



## General

FH-SB3512CDS20 The SFP-BIDI transceivers are high performance, cost effective modules supporting dual data-rate of 1.25Gbps/1.0625Gbps and 20km transmission distance with SMF.

The transceiver consists of three sections: a DFB laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	V <sub>cc</sub>	-0.5	4.0	V	
Storage Temperature		-40	85	°C	
Relative Humidity			85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the module

## General Operating Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate			1250		Gb/s	
Supply Voltage	V <sub>cc</sub>	3.13	3.3	3.47	V	
Supply Current	I <sub>cc5</sub>			220	mA	
Operating Case Temp.	T <sub>c</sub>	0		70	°C	

### Electrical Input/Output Characteristics

Parameter		Symbol	Min.	Typ	Max.	Unit	Note
Transmitter							
Diff. input voltage swing			120		820	mVpp	1
Tx Disable input	H	VIH	2.0		Vcc+0.3	V	
	L	VIL	0		0.8		
Tx Fault output	H	VOH	2.0		Vcc+0.3	V	2
	L	VOL	0		0.8		
Input Diff. Impedance		Zin		100		Ω	
Receiver							
Diff. output voltage swing			340	650	800	mVpp	3
Rx LOS Output	H	VOH	2.0		Vcc+0.3	V	2
	L	VOL	0		0.8		

Note 1) TD+/- are internally AC coupled with 100Ω differential termination inside the module.

Note 2) Tx Fault and Rx LOS are open collector outputs, which should be pulled up with 4.7k to 10kΩ resistors on the host board. Pull up voltage between 2.0V and Vcc+0.3V.

Note 3) RD+/- outputs are internally AC coupled, and should be terminated with 100Ω (differential) at the user SERDES.

### Optical Characteristics

Parameter		Symbol	Min.	Typ	Max.	Unit	Note
Transmitter							
Operating Wavelength		λC	1270	1310	1350	nm	
Ave. output power (Enabled)		Po	-9		-3	dBm	1
Extinction Ratio		ER	9			dB	1
RMS spectral width		Δλ			4	nm	
Rise/Fall time (20%~80%)		Tr/Tf			0.26	ps	2

Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					
Receiver						
Operating Wavelength		1530	1550	1570	nm	
Sensitivity	Psen			-24	dBm	3
Min. overload	Pimax	-3			dBm	
LOS Assert	Pa	-35			dBm	
LOS De-assert	Pd			-23	dBm	4
LOS Hysteresis	Pd-Pa	0.5		6	dB	

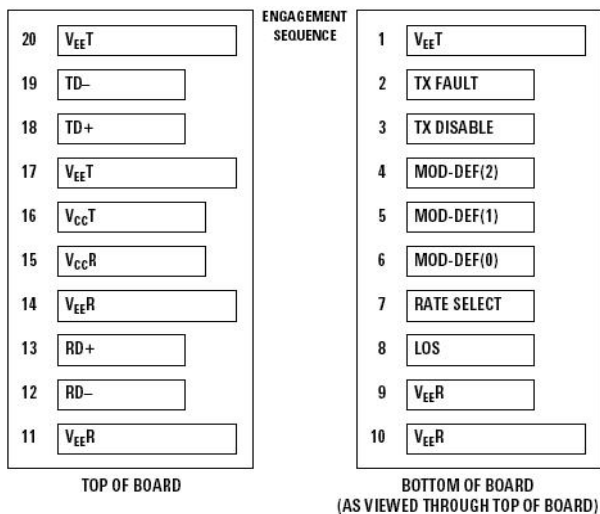
Note 1) Measure at 2<sup>23</sup>-1 NRZ PRBS pattern

2) Transmitter eye mask definition

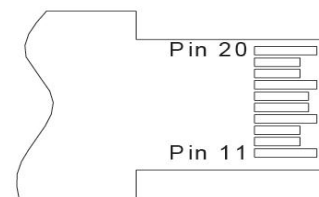
3) Measured with Light source 1550nm(1310nm), ER=9dB; BER =<10<sup>-12</sup> @PRBS=2<sup>23</sup>-1 NRZ.

4) When LOS de-asserted, the RX data+/- output is signal output.

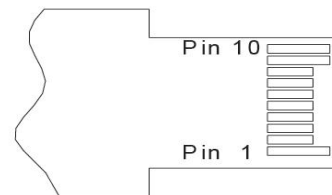
## Pin Definitions And Functions



TOP VIEW  
OF BOARD



BOTTOM VIEW  
OF BOARD





Mod-Def 2 is the data line of two wire serial interface for serial ID

4) When high, this output indicates loss of signal (LOS). Low indicates normal operation.

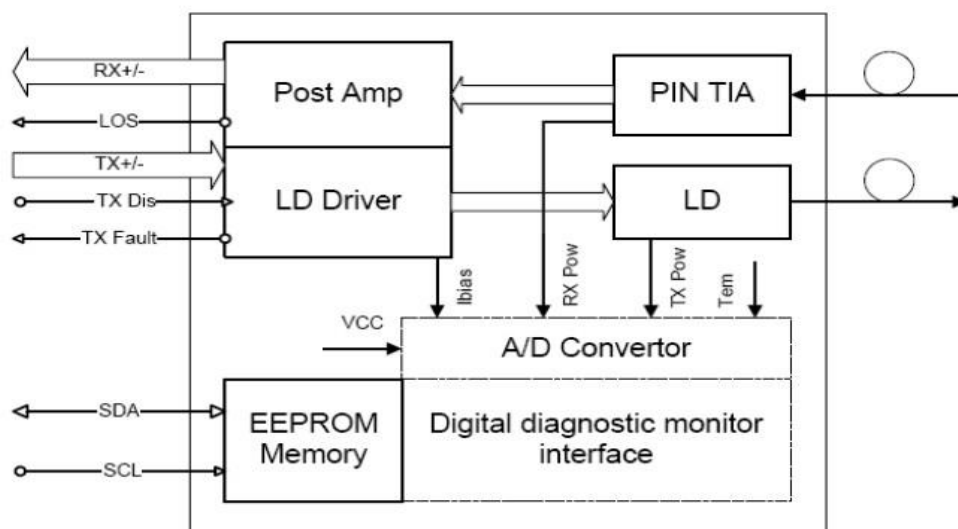
5) RD+/-: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.

6) TD+/-: 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 and is thus not required on the host board.

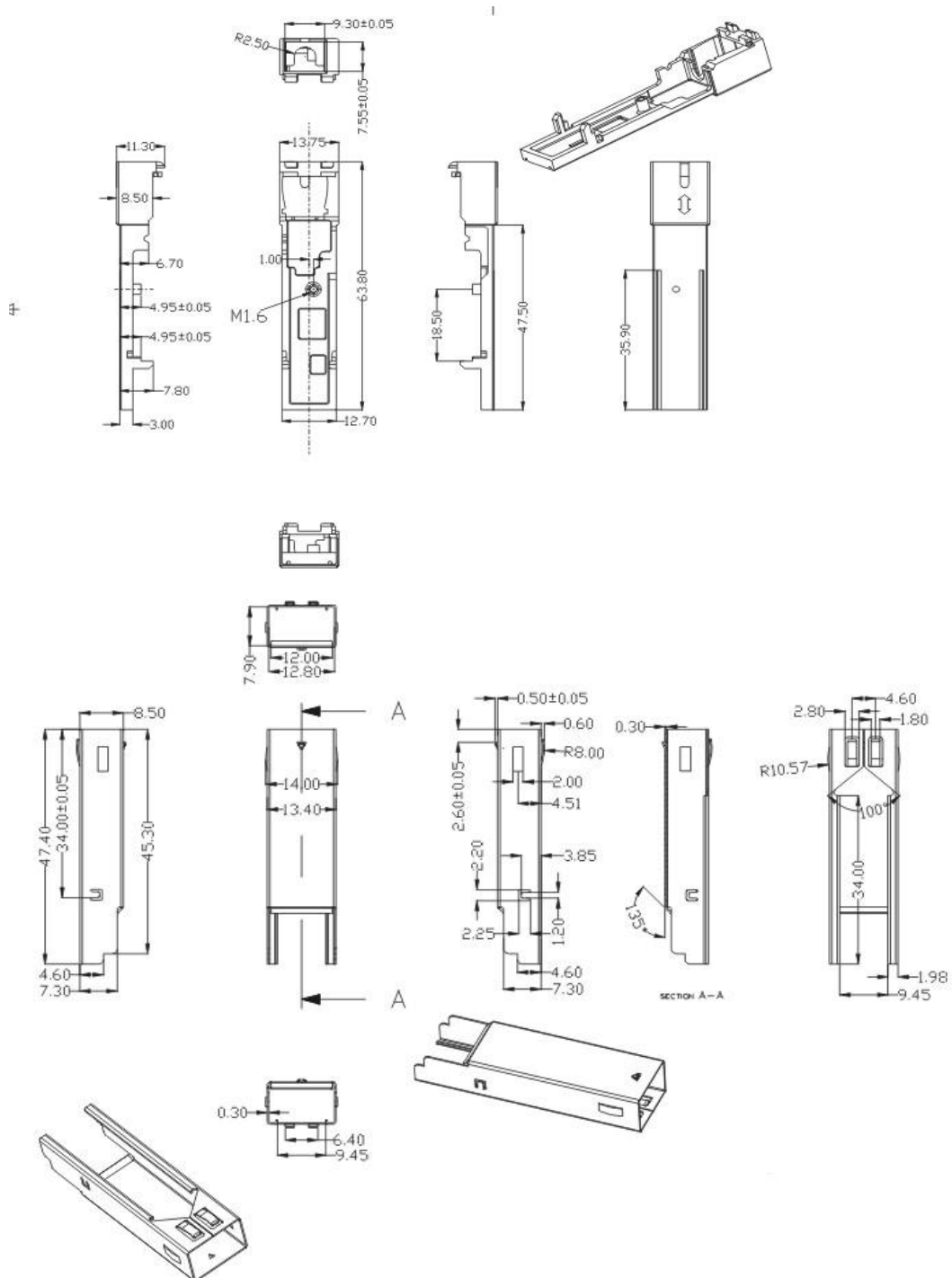
## Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70 -40 to +85	°C	±3°C	Internal/ External
Voltage	3.0 to 3.6	V	±3%	Internal/ External
Bias Current	2 to 80	mA	±10%	Internal/ External
TX Power	-11 to -1	dBm	±3dB	Internal/ External
RX Power	-25 to 0	dBm	±3dB	Internal/ External

## Functional Diagram



## Package Dimensions



**For More Information**

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