

## **10GBASE-ER XFP 1550nm 40km Transceiver**

### **P/N: AE-XFP-ER**

#### **Features**

- Supports 10GBE Application at the Data-Rate of 9.953Gbps to 10.3125Gbps
- Maximum link length of 40km with SMF
- 1550nm cooled EML laser and PIN photodiode
- XFP MSA package with duplex LC connector
- XFI High Speed Electrical Interface
- +5V, +3.3V power supply
- Power dissipation <3.5W
- 2-wire interface for management and diagnostic monitor
- Compatible with RoHS
- Compatible with IEEE 802.3ae 10 Gigabit Ethernet
- Compatible with Sonet OC-192/SDH STM-64

#### **Applications**

- SONET(OC-192)/SDH(STM64) line card
- 10GE Ethernet switches and routers
- 10GE Core-routers
- 10GE Storage
- Inter Rack Connection
- Other high speed data connections

## I. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Ref.
Storage Ambient Temperature Range		-40	+85	°C	
Powered case Temperature Range		-5	+70	°C	
Operating Relative Humidity	RH		80	%	
Supply Voltage Range @ 5V	Vcc5	-0.5	6.0	V	
Supply Voltage Range @ 3.3V	Vcc3	-0.5	4.0	V	

Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions.

## II. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc5	4.75	5.0	5.25	V
	Vcc3	3.13	3.3	3.47	
Power Dissipation	PD			3.5	W

## III. Transmitter E/O Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate		9.95		11.1	Gb/s	
Ave. Output Power	Po	-2		4	dBm	1
Output Centre Wavelength	$\lambda$	1530	1550	1565	nm	
Disable Power	Poff			-30	dBm	
Extinction Ratio	ER	8.2			dB	1
Sidemode Suppression Ratio		30			dB	
Rise/Fall Time (20%~80%)	Tr/Tf			38	PS	
Dispersion penalty				2	dB	1
Generation Jitter1(20KHZ-80MHZ)				0.3	Ulp-p	1
Generation Jitter 2(4MHZ-80MHZ)				0.1	Ulp-p	1
Optical Eye Mask 1		GR-253-CORE/ITU-T G.6911				1
Optical Eye Mask 2		IEEE802.3ae				2

## IV. Receiver E/O Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Data Rate		9.95		11.1	Gb/s	
Overload	Po	0.5			dBm	
Input Centre Wavelength	$\lambda$	1270		1600	nm	
Minimum Sensitivity	Pmin			-15.8	dBm	1
Stressed Sensitivity in OMA				-13.8	dBm	2
LOS Assert	LosA	-30			nm	

LOS De-assert	LosD			-17	dBm	
LOS Hysteresis		0.5			dBm	
Optical Return Loss		27			dB	
Jitter Tolerance		GR-253-CORE/ITU-T G.783				1

**NOTES:**

1. MEASURED AT 9.95328Gb/s, FRAMED PRBS2^31-1, NRZ

2. MEASURED AT 10.3125Gb/s, NON-FRAMED PRBS2^31-1, NRZ

**V. Pin Descriptions**

Pin	Logic	Symbol	Name/Description	Note
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply (Not required)	
3	LVTTL-I	MOD_DESEL	Module De-select; When held low allows the module to respond to 2-wire serial interface	
4	LVTTL-O	INTb	Interrupt; Indicates presence of an important condition which can be read via the 2-wire serial interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTL-O	MOD_Abs	Indicates Module is not present. Grounded in the Module	2
13	LVTTL-O	MOD_NR	Module Not Ready; Indicating Module Operational Fault	2
14	LVTTL-O	RX_LOS	Receiver Loss Of Signal Indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RDN	Receiver Inverted Data Output	
18	CML-O	RDP	Receiver Non-Inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply (Not required).	3
21	LVTTL-I	P_DOWN/RS T	Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		Vcc2	+1.8V Power Supply (Not required)	3
23		GND	Module Ground	1
24	PECL-I	REFCLKP	Not used, internally terminated to 50ohm (100ohm diff).	4
25	PECL-I	REFCLKN	Not used, internally terminated to 50ohm (100ohm diff).	4
26		GND	Module Ground	1

27		GND	Module Ground	1
28	CML-I	TDN	Transmitter Inverted Data Input	
29	CML-I	TDP	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

1. MODULE GROUND PINS GND ARE ISOLATED FROM THE MODULE CASE AND CHASSIS GROUND WITHIN THE MODULE.
2. OPEN COLLECTOR; SHALL BE PULLED UP WITH 4.7K-10KOHMS TO A VOLTAGE BETWEEN 3.15V AND 3.6V ON THE HOST BOARD.
3. THE PINS ARE OPEN WITHIN MODULE.
4. REFERENCE CLOCK IS NOT REQUIRED.

## VI. Ordering information

Part Number	Product Description
AE-XFP-ER	XFP, 10Gbps , 1550nm, SMF, 40KM, DDM, LC connector, 0°C ~ +70°C