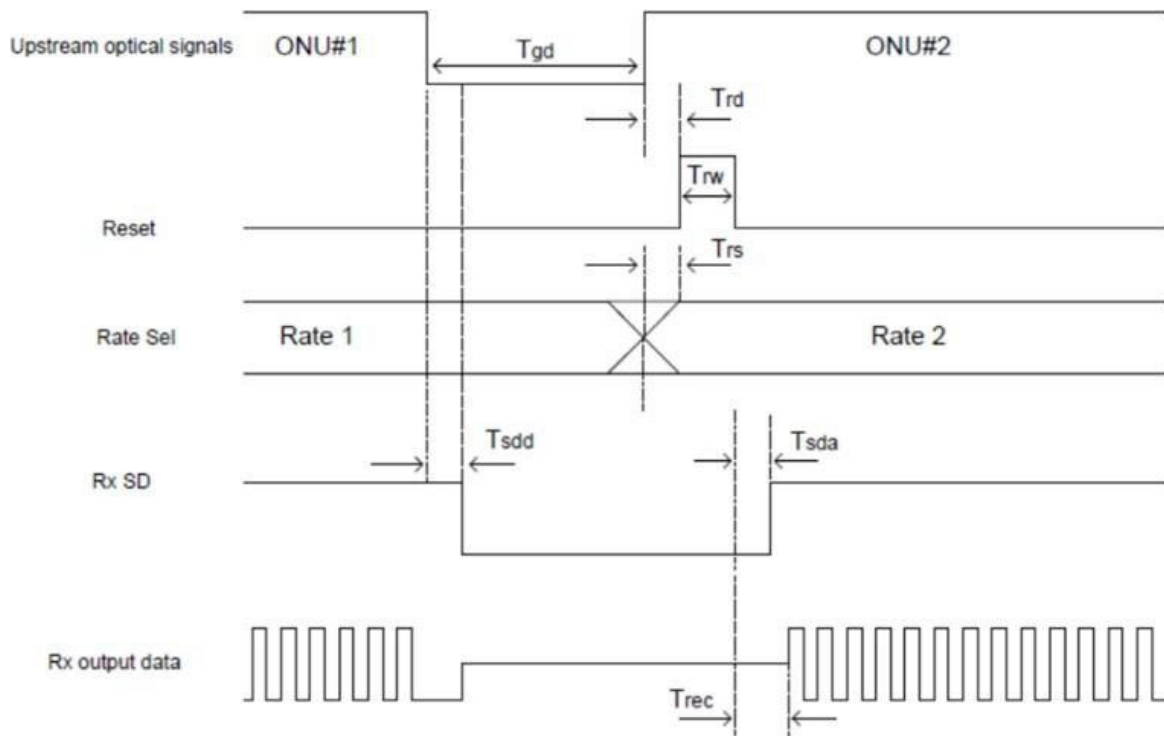
RSSI Timing



RSSI Timing Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Packet Length		575			ns	
RSSI Trigger Delay	T_d	100			ns	
RSSI Trigger Width	T_w	500			ns	
RSSI Sampling Time	T_{SAMPLE}	500			ns	
Delay Before Read	T_s	500			us	

XGSPON RX Burst Timing

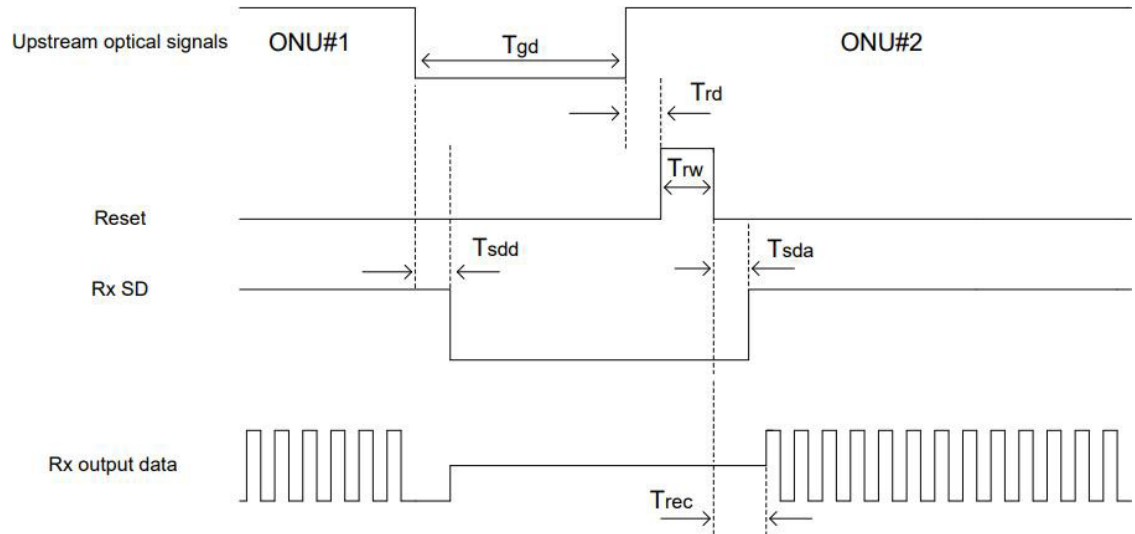


Parameters	Symbol	Min	Typ	Max	Units	Notes
Guard Time	T_{gd}	51.2			ns	
Reset Delay	T_{rd}	0			ns	1
Reset Width	T_{rw}	25.6			ns	
RateSel Setup Time	T_{rs}	5			ns	2
SD Assert Time	T_{sda}	0		51.2	ns	
SD De-assert Time	T_{sdd}		100		ns	3
Data Recovery Time	T_{rec}	0	51.2	100	ns	

Notes:

- Reset pulse is suggested to be fully inside the preamble.
- The polarity of RateSel signal could be customized, high = 10G rate, low = 2.5G rate by default.
- 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

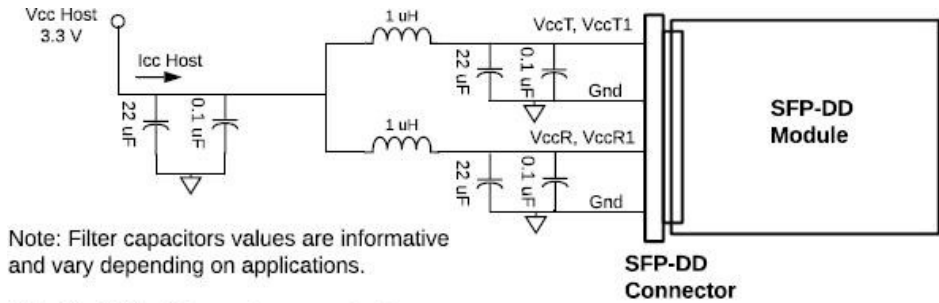


Parameters	Symbol	Min	Typ	Max	Units	Notes
Guard Time	T_{gd}	25.6			ns	
Reset Delay	Trd	0			ns	1
Reset Width	Trw	12.8			ns	
SD Assert Time	$Tsda$	0	25.6	51.2	ns	
SD De-assert Time	$Tsdd$		100		ns	2
Data Recovery Time	T_{rec}	0	25.6	100	ns	

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.

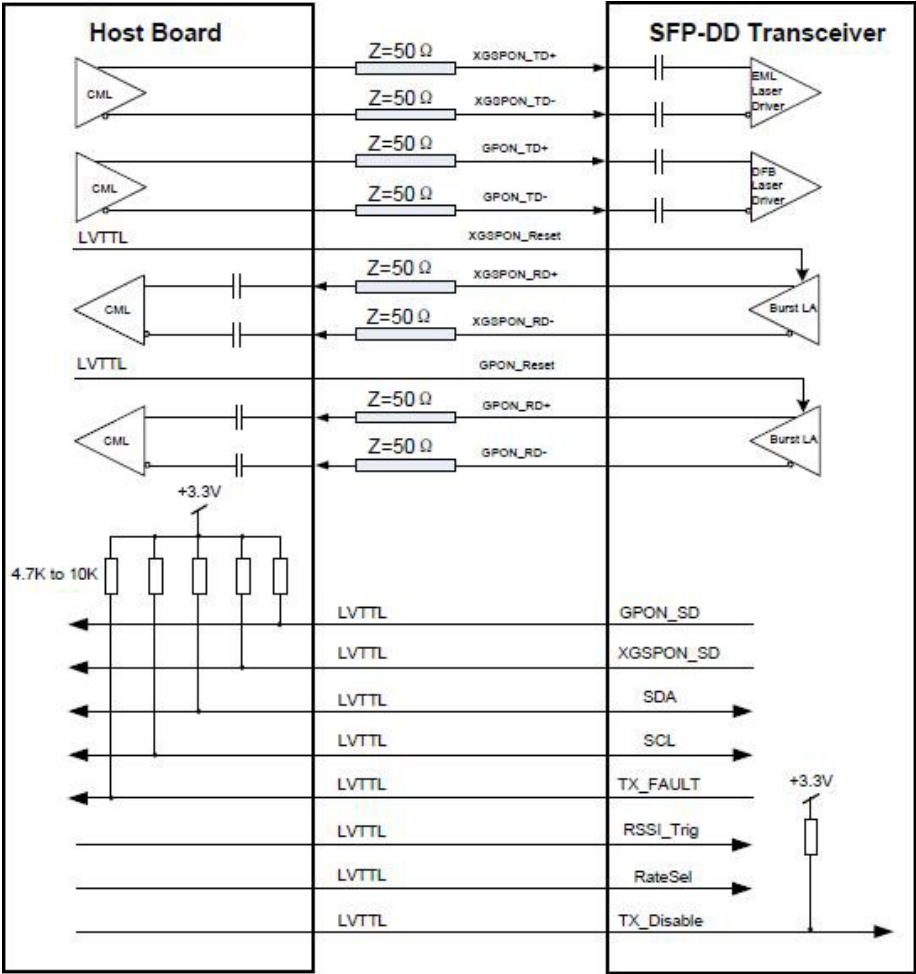
Recommended Host Board Power Supply Filtering Network



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



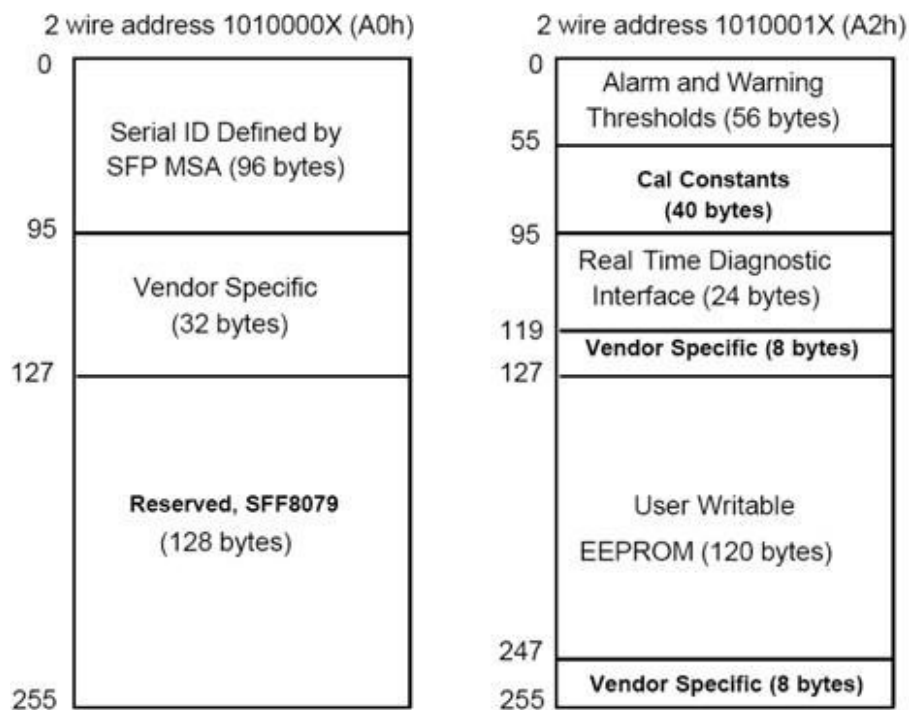
Pin Descriptions

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.	

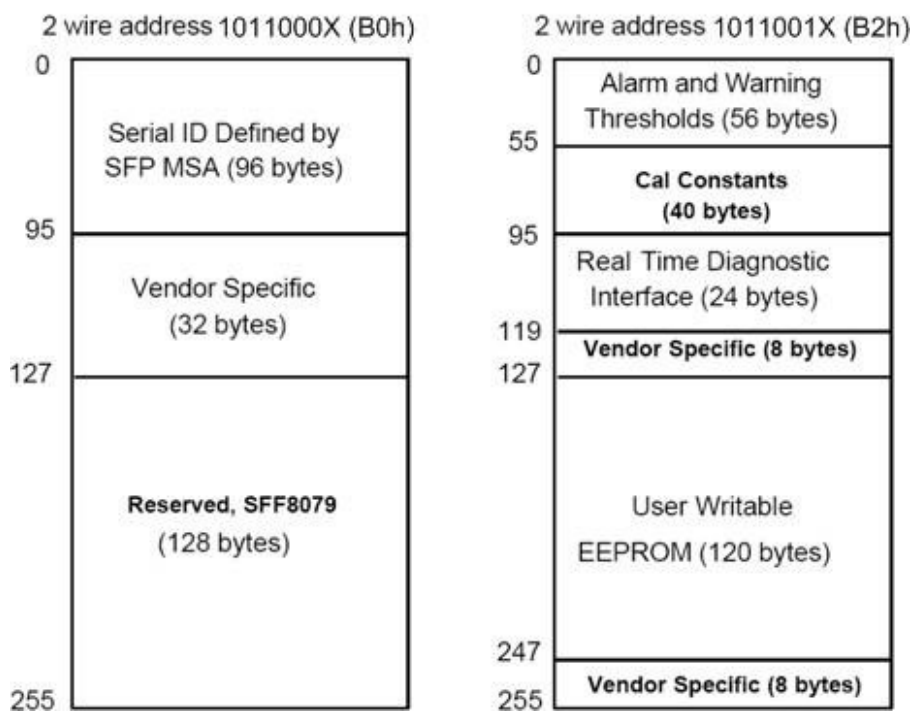
39	CML-I	TD2-	Inverted GPON transmit data input, AC coupling.	
40		GND	Module Ground.	

EEPROM Definitions

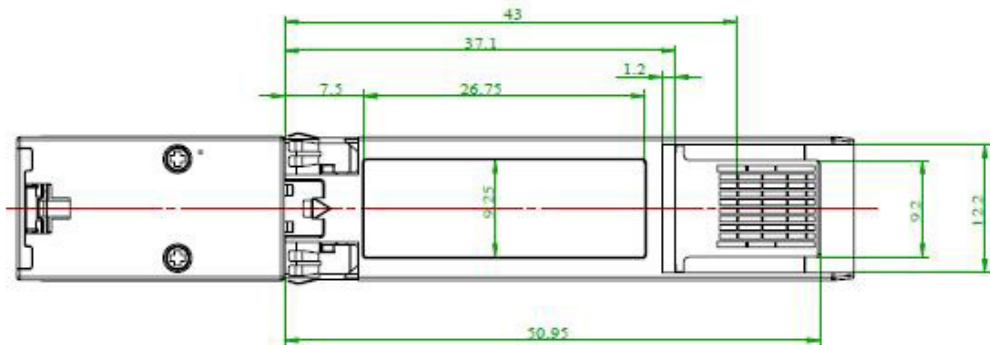
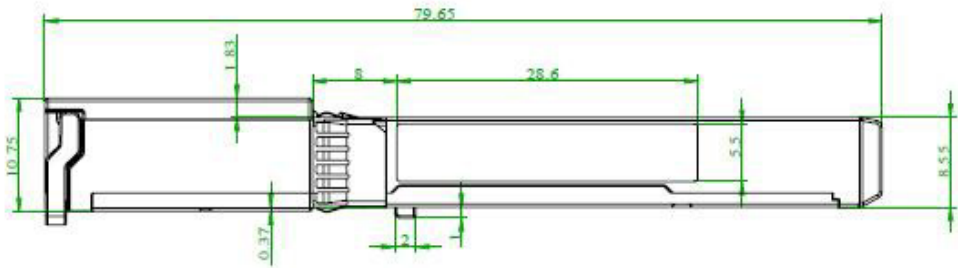
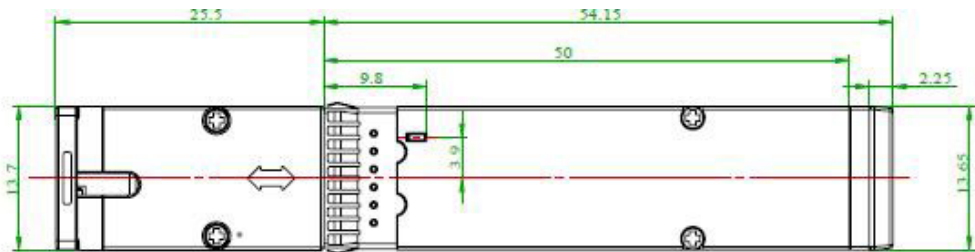
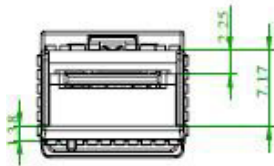
XGSPON Digital Diagnostic Memory Map



GPON Digital Diagnostic Memory Map



Mechanical Specifications



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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