

**Alpha Bridge
ASFP-1G-SX
Datasheet**

Features

- Data-Rate of 1.25Gbps operation
- 850nm VCSEL laser and PIN photodetector
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Digital Diagnostic Monitoring: Internal Calibration or External Calibration
- 550m transmission with 50/125 μ m MMF
- 300m transmission with 62.5/125 μ m MMF
- Single +3.3V power supply
- RoHS Compliant
- Operating case temperature: Class C: 0 $^{\circ}$ C ~70 $^{\circ}$ C
- Class I: -40 $^{\circ}$ C ~85 $^{\circ}$ C

Application

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

Description

The SFP optical transceivers are high-performance, cost-effective modules supporting data rate of 1.25Gbps and 550m transmission distance with MMF.

The transceiver consists of three sections: a VCSEL laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and 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 the SFP MSA.

Absolute Maximum Ratings

Parameter	Symbol	Min	Max.	Units	Note
Storage Temperature	Ts	-40	85	$^{\circ}$ C	
Supply Voltage	Vcc	-0.5	4.5	V	
Operating Relative Humidity		5	Vcc	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Power Supply Voltage	Vcc	3.13	3.3	3.47	v	
Case Operating Temperature	Top	0		70	$^{\circ}$ C	CMF
		-40		85	$^{\circ}$ C	IMF
Power Supply Current	Icc			300	mA	
Data Rate			1.25		Gbps	

Digital Diagnostic Functions

Parameter	Symbol	Accuracy	Unit	Notes
Temperature Monitor Absolute Error	<i>DMI_Temp</i>	± 3	°C	Over operating Temp
Supply Voltage Monitor Absolute Error	<i>DMI_VCC</i>	±0.1	V	Full operating range
RX Power Monitor Absolute Error	<i>DMI_RX</i>	± 3 dB	dB	1
Bias Current Monitor	<i>DMI_Ibias</i>	± 10%	mA	
Laser Power Monitor Absolute Error	<i>DMI_TX</i>	± 3 dB	dB	1

Notes:

- Due to the measurement accuracy of different single mode fibers, there could be an additional +/-1 dB fluctuation, or a +/- 3 dB total accuracy.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Optical Center Wavelength	λ	830	850	860	nm	
Output Optical Power	<i>P_{TX}</i>	-9.5		-3.5	dBm	1
Extinction Ratio	<i>ER</i>	9			dB	
Spectral Width (RMS)	$\Delta\lambda$			0.85	nm	
Optical Rise/Fall Time (20%-80%)	<i>tr/tf</i>			0.25	Ns	
Receiver						
Optical Center Wavelength	λ	770		860	nm	
Receiver Overload	<i>P_{OL}</i>	-3			dBm	2
Receiver Sensitivity	<i>P_{SEN}</i>			-18	dBm	2
LOS Assert	<i>LOSA</i>	-35			dBm	
LOS De-assert	<i>LOSD</i>			-18	dBm	
LOS Hysteresis	<i>LOSH</i>	1		4	dB	

Note:

- The optical power is launched into MMF
- Measured with a PRBS²⁷-1 test pattern @1250Mbps, BER ≤ 1x10⁻¹²

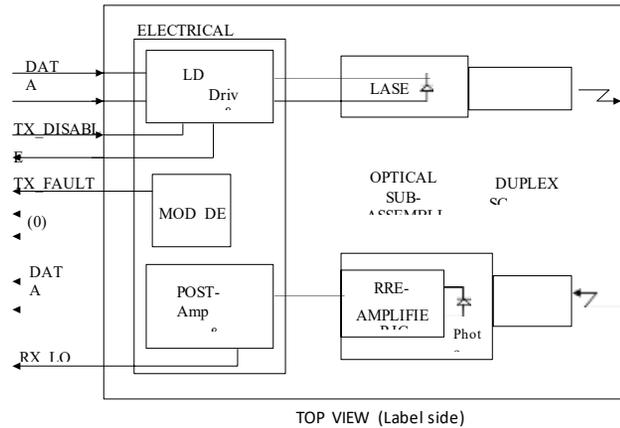
Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Transmitter						
Input Differential Impedance	<i>Z_{IN}</i>	90	100	110	Ω	
Single Ended Data Input Swing	<i>V_{IN_PP}</i>	400		1800	mV	1
Transmit Disable Voltage	<i>V_D</i>	2		V _{CC}	V	
Transmit Enable Voltage	<i>V_{EN}</i>	0		0.8	V	
Receiver						
Data Output Swing Differential	<i>V_{OUT}</i>	400		1800	mV	2
Data Output Rise/Fall Time (20%~80%)	<i>tr/tf</i>			300	ps	
LOS	<i>High</i>	2		V _{CC}	V	
	<i>Low</i>			0.8	V	

Notes:

- PECL input, internally AC-coupled and terminated.
- Internally AC-coupled.

Block Diagram of Transceiver



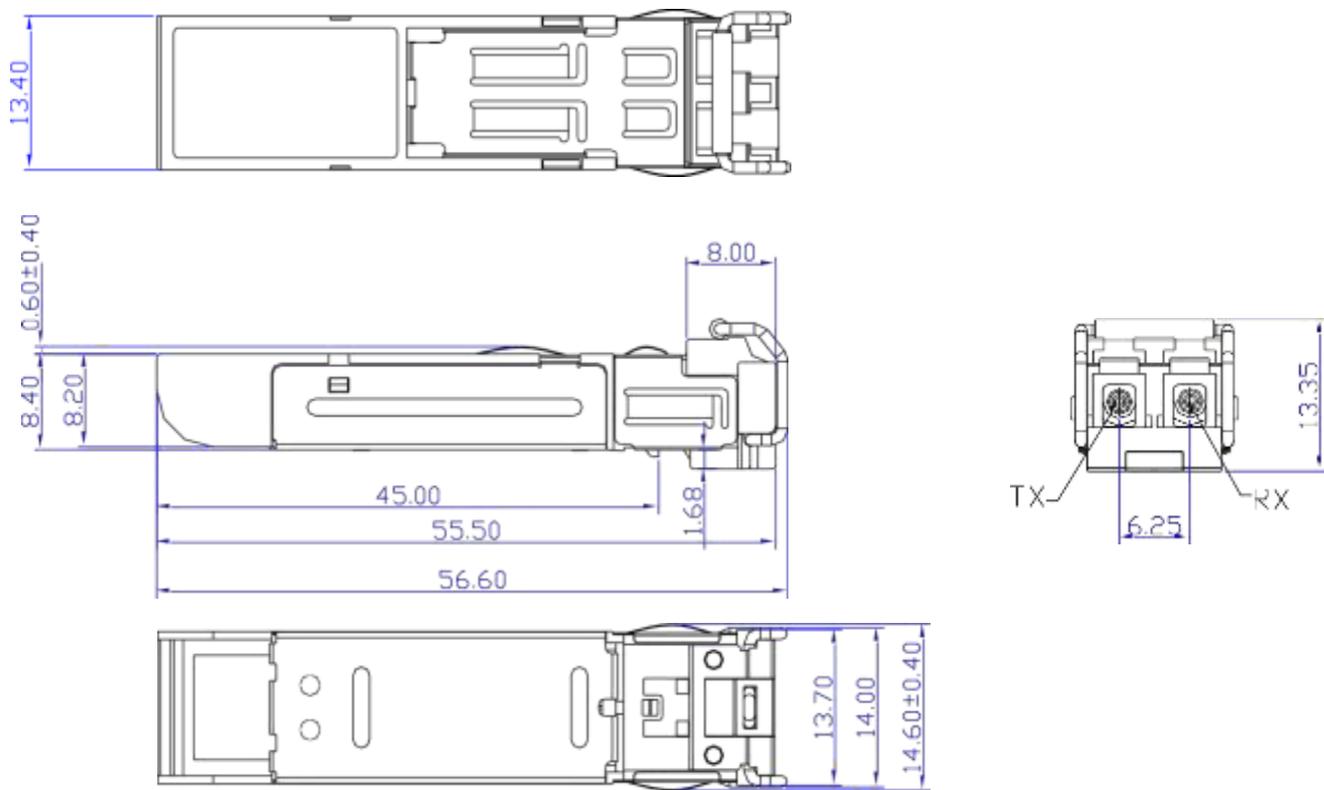
Pin Descriptions

Pin	Symbol	Function/Description	Note
1	VEET	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault. Not supported	
		Transmitter Disable. Laser output disabled on high	
3	TX DISABLE	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	
		Loss of Signal indication. Logic 0 indicates normal	
8	LOS	operation	4
9	VEER	Receiver ground (common with transmitter ground)	1
10	VEER	Receiver ground (common with transmitter ground)	1
11	VEER	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	VEER	Receiver ground (common with transmitter ground)	1
15	VCCR	Receiver power supply	
16	VCCT	Transmitter power supply	
17	VEET	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	VEET	Transmitter ground (common with receiver ground)	1

Notes:

1. Circuit ground is isolated from chassis ground.
2. Disabled: TDIS>2V or open Enabled: TDIS<0.8V
3. Should be pulled up with 4.7k~10k ohm on the host board to a voltage between 2V and 3.6V.
4. LOS is open collector output.

Dimensions



DIMENSIONS ARE IN MILLIMETERS
ALL DIMENSIONS ARE 0.2mm UNLESS OTHERWISE SPECIFIED

Ordering Information

Model Number	Part Number	Wavelength	Temperature
ASFP-1G-SX	OP6C-MX5-85-CMF	850nm	0°C ~70 °C
ASFP-1G-SX-I	OP6C-MX5-85-IMF	850nm	-40 °C ~85 °C

Note: All information contained in this document is subject to change without notice.

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