Alpha Bridge ASFPP-10G-LR Datasheet

Alpha Bridge® Technologies

Features

- Compliant with SFF-8431 SFP+ MSA
- Compliant with IEEE802.3ae 10G BASE-LW/LR
- 1310nm DFB transmitter
- PIN photodetector
- 2-wire interface for management specifications compliantwith SFF 8472 digital diagnostic monitoring interface for optical transceivers
- Advanced firmware allows customer system encryption information to be stored in the transceiver
- Cost-effective SFP+ solution, enables higher port densitiesand All-metal housing for superior EMI performance.
- Low power consumption
- greater bandwidth
- RoHS Compliant

Applications

- High-speed storage area networks Alpha#Tech@2024$
- Computer cluster cross-connect.
- Custom high-speed data pipes

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	Tc	-40	85	°C	
Operating Case Temperature	Tc	-40	85	°C	OPAK-S10-13-IB
Supply Voltage	Vcc	0	3.6	V	
Relative Humidity	RH	5	95	%	
RX Input Average Power	Pmax	---	1.5	dBm	

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit	Note
Case Operating System	Tc	0	70	°C	OPAK-S10-13-CB
		-40	85	°C	OPAK-S10-13-IB
Supply Voltage	Vcc	3.135	3.465	V	
Supply Current	ICC	---	300	mA	
Power Consumption		---	1000	mW	

Diagnostics

Parameter	Symbol	Accuracy	Unit	Notes
Voltage	VCC	± 0.08	V	Full operating range
Bias Current	Bias	± 10	mA	
TX Power	TX	± 3 dB	dBm	
RX Power	RX	± 3 dB	dBm	-1dBm to -15dBm range

Transmitter Electro-optical Characteristics

$Vcc = 3.135$ V to 3.465 V, $T_C = 0\,^{°C}$ to $70\,^{°C}$ $(-40\,^{°C}$ to $85\,^{°C})$

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Data Rate		---	10.3125	---	Gbps	
Output Optical Power	Pout	-8.2	---	0.5	dBm	1
Launched power OMA	dBm	-5.2				
Launched power OMA -TDP	dBm	-6.2				
Center Wavelength	IC	1260		1355	nm	
Relative Intensity Noise	RIN	---	---	-128	dB/Hz	12dB reflection
Side Mode Suppression Ratio	SMSR	30			dB	
Laser Off Power	POFF	---	---	-30	dBm	
Extinction Ratio	ER	3.5	---	---	dB	
Transmitter Dispersion Penalty	TDP	---	---	3.2	dB	

Parameter		Symbol	Min.	Typ.	Max.	Units	Note
Optical Return Loss Tolerance			---	---	12	dB	
Single Ended Output Voltage Tolerance			-0.3	---	4	V	
C common mode voltage tolerance			15	---	---	mV	
TX Input Diff Voltage		VI	180		700	mV	
TX Fault		VoL	-0.3		0.4	V	At 0.7mA
Data Dependent Input Jitter		DDJ			0.1	UI	
Data Input Total Jitter		TJ			0.28	UI	

Note 1: Average optical power shall be measured using the methods specified in TIA/EIA-455-95

Receiver Electro-optical Characteristics

Vcc = 3.135 V to 3.465 V, T_C = 0 °C to 70 °C (-40 °C to 85 °C)

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Data Rate		---	10.3125	---	Gbps	
Output Optical Power	Pout	-8.2	---	0.5	dBm	1
Launched power OMA	dBm	-5.2				
Launched power OMA -TDP	dBm	-6.2				
Center Wavelength	IC	1260		1355	nm	
Relative Intensity Noise	RIN	---	---	-128	dB/Hz	12dB reflection
Side Mode Suppression Ratio	SMSR	30			dB	
Laser Off Power	POFF	---	---	-30	dBm	
Extinction Ratio	ER	3.5	---	---	dB	
Transmitter Dispersion Penalty	TDP	---	---	3.2	dB	
Optical Return Loss Tolerance		---	---	12	dB	
Single Ended Output Voltage Tolerance		-0.3	---	4	V	
C common mode voltage tolerance		15	---	---	mV	
TX Input Diff Voltage	VI	180		700	mV	
TX Fault	VoL	-0.3		0.4	V	At 0.7mA
Data Dependent Input Jitter	DDJ			0.1	UI	
Data Input Total Jitter	TJ			0.28	UI	

Note 1:Average optical power shall be measured using the methods specified in TIA/EIA-455-95.

Note 2: Receiver sensitivity is informative. Stressed receiver sensitivity shall be measured with conformance test signalfor BER =1x 10^{-12} ·

Note 3. Vertical eye closure penalty and stressed eye jitter are the test conditions for measuring stressed receiversensitivity. They are not the required characteristic of the receiver.

Block Diagram of Transceiver
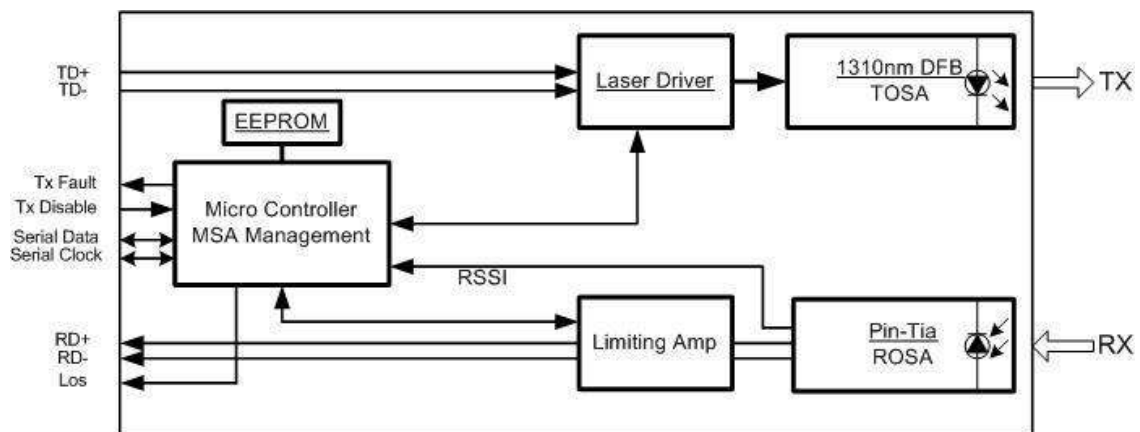
This 1310 nm DFB 10Gigabit SFP+ transceiver is designed to transmit and receive optical data over single mode optical fiber for link length 10km.

The SFP+ LR module electrical interface is compliant to SFI electrical specifications. The transmitter input and receiveroutput impedance is 100 Ohms differential. Data lines are internally AC coupled. The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about 150mmof

standard FR4 with one connector.

The transmitter converts 10Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 10GBASE-LR standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. A logic "1," or no connection on this pin will disable the laser from transmitting. A logic "0" on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supplyvoltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is amodule output contact that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Hostin the host with a resistor in the range 4.7-10 kΩ. TX_Disable is a module input contact. When TX_Disable is assertedhigh or left open, the SFP+ module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 kΩ to 10 kΩ resistor

The receiver converts 10Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to Vcc_Host in the host with a resistor in the range 4.7-10 kΩ, or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the SFP+ isinstalled that the received signal strength is below the specified range. Such an indication typically points to non- installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.

Pin Assignment
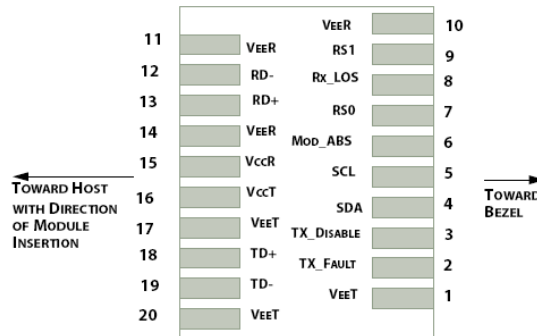
**Module Interface to Host**
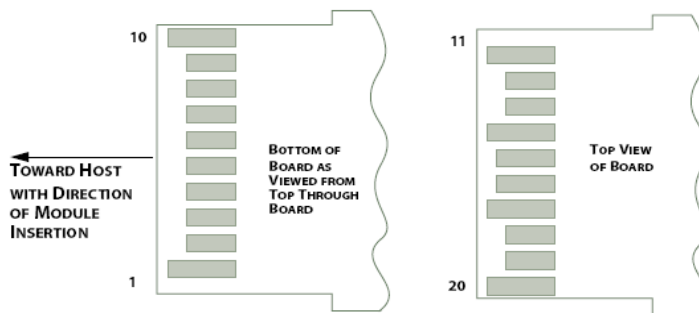
Module Contact Assignment

Pin Descriptions

| Pin	Logic	Symbol	Name /Description	Note
1		VeeT	Module Transmitter Ground	1
2	LVTTL-O	TX_Fault	Module Transmitter Fault	
3	LVTTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	
4	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
5	LVTTL-I	SCL	2-Wire Serial Interface Clock	2
6		MOD_DEF0	Module Definition, Grounded in the module	
7	LVTTL-I	RS0	Not used	
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication Active High	
9	LVTTL-I	RS1	Not used	
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Receiver 3.3 V Supply	
17		VeeT	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeeT	Module Transmitter Ground	1

Note:

1. Module ground pins GND are isolated from the module case.

2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

Dimensions
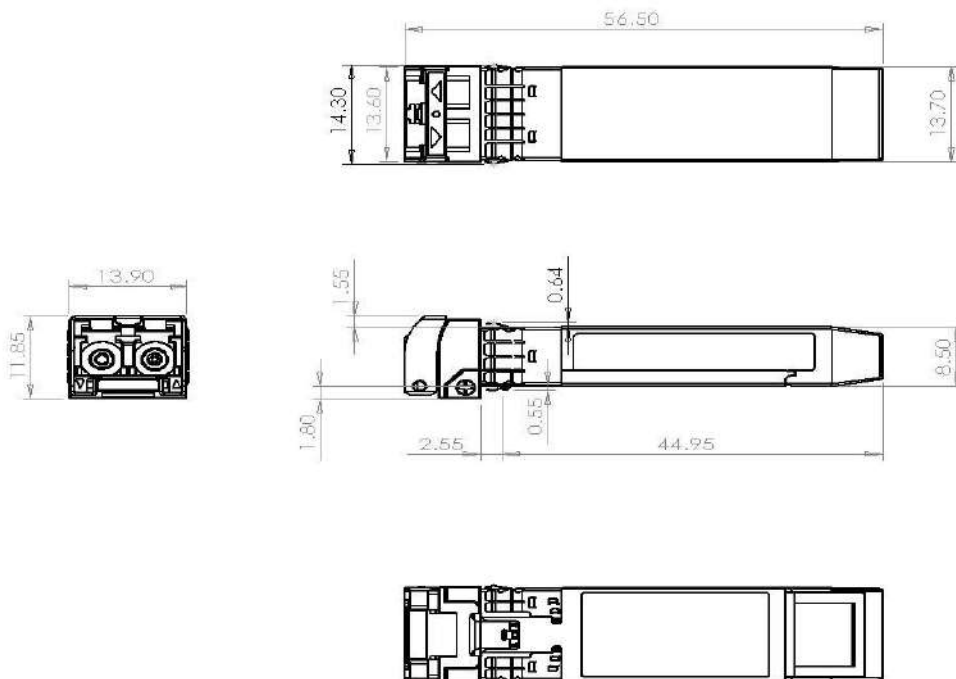
Optical Receptacle Cleaning Recommendations:

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette.
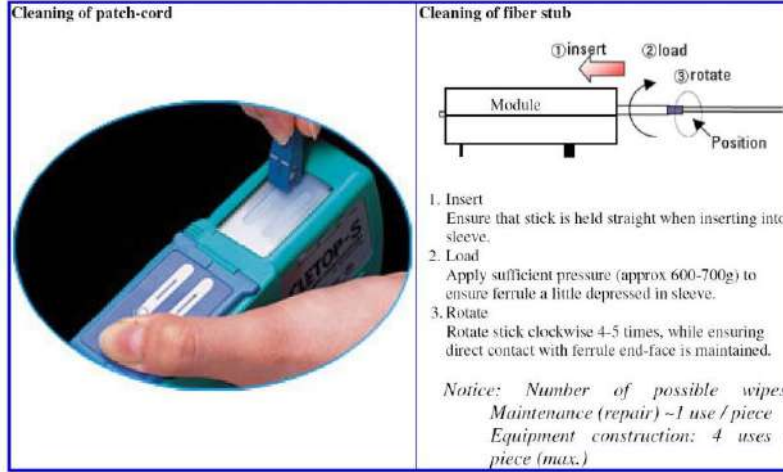
Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

Ordering Information

Model Number	Part Number	Reach	Input/Output	Signal Detect	Voltage	Temperature
ASFPP+10G-LR	OPAK-S10-13-CB	10km	AC/AC	TTL	3.3V	0°C to 70 °C
ASFPP+10G-LR-I	OPAK-S10-13-CB-I	10km	AC/AC	TTL	3.3V	-40°C to 85 °C

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