



3FE47581AF-SKY

Alcatel-Lucent Nokia® 3FE47581AF Compatible Combo PON OLT (SMF, 1577nmTx/1270nmRx and 1490nmTx/1310nmRx, N1/B+, SC, DOM, -40 to 85C)

Product Description

This Alcatel-Lucent Nokia® 3FE47581AF compatible 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 an SC connector. This product is in compliance with Multi-Source Agreement (MSA) standards to provide seamless network integration. 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.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

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



Applications:

- GPON
- Access and Enterprise

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

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

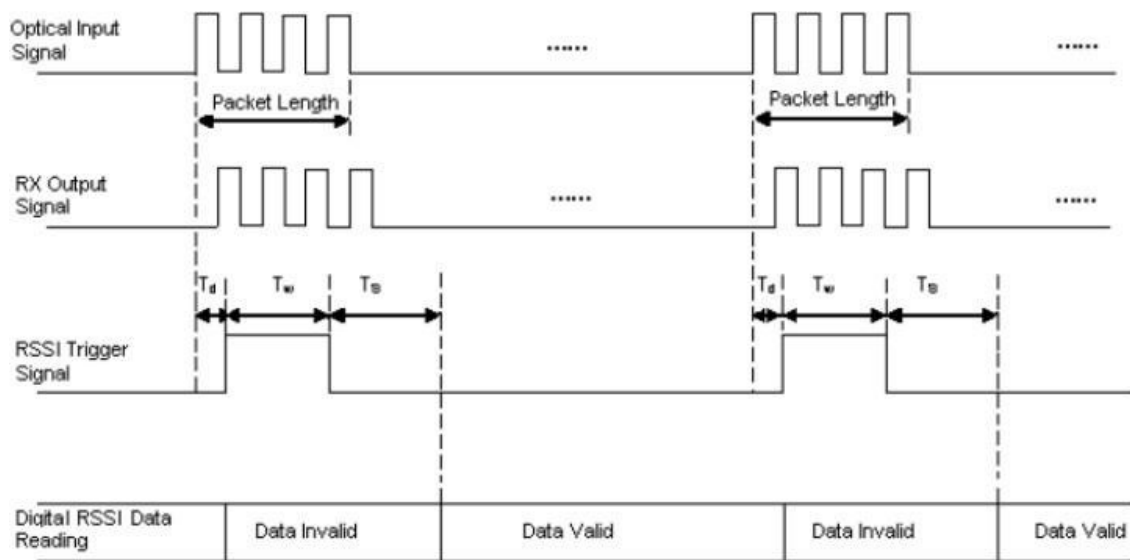
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter (9.953G)						
Centre Wavelength	λC	1575	1577	1580	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	Aop	1		4	dBm	
Average Launch Power-OFF	POFF			-39	dBm	
Extinction Ratio	ER	8.2			dB	
Transmitter Tolerance to Reflected Power		-15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

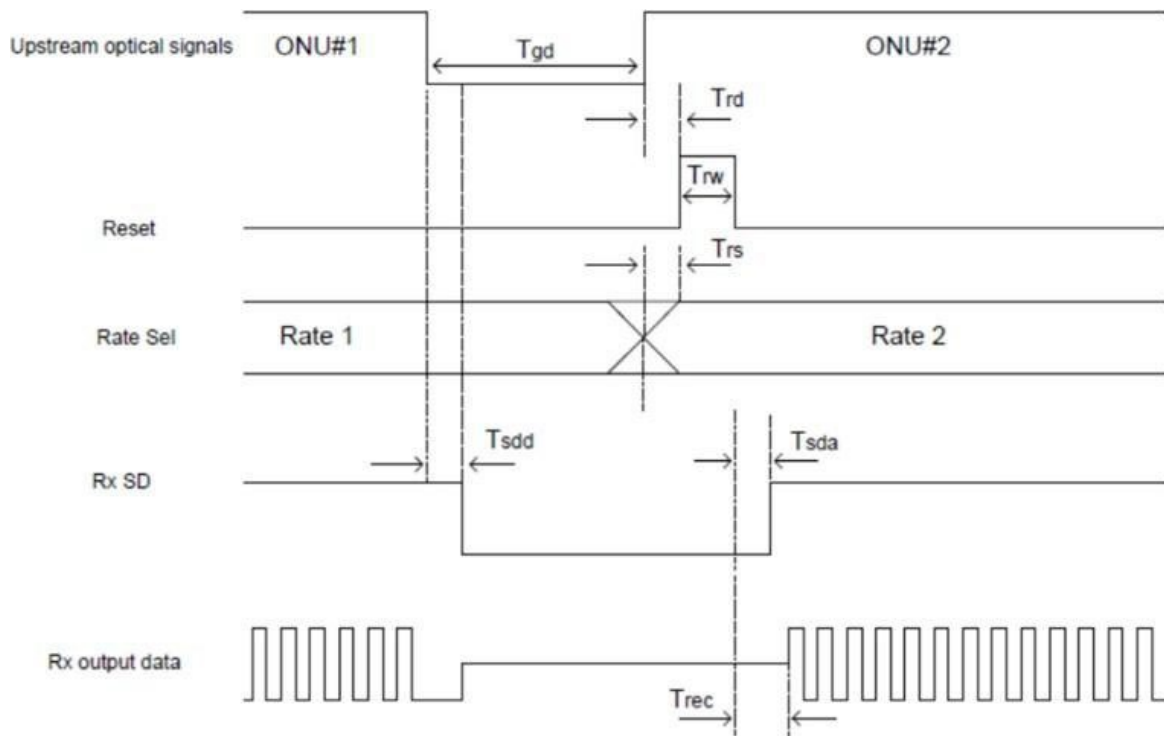
RSSI Timing



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

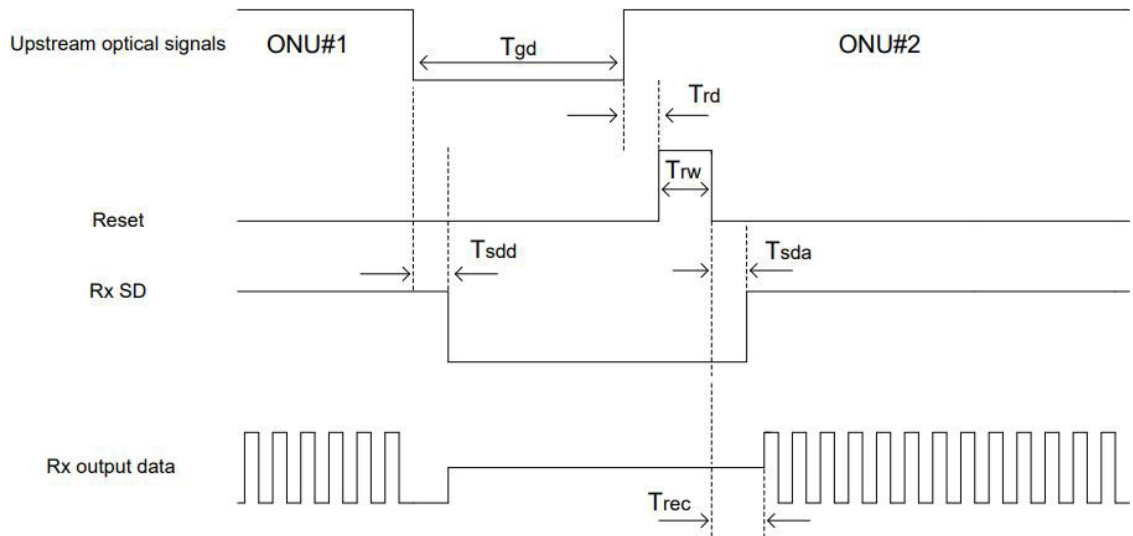


Parameters	Symbol	Min	Typ	Max	Units	Notes
Guard Time	T_{gd}	51.2			ns	
Reset Delay	T_{rd}	0			ns	1
Reset Width	T_{rw}	25.6			ns	
RateSel Setup Time	T_{rs}	5			ns	2
SD Assert Time	T_{sda}	0		51.2	ns	
SD De-assert Time	T_{sdd}		100		ns	3
Data Recovery Time	T_{rec}	0	51.2	100	ns	

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

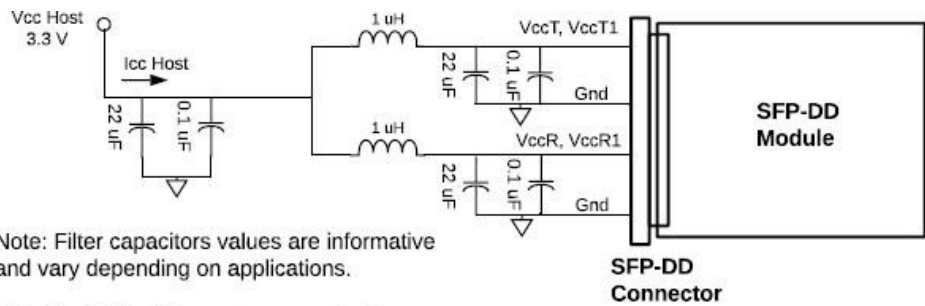


Parameters	Symbol	Min	Typ	Max	Units	Notes
Guard Time	T_{gd}	25.6			ns	
Reset Delay	T_{rd}	0			ns	1
Reset Width	T_{rw}	12.8			ns	
SD Assert Time	T_{sda}	0	25.6	51.2	ns	
SD De-assert Time	T_{sdd}		100		ns	2
Data Recovery Time	T_{rec}	0	25.6	100	ns	

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.

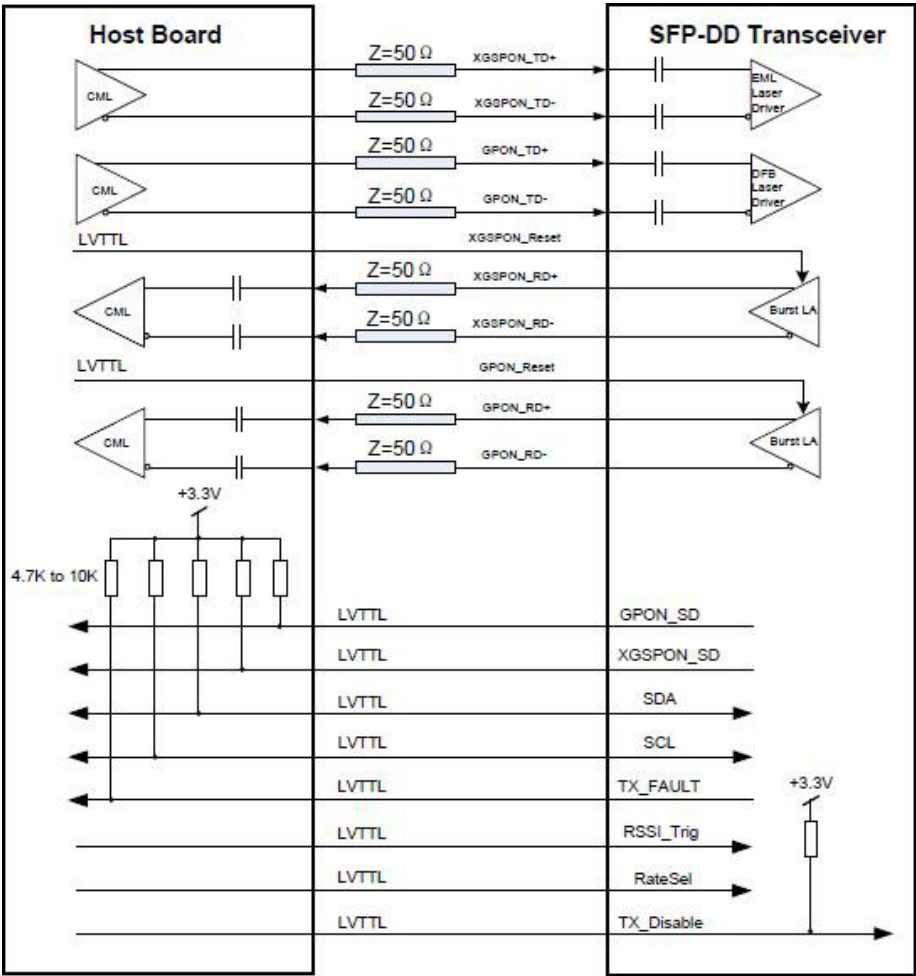
Recommended Host Board Power Supply Filtering Network



Note: Filter capacitors values are informative and vary depending on applications.

Note: V_{ccT}, V_{ccT1} may be connected to V_{ccR}, V_{ccR1} provided the applicable derating of the maximum current limit is used.

Recommended Host Circuit



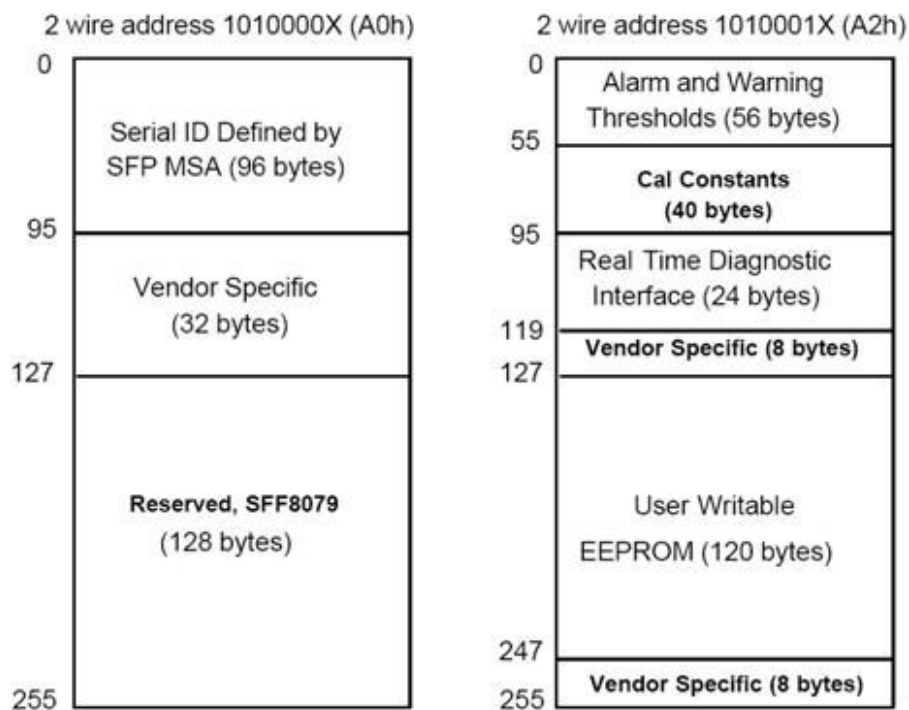
Pin Descriptions

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.	

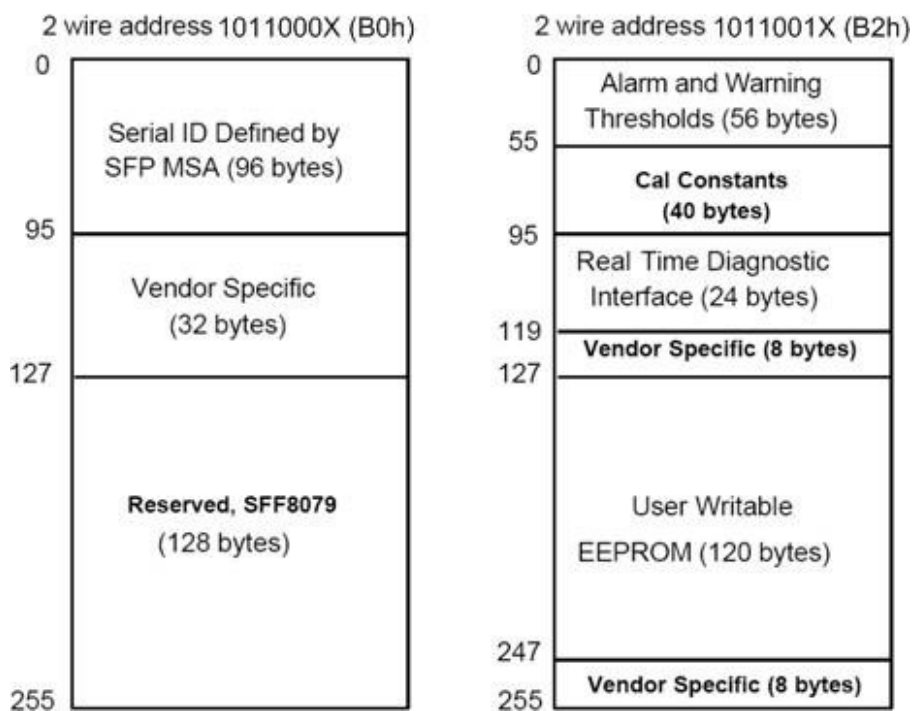
39	CML-I	TD2-	Inverted GPON transmit data input, AC coupling.	
40		GND	Module Ground.	

EEPROM Definitions

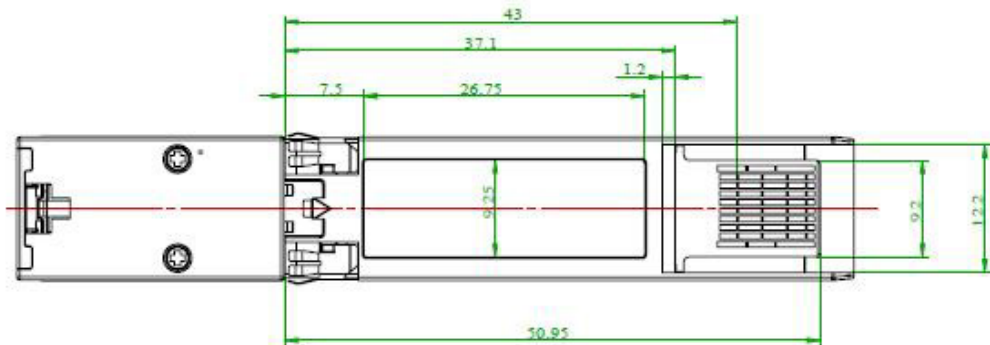
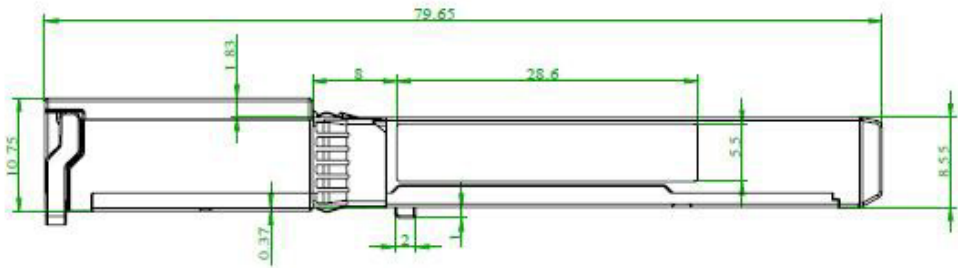
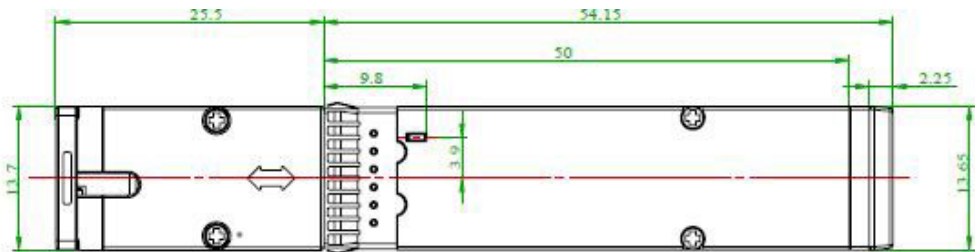
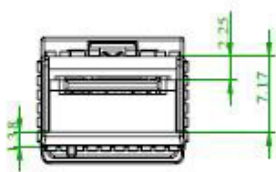
XGSPON Digital Diagnostic Memory Map



GPON Digital Diagnostic Memory Map



Mechanical Specifications



About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

