

VC-2.5G-SFP-ZX-120

2.5Gbps 1550nm 120km duplex SFP Transceiver

Features

- ✓ Up to 2.5Gbps data rate
- ✓ Duplex LC receptacle optical interface compliant
- ✓ Single +3.3V power supply
- ✓ DDMI function available with internally calibrated mode
- ✓ Hot-pluggable
- ✓ Receiver loss of signal output
- ✓ Transmitter disable input
- ✓ International Class1 laser safety certified
- ✓ Operating temperature range:
 - Commercial: -5°C~70°C
 - Industrial: -40°C~85°C
- ✓ RoHS Compliant

Application

- ✓ Gigabit Ethernet
- ✓ 1x/2x Fiber Channel
- ✓ SONET/SDH, OC-3/STM-1, OC-12/STM-4, OC-48/STM-16
- ✓ Switch to Switch Interface
- ✓ Other Optical Links

Standard

- ✓ Compliant with SFP MSA (INF-8074i)
- ✓ Compliant with SFF-8472
- ✓ Compliant with ITU-T G.957

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage temperature	TS	-40	85	°C
Power Supply Voltage	V _{CC}	0	3.6	V
Relative Humidity	RH	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _C	-5		70	°C	VC-2.5G-SFP-ZX-12 0C
		-40		85		VC-2.5G-SFP-ZX-12 0I
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V	
Data Rate	OC-48/STM-16		2.488		Gbps	
	2FC		2.125			
	GBE		1.25			
	FC		1.063			
Fiber Length 9/125μm core SMF				120	km	

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Total Supply Current	I _{CC}			300	mA	
Transmitter						
Transmitter Differential Input Voltage		400		2400	mV	
Tx_Fault Output Voltage - High	V _{OH}	2.4		V _{CC}	V	LVTTL
Tx_Fault Output Voltage - Low	V _{OL}	0		0.4	V	LVTTL
Tx_Disable Input Voltage - High	V _{IH}	2		V _{CC}	V	LVTTL

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Tx_Disable Input Voltage - Low	V _{IL}	0		0.8	V	LVTTL
Input Differential Impedance		90	100	110	Ω	
Receiver						
Receiver Differential Output Voltage		600		1600	mV	
LOS Output Voltage - High	V _{OH}	2.4		V _{cc}	V	LVTTL
LOS Output Voltage - Low	V _{OL}	0		0.4	V	LVTTL
Output Differential Impedance		90	100	110	Ω	

Optical Transmitter Characteristics

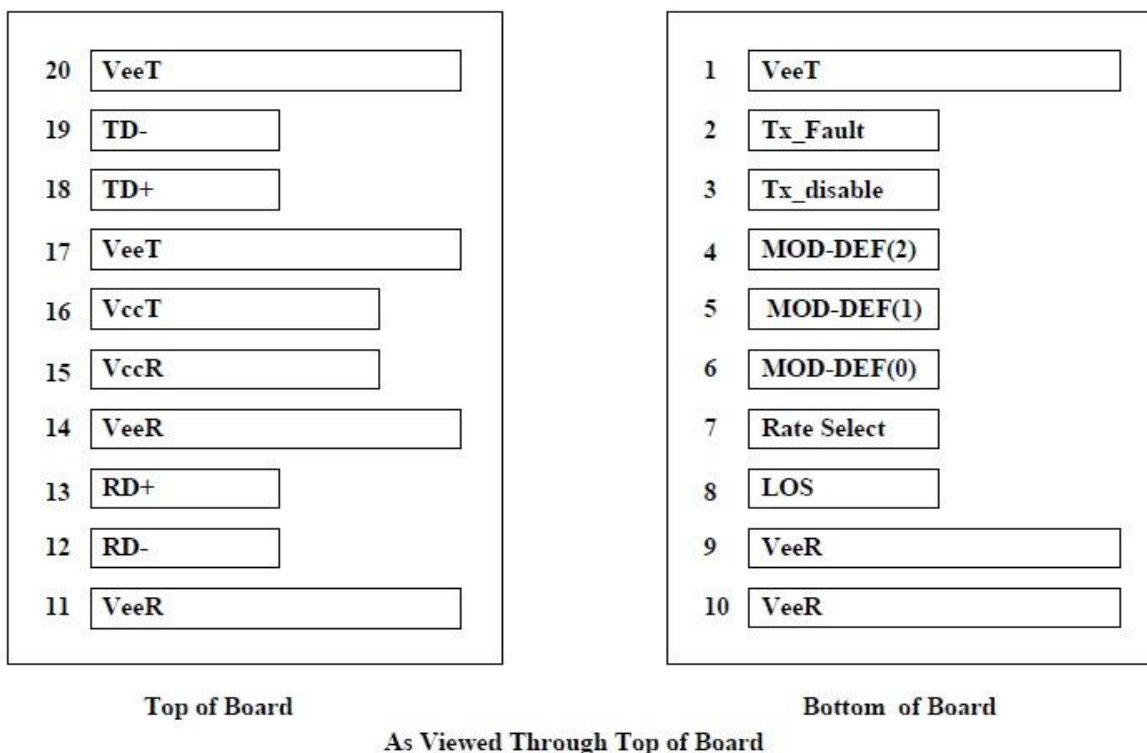
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Output Power	P _{OUT}	0		5	dBm	
Center Wavelength	λ _c	1530	1550	1570	nm	
Spectral Width(-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	8.2			dB	
Transmitter OFF Power	P _{OFF}			-45	dBm	
Jitter P-P	T _J			0.1	UI	
Output Eye Diagram	Complies with ITU-T G.957					

Optical Receiver Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Center Wavelength	λ _c	1260		1610	nm	
Receiver Sensitivity	P _{SEN}			-27	dBm	1
Input Saturation Power (Overload)	P _{SAT}	0			dBm	
LOS De-assert Level	LOSD			-28	dBm	
LOS Assert Level	LOSA	-42			dBm	
LOS hysteresis	HYS	0.5		6	dB	

Note 1. Measured with PRBS2²³-1 pattern, @2.488Gbps, ER=9dB, BER=1x10⁻¹².

Pin Definition



Pin No	Symbol	Name/Description	Power Seq.	Notes
1	VeeT	Transmitter Ground	1st	
2	TX_Fault	Transmitter Fault Indication, Logic 1 indicates Transmitter Fault.	3rd	1
3	TX_Disable	Transmitter Disable, Transmitter disables on high or open.	3rd	2
4	MOD-DEF(2)	Module Definition 2. Data line for two wire Serial ID.	3rd	3
5	MOD-DEF(1)	Module Definition 1. Clock line for two wire Serial ID.	3rd	3
6	MOD-DEF(0)	Module Definition 0. Grounded within the module.	3rd	3
7	Rate Select	Not Connected	3rd	
8	LOS	Loss of Signal indication. Logic 1 indicates Loss of Signal.	3rd	4
9	VeeR	Receiver Ground	1st	
10	VeeR	Receiver Ground	1st	
11	VeeR	Receiver Ground	1st	
12	RD-	Inverse Received Data Out, AC coupled	3rd	

Pin No	Symbol	Name/Description	Power Seq.	Notes
13	RD+	Received Data Out, AC coupled	3rd	
14	VeeR	Receiver Ground	1st	
15	VccR	Receiver Power	2nd	
16	VccT	Transmitter Power	2nd	
17	VeeT	Transmitter Ground	1st	
18	TD+	Transmit Data In, AC coupled	3rd	
19	TD-	Inverse Transmit Data In, AC coupled	3rd	
20	VeeT	Transmitter Ground	1st	

Note 1. TX Fault is open collector/drain output which should be pulled up externally with a 4.7k - 10k Ω resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

Note 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 4.7k - 10k Ω resistor. It's states are:

Low (0 - 0.8V): Transmitter on
 (0.8 - 2.0V): Undefined
 High (2.0 - 3.465V): Transmitter Disabled
 Open: Transmitter Disabled

Note 3. Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k - 10k Ω resistor on the host board. The pull-up voltage shall be VccT or VccR.

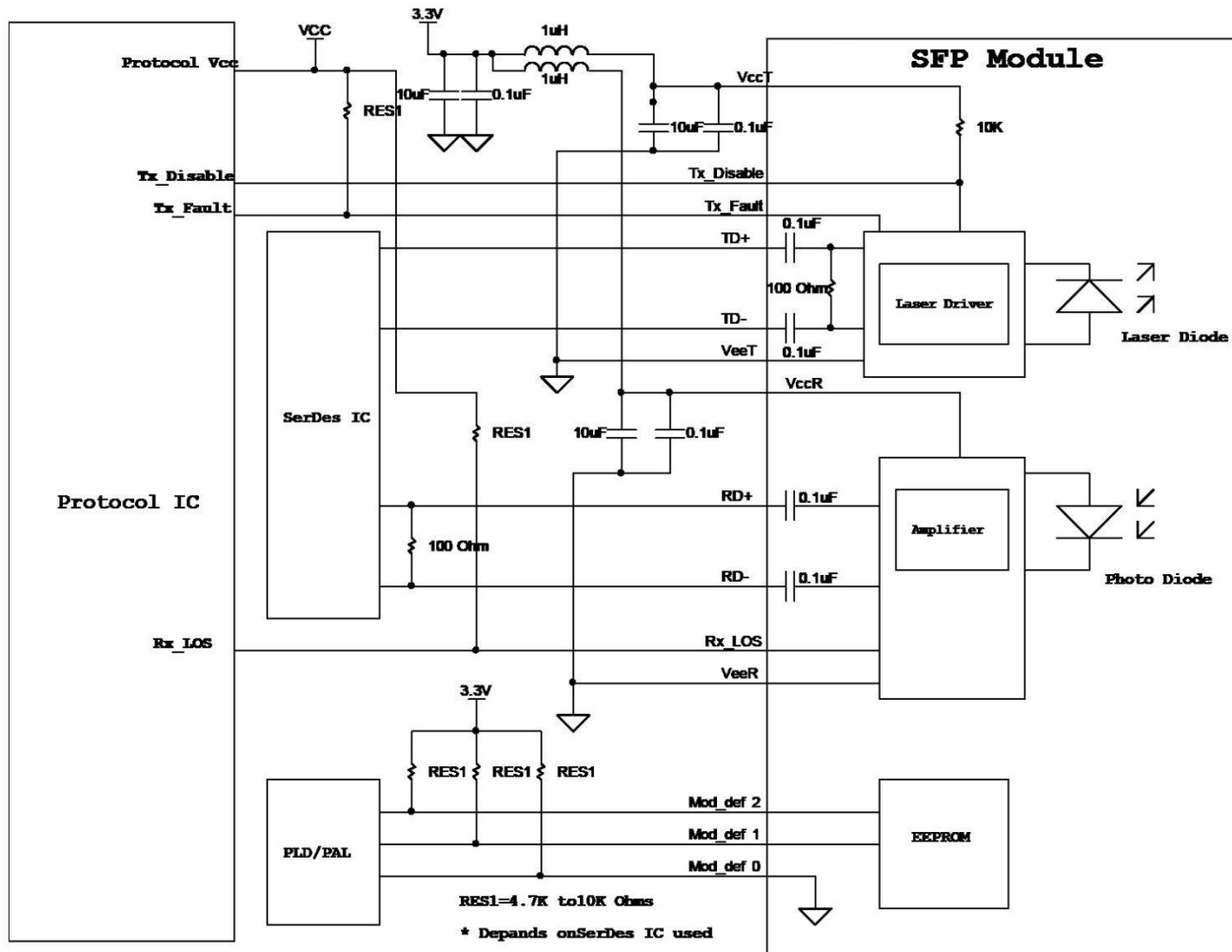
Mod-Def 0 is grounded by the module to indicate that the module is present

Mod-Def 1 is the clock line of two wire serial interface for serial ID

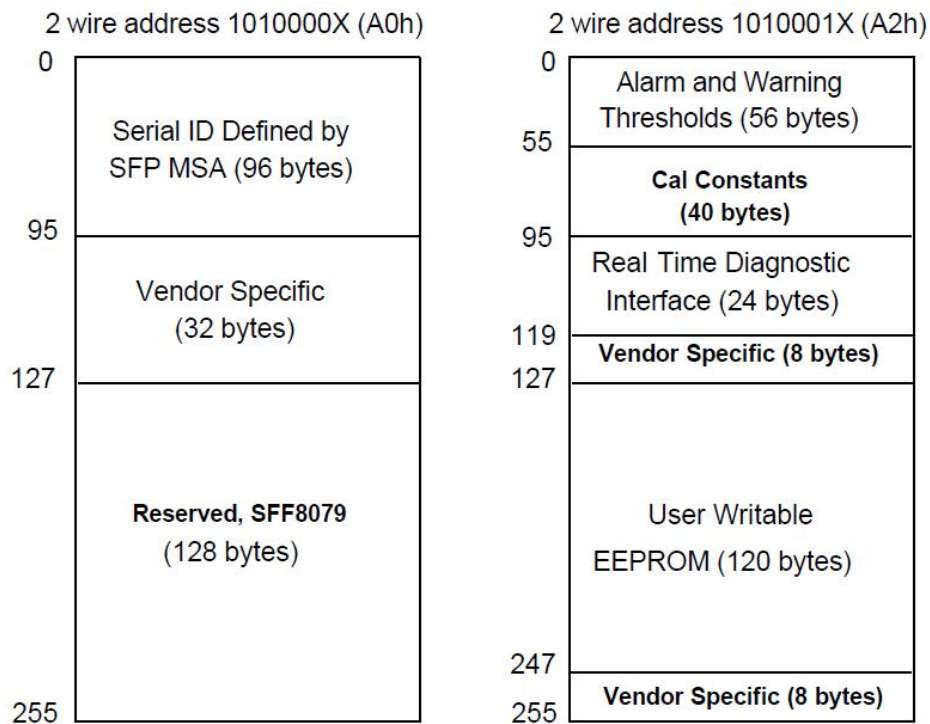
Mod-Def 2 is the data line of two wire serial interface for serial ID

Note 4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7k - 10k Ω 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.

Typical Application Circuit



Digital Diagnostic Memory Map



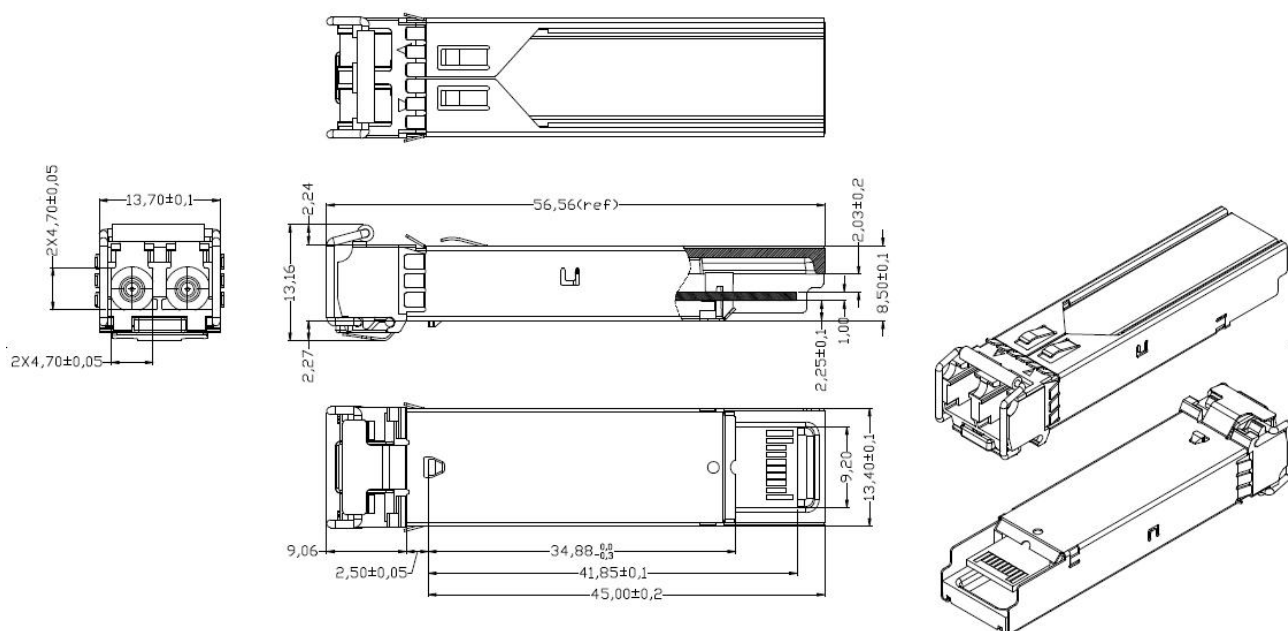
EEPROM Serial ID Memory Contents

The optical transceiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. 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 writing protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. 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 transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, 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 fields define as following.

Package Outline

Dimensions are in millimeters. All dimensions are ± 0.1 mm unless otherwise specified. (Unit: mm)



Ordering Information

Part Number	Specifications					
	Package	Data Rate (Gbps)	Wavelength (nm)	Temperature (°C)	Reach (km)	DDM
VC-2.5G-SFP-ZX-1 20C	SFP	2.5	1550	-5~70	120	Y
VC-2.5G-SFP-ZX-1 20I	SFP	2.5	1550	-40~85	120	Y