XGS-PON ONU Stick Transceiver

Product Features

- Single Fiber XGS-PON ONU Transceiver
- 1270nm burst-mode 9.953 Gb/s transmitter with DFB laser
- 1577nm continuous-mode 9.953Gb/s APD-TIA receiver
- SFP+ package with SC UPC receptacle connector
- Digital diagnostic monitoring (DDM)with internal calibration
- 0 to 70°C operating case temperature
- +3.3V separated power supply, low power dissipation
- Compliant with SFF-8431/SFF-8472/ GR-468
- MIL-STD-883 compliant
- FCC Part 15 Class B/EN55022 Class B (CISPR 22B)/ VCCI Class B compliant
- Class I laser safety standard IEC-60825 compliant
- RoHS-6 compliance

Software Features

- Compliant with ITU-T G.988 OMCI Management
- Support 4K MAC entries
- Support IGMPv3/MLDv2 and 512 IP multicast address entries
- Support advanced data features such as VLAN tag manipulation, classification and filtering
- Support “Plug-and-play” via auto-discovery and Configuration
- Support Rogue ONU Detecting
- Data transferring at wire-speed for all packet size
- Support Jumbo frames up to 9840 Bytes

General Description

The XGS-PON ONU stick transceiver is an Optical Network Terminal (ONT) with Small Form-factor Pluggable (SFP+) packaging. The XGS-PON ONU stick integrates a bi-directional (max 10Gbit/s) optical transceiver function and 2nd layer function. By being plugged into the customer premise equipment (CPE) with standard SFP port directly, the XGS-PON ONU stick provides multi-protocol link to the CPE without requiring separate power Supply.

The transmitter designed for single mode fiber and operates at wavelength of 1270nm. The transmitter uses a DFB laser diode and fully compliant with IEC-60825 and CDRH class 1 eye safety. It contains APC functions, a temperature compensation circuit to ensure compliance with ITU-T G.9807 requirements at operating temperature.

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 signals are produced by the limiting amplifier. The APD-TIA is AC coupled to the limiting amplifier through a low pass filter.

The XGS-PON ONU stick supports a sophisticated ONT management system, including alarms,

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provisioning, DHCP and IGMP functions for a stand-alone IPTV solution at the ONT. It can be managed from the OLT using G.988 OMCI.

Block Diagram

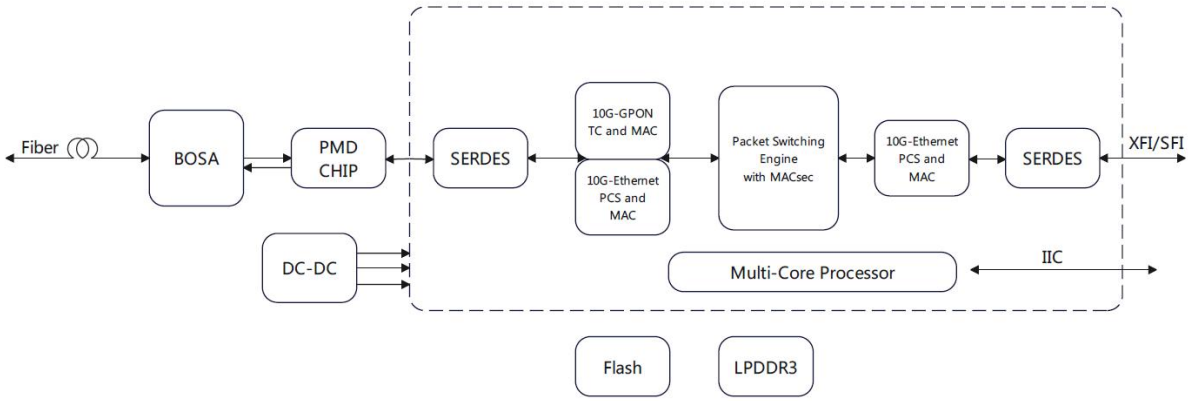

Figure 1 Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Ambient Temperature	T_{STG}	-40	85	°C	
Operating Case Temperature	T_c	0	70	°C	C-Temp
Relative Humidity	RH	5	85	%	
Power Supply Voltage	V_{CC}	0	3.63	V	

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Note
Operating Voltage	V_{CC}	3.14	3.3	3.46	V	
Power Dissipation	PD			3	W	
Operating Case Temperature	T_c	0		70	°C	C-Temp
Operating Humidity Range	OH	5		85	%	
Bit Rate(TX)			9.953		Gbit/s	
Bit Rate(TX)			9.953		Gbit/s	
Transmission Distance		-	-	20	KM	

Optical Characteristics

Transmitter 10G						
Parameter	**Symbo**	**Min**	**Typical**	**Max**	**Unit**	**Note**
Center Wavelength Range	λ_C	1260	1270	1280	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Launch Optical Power	P_{OUT}	+5		+9	dBm	1
Power-OFF Transmitter Optical	P_{OFF}			-45	dBm	
Extinction Ratio	ER	6			dB	
Optical Waveform Diagram	Compliant With ITU-T G.9807.1					
Receiver 10G						
Center Wavelength Range		1570	1577	1580	nm	
Overload	PSAT	-8	-	-	dBm	
Sensitivity(BOL Full temp)	Sen	-	-	-28.5	dBm	2
Bit Error Ratio		10E-3				
Loss of Signal Assert Level	P_{LOSA}	-45	-	-	dBm	
Loss of Signal Deassert Level	P_{LOSD}	-	-	-30	dBm	
LOS Hysteresis		1	-	5	dBm	
Receiver Reflectance		-	-	-20	dB	
Isolation (1400~1560nm)		35			dB	
Isolation(1600~1675nm)		35			dB	
Isolation(1575~1580nm)		34.5			dB	

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

Note 2: Measured with a PRBS 2^31-1 test pattern @9.9532Gbps and ER=6dB, BER ≤10-3.

Electrical Characteristics

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Transmitter						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Data Input Differential Swing	V_{IN}	100		1000	mV_{p-p}	
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
Transmitter Disable Voltage - Low	V_L	0	-	0.8	V	
Transmitter Disable Voltage - High	V_H	2.0	-	V_{CC}	V	
Burst Turn On Time	T_{BURST_ON}	-	-	512	ns	
Burst Turn Off Time	T_{BURST_OFF}	-	-	512	ns	
TX Fault Assert Time	T_{FAULT_ON}	-	-	50	ms	
TX Fault Reset Time	T_{FAULT_RESET}	10	-	-	us	
Receiver						
Data Output Differential Swing		900	1000	1100	mV	
Output Differentia Impedance	R_{OUT}	90	100	110	Ω	
Loss of Signal (LOS) Assert Time	T_{LOSA}			100	us	
Loss of Signal(LOS) Deassert Time	T_{LOSD}			100	us	
LOS low voltage	V_{OL}	0		0.4	V	
LOS high voltage	V_{OH}	2.4		V_{CC}	V	

Note 1: Measured with a PRBS 2^{23}-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).

Recommended Host Board Power Supply Circuit

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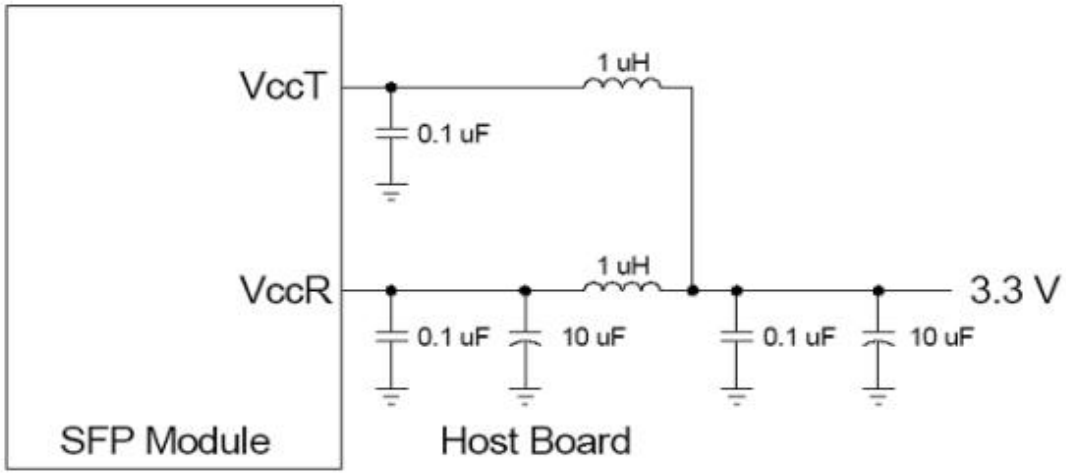

Figure 2 Recommended Host Board Power Supply Circuit

EEPROM Information

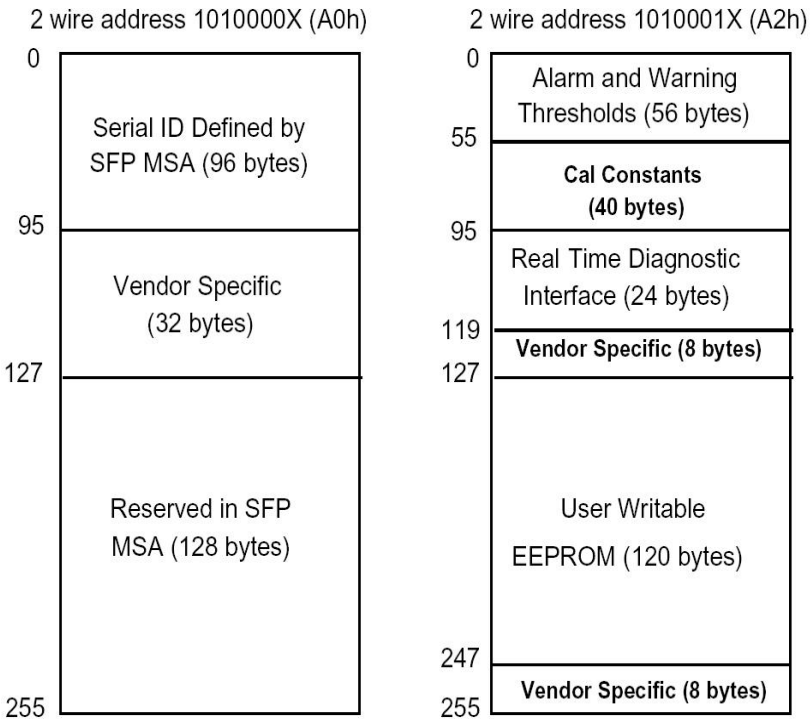

Figure 3 EEPROM Information

Mechanical Dimensions

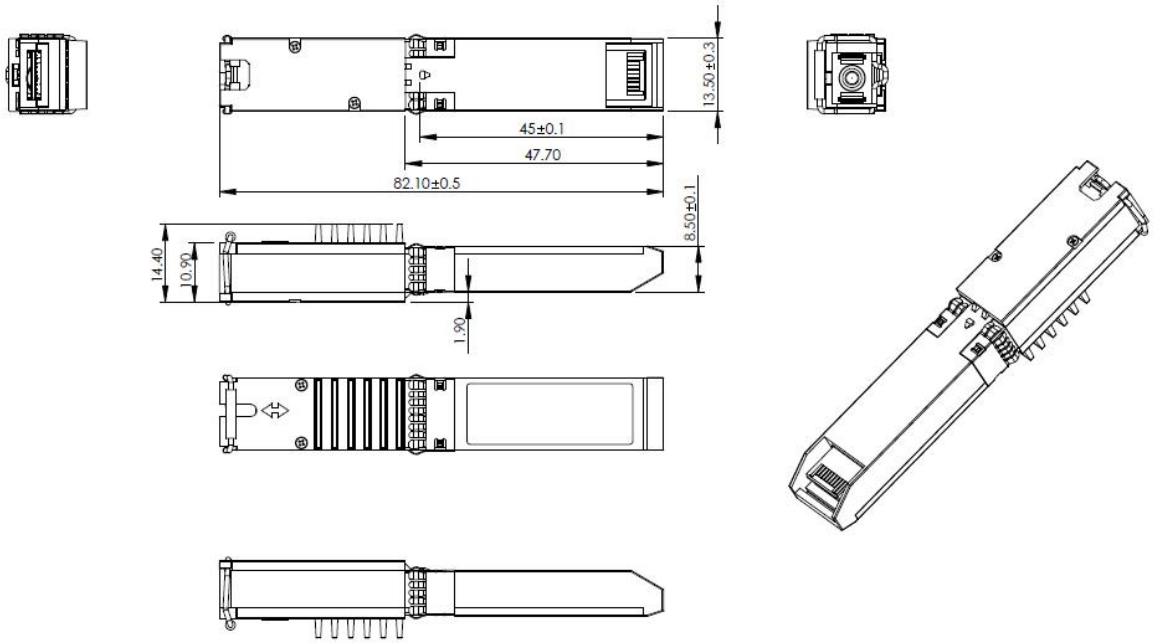

Figure 4 Package Outline (unit: mm)

Pin Out Drawing

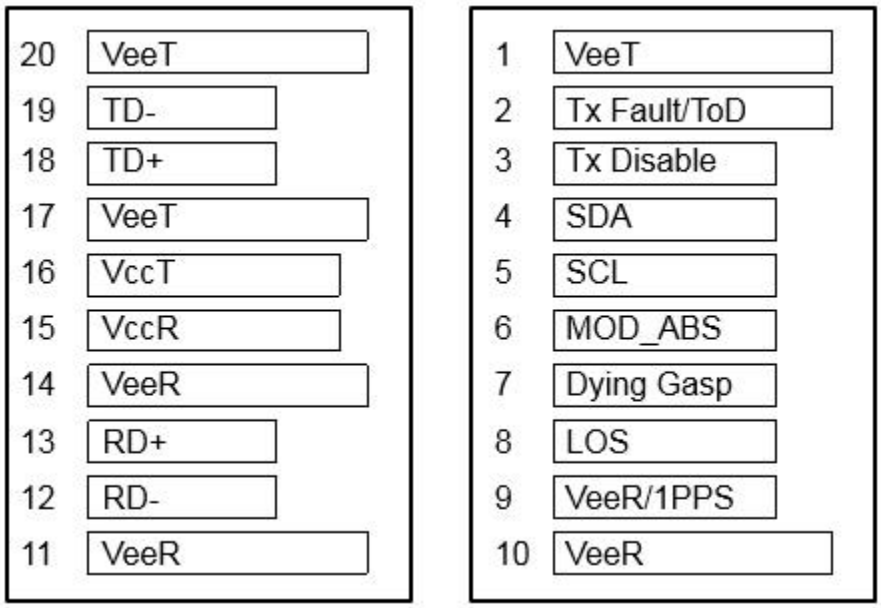

Figure 5 Pin Out Drawing

Pin Description

PIN	Name	Description	Notes
1	VeeT	Module Transmitter Ground	
2	Tx-Fault/ToD	Tx Fault/Time of Day	1
3	Tx-Disable	Transmitter Disable; turns off transmitter laser	
4	SDA	SDA I2C Data line(MOD-DEF2)	2
5	SCL	SCL I2C Clock line(MOD-DEF1)	2
6	MOD_ABS	Module Absent, connected to VeeR or VeeT in the module	
7	DYING GASP	Dying Gasp message indicator	3
8	LOS	Loss of Signal	
9	VeeR/1PPS	Module Receiver Ground/1 Pulse per second	4
10	VeeR	Module Receiver Ground	
11	VeeR	Module Receiver Ground	
12	RD-	Received Inverted Data Output	
13	RD+	Received Data Output	
14	VeeR	Module Receiver Ground	
15	VccR	Module Receiver 3.3V Supply	
16	VccT	Module Transmitter 3.3V Supply	
17	VeeT	Module Transmitter Ground	
18	TD+	Transmitter Data Input	
19	TD-	Transmitter Inverted Data Input	
20	VeeT	Module Transmitter Ground	

Notes:

1. Default Factory Mode is Tx Fault. For Small Cell type of applications, during Activation/ provisioning, it will be software configured to ToD.
2. This PIN is an open collector/drain output pin and shall be pulled up with 4.7K-10K ohms to a Host_Vcc on the host board.
3. PIN7 can support Dying Gasp function. Dying Gasp function is managed by software. If software turn off the dying gasp function,no influence to the module if logical “0” or “1”. If software turn on the function,no influence to the module if logical “1”; if logical "0", the module will report dying gasp to OLT and the module will repeating restart.
4. Default Factory Mode is Veer. For Small Cell type of applications, during Activation/ provisioning, it will be software configured to 1PPS.

Recommended Board Layout

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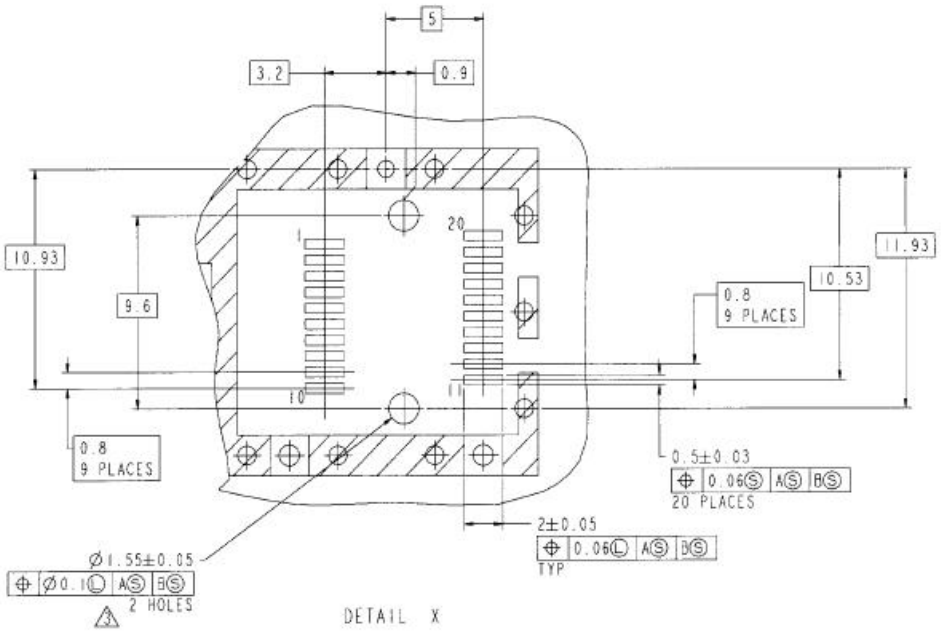

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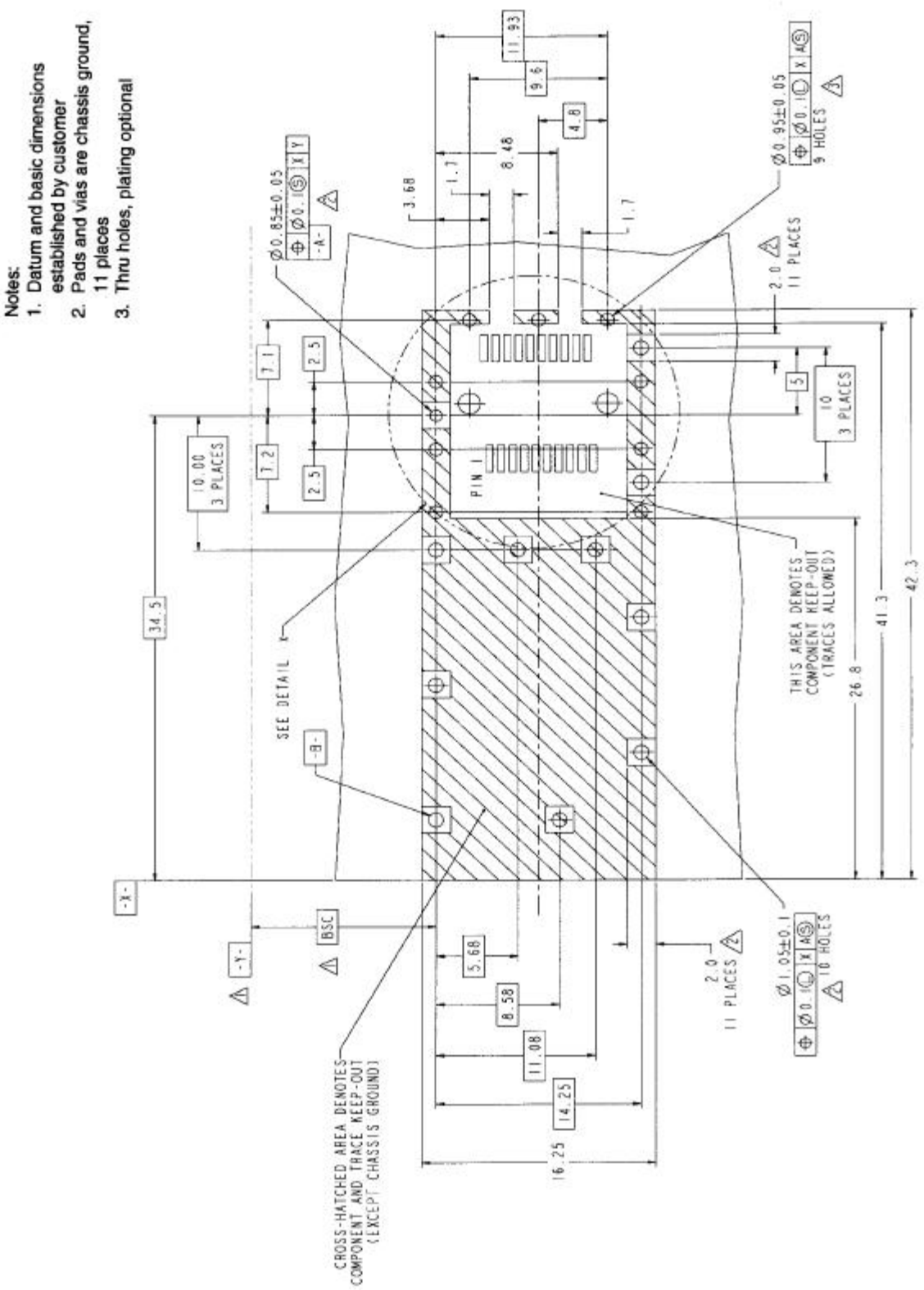

Figure 6 Recommended Board Layout Hole Pattern and Panel Mounting