

## SFP 1.25G Copper RJ45 Transceiver



### Description

The BlueOptics® BO08C28S1 SFP transceiver is a high performance, cost effective module supporting a data rate up to 1.25Gbps with 100 Meter link length on twisted pair Cat5E cable.

BlueOptics® transceivers are 100% compliant with SFP Multi-Source Agreement (MSA).

### Features

- ✓ 1.25Gb/s serial optical interface compliant to 802.3ab 1000BASE-T
- ✓ Hot-pluggable SFP footprint compliant to SFF-8074i
- ✓ RJ-45 connector interface
- ✓ Auto MDI-X
- ✓ Access to physical layer IC via 2 wire serial bus
- ✓ Metal enclosure, for lower EMI
- ✓ RoHS compliant and lead-free
- ✓ Low power dissipation: maximum 1.2W
- ✓ Single +3.3V power supply
- ✓ Compliant with SFF-8472
- ✓ Case operating temperature
  - Commercial: 0°C to +70°C
  - Extended: -10°C to +80°C
  - Industrial: -40°C to +85°C

### Applications

- ✓ 1000Base-T
- ✓ Ethernet
- ✓ Switch to Switch Interface
- ✓ Router/Server Interface
- ✓ Other links

## Warnings

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended.

**Laser Safety:** Even small radiation emitted by laser devices can be dangerous to human eyes and lead to permanent eye injuries. Be sure to avoid eye contact with direct or indirect radiation.

## Warranty

Every BlueOptics® transceiver comes with a 5 year replacement warranty and lifetime support.

For a warranty inquiry, please contact your CBO sales representative.

This warranty only covers the first user of the equipment.

## Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by CBO before they become applicable to any particular order or contract. In accordance with the CBO policy of continuous improvement specifications may change without notice.

The publication of information in this data sheet does not imply freedom from patent or other protective rights of CBO or others.

Further details are available from any CBO sales representative.

## Installation

Before installation attach an ESD-preventive wrist to ensure not to damage the transceiver or hardware.

BlueOptics® BO08C28S1 can be installed in any Small Form Factor Pluggable (SFP) port. You can install the BO08C28S1 regardless if the system is powered on or off, because it is hot-swappable.

Insert the transceiver into the SFP port and remove the dust cap.

You can now connect your cable.

## Order Information

Part No.	Temp.	DDM
BO08C28S1	0°C to +70°C	-
BO08C28S1EX	-10°C to +80°C	-
BO08C28S1IN	-40°C to +80°C	-

## Regulatory Compliance

Feature	Standard	Co.
Electrostatic Discharge (ESD)	- IEC/EN 61000-4- 2	✓
Electromagnetic Interference (EMI)	- FCC Part 15 Class B EN 55022 - Class B (CISPR 22A)	✓
Laser Eye Safety	- FDA 21CFR 1040.10, 1040.11 - IEC/EN 60825-1, 2	Class 1 ✓
Component Recognition	- IEC/EN 60950, UL	✓
RoHS	- 2002/95/EC	✓
EMC	- EN61000-3	✓

### 1. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	Ts	-40		85	°C
Storage Ambient Humidity	HA	5		95	%

### 2. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note	
Case Operating Temperature	Tcase	0		70		BO08C28S1	
		-10		80	°C	BO08C28S1EX	
		-40		85		BO08C28S1IN	
Ambient Humidity	HA	5		70	%		
Data Rate			1250/1250		Mbps	Does not support SGMII	
Transmission Distance				100	M		
Coupled Copper Cable		Twisted Pair					Min. Cat5E

### 3. Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Current	Is		320	375	mA	1
Input Voltage	Vcc	3.13	3.3	3.47	V	2
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge			30	mA	3

**Notes:**

1. 1.2W maximum power consumption
2. Referenced to GND
3. Power consumption and surge current are higher than the specified values in MSA

### 4. Low Speed Signals

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
SFP Output LOW	Vol	0		0.5	V	1
SFP Output HIGH	Voh	host_Vcc -0.5		host_Vcc + 0.3	V	1
SFP Input LOW	Vil	0		0.8	V	2
SFP Input HIGH	Vih	2		Vcc+0.3	mA	2

**Notes:**

1. 4.7k to 10k pull-up to host\_Vcc, measured at host side of connector
2. 4.7k to 10k pull-up to Vcc, measured at SFP side of connector

## 5. High Speed Signals

High-Speed Electrical Interface - Transmission Line-SFP						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Line Frequency	fL		125		MHz	1
Tx Output Impedance	Zout,TX		100		Ohm	2
Rx Input Impedance	Zin,RX		100		Ohm	2

**Notes:**

1. 5 level encoding, per IEEE802.3
2. Differential, for all frequencies between 1MHz and 125MHz

High-Speed Electrical Interface - Host-SFP						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Single ended data input swing	Vinsing	250		1200	mV	1
Single ended data output swing	Voutsing	350		800	mV	1
Rise/Fall Time	Tr ,Tf		175		Psec	2
Tx Input Impedance	Zin		50		Ohm	1
Rx Output Impedance	Zout		50		Ohm	1

**Notes:**

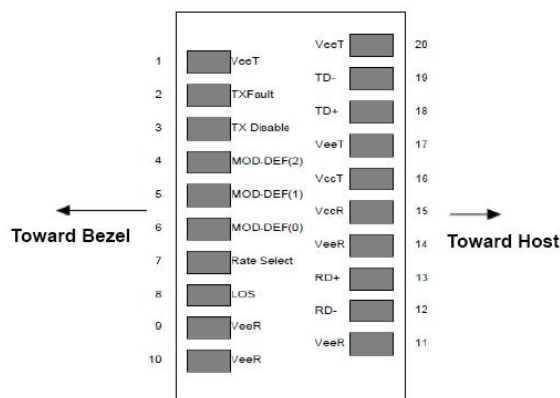
1. Single ended
2. 20%-80%

## 6. SFP to Host Connector Pin Out

Pin	Symbol	Name / Description	Note
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault indication	
3	T <sub>DIS</sub>	Transmitter Disable	
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	2
5	MOD_DEF(1)	Module Definition 1. Data line for Serial ID.	2
6	MOD_DEF(0)	Module Definition 0. Data line for Serial ID.	2
7	RS0	Rate Select 0	
8	LOS	Loss of Signal indication	3
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-	Inv. Received Data Out	
13	RD+	Received Data Out	
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	
17	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmit Data In	
19	TD-	Inv. Transmit Data In	
20	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

**Notes:**

1. Circuit ground is connection chassis ground.
2. It is pulled up within the module with a 4.7k~10kΩ resistor. Voltage is between 2.0V and 3.6. MOD\_DEF(0) indicates if module is plugged in.
3. LVTTTL compatible with a maximum voltage of 2.5V.



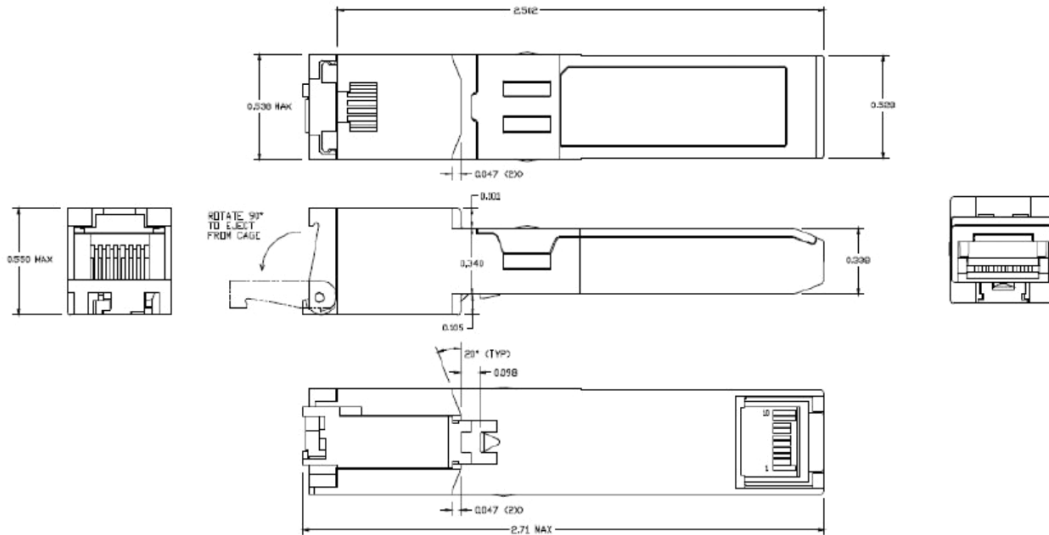
Pinout of Connector Block on Host Board

**7. EEPROM Information**

The SFP MSA defines a 256-byte memory map in EEPROM describing the transceivers capabilities, standard interfaces, manufacturer, and other information, which is accessible over a 2 wire serial interface at the 8-bit address 1010000X (A0h).

Data Address	Field Size (Bytes)	Name of Field	Contents (Hex)	Description
0	1	Identifier	XX	Formfactor
1	1	Ext. Identifier	XX	
2	1	Connector	XX	
3-10	8	Transceiver	XX XX XX XX XX XX XX XX	Transmittter Code
11	1	Encoding	XX	
12	1	BR, Nominal	XX	Transceiver Speed
13	1	Reserved	00	
14	1	Length (9µm) km	XX	Max. link length in KM
15	1	Length (9µm) 100m	XX	Max. link length in M
16	1	Length (50µm) 10m	XX	Max. link length in M
17	1	Length(62.5µm)10m	XX	Max. link length in M
18	1	Length (Copper)	XX	Max. link length in M
29	1	Reserved	00	
30-35	16	Vendor name	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Vendor name - OEM
36	1	Reserved	00	
37-39	3	Vendor OUI	XX XX XX	
40-55	16	Vendor PN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Product Number - depending on Part
56-59	4	Vendor rev	XX XX XX XX	Vendor revision
60-61	2	Wavelength	XX XX	Transceiver Wavelength
62	1	Reserved	00	
63	1	CC BASE	XX	Checksum of bytes 0-62
64-65	2	Options	XX XX	
66	1	BR, max	XX	
67	1	BR, min	XX	
68-83	16	Vendor SN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Part serial number
84-91	8	Vendor date code	XX XX XX XX XX XX 20 20	Year, Month, Day
92	1	Diagnostic type	XX	Diagnostics
93	1	Enhanced option	XX	Diagnostics
94	1	SFF-8472	XX	Diagnostics
95	1	CC_EXT	XX	Checksum of bytes 64-94
96-255	160	Vendor Specific		

**8. Mechanical Specifications** (Unit: mm)



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