
XGSPON OLT NI C-temp VP-STN152CS-AA

Product Overview

The VP-STN152CS-AA is a high-performance, hot-pluggable SFP+ transceiver module designed for XGSPON OLT (Optical Line Termination) equipment operating under the NI power class. This module facilitates single-fiber bi-directional data links with a 9.953Gbps downstream transmission rate and a burst-mode upstream reception capability of 9.953Gbps or 2.488Gbps. Featuring a SC receptacle connector, the transceiver utilizes a high-power 1577nm EML laser diode for transmission and a high-sensitivity 1270nm APD for reception, enabling a transmission distance of up to 20km over single-mode fiber.

Features

- Single fiber bi-directional data links TX 9.953Gbps, Burst Mode RX 9.953Gbps/2.488Gbps 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 sensitivity 1270nm APD
- Support 20km transmission distance with SMF
- SD indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS6 compliance

Applications

- SFP+ XGS-PON OLT NI

Standards

- Complies with SFP+ MSA
- Complies with SFF-8472
- 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-STN152CS-AA	XGSPON OLT NI C-temp

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Ambient Temperature	T_{STG}	-40		85	°C	
Operating Case Temperature	T_c	0		70	°C	
Operating Humidity	OH	5		95	%	
VCC3 Power Supply Voltage	VCC3	-0.5		3.6	V	

Recommended Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T_c	0		70	°C	
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Consumption	P			2.5	W	
TX Data Rate			9.953		Gbps	
RX Data Rate			9.953/2.488		Gbps	

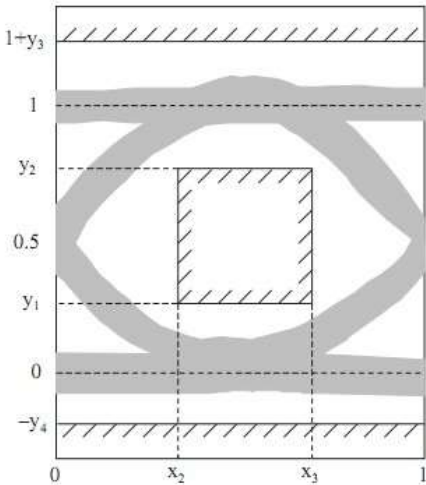
Optical – Transmitter

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	AOP	+2		+5	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS2 ³¹ -1 @9.953Gbps
Total Jitter	TJ			0.39	UI	PRBS2 ³¹ -1 @9.953Gbps
Optical Waveform Diagram	Compliant with ITU G.9807.1					Fig 1, Mask Margin>5%
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF

Electrical – Transmitter

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing			180		850	mV	
Input Differential Impedance			85	100	115	Ω	
TX Disable	Disable		2		VCC	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.4		VCC	V	
	Normal		0		0.4	V	

XGS PON OLT Transmitter Eyemask Definitions (Fig 1)



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

XGS-PON Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-26	dBm	PRBS2 ³¹ -1@9.953Gbps BER $\leq 1 \times 10^{-3}$
Saturation Optical Power	SAT	-5			dBm	PRBS2 ³¹ -1@9.953Gbps BER $\leq 1 \times 10^{-3}$
Max Input power		-3			dBm	
SD De-Assert Level		-45			dBm	
SD Assert Level				-27	dBm	
Signal Detected Hysteresis		0.5		6	dB	
CID		72			Bit	

XG-PON Optical – Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-27.5	dBm	PRBS2 ²³ -1@2.488Gbps BER $\leq 1 \times 10^{-4}$
Saturation Optical Power	SAT	-7			dBm	PRBS2 ²³ -1@2.488Gbps BER $\leq 1 \times 10^{-4}$
SD De-Assert Level		-45			dBm	
SD Assert Level				-29	dBm	
Signal Detected Hysteresis		0.5		6	dB	
CID		72			Bit	

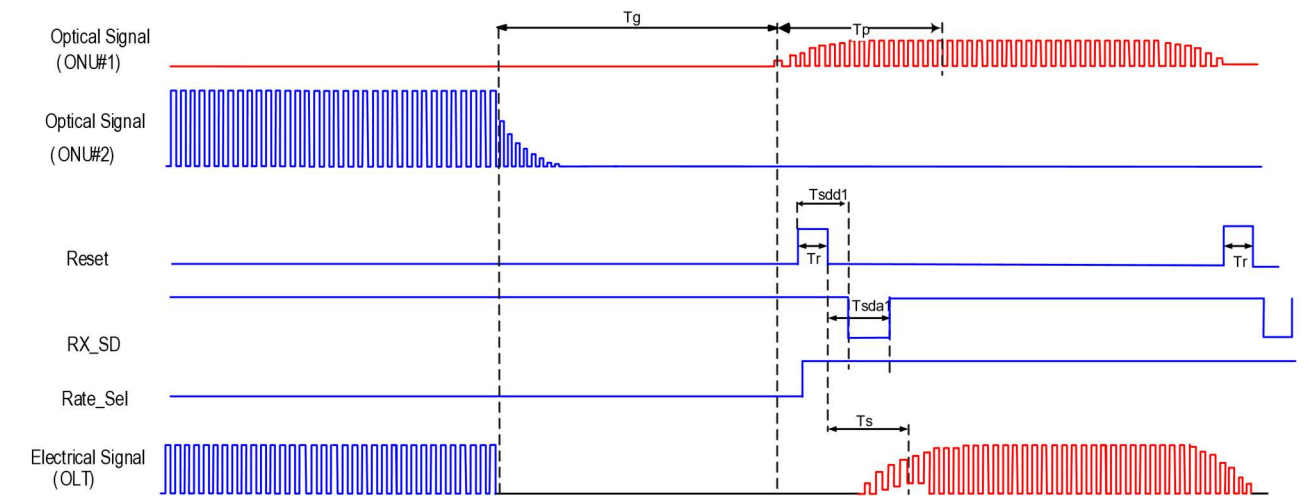
RECOMMENDED XGS/XGPON Receiver Timing Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
Data Output Differential Swing		340		850	mV	CML output, DC coupled
Reset-Low		0		0.8	V	
Reset-High		2.0		Vcc	V	
SD Voltage-Low		0		0.4	V	
SD Voltage-High		2.4		Vcc	V	
Reset Width	Tr		25.6		ns	Suggest the first Reset location is partial in preamble of the optical packet.
Data Recovery Time	Ts		50	100	ns	
SD De-Assert Time	TSDD			50	ns	
SD Assert Time	TSDA			50	ns	
Guard time	Tg		50		ns	

- Vendor recommends providing the second Reset signal at the end of the optical packet

Timing Parameter Definitions in Burst Mode Sequence (Fig 2)

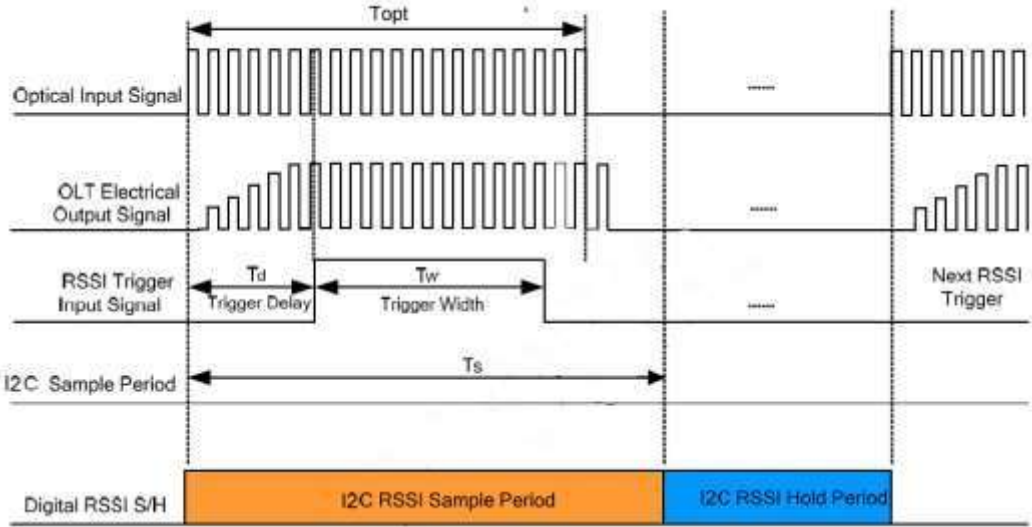
TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE



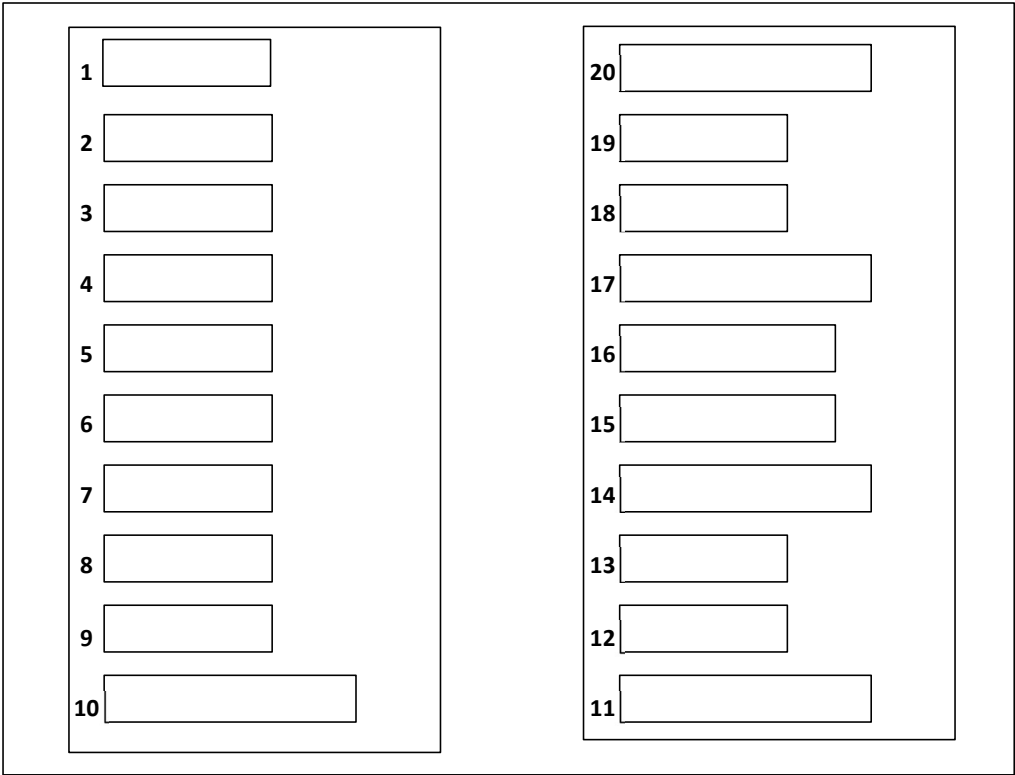
Timing Parameter Definitions in RSSI Trigger (Fig 3)

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Signal During Time	T_{opt}	1200			ns	
RSSI Trigger width	T_w	500			ns	
RSSI Trigger Delay	T_d	150			ns	
I ² C Access Prohibited Time	T_s			500	μs	

Digital RSSI Sample/Hold Timing Specification



Pin Out Definition



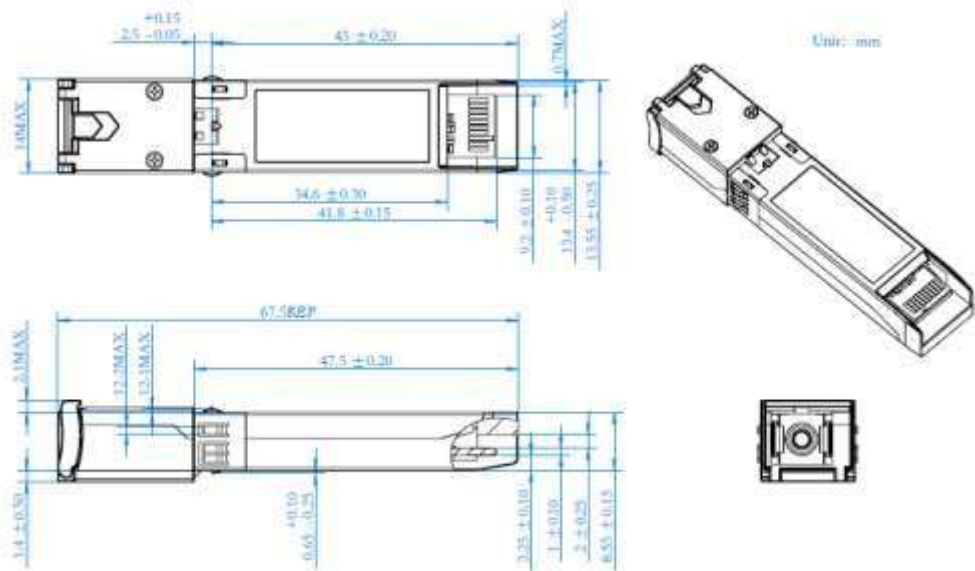
Electrical Pin Definition

PIN #	Symbol	Description	Remarks
1	Rate_Select	Rate select	Low:2.488Gbps, High:9.953Gbps
2	TX_Fault	TX fault out	
3	TX_Disable	TX disable in	
4	SDA	I2C Data in/out	
5	SCL	I2C Clock in	
6	MOD_ABS	Module absent	
7	RX_Reset	Reset	Active High
8	RX_SD	Signal detect out	
9	RSSI_Trigger	RSSI trigger in	
10	GND	GND.	
11	GND	GND.	
12	XGS_RD-	XGSPON data out, CML	CML output, DC coupled; squelch function
13	XGS_RD+	XGSPON data out, CML	CML output, DC coupled; squelch function
14	GND	GND.	



15	VCCR	Module power	
16	VCCT	Module power	
17	GND	GND.	
18	XGS_TD+	XGSPON data in, CML	
19	XGS_TD-	XGSPON data in, CML	
20	GND	GND.	

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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