SFP-CWDM-01XX
155M~2.67Gbps CWDM SFP

Transceiver with Digital Diagnostic

Feature

- Compliant with SFP Transceiver SFF-8472 MSA specification with internal calibration
- Compliant with proposed specifications for IEEE 802.3z/Gigabit Ethernet
- Up to 2.125/2.5Gb/s bi-directional data link
- Single + 3.3V Power Supply
- Uncooled DFB laser transmitter
- 8 channels can be selected from 1470 nm to 1610nm in wavelength
- High sensitivity APD receiver
- Clasp Color code for different wavelengths
- Hot Pluggable
- Industry standard small form pluggable (SFP) package
- Duplex LC Connector interface
- Metal enclosure, Low EMI
- Operating temperature 0°C to +70°C
- Class 1 Laser Product Compliant with the Requirements of IEC 60825-1 and IEC 60825-2

Applications

- 1X/2X Fibre Channel
- Gigabit Ethernet
- SDH/SONET/ATM
- Other optical links

Description

The SFP-CWDM pluggable transceiver module is a high performance integrated duplex data link for bi-directional communication . It is designed are designed for operation in Metro Access Rings and Point-to-Point networks using SONET,SDH, Gigabit Ethernet and Fibre Channel networking equipment.

They are available in eight different CWDM wavelengths. Digital diagnostics functions are available via a two wire serial bus.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	Ts	-40		85	ºC	
Supply Voltage	VCC	0		6	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Ambient Operating Temperature	T_A	0		70	ºC	
Supply Voltage	VCC	3.15	3.3	3.6	V	
Baud Rate			2488	2670	Mbps	
Total Supply Current	I_{CC}			300	mA	
Surge Current	Isurge			+30	mA	

PERFORMANCE SPECIFICATIONS - ELECTRICAL

0ºC<Tc<+70°C; +3.15V<Vcc<+3.6V

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
TRANSMITTER						
CML/PECL Inputs (Differential)	Vin	400		2500	mVpp	AC coupled nputs
Input Impedance (Differential)	Zin	85	100	115	ohms	Rin > 100 ohms @ DC
Tx_DISABLE Input Voltage - High		Vcc – 1.3		Vcc	V	
Tx_DISABLE Input Voltage - Low		Vee		Vee+ 0.8	V	
Transmit Disable Assert Time				10	µs	
Tx_FAULT Output Voltage -- High		Vcc-0.5		Vcc+0.3	V	Io = 400µA; Host Vcc
Tx_FAULT Output Voltage -- Low		0		0.5	V	Io = -4.0mA
RECEIVER						
CML Outputs (Differential)	$\mathbf{V}_{out}$	400	800	1200	mVpp	AC coupled outputs
Output Impedance (Differential)	Z_{out}	85	100	115	ohms	
Rx_LOS Output Voltage - High		Vcc-0.5		VccHOST	V	lo = 400µA; Host Vcc
Rx_LOS Output Voltage – Low		Vee		Vee+0.5	V	lo = -4.0mA
RMS Jitter				0.01	UI	Measured @2.5Gbps, 2^{23}-1PRBS pattern

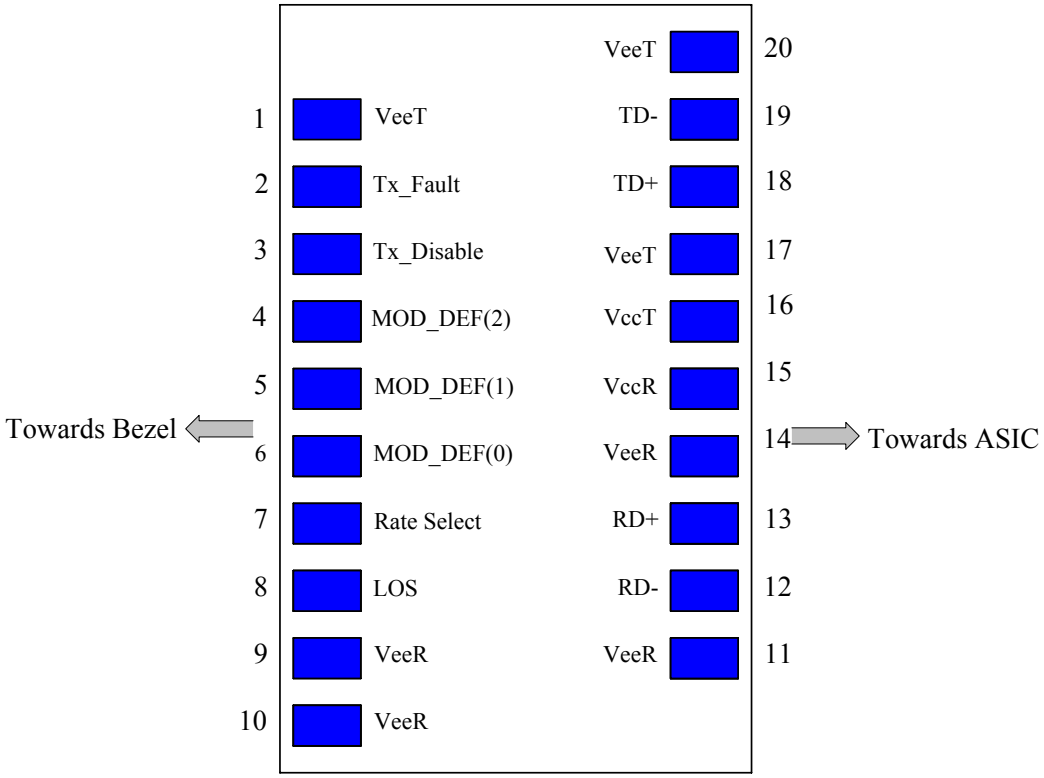
OPTICAL SPECIFICATIONS

0ºC<Tc<+80°C; +3.15V<Vcc<+5.25V

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
TRANSMITTER						
Optical Transmit Power	Po	0		5	dBm	Average
Extinction Ratio	ER	8.2			dB	P1/P0
Optical Center Wavelength	λ*C*	x-6.5	x	x+6.5	nm	Note1
Spectral Width (-20dB)	Δλ			1	nm	
Side-mode Suppression ratio	*SMSR*	30			dB	
RMS Jitter				0.01	UI	Measured @2.5Gbps, 2^{23}-1PRBS pattern
RECEIVER						
Optical Center Wavelength	λ_c	1450		1620	nm	
Average Rx Sensitivity	P_{in}			-28	dBm	BER<1.0E-12 @2.5G bps
Optical Input Power-maximum	P_{in}	-7			dBm	BER<1.0E-12 @2.5G bps
Optical Return Loss	ORL	12			dB	
RX_LOS - Asserted	Pa	-45			dBm	Measured on transition - Low to High
RX_LOS - Deasserted	Pd			-29	dBm	Measured on transition - High to Low

Note1: "X" can be specified by the customer. The current available wavelengths are : 1470,1490,1510,1530,1550,1570,1590 and 1610nm

SFP Transceiver Electrical Pad Layout



Pin Function Definitions

Pin Num.	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2 Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, Data line for Serial ID.
5	MOD-DEF1	Module Definition 1	3	Note 3, Clock line for Serial ID.
6	MOD-DEF0	Module Definition 0	3	Note 3, Grounded within the module.
7	Rate Select	Not Connect	3	Function not available
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5

12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

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 K Ω 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 – 10KΩresistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). 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) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5) VeeR and VeeT may be internally connected within the SFP module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 –1000 mV single ended) when properly terminated.
7) VccR and VccT are the receiver and transmitter power supplies. They are 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 1 ohm 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, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

8) 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. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600mV single-ended) be used for best EMI performance.

Digital Diagnostic Functions

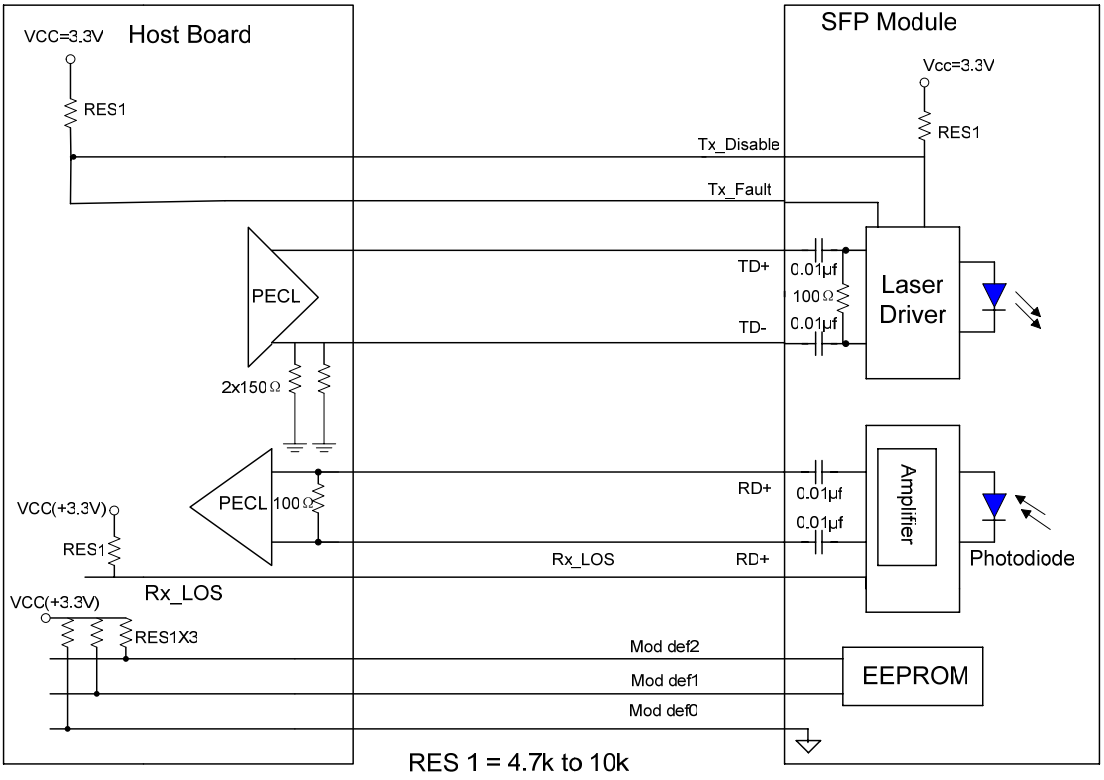
Zytom SFP CWDM SFP transceivers support the 2-wire serial communication protocol as defined in the draft SFP MSA. It is very closely related to the E^2PROM defined in the GBIC standard, with the same electrical specifications.

The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

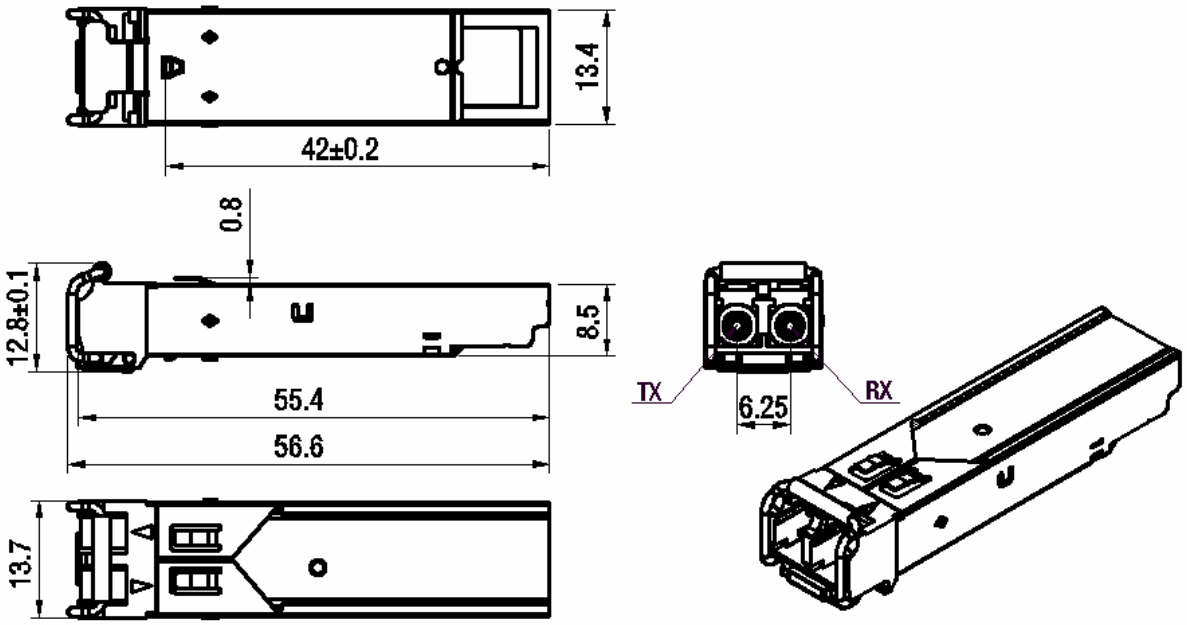
Additionally, Zytom SFP trans ceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end- users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in E_2PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement.

Recommend Circuit Schematic



Mechanical Specifications



Ordering information

Part No.	Wavelength	Clasp Color Code	Distance
SFP-CWDM-80-47D	1470 nm	Gray	80Km
SFP-CWDM-80-49D	1490 nm	Violet	80Km
SFP-CWDM-80-51D	1510 nm	Blue	80Km
SFP-CWDM-80-53D	1530 nm	Green	80Km
SFP-CWDM-80-55D	1550 nm	Yellow	80Km
SFP-CWDM-80-57D	1570 nm	Orange	80Km
SFP-CWDM-80-59D	1590 nm	Red	80Km
SFP-CWDM-80-61D	1610 nm	Brown	80Km

NOTICE:

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CONTACT:

Add: C5, 17th Floor, Yue Hu Building,Minzhi Road, Bao'an District, Shenzhen, China

Tel: (+86) 0755-88821664

Fax: (+86) 0755-26859755

Posal: 518131

E-mail:sales@zytom.com

http://www.zytom.com