

### CSFP-1G-2BX-53-D-20-EC-AO

Edge-corE® Compatible TAA 1000Base-BX 2-Channel SFP Transceiver (SMF, 1550nmTx/1310nmRx, 20km, LC, DOM)

#### Features

- Operating Data Rate up to 1.25Gbps
- 20km with 9/125um SMF
- 1550nm DFM Tx/1310nm Rx
- 2xBi-Directional Transceiver
- Class 1 Laser Safety Compliant
- Single 3.3V Power Supply
- Operating Temperature: 0 to 70 Celsius
- Compliant with MSA SFP Specifications
- RoHS Compliant and Lead-Free



#### Applications

- 1000Base Ethernet
- Access and Enterprise

#### Product Description

This Edge-corE® compatible SFP transceiver provides 1000Base-BX 2-Channel throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1550nmTx/1310nmRx via an LC connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between 0 and 70C. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Edge-corE®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



## Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature		Tc	0		70	°C	
Storage Temperature		Tstg	-40		85	°C	
Relative Humidity		RH			95	%	
Data Rate	FE	DR			100	Mbps	
	OC-3/STM-1				155		
	STM-4				622		
	FC				1063		
	GBE				1250		
9µm Core Diameter SMF		L		20		km	

## Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.15	3.3	3.45	V	
Power Supply Current		Icc			300	mA	
Transmitter							
LVPECL Differential Input		VIN	400		2000	mVp-p	1
Input Differential Impedance		ZIN	85	100	115	Ω	2
Tx_Disable	Disable		2		Vcc+0.3	V	
	Enable		0		0.8	V	
Tx_Fault	Fault		2		Vcc+0.3	V	
	Normal		0		0.8	V	
Receiver							
CML Differential Output		VOUT	400		800	mVp-p	3
Output Differential Impedance		ZOUT	85	100	115	Ω	
Rx_LOS	LOS		2		Vcc+0.3	V	
	Normal		0		0.8	V	
MOD_DEF(0.2)		VOH	2.5			V	4
		VOL	0		0.8	V	

## Notes:

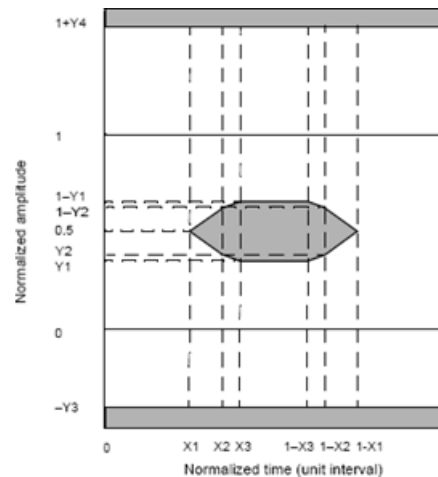
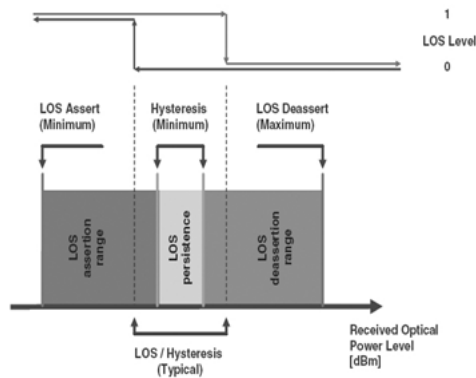
1. AC coupled inputs. LVPECL logic. Internally AC coupled.
2. RIN > 100kΩ @ DC.
3. AC coupled outputs. LVPECL logic. Internally AC coupled.
4. With serial ID.

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	$\lambda_C$	1540	1550	1560	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	POUT	-8		-3	dBm	1
Side-Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio @1250Mbps	ER	6			dB	
Rise/Fall Time (20-80%)	Tr/Tf			0.26	ns	
POUT @ Tx_Disable Asserted	POUT			-45	dBm	
Tx_Disable Assert Time	Toff			10	us	
Output Optical Eye	Compliant with IEEE 802.3ah-2004					2, 5
Receiver						
Center Wavelength	$\lambda_C$	1260	1310	1360	nm	
Receiver Sensitivity @ 1250Mbps	Pmin			-22	dBm	3
Receiver Overload	Pmax	-3			dBm	
Return Loss		12			dB	
Optical Path Penalty				1	dB	
LOS Assert	LOSA	-35			dBm	
LOS De-Assert @ 1250Mbps	LOSD			-23	dBm	
LOS Hysteresis	LOSH	0.5			dB	4

### Notes:

1. Output is coupled into a 9/125 $\mu$ m SMF.
2. Filtered, measured with a PRBS 2<sup>7</sup>-1.
3. Minimum average optical power is measured at BER less than 1E<sup>-12</sup> with a 2<sup>7</sup>-1 PRBS and ER=9dB.
4. LOS Hysteresis.
5. Eye Pattern Mask.



## Pin Descriptions

Pin	Symbol	Name/Description	Channel No.	Notes
1	Vee	Transceiver Ground.	Common	3
2	Tx_Fault	Transmitter Fault Indication.	Common	8
3	Tx1_Disable	Transmitter Disable of Channel 1. Module disables on “high” or “open.”	1	1
4	MOD_DEF2	SDA. 2-Wire Serial ID Interface.	Common	2
5	MOD_DEF1	SCL. 2-Wire Serial ID Interface.	Common	2
6	TD2-	Inverted Transmit Data Input of Channel 2.	2	6
7	TD2+	Transmit Data Input of Channel 2.	2	6
8	LOS1	Loss of Signal of Channel 1.	1	7
9	RD2+	Received Data Output of Channel 2.	2	4
10	RD2-	Inverted Received Data Output of Channel 2.	2	4
11	Vee	Transceiver Ground.	Common	3
12	RD-	Receiver Inverse Data Output of Channel 1.	1	4
13	RD+	Receiver Data Output of Channel 1.	1	4
14	LOS2	Loss of Signal of Channel 2.	2	7
15	VccR	3.3 ± 5% Receiver Power.	Common	5
16	VccT	3.3 ± 5% Transmitter Power.	Common	5
17	Tx2_Diable	Transmitter Disable of Channel 2. Module disables on “high” or “open.”	2	1
18	TD+	Transmit Data Input of Channel 1.	1	6
19	TD-	Inverted Transit Data Input of Channel 1.	1	6
20	VeeT	Transceiver Ground.	Common	6

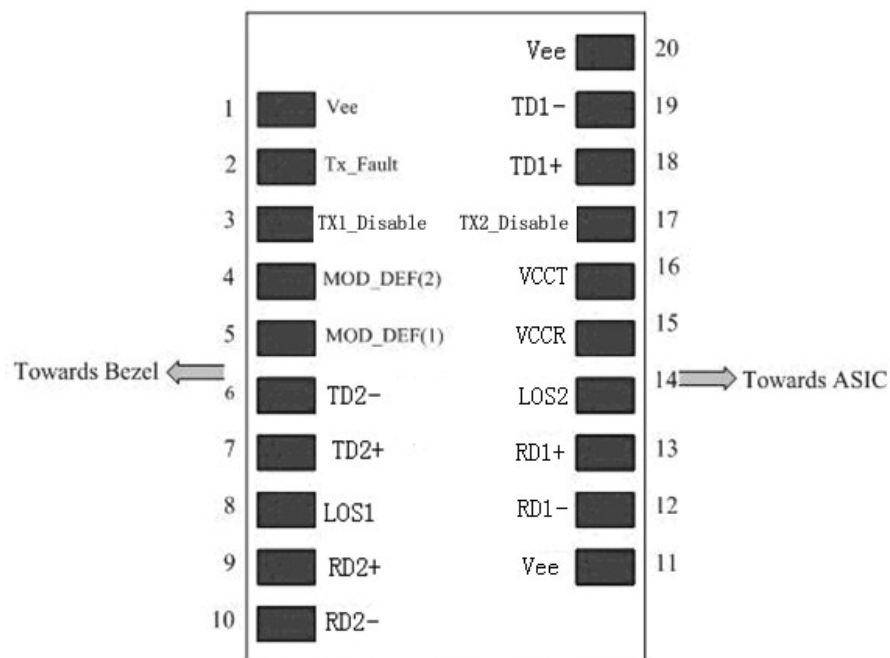
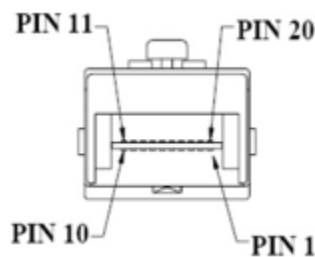
## Notes:

1. Tx\_Disable 1 and 2 are inputs that are used to shut down the transmitter optical output. They are pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:  
Low (0V – 0.8V): Transmitter On  
(>0.8V, <2.0V): Undefined  
High (2.0V – 3.465V): Transmitter Disabled  
Open: Transmitter Disabled.
2. MOD-DEF0, 1, & 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.  
MOD-DEF1 is the clock line of the 2-wire serial interface for serial ID.  
MOD-DEF2 is the data line of the 2-wire serial interface for serial ID.
3. Vee may be internally connected within the SFP module.
4. RD1,2 -/+. These are the differential receiver outputs. They are AC-coupled, 100Ω differential lines that should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
5. VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ± 5% at the SFP

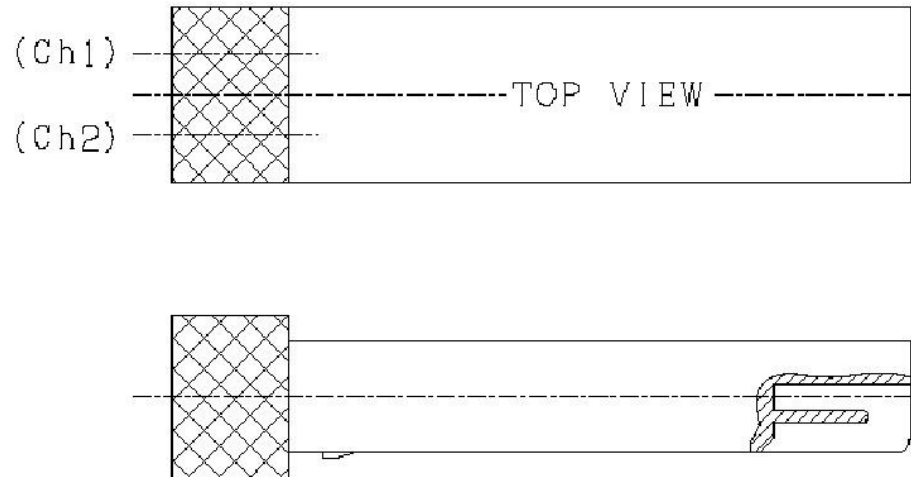
connector pin. Maximum supply current is 600mA at 3.3V VccR and VccT may be internally connected within the SFP transceiver module.

6. TD1, 2 -/+. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module.
7. LOS1, 2 (Loss of Signal) is an open collector/drain output, which is pulled up with a 4.7kΩ to 10kΩ resistor. Pull up voltage between 2.0V and VccT, VccR +0.3V. When high, this output indicated the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.4V.
8. Tx Fault report transceiver status as following:  
Tx Fault is an open collector/drain output, which should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull up voltage between 2.0V and VccT, VccR +0.3V. When high, output indicates a laser fault of some kind either in Channel 1 or Channel 2. The Host shall read Channel ½: A2H/AAH: 100 for details: Tx Fault from Channel 1 of bit 2 is set in [A2H:110]; Tx Fault from Channel 2 if bit is set in [B2H: 110]. Low indicates normal operation, the output will be pulled to <0.8V.

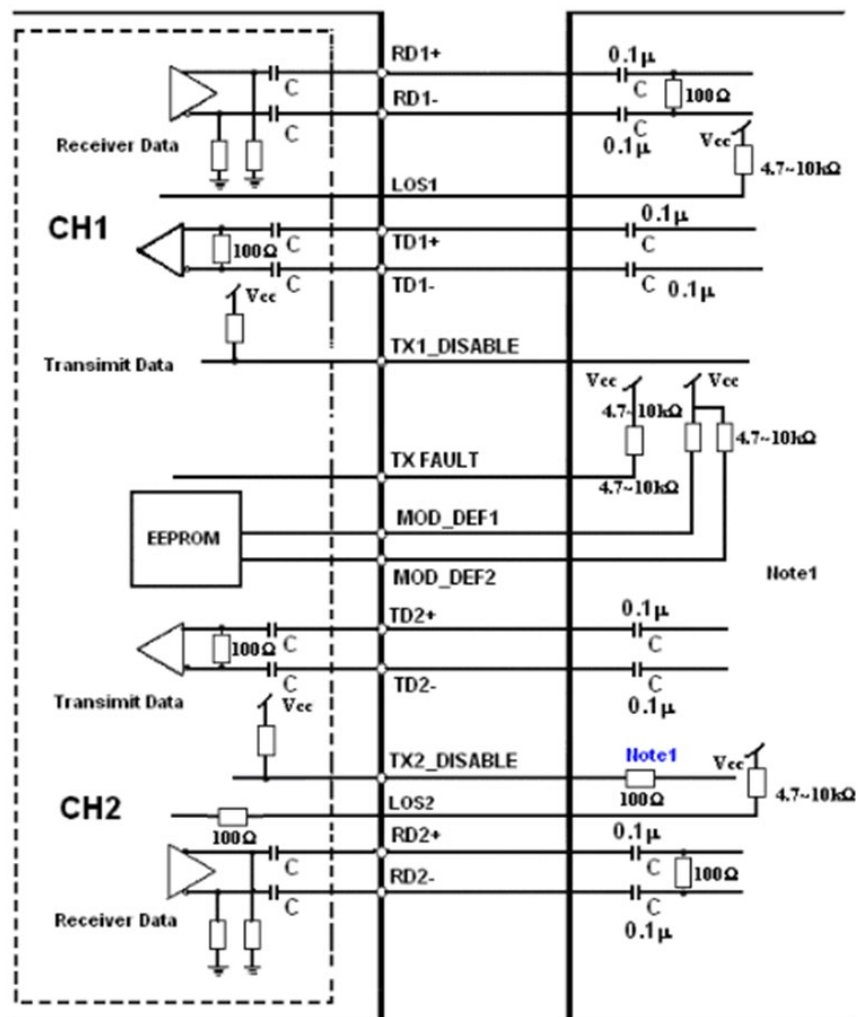
## Electrical Pad Layout



### Channel Description of Transceiver

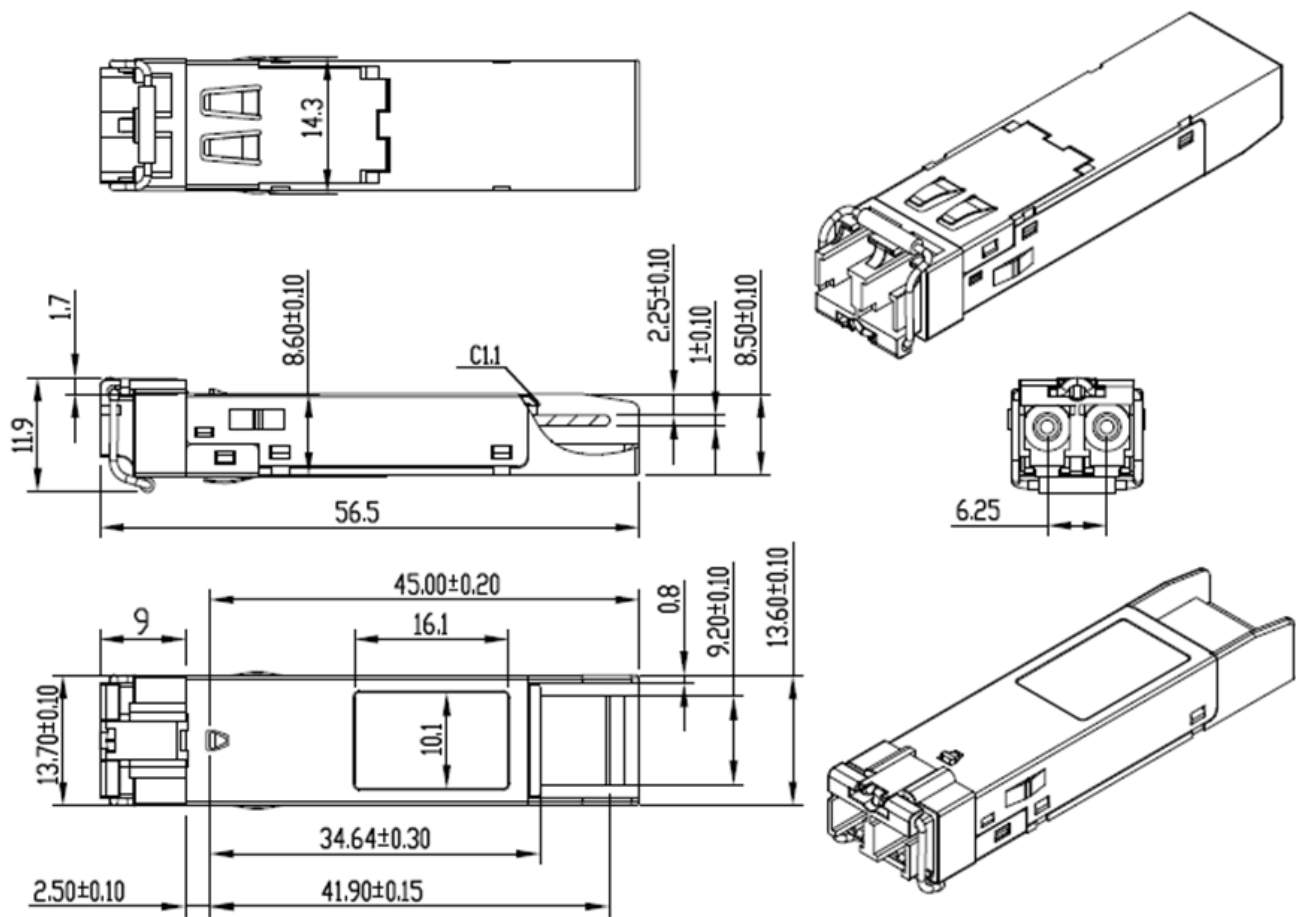


### Recommended Circuit Schematic



**Note1:** Recommendation 100Ω series resistance on host board.

Mechanical Specifications



Laser Emission



## About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications from ranging from NEBS Level 3 to ISO 9001:2005 with every new development while maintaining the signature reliability of its products.



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