

12G-SDI Video SFP 1310nm 20km Optical Transceiver GHP-3112G-L2CD

Features

- ◆ SD/HD/3G/6G/12G-SDI SFP Transceiver available
- ◆ SMPTE ST-297-2015, ST-2081 and ST-2082 Compatible
- ◆ Metal enclosure for Lower EMI
- ◆ 1310nm DFB laser
- ◆ Supports video pathological patterns for SD-SDI, HD-SDI, 3G-SDI,6G-SDI and 12G SDI
- ◆ Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- ◆ Digital Diagnostic functions available through the I2C interface
- ◆ Compliance with RoHS
- ◆ +3.3V single power supply
- ◆ Operating case temperature:
Standard: 0 to +70°C



Applications

- ◆ SMPTE ST-297-2015, ST-2081 and ST-2082 Compatible Electrical-to-Optical Interfaces.
- ◆ UHDTV/HDTV/SDTV Service Interfaces.

Description

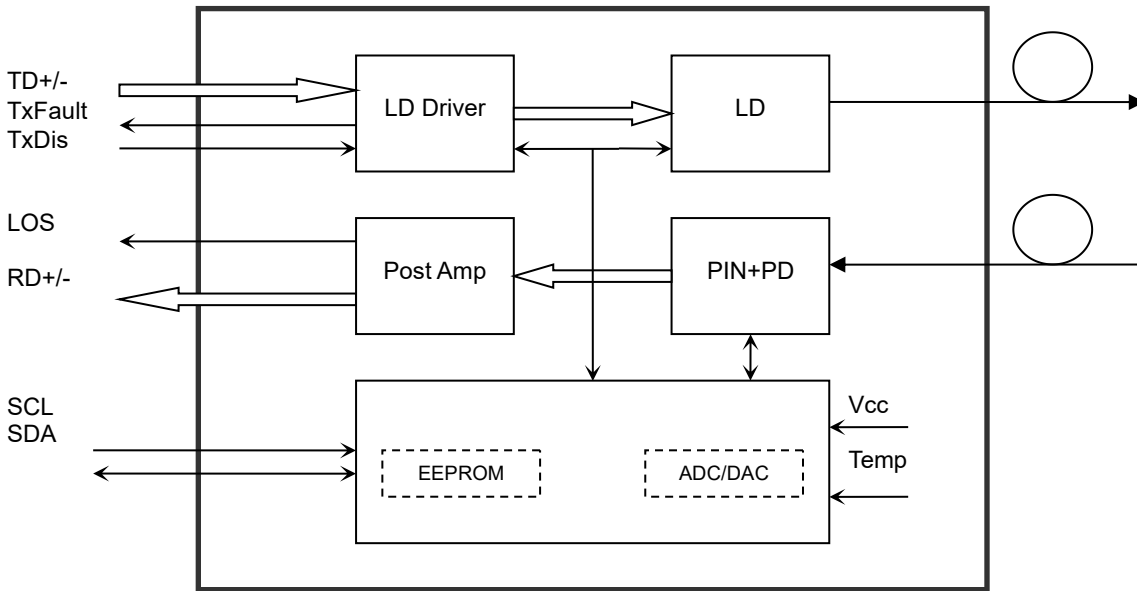
The video series transceivers are high performance, cost effective modules for duplex video transmission application over single mode fiber.

The transceiver is designed to transmit/receive data rates from 50Mbps to 11.88Gbps and is specifically designed for robust performance in the presence of SDI pathological patterns for SMPTE 259M, SMPTE 344M, SMPTE 292M, SMPTE 424M, ST-2081 and ST-2082 serial rates.

The transceiver consists of three sections: a DFB laser, a PIN photodiode integrated with a

trans-impedance preamplifier (TIA) and transceiver IC with MCU control unit for DDM. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.



Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%



Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	
Operating Case Temperature	Standard	Tc	0		+70	°C
						°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc		200	300	mA	
Data Rate			12		Gbps	

Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes		
Transmitter								
Centre Wavelength	λ_c	1300	1310	1320	nm			
Spectral Width (-20dB)	σ			1	nm			
Side Mode Suppression Ratio	SMSR	30			dB			
Average Output Power	Pout	-5		-2	dBm	1		
Extinction Ratio	ER	3.5			dB			
Rise/Fall Time (20%~80%)	SD-SDI	tr/tf			1500	ps	2	
	HD-SDI				270			
	3G-SDI				135			
	6G-SDI				80			
	12G-SDI				45			
Output Jitter	Timing Jitter	SD-SDI			0.2	UI	6	
		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
Data Input Swing Differential	V _{IN}	400		1800	mV	3		
Input Differential Impedance	Z _{IN}	90	100	110	Ω			



TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength	λ_c		1260		1580	nm	
Receiver Sensitivity					-14	dBm	5
Receiver Overload			+0.5			dBm	4
LOS De-Assert	LOS _D				-20	dBm	
LOS Assert	LOS _A		-28			dBm	
LOS Hysteresis			1		4	dB	
Data Output Swing Differential	Vout		650	800	1000	mV	3
LOS	High		2.0		Vcc	V	
	Low				0.8	V	

Notes:

1. The optical power is launched into SMF.
2. Rise and fall times, 20% to 80%, are measured following a fourth-order Bessel-Thompson filter with a bandwidth of 0.75 x clock frequency corresponding to the serial data rate
3. PECL input, internally AC-coupled and terminated.
4. Internally AC-coupled, minimum input overload power for SMPTE ST 2081-1, SMPTE ST 2082-1.
5. The sensitivity and overload specification refers to the input power levels for BER = 1E-12 against both PRBS and pathological patterns at SMPTE 259M, SMPTE 292M and SMPTE 424M rates, ST-2081 and ST-2082.
6. UI means one period.

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	μs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	μs
Tx Disable To Reset	t_reset	10			μs
LOS Assert Time	t_loss_on			100	μs
LOS De-assert Time	t_loss_off			100	μs
Serial ID Clock Rate	f_serial_clock		100		KHz
MOD_DEF (0:2)-High	V _H	2		V _{cc}	V
MOD_DEF (0:2)-Low	V _L			0.8	V

Diagnostics Specification

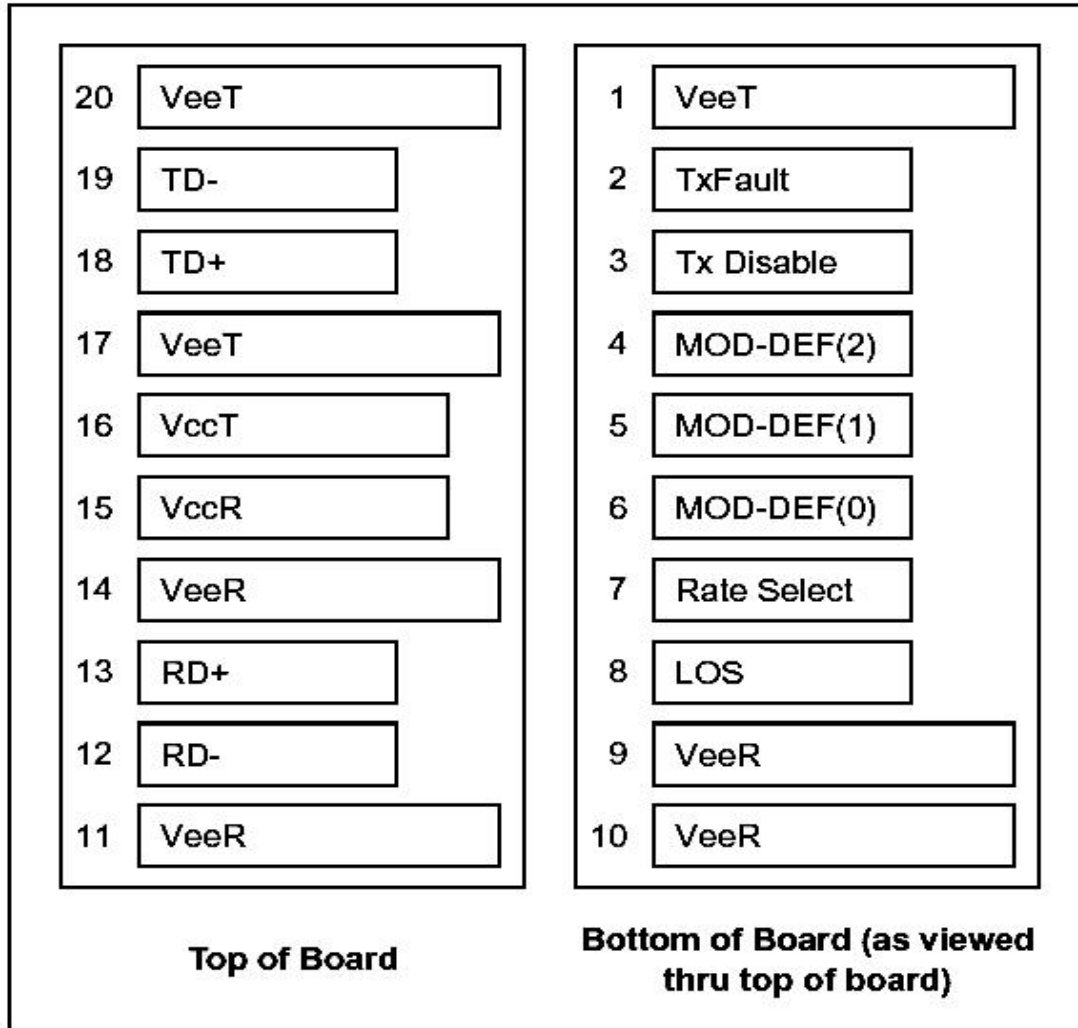
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-5 to -2	dBm	±3dB	Internal / External
RX Power	-14 to -5	dBm	±3dB	Internal / External

I2C Bus Interface

The I2C bus interface uses the 2-wire serial CMOS E2PROM protocol. The serial interface meets the following specifications:

- Support a maximum clock rate of 280Khz.
- 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 Definitions



Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V _{EER}	Receiver ground	1	

10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V _{EET}	Transmitter Ground	1	

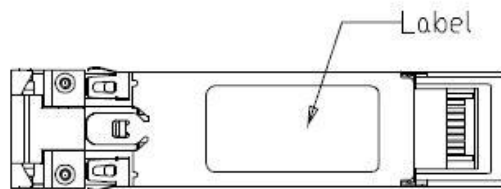
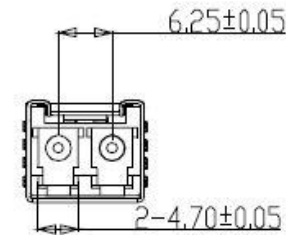
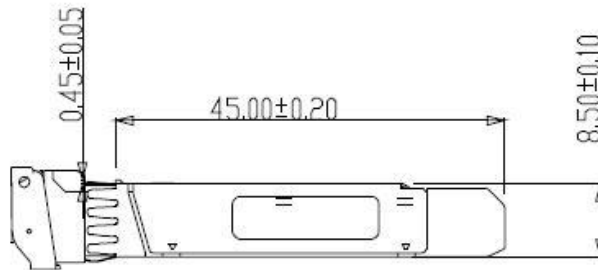
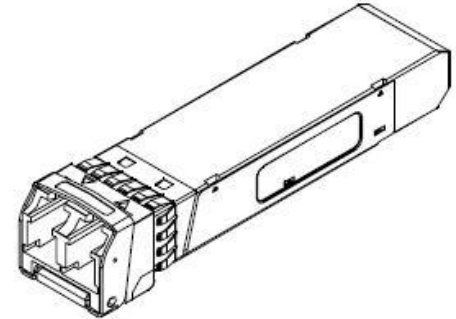
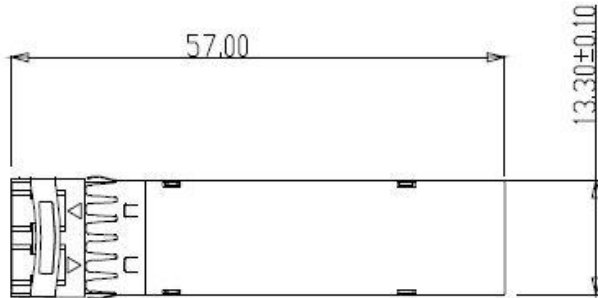
Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 1) 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 V_{cc}+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 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 4.7k~10kΩ resistor. Its states are:

Low (0 to 0.8V):	Transmitter on
(>0.8V, < 2.0V):	Undefined
High (2.0 to 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~10kΩ resistor on the host board. The pull-up voltage shall be V_{ccT} or V_{ccR}.
 - 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 is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and V_{cc}+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
- 5) RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 6) TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Mechanical Dimensions



Ordering information

Part Number	Product Description
GHP-3112G-L2CD	1310nm, 12Gbps, 10/20km, 0°C ~ +70°C, With Digital Diagnostic Monitoring

Important Notice

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