

## 10.3Gb/s SFP+ Transceiver

The 10.3Gb/s Small Form Factor Pluggable (SFP+) transceivers are compatible with SFF-8431 and support 10G Ethernet LR and 10G Fibre Channel. It is designed for use in 10G-Gigabit multi-rate links up to 2km of G.652. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

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## Features

- Duplex LC connector
- Hot-pluggable SFP footprint
- 1310nm FP laser
- RoHS compliant and Lead-Free
- Distance up to 2Km on 9/125um SMF
- Metal enclosure for lower EMI
- Power dissipation <1W
- Commercial and industrial operating temperature optional
- SFP MSA SFF-8472 SFF-8431 Compliant
- Compliant with IEEE 802.3ae-2002

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## Applications

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

## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex 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) 60825-1,2
- RoHS compliant with RoHS 2 (2011/65/EU)

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
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
Power Supply Voltage	Vcc	3.13	3.30	3.47	V
Power Supply Current	Icc (Commercial)	-	-	300	mA
	Icc (Industrial)	-	-	350	
Case Operating Temperature	Tc	0	-	+70	°C
	Tl	-40	-	+85	
Data Rate (Gigabit Ethernet)	BR	-	10.3	-	Gbps
9/125um G.652 SMF	Lmax	-	-	2	Km

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

Parameter	Symbol	Min	Typ	Max	Unit
<b>Transmitter</b>					
Input differential impedance	Rin	80	100	120	Ω
Differential 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-0.8		Vcc	V
TX Fault-Low		Vee		Vee+0.8	V
<b>Receiver</b>					
Differential data output swing	Vout, pp	300		850	mV
Data output rise time	Tr	30			ps
Data output fall time	Tf	30			ps
LOS-High		Vcc - 0.8		Vcc	V
LOS-Low		Vee		Vee+0.8	V

## Notes:

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

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

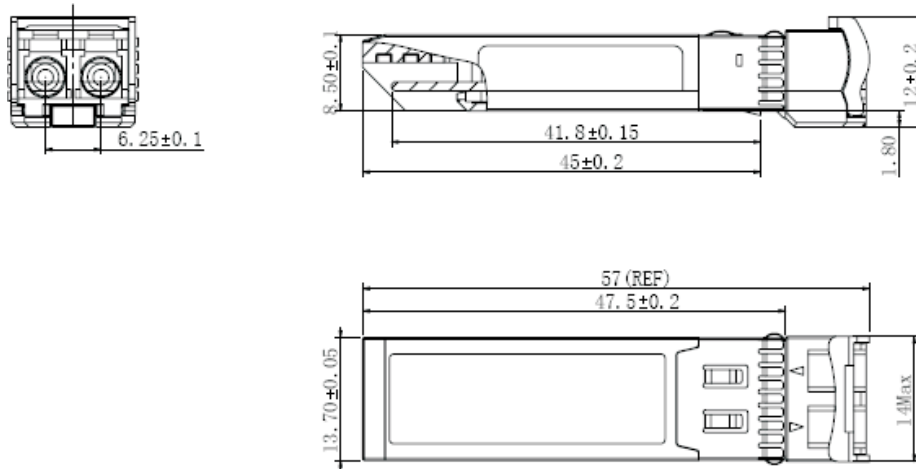
Parameter	Symbol	Min	Typ	Max	Unit
<b>Transmitter</b>					
Output Opt. Power	PO	-8.2		+0.5	dBm
Optical Wavelength	$\lambda$	1260		1355	nm
RMS Spectral Width	$\sigma$			3	nm
Optical Extinction Ratio	ER	3.5			dBm
<b>Receiver</b>					
RX Sensitivity @10.3 Gb/s	SENS1			-14.4	dBm
RX Sensitivity (OMA) @10.3 Gb/s	SENS2			-12.6	dBm
Receiver Overload		0.5			dBm
Optical Center Wavelength	$\lambda_C$	1260		1610	nm
LOS De-Assert	LOSD			-15	dBm
LOS Assert	LOSA	-30			dBm
LOS Hysteresis	-	0.5		5	dB

## Notes:

1. Measured with conformance signals defined in FC-PI-2
2. Measured with PRBS  $2^{31}-1$  at  $10^{-12}$  BER

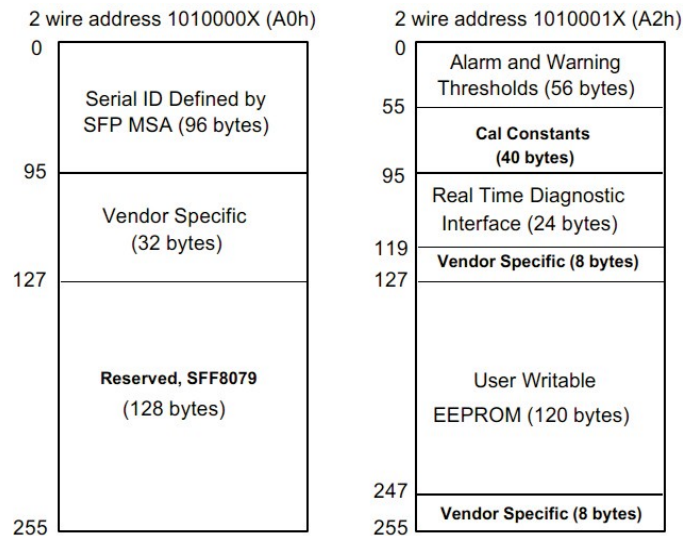
## Mechanical Specifications

Optronics Small Form Factor Pluggable (SFP+) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA), dimensions are in mm.



## EEPROM Information

EEPROM memory map specific data field description is as below:



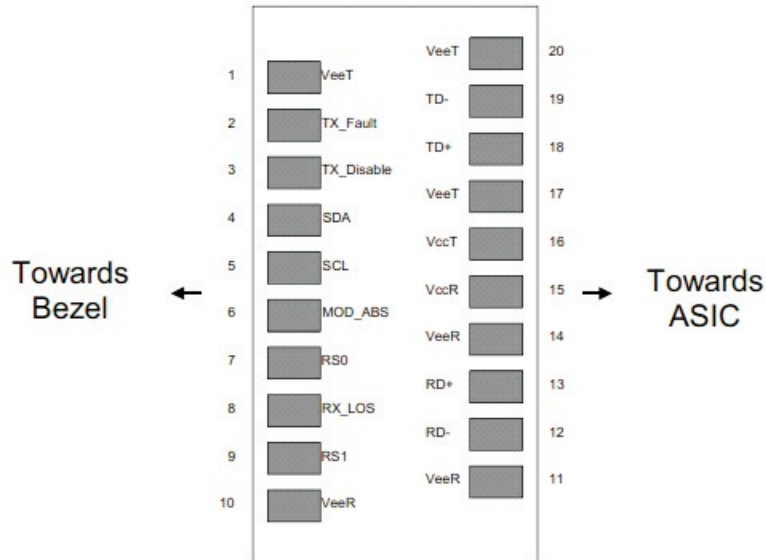
## Digital Diagnostic Monitoring Interface

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C (C) -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	-8.2 to 0.5dBm	±3dB	Internal
RX Power	-12 to 2.5dBm	±3dB	Internal

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

## Pin Diagram

### Pin-out of Connector Block on Host Board



## Pin Definitions

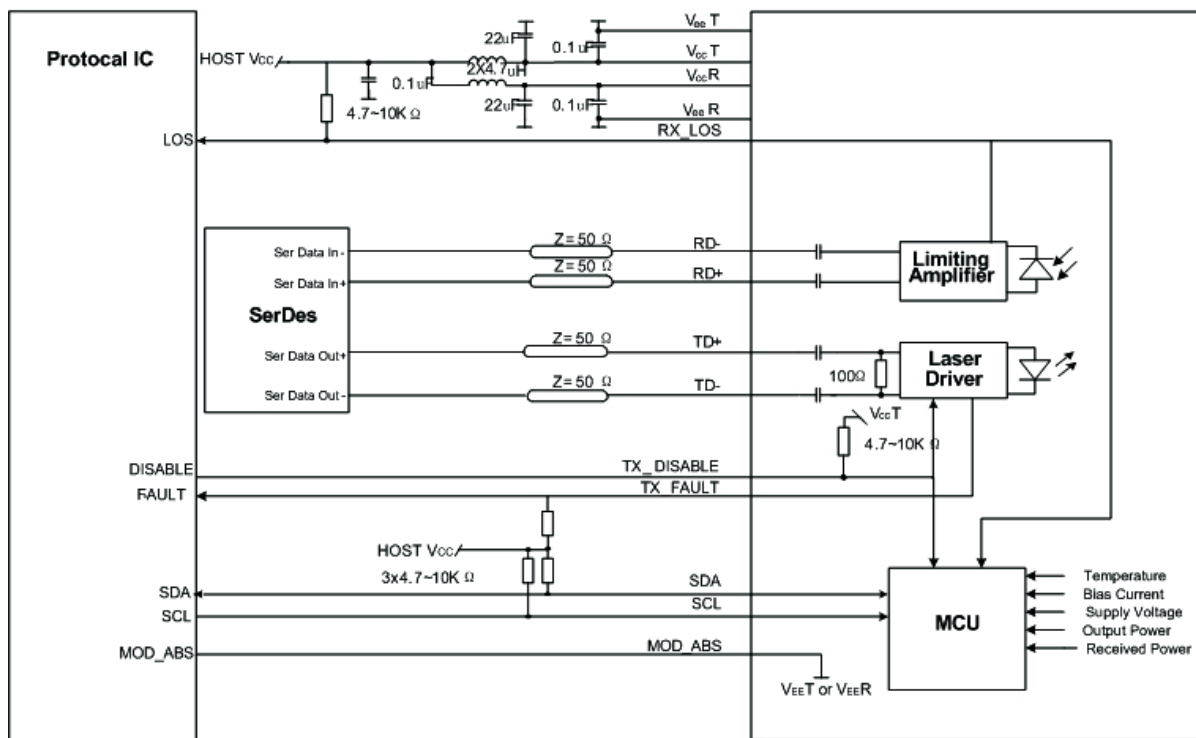
Pin	Symbol	Name/Description
1	VeeT	Transmitter Ground (Common with Receiver Ground)
2	TX Fault	Transmitter Fault. LVTTTL-O
3	TX Disable	Transmitter Disable. Laser output disabled on high or open. LVTTTL-I
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I
6	Mode_ABS	Module Absent, Connect to VeeT or VeeR in Module.
7	RS0	Rate Select 0, optionally controls SFP+ module receiver LVTTTL-I
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter. LVTTTL-I
10	VeeR	Receiver Ground (Common with Transmitter Ground)
11	VeeR	Receiver Ground (Common with Transmitter Ground)
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O
14	VeeR	Receiver Ground (Common with Transmitter Ground)
15	VccR	Receiver Power Supply
16	VccT	Transmitter Power Supply
17	VeeT	Transmitter Ground (Common with Receiver Ground)

18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML- I
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML- I
20	VeeT	Transmitter Ground (Common with Receiver Ground)

Note

1. Circuit ground is internally isolated from chassis ground.
2. TX Fault 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 TX Disable >2.0V or open, enabled on TX Disable <0.8V.
4. Internally pulled down per SFF-8431.
5. 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.
6. Internally connected

Recommend Circuit Schematic



Ordering Information

DESCRIPTION	PART NUMBER	OPERATING CASE TEMPERATURE	DMMI
Optronics 10.3Gb/s SFP+ Transceiver Singlemode 2km Commercial	OSFP-0092C-10-2	Commercial (0~70°C)	Yes
Optronics 10.3Gb/s SFP+ Transceiver Singlemode 2km Industrial	OSFP-0092I-10-2	Industrial (-40~85°C)	Yes