Fiberend

10.3Gb/s SFP+ Transceiver

10G-S-ER

Product Features

- ✓ Supports 9.95 to 11.3Gb/s
- ✓ Duplex LC connector
- ✓ Hot-pluggable SFP footprint
- ✓ Cooled 1550nm EML laser
- ✓ RoHS compliant and Lead Free
- √ 40Km link length
- ✓ Metal enclosure for lower EMI
- ✓ Built-in dual CDR
- ✓ Power dissipation
 <2.0W (0~70°C),<2.3W(0~85°C) ,</p>
 <2.3W(-40~85°C)
- ✓ Commercial and industrial operating temperature optional
- ✓ SFP MSA SFF-8472 SFF-8431 SFF-8432 Compliant



Applications

- √ 10G Ethernet ER and 10G

 Fibre Channel
- ✓ OTN G.709 OTU1e/2/2e FEC bit rates
- ✓ SDH STM-64

General

Fiberend's 10G-S-ER Small Form Factor Pluggable (SFP+) transceivers are compatible with SFF-8431,SFF-8432 and support 10G Ethernet ER and 10G Fibre Channel .It is designed for use in 10G-Gigabit multi-rate links up to 40km of G.652. Digital diagnostics functions are available via a 2-wire serial interface as specified in SFF-8472.

Product Selection

Part Number	Operating Case temperature	DDMI
10G-S-ER	Commercial(0~70°C)	Yes
10G-S-ERE	Extend(0~85°C)	Yes
10G-S-ERI	Industrial(-40~85°C)	Yes



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)

Pin Descriptions

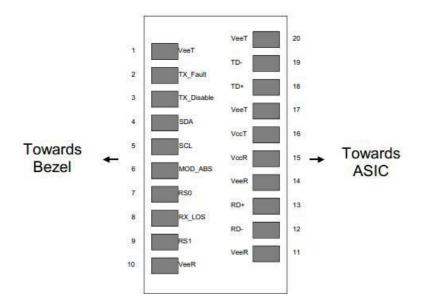
Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX Fault	Transmitter Fault. LVTTL-O	2
3	TX Disable	Transmitter Disable. Laser output disabled on high or open.	3
3	TA Disable	LVTTL-I	3
4	SDA	2-Wire Serial Interface Data Line(Same as MOD-DEF2 in	2
4	SDA	INF-8074i). LVTTL-I/O	2
5	SCL	2-Wire Serial Interface Data Line(Same as MOD-DEF2 in	2
5	SOL	INF-8074i). LVTTL-I	2
6	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module.	2
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	4
,	N30	LVTTL-I	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
0	200	LVTTL-O	
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter.	4
3	Koi	LVTTL-I	4
10	VeeR	Receiver Ground (Common with Transmitter Ground)	1
11	VeeR	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	

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14	VeeR	Receiver Ground (Common with Transmitter Ground)	1
15	VccR	Receiver Power Supply	6
16	VccT	Transmitter Power Supply	6
17	VeeT	Transmitter Ground (Common with Receiver Ground)	1
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)	1

Notes:

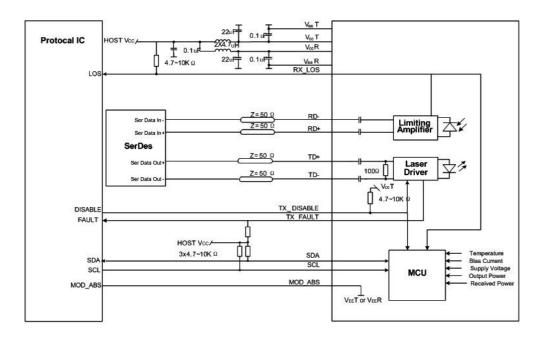
- 1. Circuit ground is internally isolated from chassis ground.
- 2. T_fault is an open collector/drain output which should be pulled up with a 4.7K 10K Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc+0.3V.A high output indicates a transmitter fault 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.</p>
- 3. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
- 4. Internally pulled down per SFF-8431 Rev4.1.
- 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



Pin-out of Connector Block on Host Board



Recommend Circuit Schematic



Absolute Maximum Ratings

Parameter	Symbol	Min	Тур	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	Тур	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
	Icc			600	mA	Commercial
Power Supply Current	Icc			700	mA	Extend
	Icc			700	mA	Industrial
	Тс	0		+70		Commercial
Case Operating Temperature	Te	0		+85	°C	Extend
	TI	-40		+85		Industrial
Bit Rate	Br	9.95		11.3	Gbps	
9/125um G.652 SMF	Lmax			40	km	



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

Parameter	Symbol	Min	Тур	Max	Unit	Ref.	
Transmitter							
Input differential impedance	Rin	80	100	120	Ω	1	
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		
Receiver							
Single ended data output swing	Vout, pp	300		850	mV	2	
Data output rise time	Tr	30			ps	3	
Data output fall time	Tf	30			ps	3	
LOS-High		Vcc - 0.8		Vcc	V		
LOS-Low		Vee		Vee+0.8	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	Тур	Max	Unit	Ref.	
Transmitter							
Output Opt. Power	PO	-1		4	dBm		
Optical Wavelength	λ	1530		1565	nm		
Side-Mode Suppression Ratio	SMSR	30			dB		
RMS Spectral Width(-20dB)	σ			1	nm		
Relative Intensity Noise	RIN			-128	dB/Hz		
Path penalty at 800ps/nm@9.95Gb/s				2	dB		
Optical Extinction Ratio	ER	8.2			dB		



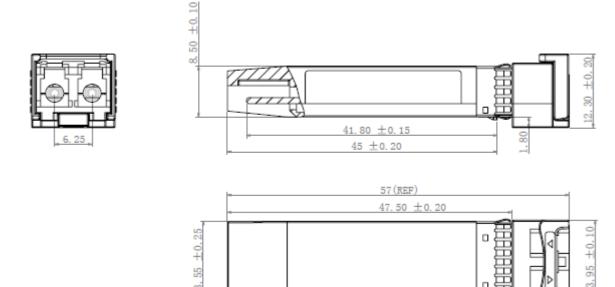
Receiver								
RX Sensitivity @10.3 Gb/s	SENS			-15.8	dBm	1,2		
Receiver Overload		-1			dBm			
Optical Center Wavelength	λС	1260		1600	nm			
LOS De-Assert	LOSD			-20	dBm			
LOS Assert	LOSA	-34			dBm			
LOS Hysteresis		0.5			dB			

Notes:

- 1. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
- 2. Measured with PRBS 2³¹-1 at 10⁻¹² BER.

Mechanical Specifications

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

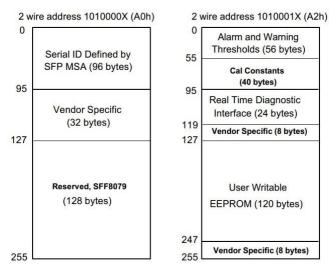


10G-S-ER

EEPROM Information

EEPROM memory map specific data field description is as below:





Digital Diagnostic Monitoring Interface

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

Parameter	Range	Accuracy	Calibration	
	0 to +70°C (C)			
Temperature	0 to +85°C (E)	±3°C	Internal	
	-40 to +85°C (I)			
Voltage	2.97 to 3.63V	±3%	Internal	
Bias Current	0 to 100mA	±10%	Internal	
TX Power	-1 to 4dBm	±3dB	Internal	
RX Power	-16 to -1dBm	±3dB	Internal	