



## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

BO05C856S5

### DESCRIPTION:

THE BLUEOPTICS® BO05C856S5 SFP TRANSCEIVER IS A HIGH PERFORMANCE, COST EFFECTIVE MODULE SUPPORTING A DATA RATE UP TO 1.25GBPS WITH 550 METER LINK LENGTH ON MULTI MODE FIBER. BLUEOPTICS® TRANSCEIVERS ARE 100% COMPLIANT WITH SFP MULTI SOURCE AGREEMENT (MSA). ALL BLUEOPTICS® SFP TRANSCEIVERS CAN BE EQUIPPED WITH DIGITAL DIAGNOSTIC FUNCTION COMPLIANT TO MSA SFF 8472.

USING DIGITAL DIAGNOSTIC, BLUEOPTICS® SFP TRANSCEIVERS PROVIDE THE FOLLOWING REAL TIME INFORMATION:

- SUPPLY VOLTAGE
- LASER BIAS CURRENT
- LASER AVERAGE OUTPUT POWER
- LASER RECEIVED INPUT POWER
- TEMPERATURE

THE TRANSCEIVER CONSISTS OF FIVE SECTIONS: A VCSEL TRANSMITTER, A PIN PHOTODIODE, A TRANS IMPEDANCE PREAMPLIFIER (TIA), THE LD DRIVER AND THE DIGITAL DIAGNOSTIC FUNCTION.



### APPLICATIONS:

- 1000BASE SX
- ETHERNET / FIBER CHANNEL
- SWITCH TO SWITCH INTERFACE
- ROUTER/SERVER INTERFACE
- OTHER OPTICAL LINKS

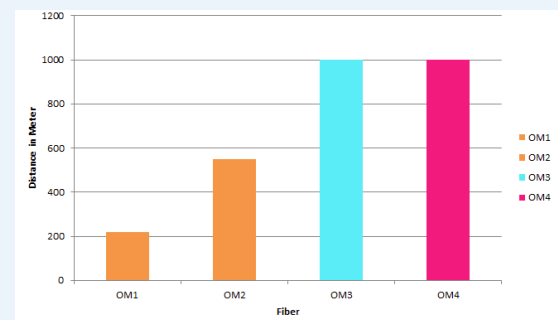
### WARRANTY:

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.

### FEATURES:

- 1.25GB/S SERIAL OPTICAL INTERFACE COMPLIANT TO 802.3Z 1000BASE SX
- VCSEL LASER TRANSMITTER
- PIN PHOTO DETECTOR
- HOT PLUGGABLE SFP FOOTPRINT COMPLIANT TO SFF 8074I
- DUPLEX LC/UPC TYPE PLUGGABLE OPTICAL INTERFACE
- 2 WIRE INTERFACE FOR MANAGEMENT
- METAL ENCLOSURE, FOR LOWER EMI
- ROHS COMPLIANT AND LEAD FREE
- 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





### MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

BO05C856S5

#### ORDER INFORMATION

Part No.	Temp.	DDM
BO05C856S5	0°C to + 70°C	-
BO05C856S5EX	-10°C to + 80°C	-
BO05C856S5IN	-40°C to + 80°C	-
BO05C856S5D	0°C to + 70°C	√
BO05C856S5DEX	-10°C to + 80°C	√
BO05C856S5DIN	-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	√

#### 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.

#### 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.



## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

BO05C856S5

### INSTALLATION:

BEFORE INSTALLATION ATTACH AN ESD PREVENTIVE WRIST TO ENSURE NOT TO DAMAGE THE TRANSCEIVER OR HARDWARE.

BLUEOPTICS® BO05C856S5 CAN BE INSTALLED IN ANY SMALL FORM FACTOR PLUGGABLE (SFP) PORT. YOU CAN INSTALL THE BO05C856S5 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.

### 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
		0		70		BO05C856S5 BO05C856S5D
		-10		80	°C	BO05C856S5EX BO05C856S5DEX
		-40		85		BO05C856S5IN BO05C856S5DIN
Ambient Humidity	HA	5		70	%	
Data Rate			1250/1250		Mbps	TX Rate/RX Rate
Transmission Distance				100	M	
Coupled Fiber		Multimode fiber				50/125µm MMF



## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

B005C856S5

### 3. ELECTRICAL INTERFACE CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Total Supply Current	ICC			A	mA	1
Transmitter Disable Input High	VDISH	2		V <sub>CC</sub> +0.3	V	
Transmitter Disable Input Low	VDISL	0		0.8	V	
Transmitter Fault Input High	VTxFH	2		V <sub>CC</sub> +0.3	V	
Transmitter Fault Input Low	VTxFL	0		0.8	V	
<b>Receiver</b>						
Total Supply Current	ICC			B	mA	1
LOSS Output Voltage High	VLOSH	2		V <sub>CC</sub> +0.3	V	
LOSS Output Voltage Low	VLOSL	0		0.8	V	

#### NOTES:

1. A (TX) + B (RX) = 280MA (WITHOUT TERMINATION CIRCUIT)

### 4. TRANSMITTER SPECIFICATIONS OPTICAL

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	POUT	-9		-3	dBm	
Extinction Ratio	ER	9			dB	
Center Wavelength	λC	830	850	860	nm	VCSEL Laser
Spectrum Bandwidth(RMS)	σ			0.85	nm	
Transmitter OFF Output Power	POff			-45	dBm	
Differential Line Input Impedance	RIN	90		110	Ohm	
Jitter P P	tJ			0.1	UI	
Output Eye Mask	Compliant with IEEE802.3ay (class 1 laser safety)					



## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

B005C856S5

### 5. RECEIVER SPECIFICATIONS OPTICAL

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	$\lambda_{IN}$	770	850	860	nm	
Receiver Sensitivity	PIN			-18	dBm	1
Input Saturation Power (Overload)	PSAT	0			dBm	
LOS Assert	PA			-19	dBm	
LOS De-assert	PD	-33			dBm	
LOS Hysteresis	PA PD	0.5	2.0	6.0	dB	

#### NOTES:

1. MEASURED WITH LIGHT SOURCE 850NM, ER=9DB; BER =<math>10^{-12}</math> @PRBS=2<sup>7</sup> -1 NON RETURN-TO-ZERO.

### 6. SFP TO HOST CONNECTOR PIN OUT

Pin	Symbol	Name / Description	Note
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault indication	
3	TDIS	Transmitter Disable	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Data line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Data line for Serial ID.	3
7	RS0	Rate Select 0	
8	LOS	Loss of Signal indication	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-	Inv. Received Data Out	

## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

B005C856S5

### 6. SFP+ TO HOST CONNECTOR PIN OUT

Pin	Symbol	Name / Description	Note
13	RD+	Received Data Out	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmit Data In	
19	TD-	Inv. Transmit Data In	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

#### NOTES:

1. CIRCUIT GROUND IS INTERNALLY ISOLATED FROM CHASSIS GROUND.

2. TDIS IS AN INPUT THAT IS USED TO SHUT DOWN THE TRANSMITTER 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 (2.0 TO 3.465V): TRANSMITTER DISABLED

OPEN: TRANSMITTER DISABLED

3. 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.

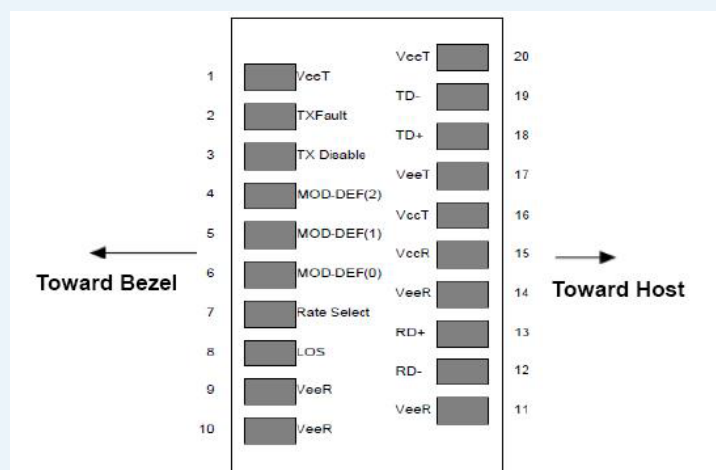
MOD-DEF 0 IS GROUNDED BY THE MODULE TO

INDICATE THAT THE MODULE IS PRESENT

MOD-DEF 1 IS THE CLOCK LINE OF TWO WIRE SERIAL INTERFACE FOR SERIAL ID

MOD-DEF 2 IS THE DATA LINE OF TWO WIRE SERIAL INTERFACE FOR SERIAL ID

4. LOS IS AN OPEN COLLECTOR OUTPUT, WHICH SHOULD BE PULLED UP WITH A 4.7K-10KΩ RESISTOR. PULL UP VOLTAGE BETWEEN 2.0V AND VC-C+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.





## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

B005C856S5

### 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



## MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

B005C856S5

Data Address	Field Size (Bytes)	Name of Field	Contents (Hex)	Description
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. DIGITAL DIAGNOSTICS / DIGITAL OPTICAL MONITORING

THE TRANSCEIVER PROVIDES SERIAL ID MEMORY CONTENTS AND DIAGNOSTIC INFORMATION ABOUT THE PRESENT OPERATING CONDITIONS BY THE 2-WIRE SERIAL INTERFACE (SCL, SDA).

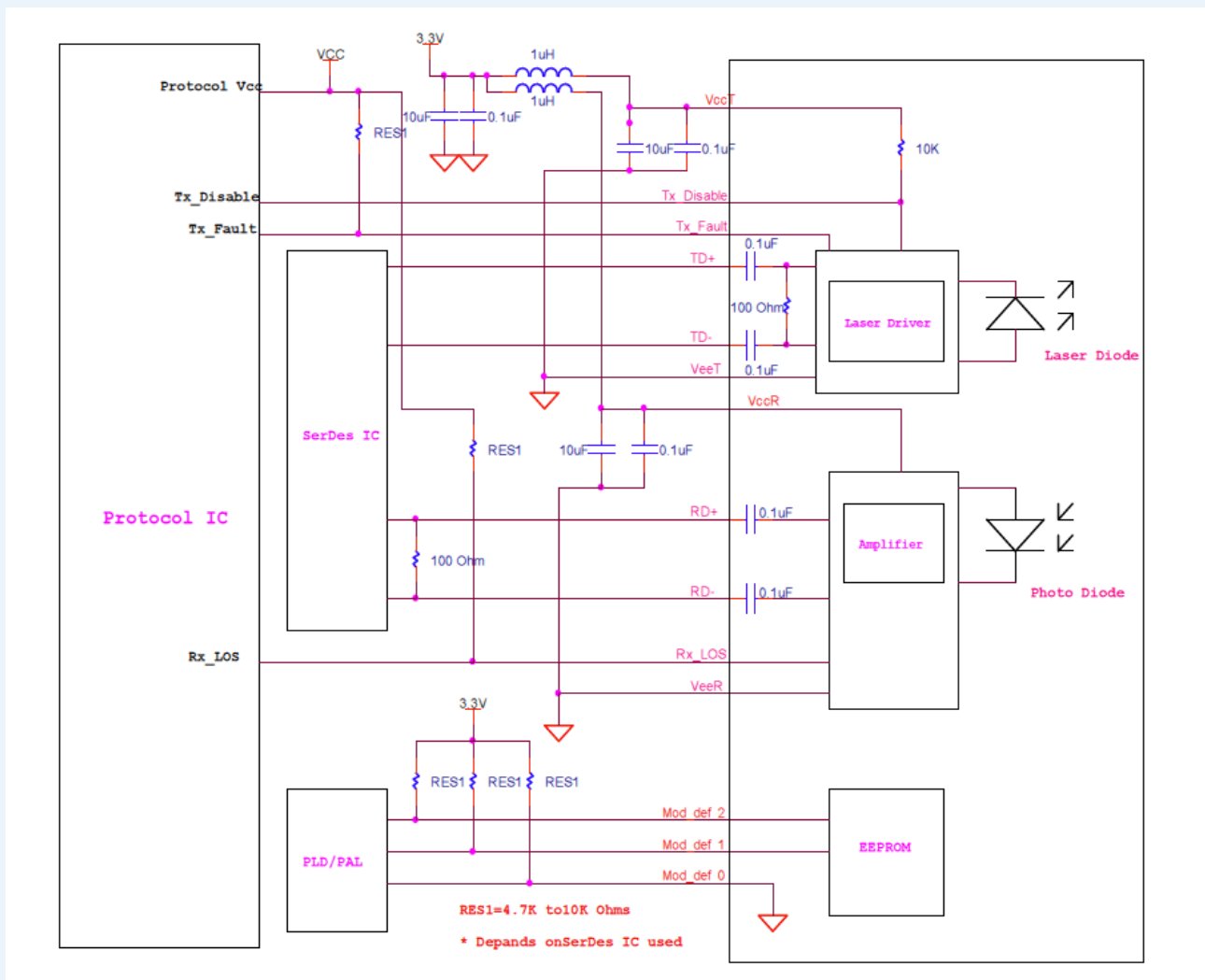
THE DIAGNOSTIC INFORMATION WITH INTERNAL CALIBRATION OR EXTERNAL CALIBRATION ARE ALL IMPLEMENTED, INCLUDING RECEIVED POWER MONITORING, TRANSMITTED POWER MONITORING, BIAS CURRENT MONITORING, SUPPLY VOLTAGE MONITORING AND TEMPERATURE MONITORING.



# MULTIMODE OPTICAL TRANSCEIVER - SFP 1.25G 850NM

B005C856S5

## 9. RECOMMENDED INTERFACE CIRCUIT



## MULTIMODE OPTICAL TRANSCEIVER - SFP+ 25G 850NM

B027Q856S1D

### 10. MECHANICAL SPECIFICATIONS (UNIT: MM)

