

# 8Gb/s Fiber Channel SFP+ LR 1310nm 10km Optical Transceiver

## Features

- Up to 10km transmission distance
- Support Multi Rate 8.5 to 11.3Gbps
- 1310nm DFB and PIN receiver
- SFI electrical interface
- 2-wire interface for integrated Digital Diagnostic monitoring
- SFP MSA package with duplex LC connector
- Hot pluggable
- Very low EMI and excellent ESD protection
- +3.3V power supply
- Power consumption less than 1.75W
- Operating case temperature: 0~+70°C

## Applications

- 10GBASE-LR/LW Ethernet
- SONET OC-192 / SDH STM-64
- 10G Fiber Channel
- Other optical transmission systems

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## Compliance

- Compliant with IEEE 802.3ae-2002
- Compliant with MSA SFF-8472
- Compliant with MSA SFF-8431

## Description

8Gb/s Enhanced Small Form Factor Pluggable SFP+ transceivers are designed for use in 8-Gigabit Ethernet links up to 10km over Single Mode fiber. They are compliant with SFF-8431, SFF-8432 and IEEE802.3ae 10GBASE-LR/LW, and 10G Fiber Channel 1200-SM-LL-L. Digital diagnostics functions are available via a 2-wire serial interface. The transceiver is a "limiting module", i.e., it employs a limiting receiver. Hostboard designers using an EDCPHY IC should follow the IC manufacturer's recommended settings for interoperating the host-board EDCPHY with a limiting receiver SFP+ module. The optical transceiver is compliant per the RoHS Directive 2011/65/EU.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	0	3.6	V
RX Input Average Power	Pmax	0	+3	dBm

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	TC	0	25	+70	°C
Power Supply Voltage	VCC	3.14	3.3	3.47	V
Power Supply Current	ICC			300	mA

## Transmitter Operating Characteristic-Optical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Side Mode Suppression Ratio	SMSR	30			dBm	
Output Center Wavelength	$\lambda_c$	1260	1310	1355	nm	
Spectral Width (-20dB)	Pm			1	nm	
Laser Off Power	Poff			-30	dBm	
Relative Intensity Noise	Rin			-128	dB/Hz	
Average Optical Power	Pavg	-8		0	dBm	
Extinction Ratio	ER	3.5			dB	

## Receiver Operating Characteristic-Optical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Rx Output Rise and Fall Time	Tr/Tf		34		ps	20% to 80%
Center Wavelength Range	$\lambda_r$	1260	1310	1355	nm	
Overload	Rovl	0.5			dBm	
Sensitivity	Rsen			-15	dBm	
RX_LOS Assert Level	RLOSa	-26			dBm	
RX_LOS De-assert Level	RLOSd			-12	dBm	
RX_LOS Hysteresis	RLOSh	0.5			dB	

## Digital Diagnostic Functions

The transceiver can be used in host systems that require either internally or externally calibrated digital diagnostics.

Parameter	Symbol	Min.	Max.	Unit	Notes
Internally measured transceiver temperature	DMI_Temp	-3	3	°C	Over operating temp
Measured RX received average optical power	DMI_TX	-2	2	dB	
Measured TX output power	DMI_RX	-2	2	dB	-1dBm to -16dBm range
Internally measured transceiver supply voltage	DMI_VCC	-100	100	mV	Full operating range
Measured TX bias current	DMI_Ibias	-10	10	%	

## Pin Description

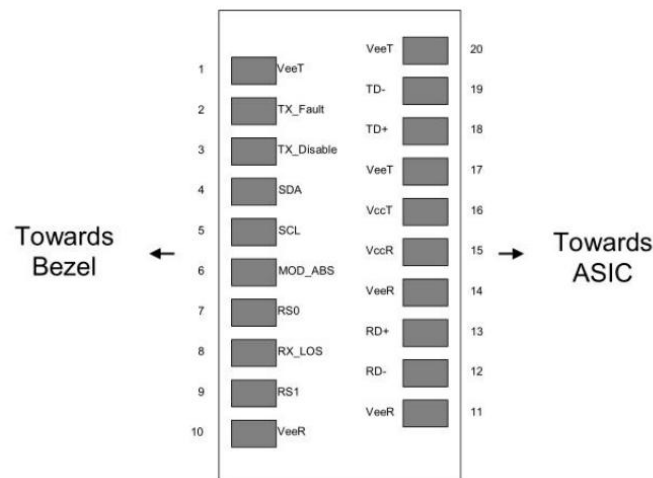


Figure1 Pin view

## Pin Function Definitions

Table6-Pin Function Definitions				
PIN	Symbol	Name / Description	Power Sequence Order	Note
1	VeeT	Module Transmitter Ground	1st	1
2	TX_Fault	Module Transmitter Fault	3rd	2
3	TX_Dis	Transmitter Disable. Laser output disabled on high or open	3rd	3
4	SDA	2-Wire Serial Interface Data Line	3rd	2
5	SCL	2-Wire Serial Interface Clock	3rd	2
6	MOD_ABS	Module Absent, connected to VeeT or VeeR in the module	3rd	
7	RS0	Not used	3rd	4
8	RX_LOS	Receiver Loss of Signal Indication Active High	3rd	5
9	RS1	Not used	3rd	4
10	VeeR	Module Receiver Ground	1st	1
11	VeeR	Module Receiver Ground	1st	1
12	RD-	Receiver Inverted Data Output	3rd	
13	RD+	Receiver Data Output	3rd	
14	VeeR	Module Receiver Ground	1st	1
15	VccR	Module Receiver 3.3 V Supply	2nd	
16	VccT	Module Receiver 3.3 V Supply	2nd	
17	VeeT	Module Transmitter Ground	1st	1
18	TD+	Transmitter Non-Inverted Data Input	3rd	
19	TD-	Transmitter Inverted Data Input	3rd	
20	VeeT	Module Transmitter Ground	1st	1

**Notes:**

- [1] Circuit ground is internally isolated from chassis ground.
- [2] TFAULT is an open collector/drain output, which should be pulled up with a 4.7k-10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
- [3] Laser output disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V.
- [4] Internally pulled down per SFF-8431 Rev 2.0. See Sec. X for the logic table to use for the internal CDRs locking modes.
- [5] LOS is open collector output. Should be pulled up with 4.7kΩ - 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

**Monitoring Specification**

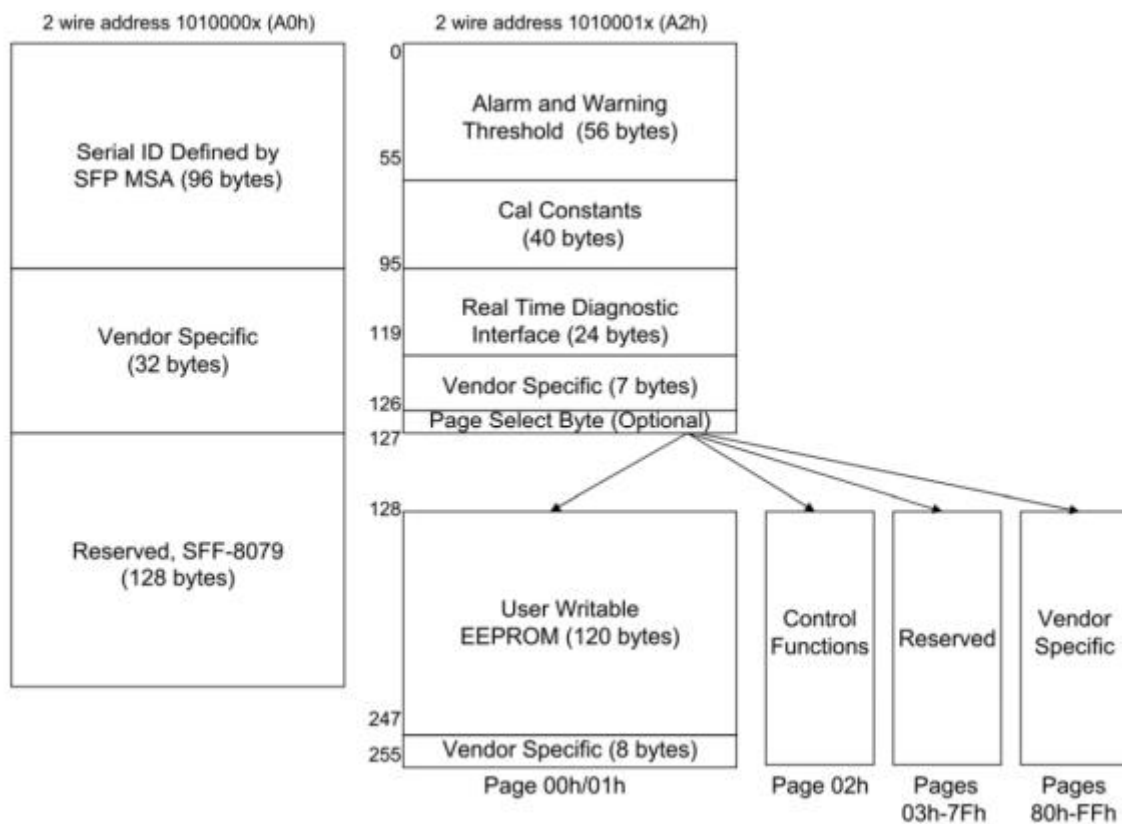
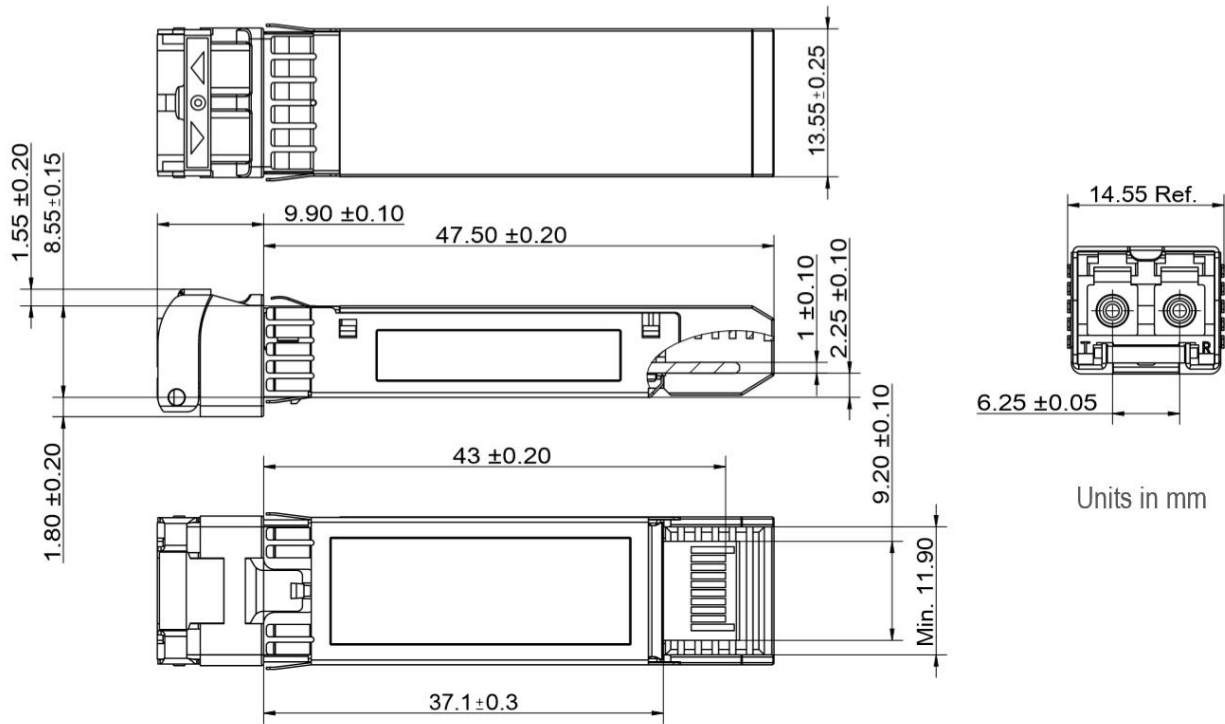


Figure2 Memory map

## Mechanical Dimensions



Units in mm

Figure3 Map Mechanical Outline

## Further Information:

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Web [www.naddod.com](http://www.naddod.com)

Email For order requirements: [sales@naddod.com](mailto:sales@naddod.com)

For cooperation: [agency@naddod.com](mailto:agency@naddod.com)

For customer service: [support@naddod.com](mailto:support@naddod.com)

For other informations: [info@naddod.com](mailto:info@naddod.com)

For technical support: [tech@naddod.com](mailto:tech@naddod.com)

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