SFP-10G-80KM-A

1 Features

1.1 Single Fiber Transceiver hot-plugable with single mode LC receptacle

1.2 1490nm DFB laser and 1550nm PIN photodiode for 80km transmission

1.3 Compliant with SFP+ MSA Specification SFF-8431

1.4 Compliant with SFP+ MSA Specification SFF-8432

1.5 Compliant with SFP MSA and SFF-8472

1.6 Digital Diagnostic Monitoring (DDM)

1.7 Complies with RoHS directive (2002/95/EC)

2 Applications

- 10GBASE-ZX 10G Ethernet, SONET, SDH, 10G/8.5G/4.25G/2.125G/1.0625G Fiber Channel...
- Wireless CPRI optical
- Other optical data links

3 General

This is a high performance transceiver module for single fiber communications with metal housing meets EMI standards.

The 1490nm DFB LD transmitter has automatic power control (APC) function and temperaturecompensation circuitry to ensure stable optical power and extinction ratio over all operating temperature range. The transmitter meets Class 1 eye safety per IEC60825 and CDRH standards.

The receiver has a hermetically packaged PIN-TIA (trans-impedance amplifier) pre-amplifier and a limiting amplifier.

The module provides digital diagnostic information of its operating conditions and status, including transmitting power, laser bias current, module temperature, and supply voltage.

4 Performance Specifications

4.1 Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_{st}	-40	+85	°C
Operating relative humidity (Non- condensing)	RH	5	95	%
Input Voltage	-	GND	V_{cc}	V
Power Supply Voltage	V_{cc}	-0.3	4	V

4.2 Recommended Operating Environment

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	V_{cc}	+3.14	+3.3	+3.46	V
Power Supply Current	I_{cc}	-		490	mA
Data rate		-	10.3125	-	Gbps
Operating relative humidity	RH	5		85	%

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(Non- condensing)					
Case Temperature (Operating)	T$_C$	0	-	70	°C
		-40		85	°C
I2C clock frequency		-	100	400	KHz
Power consumption Max	-	-	-	1	W

4.3 Transmitter Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength	λ	1480	1490	1500	nm	
Spectral Width (-20dB)	Δλ	-	-	0.3	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Optical Output Power	Po	0	-	4	dBm	
Extinction Ratio	Er	8.2	-	-	dB	
Differential Input Impedance	-	80	100	120	Ω	
Differential Data Input Swing	V$_{INPP}$	180		1000	mVp-p	
Output Eye Mask	Compliant with IEEE 802.3ae					

4.4 Receiver Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Wavelength of Operation	-	1540	1550	1560	nm	-
Receiver Sensitivity	Sen.	-	-	-23	dBm	4.4.1
Saturation Optical Power	Sat	-6	-	-	dBm	4.4.1

LOS Asserted	T_loss_on	-38			dBm	-
LOS De-Asserted	T_loss_off			-24	dBm	-
LOS Hysteresis	T_loss_Hs	0.5		8	dB	
Differential Data Output Swing	V_{OUTPP}	300		850	mV	

Note4.4.1: Measured with 10.3125Gbps PRBS2^{31}-1, ER=3.5dB, BER=1x10^{-12}

4.5 Digital Diagnostic Monitoring Characteristics

Parameter	Symbol	Range			Accuracy	
Transceiver Case Temperature	T	Measured transceiver case temperature over specified operating range			±3°C	
Supply Voltage	Vcc	Internally measured transceiver supply voltage ,3.0~3.6V			±3%	
TX Bias Current	Id	Measured TX Bias current in uA			±10%	
TX Output Power	Po	Measured TX Output Power in dBm Over the specified output power range			±3dB	
Received Optical Power	Pi	Measured RX Received Power in dBm Over the specified input power range			±3dB	

5   EEPROM Section

The optical transceiver contains an EEPROM. It provides access to sophisticated identification

information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. 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. The digital diagnostic memory map specific data field defines as following.
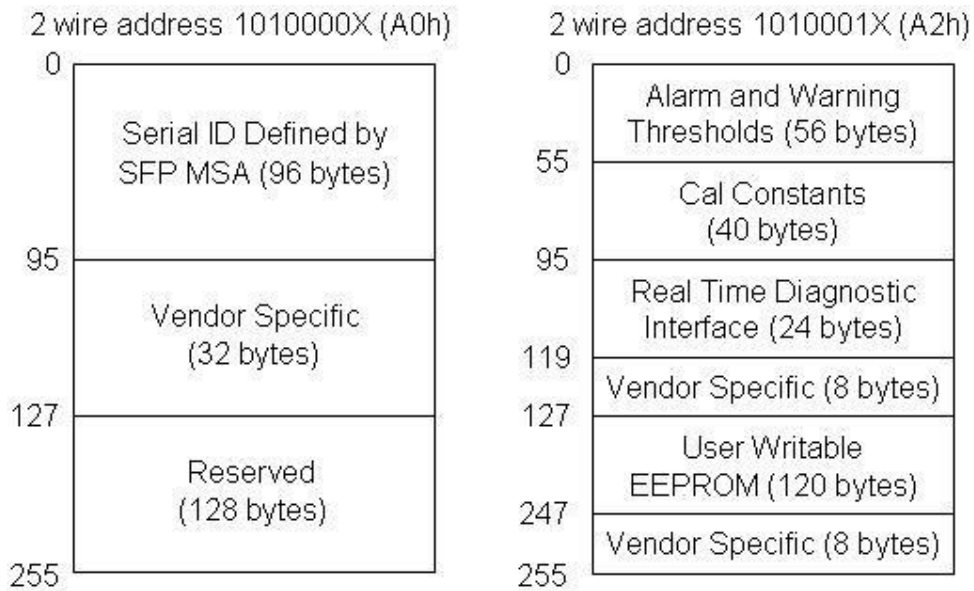
6   Pin Definitions

6.1   Pin Diagram
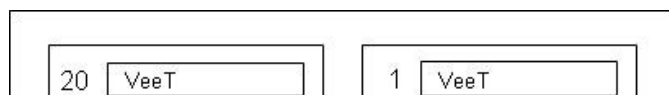
6.2   Pin Descriptions

Pin#	Logic	Name	Function	Notes
1		VeeT	Transmitter Ground	Note 5
2	LVTTL	TxFault	Transmitter Fault Indication	Note 1
3	LVTTL	TxDisable	Transmitter Disable	Note 2
4		SDA	I^2C Data	Note 3
5		SCL	I^2C Clock	Note 3
6		MOD-ABS	Internally grounded	
7		RS0	Not used	Note 9
8	LVTTL	LOS	Loss of Signal	Note 4
9		RS1	Not used	Note 9
10		VeeR	Receiver Ground	Note 5
11		VeeR	Receiver Ground	Note 5
12		RD-	Inv. Received Data Out	Note 6
13		RD+	Received Data Out	Note 6
14		VeeR	Receiver Ground	Note 5
15		VccR	Receiver Power	Note 7
16		VccT	Transmitter Power	Note 7
17		VeeT	Transmitter Ground	Note 5
18		TD+	Transmit Data In	Note 8

19		TD-	Inv. Transmit Data In	Note 8
20		VeeT	Transmitter Ground	Note 7

Notes:

1. TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the hostboard to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.

2. TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7–10 KΩ 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.

3. SDA and SCL is communication interface for I_2C . They should be pulled up with a 4.7K – 10KΩ resistor on the host board. The pull-up voltage should be VccT or VccR.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccR+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.

5. VeeR and VeeT may be internally connected within the SFP+ module

6. 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.

7. 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 35 0mA. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. Vcc is internally connected inside the BIDI transceiver.

8. TD- and TD+ are the differential transmitter inputs. They are AC coupled differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

9. Internally pulled down per SFF-8431 Rev 4.1.

7 Recommended Circuit
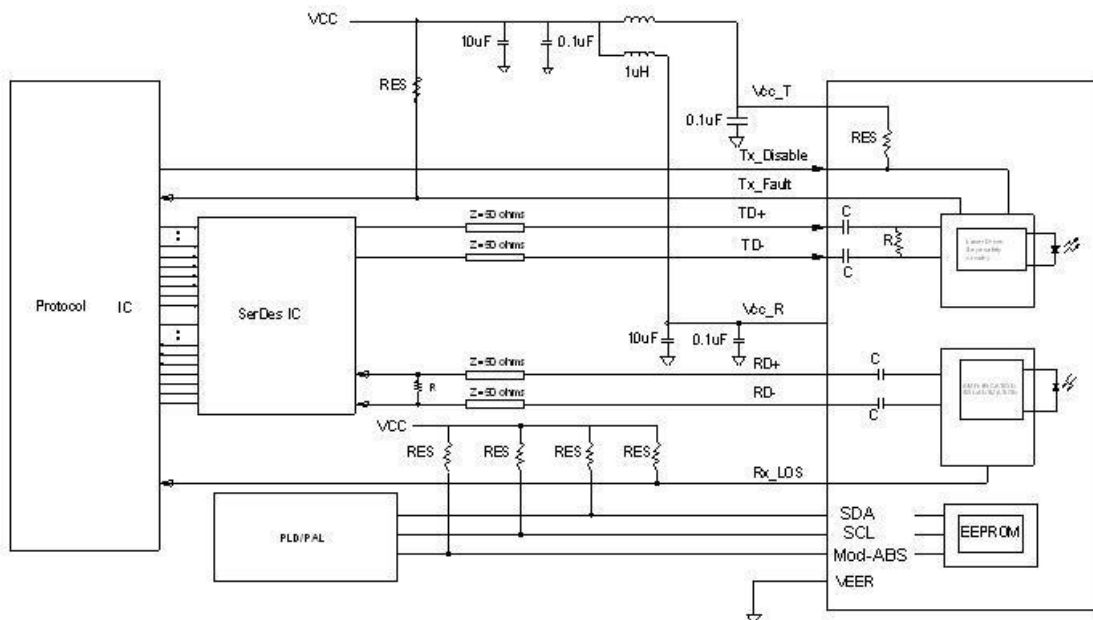
NOTE: 4.7K ohms<RES<10K ohms

8   Outline Dimensions