

GPON-OLT-C++I

GPON OLT Class C++ industrial SFP Transceiver

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
- -40 to 85°C operating 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
- LVTTTL transmitter disable control
- LVTTTL transmitter laser fault alarm
- LVTTTL 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 C++ 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 B
- Complies with FDA 21 CFR 1040.10 and 1040.11

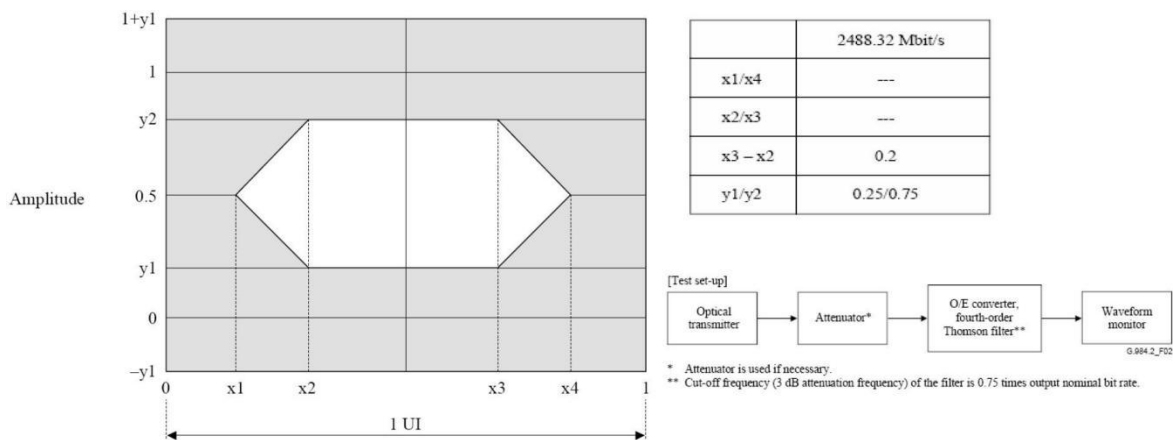
ABSOLUTE MAXIMUM RATING					
Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	T _{STG}	-40	85	°C	
Operating Case Temperature	T _c	-40	85	°C	
Storage Humidity	OHs	5	95	%	
Power Supply Voltage	V _{CC}	0	3.6	V	
Receiver Damaged Threshold		+5		dBm	

RECOMMENDED OPERATING CONDITION						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V	
Power Supply Current			350	500	mA	
Operating Case Temperature	T _c	-40		85	°C	
Operating Humidity Range	OHO	5		85	%	
Nominal Data Rate			RX 1244.16 TX 2488.32		Mbit/s	

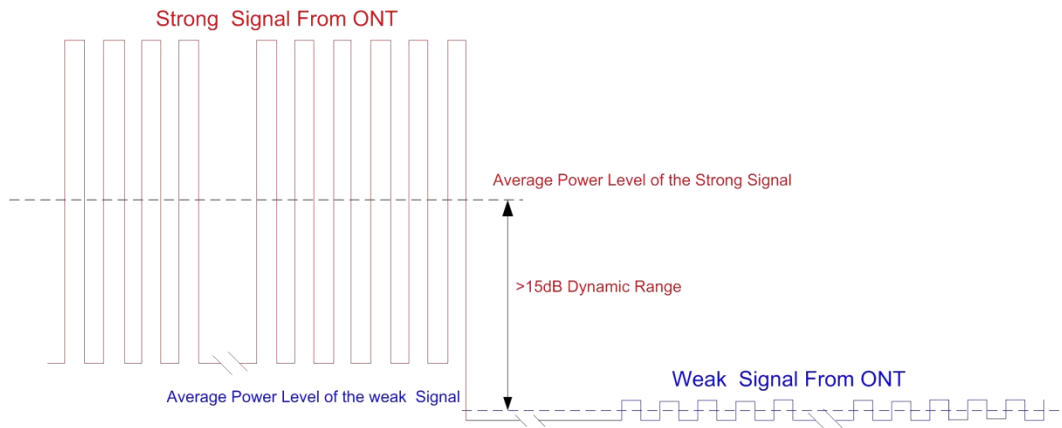
TRANSMITTER OPTICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	λ_c	1480		1500	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP	+5.5		+10	dBm	BOL, Room Temperature
		+4.5		+10	dBm	EOL, -40~85°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

TRANSMITTER ELECTRICAL CHARACTERISTICS

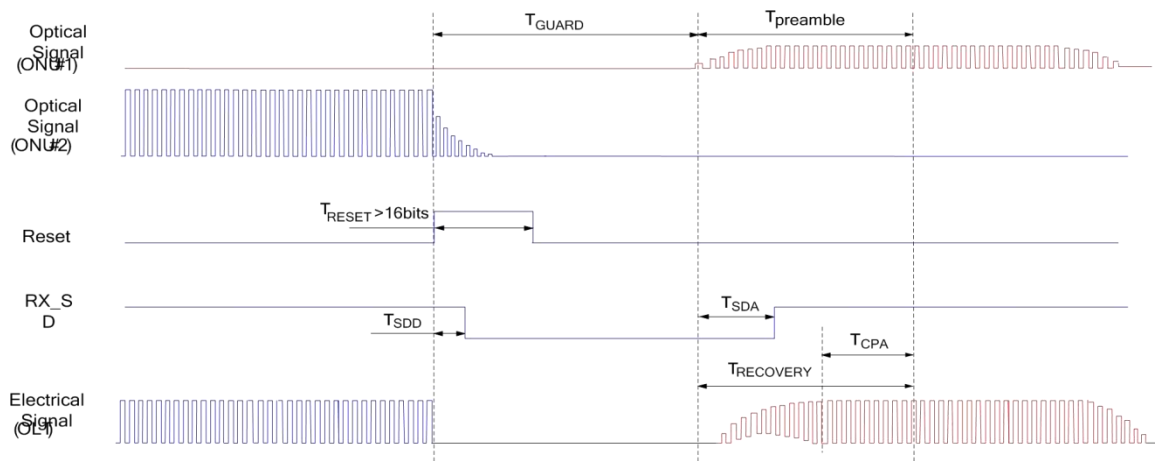
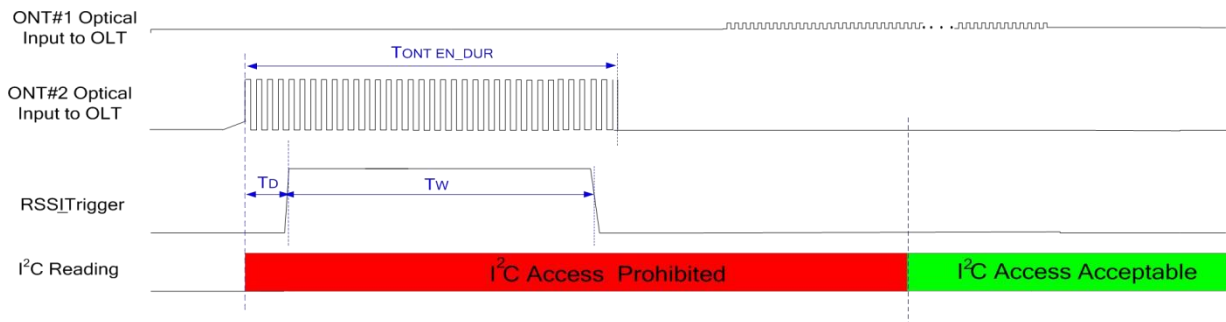
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		600		1600	mV	LVPECL input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Transmitter Disable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		V _{CC}	V	
Transmitter Fault Alarm Voltage - Low		0		0.4	V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

TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE

Figure 1 Transmitter Eye Mask Definitions and Test Procedure
RECEIVER OPTICAL CHARACTERISTICS

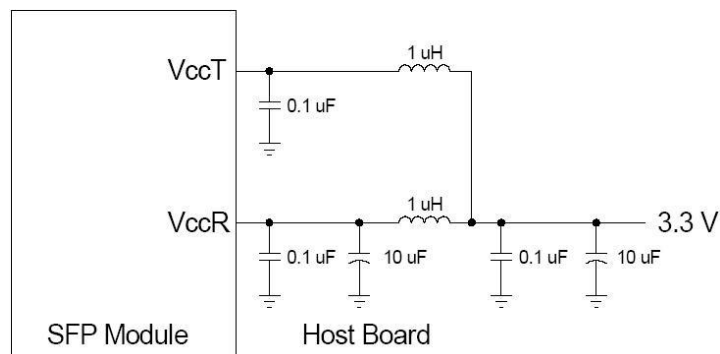
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1290		1330	nm	
Sensitivity (BOL, Normal Temperature)	SEN			-31	dBm	PRBS 2 ²³ -1+72CID@1.244Gbps BER ≤1×10 ⁻¹⁰
Sensitivity (EOL, -40~85°C)	SEN			-30	dBm	
Saturation Optical Power	SAT	-12			dBm	
Dynamic Range		15			dB	Figure 2
Loss Of Signal De-assert Level				-33	dBm	
Loss Of Signal Assert Level		-45			dBm	
Loss Of Signal Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

BURST MODE RECEIVER DYNAMIC RANGE IN GPON SYSTEM

Figure 2 Burst Mode Receiver Dynamic Range in GPON System

RECEIVER ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Un	Notes
Data Output Voltage –Low (-Vcc)		-1.81		-1.62	V	
Data Output Voltage –High (-Vcc)		-1.02		-0.88	V	
Data Output Differential Swing		400		1600	mV	LVPECL output, DC coupled
Reset width	T _{RESET}	16			bit	
Reset-Low		0		0.4	V	
Reset-High		2.4		V _{cc}	V	
Receiver Amplitude Recovery	T _{RECOVERY}			32	bit	Refer to the Reset signal falling edge
Signal Detect Assert Time				50	ns	
Signal Detect De-assert Time				12.8	ns	Refer to the Reset signal rising edge
Signal Detect Voltage-Low		0		0.4	V	
Signal Detect Voltage-High		2.4		V _{cc}	V	
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		V _{cc}	V	
Optical Signal During Time	T _{ont}	300			ns	
RSSI Trigger width	T _w	300		T _{ont} -T _D	ns	
RSSI Trigger Delay	T _D	0		3000	ns	
I ² C Access Prohibited Time				500	μs	

TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE

Figure 3 Burst Receiver Timing Sequence
RSSI TIMING SEQUENCE

Figure 4 RSSI TIMING SEQUENCE

PIN DESCRIPTION			
PIN	Name	Description	Notes
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	

SFP RECOMMENDED HOST BOARD POWER SUPPLY FILTERING NETWORK

Figure 5 SFP Recommended Host Board Power Supply Filtering Network

SFP PIN (GOLDEN FINGER) DRAWING

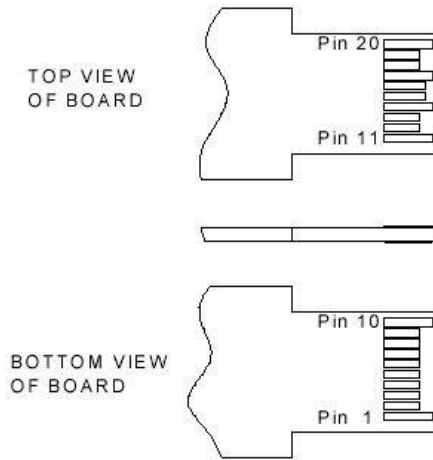


Figure 6 SFP Pin (Golden Finger) Drawing

TYPICAL INTERFACE CIRCUIT

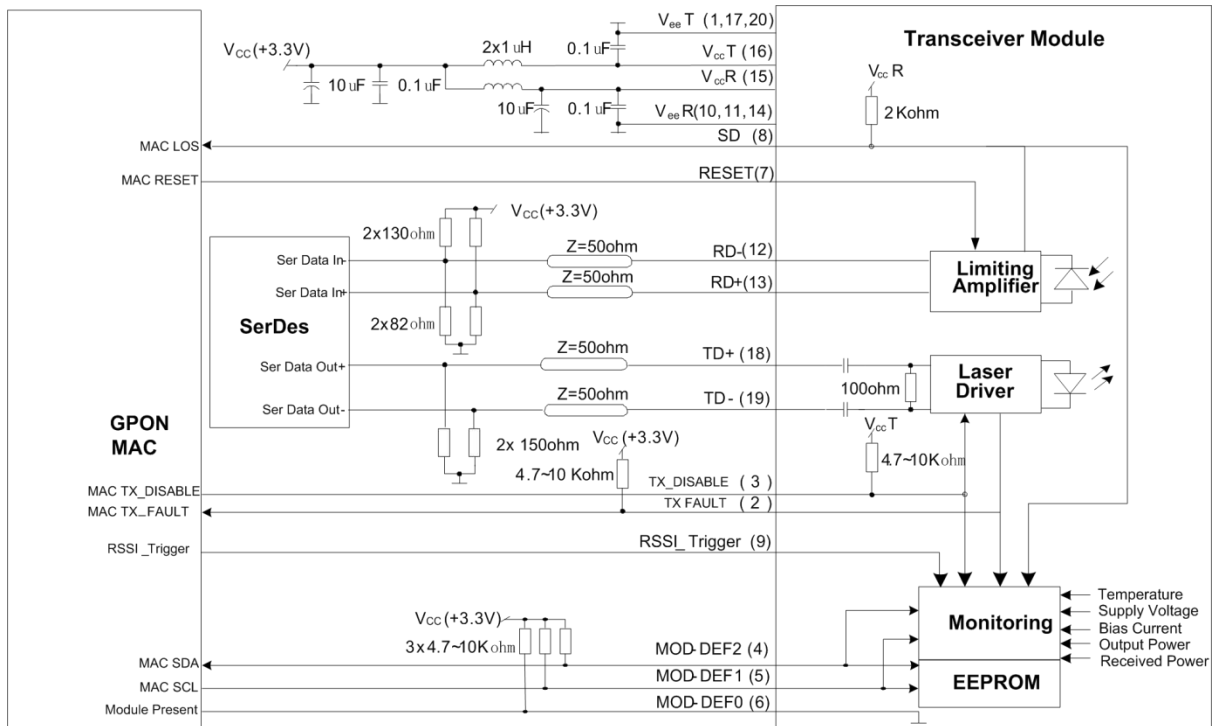


Figure 7 Typical Interface Circuit

PACKAGE OUTLINE

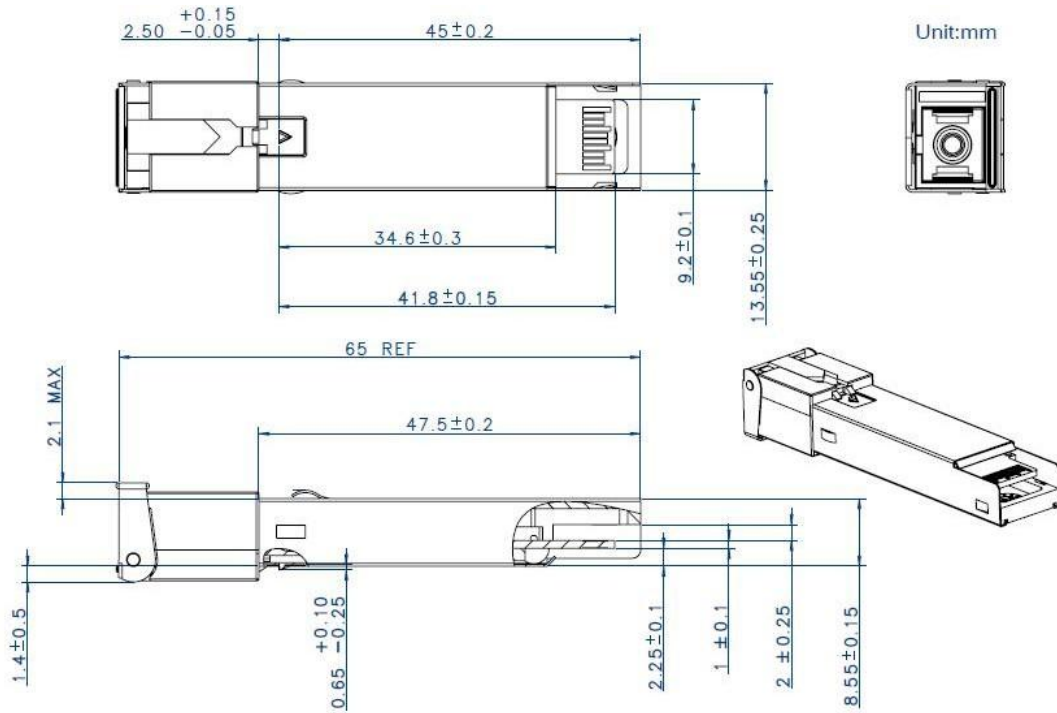


Figure 8 Package Outline

DIGITAL DIAGNOSTIC MONITORING INTERFACE				
Parameter	Range	Accuracy	Calibration	Notes
Temperature	-40 to 85°C	±3°C	Internal	1LSB = 1/256°C
Voltage	3.0 to 3.6V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to 100mA	±10%	Internal	1LSB = 2uA
TX Power	0 to 8dBm	±2dB	Internal	1LSB = 0.1uW
RX Power monitor	-30 to -10dBm	±2dB@25°C ±3dB@0~70°C	External	1LSB = 0.1uW

WARNINGS

- Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
- Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

LEGAL NOTES

- All information contained in this document is subject to change without notice, at Sate Optics's sole and absolute discretion. Sate Optics warrants performance of its products to current specifications only in accordance with the company's standard one-year warranty; however, specifications designated as "preliminary" are given to describe components only, and Sate Optics expressly disclaims any and all warranties for said products, including express, implied, and statutory warranties, warranties of merchantability, fitness for a particular purpose, and non-infringement of proprietary rights. Please refer to the company's Terms and Conditions of Sale for further warranty information.
- Sate Optics assumes no liability for applications assistance, customer product design, software performance, or infringement of patents, services, or intellectual property described herein. No license, either express or implied, is granted under any patent right, copyright, or intellectual property right, and Sate Optics makes no representations or warranties that the product(s) described herein are free from patent, copyright, or intellectual property rights. Products described in this document are NOT intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. Sate Optics customers using or selling products for use in such applications do so at their own risk and agree to fully defend and indemnify Sate Optics for any damages resulting from such use or sale.
- THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED ON AN "AS IS" BASIS. Customer agrees that Sate Optics is not liable for any actual, consequential, exemplary, or other damages arising directly or indirectly from any use of the information contained in this document. Customer must contact Sate Optics to obtain the latest version of this publication to verify, before placing any order, that the information contained herein is current.
- Copyright © 2017 Sate Co., Ltd All rights reserved.