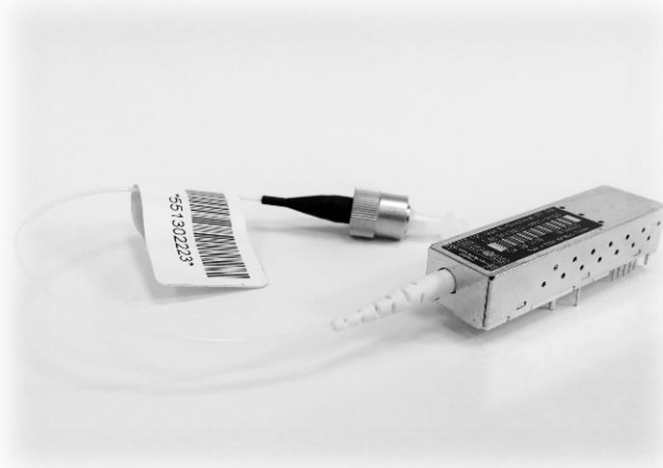


1.25 Gbps Bi-Directional single fiber SFF transceiver

T.BE5P85SS2-MB1-R100
 1310nm TX FP / 1550nm Rx TIA



Features

- Data rates up to 1.25Gbps
- Industry standard 2x5 SFF MSA footprint
- Integrated WDM filter for dual TX/RX operation
- Hermetically sealed BOSA
- Harsh environment design
- PIN-TIA Receiver with post-amp
- CML compatible inputs and outputs
- Up to 10km reach through single mode fibre
- Class 1 laser product
- ROHS-6 compliant

Parameters

- Industrial operating temperature range: -40 to +85 °C
- Storage Ambient Temperature: -40 to 85 °C
- Power Dissipation 1 W
- Power Supply Voltage 3.3 V

Applications

- Access Networks, e.g. media converters for Fiber-In-The-Loop (FITL) and Point-to-Point (P2P) links
- Inter-system communication between Servers, Switches, Routers, Add-Drop-Multiplexers, Cross Connects, etc. in Central Offices, Data Storage Networks, High Speed Server Farms, etc.
- Digital Video and Closed Circuit Television (CCTV) applications for Transport, Traffic, and Security

Ordering Information

Part Number	Wavelengths	Coupling (Tx / Rx)
T.BE5P85SS2-MB1-R100	TX 1310nm, RX 1550nm	AC / AC

Pin configuration



Pin No.	Symbol	Logic family	Function/Description
1	Vee_RX	N/A	Receiver ground (common with Transmitter ground)
2	Vcc_RX	N/A	Receiver power supply
3	SD	Open collector	Signal detect, logic 1 indicates that light is present at receiver input
4	RD-	CML	Receiver inverted data out
5	RD+	CML	Receiver non-inverted data out
6	Vcc_TX	N/A	Transmitter power supply
7	Vee_TX	N/A	Transmitter ground (common with receiver ground)
8	TxDis	LVTTL Input	Transmitter disable, high/open level switch laser off, low level switch laser on
9	TD+	CML	Transmitter non-inverted data
10	TD-	CML	Transmitter inverted data
MS	MS	N/A	Mounting studs for transceiver mechanical attachment to the circuit board.

Description

The EZconn BIDI transceiver - part of EZconn's Small Form Factor transceiver family - is based on the Physical Medium Depend (PMD) sublayer and baseband medium.

EZconn's BIDI transceiver is designed to handle multiple data rates and can be designed into Gigabit Ethernet, SONET OC-24, CCTV and other applications.

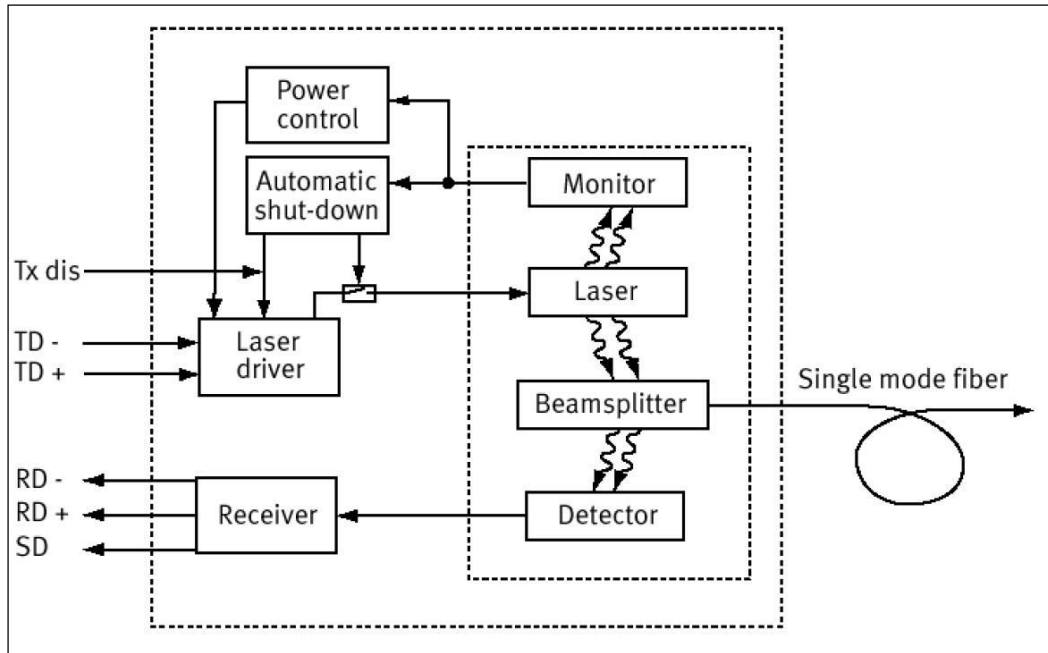
The appropriate fiber optic cable is the 9 μm single mode fiber with FC/UPC connector.

The EZconn BIDI transceiver is a single unit comprised of a transmitter, a receiver, WDM filter or beam splitter, and a Pigtail fiber with a connector. This design frees the customer from many alignment and PC board layout concerns.

This transceiver operates up to 1.25 Gbit/s from a single power supply (+3.3 V). The full differential data inputs and outputs are CML compatible.

Functional description of 2x5 pin row transceiver

This transceiver is designed to transmit and receive serial data via a single mode cable.



Functional Diagram

The receiver component converts the optical serial data into CML compatible electrical data (RD+ and RD-). The Signal Detect (SD, active high) shows whether an optical signal is present.

The transmitter converts CML compatible electrical serial data (TD+ and TD-) into optical serial data. Data lines are differentially 100 Ohms terminated.

The transmitter contains a laser driver circuit that drives the modulation and bias current of the laser diode. The currents are controlled by a power control circuit to guarantee constant output power of the laser over temperature and aging.

The power control uses the output of the monitor PIN diode (mechanically built into the laser coupling unit) as a controlling signal, to prevent the laser power from exceeding the operating limits.

Single fault condition is ensured by means of an integrated automatic shutdown circuit that disables the laser when it detects laser fault to guarantee the laser Eye Safety.

The laser can be disabled by the TxDis input.

Technical Data

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit
		Min.	Max.	
Storage Ambient Temperature	T_s	-40	85	°C
Power Dissipation			1.0	W
Power Supply Voltage	V_{CC}	-0.5	5	V
Soldering Conditions Temp/Time ¹⁾			260/10	°C/s

¹⁾ Wave soldering is acceptable.

Recommended Operating Conditions

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Operating Temperature Range Case	T_C	-40		85	°C
Relative Humidity (non-condensing)	H	10		85	%
Power Supply Voltage	$V_{CC}-V_{EE}$	3.15	3.3	3.45	V

The electro-optical characteristics described in the following tables are valid only for use under the recommended operating conditions.

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Average Launched Power	$P_{out, max}$	-3	0	+2	dBm
Emission Wavelength Range	λ	1260	1310	1360	nm
Spectral Bandwidth (RMS)	S_λ			3.0	nm
Extinction Ratio	ER	6.0			dB
Jitter (pkpk)	J_{PP}			150	ps
Rise Time (20% - 80%) ¹⁾	t_R			500	ps
Fall Time (20% - 80%) ¹⁾	t_F			500	ps
Eye Diagram	<i>IEEE 802.3ah 1000BX Mask</i>				
Differential Input Swing	V_{ID}	0.4		1.8	Vp-p
TxDis Input High	V_{HI}	2			V
TxDis Input Low	V_{LO}			0.8	V
Power on Delay	t_{PWR_ON}		60		ms
Shut Off Time for TxDis	t_{DIS}		90		ns
Tx Supply Current	I_{TX}			200	mA

¹⁾ Rise and fall times are measured with the OC-24 filter ON.

Receiver Electro-Optical Characteristics

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Receiving Wavelength Range /depending on the TRX type/	I_R	1490	1550	1600	nm
Sensitivity (Average Power) ¹⁾	P_{IN}			-24	dBm
Saturation (Average Power)	P_{SAT}	+3.0			dBm
Signal Detect Assert Level ²⁾	P_{SDA}			-22	dBm
Signal Detect Deassert Level ³⁾	P_{SDD}	-34			dBm
Signal Detect Hysteresis	$P_{SDA}-P_{SDD}$		2		dB
Differential Output Voltage		650	800	950	mV _{P-P}
Signal Detect Assert Time	t_{ASS}		6		μs
Signal Detect Deassert Time	t_{DAS}		6		μs
SD Output High Voltage ⁴⁾	V_{OH}	Vcc-0.4			V
SD Output Low Voltage ⁴⁾	V_{OL}			0.4	V
Rise/Fall Time	t_R, t_F			200	ps
Max. Rx Supply Current ⁵⁾	I_{RX}			100	mA

¹⁾ Minimum average optical power at which the BER is less than 1×10^{-12} . Measured with a $2^{23}-1$ NRZ PRBS and Extinction Ratio of 10.0dB.

²⁾ An increase in optical power above the specified level will cause the Signal Detect output to switch from a low state to a high state.

³⁾ A decrease in optical power below the specified level will cause the Signal Detect to change from a high state to a low state.

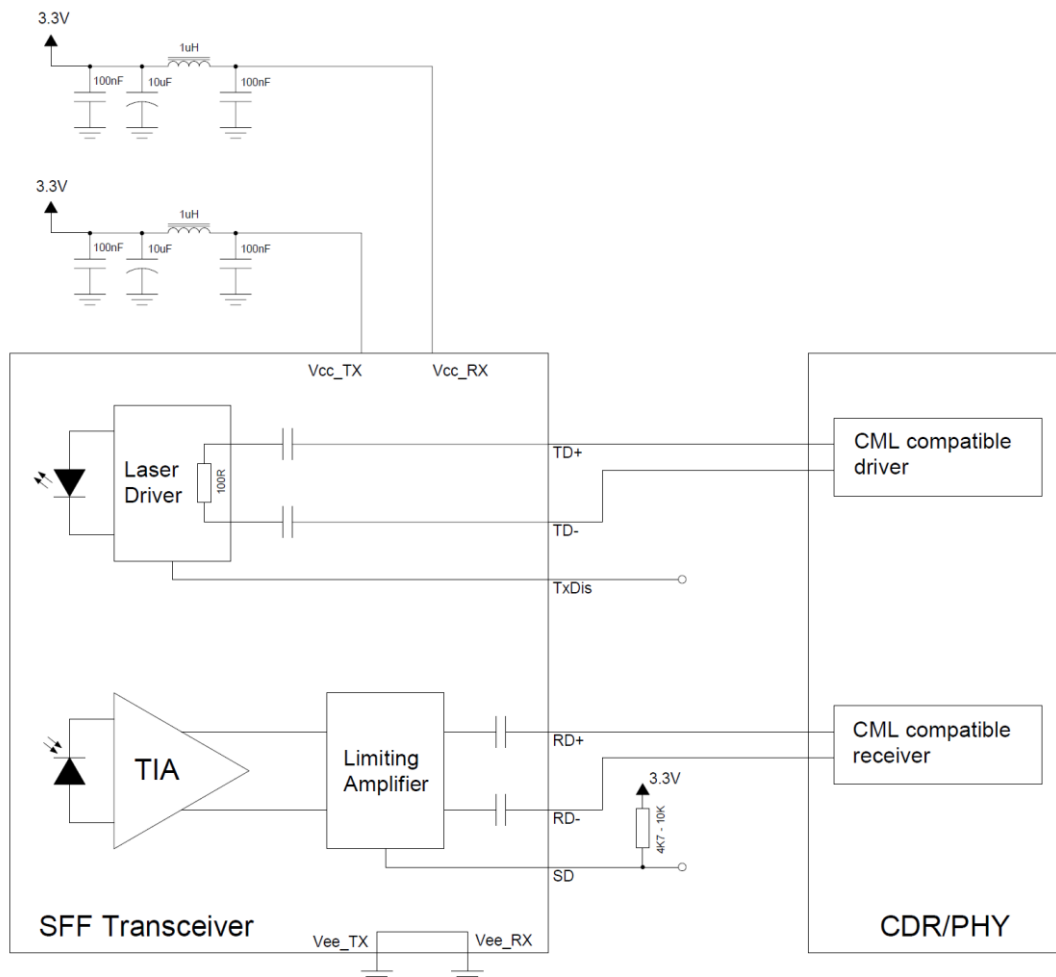
⁴⁾ Measured with a 4k7 Ω to 10k Ω resistor pull-up to Vcc.

⁵⁾ Supply current excluding Rx output load.

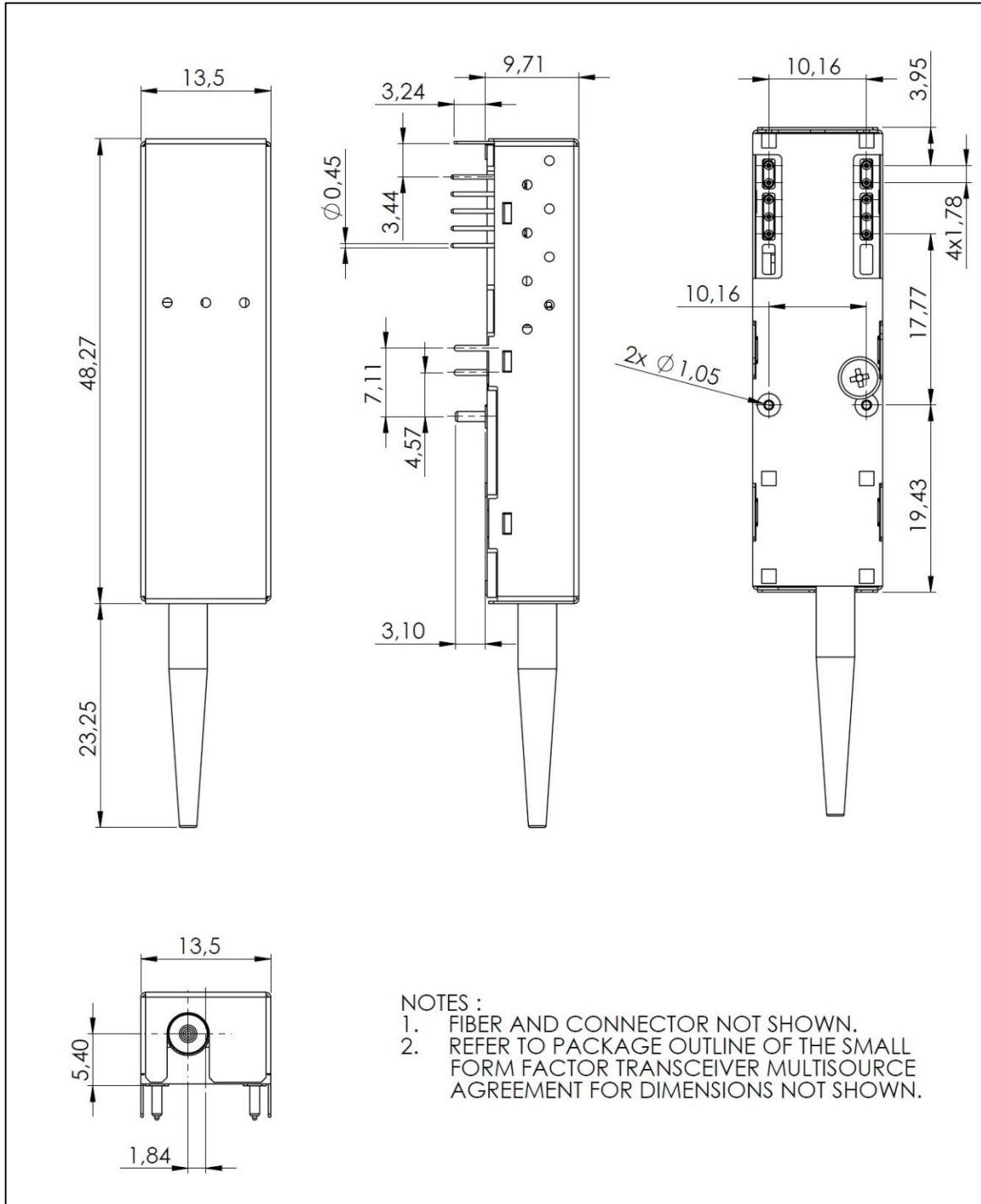
Module Electro-Optical Characteristics

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Receiver Reflectance	ORL			-20	dB

Typical application circuit



Technical Drawing



Eye Safety

This laser based single mode transceiver is a Class 1 product. It complies with IEC 60825-1/A2:2001 and FDA performance standards for laser products (21 CFR 1040.10 and 1040.11) except for deviations pursuant to Laser Notice 50, dated July 26, 2001.

Class 1 Laser Product

To meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Fiber Data

The mechanical fiber characteristics are described in the following table.

Fiber Characteristics	Min.	Typ.	Max.	Unit
Mode Field Diameter	8	9	10	μm
Cladding Diameter	123	125	127	μm
Mode Field/Cladding Concentricity Error			1	μm
Cladding Non-circularity			2	%
Mode Field Non-circularity			6	%
Cut off Wavelength	1270			nm
Jacket Diameter	0.8		1	mm
Bending Radius	30			mm
Tensile Strength Fiber Case	5			N
Length	0.17		0.19	m

Connector Option

Model	Type
T.BE5P85SS2-MB1-R100	SM Huber & Suhner FC/UPC 0°

Laser Emission Data

Wavelength	1310nm
Maximum total output power (as defined by IEC: 7 mm aperture at 14 mm distance)	15.6 mW / 11.9 dBm
Beam divergence (full angle) / NA (half angle)	11.0° / 0.1 rad

Note: All adjustments have been made at the factory prior to shipment of the devices.

No maintenance or alteration to the device is required.

Tampering with or modifying the performance of the device will result in voided product warranty.

Revision Date: 2016-04-15

Major changes since last revision

Page	Subject
5	Improved Sensitivity to min. -24dBm
all	Modified to only 1310Tx version
7	Updated Technical drawing

Edition 2016-04-15

Published by EZconn Czech a.s.

Náchodská 529

541 01 Trutnov, Czech Republic

All Rights Reserved.

Attention please!

The information herein is given to describe certain components and shall not be considered as a guarantee of characteristics.

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

Information

For further information on technology, delivery terms and conditions and prices please contact EZconn Czech a.s, Náchodská 529, 541 01 Trutnov, Czech Republic (www.ezconn.cz)

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact EZconn Czech Office.

EZconn Czech Components may only be used in life-support devices or systems with the express written approval of EZconn Czech, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.