3Gbps 10km Video 1310nm SFP Single Transmitter MSA

V13109-SFP-TLC.S10

Features

- HD-SDI SFP Transmitter available
- SD-SDI SFP Transmitter available
- 3G-SDI SFP Transmitter available
- SMPTE 297-2006 compatible
- Simplex LC receptacle optical interface compliant
- Single +3.3V power supply
- Compliant with SFP MSA and SFF-8472
- Digital Diagnostic functions available through the I2C interface
- International Class1 laser safety certified
- Operating temperature range:
  Commercial: 0°C~70°C
  Industrial: -40°C~85°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)	Reach (km)	MSA
V13309-SFP-TLC.S10	SFP	2.97	1310	0~70	10	Yes
V13309-SFP-TLC.S10(WT)	SFP	2.97	1310	-40~85	10	Yes

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	%

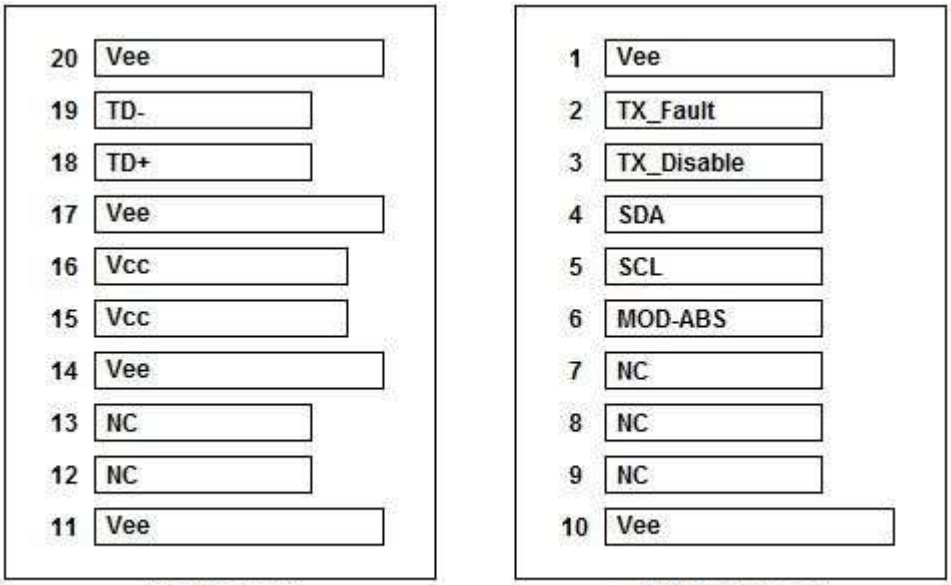
Recommended Operating Conditions						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T_C	0		70	°C	VC13109-SFP-TLC.S10
		-45		80		VC13109-SFP-TLC.S10(WT)
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Data Rate			2.97		Gbps	
Fiber Length 9/125μm core SMF				10	km	

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}	2.0		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	

Optical Transmitter Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Output Power	P_{OUT}	-7		0	dBm	
Center Wavelength	λc	1260	1310	1360	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					

Pin Definition



As Viewed Through Top of Board

Pin No.	Symbol	Name/Description	Power Seq.	Notes
1	Vee	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, Connect to Vee in Module	3rd	5
7	NC	NC	3rd	
8	NC	NC	3rd	
9	NC	NC	3rd	
10	Vee	Ground	1st	1
11	Vee	Ground	1st	1
12	NC	NC	3rd	
13	NC	NC	3rd	
14	Vee	Ground	1st	1
15	Vcc	Power Supply	2nd	
16	Vcc	Power Supply	2nd	
17	Vee	Ground	1st	1
18	TD+	Transmitter Non-Inverted Data in. AC Coupled	3rd	

Pin No.	Symbol	Name/Description	Power Seq.	Notes
19	TD-	Transmitter Inverted Data in. AC Coupled	3rd	
20	Vee	Ground	1st	1

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.

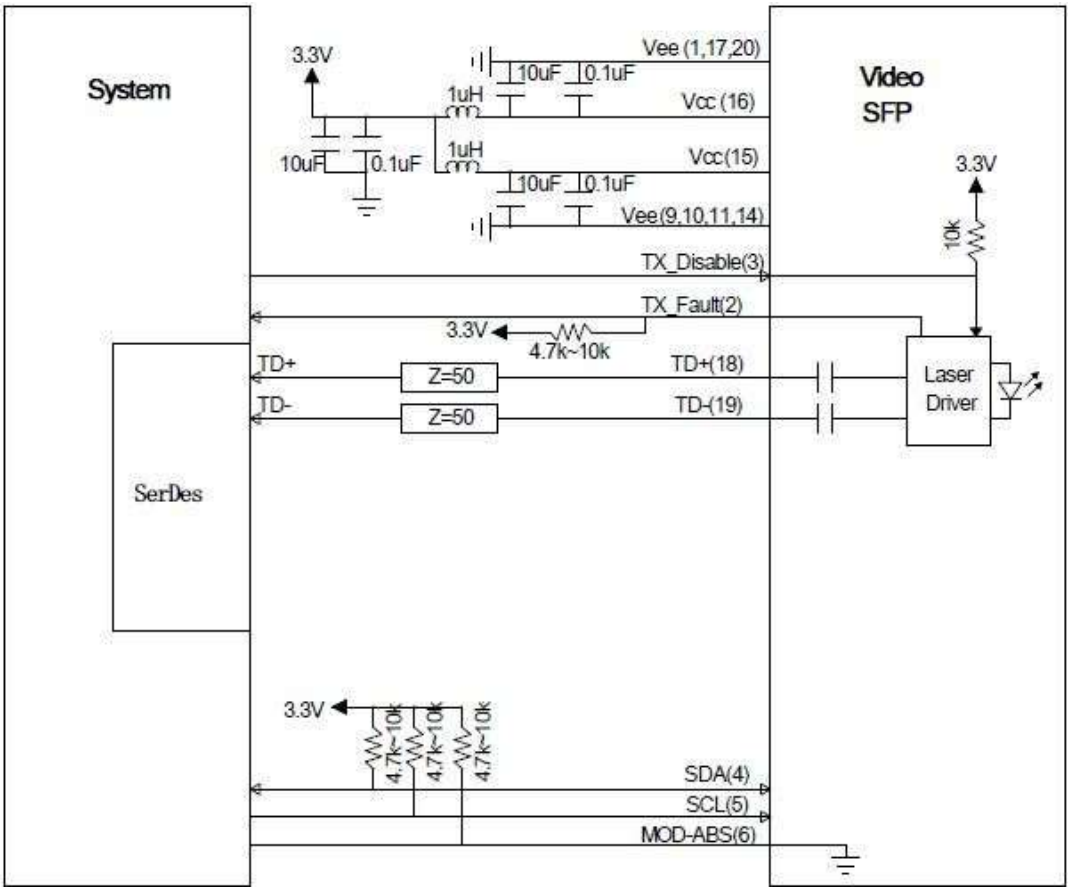
Note3. TX_Disable is pulled up to Vcc with a 4.7k - 10kΩ resistor inside the module. It's states are:

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

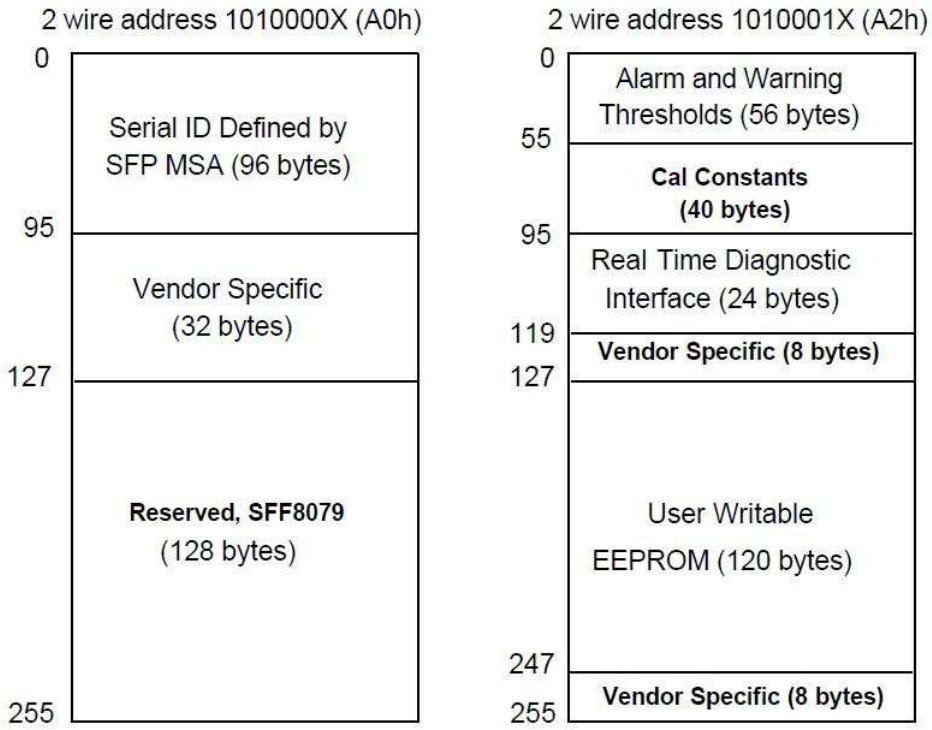
Note4. SDA&SCL (I2C) shall be pulled up with a 4.7k - 10kΩ resistors on host board.

Note5. MOD_ABS is connected to Ground inside the module.

Typical Application Circuit



Digital Diagnostic Memory Map



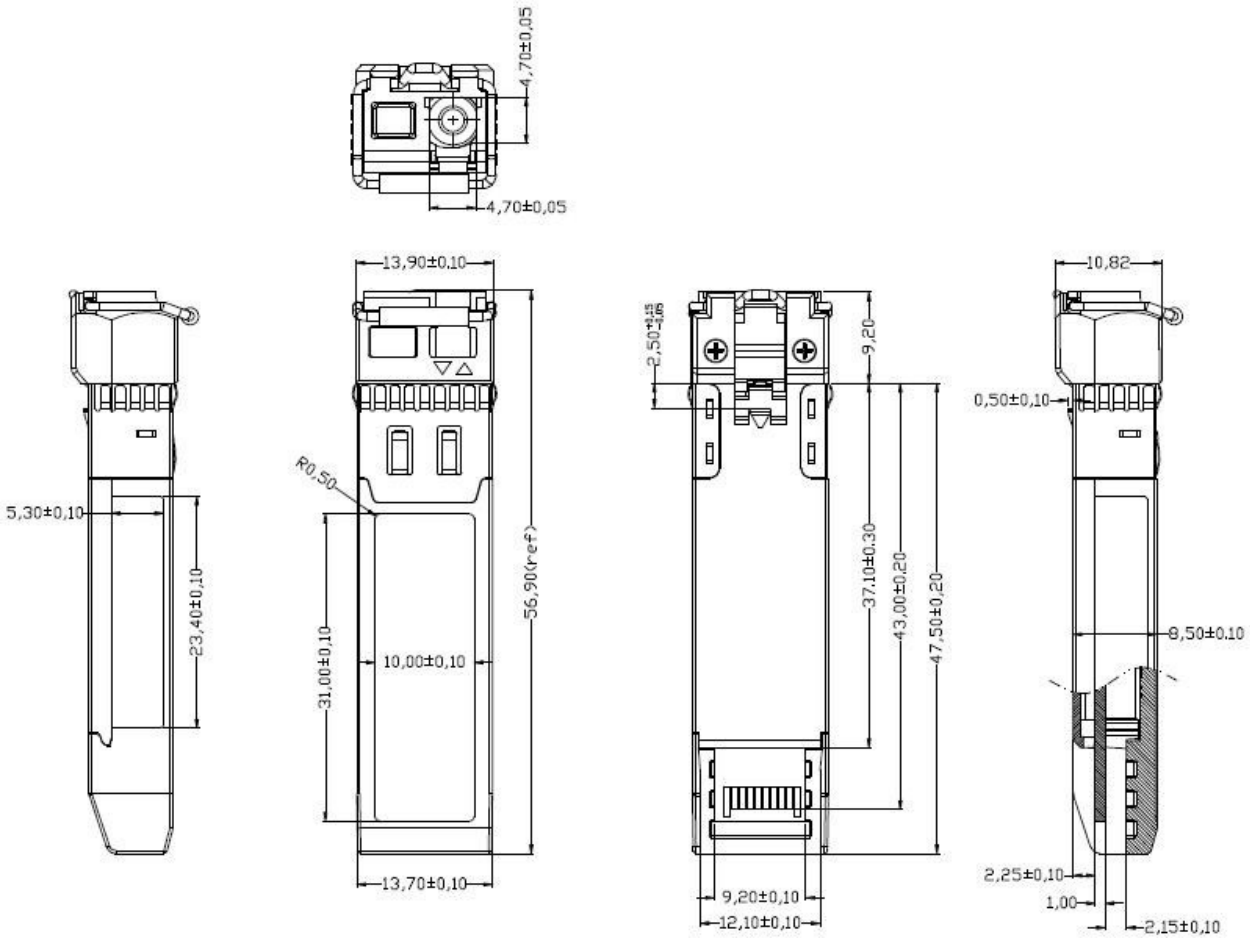
EEPROM Serial ID Memory Contents

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	Revision	Release Date
V1.0	New Release	Jul.31, 2024

For More Information

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