

## SFP-GG-SP-4931

### GPON OLT

### Transceiver

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## SFP Series

- **Bi-directional 1.25 Gbps Upstream / 2.5 Gbps Downstream**
- **Complies with ITU-T G.984.2 Class B+**
- **SFP package with SC Receptacle**
- **1490 nm continuous-mode 2.5 Gb/s DFB transmitter**
- **1310 nm burst-mode 1.25 Gb/s APD receiver**
- **Single +3.3V power supply**
- **Rx Signal Detect output**
- **Laser Class 1 Product which comply with the Requirements of IEC 60825-1 and IEC 60825-2**

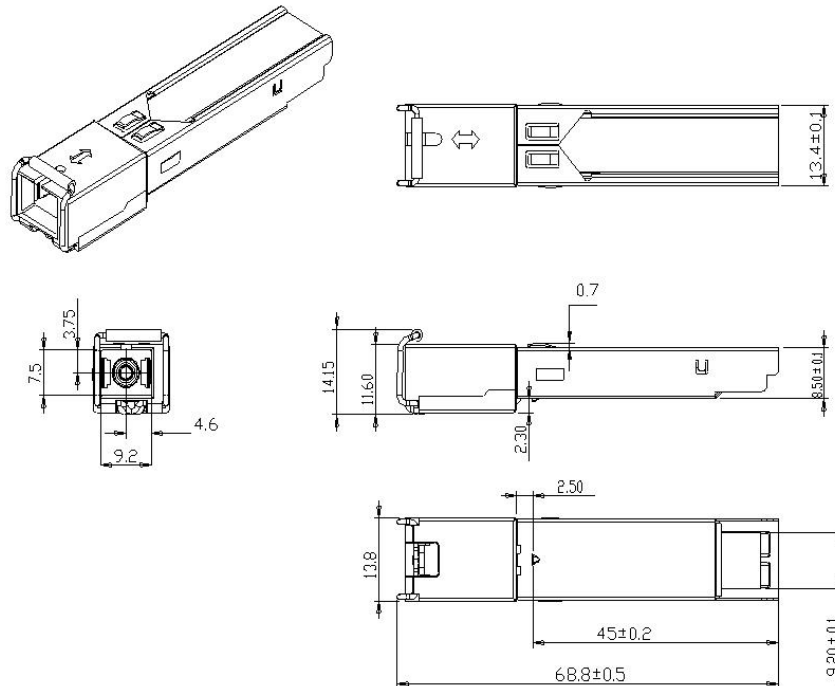
ASCENT's GPON OLT transceiver SFP-GG-SP-4931 is designed for G.984.2 Class B+ requirements Network transmission. The module is contained in a SFP package with SC/UPC receptacle connector. The module consists 1490nm DFB laser, InGaAs APD, Preamplifier and WDM filter in a high-integrated optical sub-assembly, and it can transmit up to 2.5 Gbps of continuous data at 1490 nm, and receives 1.25 Gbps burst-mode data at 1310 nm. The module data link up to 20 km in 9/125  $\mu$ m Single-mode fiber.

## Key Features

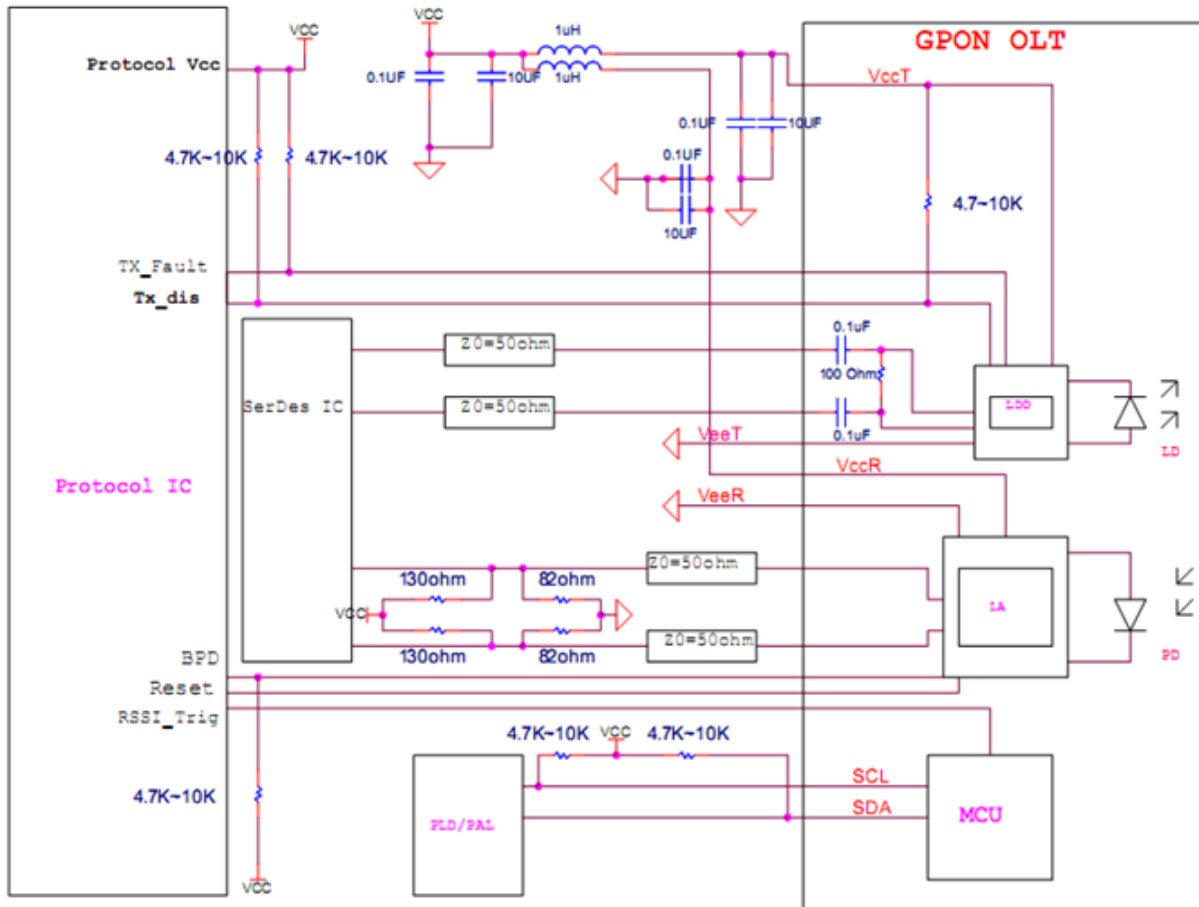
- Bi-directional 1.25 Gbps Upstream/2.5Gbps Downstream
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## Outline Diagram

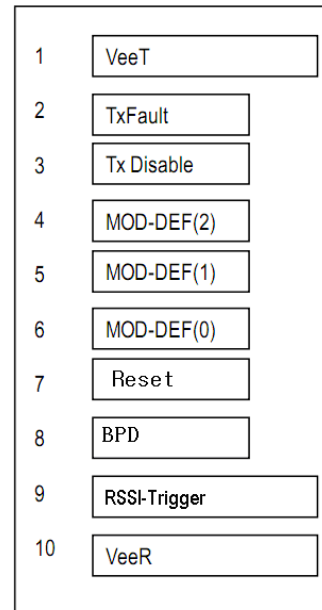
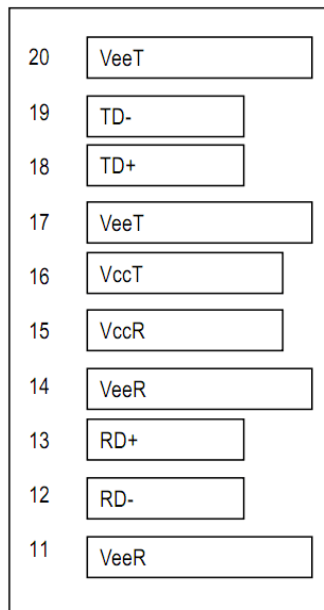
Parameter	Unit	Description	Note
Mechanical Dimensions	mm	68.8 x 13.4 x 8.5	
Connector Type	-	SC/UPC connector	IEC-61754-4



## Recommended Interface Circuit



## Pin Description



Pin#	Name	Function	Notes
1	VeeT	Transmitter Ground	-
2	TX Fault	Transmitter Fault Indication	open collector/drain output,
3	TX Disable	Transmitter Disable	Module disables on high or open
4	MOD-DEF2	Module Definition 2	2 wire serial ID interface, SDA
5	MOD-DEF1	Module Definition 1	2 wire serial ID interface, SCL
6	MOD-DEF0	Module Definition 0	Grounded in Module
7	Reset		
8	BPD	Burst packet detect	
9	RSSI-Trigger		
10	VeeR	Receiver Ground	
11	VeeR	Receiver Ground	
12	RD-	Inv. Received Data Out	DC-coupled
13	RD+	Received Data Out	DC-coupled
14	VeeR	Receiver Ground	
15	VccR	Receiver Power	3.3V± 5%
16	VccT	Transmitter Power	3.3V± 5%
17	VeeT	Transmitter Ground	
18	TD+	Transmit Data In	AC-coupled, differential lines with 100Ω differential termination inside the module
19	TD-	Inv. Transmit Data In	AC-coupled, differential lines with 100Ω differential termination inside the module
20	VeeT	Transmitter Ground	

**Notes:**

1. TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K $\Omega$  resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module
2. with a 4.7 – 10 K  $\Omega$  resistor. Its states are:  
 Low (0 – 0.8V): Transmitter on  
 (>0.8, < 2.0V): Undefined  
 High (2.0 – 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 – 10K $\Omega$  resistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). 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. BPD is a LVTTTL output. When low, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). High indicates burst packet is come. In the low state, the output will be pulled to < 0.8V.
5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+: These are the differential receiver outputs. They are AC coupled 100 $\Omega$  differential lines which should be terminated with 100 $\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 – 1000 mV single ended) when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V  $\pm$ 5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1  $\Omega$  should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 $\Omega$  differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200 mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600 mV single-ended) be used for best EMI performance.

## Specifications

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T <sub>s</sub>	-40		85	°C	
Relative Humidity	RH	5		95	%	
Power Supply Voltage	VCC	-0.3		4	V	
Signal Input Voltage		-0.3		V <sub>cc</sub> +0.3	V	
Receiver Damage Threshold		+5			dBm	

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T <sub>case</sub>				°C	See ordering information
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC			380	mA	SFP-GG-SP-4931
				450	mA	SFP-GG-SP-4931A
Power Supply Noise Rejection				100	mVp-p	100 Hz to 1 MHz
Data Rate			1.25Gbps/2.5Gbps		Gbps	Rx data/Tx data

### Transmitter Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Launched Power	P <sub>O</sub>	2		5	dBm	1
		1.5		5.5		1
						SFP-GG-SP-4931A
Extinction Ratio	ER	10			dB	
Center Wavelength	λ <sub>c</sub>	1480		1500	nm	DFB Laser
Spectrum Width (-20dB)	σ			1.0	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter OFF Output Power	P <sub>off</sub>			-45	dBm	
Optical Return Loss Tolerance	ORLT			15	dB	
Output Eye Mask	Compliant with ITU-T G.984.2 Mask					

### Notes:

1. Launched power (avg.) is power coupled into a single-mode fiber with master connector.

### Receiver Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	λ <sub>in</sub>	1260	1310	1360	nm	APD
Receiver Sensitivity	P <sub>sen</sub>			-28	dBm	1

Input Saturation Power (Overload)	Psat	-8		dBm	
Burst Packet Detect sensitivity	PA		-30	dBm	2
Data Output Rise/Fall time	tr/tf		260	ps	3
Receiver Reflectance (1260 nm to 1360 nm)			-12	dB	4

## Notes:

1. Measured with Light source 1490nm, ER=10dB; BER =<10<sup>-10</sup> @PRBS=2<sup>23</sup>-1 NRZ, This assurance should be met with asynchronous data flowing out of the optical transmitter of the , system under test. The output data pattern from the transmitter of the system under test is a repetition of alternate 0/1 pattern as defined for this measurement.
2. Measured with 1310 nm, 1.244Gbps PRBS2<sup>23</sup>-1 burst mode optical input, ER=10dB
3. These are 20% to 80% values.
4. Measured at wavelength of 1310 nm.

## Electrical Interface Characteristics

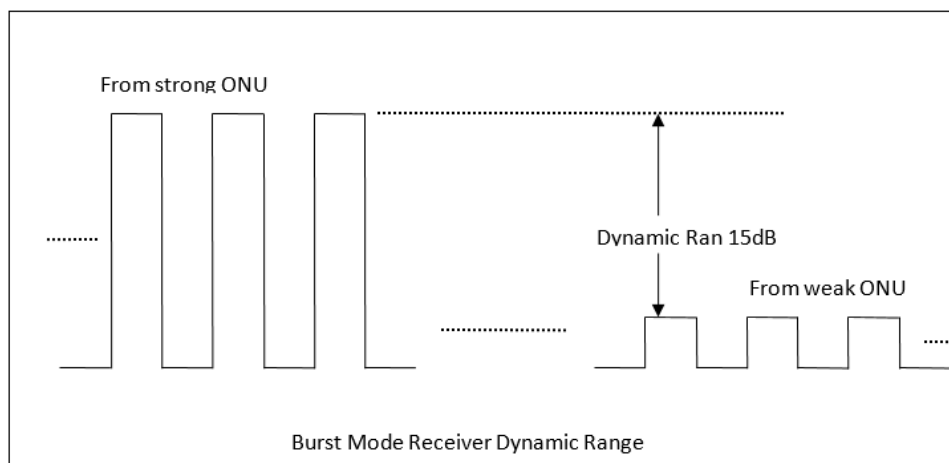
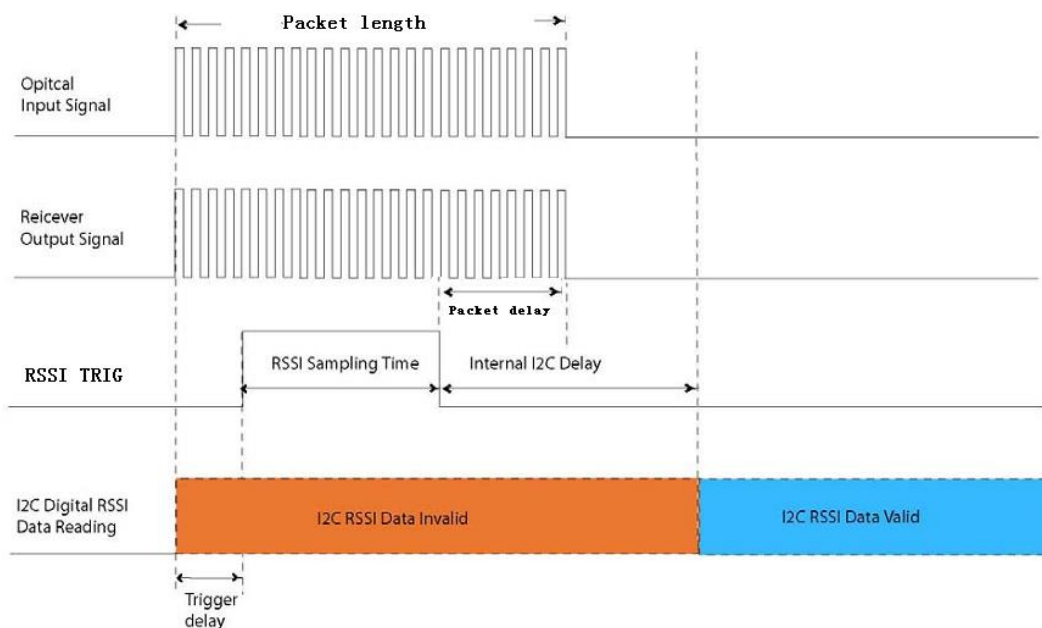
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Differential Line Input Impedance	Rin	80	100	120	Ω	
Differential Data Input Swing	Vdt	300		1600	mVp-p	
TX_disable Input Voltage- High	VDisH	2		Vcc	V	LVTTL
TX_disable Input Voltage- Low	VDisL	0		0.8	V	
Transmitter Fault Output-High	VFaultH	2		Vcc	V	OC output
Transmitter Fault Output-Low	VFaultL	0		0.8	V	
<b>Receiver</b>						
Differential Data Output Swing	Vdr	400		1600	mVp-p	
BPD Output Voltage High	VLOSH	2.0		Vcc	V	LVTTL
BPD Output Voltage Low	VLOSL	0		0.8	V	

## Regulatory Compliance

Feature	Reference	Performance
Electrostatic Discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950	Compatible with standards
ROHS	2002/95/EC	Compatible with standards

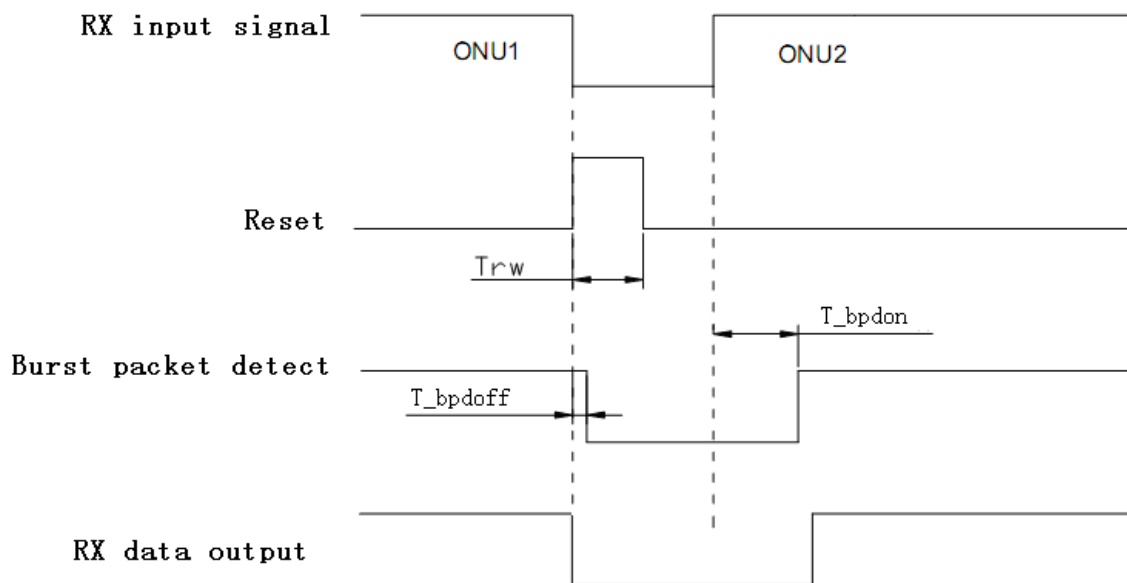
## Timing Characteristics for Digital RSSI

Parameter	Symbol	MIN	TYPE	MAX	Units
Trigger delay	Td	25			ns
Packet length		525			ns
Packet delay		0			ns
Internal I2C delay	Ts	400		500	us





## Reset Timing Characteristics



Parameter	Symbol	MIN	TYPE	MAX	Units
Guard width	T <sub>g</sub>	32			bit
BPD off	T <sub>bpdoff</sub>		10	20	ns
BPD on	T <sub>bpdon</sub>		10	20	ns

## Ordering Information

Product part Number	Data Rate (Mbps)	Wavelength(nm) Tx(Rx)	Temperature Range(°C)(Tcase)
SFP-GG-SP-4931	1244Mbps Upstream/ 2488Mbps Downstream	1490 (1310)	0 to 70
SFP-GG-SP-4931A	1244Mbps Upstream/ 2488Mbps Downstream	1490 (1310)	-40 to 85

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