DATASHEET

DESCRIPTION:

PeakOptical's CWDM Transceiver products provide optical networking equipment manufacturers with a timely and cost effective tool in supporting the unceasing demand for higher bandwidth equipment build-outs in the enterprise access and metropolitan area networks. There are 18 center wavelengths available from 1270nm to 1610nm. The 20nm channel spacing allows for un-cooled laser operation, a high yield manufacturing process, and lower cost Mux/Demux technology, thus providing a complete cost effective solution for various data and telecom applications.

FEATURES:

- 18 CWDM Wavelengths Available
- 24dB Power Budget
- Build-in Isolator Optional
- Hot-Pluggable Duplex LC/PC Connector
- Single +3.3V Power Supply
- Operating Temperature from 0°C to +70°C
- Compliant with ITU-T G694.2
- Compliant with Telcordia(Bellcore) GR-468-CORE
- Designed to meet Laser Class1 Compliant with IEC60825-1
- With real time monitors of
  - o Transmitter Output Power
  - o Receiver Input Power
  - o Laser Bias Current
  - o Temperature
  - o Supply Voltage

APPLICATIONS:

- Metro/Access Networks
- 1.25 Gb/s 1000Base-ZX Ethernet
- 1×Fiber Channel
- Other Optical Links

SPECIFICATIONS:

Electrical and Optical Characteristics (Condition: Tc= T_{op})

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter Differential Input Voltage	+/-TX_DAT	650		2000	mV p-p
Supply Current	I_{CC}		200	250	mA
Tx_Disable Input Voltage – Low	V_{IL}	0		0.8	V
Tx_Disable Input Voltage – High	V_{IH}	2.0		Vcc	V
Tx_Fault Output Voltage – Low	V_{OL}	0		0.8	V
Tx_Fault Output Voltage – High	V_{OH}	2.0		Vcc	V
Receiver Differential Output Voltage	+/-RX_DAT	400		2000	mV p-p
Rx_LOS Output Voltage- Low	V_{OL}	0		0.8	V
Rx_LOS Output Voltage- High	V_{OH}	2.0		Vcc	V

Transmitter:

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate	B	-	1.25	-	Gb/s
Output Center Wavelength(0~70°C)	λ_C	λ-5.5	λ	λ+7.5	nm
Output Spectral Width	$\Delta\lambda$	-	-	1	nm
Average Output Power	P_O	0	-	+5	dBm
Extinction Ratio	E.R.	9	-	-	dB
Rise and Fall Time (20~80%)	T_r	-		0.15	ns
Data Input Voltage-High	V_{IHS}	V_{cc}-1.16	-	V_{cc}-0.89	V
Data Input Voltage -Low	V_{ILS}	V_{cc}-1.82	-	V_{cc}-1.48	V
Supply Current	I_{CC}	-	-	120	mA
Output Optical Eye	Compliant with ITU-T G.957				

Receiver:

Parameter	Symbol	Min.	Typical	Max.	Unit
Date Rate	B	-	1.25	-	Gb/s
Receive Sensitivity	S	-	-	-24	dBm
Maximum Input Power	Pmax	-3	-	-	dBm
Operating Wavelength	λc	1100	-	1620	nm
Signal Detect Threshold-Assertion:	SD_{HIGH}			-25	dBm
Signal Detect Threshold-Deassertion:	SD_{LOW}	-35			dBm
Hysteresis	-		2.0		dBm
Supply Current	I_{CC}	-	-	110	mA
Rise and Fall Time (20~80%)	T_r/T_f			0.15	ns
Output High Voltage	V_{OH}	V_{cc}-1.03	-	V_{cc}-0.89	V
Output Low Voltage	V_{OL}	V_{cc}-1.82	-	V_{cc}-1.63	V
Alarm Output Interface	LV-TTL				

Absolute Maximum Ratings:(T_C=25℃)

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	Tst	-40	+85	°C
Operating Temperature	Top	-20	+70	°C
Supply Voltage	Vcc	0	Vcc	V
Output Current	Io	0	30	mA

Operating Environment:

Parameter	Symbol	Min.	Max.	Units
Supply Voltage	V_{CC}	+3.1	+3.5	V
Ambient Operating Temperature	T_A	-20	70	°C

Timing Characteristics:

Parameter	Symbol	Min.	Typical	Max.	Unit
TX_DISABLE Assert Time	t_off		3	10	Usec
TX_DISABLE Negate Time	t_on		0.5	1	msec
Time to Initialize Include Reset of TX_FAULT	t_int		30	300	msec
TX_FAULT from Fault to Assertion	t_fault		20	100	Usec
TX_DISBEL Time to Start Reset	t_reset	10			Usec
Receiver Loss of Signal Assert Time (off to On)	T_A,RX_LOS			100	Usec
Receiver Loss of Signal Assert Time (On to Off)	T_d,RX_LOS			100	Usec

Block Diagram of Transceiver:

![PeakOptical®]
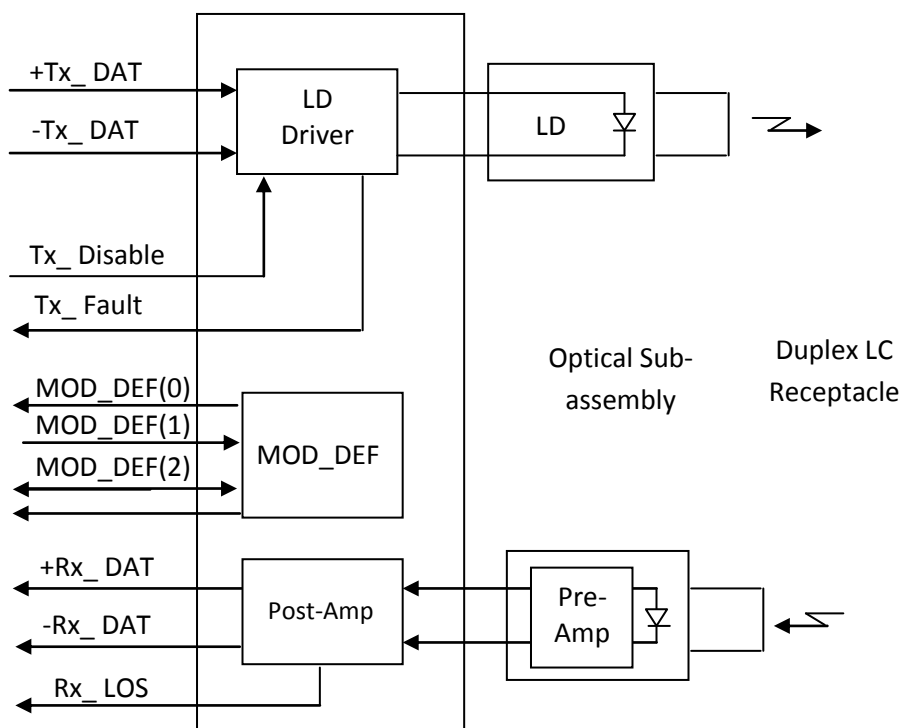
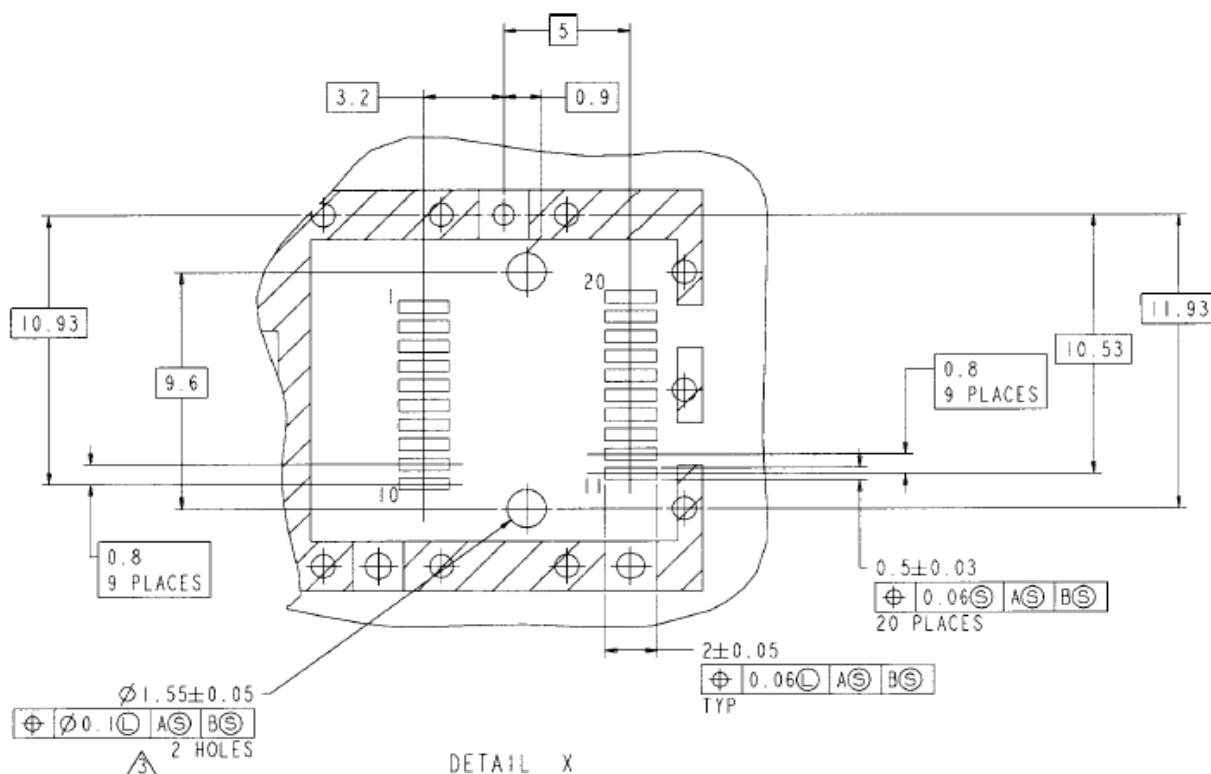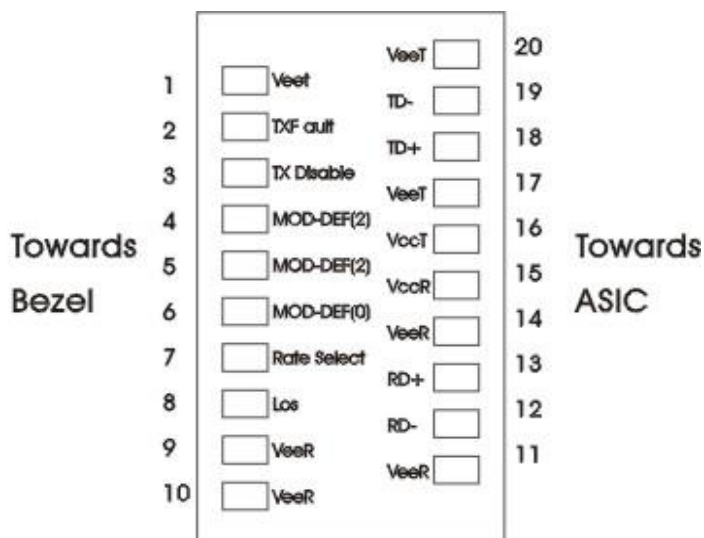**CWDM SFP Transceiver with DDMI**
1.25Gb/s, SFP Pluggable, Duplex LC/PC Connector, +3.3v
1270~1610nm DFB-LD, Single-Mode
PCSFP-24-1XX12-22F

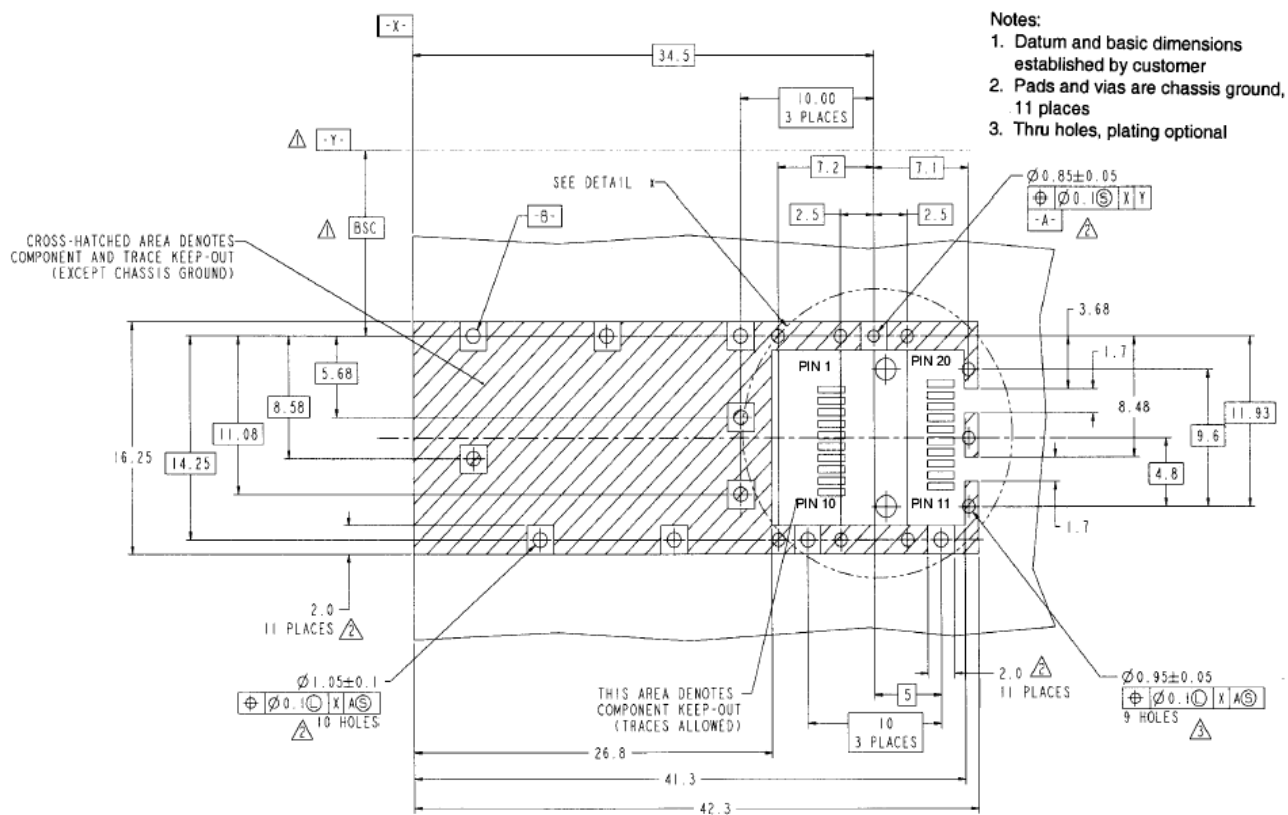**Pin Assignment:**

	Towards Bezel		Towards ASIC
1	VeeT	20	VeeT
2	TXF ault	19	TD-
3	TX Disable	18	TD+
4	MOD-DEF(2)	17	VeeT
5	MOD-DEF(2)	16	VccT
6	MOD-DEF(0)	15	VccR
7	Rate Select	14	VeeR
8	Los	13	RD+
9	VeeR	12	RD-
10	VeeR	11	VeeR

SFP Host Board Mechanical Layout

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

SFP Host Board Mechanical Layout(Cont)

Pin Description:

Pin	Symbol	Name/Description	Ref.
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault. Low normal operation, High fault indication	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	4
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	4
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	4
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
5. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Serial ID Memory Contents:

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	Gigabit Ethernet 1000Base-ZX & Fiber Channel
11	1	Encoding	8B10B (01h)
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: PCSFP-24-1xx12-22F (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-61	2	Wavelength	Laser wavelength
62	1	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92	1	Diagnostic Type	Diagnostics
93	1	Enhanced	Diagnostics

		Options	
94	1	SFF-8472	Diagnostics
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	Specific date, read only

Diagnostics Memory Contents(A2h):

| Data Address	Length (Byte)	Name of Length	Description and Contents
Diagnostic and control/status fields			
0-39	40	A/W Thresholds	Diagnostic Flag Alarm and Warning Thresholds
40-55	16	Unallocated	
56-91	16	Ext Cal Constants	Diagnostic calibration constants for optional External Calibration
92-94	3	Unallocated	
95	1	CC_DMI	Check code for Base Diagnostic Fields (addresses 0 to 94)
96-105	10	Diagnostics	Diagnostic Monitor Data (internally or externally calibrated)
106-109	4	Unallocated	
110	1	Status/Control	Optional Status and Control Bits
111	1	Reserved	Reserved for SFF-8079
112-113	2	Alarm Flags	Diagnostic Alarm Flag Status Bits
114-115	2	Unallocated	
116-117	2	Warning Flags	Diagnostic Warning Flag Status Bits
118-119	2	Ext Status/Control	Extended module control and status bytes
General use fields			
120-127	8	Vendor Specific	Vendor specific memory addresses
128-247	120	User EEPROM	User writable non-volatile memory
248-255	8	Vendor Control	Vendor specific control addresses

Recommended Circuit:
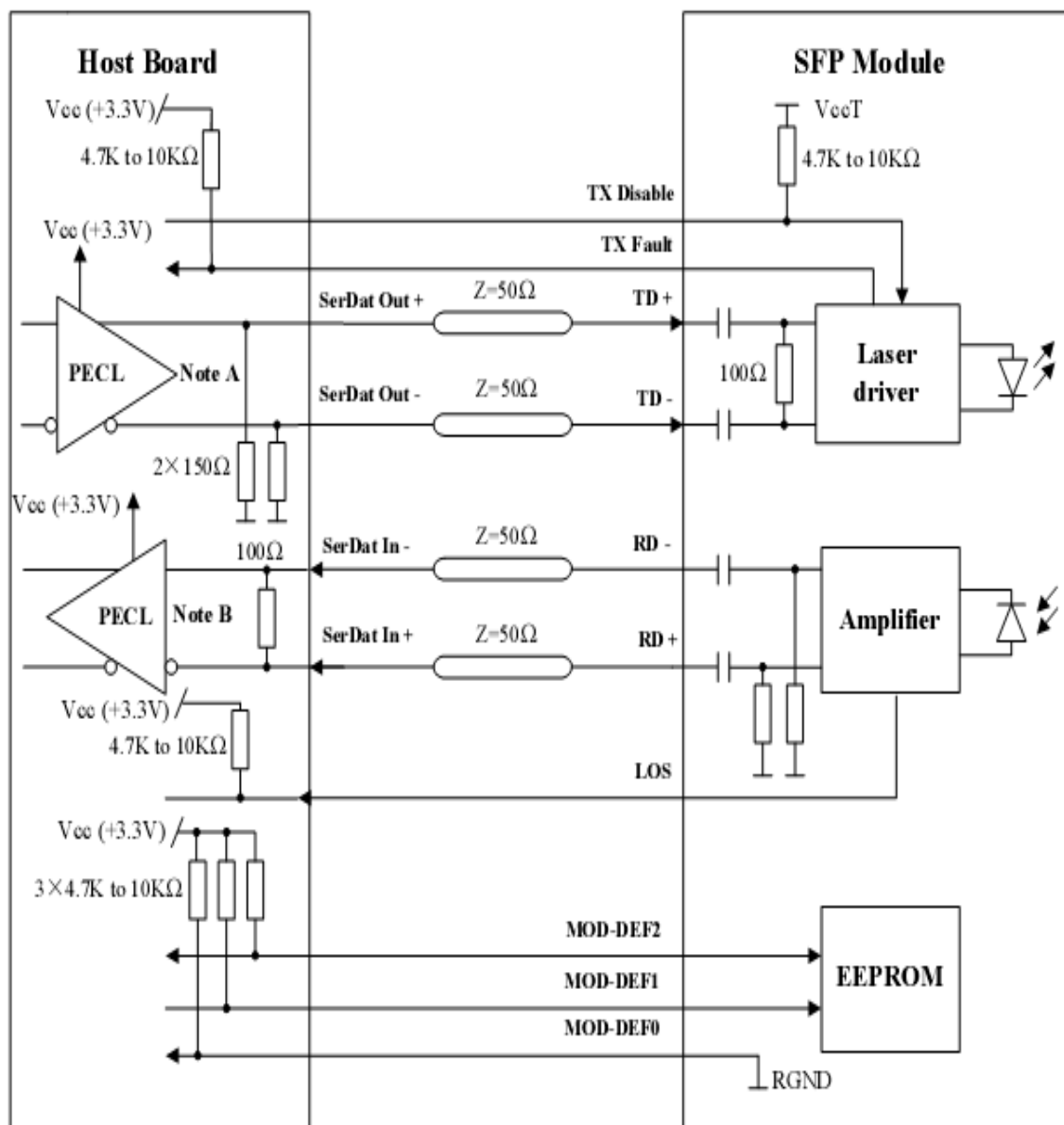
Note A: Circuit assumes open emitter output

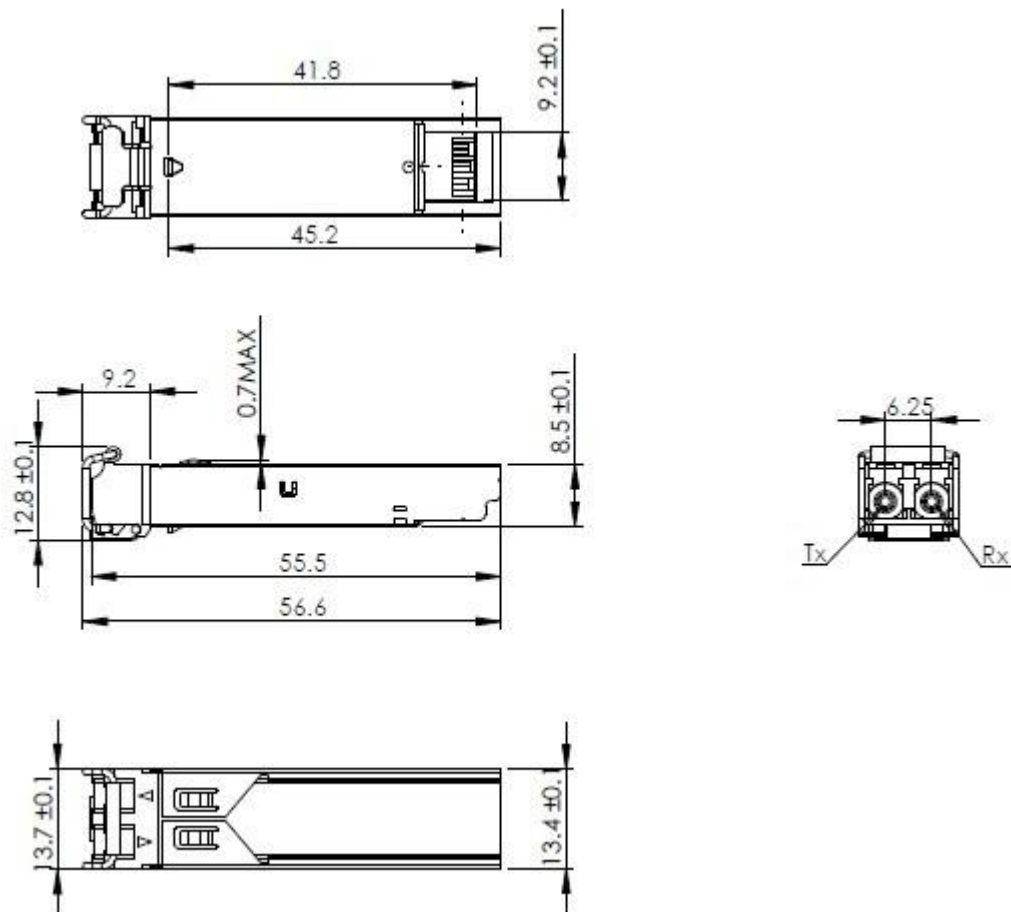Note B: Circuit assumes high impedance internal bias @Vcc-1.3V

Mechanical Dimensions:

Note: In the Part No. of <u>PCSFP-24-1xx12-22F</u>, XX stands for wavelength, such as:
   27: for 1270nm, 29: for 1290nm, 31: for 1310nm, 33: for 1330nm, 35: for 1350nm,
   37: for 1270nm, 39: for 1290nm, 41: for 1410nm, 43: for 1430nm, 45: for 1450nm,
   47: for 1470nm, 49: for 1490nm, 51: for 1510nm, 53: for 1530nm, 55: for 1550nm,
   57: for 1570nm, 59: for 1590nm, 61: for 1610nm.