GPON ONU Stick

Product Specification

Version: 1.0

The STK2P5GPONONU series transceiver is a high performance module for single fiber communications using a 1310nm burst- mode transmitter and a 1490nm continuous-mode receiver. It is used in the optical network terminal (ONT) for GPON ONU Class B+ applications with Mac inside.

STICKOPTICS

Shenzhen Stick Optics Co., Ltd.

Contact

Production information

STK2P5GPONONU-I/C

2.5G GPON STICK SFP+ ONU; 20KM;GPON SFP+ ONU;Including a 1.244G 1310nm Burst mode Tx and a 2.488G 1490nm APD-Rx ; I-Temp or C-Temp;

The Transmitter is designed for single mode fiber and operates at a nominal wavelength of 1310nm. The transmitter module uses a DFB laser diode with full IEC825 and CDRH class 1 eye safety.

The receiver section uses a hermetic packaged APD-TIA (APD with trans-impedance amplifier) and a limiting amplifier. The APD converts optical power into electrical current and the current is transformed to voltage by the trans-impedance amplifier. The differential DATA and /DATA CML data signals are produced by the limiting amplifier.

An enhanced Digital Diagnostic Monitoring Interface has been incorporated into the transceivers. It allows real time access to the transceiver operating parameters such as transceiver temperature, laser bias current, burst mode transmitted optical power, received optical power and transceiver supply voltage by reading a built-in memory with I2C interface.

Features

- Single fiber bi-directional data links asymmetric TX 1244Mbps / RX 2488Mbps GPON ONU application with GPON MAC function
- SC/UPC or SC/APC receptacle SFP with GPON ONU MAC inside, “Plug-and-play” via auto-discovery and configuration
- 1310nm DFB burst mode transmitter, 1490nm APD-TIA continuous mode receiver for 20km transmission
- 0 to 70°C operating case temperature for **STK2P5GPONONU-C** , C-Temp
- -40 to 85°C operating case temperature for **STK2P5GPONONU-I** , I -Temp
- Single 3.3V power supply
- Digital diagnostic monitor interface compatible with SFF-8472
- SFP MSA compliance
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance

Applications

- Gigabit-capable Passive Optical Networks (GPON)
- **STK2P5GPONONU-I/C** is a MSA-compliant SFP that incorporates not just the optics for an ONU, but all of the electronics need as well. It is a “PON on a Stick” that an entire FTTH ONU in a slightly oversized SFP. It can be plugged into networking equipment. Allowing the data interfaces on a switch, router, PBX, etc. to be customized for different fiber environments and distance requirements
- The **STK2P5GPONONU-I/C** is designed as dual-mode ONU stick, it also supports the EPON ONU OAM. It can be applied both on EPON system and on the GPON system .It will automatically establish an EPON link with the EPON OLT or GPON link with the GPON OLT.

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maxim	Unit	Note
Storage Ambient Temperature	T_{STG}	-40	85	°C	-
Operating Case Temperature	T_C	0	70	°C	C-Temp
		-40	85	°C	I -Temp
Operating Humidity	OH	5	95	%	-
Power Supply Voltage	V_{CC}	0	3.63	V	-
Receiver Damaged Threshold	-	+4	-	dBm	-
Soldering Temperature	-	-	260/10	°C/S	-

Recommended Operating Conditions

Parameter	Symbol	Minimu	Typical	Maxim	Unit	Note
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	3.3V ± 5%
Power Dissipation	PD	-	2.00	2.48	W	-
Operating Case Temperature	Tc	0	-	70	° C	C-Temp
		-40	-	85	° C	I -Temp
Operating Humidity Range	OH	5	-	85	%	-
Data Rate upstream	-	-	1.244	-	Gbit/s	-
Data Rate downstream	-	-	2.488	-	Gbit/s	-
Data Rate Drift	-	-100		+100	PPM	-

Transmitter Optical and Electrical Characteristics

Parameter	Symb	Minimu	Typica	Maxim	Unit	Note
Optical Center Wavelength	λ_C	1290	-	1330	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Optical Spectrum Width	$\Delta\lambda$	-	-	1	nm	-
Average Launch Optical Power	P_O	+0.5	-	+5	dBm	1
Power-OFF Transmitter Optical Power	P_{off}	-	-	-45	dBm	
Extinction Ratio	ER	9	-		dB	2
Rise/Fall Time (20%-80%)	T_R/T_F	-	-	260	ps	2,3
Turn On Time at Burst mode	T_{on}	-	-	12.8	ns	-
Turn Off Time at Burst mode	T_{off}	-	-	12.8	ns	
RIN15OMA	-	-	-	-115	dB/Hz	-
Optical Return Loss Tolerance	-	-	-	15	dB	-
Transmitter Reflectance	-	-	-	-6	dB	-
Transmitter and Dispersion Penalty	TDP	-	-	2	dB	4
Optical Waveform Diagram	Compliant With ITU-T G.984.2					5
Data Input Differential Swing	-	300		1600	mV	6
Input Differential Impedance	-	90	100	110	Ω	-
Tx-Disable Voltage (Enable)	-	0		0.8	V	-
Tx-Disable Voltage (Disable)	-	2.0		VCC	V	-
Tx-Fault Output (Normal)	-	0		0.8	V	-
Tx-Fault Output (Fault)	-	2.0		VCC	V	-

Note 1: Launched into 9/125um Single Mode Fiber.

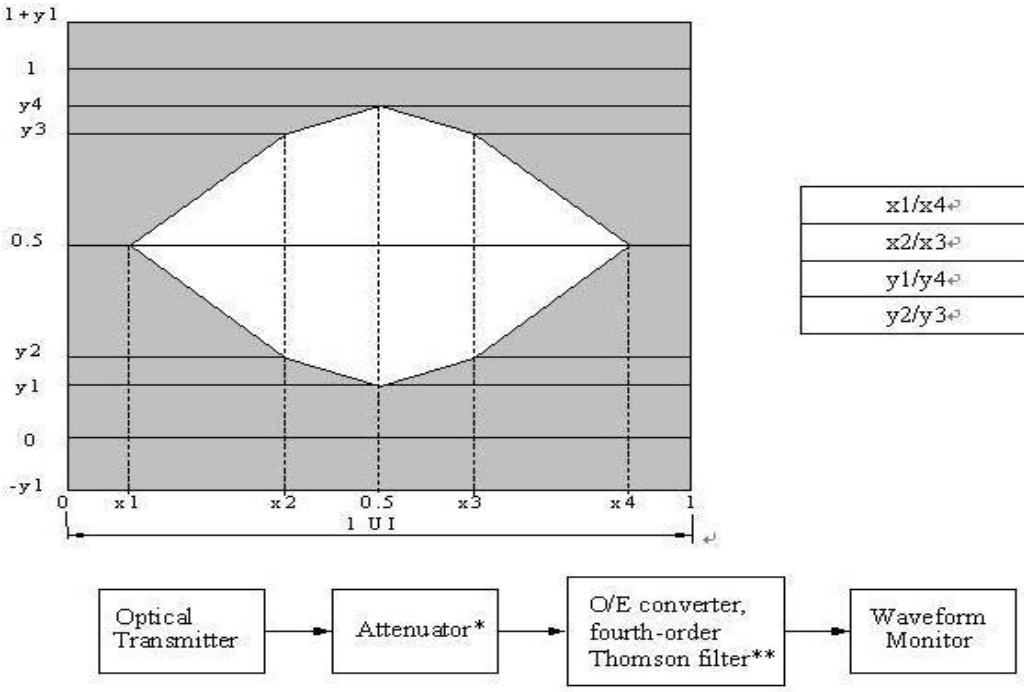
Note 2: Measured with PRBS 223-1 test pattern @1.244Gbit/s.

Note 3: Measured with the Bessel-Thompson filter OFF.

Note 4: Maximum sensitivity penalty due to transmitter and dispersion effect through 20km of SMF optical fiber.

Note 5: Transmitter eye mask definitions (Figure 1).

Note 6: Compatible with LVPECL input, DC coupled internally.



x1/x4	0.22/0.78
x2/x3	0.40/0.60
y1/y4	0.17/0.83
y2/y3	0.20/0.80

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

Figure 1 Transmitter Eye Mask Definitions

Receiver Optical and Electrical Characteristics

Parameter	Symbol	Minimu	Typical	Maxim	Unit	Notes
Operating Wavelength	-	1480	1490	1500	nm	-
Sensitivity	SEN	-	-	-28	dBm	1
Saturation Optical Power	SAT	-8	-	-	dBm	
LOS Deassert Level	-		-	-29	dBm	2
LOS Assert Level	-	-40	-	-	dBm	
LOS Hysteresis	-	0.5	-	5	dB	-
Receiver Reflectance	-		-	-20	dB	-
WDM Filter Isolation	-	38	-	-	dB	1550nm
		35	-	-	dB	1650nm
Data Output Differential Swing	-	300	-	1200	mV	3
LOS low voltage	-	0	-	0.8	V	-
LOS high voltage	-	2.0	-	VCC	V	

Note: T_{op} = -40 ~ 85°C, V_{CC} = 3.15~3.45 V

Note 1: Measured with a PRBS 223-1 test pattern @2.488Gbit/s and ER=9dB, BER =10-12

Note 2: A decrease in optical power above the specified level will cause Los output to switch from a low state to a high state; An increase in optical power below the specified level will cause Los output to switch from a high state to a low state.

Note 3: CML output, AC coupled internally, guaranteed in the full range of input optical power (-8dBm to -28dBm).

EEPROM Information

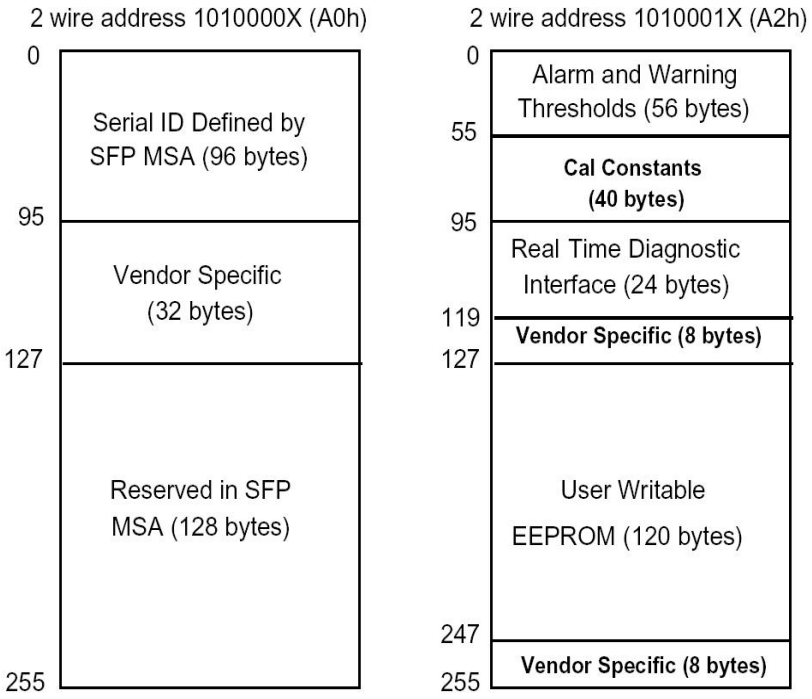


Figure 2 EEPROM Information

Mechanical Dimensions

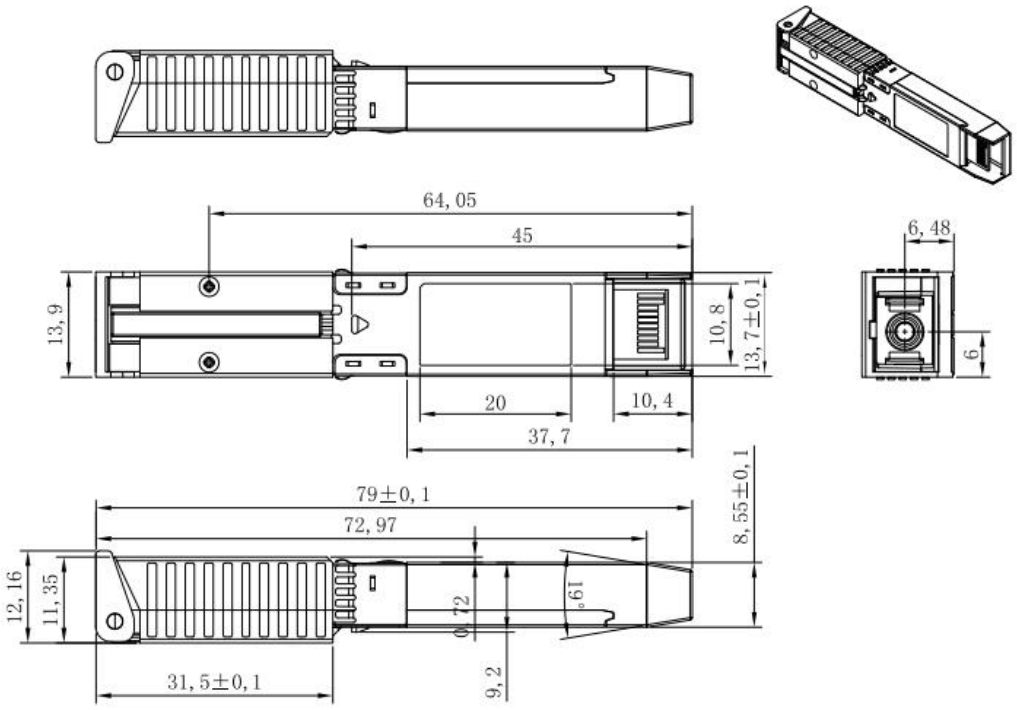


Figure 3 Package Outline (unit: mm)

Pin Description

PIN	Name	Description	Notes
1	VeeT	Transmitter Ground	1
2	Tx-Fault	Transmitter Fault Indication ,Normal “0”, fault: Logic “1”output , LVTTL	2
3	Tx-Disable	Transmitter Disable; turns off transmitter laser output	3
4	Mod-Def(2)	SDA I2C Data line	2
5	Mod-Def(1)	SCL I2C Clock line	2
6	Mod-Def(0)	Module Absent, connected to VeeR	2
7	Rate Select	For Dying Gasp detect, input low active	
8	LOS	Loss of Signal	2
9	VeeR	Receiver Ground	1
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inv. Received Data Output	
13	RD+	Received Data Output	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power	1
16	VccT	Transmitter Power	
17	VeeT	Transmitter Ground	1
18	TD+	Transmit Data In	
19	TD-	Inv.Transmit Data In	
20	VeeT	Transmitter Ground	1

Notes:

Note 1. Module circuit ground is isolated from module chassis ground within the module.

Note 2. The pins shall be pulled up with 4.7K-10KΩ to a voltage between 3.13V and 3.47V on host board.

Note 3. The pin is pulled up to VccT with a 4.7K-10KΩ resistor in the module.

Pin Out Drawing

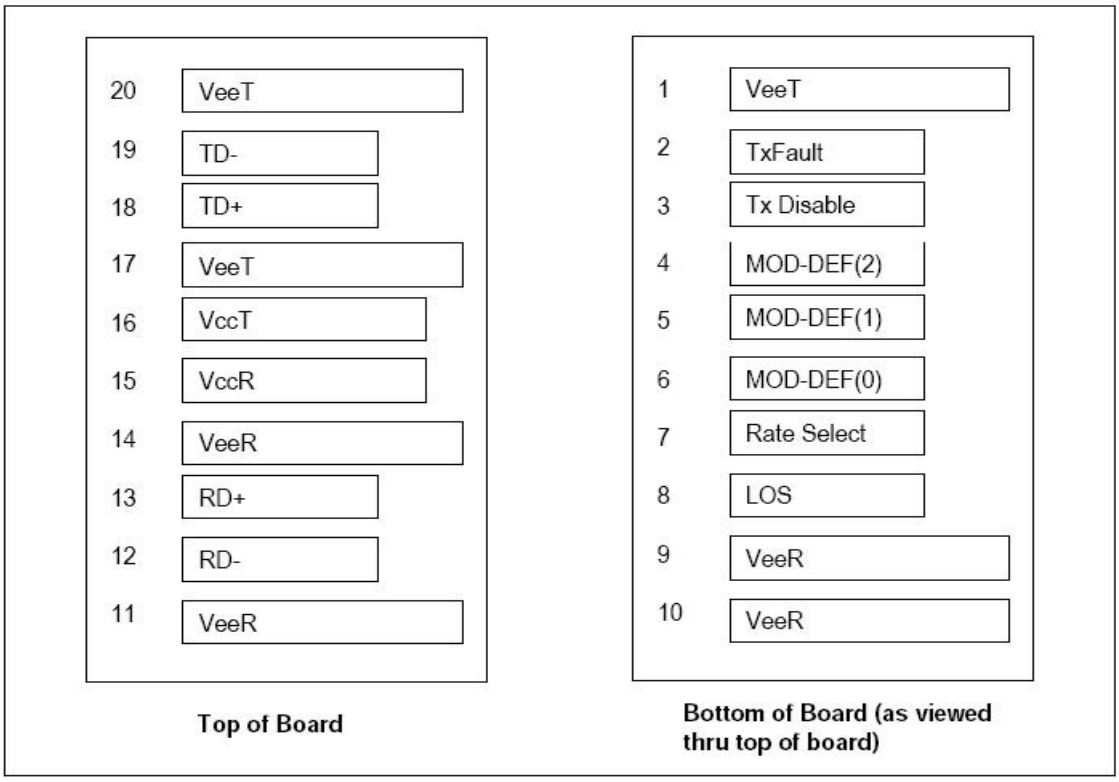
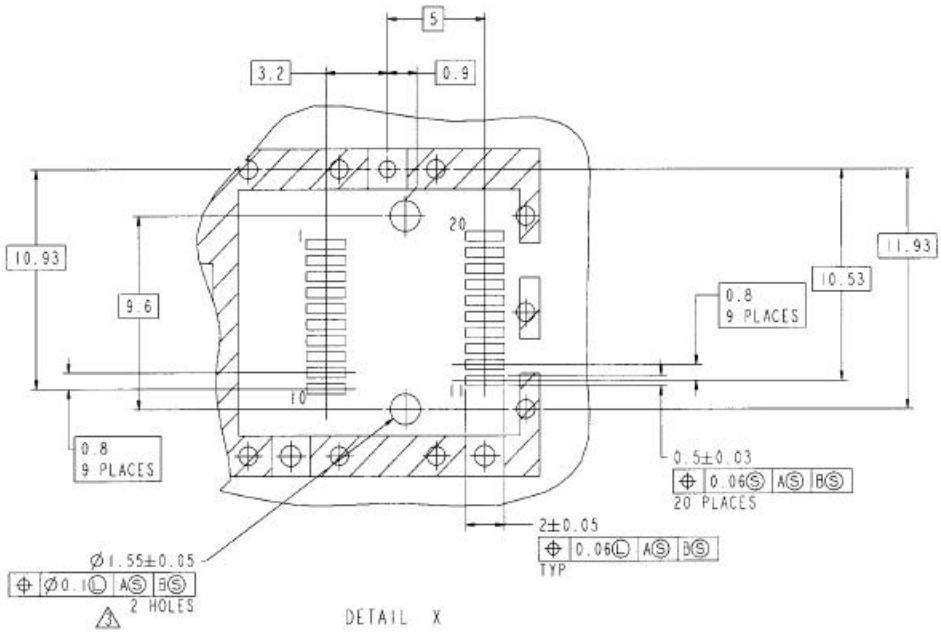


Figure 4 Pin Out Drawing (Top view)

Recommended Board Layout



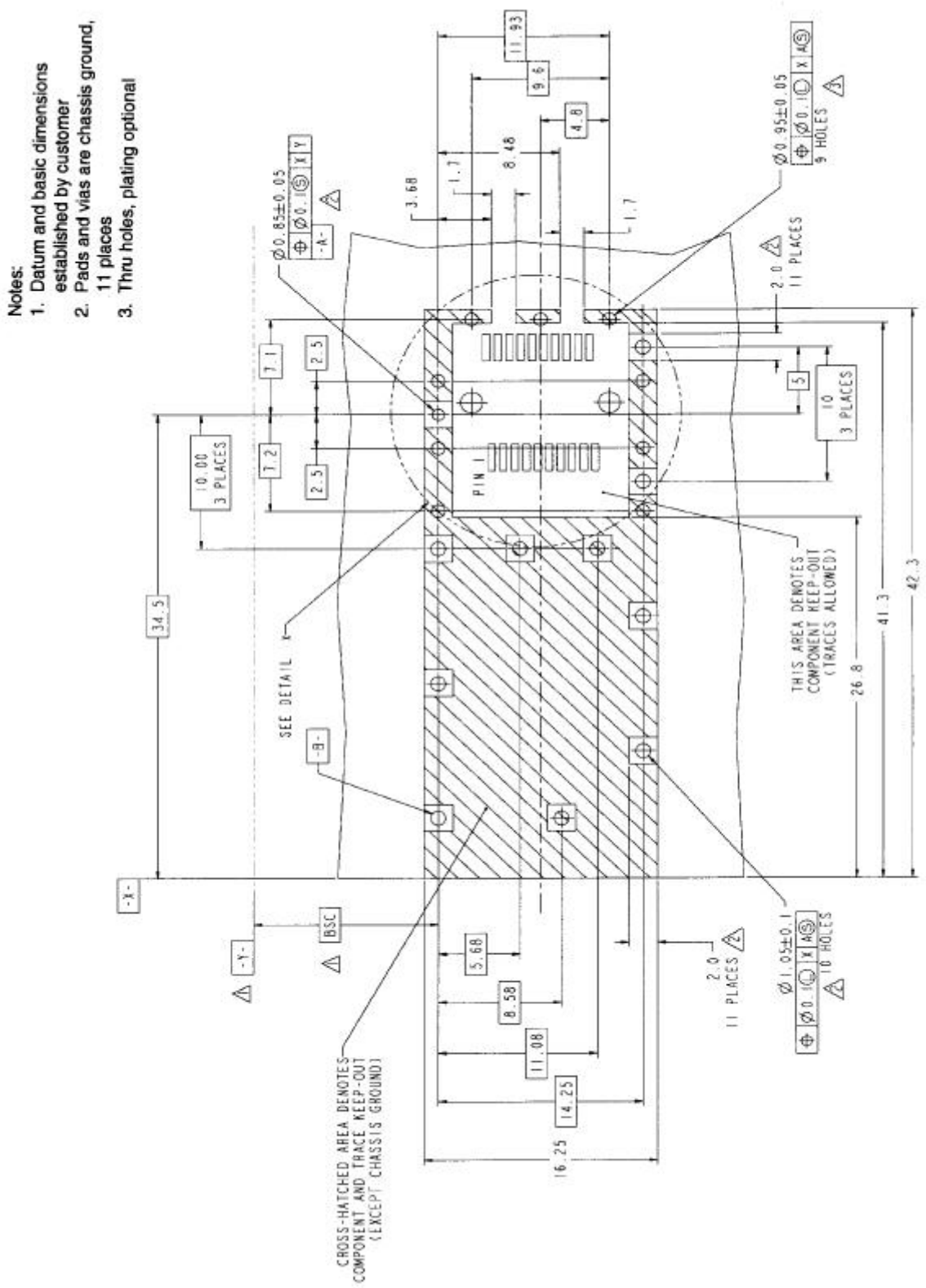


Figure 5 Recommended Board Layout Hole Pattern and Panel Mountin

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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