

# **Alpha Bridge ASFP-1G-eLX Datasheet**



### Features

- Dual data-rate of 1.25Gbps/1.063Gbps operation
- 1310nm FP laser and PIN photodetector for 20km transmission
- +3.3 single power supply
- Compliant with SFP MSA AND SFF-8472 with duplex LC receptacle
- Digital Diagnostic Monitoring
- Internal Calibration or External Calibration
- Compatible with RoHS
- Operating case temperature:
- Standard: 0°C ~70°C
- Industrial: -40°C ~85°C

### Applications

- Gigabit Ethernet
- Fiber Channel
- Switch to Switch interface.
- Switched backplane applications
- Router/Server interface.
- Other optical transmission system

### Description

The SFP transceivers are high-performance, cost-effective modules supporting dual data rate of 1.25Gbps/1.0625Gbps and 20km transmission distance with SMF.

The transceiver consists of three sections: an FP laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA), and an MCU control unit. All modules satisfy class I laser safety requirements.

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

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Storage Temperature	T <sub>s</sub>	-40		85	°C	
Supply Voltage	VCC	-0.5		4.5	V	
Operating Humidity	-	5		85	%	

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Case Operating Temperature -Standard	T <sub>c</sub>	0		70	°C
Case Operating Temperature - Industrial	T <sub>c</sub>	-40		85	°C
Data Rate - Gigabit Ethernet			1.25		Gbps
Date Rate - Fiber Channel			1.063		
Power Supply Voltage	V <sub>cc</sub>	3.13	3.3	3.47	V
Power Supply Current	I <sub>cc</sub>			300	mA

### Digital Diagnostic Functions

Parameter/Range	Symbol	Accuracy	Unit	Notes
Temperature /0 to 70	DMI_Temp	± 3 °C	°C	
Temperature /-40 to 85	DMI_Temp	± 3 °C	°C	
Voltage/3.0 to 3.6	DMI_VCC	±3 %	V	
TX Power / -9 to -3	DMI_TX	± 3 dB	dBm	
RX power/-23 to 0	DMI_RX	± 3 dB	dBm	
Bias Current/ 0 to 100	DMI_Ibias	± 10%	mA	

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
<b>Transmitter</b>						
Center Wavelength	$\lambda_C$	1260	1310	1360	nm	
Spectral Width (RMS)	$\sigma$			4	nm	
Average Output Power	$P_{out}$	-9		-3	dBm	1
Extinction Ratio	$ER$	9			dB	
Optical Rise/Fall Time (20%~80%)	$tr/tf$			0.26	ns	
<b>Receiver</b>						
Center Wavelength	$\lambda_C$	1260		1580	nm	
Receive Overload		-3			dBm	2
Receiver Sensitivity				-23	dBm	2
LOS Assert	$LOSA$	-35			dBm	
LOS De-assert	$LOSD$			-24	dBm	
LOS Hysteresis	$LOSH$	1		4	dB	

### NOTES:

1. The optical power is launched into SMF
2. Measured with a PRBS 27-1 test pattern @1250Mbps, BER  $\leq 1 \times 10^{-12}$ .

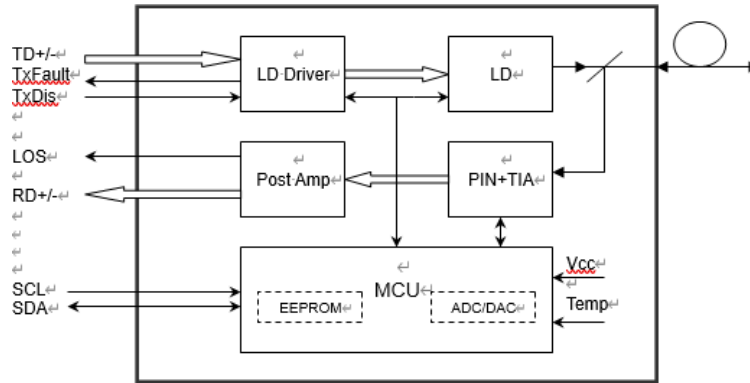
## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
<b>Transmitter</b>						
Input Differential Impedance	$Z_{IN}$	90	100	110	$\Omega$	
Data Input Swing Differential	$V_{IN}$	400		1800	mV	1
Disable	$VD$	2		$V_{CC}$	V	
Transmit Disable						
Enable	$VEN$	0		0.8	V	
Fault		2		$V_{CC}$	V	
Transmit Fault						
Normal		0		0.8	V	
<b>Receiver</b>						
Data Output Swing Differential	$V_{out}$	400		1800	mV	1
LOS	High	2		$V_{CC}$	V	
	Low	0		0.8	V	

### Notes:

1. Internally AC-coupled.

## Block Diagram of Transceiver



## Pin Descriptions

Pin	Symbol	Function/Description	Note
1	VEET	Transmitter Ground	
2	TX FAULT	Transmitter Fault Indication	1
3	TX DISABLE	Transmitter Disable	2
4	MOD_DEF(2)	SDA Serial Data Signal	3
5	MOD_DEF(1)	SCL Serial Clock Signal	3
6	MOD_DEF(0)	TTL Low	3
7	Rate Select	Not Connected	
8	LOS	Loss of Signal	4
9	VEER	Receiver ground	
10	VEER	Receiver ground	
11	VEER	Receiver ground	
12	RD-	Inv. Received Data Out	5
13	RD+	Received Data Out	5
14	VEER	Receiver ground	
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground	
18	TD+	Transmit Data In	6
19	TD-	Inv. Transmit Data In	6
20	VEET	Transmitter Ground	

### Notes:

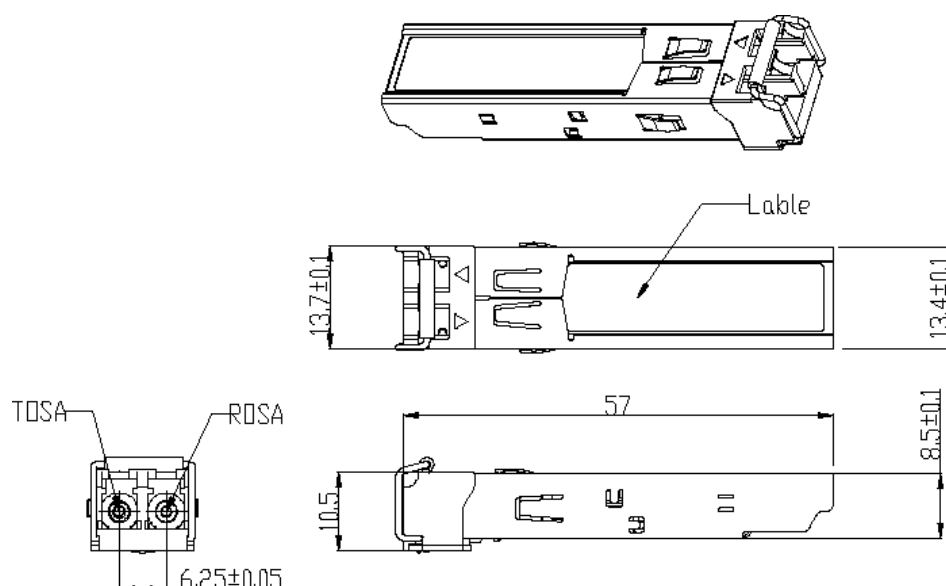
Plug Seq.: Pin engagement sequence during hot plugging.

- 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 of some kind. 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's 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. DisabledOpen: 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 the wire serial interface for serial ID  
 Mod-Def 2 is the data line of two wire serial interfaces for serial ID
- LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and

Vcc+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.

## Dimensions



## Ordering Information

Model Number	Part Number	Wavelength	Temperature
ASFP-1G-eLX	OP6C-S20-13- CMF	1310nm	0°C ~70 °C
ASFP-1G-eLX-I	OP6C-S20-13- IMF	1310nm	-40°C ~85°C

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