

Product Overview

The F413L174XX-D of Small Form Factor Pluggable (SFP) transceiver module is specifically designed for high performance integrated duplex data link over single mode optical fiber. The high-speed laser diode and APD are provided as a light source and a detector, respectively. There are eight central wavelengths available at present: **1470nm, 1490nm, 1510nm, 1530nm, 1550nm, 1570nm, 1590nm and 1610nm**. An EEPROM contained the detailed product information and digital diagnostics function 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
- Digital Diagnostics are External Calibrated
- Operation Temperature: 0~70
- 8 wavelength uncooled DFB LD
- APD Receiver
- 80Km link distance_(indicative only)
- 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	Product Code	Description/Clasp Color
<u>F413L17447-D</u>	1470nm, Gray	<u>F413L17455-D</u>	1550nm, Yellow
<u>F413L17449-D</u>	1490nm, Violet	<u>F413L17457-D</u>	1570nm, Orange
<u>F413L17451-D</u>	1510nm, Blue	<u>F413L17459-D</u>	1590nm, Red
<u>F413L17453-D</u>	1530nm, Green	<u>F413L17461-D</u>	1610nm, Brown

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T _S	-40		85		
Supply Voltage	V _{CC} T V _{CC} R	0		5.5	V	
Relative Humidity	RH	0		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Temperature	T _{OP}	0		70		
Supply Voltage	V _{CC} T,R	3.1	3.3	3.5	V	
Supply Current	I _{TX} +I _{RX}		200	300	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 +/-	400		2000	mVp-p	A
Optical Output Power	P _O	0		+5	dBm	A
Optical Extinction Ratio	E _R	9			dB	A
Center Wavelength	λ_C	$\lambda_C - 6.5$	λ_C	$\lambda_C + 7$	nm	A
Spectral Width	$\Delta\lambda$			<1	nm	A
Side Mode Suppression Ratio	SMSR			30	dB	A
Optical Rise / Fall Time	t _r / t _f			0.25	nsec	A,B
Tx_Fault - High	V _{Fault_H}	2		V _{CC}	V	A
Tx_Fault - Low	V _{Fault_L}	V _{ee}		V _{ee} + 0.5	V	A
Tx_Disable - High	V _{Disable_H}	2		V _{CC}	V	A
Tx_Disable - Low	V _{Disable_L}	V _{ee}		V _{ee} + 0.8	V	A

Notes:

A. All of data is measured at 1250Mbps, PRBS 2⁷-1, NRZ.

B: 20%~80%

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

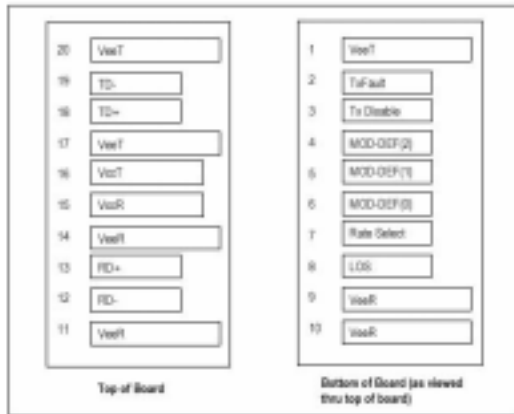
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Differential Output Voltage	RD +/-	600	800		mV _{p-p}	
Receiver Overload	P _{INMAX}	-8			dBm	A,B
Receiver Sensitivity	P _{INMIN}			-30	dBm	A,B
Operating Center Wavelength	λ_c	1270		1620	nm	
Receiver LOS Assert Level	P _{RX_LOSA}	-40			dBm	B
Receiver LOS Deassert Level	P _{RX_LOSD}			-30.5	dBm	B
Receiver Loss of Signal Hysteresis		0.5	2		dB	B

Notes:

A. With BER better than or equal to 1×10^{-12}

B. measured in the center of the eye opening with 2⁷-1 PRBS, NRZ

Pin Description



SFP Transceiver Electric Pad Layout

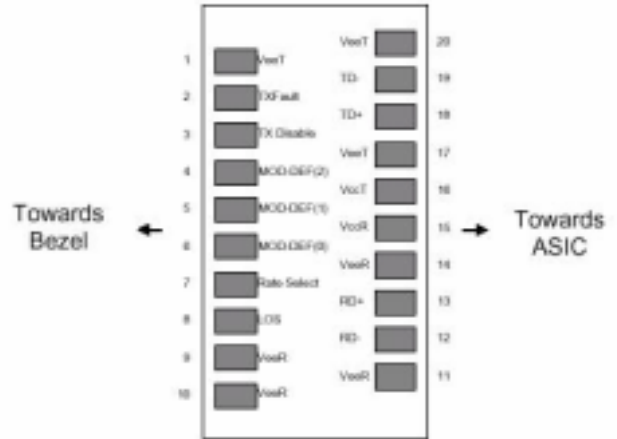


Diagram of Host Board Connector Block Pin Numbers and Names

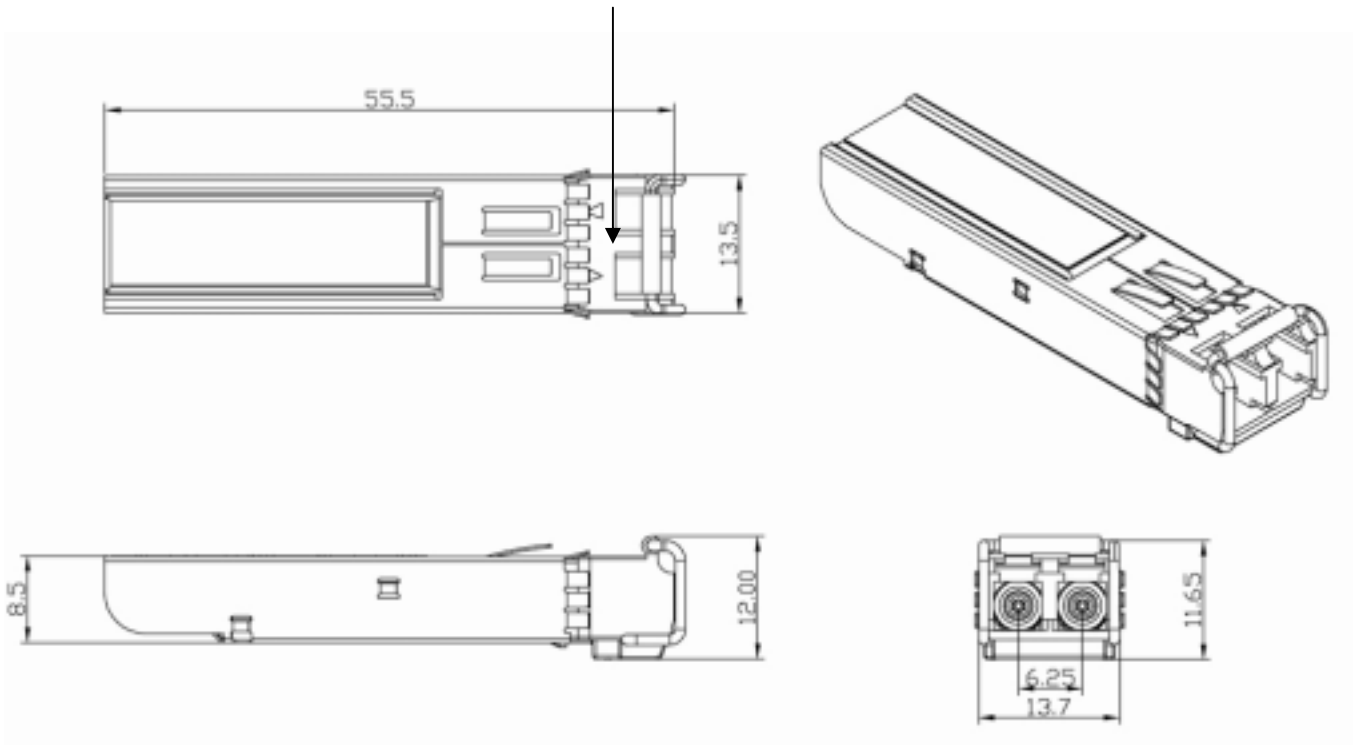
Pin No.	Pin Name	Function	Plug Seq.	Notes
1	V _{cc} T	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	2
3	TX Disable	Transmitter Disable	3	3
4	MOD_DEF 2	Module Definition 2	3	4
5	MOD_DEF 1	Module Definition 1	3	4
6	MOD_DEF 0	Module Definition 0	3	4
7	Rate Select	Select between full or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

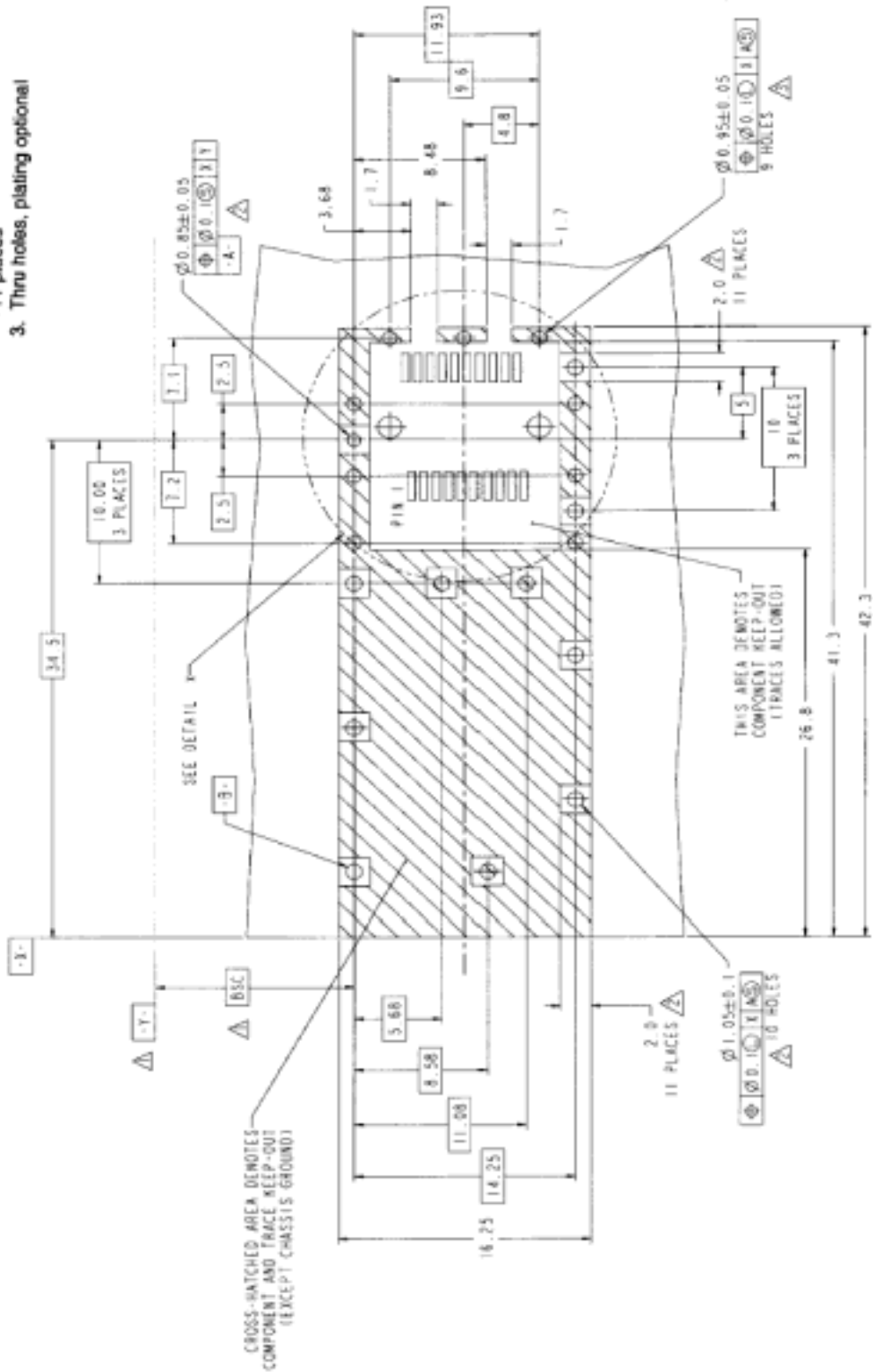
Tc measurement point

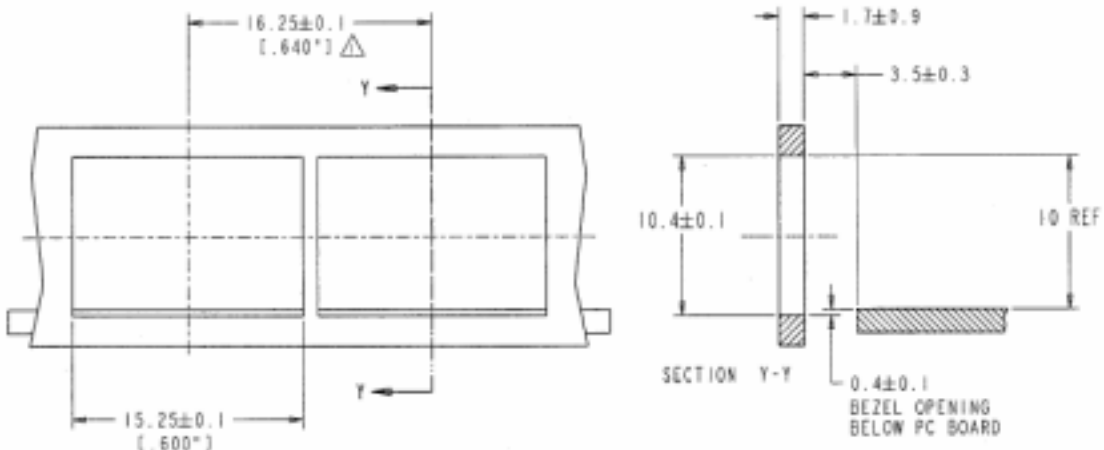
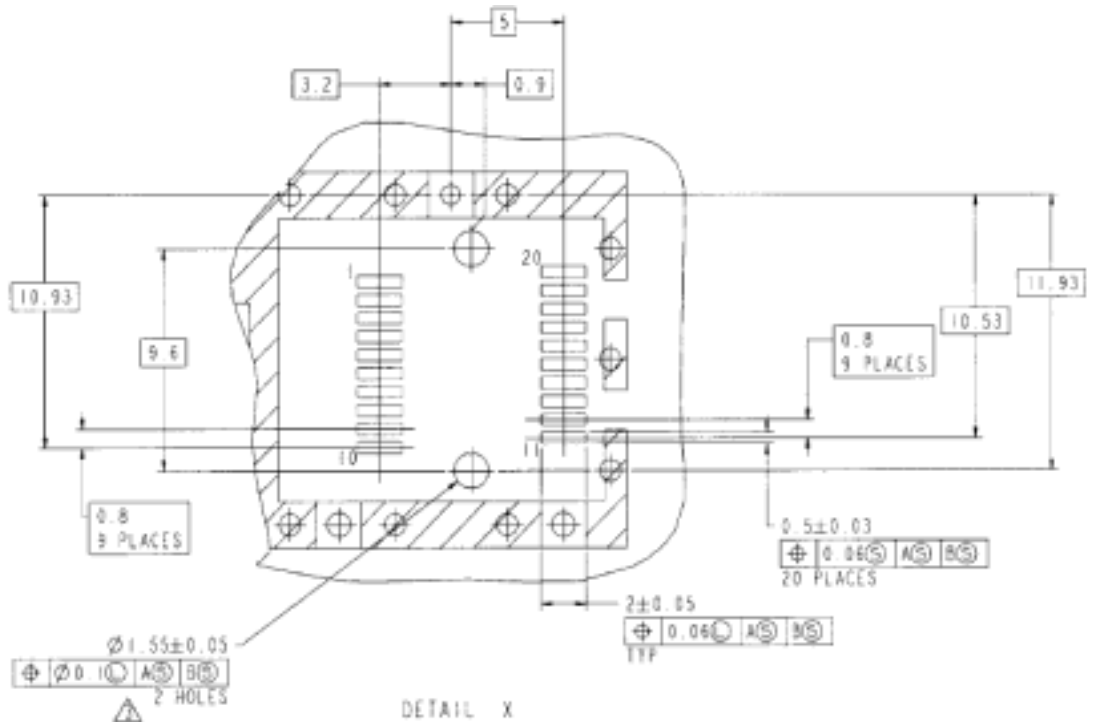


References (From SFP MSA September 14, 2000 page 11, 12, 13, and 23)

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





- NOTES:
- MINIMUM PITCH ILLUSTRATED, ENGLISH DIMENSIONS ARE FOR REFERENCE ONLY
 - NOT RECOMMENDED FOR PCI EXPANSION CARD APPLICATIONS

2.Application Circuit

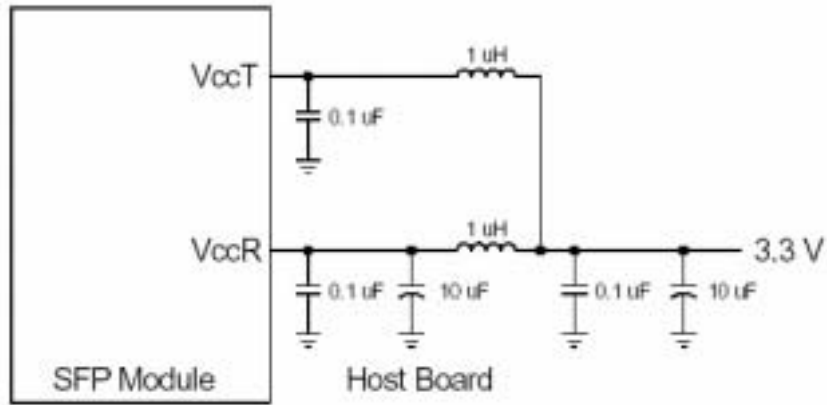


Figure 2A. Recommended Host Board Supply Filtering Network

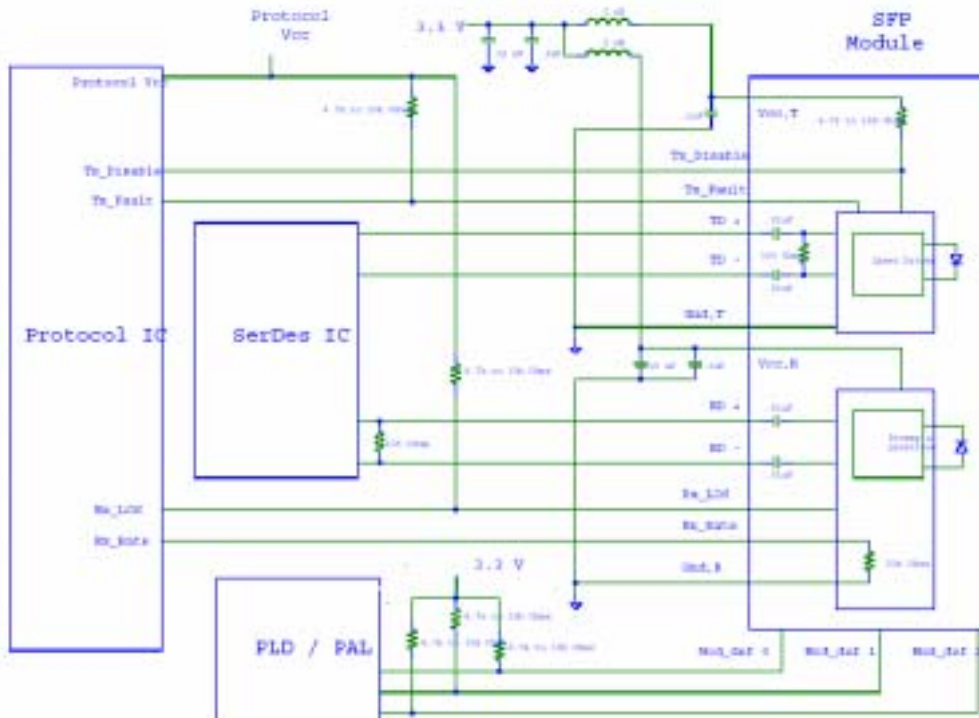


Figure 2B. Example SFP Host Board Schematic

Record of Revisions		
Rev.	Date	Description of Change
VERA	2005.12.16	F413L174XX-D Original Specification issued.