
XGSPON+GPON Combo OLT B+ C-temp

VP-SGTBB52CS-AA

Product Overview

The VP-SGTBB52CS-AA is a high-performance, hot-pluggable SFP+ combo OLT transceiver supporting both XGSPON and GPON applications. It features single-fiber bi-directional data links with a 9.953Gbps transmit rate and burst-mode receive rates of 9.953G/2.488Gbps for XGSPON, and a 2.488Gbps transmit rate with a 1.244Gbps burst-mode receive rate for GPON. This module operates and is equipped with an SC receptacle connector. It incorporates a high-power 1577nm EML LD and a high-power 1490nm DFB LD.

Features

- Single fiber bi-directional data links TX 9.953Gbps, Burst Mode RX 9.953G/2.488Gbps application
- Single fiber bi-directional data links TX 2.488Gbps, Burst Mode RX 1.244Gbps application
- 0 to 70°C operating case temperature
- 3.3V power supply
- SFP+ package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML LD and High power 1490nm DFB LD
- High sensitivity 1270nm/1310nm APD
- Support 20km transmission distance with SMF
- Rx_SD indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS6 compliance

Applications

- XGS-PON OLT B+
- GPON OLT B+

Standards

- Complies with SFF-8472 and ITU G.987.2
- Complies with ITU G.9807.1
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11

Ordering Information

Part Number	Description
VP-SGTBB52CS-AA	XGSPON+ GPON Combo OLT B+ C

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Ambient Temperature	TSTG	-40		85	°C	
Operating Case Temperature	T _A	0		70	°C	
Relative Storage Humidity	RHs	5		85	%	
Relative Operating Humidity	RoHS	5		85	%	
V _{CC3} Power Supply Voltage	V _{CC3}	3.13		3.47	V	
Total Power				3.3	W	

General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _c	0		70	°C	
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V	
RX Data Rate			9.953 2.488 1.244		Gbps Gbps Gbps	
TX Data Rate			9.953 2.488		Gbps Gbps	
Operating Case Temperature	T _c	0		70	°C	

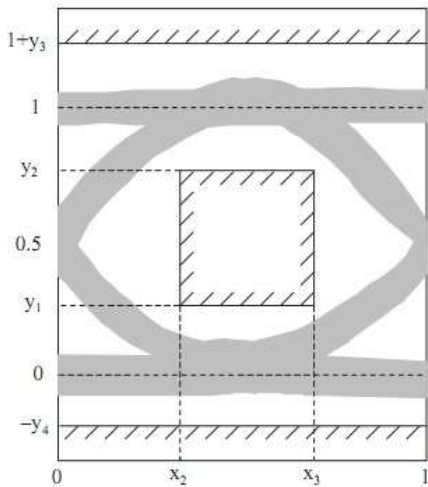
XGS PON Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λ_c	1575		1580	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power(BOL)	AOP	+1		+4	dBm	25°C, Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS2 ³¹ -1 @9.953Gbps
Optical Waveform Diagram	Compliant with ITU G.9807.1					Fig 1, Mask Margin>5%
Tolerance to Transmitter Incident Light		-15			dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF

XGS PON Electrical – Transmitter

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing			180		850	mV	CML input, AC coupled
Input Differential Impedance			90	100	110	Ω	
TX Disable	Disable		2		VCC+0.3	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.4		VCC+0.3	V	
	Normal		0		0.4	V	

XGS PON Transmitter Eyemask Definitions and Test Procedures (Fig 1)



X3-X2	Y1	Y2	Y3	Y4	Unit
0.2	0.25	0.75	0.25	0.25	UI

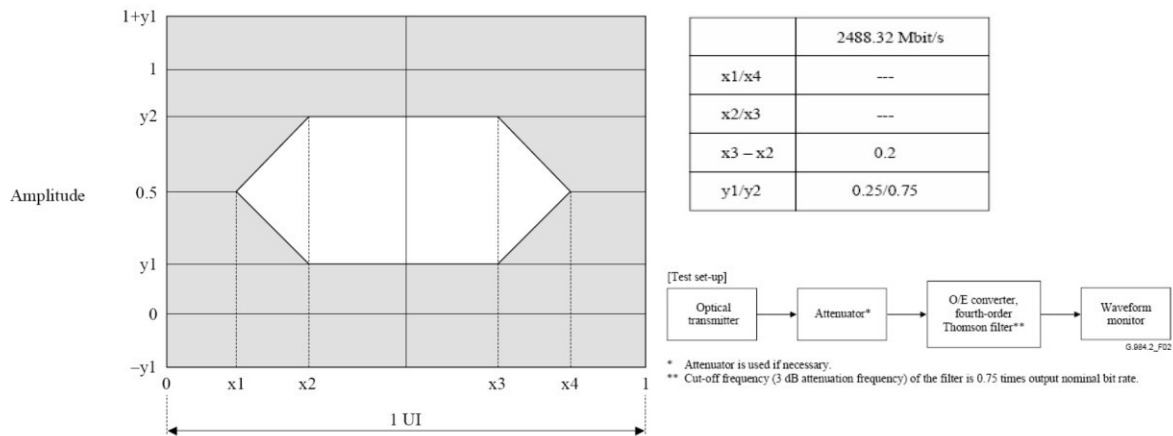
GPON Optical – Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λ_c	1480		1500	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power (BOL)	AOP	+1.5		+5	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS 2 ²³ -1+72CID @2.488G
Optical Waveform Diagram	Compliant with ITU-T G.984.2					Fig 2, Mask Margin>5%
Tolerance to Transmitter Incident Light		-15			dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF

GPON Electrical – Transmitter

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing			180		850	mV	CML input, AC coupled
Input Differential Impedance			90	100	110	Ω	
TX Disable	Disable		2		VCC+0.3	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.4		VCC+0.3	V	
	Normal		0		0.4	V	

GPON Transmitter Eyemask Definitions and Test Procedures (Fig 2)



XGS PON Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-25	dBm	ER≥6dB, PRBS2 ³¹ @9.953Gbps BER ≤1×10 ⁻³
Minimum Overload		-4			dBm	
Max Optical input				0	dBm	
SD Assert Level				-25.5	dBm	
SD De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

XG PON Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-26.5	dBm	ER≥6dB, PRBS2 ²³ @2.488Gbps BER ≤1×10 ⁻⁴
Minimum Overload		-6			dBm	
Max Optical input				0	dBm	
SD Assert Level				-27.0	dBm	
SD De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

XGS/XGPON Electrical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Guard time	T _g	50	100	-	ns	
Reset Pulse Width	T _r	25.6	-	-	ns	
Receiver Threshold Settling Time	T _{SETTLING}			100	ns	Fig 3
Data Output Differential Swing		400		800	mV	DC Coupled, CML output
Input Differential Impedance	Z _{in}	90	100	110	Ω	
SD Assert Level Time				100	ns	
SD De-Assert Level Time				100	ns	
SD Voltage - Low		0		0.4	V	
SD Voltage - High		2.4		VCC+0.3	V	

GPON Optical – Receiver

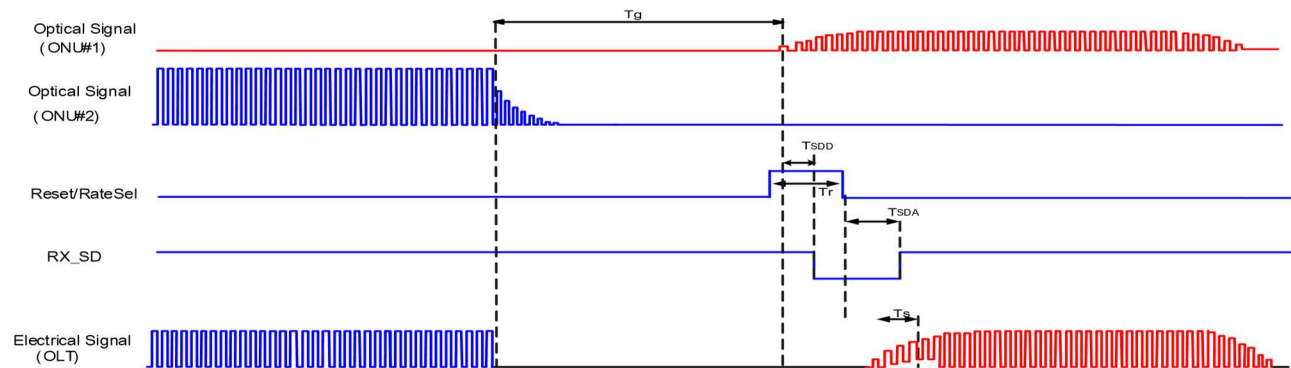
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1290	1310	1330	nm	
Sensitivity	SEN			-28.0	dBm	ER≥10dB, PRBS2 ²³ @1.244Gbps BER ≤1×10 ⁻¹⁰
Minimum Overload		-6			dBm	
Max Optical input				0	dBm	
SD Assert Level				-28.5	dBm	
SD De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	
Receiver Reflectance		72			dB	



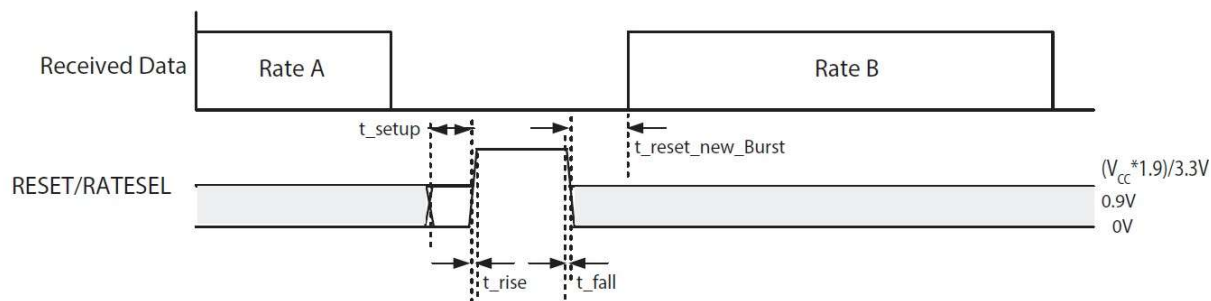
GPON Electric - Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Guard time	Tg	25.6	50	-	ns	
Reset Pulse Width	Tr	12.8	-	-	ns	Fig 4 LVPECL output, DC coupled
Receiver Threshold Settling Time	TSETTLE		25.6		ns	
Data Output Differential Swing		600		1600	mV	
Input Differential Impedance	Zin	90	100	110	Ω	
SD Assert Level Time	Ta			24	ns	Fig 4
SD De-Assert Level Time				25.6	ns	
SD Voltage - Low		0		0.4	V	
SD Voltage - High		2.4		VCC+0.3	V	

Timing Parameter Definitions in XGS PON Burst Mode Sequence (Fig 3)



Reset/RateSel Timing Diagram (Fig 4)





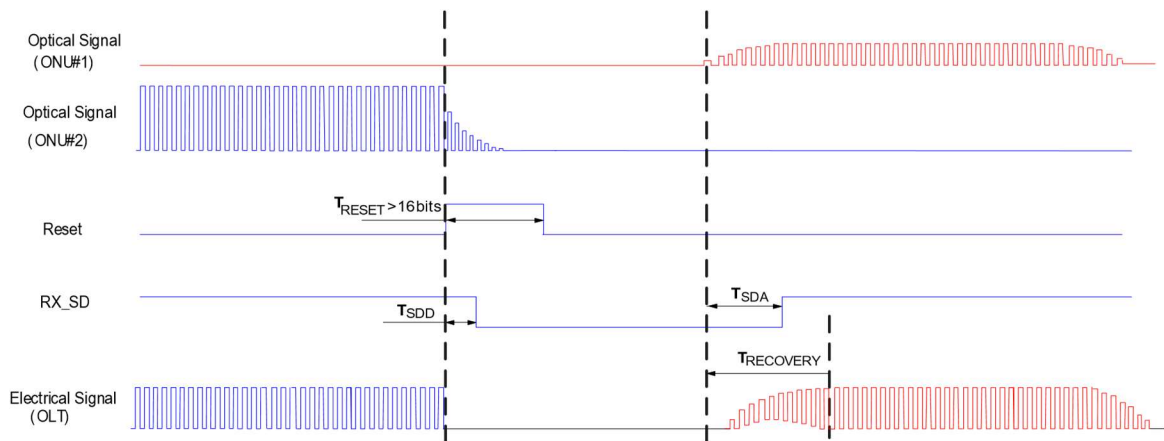
Reset/RateSel Set Function

Reset/RateSel	Voltage V	Function
High	1.9~3.3V	Reset
Middle	1.2~1.6V	Rate=2.488G
Low	0~0.9V	Rate=9.953G

Reset/RateSel Timing Diagram

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Setup Time	T _{Setup}	5			ns	
Reset Rise Time	T _{Rise}			3	ns	
Reset Fall Time	T _{Fall}			3	ns	
Reset New Burst Time	T _{Reset new burst}			0	ns	

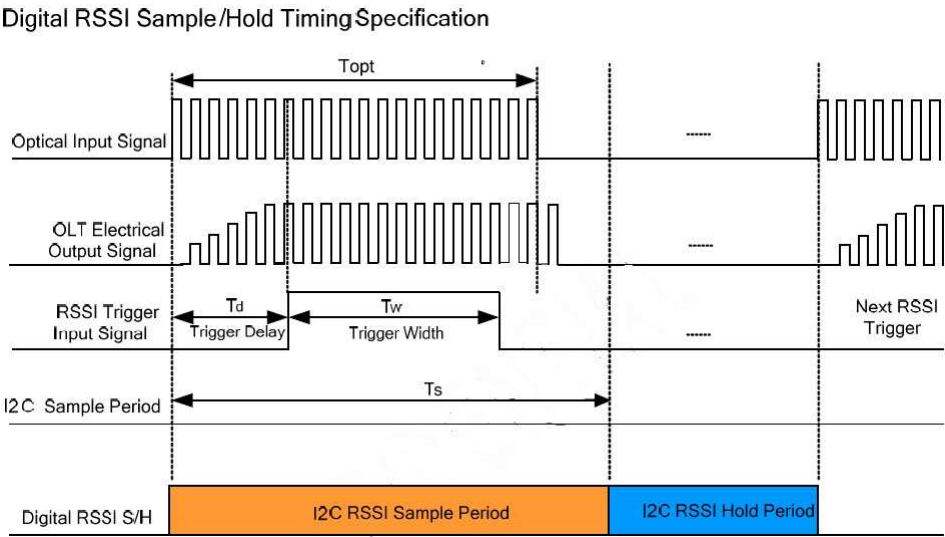
Timing Parameter Definitions in GPON Burst Mode Sequence (Fig 5)



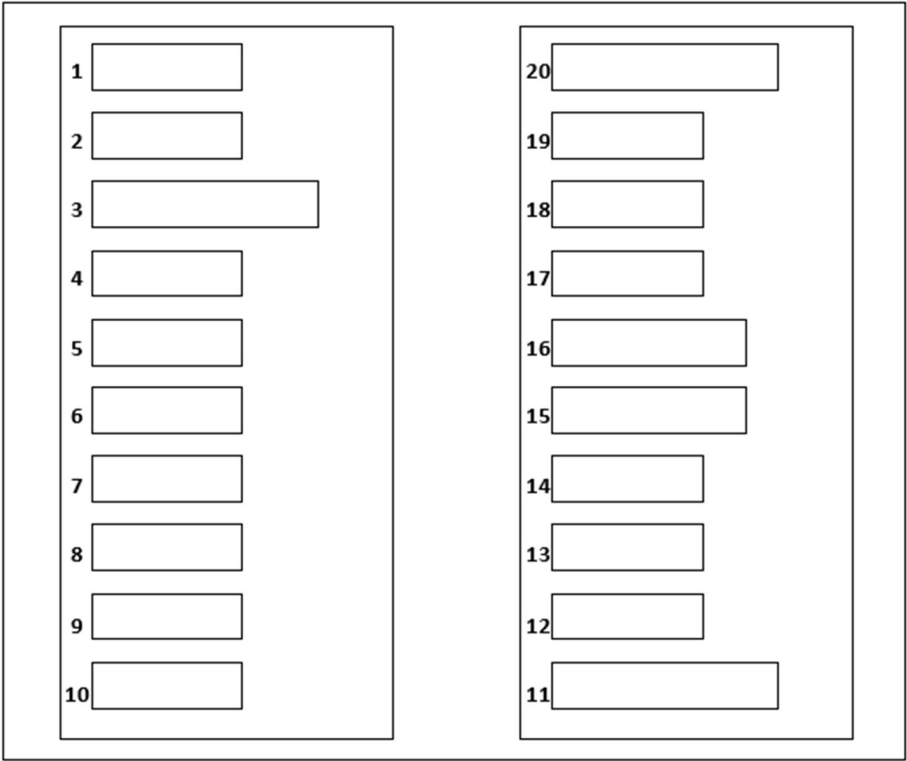
RSSI Timing Sequence

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Signal Duration time	T _{opt}	1200			ns	
RSSI Trigger width	T _w	550			ns	
RSSI Trigger Delay	T _D	150			ns	
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		V _{cc}	V	
I ² C Access Prohibited Time	T _s	500			μs	
I ² C Bus Frequency		0	100	200	KHz	
I ² C - High		2.4		3.6	V	
I ² C - Low		0		0.4	V	

Timing Parameter Definitions in RSSI Trigger (Fig 6)



Pin Out Definition

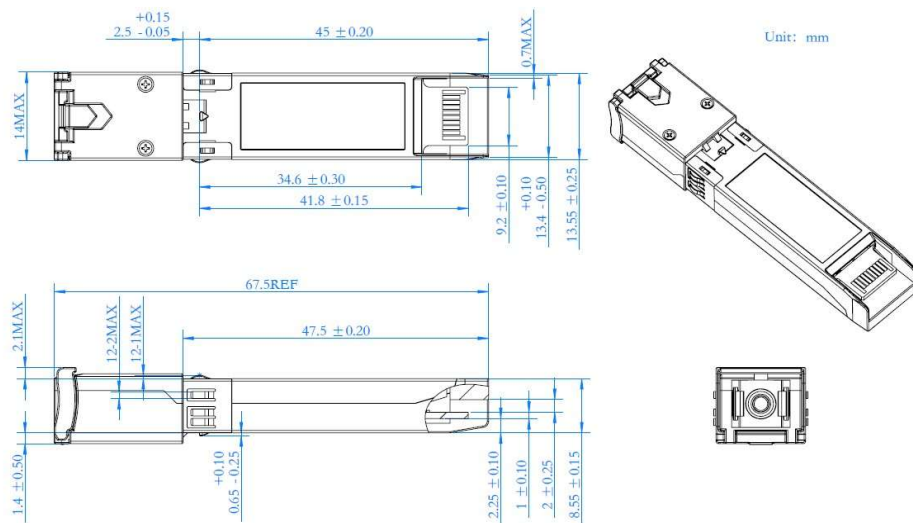


Electrical Pin Definition

PIN #	Symbol	Description	Remarks
1	GPON_TD+	2.5G Transmit Data In	AC coupled, CML input
2	GPON_TD-	Inv. 2.5G Transmit Data In	AC coupled, CML input
3	GND	Module Ground	
4	SDA	2-Wire Serial Interface Data	The data line of two wire serial interface
5	SCL	2-Wire Serial Interface Clock	The clock line of two wire serial interface
6	GPON_RD-	Inv. Received 1G Data Out	DC coupled, LVPECL output ^[1]
7	Reset& Rate Select	XGSPON Reset & Rate Select	High: Reset, Middle:2.5G, Low:10G ^[2]
8	XGSPON SD	XGSPON SD Indicator	LOW: lost signal
9	Trig/Tx_Dis	Receiver RSSI trigger input /Transmitter Disable	The Mode can be switched ^[3]
10	GPON_RD+	Received 1G Data Out	DC coupled, LVPECL output ^[1]
11	GND	Module Ground	
12	XGSPON_RD-	Inv. Received 10G Data Out	DC coupled, CML output ^[5]
13	XGSPON_RD+	Received 10G Data Out	DC coupled, CML output ^[5]
14	GPON SD	GPON SD Indicator	
15	VCCR	3.3V DC Power Input	
16	VCCT	3.3V DC Power Input	
17	GPON RESET	GPON RESET	
18	XGSPON_TD+	differential 10G Transmit Data In	AC coupled, CML input
19	XGSPON_TD-	Inv. differential 10G Transmit Data In	AC coupled, CML input
20	GND	Module Ground	

1. This contact shall be pulled down with LVPECL output in the host;
2. High voltage is greater than 1.9V, intermediate voltage is 1.2V ~ 1.6V, low voltage is lower than 0.9V;
3. A2 RSSI/TXDIS SELECTION

Mechanical Diagram





Revision History

Date	Rev	Description
07/15/2024	1.0	Release version
01/24/2025	1.1	New branding guidelines

For more information

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