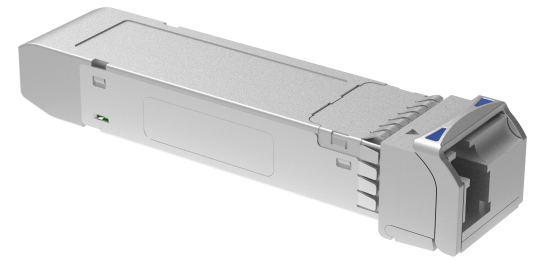


# 12Gbps Video SFP+ 1310nm Single Transmitter, 20km Reach

## FGB-V1231K20CM

### Features

- SD/HD/3G/6G/12G-SDI SFP Transmitter
- ST 259, ST 292-1, ST 424, ST-2081 and ST-2082 compatible
- Metal enclosure for Lower EMI
- 1310nm DFB laser transmitter
- Supports SDI pathological patterns for SD-SDI, HD-SDI, 3G-SDI, 6G-SDI and 12G SDI
- Compliant with SFP MSA
- ROHS compliant (lead free)
- single 3.3V power supply
- Hot-pluggable SFP footprint
- Operating case temperature range: 0 to +70°C



### Applications

- Serial Digital Fiber Transmission System for SMPTE ST 259, SMPTE ST 344, SMPTE ST 292-1/2, SMPTE ST 424, SMPTE ST 2081-1 and SMPTE ST 2082-1 Signals
- UHDTV/HDTV/SDTV Service Interfaces

### Description

FIBERSTAMP's Video transmitter is designed to transmit data rates from 50Mbps to 11.88Gbps, compliant with SMPTE ST 2082-1 (12G UHD-SDI), ST 2081-1 (6G UHD-SDI), ST424 (3G SDI), ST 292-1 (HD-SDI), and ST 259 (SD-SDI). FIBERSTAMP's Video transceiver supports SDI pathological patterns signals. The transmitter is compliant with SFP Multi-Source Agreement (MSA).

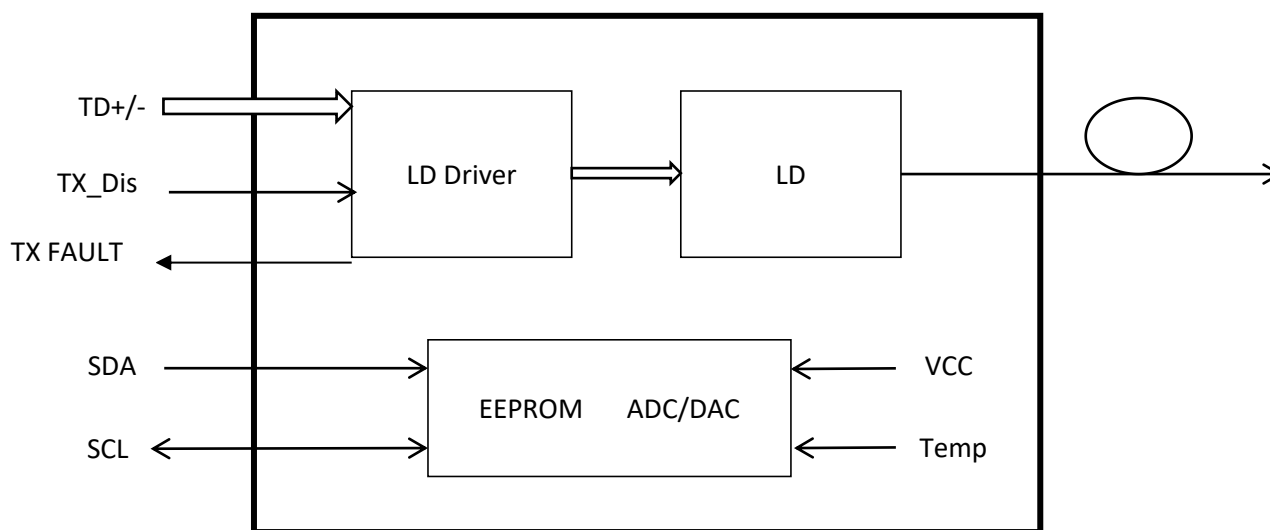


Figure 1. Module Block Diagram



### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

### Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc		160		mA
Data Rate			12		Gbps

### Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes		
<b>Transmitter</b>								
Center Wavelength	$\lambda_c$	1300	1310	1320	nm			
Spectral Width (-20dB)	$\sigma$			1	nm			
Side Mode Suppression Ratio	SMSR	30			dB			
Average Output Power	Pout	-3		1	dBm	1		
Extinction Ratio	ER	3.5			dB			
Data Input Swing Differential	VIN	400		1000	mV	2		
Input Differential Impedance	ZIN	90	100	110	$\Omega$			
Rise/Fall Time (20%~80%)	SD-SDI			1500	ps	3		
	HD-SDI			270				
	3G-SDI			135				
	6G-SDI			80				
	12G-SDI			45				
Output Jitter	Timing Jitter	SD-SDI			0.2	UI	4	
		HD-SDI			1			
		3G-SDI			2			
		6G-SDI			4			
		12G-SDI			8			
	Alignment Jitter	SD-SDI						0.2
		HD-SDI						0.2
		3G-SDI						0.3
		6G-SDI						0.3
		12G-SDI						0.3



Parameter	Symbol	Min	Typical	Max	Unit	Notes
TX Disable	Disable	2.0		Vcc	V	
	Enable	0		0.8	V	
TX Fault	Fault	2.0		Vcc	V	
	Normal	0		0.8	V	

**Note:**

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Rise and fall times, 20% to 80%
4. UI means one period.

**Diagnostics Specification**

Parameter	Range	Unit	Accuracy	Calibration
Tx Disable Negate Time	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-3 to +1	dBm	±3dB	Internal / External

**I<sup>2</sup>C Bus Interface**

The I<sup>2</sup>C bus interface uses the 2-wire serial CMOS E2PROM protocol. The serial interface meets the following specifications:

1. Support a maximum clock rate of 280Khz.
2. Input/Output levels comply with LVCMOS/LVTTL or compatible logics.

Low: 0 - 0.8 V

High: 2.0 - 3.3 V

Undefined: 0.8 - 2.0 V

**Pin Description**

Pin	Signal Name	Description	Plug Seq.	Notes
1	VEE	Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX_DIS	Transmitter Disable	3	Note 2
4	MOD_DEF(2)-SDA	2-wire Serial Interface Data Line	3	Note 3
5	MOD_DEF(1)-SCL	2-wire Serial Interface Clock	3	Note 3
6	MOD_DEF(0)-PRESENCE (VEE)	TTL Low	3	Note 3
7	Rate (NC)	Not Connected	3	
8	NC	Not Connected	3	
9	VEE	Ground	1	
10	VEE	Ground	1	
11	VEE	Ground	1	
12	NC	Not Connected	3	



Pin	Signal Name	Description	Plug Seq.	Notes
13	NC	Not Connected	3	
14	VEE	Ground	1	
15	VCC	Module 3.3 V Supply	2	
16	VCC	Module 3.3 V Supply	2	
17	VEE	Ground	1	
18	TD+	Transmitter Non-Inverted Data Input	3	Note 4
19	TD-	Transmitter Inverted Data Input	3	Note 4
20	VEE	Ground	1	

**Note:**

Plug Seq.: Pin engagement sequence during hot plugging.

- TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault. In the low state, the output will be pulled to less than 0.8V.
- 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~10kΩ resistor. Its states are:  
 Low (0 ~ 0.8V): Transmitter on  
 (0.8V~ 2.0V): Undefined  
 High (2.0 to 3.465V): Transmitter Disabled  
 Open: Transmitter Disabled
- 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.
- TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

**Pin Definition**

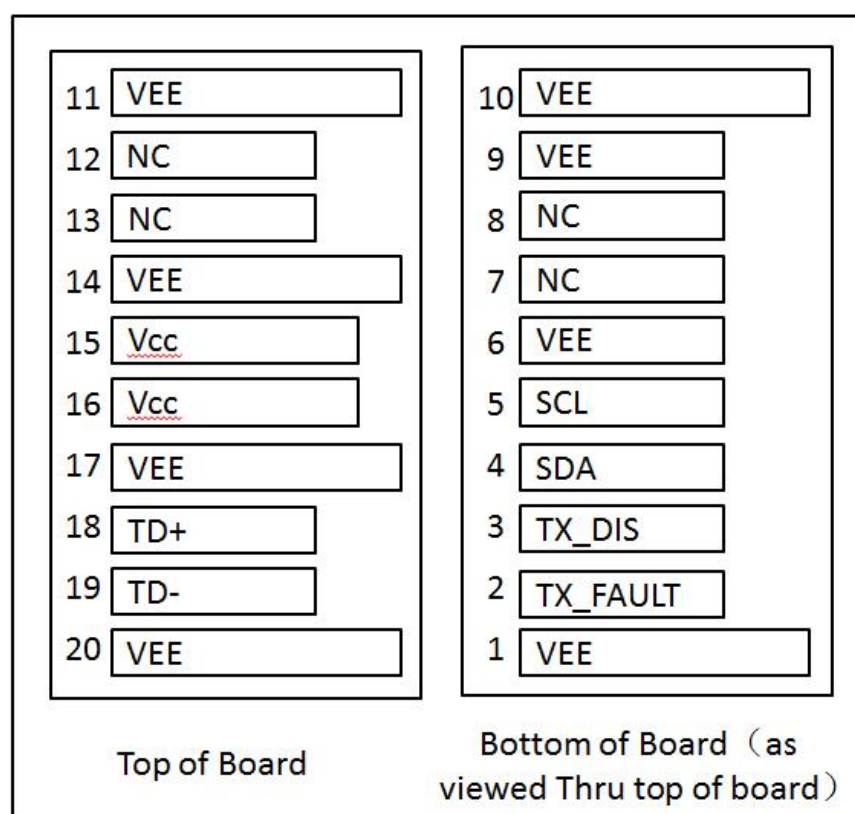
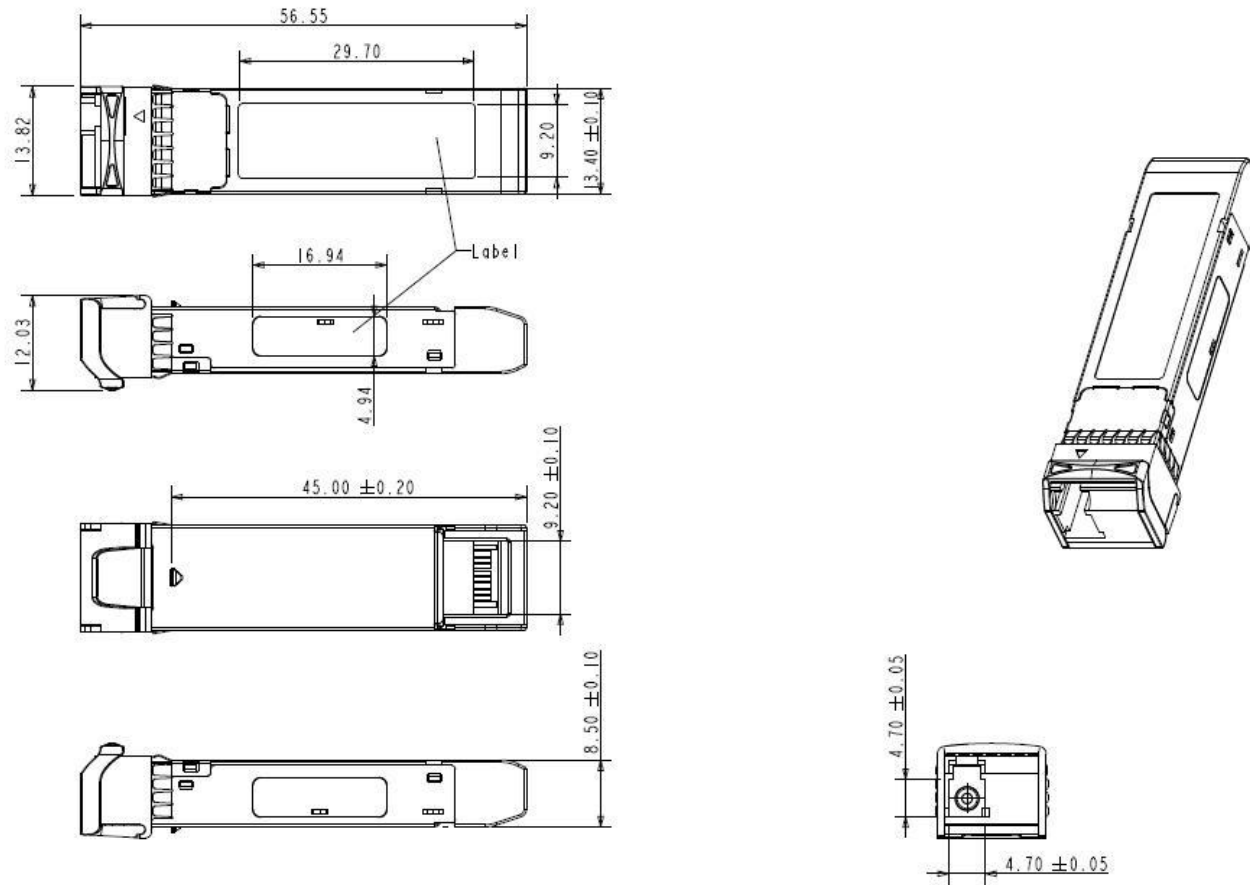


Figure2. Electrical Pin-out Details

**Mechanical Dimensions**



**Figure 3. Mechanical Specifications**

**Regulatory Compliance**

Feature	Standard
Laser Safety	IEC 60825-1:2014 (Third Edition)
Environmental protection	2011/65/EU
CE EMC	EN55032: 2015 EN55035: 2017 EN61000-3-2:2014 EN61000-3-3:2013
FCC	FCC Part 15, Subpart B; ANSI C63.4-2014
Product Safety	EN/UL 60950-1, 2nd Edition, 2014-10-14

**⚠ CAUTION:**

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

**Ordering Information**

Part Number	Product Description
FGB-V1231K20CM	1310nm,10/20km,SD/HD/3G/6G/12G SDI Single Transmitter, MSA

**Important Notice**

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