3Gbps Video CWDM SFP Transceiver

VC1xx09-SFP-LC.S80

Features

- HD-SDI SFP Transceiver available
- SD-SDI SFP Transceiver available
- 3G-SDI SFP Transceiver available
- SMPTE 297-2006 compatible
- Duplex LC receptacle optical interface compliant
- Single +3.3V power supply
- 18 CWDM DFB laser and APD photo detector
- 28dB guaranteed link budget
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Digital Diagnostic functions available through the I2C interface
- International Class1 laser safety certified
- Operating temperature range:

  Commercial: 0°C~70°C
- RoHS Compliant

Application

- SMPTE 297-2006 Compatible Electrical-to-Optical Interfaces
- HDTV/SDTV Service Interfaces
- Other Optical Links

Standard

- Compliant with SFP MSA (INF-8074i)
- Compliant with SFF-8472
- Compliant with SMPTE

Ordering Information

Part Number	Specifications					
	Package	Data Rate (Gbps)	Wavelength (nm)	Temperature (°C)	Link Budget (dB)	DDM
VC1xx09-SFP-LC.S80	SFP	2.97	CWDM	0~70	28	Yes

Note: xx means CWDM wavelength range from 1270nm to 1610nm, as table below.

xx	Wavelength	Band
27	1270nm	O-band
29	1290nm	
31	1310nm	
33	1330nm	
35	1350nm	
37	1370nm	E-band
39	1390nm	
41	1410nm	
43	1430nm	
45	1450nm	
47	1470nm	S-band
49	1490nm	
51	1510nm	
53	1530nm	
55	1550nm	C-band
57	1570nm	L-band
59	1590nm	
61	1610nm	

Specification

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	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Data Rate			2.97		Gbps	
Link Budget @9/125μm SMF		28			dB	

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Total Supply Current	I_{CC}			400	mA	
Transmitter						
Transmitter Differential Input Voltage		400		1800	mV	
Tx_Fault Output Voltage - High	V_{OH}	2.0		Vcc	V	LVTTL
Tx_Fault Output Voltage - Low	V_{OL}	0		0.8	V	LVTTL
Tx_Disable Input Voltage - High	V_{IH}	2.0		Vcc	V	LVTTL
Tx_Disable Input Voltage - Low	V_{IL}	0		0.8	V	LVTTL
Input Differential Impedance		90	100	110	Ω	
Receiver						
Receiver Differential Output Voltage		650		1000	mV	
LOS Output Voltage - High	V_{OH}	2.0		Vcc	V	LVTTL
LOS Output Voltage - Low	V_{OL}	0		0.8	V	LVTTL
Output Differential Impedance		90	100	110	Ω	

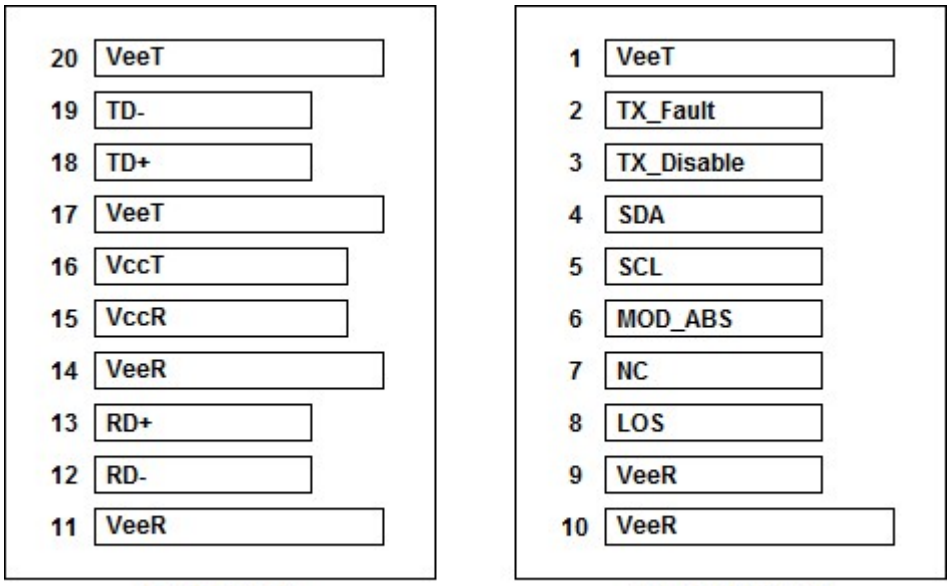
Optical Transmitter Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Output Power	P_{OUT}	0		5	dBm	
Center Wavelength	λc	λc-6.5	λc	λc+6.5	nm	
Spectral Width(-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	5			dB	

Optical Rise/Fall Time	T_R/T_F			160	ps	
Transmitter OFF Power	P_{OFF}			-45	dBm	
Jitter P-P	T_J			0.1	UI	
Output Eye Diagram	Complies with SMPTE 297-2006					
Optical Receiver Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Center Wavelength	λc	1260		1610	nm	
Receiver Sensitivity @2.97Gbps	P_{SEN}			-28	dBm	
Receiver Sensitivity @1.485Gbps	P_{SEN}			-29	dBm	
Receiver Sensitivity @270Mbps	P_{SEN}			-30	dBm	
Input Saturation Power (Overload)	P_{SAT}	-8			dBm	
LOS De-assert Level	LOSD			-33	dBm	
LOS Assert Level	LOSA	-42			dBm	
LOS hysteresis	HYS	1		4	dB	

Note 1. Measured with PRBS2^{23}-1 pattern, @2.97Gbps, BER=1x10^{-12}.

Pin Definition



As Viewed Through Top of Board

Pin No.	Symbol	Name/Description	Power Seq.	Notes
1	VeeT	Transmitter Ground	1st	1
2	TX_Fault	Transmitter Fault Indication, Low: normal; High: abnormal	3rd	2

3	TX_Disable	Transmitter Disable input High: Transmitter off; Low: Transmitter on	3rd	3
4	SDA	I2C Serial Data Signal	3rd	4
5	SCL	I2C Serial Clock Signal	3rd	4
6	MOD_ABS	Module Absent, Grounded in the Module	3rd	5
7	NC	Not Connected	3rd	
Pin No.	**Symbol**	**Name/Description**	**Power Seq.**	**Notes**
8	RX_LOS	Receiver Loss of Signal indication High: loss of signal; Low: signal detected	3rd	6
9	VeeR	Receiver Ground	1st	
10	VeeR	Receiver Ground	1st	
11	VeeR	Receiver Ground	1st	
12	RD-	Inverted Received Data Out, AC coupled	3rd	
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-	Inverted Transmit Data In, AC coupled	3rd	
20	VeeT	Transmitter Ground	1st	

Power Seq.: Pin engagement sequence during hot plugging.

Note1. The module signal ground contacts.

Note2. TX_Fault is an open drain/collector and should be pulled up to Vcc on the host with a 4.7k - 10kΩ resister.

Note3. TX_Disable is pulled up to Vcc with a 4.7k - 10kΩ resistor inside the module. The states are:

Low (0 - 0.8V): Transmitter on

(0.8 - 2.0V): Undefined

High (2.0 - 3.465V): Transmitter Disabled

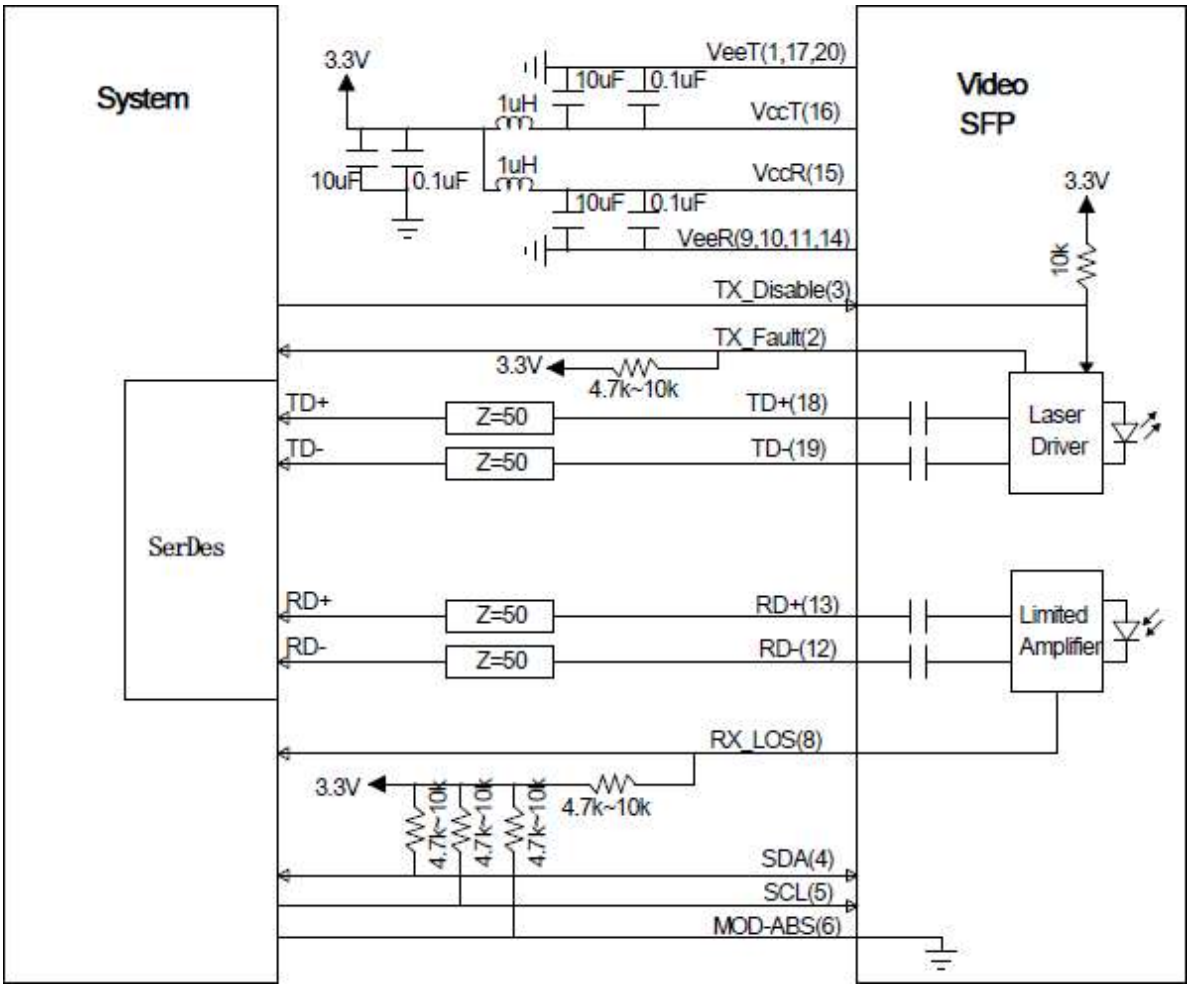
Open: Transmitter Disabled

Note4. SDA&SCL (I2C) shall be pulled up with a 4.7k - 10kΩ resistors on host board.

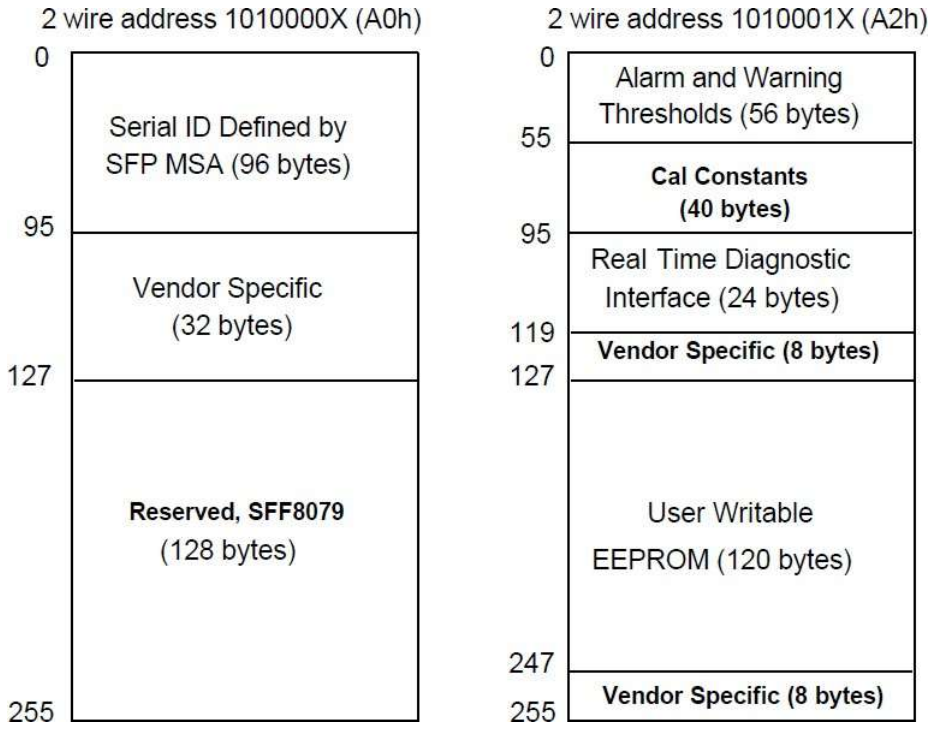
Note5. Mod_ABS is connected to Ground inside the module.

Note6. RX_LOS is loss of signal indication, shall be pulled up a 4.7k - 10kΩ resistor on host board.

Typical Application Circuit



Digital Diagnostic Memory Map



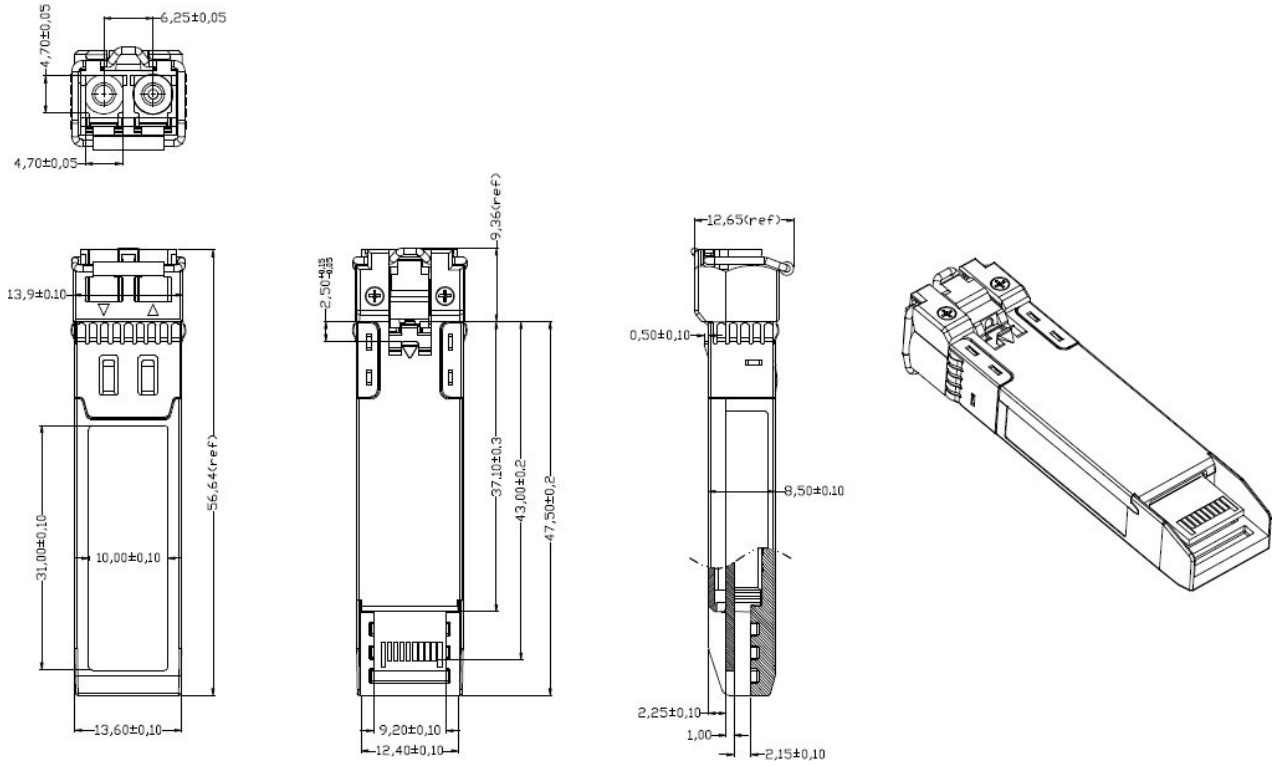
EEPROM Serial ID Memory Contents

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 ±0.1mm unless otherwise specified. (Unit: mm)



Revision History

Version	Initiated	Reviewed	Revision	Release Date
V1.0	Hu	Kevin	New Release	Feb. 18, 2026

For More Information

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