GPON OLT Stick

Product Specification

Version: 1.0

This document details the specifications required for optical transceiver modules designed for use in GPON applications. With 1490nm DML laser and single channel GPON OLT MAC, this OLT Stick module brings extra benefits and value to our customers, such as high optical power, low cost, no system management required, zero-touch provisioning and lexible deployment solutions.

STICKOPTICS

Shenzhen Stick Optics Co., Ltd.

Contact

Production information

STK2PGPON320LT

2.5G GPON STICK SFP+ OLT; 20KM;GPON SFP+ OLT;Including a 2.448G 1490nm Burst mode Tx and a 1.244G 1310nm APD-Rx ; I-Temp;

Features

- Single fiber bi-directional asymmetric data links

  1490nm continuous-mode 2488Mbps transmitter with DML laser

  1310nm burst-mode 1244Mb ps APD-TIA receiver

  GPON OLT application with GPON MAC function
- Small Form Factor Pluggable package with SC/UPC Connector
- Maximum link length of 20km on SMF
- SFP with GPON OLT MAC inside, “Plug-and-play” via auto-discovery and configuration
- Single 3.3V power supply
- Digital diagnostic monitor interface compatible with SFF-8472
- SFP MSA compliance
- Compatible with 1G, 2.5G and 10G switches
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance

Applications

- Gigabit Passive Optical Networks (GPON) – OLT side

Standards

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with ITU-T G.984.2
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No.50, dated June 24, 2007
- Complies with SFF-8472
- Compatible with TR-NWT-000870 4.1 ESD sensitivity classification Class2.
- Compatible with Telcord ia GR-468-CORE

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Ambient Temperature	T_{STG}	-40	85	℃
Storage Humidity	HS	5	90	%
Operating Humidity	HO	5	85	%
Power Supply Voltage	V_{CC}	0	3.6	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	T_C	-20	-	75	℃
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Supply Current	I_{CC}	-	-	1	A
Power Consumption	P_O	-	-	3.5	W

Electrical Characteristics

Parameter	Symbol	Min	Max	Unit	Notes
Transmitter differential input voltage	-	-	1200	mV	-
Receiver differential output Voltage	-	360	1300	mV	-
LVTTL output Voltage	V_{oh}	2.4	V_{CC}	V	TX Fault
	V_{ol}	0	0.4	V	RX LOS
LVTTL input Voltage	V_{ih}	2	V_{CC}+0.3	V	TX Disable
	V_{il}	0	0.8	V	

Optical Characteristics

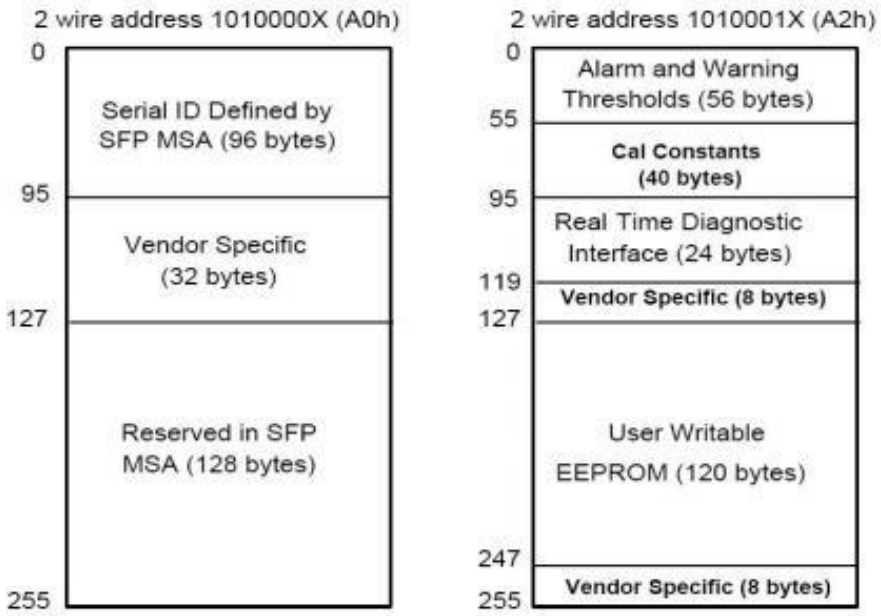
Parameter	Symbol	Min	Typ	Max	Unit	Note
Optical transmitter Characteristics						
Launched Power (avg.)	P_{OUT}	3	-	7	dBm	-
Operating Wavelength Range	λ_C	1480	1490	1500	nm	-
Spectral Width (-20dB)	$\Delta\lambda$	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Extinction Ratio	ER	8.2	-	-	dB	PRBS 2^23-1 @2.488Gbit/s
Transmitter and Dispersion Penalty	TDP	-	-	1	dB	Transmit on 20km SMF
Optical Output Power after TX Disable	P_{DIS}	-	-	-39	dBm	-
Output Eye Diagram	Compliant with ITU-T G.984.2					
Transmitter Reflectance	-	-	-	-10	dB	-
Optical Receiver Characteristics						
Wavelength Range	λ_C	1290	1310	1330	nm	-
Receiver Sensitivity	P_{SEN}	-	-	-32	dBm	PRBS 2^23-1+72CID @ 1.244 Gbit/s, BER<10^-10 transmitter is operating
Optical Power Input Overload	SAT	-12	-	-	dBm	
Dynamic Range	-	15	-	-	dB	-
Receiver Reflectance	-	-	-	-20	dB	-

Digital Diagnostic Monitoring Information

Parameter	Accuracy	Calibration	Note
Voltage	±3%	Internal	
Bias Current	±10%	Internal	
TX Power	±3dB	Internal	

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 for the detail information.

Digital Diagnostic Memory Map



EEPROM Serial ID Memory Contents

The optical transceiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data fields define as following.

EEPROM Serial ID Memory Contents(2-Wire Address A0h)

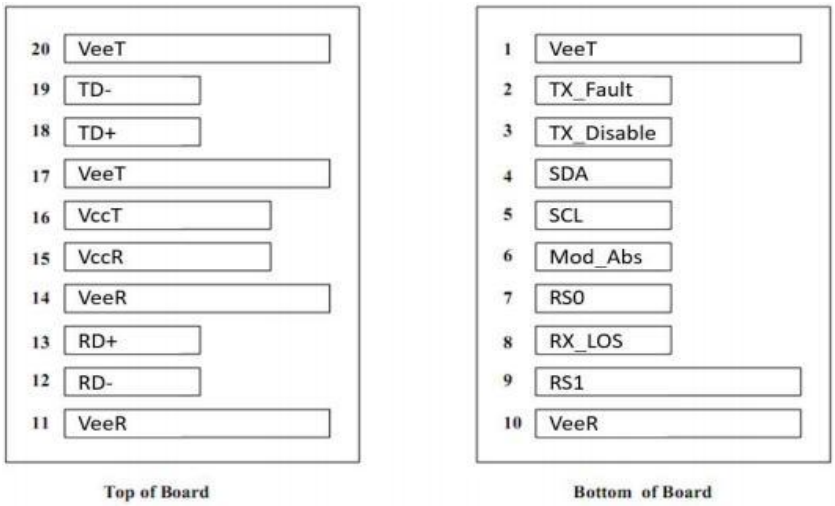
Address	Name of field	Hex	Description
BASE ID Fields			
00	Identifier	03	SFP transceiver
01	Ext. Identifier	04	Serial ID module supported for SFP
02	Connector	01	SC
03-05	Transceiver Codes	00 00 00	Not defined
06	Transceiver Codes	00	Not defined
07-10	Transceiver Codes	00 00 00	Not defined
11	Encoding	03	Encoding codes
12	BR, Nominal	19	2500MBps
13	Rate Identifier	00	Not defined
14	Length(9um)-km	14	20km
15	Length(9um)-m	C8	20000m
16	Length(50um)	00	Transceiver transmit distance
17	Length(62.5um)	00	
18	Length(cable)	00	Not support cable
19	Length(OM3)	00	Not support OM3
20-35	Vendor Name	4D 45 4E 54 45 43 48 4F 50 54 4F 20 20 20 20 20	“ MENTECHOPTO”(ASCII character)
36	Reserved	00	Not defined
37-39	Vendor OUI	00 00 00	Not defined
40-55	Vendor P/N	4D 53 4C 47 32 30 2D 44 36 45 2D 53 43 54 31 20	“ MSLG20-D6E-SCT1”(ASCIIcharacter)
56-59	Vendor P/N Rev.	41 30 20 20	“A0”(ASCII character)
60-61	Laser Wavelength	05 D2	1490nm
62	Reserved	00	Not defined
63	CC_BASE	xx	Check sum of bytes 0-62
Extended ID Fields			
64-65	Options	10 1C	TX_Disable,TX_Fault and RX_SD are implemented
66	BR ， max	00	Not specified
67	BR ， min	00	Not specified
68-83	Vendor SN	xx xx	Vendor Serial Number in ASCII character
84-91	Date Code	Data Code	Vendor Date Code in ASCII character

92	Diagnostic Monitoring Type	68	Digital Diagnostic monitoring implemented “ Internal calibrated ” is implemented
93	Enhanced options	E0	Optional Alarm/warning flags, soft Tx_Disable control and monitoring, soft Tx_Fault monitoring are implemented
94	SFF-8472 compliant	08	SFF-8472 compliant with revision 12.0
95	CC-EXT	xx	Check sum of bytes 64-94
Vendor Specific ID Field			
96-127	Vendor Specific	00	Vendor specific EEPROM
128-255	Reserved	00	Reserved for future use

Digital Diagnostic Monitoring Interface (2-Wire Address A2h)

Address	#Bytes	Name	Real Value	Unit
00-01	2	Temp High Alarm	85	°C
02-03	2	Temp Low Alarm	-30	°C
04-05	2	Temp High Warning	75	°C
06-07	2	Temp Low Warning	-20	°C
08-09	2	Voltage High Alarm	3.6	V
10-11	2	Voltage Low Alarm	3.0	V
12-13	2	Voltage High Warning	3.5	V
14-15	2	Voltage Low Warning	3.1	V
16-17	2	Bias High Alarm	90	mA
18-19	2	Bias Low Alarm	1	mA
20-21	2	Bias High Warning	70	mA
22-23	2	Bias Low Warning	2	mA
24-25	2	TX Power High Alarm	8	dBm
26-27	2	TX Power Low Alarm	2	dBm
28-29	2	TX Power High Warning	7	dBm
30-31	2	TX Power Low Warning	3	dBm
32-55	16	Reserved	Reserved	
110	1	Optional Status/Control	Bit 6: Soft TX Disable (R/W) , “ 1” = Disabled. Default is “0” .	

Pin Description



As Viewed Through Top of Board

Pin	Name	Function/Description	Engage-ment	Order
1	VeeT	Transmitter Ground	1	
2	TX_Fault	Transmitter Fault Indication	3	1
3	TX_Disable	Transmitter Disable-Module disables on high or open	3	2
4	SDA	Module Definition 2, SDA Serial Data Signal	3	3
5	SCL	Module Definition 1, SCL Serial Clock Signal	3	3
6	Mod_Abs	Connected to the ground internal	3	3
7	RS0	Not Connected	3	
8	RX_LOS	Loss of Signal	3	4
9	RS1	Not Connected	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inverse Received Data out	3	5
13	RD+	Received Data out	3	5
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power 3.3V±5%	2	6
16	VccT	Transmitter Power 3.3V±5%	2	6
17	VeeT	Transmitter Ground	1	
18	TD+	Transmitter Data In	3	7
19	TD-	Inverse Transmitter Data In	3	7
20	VeeT	Transmitter Ground	1	

Note1. TX Fault is open collector/drain output which should be pulled up externally with a 4.7K to 10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V.

Note2. TX Disable input is used to shut down the laser output per the state table below.
Low (0 – 0.8V): Transmitter on;
Between (0.8V and 2V): Undefined;
High(2.0 – VccT): Transmitter Disabled;
Open: Transmitter Disabled.

Note3. These are the module definition pins. They should be pulled up with a 4.7 to 10K Resistor on the host board to supply less than VccT+0.3V or VccR+0.3V.
Mod_Abs is grounded by the module to indicate that the module is present.

SCL is clock line of two wire serial interface for optional serial ID.
SDA is data line of two wire serial interface for optional serial ID.

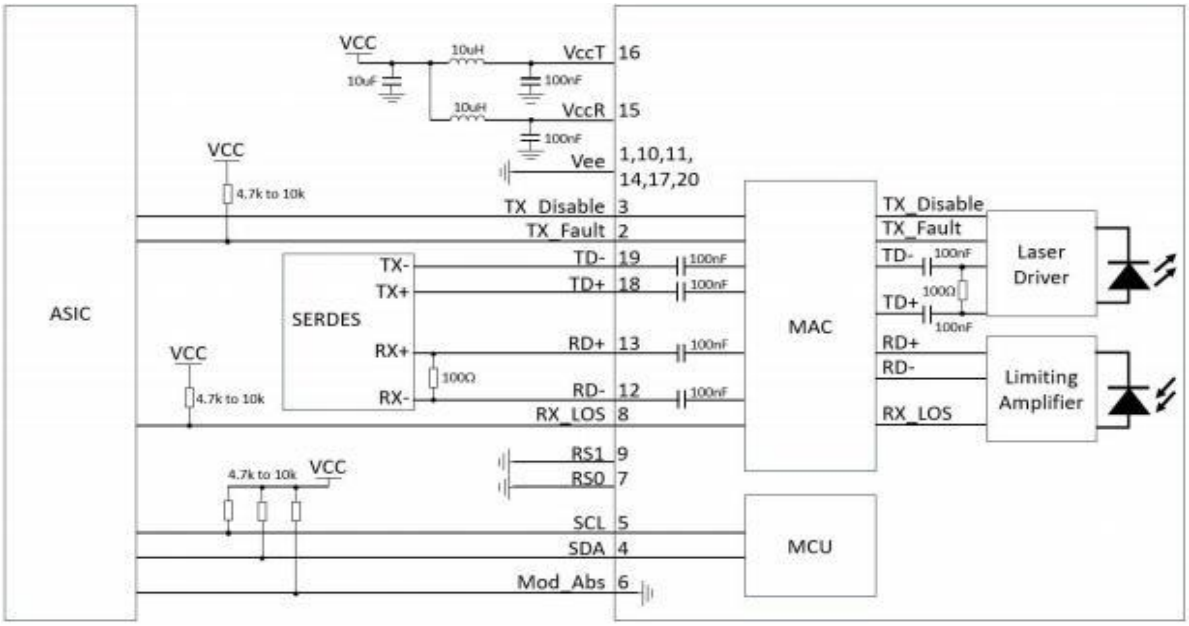
Note4. LOS (Loss of signal) is an open collector/drain output which should be pulled up externally with a 4.7K to 10KΩ resistor on the host board to supply <VccT+0.3V or VccR+0.3V.

Note5. RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.

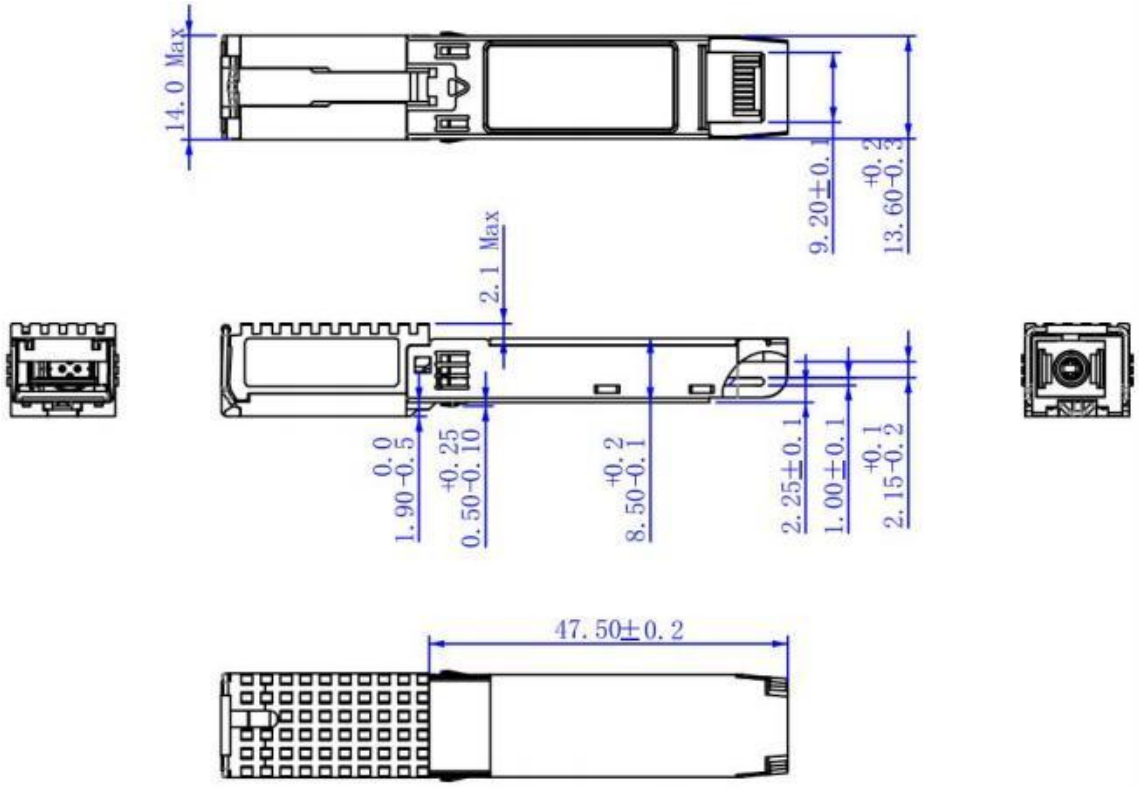
Note6. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V±5% at the SFP connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.

Note7. TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board

Typical application Circuit



Package Outline



About Stick Optics

Shenzhen Stick Optics specializes in high-speed PON Stick communication technology, offering professional PON Stick solutions. Built on a strong foundation in optical components and backed by robust R&D capabilities, the company delivers a full range of PON Stick products. As an emerging high-tech enterprise, Stick integrates chip-level R&D, manufacturing, and sales under one roof. Its products are defined by high speed, high reliability, and low power consumption.

The company's latest flagship offerings-XGS/XGPON OLT Stick, XGSPON ONU Stick, and XGS Combo Stick-have already captured the attention of multiple industry leaders with their exceptional performance.

STICKOPTICS

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