

SO-CSFP-100BASE-BX20D-34-O2

CSFP BIDI, 100/155Mbps FE, TX/RX=1310/1490nm, SM, DDM, 20dB, 20km, LC,

Option 2 PIN conf.

OVERVIEW

The SO-CSFP-100Base-BX20D-34-O2 series is compliant with the compact Small Form-Factor Pluggable (CSFP) MSA option 2 for STM-1 and Fast Ethernet. Both channels have BOSA. Each BOSA is using 1310nm / 1490nm transmitter and 1490nm / 1310nm receiver. It is with the 20-pin connector to allow hot plug capability. It also can be compatible with conventional SFP. Conventional SFP can function when plugged into a C-SFP socket. No damage to C-SFP and host board if C-SFP module is plugged into a conventional SFP socket. The SO-CSFP-100Base-BX20D-34-O2 series are designed to be compliant with SFF-8472 Multi-source Agreement (MSA).

PRODUCT FEATURES

- Support up to 155Mbps data links
- 1310nm FP TX /1490nm RX
- 20km with 9/125 μ m SMF
- Single 3.3V power supply and TTL logic interface
- 2XBi-directional transceivers in 1 SFP transceiver package
- Class 1 FDA and IEC60825-1 laser safety compliant
- Operating Case Temperature
 - Standard: 0°C to +70°C
 - Industrial: -40°C to +85°C
- Compliant with CSFP MSA option 2
- Compliant with Digital Diagnostic Monitor (DDM) interface (FF-8472)

APPLICATIONS

- SONET OC-3 / SDH STM-1
- WDM fast Ethernet links
- Point to point FTTH application

ORDERING INFORMATION

Part Number	Description
SO-CSFP-100Base-BX20D-34-O2	CSFP BIDI, 100/155Mbps FE, TX/RX=1310/1490nm, SM, DDM, 20dB, 20km, LC, Option 2 PIN conf.
SO-CSFP-100Base-BX20D-34-O2 -I	CSFP BIDI, 100/155Mbps FE, TX/RX=1310/1490nm, SM, DDM, 20dB, 20km, LC, Option 2 PIN conf., ind. temp.

Subject to change without notice.

For more information, visit smaroptics.com.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T_s	-40	+85	°C
Supply Voltage	V_{cc}	-0.5	3.6	V
Operating Relative Humidity		-	95	%

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Operating Case Temperature	SO-CSFP-100Base- BX20D-34-O2	0		70	°C
	T_c				
Power Supply Voltage	V_{cc}	3.15	3.3	3.45	V
Power Supply Current	I_{cc}			300 Per channel	mA
Data Rate	OC-3		155		Mbps
	FE		125		

PERFORMANCE SPECIFICATIONS – ELECTRICAL TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
LVPECL Compatible Inputs(Differential)	V_{IN}	400		2000	mVpp	AC coupled inputs
Input Impedance (Differential)	C_{IN}	85	100	115	ohms	$R_{in} > 100 \text{ kohms @ DC}$
Tx_DISABLE Input Voltage – High		2		$V_{cc}+0.3$	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		$V_{cc}+0.3$	V	
Tx_FAULT Output Voltage – Low		0		0.5	V	

PERFORMANCE SPECIFICATIONS – ELECTRICAL RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	V_{out}	400		2000	mVpp	AC coupled inputs
Output Impedance (Differential)	C_{out}	85	100	115	ohms	
Rx_LOS Output Voltage – High		2		$V_{cc}+0.3$	V	
Rx_LOS Output Voltage – Low		0		0.8	V	
MOD_DEF (2:0)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

OPTICAL AND ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
9µm Core Diameter SMF	L		20		km
Data Rate			125/155		Gbps

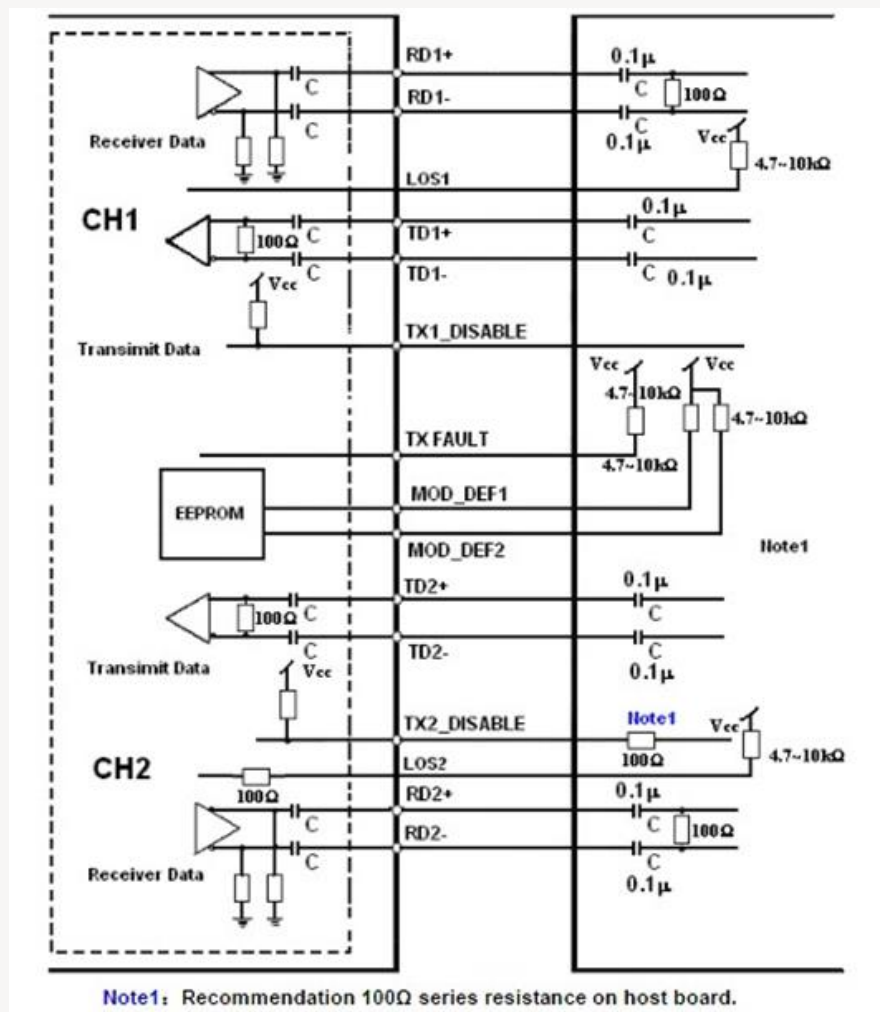
OPTICAL AND ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	λ_c	1260	1310	1360	nm
Spectral Width (RMS)	$\Delta\lambda$			4	nm
Average Output Power	P_{out}	-14		-8	dBm
Extinction Ratio @ 125 Gbps	E_r	8.2			dB
Rise/Fall Time(20%~80%)	tr/tf			2	ns
Output Optical Eye		IUT-T G.957 Compliant			
TX_Disable Assert Time	t_{off}			10	us
P_{out} @ TX Disable Asserted	P_{out}			-45	dBm

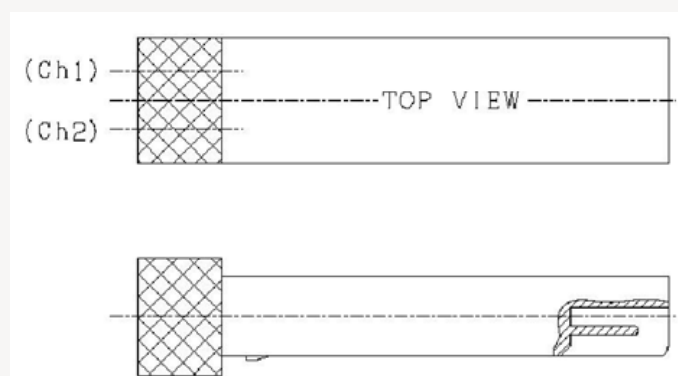
OPTICAL AND ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit
Centre Wavelength	λ_c	1440	1490	1540	nm
Receiver Sensitivity	$P_{min} @ OC-3$			-33	dBm
	$P_{min} @ 125M$			-34	
Receiver Overload	P_{max}	-8			dBm
Return Loss		12			dB
Optical Path Penalty				1	dB
LOS De-Assert@155Mbps	LOSD			-34	dBm
LOS De-Assert@125Mbps				-35	
LOS Assert	LOSA	-45			dBm
LOS Hysteresis		0.5			dB

RECOMMENDED CIRCUIT SCHEMATIC

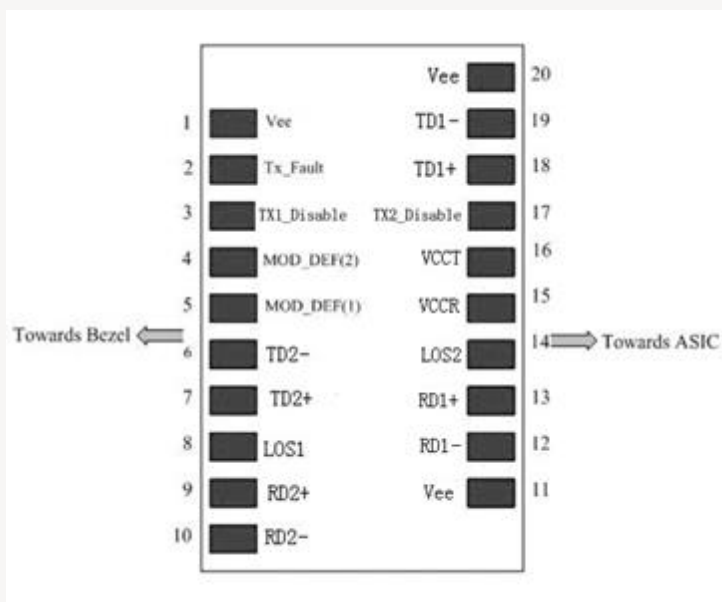


CHANNEL DESCRIPTION OF CSFP TRANSCEIVER



PIN FUNCTION DEFINITIONS

PIN LAYOUT



PIN DEFINITIONS

PIN	Signal Name	Description	PIN	Signal Name	Description
1	V _{EE}	Common Ground	11	V _{EE}	Common Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation	12	RD1-	Inverted Receive Data Output of Ch1
3	TX1_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.	13	RD1+	Receive Data Output of Ch1
4	MOD-DEF2	Modulation Definition 2 – Two wires serial ID Interface	14	LOS2	Loss of Signal Ch2
5	MOD-DEF1	Modulation Definition 1 – Two wires serial ID Interface	15	V _{CC} R	Receiver Power – 3.3V±5%
6	TD2-	Inverted Transmit Data Input of Ch2	16	V _{CC} T	Transmitter Power – 3.3V±5%
7	TD2+	Transmit Data Input of Ch2	17	TX2_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.
8	LOS1	Loss of Signal Ch1	18	TD1+	Transmit Data Input of Ch1
9	RD2+	Receive Data Output of Ch2	19	TD1-	Inverted Transmit Data Input of Ch1
10	RD2-	Inverted Receive Data Output of Ch2	20	V _{EE}	Common Ground

Notes:

- TX_disable1, 2 are an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K–10K_Ω resistor. It's states are:
 - Low (0 – 0.8V): Transmitter on
 - (>0.8, < 2.0V): Undefined
 - High (2.0 – 3.465V): Transmitter Disabled
 - Open: Transmitter Disabled
- Mod-Def 1, 2. These are the module definition pins. They should be pulled up with a 4.7K –10K_Ω resistor on the host board. The pull-up voltage shall be V_{CC}T or V_{CC}R.

Mod-Def 1 is the clock line of two wire serial interfaces for serial ID. Mod-Def 2 is the data line of two 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 100_ differential lines which should be terminated with 100_ (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
5. VccT, VccR are the power supplies. They are defined as 3.3V \pm 5% at the SFP connector pin. Maximum supply current is 600mA@3.3V. Vcc 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 100_ differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.
7. LOS1,2 (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates 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–10K_ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind either in Channel 1 or Channel 2. The Host shall read Channel 1/2: A2H/AAH: 110 for details: TX Fault from channel 1 if bit 2 is set in [A2H:110]; TX Fault from channel 2 if bit 2 is set in [B2H: 110]. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

EEPROM

The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not write protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The module provides diagnostic information about the present operating conditions. The transceivers generates this diagnostic data by digitization of internal analogue signals. Calibration and alarm/warning threshold data is written during device manufacturing. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring are all implemented.

If the module is defined as external calibrated, the diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56-95 at wire serial bus address A2H/B2H. The digital diagnostic memory map specific data field defined as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 9.3.

2 wire address 1010000X	2 wire address 1010001X	2 wire address 10110000X	2 wire address 10110001X
0	0	0	0
Serial ID Defined by SFP MSA (96 bytes)	Alarm and Warning Thresholds (56 bytes)	Serial ID Defined by SFP MSA (96 bytes)	Alarm and Warning Thresholds (56 bytes)
95	55	95	55
Vendor Specific (32 bytes)	Cal Constants (40 bytes)	Vendor Specific (32 bytes)	Cal Constants (40 bytes)
127	95	127	95
Reserved (128 bytes)	Real Time Diagnostic Interface (24 bytes)	Reserved (128 bytes)	Real Time Diagnostic Interface (24 bytes)
255	119	255	119
	Vendor Specific (8 bytes)		Vendor Specific (8 bytes)
	127		127
	User Writable EEPROM (120 bytes)		User Writable EEPROM (120 bytes)
	247		247
	Vendor Specific (8 bytes)		Vendor Specific (8 bytes)
	255		255

A0H (CH1)

A2H (CH1)

B0H (CH2)

B2H (CH2)

MECHANICAL DRAWING

