

10.3125Gb/s CSFP BIDI Transceiver

APCSPxxB33xDL10

■ Product Features

- ✓ Two Bi-Directional transceivers in one SFP package
- ✓ Up to 10.3125Gb/s data links
- ✓ Duplex LC connector
- ✓ Hot-pluggable SFP footprint
- ✓ Uncooled DFB laser transmitter
- ✓ RoHS compliant and Lead Free
- ✓ Up to 10Km on 9/125um SMF
- ✓ Metal enclosure for lower EMI
- ✓ Single +3.3V power supply
- ✓ Compliant with CSFP MSA 2.0 (Option 2)
- ✓ Commercial operating temperature optional



■ Applications

- ✓ 10GBASE-LR/LW
- ✓ 10G Fibre Channel

■ Product Selection

Part Number	Wavelength	Operating Case temperature
APCSP23B33CDL10	Tx-1270 / Rx-1330	Commercial
APCSP32B33CDL10	Tx-1330 / Rx-1270	Commercial
APCSP23B33IDL10	Tx-1270 / Rx-1330	Industrial
APCSP32B33IDL10	Tx-1330 / Rx-1270	Industrial

■ Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Single LC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC)



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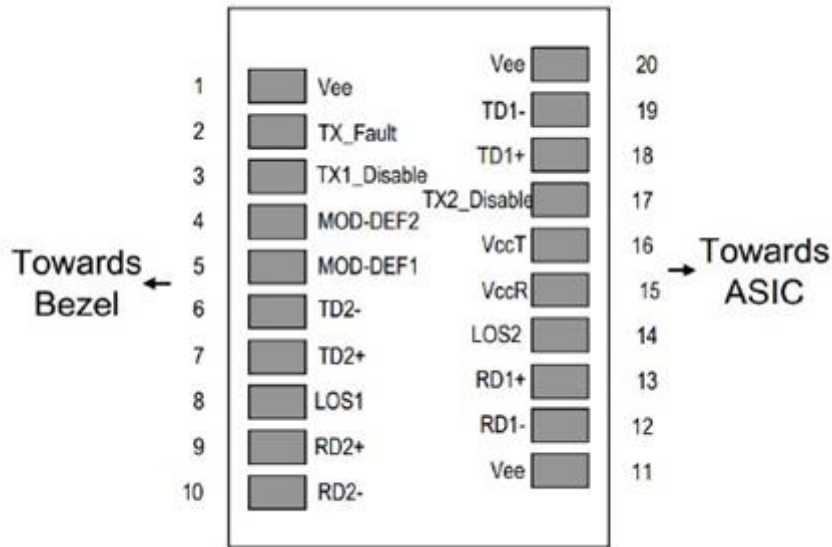
- RoHS compliant with RoHS 2 (2011/65/EU)

■ **Pin Descriptions**

Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX Fault	Transmitter Fault.	2
3	TX1_Disable	Transmitter Disable of Ch1; Turns off transmitter laser output of Ch1.	3
4	MOD_DEF(2)	2-wire Serial Interface Data Line (SDA).	
5	MOD_DEF(1)	2-wire Serial Interface Clock Line (SCL).	
6	TD2-	Inverted Transmit Data Input of Ch2.	
7	TD2+	Transmit Data Input of Ch2.	
8	LOS1	Loss of signal for Ch1.	4
9	RD2+	Received Data Output of Ch2.	
10	RD2-	Inverted Received Data Output of Ch2.	
11	VeeT	Transmitter Ground.	
12	RD1-	Inverted Received Data Output of Ch1.	
13	RD1+	Received Data Output of Ch1.	
14	LOS2	Loss of signal for Ch2.	4
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	Tx2_Disable	Transmitter Disable of Ch2; Turns off transmitter laser output of Ch2.	3
18	TD1+	Transmit Data Input of Ch1.	
19	TD1-	Inverted Transmit Data Input of Ch1.	
20	VeeT	Transmitter Ground.	

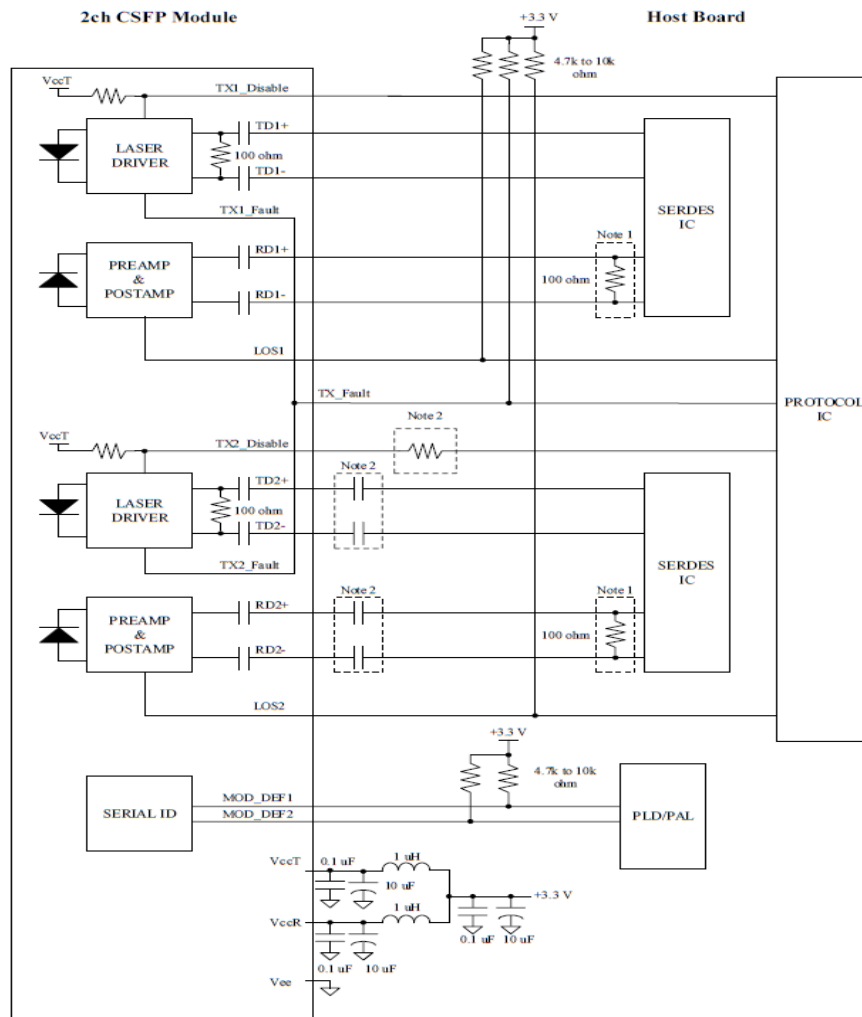
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TX_ Fault is internally OR output for TX fault conditions in either Channel 1 or Channel 2. In order to determine which channel is at fault, the Host can read the internal memory bits.
3. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



Pin-out of Connector Block on Host Board

■ **Recommend Circuit Schematic**





Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		+4.0	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	0		85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power Supply Current	Icc		400	500	mA	
Case Operating Temperature	Tc	0		+70	°C	
Case Operating Temperature	Ti	-40		+85	°C	
Data Rate			10.3		Gbps	
9/125um G.652 SMF	Lmax			10	km	

Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	1
Single ended data input swing	Vin, pp	120		850	mV	
TX Disable-High	-	Vcc – 0.8		Vcc	V	
TX Disable-Low	-	Vee		Vee+ 0.8	V	
TX Fault-High	-	Vcc-0.5	-	Vcc	V	
TX Fault-Low	-	Vee	-	Vee+0.5	V	
Receiver						
Single ended data output swing	Vout, pp	175		800	mV	2
LOS-High	-	Vcc – 0.5	-	Vcc	V	
LOS-Low	-	Vee	-	Vee+0.5	V	



Notes:

1. AC coupled.
2. Into 100 ohm differential termination.
3. 20 – 80 %

■ Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)

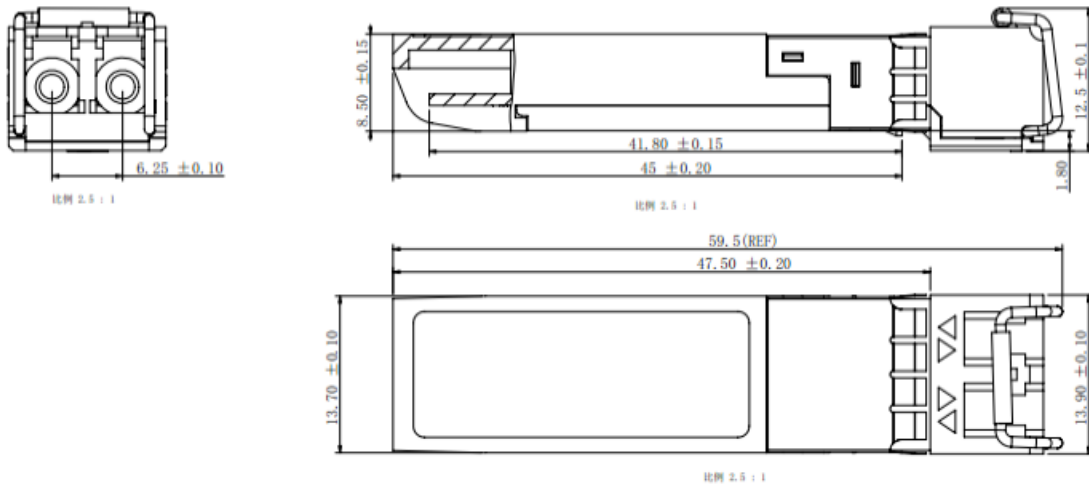
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Power	PO	-5	-	2	dBm	1
Optical Wavelength	λ	1260	1270	1280	nm	
		1320	1330	1340	nm	
Spectral Width(-20dB)	$\Delta\lambda$	-	-	1	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	3.5	-	-	dB	
Receiver						
RX Sensitivity @10.3125Gb/s	SENS	-	-	-12	dBm	2, 3
Receiver Overload	-	0.5	-	-	dBm	
Optical Center Wavelength	λ_C	1320	1330	1340	nm	
		1260	1270	1280	nm	
LOS De-Assert	LOSD	-	-	-14	dBm	
LOS Assert	LOSA	-40	-	-	dBm	
LOS Hysteresis	-	0.5	-	5	dB	

Notes:

1. Class 1 Laser Safety.
2. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
3. Measured with PRBS $2^{31}-1$ at 10^{-12} BER.

■ Mechanical Specifications

ATOP's Compact Small Form Factor Pluggable (CSFP) transceivers are compatible with the dimensions defined by the Compact SFP Multi-Sourcing Agreement (MSA).

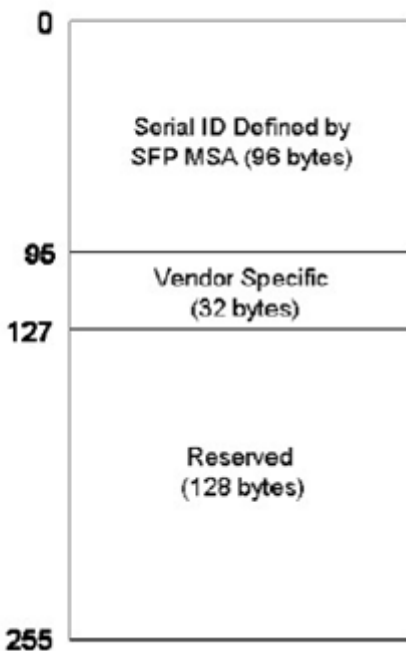


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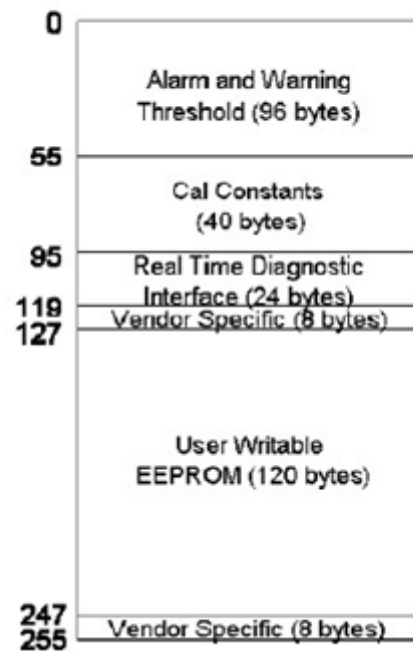
■ **EEPROM Information**

Memory map for 2ch Compact SFP (option 2) is illustrated in below figure. A0h (1010000X) and B0h (1011000X) are the Serial ID addresses for channel 1 and channel 2, respectively. A2h (1010001X) and B2h (1011001X) are the Digital Diagnostic addresses for channel 1 and channel 2.

Channel 1: 2 wire address 1010000X (A0h)
Channel 2: 2 wire address 1011000X (B0h)



Channel 1: 2 wire address 1010001X
Channel 2: 2 wire address 1011001X





■ Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C (C)	±3°C	Internal
	-40 to +85°C (I)	±3°C	Internal
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	-5 to +2dBm	±3dB	Internal
RX Power	-12 to +0.5dBm	±3dB	Internal

■ Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
V1.0	yangpeiyun	Dingzheng	Dingzheng	New Released.	Dec 19, 2016
V1.1	yangpeiyun	Dingzheng	Dingzheng	Update Tx power Spec	May 27, 2017
V1.2	yangpeiyun	tangzhiqiang	Dingzheng	Update Recommend Circuit Schematic	Nov 27, 2017

■ For More Information

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