10GBASE-LH XFP 1310nm 20km Transceiver

P/N: AE-XFP-LH

Features

- Supports 9.95Gb/s to 11.1Gb/s bit rates
- Hot-pluggable XFP footprint
- Maximum link length of 20km with SMF
- 1310nm Uncooled DFB laser and PIN photodiode
- XFP MSA package with duplex LC connector
- No reference clock required
- +3.3V power supply
- Power dissipation <1.5W
- Compatible with RoHS
- Built-in digital diagnostic functions
- Temperature range 0°C to 70°C

Applications

- SDH STM I-64.1 at 9.953Gbps
- 10GBASE-LR/LW 10G Ethernet
- 1200-SM-LL-L 10G Fibre Channel
- 10GE over G.709 at 11.09Gbps
- OC192 over FEC at 10.709Gbps
- Other optical links, up to 11.1Gbps

I. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Ref.
Storage Ambient Temperature Range		-40	+85	℃	
Powered case Temperature Range		0	+75	℃	
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. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Operating Case Temperature Range	*Tc*	0		+70	℃	
Power Supply Voltage @ 5V	Vcc5	4.75	5.0	5.25	V	
Power Supply Voltage @ 3.3V	Vcc3	3.13	3.3	3.47	V	
Module total power	P			1.5	W	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	120		450	mV	
Transmit Disable Voltage	VD	2.0		Vcc	V	
Transmit Enable Voltage	VEN	GND		GND+ 0.8	V	
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output swing	Vout,pp	500		850	mV	
Data output rise time	t_r			38	ps	2
Data output fall time	t_f			38	ps	2
LOS Fault	$V_{LOS\ fault}$	Vcc – 0.5		Vcc_{HOST}	V	3
LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V	3
Power Supply Rejection	PSR	See Note 3 below				4

Notes:

1. After internal AC coupling.

2. 20 – 80 %

3. Loss of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

4. Per Section 2.7.1.in the XFP MSA Specification.

III. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Optical output Power	P	-6.5		+0.5	dBm	
Optical Wavelength	λ	1260		1355	nm	
Side Mode Suppression	SMSR	30			dB	

Ratio						
Optical Extinction Ratio	ER	6			dB	1
Average Launch power of OFF transmitter	POFF	-30			dBm	
Tx Jitter	Tx_j	Compliant with each standard requirements				
Receiver						
Receiver Sensitivity	RSENS		-16	-14.4	dBm	2
Receiver Sensitivity in OMA	RSENS			-12.5	dBm	2
Maximum Input Power	PMAX	+0.5			dBm	
Optical Center Wavelength	λC	1260		1600	nm	
LOS De-Assert	LOS_D			-13	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Hysteresis		1		4	dB	

Notes:

1. PRBS 231-1 test pattern @10.3125Gbps.

2. PRBS 231-1 test pattern @10.3125Gbps, BER≤10-12.

IV. Pin Descriptions

Pin	Logic	Symbol	Name/Description	Ref
1		GND	Module Ground	1
2		VEE5	Optional –5.2 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 commands ,	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTL-I/O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready;	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	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply – **Not required**	
21	LVTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset	

			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**	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – **Not required**	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – **Not required**	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

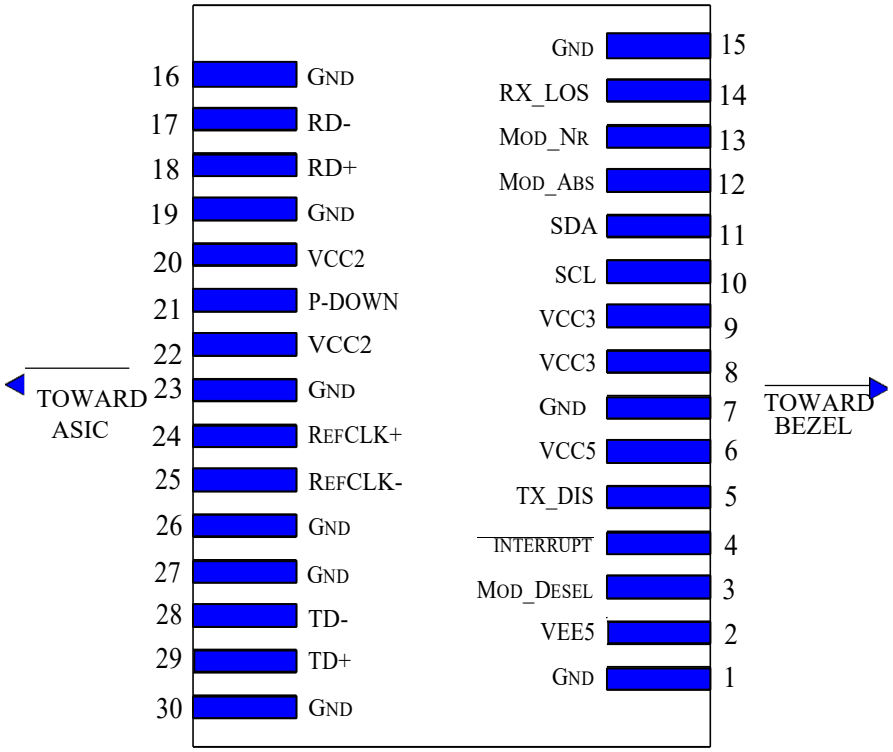
Notes:

1. Module circuit ground is isolated from module chassis ground within the module.

2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.

3. A Reference Clock input is not required.

V. Host board Connector Pinout



VI. General Specifications

Parameter	Symbol	Min	Typ	Max	Units	Ref.
Bit Rate	BR	9.95		11.1	Gb/s	1
Bit Error Ratio	BER			10^{-12}		2
Max. Supported Link Length	L_{MAX}		20		km	1

Notes:

1. SONET OC-192 SR-1， SDH STM I-64.1 ,10GBASE-LR/LW, 1200-SM-LL-L

2. Tested with a 231 – 1 PRBS

VII. Ordering information

Part Number	Product Description
AE-XFP-LH	XFP, 10Gbps , 1310nm, SMF, 20KM, DDM, LC connector, 0℃ ~ +70℃