GPON OLT D C-temp
VP-XTD043CS-AA

Product Overview

The VP-XTD043CS-AA is a Small Form Factor Pluggable transceiver designed for GPON OLT equipment operating under the D power class. It supports single-fiber bi-directional data links with an asymmetric application, providing a 2488Mbps continuous-mode downstream transmission at 1490nm using a DFB laser and a 1244Mbps burst-mode upstream reception at 1310nm using an APD-TIA receiver. Featuring an SC/UPC connector, this module incorporates a reset burst-mode receiver design supporting a dynamic range exceeding 15dB.

Features

- Single fiber bi-directional data links asymmetric TX 2488Mbps / RX1244Mbps application
- 1490nm continuous-mode DFB laser transmitter and 1310nm burst-mode APD-TIA receiver
- Small Form Factor Pluggable package with SC/UPC Connector
- Reset burst-mode receiver design support more than 15dB dynamic range
- 0 to 70°C operating case temperature
- Single 3.3V power supply
- Digital diagnostic monitoring interface
- Digital burst RSSI function to monitor the input optical power level
- LVPECL compatible data input/output interface
- LVTTL transmitter disable control
- LVTTL transmitter laser fault alarm
- LVTTL receiver Signal Detect
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant, RoHS-6 compliance

Applications

- Gigabit-capable Passive Optical Networks (GPON) Class D 20Km

Standards

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with SFF-8472 Rev 9.5
- Complies with ITU-T G.984.2 Amendment 2
- Complies with FCC 47 CFR Part 15, Class D
- Complies with FDA 21 CFR 1040.10 and 1040.11

Ordering Information

Part Number	Description
VP-XTD043CS-AA	GPON OLT D C-temp

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Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Ambient Temperature	TSTG	-40		85	°C	
Operating Case Temperature	T_c	0		70	°C	
Storage Humidity	OHs	5		95	%	
Power Supply Voltage	VCC	0		3.6	V	
Receiver Damaged Threshold		+5			dBm	

Recommended Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current			350	500	mA	
Operating Case Temperature	T_c	0		70	°C	
Operating Humidity Range	OHo	5		85	%	
Nominal Data Rate			RX 1244.16 TX 2488.32		Mbit/s	

Optical - Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical Center Wavelength	λC	1480		1500	nm	
Optical Spectrum Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP	+6		+10	dBm	EOL, 0~70°C
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS 2^{23}-1+72CID @2.488Gbit/s
Tolerance to Transmitter Incident Light		-15			dB	
Transmitter Reflectance				-10	dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Optical Waveform Diagram	ITU-T G.984.2					Figure 1, margin>5%

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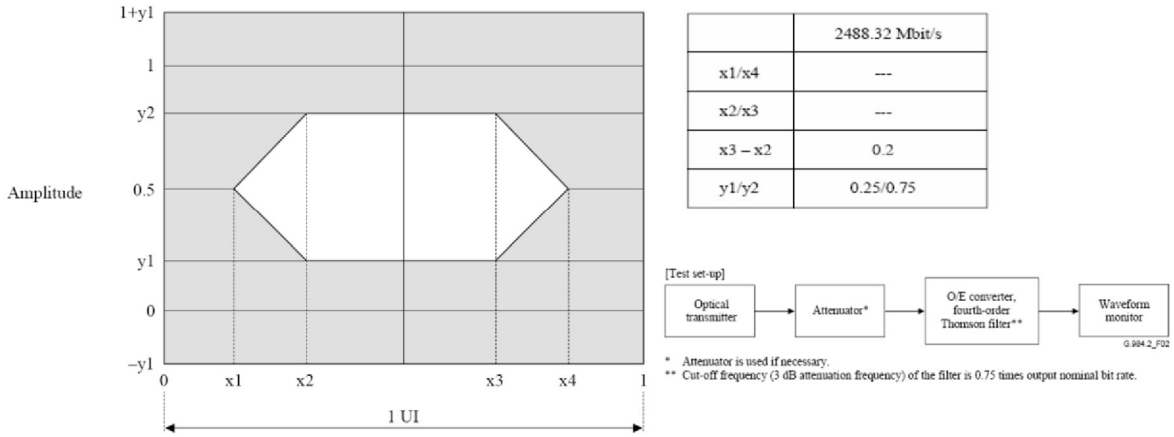
Electrical - Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Input Differential Swing		600		1600	mV	LVPECL input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Transmitter Disable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		V_{CC}	V	
Transmitter Fault Alarm Voltage - Low		0		0.4	V	
Transmitter Fault Alarm Voltage – High		2.4		Vcc	V	

Transmitter Eyemask Definitions and Test Procedures (Fig 1)



	2488.32 Mbit/s
x1/x4	---
x2/x3	---
x3 – x2	0.2
y1/y2	0.25/0.75

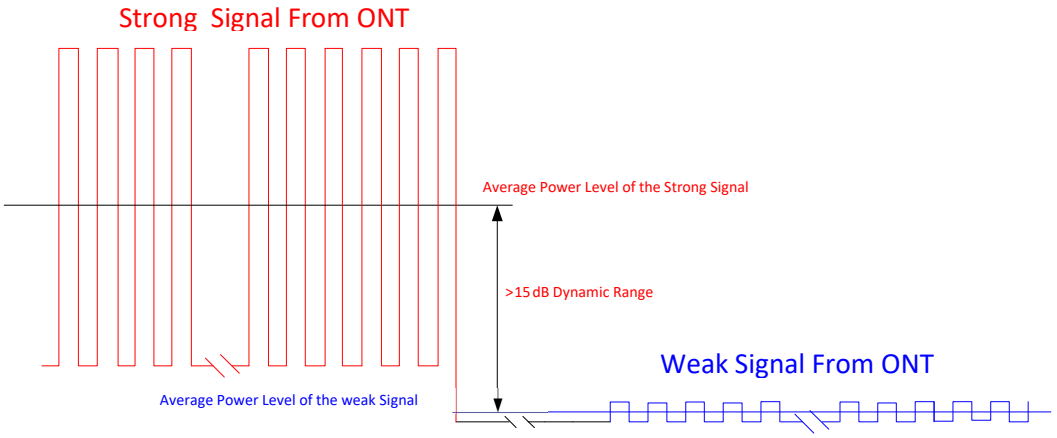
[Test set-up]

Optical transmitter → Attenuator* → O/E converter, fourth-order Thomson filter** → Waveform monitor

G.984.2_F02

* Attenuator is used if necessary.
** Cut-off frequency (3 dB attenuation frequency) of the filter is 0.75 times output nominal bit rate.

Burst Mode Receiver Dynamic Range in GPON System (Fig 2)



Receiver Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Wavelength		1290		1330	nm	
Sensitivity (BOL, Normal Temperature)	SEN			-31	dBm	PRBS 2^{23}-1@1.244Gbps BER ≤1×10^{-10}, ER≥10dB Figure 2
Sensitivity (EOL, 0~70°C)	SEN			-30		
Saturation Optical Power	SAT	-12			dBm	
Dynamic Range		15			dB	
Loss Of Signal De-assert Level				-33	dBm	
Loss Of Signal Assert Level		-45			dBm	
Loss Of Signal Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

Electrical - Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Data Output Voltage – Low		Vcc -1.81		Vcc -1.62	V	
Data Output Voltage – High		Vcc -1.02		Vcc -0.88	V	
Data Output Differential Swing		400		1600	mV	LVPECL output, DC coupled
Reset width	T_{RESET}	16			bits	
Reset-Low		0		0.4	V	
Reset-High		2.4		Vcc	V	
Receiver Amplitude Recovery Time	$T_{RECOVERY}$			32	bits	Refer to the Reset signal falling
Signal Detect Assert Time				50	ns	
Signal Detect De-assert Time				12.8	ns	Refer to the Reset signal rising
Signal Detect Voltage-Low		0		0.4	V	
Signal Detect Voltage-High		2.4		Vcc	V	
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
Optical Signal During Time	Tont	1200			ns	
RSSI Trigger width	T_W	500			ns	
RSSI Trigger Delay	T_D	150		3000	ns	
I^2C Access Prohibited Time				500	µs	

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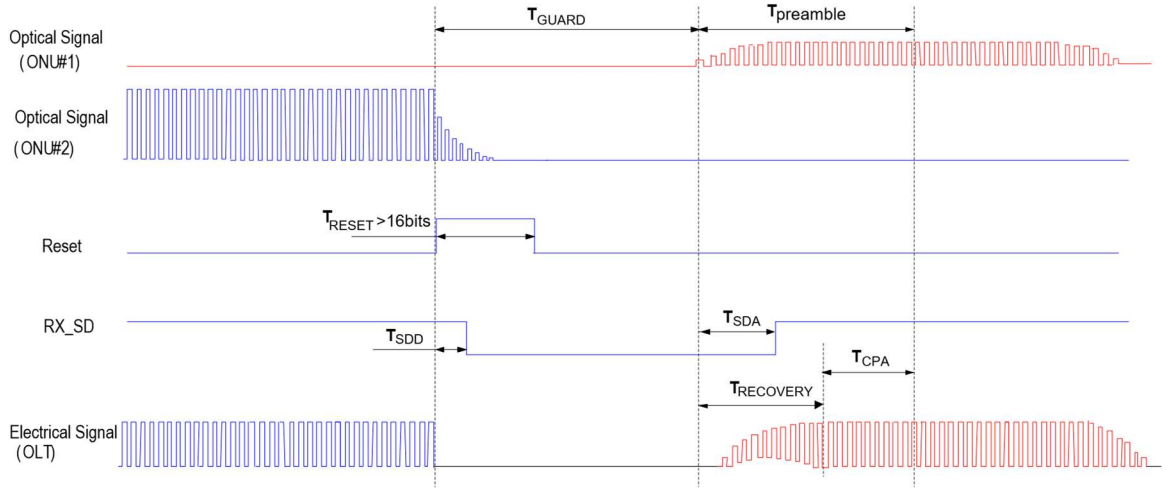
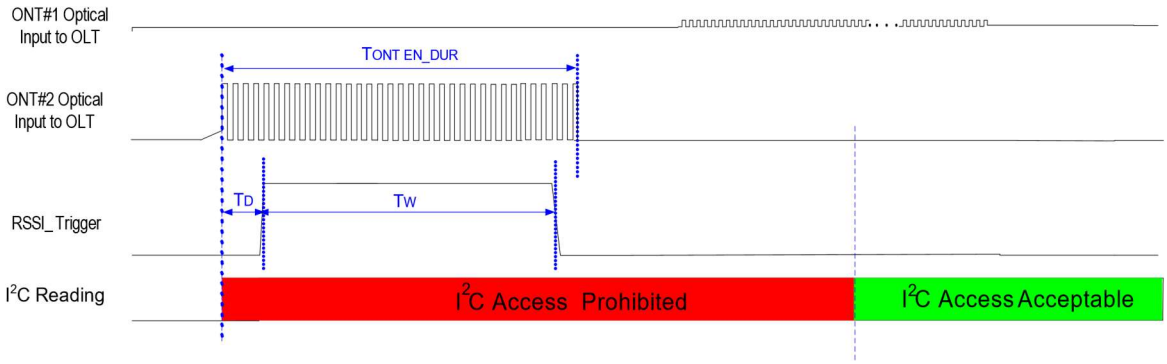
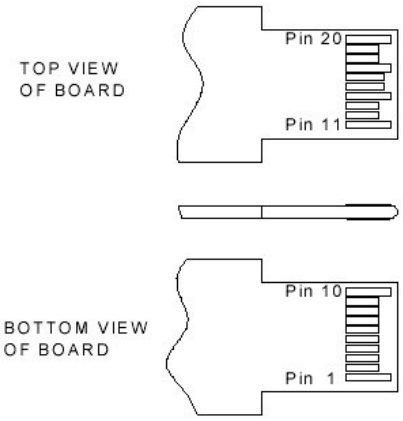
Timing Parameter Definitions In Burst Mode Sequence (Fig 3)



RSSI Timing Sequence (Fig 4)



Pin Out Definition



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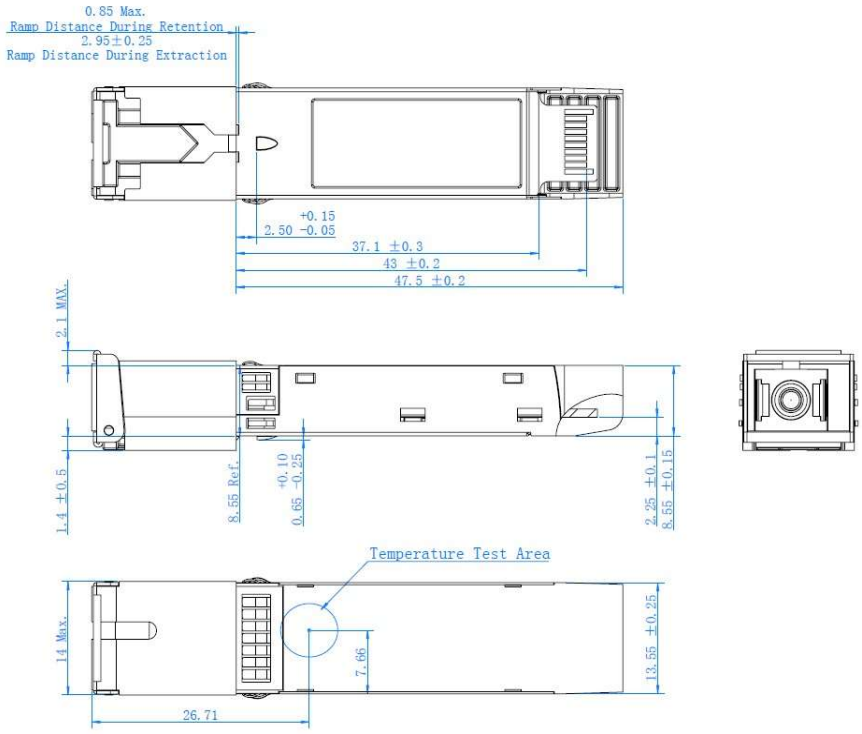
Electrical Pin Definition

PIN #	Symbol	Description	Remarks
1	$V_{EE}T$	Transmitter Ground	
2	TX Fault	Transmitter Fault Indication	High: abnormal; Low: normal
3	TX Disable	Transmitter Disable	High: transmitter disable; Low: transmitter enable
4	MOD-DEF2	Module Definition 2	The data line of two wire serial interface
5	MOD-DEF1	Module Definition 1	The clock line of two wire serial interface
6	MOD-DEF0	Module Definition 0	Connected to Ground in the transceiver
7	Reset	Receiver Reset	High: reset the receiver
8	SD	Signal Detect	High: signal detected; Low: loss of signal;
9	RSSI Trigger	RSSI Trigger for Transceiver A/D Conversion	High: enable RSSI A/D conversion
10	$V_{EE}R$	Receiver Ground	
11	$V_{EE}R$	Receiver Ground	
12	RD-	Inv. Receiver Data Out	LVPECL logic output, DC coupled
13	RD+	Receiver Data Out	LVPECL logic output, DC coupled
14	$V_{EE}R$	Received Ground	
15	$V_{CC}R$	Receiver Power	
16	$V_{CC}T$	Transmitter Power	
17	$V_{EE}T$	Transmitter Ground	
18	TD+	Transmit Data In	LVPECL logic input, AC coupled
19	TD-	Inv. Transmit Data In	LVPECL logic input, AC coupled
20	$V_{EE}T$	Transmitter Ground	

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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