

### Product Overview

The F433S17415 of Small Form Factor Pluggable (SFP) transceiver module is specifically designed for high performance integrated single data link over single mode optical fiber. The high-speed laser diode and photo diode are provided as a light source and a detector, respectively. An EEPROM contained the detailed product information for the host equipment is accessed by the 2-wire serial CMOS EEPROM protocol. It complies with SFP MSA, SONET/SDH standards, Class 1 laser products, EN60825, and EN60950.



### Features

- RoHS Compliant
- Operation Temperature: 0~70
- 1550nm uncooled DFB LD
- 1310nm receiver
- 10Km link distance<sub>(indicative only)</sub>
- Hot pluggable
- Metal enclosure, low EMI
- Single 3.3V power supply
- Low Power Dissipation

### Applications

- Metro Access Rings
- Point-to-Point networking
- 1x Fiber Channel
- Gigabit Ethernet
- Suitable for Fast Ethernet and OC-12

### Ordering information

Product Code	Description/Clasp Color
<b>F433S17415</b>	1550nm, Green

**Absolute Maximum Ratings**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T <sub>S</sub>	<b>-40</b>		<b>85</b>		
Supply Voltage	V <sub>CC</sub> T V <sub>CC</sub> R	<b>0</b>		<b>5.5</b>	V	
Relative Humidity	RH	<b>0</b>		<b>85</b>	%	

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Temperature	T <sub>OP</sub>	<b>0</b>		<b>70</b>		
Supply Voltage	V <sub>CC</sub> T,R	<b>3.1</b>	<b>3.3</b>	<b>3.5</b>	V	
Supply Current	I <sub>TX</sub> +I <sub>RX</sub>		<b>200</b>	<b>300</b>	mA	

**Transmitter Electro-Optical Interface** ( $T_C = 0\sim 70$  ,  $V_{CC,T,R}=3.1V < V_{CC} < 3.5V$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter Differential Input Voltage	TD +/-	<b>400</b>		<b>2000</b>	mVp-p	A
Optical Output Power	P <sub>O</sub>	<b>-9</b>		<b>-3</b>	dBm	A
Optical Extinction Ratio	E <sub>R</sub>	<b>9</b>			dB	A
Center Wavelength	$\lambda_C$	<b>1530</b>	<b>1550</b>	<b>1570</b>	nm	A
Spectral Width	$\Delta\lambda$			<b>&lt;1</b>	nm	A
Side Mode Suppression Ratio	SMSR	<b>30</b>			dB	A
Optical Rise / Fall Time	t <sub>r</sub> / t <sub>f</sub>			<b>0.25</b>	nsec	A,B
Tx_Fault - High	V <sub>Fault_H</sub>	<b>2</b>		V <sub>CC</sub>	V	A
Tx_Fault - Low	V <sub>Fault_L</sub>	V <sub>ee</sub>		V <sub>ee</sub> + <b>0.5</b>	V	A
Tx_Disable - High	V <sub>Disable_H</sub>	<b>2</b>		V <sub>CC</sub>	V	A
Tx_Disable - Low	V <sub>Disable_L</sub>	V <sub>ee</sub>		V <sub>ee</sub> + <b>0.8</b>	V	A

**Notes:**

**A.** All of data is measured at 1250Mbps , PRBS 2<sup>7</sup>-1 ,NRZ.

**B:** 20%~80%

**Receiver Electro-Optical Interface** ( $T_C = 0\sim 70$  ,  $V_{CC,T,R}=3.1V < V_{CC} < 3.5V$ )

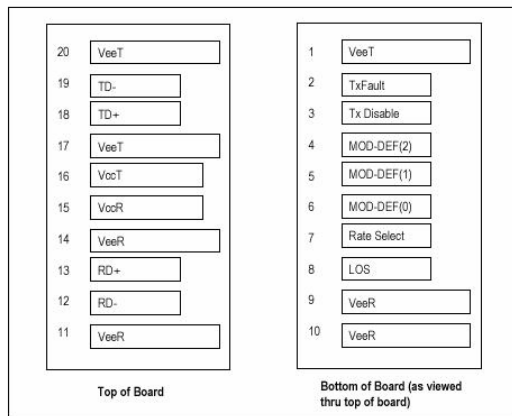
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Differential Output Voltage	RD +/-	<b>600</b>	<b>800</b>		mV <sub>p-p</sub>	
Receiver Overload	P <sub>IN</sub> MAX	<b>-3</b>			dBm	A,B
Receiver Sensitivity	P <sub>IN</sub> MIN			<b>-20</b>	dBm	A,B
Operating Center Wavelength	$\lambda_c$	<b>1260</b>		<b>1360</b>	nm	
Receiver LOS Assert Level	P <sub>RX_LOS A</sub>	<b>-35</b>			dBm	B
Receiver LOS Deassert Level	P <sub>RX_LOS D</sub>			<b>-20.5</b>	dBm	B
Receiver Loss of Signal Hysteresis		<b>0.5</b>	<b>2</b>		dB	B

**Notes:**

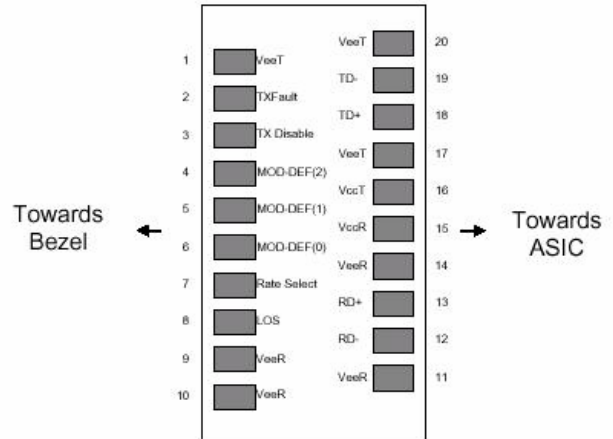
**A.** With BER better than or equal to  $1 \times 10^{-12}$

**B.** measured in the center of the eye opening with 2<sup>7</sup> -1 PRBS, NRZ

**Pin Description**



**SFP Transceiver Electric Pad Layout**



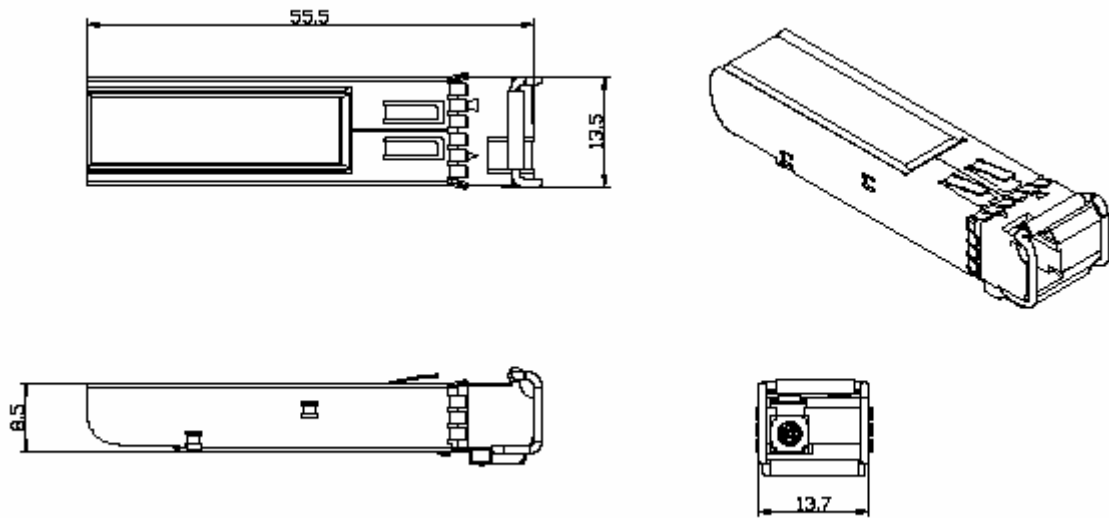
**Diagram of Host Board Connector Block Pin Numbers and Names**

Pin No.	Pin Name	Function	Plug Seq.	Notes
1	V <sub>cc</sub> T	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	2
3	TX Disable	Transmitter Disable	3	3
4	MOD_DEF 2	Module Definition 2	3	4
5	MOD_DEF 1	Module Definition 1	3	4
6	MOD_DEF 0	Module Definition 0	3	4
7	Rate Select	Select between full or reduced receiver bandwidth	3	5
8	LOS	Loss of Signal	3	6
9	V <sub>cc</sub> R	Receiver Ground	1	1
10	V <sub>cc</sub> R	Receiver Ground	1	1
11	V <sub>cc</sub> R	Receiver Ground	1	1
12	RD -	Inv. Receiver Data Out	3	
13	RD +	Receiver Data Out	3	
14	V <sub>cc</sub> R	Receiver Ground	1	1
15	V <sub>cc</sub> R	Receiver Power	2	
16	V <sub>cc</sub> T	Transmitter Power	2	
17	V <sub>cc</sub> T	Transmitter Ground	1	1
18	TD +	Transmitter Data In	3	
19	TD -	Inv. Transmitter Data In	3	
20	V <sub>cc</sub> T	Transmitter Ground	1	1

Note:

- 1, Circuit ground is internally isolated from chassis ground
- 2, Open-Collector outputs, asserted when LD and/or APC function fail.
- 3, Disable when high voltage (>2.0V or Open)
- 4, Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V. MOD\_DEF(0) pulls line low to indicate module is plugged in.
- 5, No connection required
- 6, LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V.  
Logic 0 indicates normal operation; logic 1 indicates loss of signal.

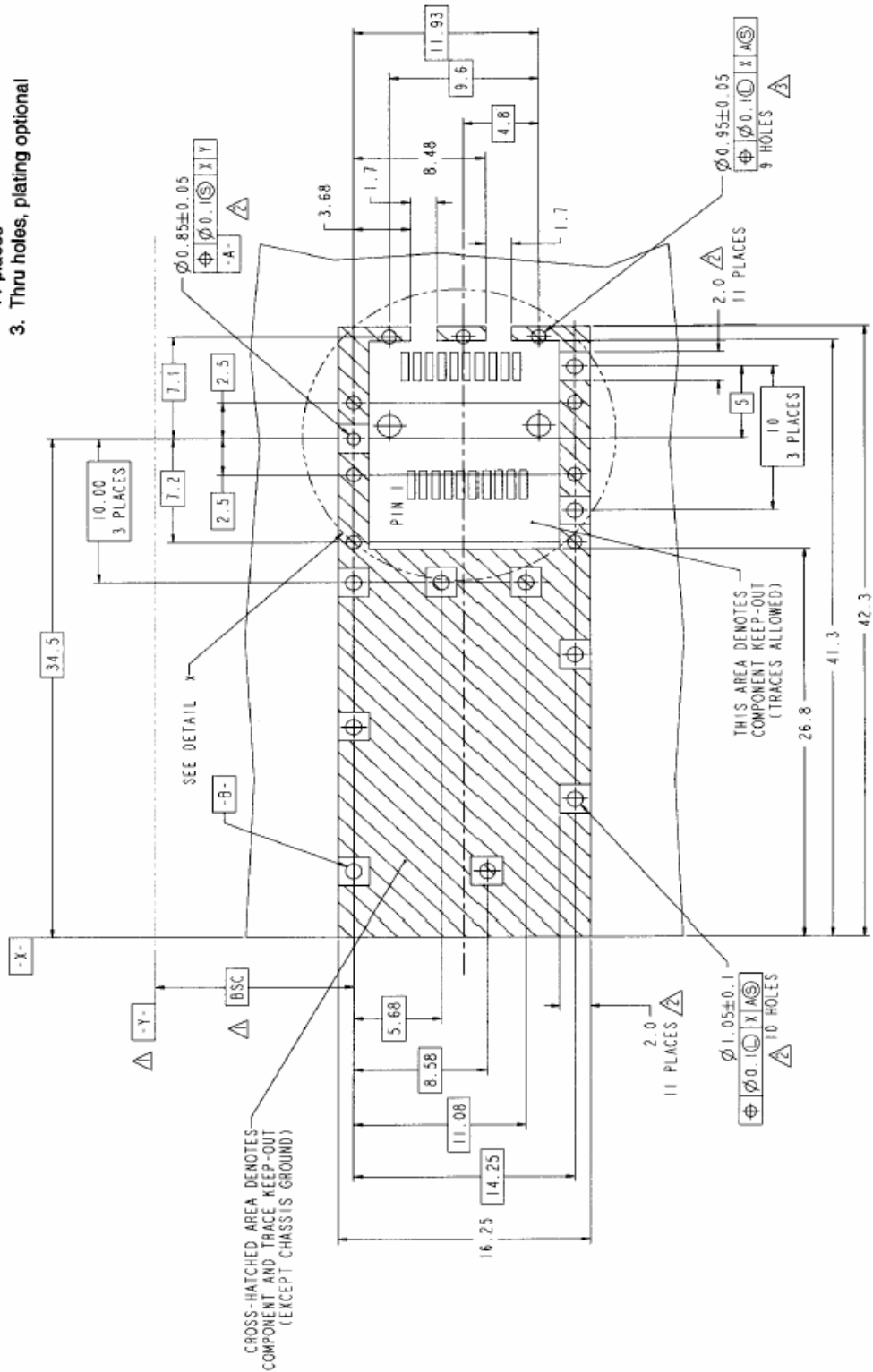
**Mechanical Dimensions** (Units in mm)



**References** (From SFP MSA September 14, 2000 page 11, 12, 13, and 23)

**1. SFP Host PCB layout**

- Notes:**
1. Datum and basic dimensions established by customer
  2. Pads and vias are chassis ground, 11 places
  3. Thru holes, plating optional





2.Application Circuit

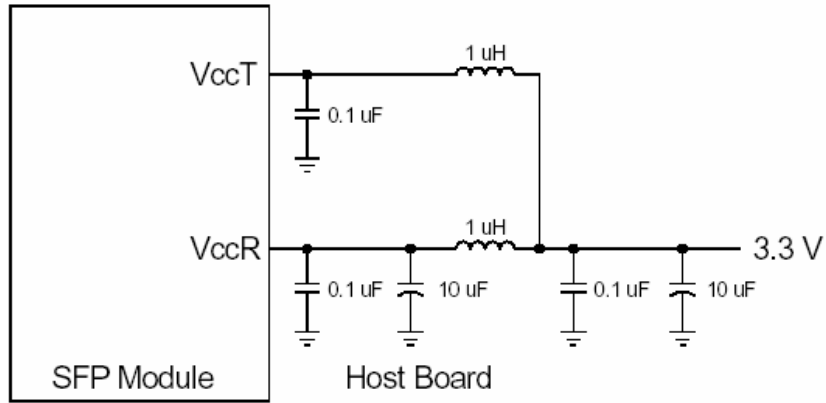


Figure 2A. Recommended Host Board Supply Filtering Network

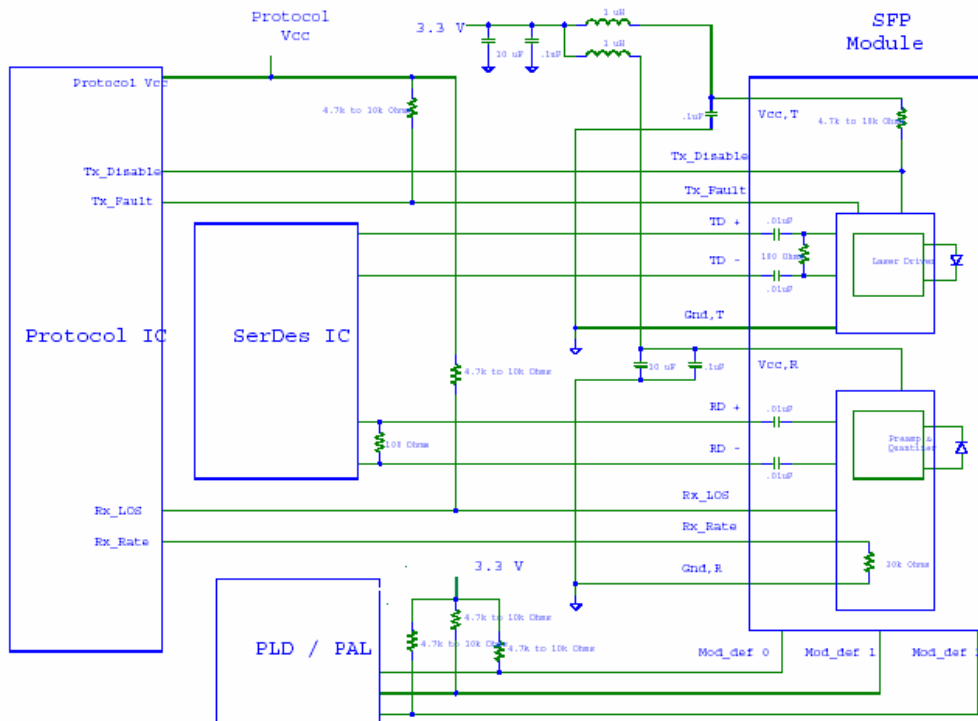


Figure 2B. Example SFP Host Board Schematic

Record of Revisions		
Rev.	Date	Description of Change
VERA	2006.04.11	F433S17415 Original Specification issued.