GPON OLT SFP Class C+

1. Feature:

- SFP package with SC/UPC Connector
- 1490nm DFB laser transmitter and 1310nm burst-mode APD-TIA receiver
- Single fiber bi-directional, downstream 2488Mbps/upstream1244Mbps application
- 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 SFF-8472 compliant
- Digital burst RSSI function to monitor the input optical power level
- LVPECL compatible data input/output interface
- LVTTL TX DISABLE control
- LVTTL TX FAULT signal
- LVTTL receiver Signal Detect (SD) indication
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance

2. Application

- Gigabit-capable Passive Optical Networks Class B+ (20Km 17~32dB attenuation range).

3.STANDARDS

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with ITU-T G.984.2 Amendment 1
- Complies with SFF-8472 Rev 9.5
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11

4. Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units	Notes
Storage Ambient Temperature	T_{STG}	-40	+85	°C	
Operating Case Temperature	Tc	0	70	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V_{CC}	0	4	V	
Receiver Damaged Threshold		+5		dBm	

5. RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Operating Case Temperature	Tc	0		70	°C	
Operating Humidity Range	OH	5		95	%	
Nominal Data Rate			RX 1244.16		Mbit/s	

6. TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Optical Center Wavelength	λc	1480		1500	nm	
Optical Spectrum Width (-20dB)	Δ λ	0		1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP	+4.0		+7.0	dBm	BOL, Room Temperature
		+3.0		+7.0	dBm	EOL, 0~70° C
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS 2 -1^{23}+72CID @2.488Gbit/s
Tolerance to Transmitter Incident Light		-15			dB	
Transmitter Reflectance				-10	dB	
Transmitter and Dispersion Penalty	TDP			1	dB	20km

7.TRANSMITTER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Data Input Differential Swing		200		1600	mV	LVPECL input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Power Supply Current				220	mA	Load free
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	

8.RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Operating Wavelength		1260		1360	nm	
Sensitivity	SEN			-31	dBm	PRBS 2 -1^{23}+72CID@1244Mbps
Saturation Optical Power	SAT	-8			dBm	
Dynamic Range		15			dB	
Signal Detect Assert Level				-31	dBm	
Signal Detect De-Assert Level		-45			dBm	
Signal Detect Hysteresis		0.5		6	dB	
Receiver Reflectance				-12	dB	

9.RECEIVER ELECTRIAL CHARACTERISTICS

Parameter	Symbol	Min	Typ.	Max	Units	Notes
Power Supply Current				350	mA	Load free
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	TRESET	20		24	bits	
Reset-Low		0		0.4	V	
Reset-High		2.4		V_{CC}	V	
Receiver Amplitude Recovery Time	TRECOVERY	48			bits	Refer to the Reset signal falling edge
Signal Detect Assert Time			10	20	ns	
Signal Detect De-assert Time			10	20	ns	Refer to the Reset signal falling 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		2.8		V_{CC}	V	
RSSI Trigger width	T_W	350			ns	
RSSI Trigger Delay		27			ns	refer to first bit of the preamble
Optical Signal During Time		375			ns	TONT EN_DUR≥T_O + T_W For RSSI Measurement
I2C Access Prohibited Time		100		500	μs	
RX Power Monitor Range		-30		-8	dBm	Note 1

Note 1: RSSI result is provided by access to EEPROM A2H 104~105Byte the unit is 0.1uW. Please refer to the SFF-8472 V11.0 for the detail information.

10.TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE

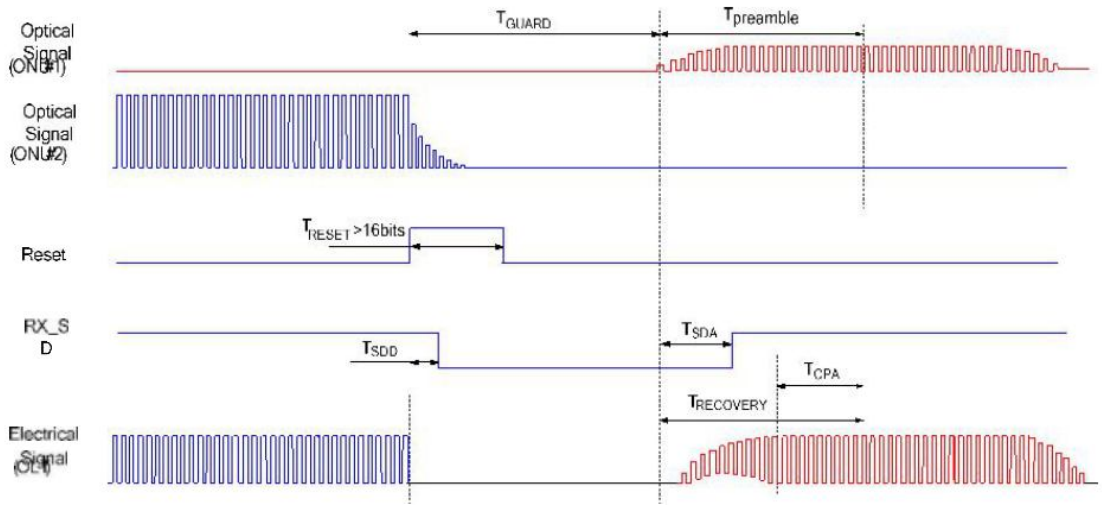

Figure 1 Burst Receiver Timing Sequence

11.RSSI TIMING SEQUENCE

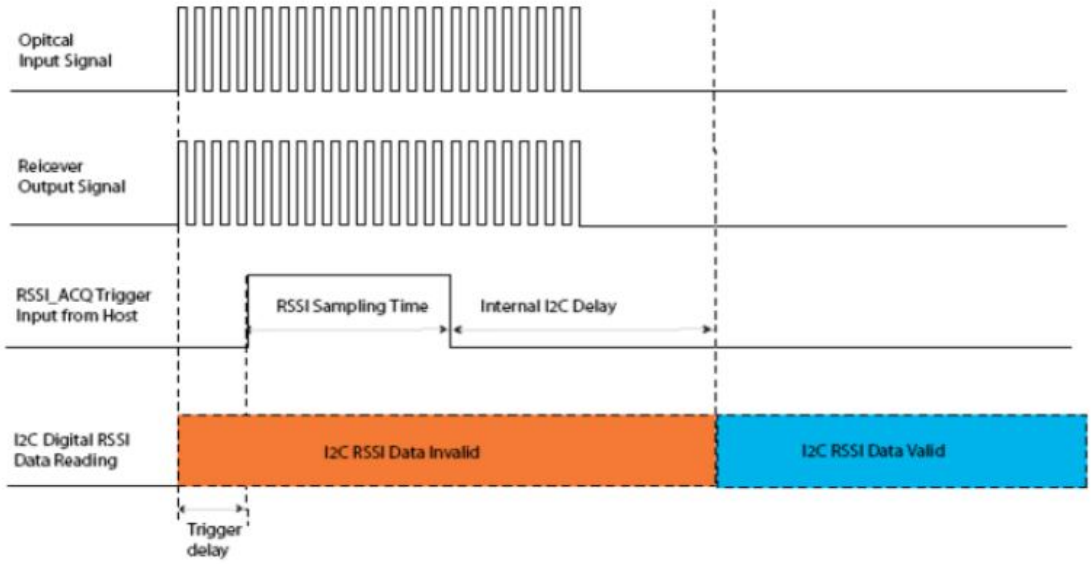

Figure 2 RSSI TIMING SEQUENCE

12.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	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	

13.SFP RECOMMENDED HOST BOARD POWER SUPPLY FILTERING NETWORK

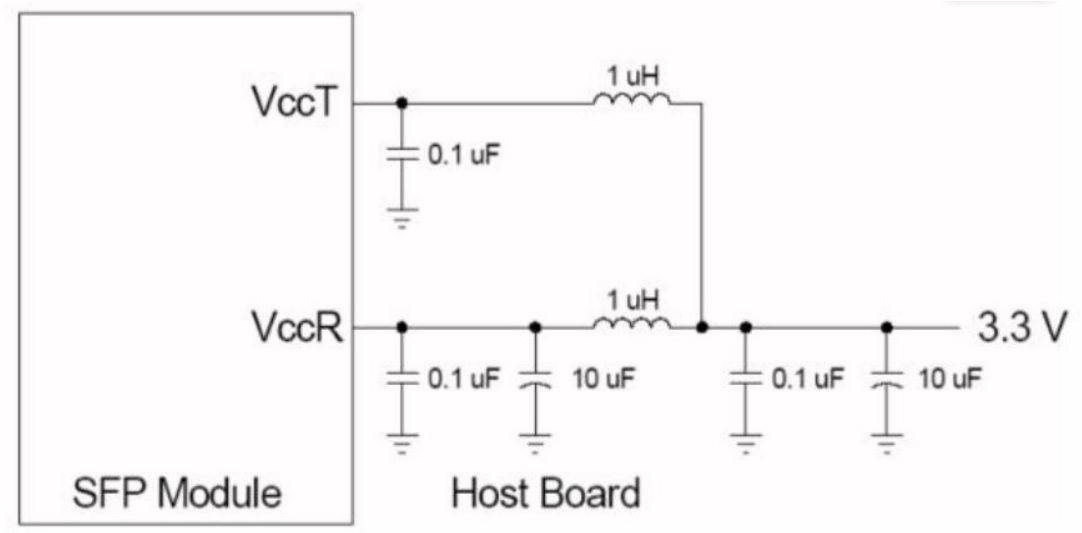

Figure 3 SFP Recommended Host Board Power Supply Filtering Network

14.TYPICAL INTERFACE CIRCUIT

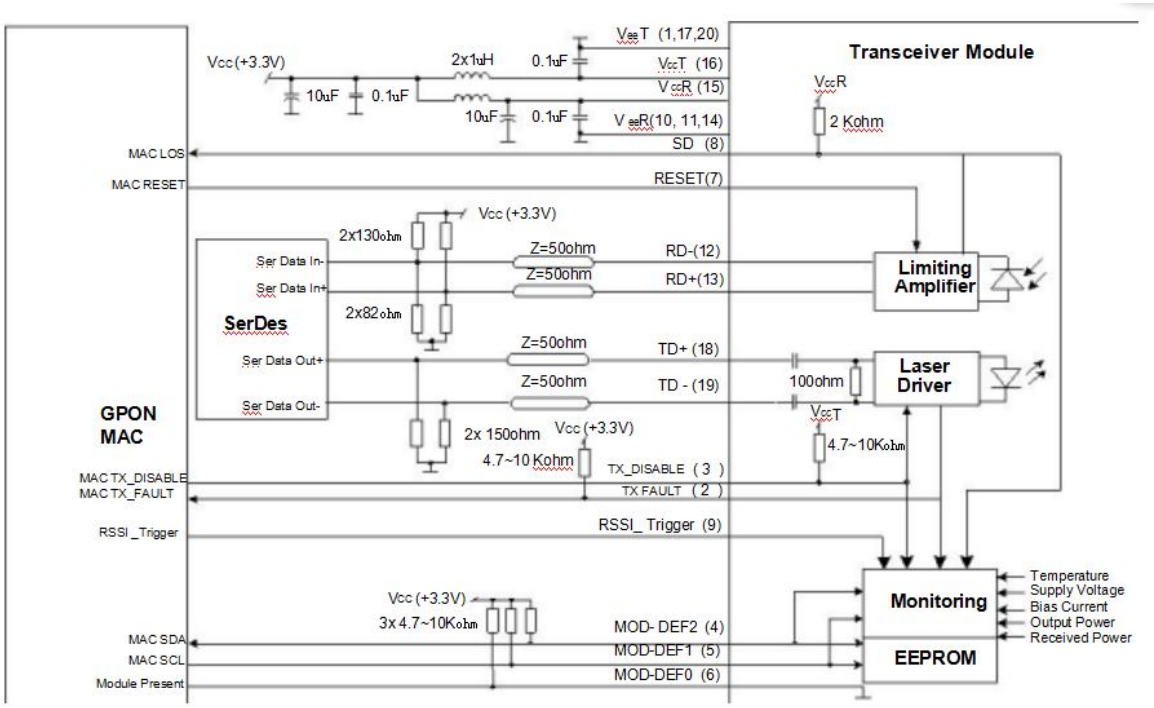

Figure 4 Typical Interface Circuit

15.PACKAGE OUTLINE

Unit:mm

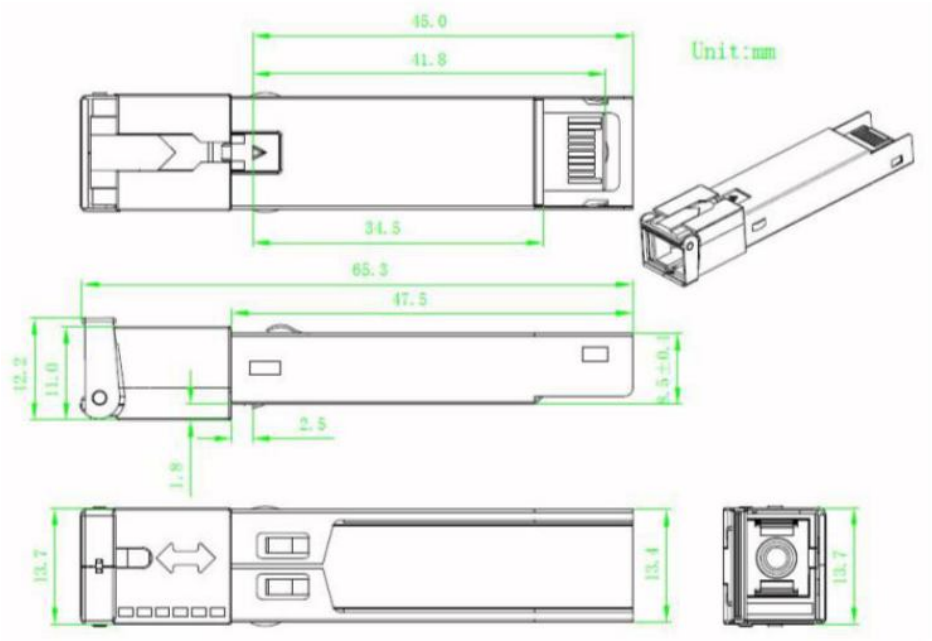

Figure 5 Package Outline

16.EEPROM INFORMATION

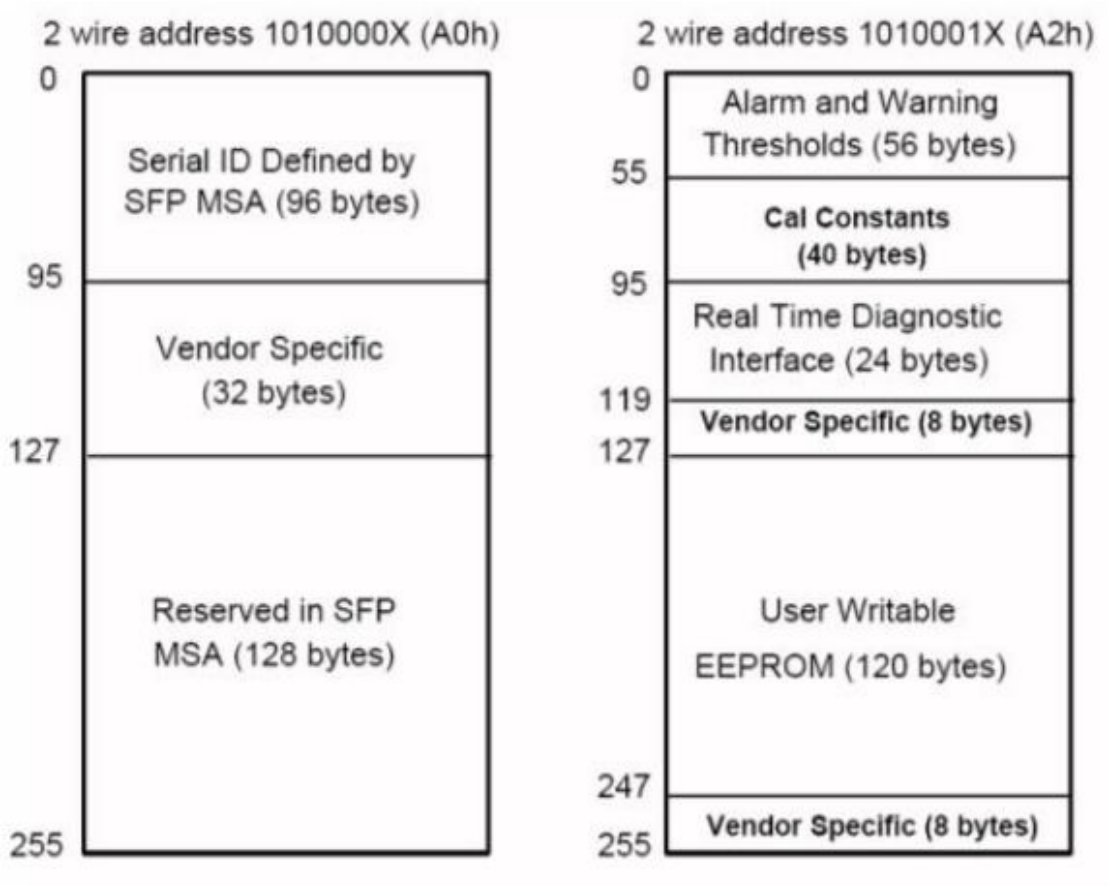

Figure 6 EEPROM Memory Map Specific Data Field Descriptions

17.DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	Note
Temperature	0 to 70° C	±3° C	Internal	1LSB = 1/256° C
Voltage	3.0 to 3.7V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to 100mA	±10%	Internal	1LSB = 2uA
TX Power	3.0 to 7.0dBm	±2dB	Internal	1LSB = 0.1uW
RX Power Monitor	-30 to -10dBm	±3dB	External	1LSB = 0.1uW

Note : The digital diagnostic monitoring interface defines 256-byte memory map in EEPROM, which makes use of the 8 bit address 1010001X(A2h). Please refer to the SFF-8472 Rev 11.0 for the detail information.