

## SFP-03SS31-02C

100BASE-FX Spring-Latch SFP Transceiver, 2km Reach

### Features

- Built-in PHY supporting SGMII Interface
- Hot-Pluggable
- 100BASE-FX operation
- 1310nm FP laser transmitter
- Duplex LC connector
- RoHS compliant and Lead Free
- Up to 2 km on 50/125µm MMF
- Single +3.3V Power Supply
- Very low EMI and excellent ESD protection
- Operating case temperature: 0 to +70°C



### Applications

- Switch to Switch interface
- Switched backplane applications
- Fast Ethernet
- Other optical transmission systems

### Description

AscentOptics's GEFE Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), and are designed for SGMII MAC interface to 100BASE-FX (The SGMII MAC Interface implements a modified 1000BASE-X Auto-Negotiation to indicate link, duplex, and speed to the MAC). The transceiver consists of four sections: the standard SFP part, the PHY part built with SGMII interface, the 1310nm FP laser and the PIN photo-detector. The module data link up to 2km in 50/125um multi mode fiber.



Figure 1. MAC to Fiber Connection

## Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40		85	°C	
Relative Humidity	RH	5		95	%	
Power Supply Voltage	VCC	-0.5		4	V	
Signal Input Voltage		-0.3		Vcc+0.3	V	
Receiver Damage Threshold		+5			dBm	

## Recommended Operating Environment

Table 2 - Recommended Operating Environment

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Case Operating Temperature	Tcase	0		70	°C		
Power Supply Voltage	VCC	3.13	3.3	3.47	V		
Power Supply Current	ICC			400	mA		
Power Supply Noise Rejection				100	mVp-p	100Hz to 1MHz	
Data Rate			125/125		Mbps	TX Rate/RX Rate	
Transmission Distance				2	KM		
Coupled Fiber		Multi mode fiber					50/125um SMF

## Electrical Interface Characteristics

Table 3- Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Total Supply Current	ICC			A	mA	Note (1)
Transmitter Disable Input-High	VDISH	2		Vcc+0.3	V	

Transmitter Disable Input-Low	VDISL	0		0.8	V	
Transmitter Fault Input-High	VDISL	2		V <sub>cc</sub> +0.3	V	
Transmitter Fault Input-Low	VTxFH	0		0.8	V	
<b>Receiver</b>						
Total Supply Current	ICC			B	mA	Note (1)
LOSS Output Voltage-High	VLOSH	2		V <sub>cc</sub> +0.3	V	LVTTTL
LOSS Output Voltage-Low	VLOSL	0		0.8	V	

**Note :** A (TX) + B (RX) = 400mA (Not include termination circuit)

## Specification of Transmitter

**Table 4- Specification of Transmitter**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	POUT	-20		-14	dBm	Note (1)
Extinction Ratio	ER	9			dB	
Center Wavelength	$\lambda_C$	1270	1310	1360	nm	FP Laser
Spectrum Bandwidth(RMS)	$\sigma$			3.5	nm	
Transmitter OFF Output Power	POff			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Output Eye Mask	Compliant with G.957(class 1 laser safety)					Note (2)

**Note:**

- 1.Measure at 2<sup>23</sup>-1 NRZ PRBS pattern
- 2.Transmitter eye mask definition

## Specification of Receiver

**Table 4- Specification of Receiver**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	$\lambda_{IN}$	1270		1610	nm	PIN-TIA
Receiver Sensitivity	P <sub>IN</sub>			-32	dBm	Note (1)
Input Saturation Power (Overload)	P <sub>SAT</sub>	-8			dBm	
Los Of Signal Assert	P <sub>A</sub>	-40			dBm	
Los Of Signal De-assert	P <sub>D</sub>			-33	dBm	Note (2)
LOS Hysteresis	P <sub>A</sub> -P <sub>D</sub>	0.5	2	6	dB	

**Note :**

- 1.Measured with Light source 1310nm, ER=9dB; BER =<10<sup>-12</sup> @PRBS=2<sup>23</sup>-1 NRZ
- 2.When SD De-Assert, the RX-LOS output is signal output.

## Pin Assignment

### Pin Diagram

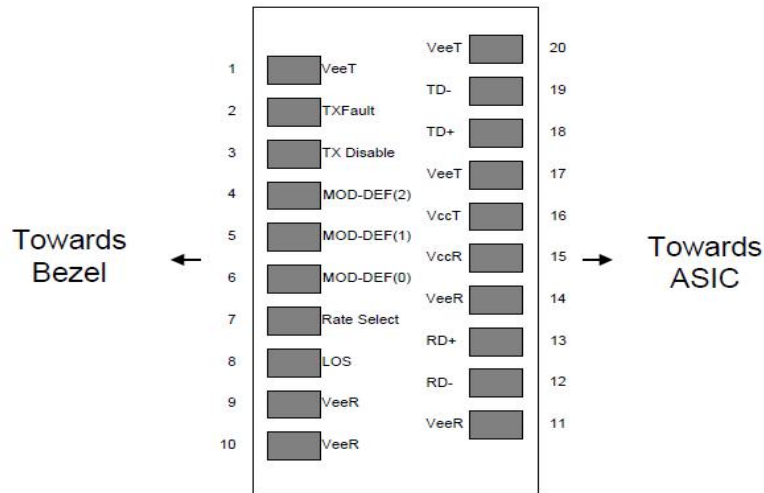


Figure2. Pin out of Connector Block on Host Board

## Pin Descriptions

Table 5- Pin Descriptions

Pin	Symbol	Name/Description	NOTE
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault.	
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
10	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
11	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

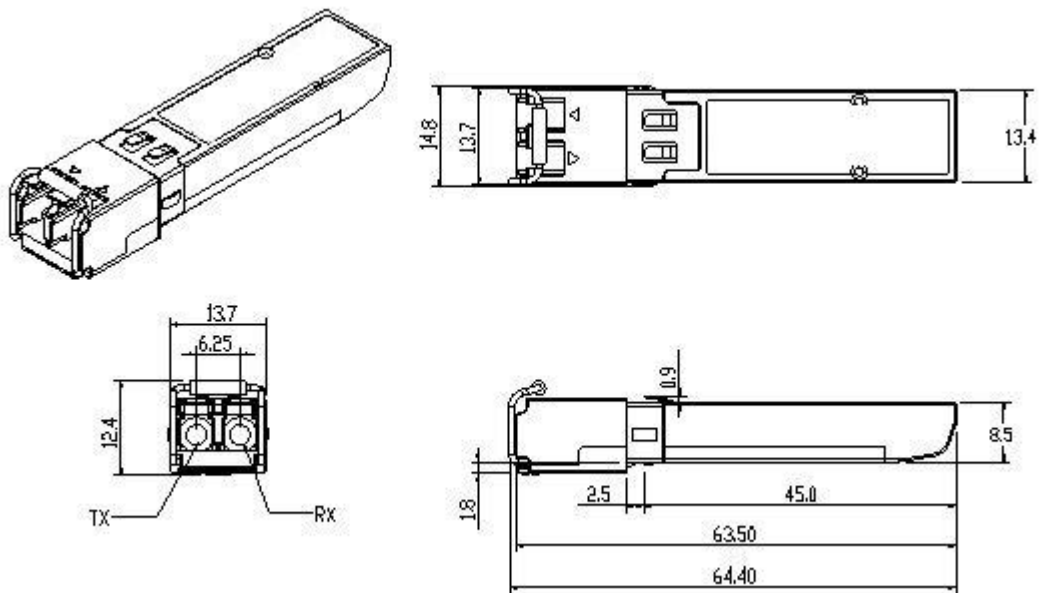
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD\_DEF (0) pulls line low to indicate module is plugged in.
4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates). If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:
  - Low (0 – 0.8V): Reduced Bandwidth
  - (>0.8, < 2.0V): Undefined
  - High (2.0 – 3.465V): Full Bandwidth
  - Open: Reduced Bandwidth
5. LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

## References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
2. IEEE 802.3ah-2004.

## Mechanical Specifications



## Ordering information

**Table 6- Ordering information**

Part Number	Product Description
SFP-03SS31-02C-1	1310nm,2km,125Mbps, 0°C ~ +70°C Marvell
SFP-03SS31-02C-2	1310nm,2km,125Mbps, 0°C ~ +70°C, Broadcom

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