

TITLE 10G SFP+ XGSPON, ONU Stick, T1270/R1577, 20km, SC Transceiver	DOC No. RFD-20220630011-001	
	REVISION : 02	AUTHORIZED BY : Mike Sun
	DATE : 2022.09.28	CLASSIFICATION : Optical Transceiver

1. SCOPE

Digital Transmitter---A DFB laser diode is employed for upstream transmission at 9.953Gbps. The optical transmitter includes a back-facet photo detector to monitor laser power for APC control.

Digital Receiver---An APD with TIA is employed for downstream data reception at 9.953Gbps. A post amplifier is also included for CML output compatibility.

2. PRODUCT FEATURES

- Bi-directional 9.953Gbps Upstream/9.953Gbps Downstream
- EEPROM with Serial ID Functionality
- Compliant with ITU-T G.9807
- SFP package with SC/UPC and MAC Inside
- Support Digital Diagnostic Monitoring interface
- 1270nm Burst mode transmitter and 1577nm Continuous Mode Receiver
- Single + 3.3V Power Supply
- ROHS-6/6 compliant
- Case Operation Temperature Ranges: Industrial: -40~85°C
- Laser Class 1 Product which comply with the Requirements of IEC 60825-1 and IEC 60825-2

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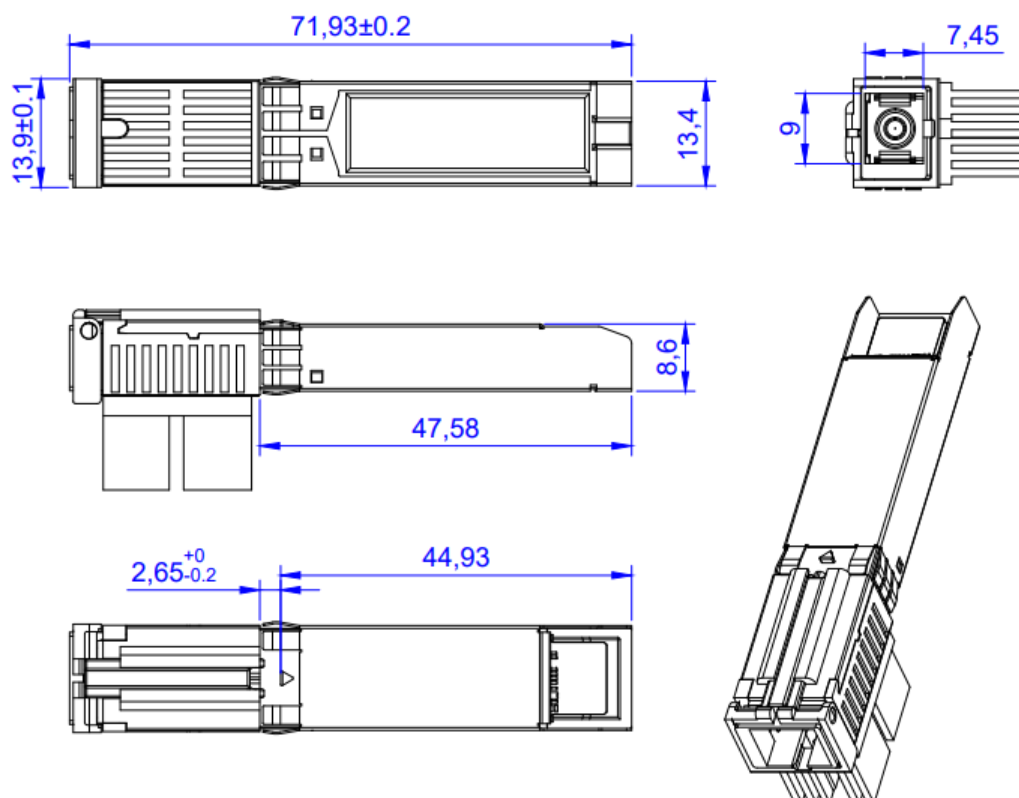
3. PRODUCT DESCRIPTION

3.1 PRODUCT NAME AND SERIES NUMBER(S)

10G XGSPON Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Tem.
P6300PBBCW20-1	10G	1270/1577	20 km	SMF	4 ~ 9	-28.5	SC/UPC	C
P6300PBBIW20-1	10G	1270/1577	20 km	SMF	4 ~ 9	-28.5	SC/UPC	I

3.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKING



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4. APPLICABLE DOCUMENTS AND SPECIFICATIONS

- 10-Gigabit-capable passive optical networks (XG-PON1) ONU (ODN:N1 or N2a class)
- 1588v2 & Syne
- Burst Mode Application
- FTTX WDM Broadband Access

5. Absolute Maximum Ratings & Recommended Operating Conditions

Absolute Maximum Ratings				
Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	85	°C
Storage Ambient Humidity	HA	5	95	%
Power Supply Voltage	VCC	-0.3	3.7	V
Signal Input Voltage		-0.3	Vcc+0.3	V
Lead Soldering Temperature	TSOLD		260	°C
Lead Soldering Time	TSOLD		10	sec

Recommended Operating Conditions					
Parameter	Symbol	Min.	Typical	Max.	Unit
Case Operating Temperature1	Tcase	-40		85	°C
Case Operating Temperature2	Tcase	0		70	°C
Ambient Humidity	HA	5		95	%

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Power Supply Voltage	VCC	3.135	3.3	3.465	V
Power Supply Current	ICC			600	mA
Power dissipation				2	W
Power Supply Noise Rejection				100	mVp-p
Data Rate			9.953/9.953		Gbps
Transmission Distance				20	km
Coupled fiber	Single mode fiber (9/125um)				

Transmitter Operating Characteristic-Optical, Electrical						
Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Average Launched Power	PO	4		9	dBm	
Extinction Ratio	ER	6			dB	
Center Wavelength	λ C	1260	1270	1280	nm	DFB Laser
Side Mode Suppression ratio	SMSR	30			dB	
Spectrum Bandwidth(-20dB)				1	nm	
Transmitter OFF Output Power	POff			-40	dBm	
Tx Burst on Time	Ton			50	ns	
Tx Burst off Time	Toff			50	ns	
Differential line Input Impedance	RIN	90	100	110	Ohm	
Differential Data Input Swing	VDT	200		1600	mVp-p	
Input Common Mode Voltage	VCM	1.4		Vcc-0.2	V	
Output Eye Mask	Compliant With ITU-T G.987.2					

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Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	λ_{IN}	1575		1580	nm	CW APD
Receiver Sensitivity	P_{IN}			-28.5	dBm	Note (1)
Input Saturation Power (Overload)	P_{SAT}	-8			dBm	
Signal Detect Assert Power	PA	-42			dBm	
Signal Detect De-Assert Power	PD			-29	dBm	Note (2)
Signal Detect- Hysteresis	PA-PD	0.5		5	dB	
Differential Data Output Swing	VDR	350		850	mVp-p	AC-Coupled CML
Signal Detect Output Voltage-High	VLOSH	2.4		VCC	V	LVTTL
Signal Detect Output Voltage-Low	VLOSL	0		0.4	V	
Signal Detect- Assert/De-Assert Time				100	us	
RSSI range		-29		-8	dBm	Accuracy +/- 3dB

Notes:

1. Measured with PRBS 2³¹-1 test pattern @9.953Gbit/s, BER $\leq 1 \times 10^{-3}$.
2. When SD de-asserted, the data output is signal output.

Digital Diagnostic Monitor Interface (DDMI) Description

DDMI	Monitor Scope	Monitor Error
TX power	4dBm ~9dBm	± 2 dBm
RX power	-8dBm~-29dBm	± 3 dBm
Bias	0mA~90mA	$\pm 10\%$
Temperature	-40°C ~85°C	± 3 °C
Vcc	3.0V~3.6V	$\pm 3\%$

The DDMI WARNING and ALARM memory positions and addresses are compliant with the SFF 8472 REV9.3 specification. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. The DDMI can detect TX power, RX power, Bias current, Temperature, VCC.

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6. Pin-out Definition:

Pin Assignment

Pin No.	Pin Name	Description
1	VeeT	Tx Ground
2	SFP_Uart_Tx	SFP_Uart_Tx
3	Burst Control	LVTTTL input. The default setting is that laser output is disabled when this pin is asserted HIGH and laser output is enabled when this pin is LOW.
4	MOD_DEF(2)	2-Wire Serial Data I/O Pin.(SDA)
5	MOD_DEF(1)	2-Wire Serial Clock Input.(SCL)
6	MOD_DEF(0)	Internally Grounded
7	SFP_Uart_Rx	SFP_Uart_Rx
8	LOS/SD	Set LOS is that active high when signal is detected(LVTTTL)
9	SFP_PPS	Plus time per second
10	NC	NC
11	VeeR	Rx Ground
12	RXD-	Inverted Receiver Data Output (AC-Coupled internally)
13	RXD+	Non-Inverted Receiver Data Output (AC-Coupled internally)
14	VeeR	Rx Ground
15	Vcc_RX	Rx Vcc
16	Vcc_TX	Tx Vcc
17	Veet	Tx Ground
18	TXD+	Non-Inverted Transmitter Data Input (AC-Coupled)
19	TXD-	Inverted Transmitter Data Input (AC-Coupled)
20	Veet	Tx Ground

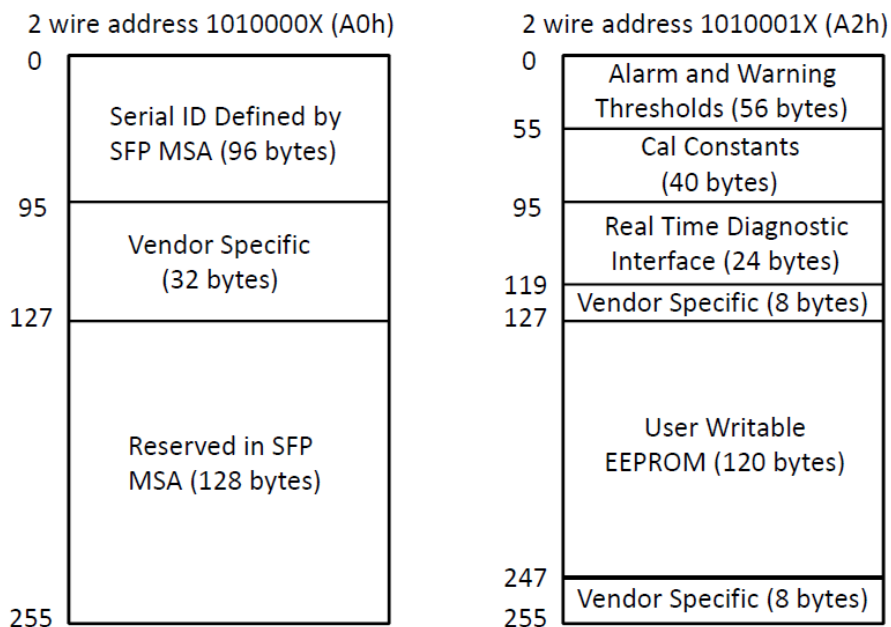
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7. Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



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8. Modification History

Rev.	Comments	Date	Originator	Approval
01	Preliminary Draft	2022.05.17	Albert Lin	Mike Sun
02	Data correction	2022.09.28	Albert Lin	Mike Sun

