Features

- Transmitter unit with CWDM DFB Laser diode
- Meet SFF MSA and SFP-8472 with single LC receptacle
- Operating data rate up to 2.5Gbps
- Digital diagnostic monitoring
- Hot-pluggable
- Metal enclosure for lower EMI
- +3.3V Single power supply
- Operating temperature:0 to +70℃
- Qualified to meet the intent of Bellcore reliability practices
- CML logic simplifies interface to external circuitry
- LVTTL logic Signal level RX LOS
- Compliant ROHS and lead free
- With pull de-latch

Application

- Metro Access Rings and Point-to-point networking for SONET
- Gigabit Ethernet and Fibre Channel

Product Selection

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1470nm	47	Gray	1550nm	55	Yellow
1490nm	49	Violet	1570nm	57	Orange
1510nm	51	Blue	1590nm	59	Red
1530mn	53	Green	1610nm	61	Brown

General Description

The optical transmitter is compliant with the Small Form- Factor Pluggable (SFP) Multi-Source Agreement (MSA) and SFP-8472. It is designed for single mode fiber and operates at CWDM wavelength of 1270~1610 nm. The transmitter module uses a DFB laser diode and full IEC825 and CDRH class 1 eye safety. The output power can be disabled via the single TxDis pin. Logic LVTTL HIGH level disables the transmitter. It contains APC function, temperature compensation circuit, LVPECL data inputs ,LVTTL Txdis input and Tx fault Output interface.

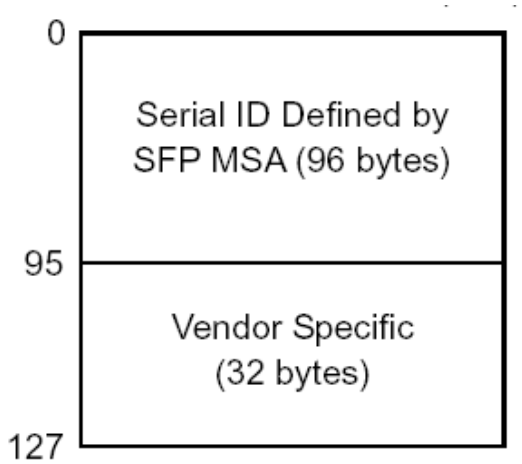
EEPROM Section

The optical transmitter contains an EEPROM. It provides access to sophisticated identification information that describes the transmitter's capabilities, standard interfaces, manufacturer, and other information.

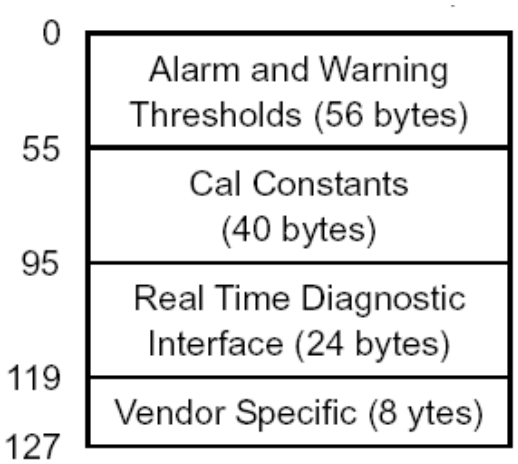
The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C01A/02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the EEPROM that are not write protected within the SFP transmitter. The negative edge clocks data from the SFP transmitter. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transmitter generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following.

Memory Map:



2 wire address 1010000x (A0h)



2 wire address 1010001x (A2h)

Performance Specifications

Table1. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Tst	-40	+85	℃
Operating Temperature	To	0	+70	℃
Input Voltage	-	GND	Vcc	V
Power Supply Voltage	Vcc-Vee	-0.5	+3.6	V

Note: Stress in excess of maximum absolute ratings can cause permanent damage to the module

Table2. Operating Environment

Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	Vcc	+3.1	+3.5	V
Ambient Operating Temperature	TA	0	+70	℃

Table3. Transmitter electrical and optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Center Wavelength	λ_p	λ-6	λ	λ+7.5	nm	T=0~+70℃ λ:1270~1610nm
Spectral Width (-20dB)	Δλ	-	-	1	nm	-
Side Mode suppression Ratio	SMSR	30	-	-	dB	-
Average Optical Output Power	Po	-10	-	-3	dBm	-
Extinction Ratio	EXT	8.2	-	-	dB	-
Transmitter disable Voltage	V_D	2.0	-	Vcc	V	-
Transmitter Enable Voltage	V_{EN}	0	-	0.8	V	-
Power supply Current	Icc	-	70	180	mA	1
Data Input Voltage	Vpp	300	-	1600	mV	-
Optical Rise/Fall Time	Tr/Tf	-	-	0.18	ns	-
Output Eye Diagram	Compliant with ITU recommendation G.957					

Pin Definition

Pin Out Diagram

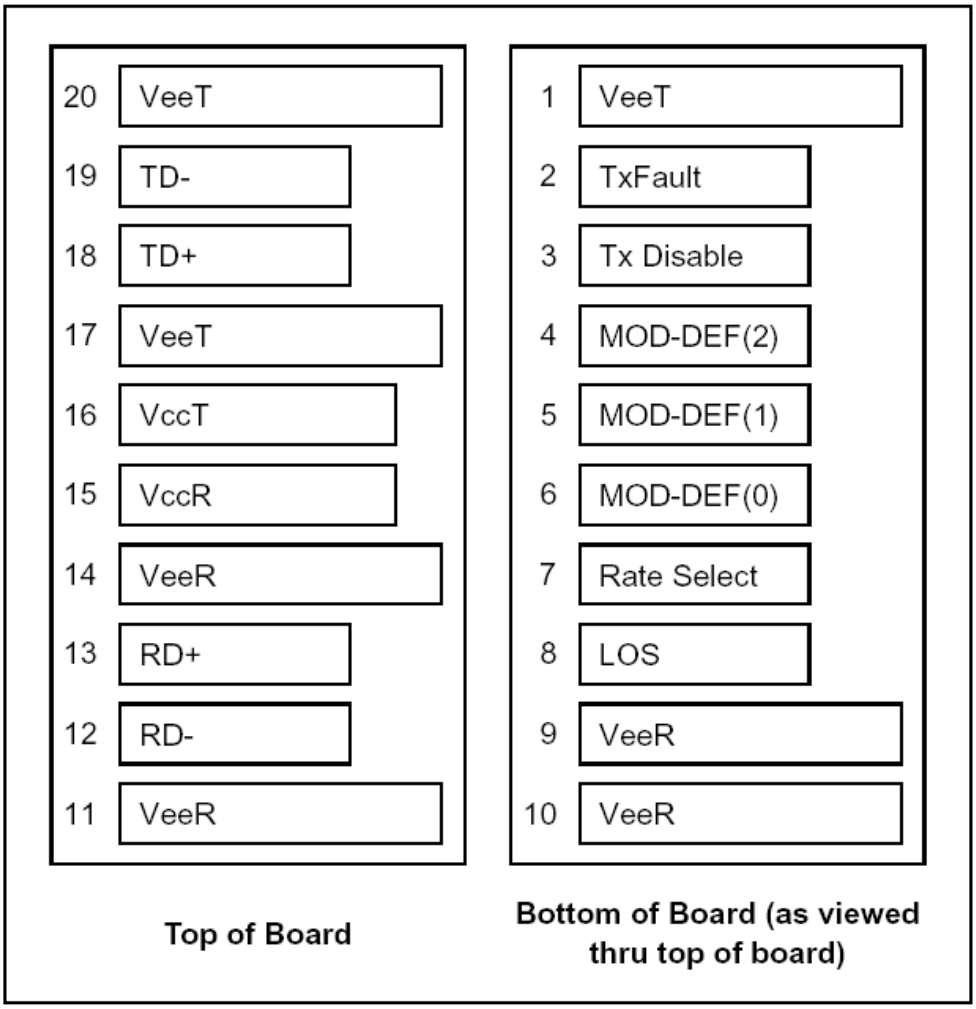


Table 4.Pin Function Definitions

Pin#	Name	Description	Notes
1	VeeT	Transmitter Ground	-
2	TX Fault	Transmitter Fault Indication	Notes 1
3	TX Disable	Transmitter Disable	Note 2, Module disables on high or open
4	MOD-DEF2	Module Definition 2	Note3, 2 wire serial ID interface
5	MOD-DEF1	Module Definition 1	Note 3, 2 wire serial ID interface
6	MOD-DEF0	Module Definition 0	Note 3, Grounded in Module
7	Rate Select	Not use	-
8	LOS	NC	-
9	VeeR	Receiver Ground	Note 5
10	VeeR	Receiver Ground	Note 5
11	VeeR	Receiver Ground	Note 5
12	RD-	NC	-
13	RD+	NC	-
14	VeeR	Receiver Ground	Note 5
15	VccR	NC	-
16	VccT	Transmitter Power	Note 4, 3.3V± 5%
17	VeeT	Transmitter Ground	Note 5
18	TD+	Transmit Data In	Note 6
19	TD-	Inv. Transmit Data In	Notes 6
20	VeeT	Transmitter Ground	Notes 5

Note:

1. **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.**
2. **TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7–10 KΩ resistor. Its states are:**

   Low (0 – 0.8V): Transmitter on

   (>0.8, < 2.0V): Undefined

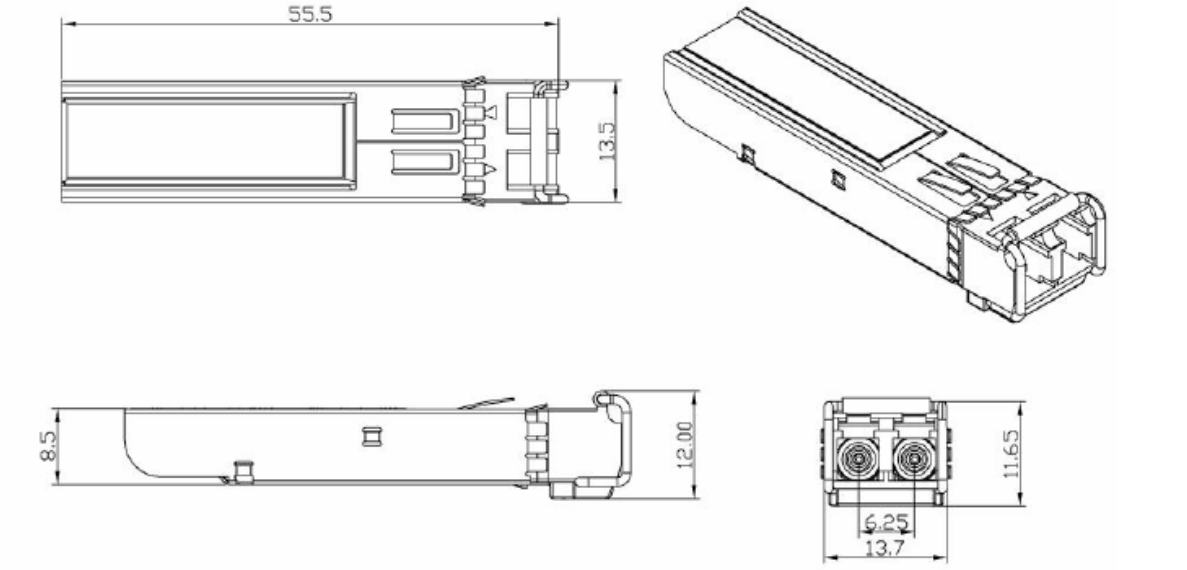
   High (2.0 – 3.465V): Transmitter Disabled

   Open: Transmitter Disabled
3. **Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩ resistor on the host board. The pull-up voltage shall be VccT or VccR. Mod-Def 0 is grounded by the**

module to indicate that the module is present Mod-Def 1 is the clock line of two wire serial interface for serial ID Mod-Def 2 is the data line of two wire serial interface for serial ID

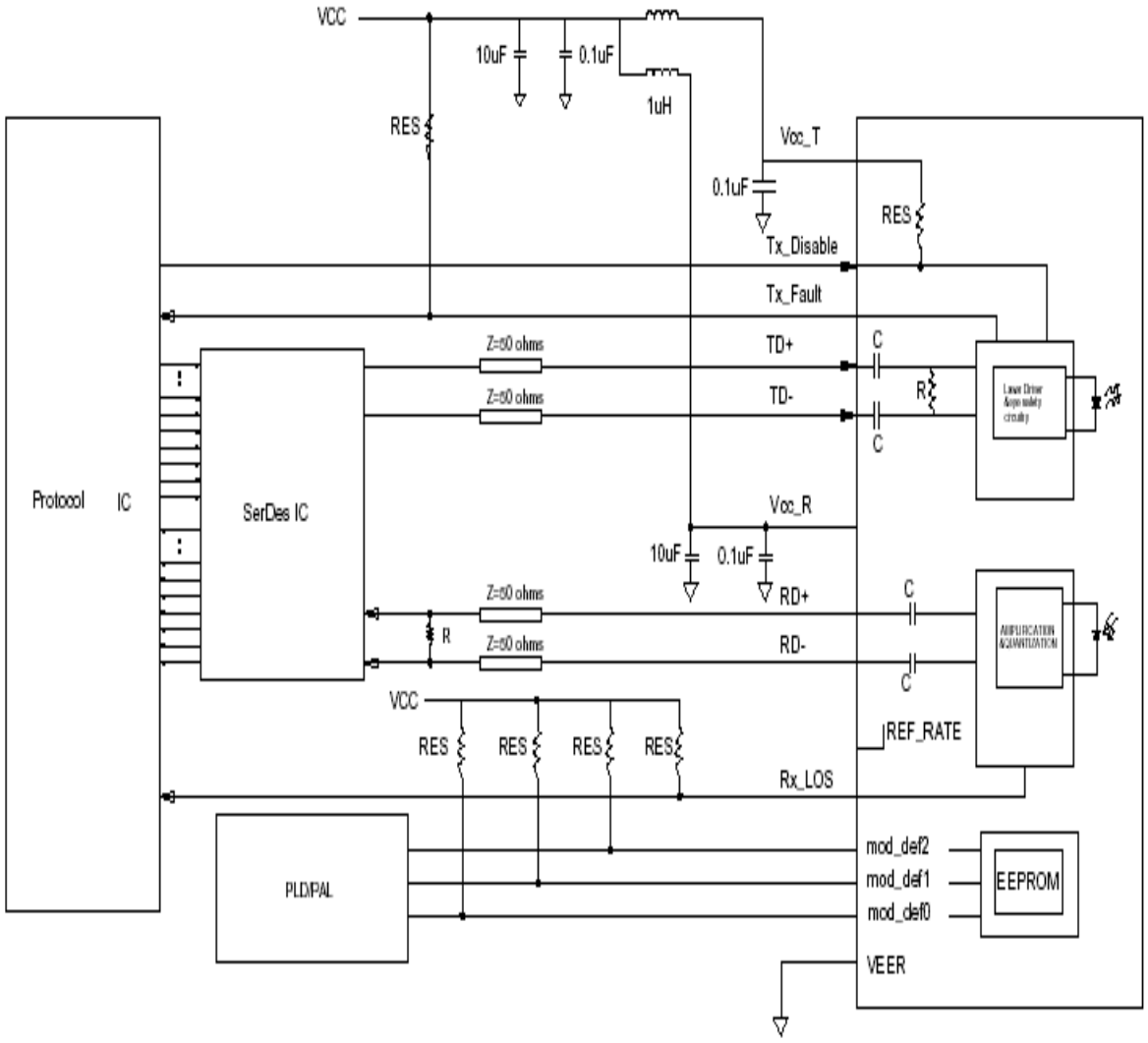
4. VccT is the transmitter power supplies. It's defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hotplugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value.
5. VeeR and VeeT may be internally connected within the SFP module.
6. TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

Package information



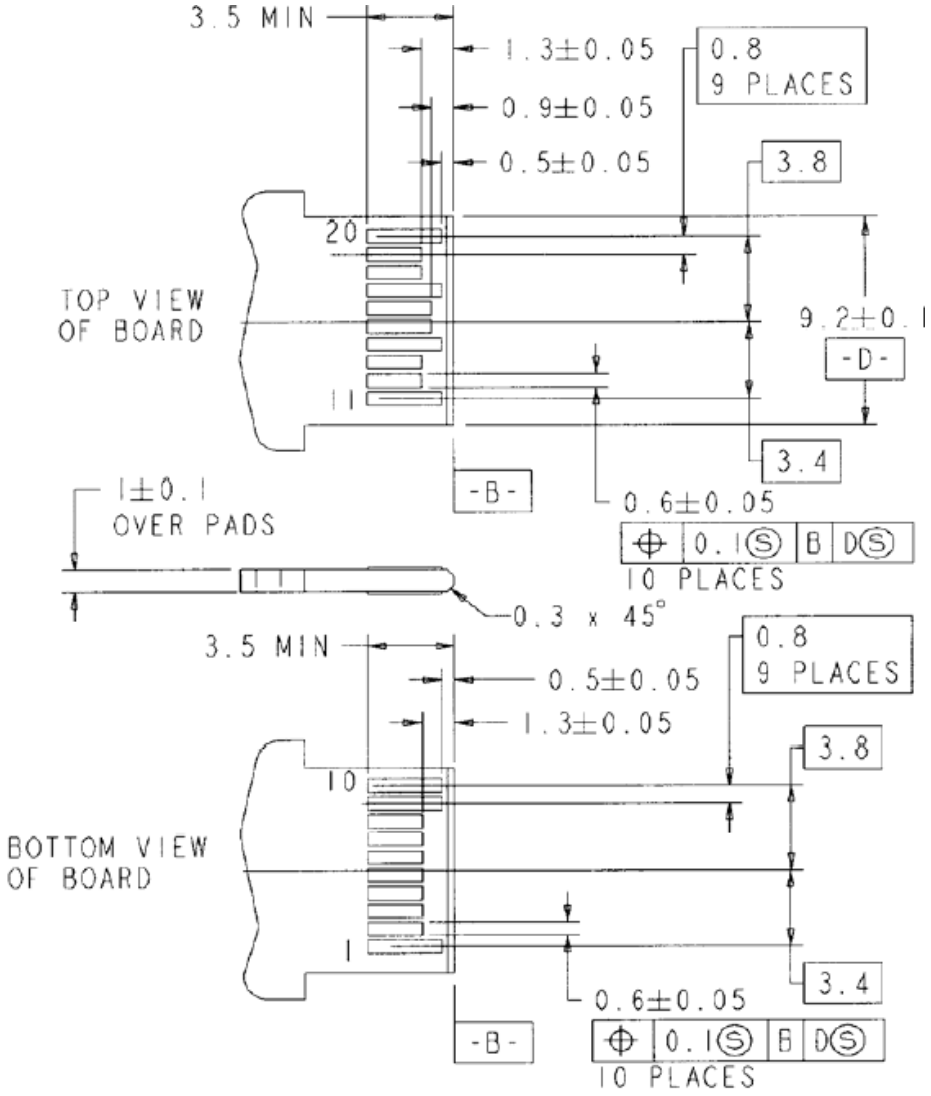
Unit: mm

Recommended Circuit



Note: 4.7K ohms < RES < 10K ohms

Recommended Board Layout Hole Pattern



For More Information

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Ordering Information

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Product classification
S: Normal
C: CWDM
M: Multi-mode

Package form:
P: SFP(W/DDM)
T: SFP(WO/DDM)

CWDM wavelength:
27:1270nm
29:1290nm
31:1310nm
33:1330nm
35:1350nm
37:1370nm
39:1390nm
41:1410nm
43:1430nm
45:1450nm
47: 1470nm
49: 1490nm
51: 1510nm
53: 1530nm
55: 1550nm
57: 1570nm
59: 1590nm
61: 1610nm

LD/PD type:
F: FP/PIN
D: DFB/PIN
V: VCSEL/PIN
A: DFB/APD

Data Rate:
3: 155M
4: 622M
5: 1.25G
6: 2.5G

Output Power

Operating Tempe Range:
1: 0～70℃
2: -40～85℃

Logic Level:
2: PECLSignle/TTLSD

Connector Type:
5: LC/PC

T: Transmitter
R: Receiver