

CSFP-1G-2BX-53-D-20-C

MSA and TAA 1000Base-BX 2-Channel SFP Transceiver (SMF, 1550nmTx/1310nmRx, 20km, LC, DOM)

Features:

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

**Applications:**

- 1000Base Ethernet
- Access and Enterprise

Product Description

This MSA compliant 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. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' 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	T _c	0		70	°C	
Storage Temperature	T _{stg}	-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	V _{cc}	3.15	3.3	3.45	V	
Power Supply Current	I _{cc}			300	mA	
Transmitter						
LVPECL Differential Input	V _{IN}	400		2000	mVp-p	1
Input Differential Impedance	Z _{IN}	85	100	115	Ω	2
Tx_Disable	Disable	2		V _{cc} +0.3	V	
	Enable	0		0.8	V	
Tx_Fault	Fault	2		V _{cc} +0.3	V	
	Normal	0		0.8	V	
Receiver						
CML Differential Output	V _{OUT}	400		800	mVp-p	3
Output Differential Impedance	Z _{OUT}	85	100	115	Ω	
Rx_LOS	LOS	2		V _{cc} +0.3	V	
	Normal	0		0.8	V	
MOD_DEF(0.2)		V _{OH}	2.5		V	4
		V _{OL}	0	0.8	V	

Notes:

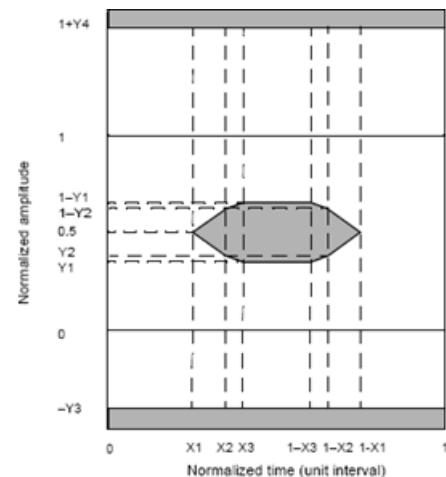
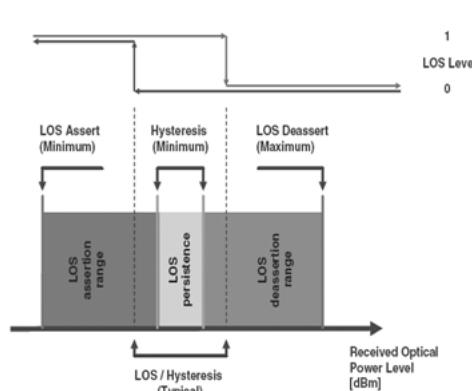
1. AC coupled inputs. LVPECL logic. Internally AC coupled.
2. RIN > 100kΩ @ DC.
3. AC coupled outputs. LVPECL logic. Internally AC coupled.
4. With serial ID.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_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	λ_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 μ m SMF.
2. Filtered, measured with a PRBS 2⁷-1.
3. Minimum average optical power is measured at BER less than 1E⁻¹² with a 2⁷-1 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_Disable	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

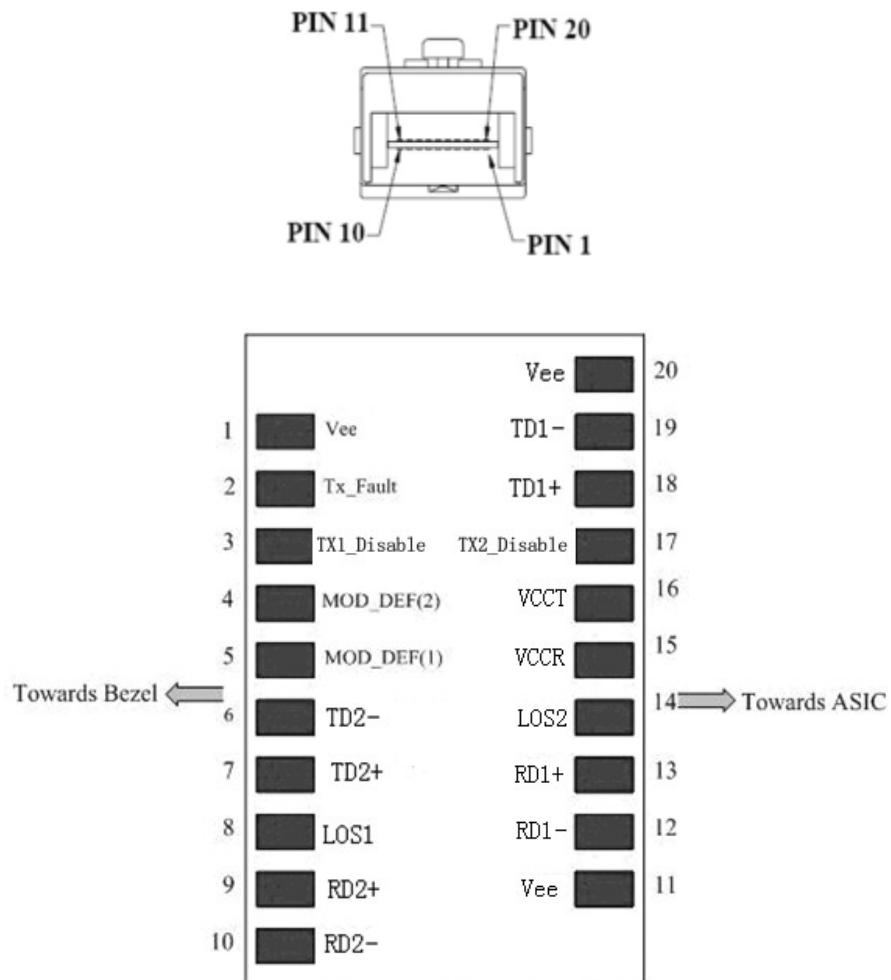
Notes:

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

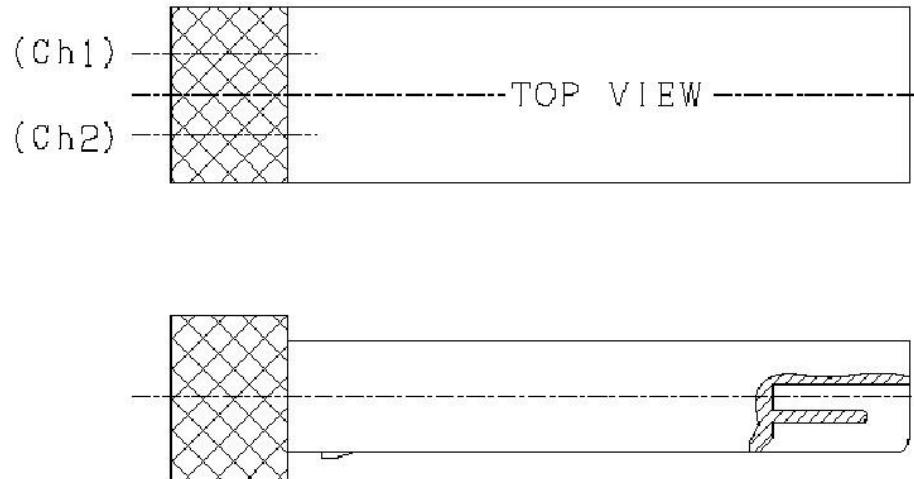
connector pin. Maximum supply current is 600mA at 3.3V VccR and VccT may be internally connected within the SFP transceiver module.

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 $4.7k\Omega$ to $10k\Omega$ 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 $4.7k\Omega$ to $10k\Omega$ 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 1: 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.

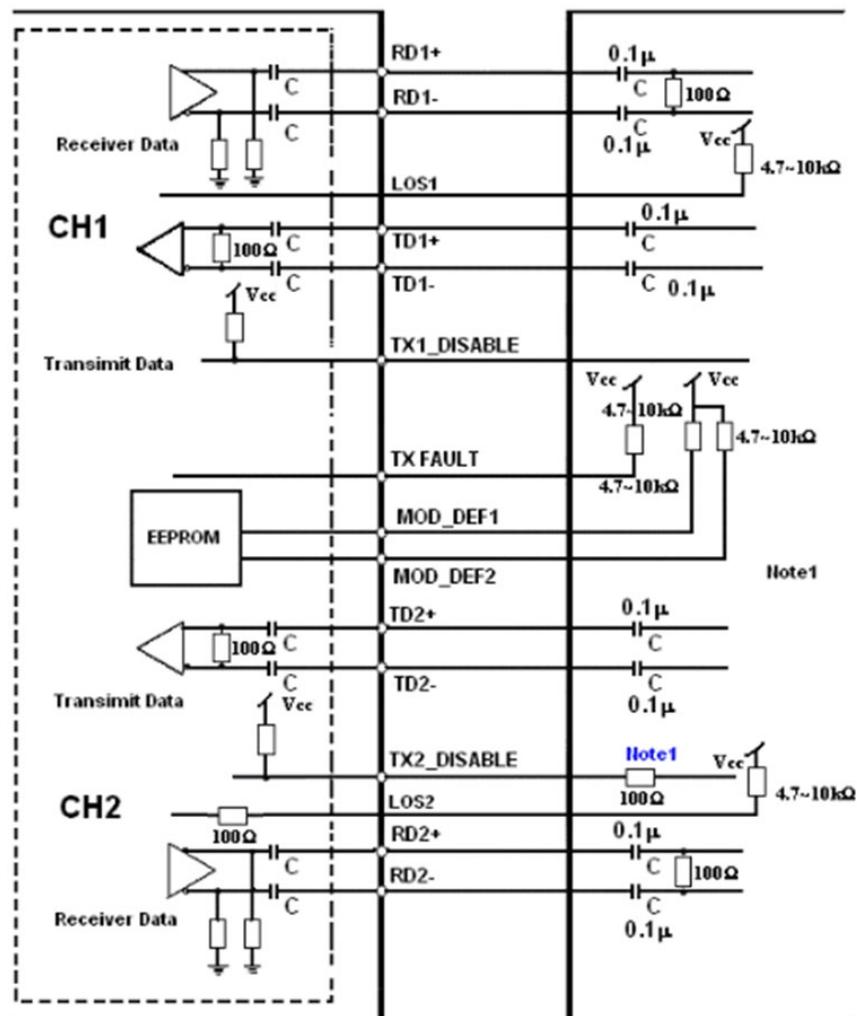
Electrical Pad Layout



Channel Description of Transceiver

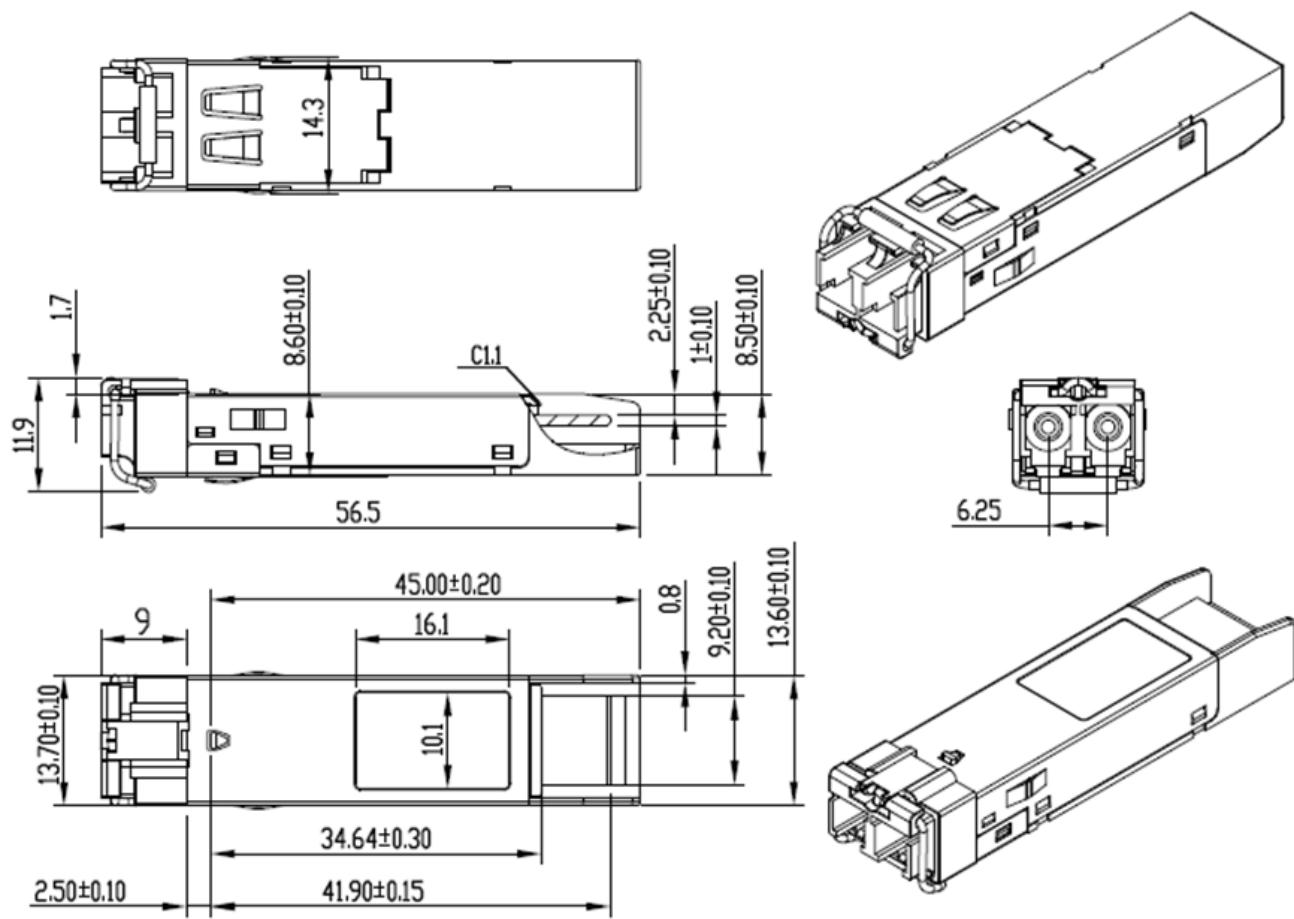


Recommended Circuit Schematic



Note1: Recommendation 100Ω series resistance on host board.

Mechanical Specifications



Laser Emission



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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