

SFP-FG31-FX

125Mbps SFP Transceiver, Multi Mode, 2km Reach



Product 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 2km on 50/125µm MMF
- ❖ Single +3.3V Power Supply

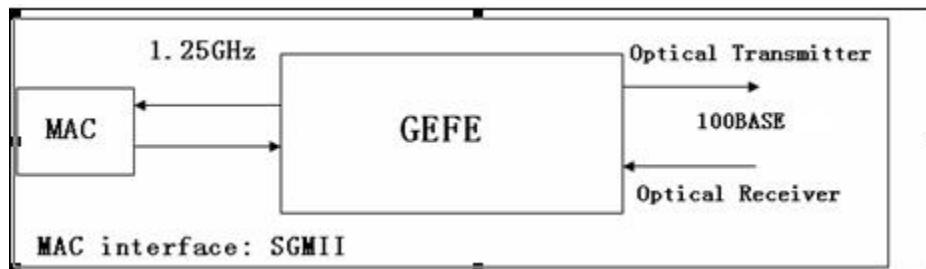
- ❖ Very low EMI and excellent ESD protection
- ❖ Operating case temperature: 0 to +70°C

Applications

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

Description

This 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 build 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.



MAC to Fiber Connection

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	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 Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Note
Case Operating Temperature	T _{case}	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

Specification of Receiver

Parameter	Symbol	Min	Typical	Max	Unit	Note
Input Optical Wavelength	λ_{IN}	1270		1610	nm	PIN-TIA
Receiver Sensitivity	P_{IN}			-32	dBm	1
Input Saturation Power (Overload)	P_{SAT}	-8			dBm	
Los Of Signal Assert	P_A	-40			dBm	
Los Of Signal De-assert	P_D			-33	dBm	2
LOS Hysteresis	P_A-P_D	0.5	2	6	dB	

Note:

1. Measured with Light source 1310nm, ER=9dB; BER = $<10^{-12}$ @PRBS=2²³-1 NRZ
2. When SD De-Assert, the RX-LOS output is signal output.

Specification of Transmitter

Parameter	Symbol	Min	Typical	Max	Unit	Note
Average Output Power	P_{OUT}	-20		-14	dBm	1
Extinction Ratio	ER	9			dB	
Center Wavelength	λ_C	1270	1310	1360	nm	FP Laser
Spectrum Bandwidth(RMS)	σ			3.5	nm	
Transmitter OFF Output Power	P_{Off}			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Output Eye Mask	Compliant with G.957(class 1 laser safety)					2

Note:

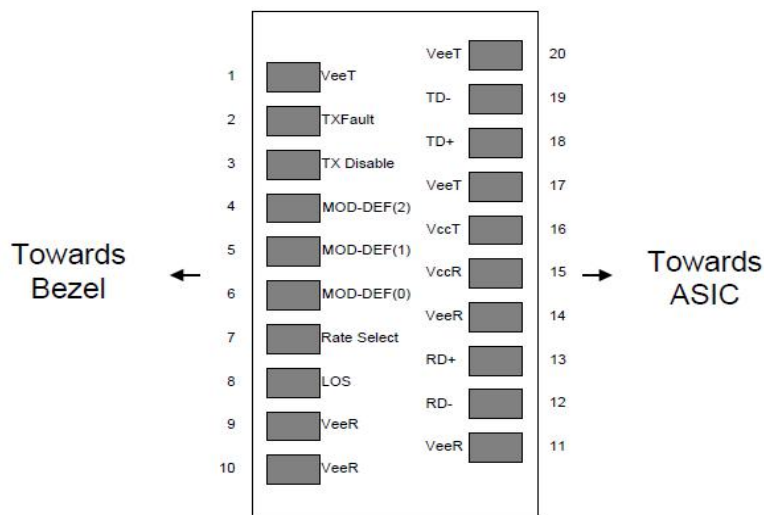
1. Measure at 2²³-1 NRZ PRBS pattern
2. Transmitter eye mask definition

Electrical Interface Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Total Supply Current	I _{CC}			A	mA	1
Transmitter Disable Input-High	V _{DISH}	2		V _{CC} +0.3	V	
Transmitter Disable Input-Low	V _{DISL}	0		0.8	V	
Transmitter Fault Input-High	V _{DISL}	2		V _{CC} +0.3	V	
Transmitter Fault Input-Low	V _{TXFH}	0		0.8	V	
Receiver						
Total Supply Current	I _{CC}			B	mA	1
LOSS Output Voltage-High	V _{LOSH}	2		V _{CC} +0.3	V	LVTTTL
LOSS Output Voltage-Low	V _{LOSL}	0		0.8	V	

Note 1: A (TX) + B (RX) = 400mA (Not include termination circuit)

Pin Descriptions



Pin out of Connector Block on Host Board

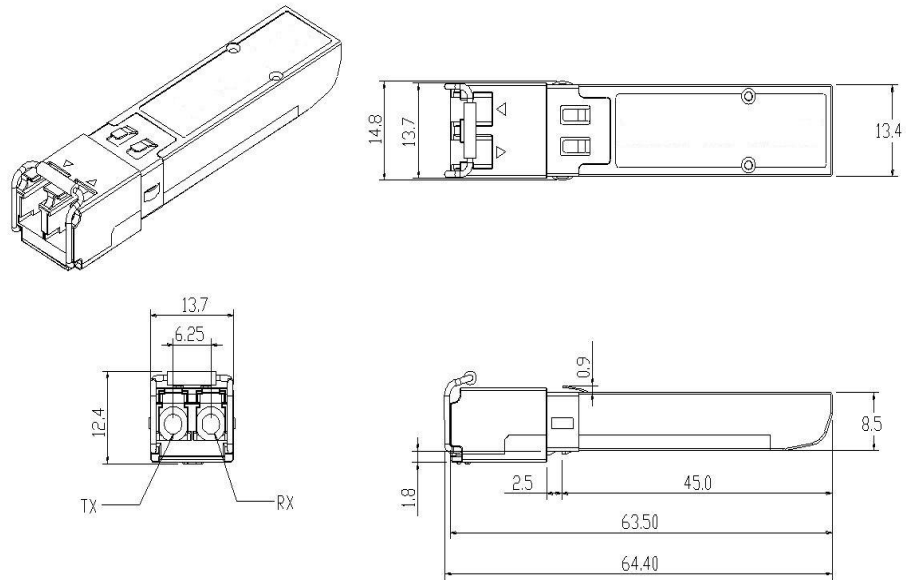
Pin	Symbol	Name/Description	NOTE
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault.	
3	T _{DIS}	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock 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 _{EER}	Receiver Ground (Common with Transmitter Ground)	1
10	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EER}	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 _{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	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 _{EET}	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.

Mechanical Specifications (Unit: mm)



Ordering Information

Part Number	Product Description
SFP-FG31-FX	1310nm, 125Mbps, LC, 2km, 0°C~+70°C