



AXFE-1313 125Mbps~155Mbps Single-mode 1310nm, 2x5 SFF Transceiver



Product Overview

The AXFE-1313 family of Small Form Factor (SFF) transceiver module is specifically designed for the high performance integrated duplex data link over single-mode optical fiber. These transceiver modules are compliant with the SFF Multisource Agreement (MSA). These modules are designed to provide 100Base-LX compliant in Fast Ethernet applications.

The AXFE-1313 transceivers using a long wavelength (1310nm) light source enable data transmission up to 30km on a single-mode optical fiber.

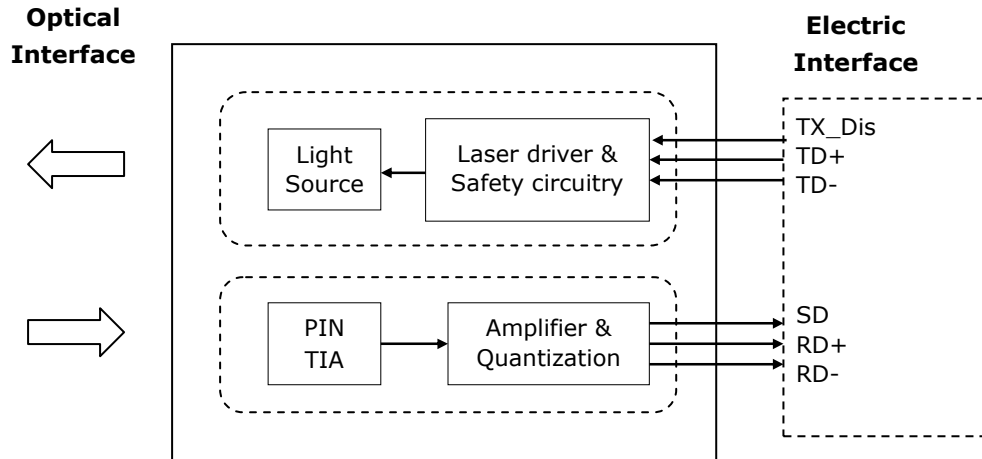
Features

- **Small Form Factor MSA compliant**
- **125Mbps IEEE802.3u 100BASE-LX compliant**
- **125Mbps FDDI ISO/IEC 9314-1 compliant**
- **2x5 package style with LC receptacle**
- **Single +3.3V power supply**
- **DC-coupled differential inputs and outputs**
- **PECL signal detect output**
- **Class 1 laser safety standard IEC 60825 compliant**
- **30km link on a single-mode fiber**

Applications

- **ATM switches and routers**
- **Fast Ethernet**
- **FDDI**

Block diagram



The transceiver is fundamentally consisted by two parts: transmitter and receiver. The transmitter features LVPECL differential data inputs (TD+ and TD-) and an LVTTTL for TX Disable control (TX_Dis). The receiver features LVPECL differential data outputs (RD+ and RD-) and LVPECL for signal detect output (SD).

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T _S	-40	+85	°C	
Supply Voltage	TxV _{CC} RxV _{CC}	-0.5	+4.0	V	
Storage Relative Humidity	RH	5	95	%	
Soldering Temperature / Time	T _{SOLD} / t _{SOLD}		260/10	°C/sec	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T _C	0		70	°C	Refer to ordering information
		-40		+85		
Supply Voltage	V _{CC} -V _{EE}	3.1	3.3	3.5	V	
Supply Current	I _{TX} +I _{RX}		150	250	mA	



Transmitter Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter Differential Input Voltage	TD+/-	400		2400	mVp-p	
Tx_Disable - High	V _{Disable_H}	2		V _{CC} T	V	
Tx_Disable - Low	V _{Disable_L}	V _{EE}		V _{EE} T+0.8	V	
Tx_Disable Assert Time	T _{ASSERT}			10	μs	
Tx_Disable Deassert Time	T _{DEASSERT}			1.0	ms	
Optical Output Power	P _o	-15		-8	dBm	
Optical Extinction Ratio	E _R	8.2			dB	
Center Wavelength	λ _C	1261		1360	nm	
Spectral Width (RMS)	Δλ			4	nm	
Optical Rise Time	t _r			2.0	ns	1
Optical Fall Time	t _f			2.0	ns	1

Notes:

1. 10% to 90% value

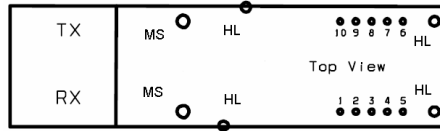
Receiver Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Differential Output Voltage	RD+/-	400		2000	mVp-p	
Receiver Overload	P _{IN} MAX	0			dBm	1
Receiver Sensitivity	P _{IN} MIN			-34	dBm	1
Operating Center Wavelength	λ _C	1260		1620	nm	
Signal Detect - Asserted	P _{SDA}			-34	dBm	
Signal Detect - Deasserted	P _{SDD}	-45			dBm	
Signal Detect - Hysteresis	P _{SDH}	0.5			dB	

Notes:

1. With BER better than or equal to 1×10^{-12} , measured in the center of the eye opening with $2^7 - 1$ PRBS

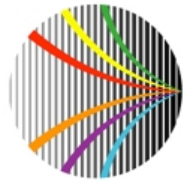
Pin Description



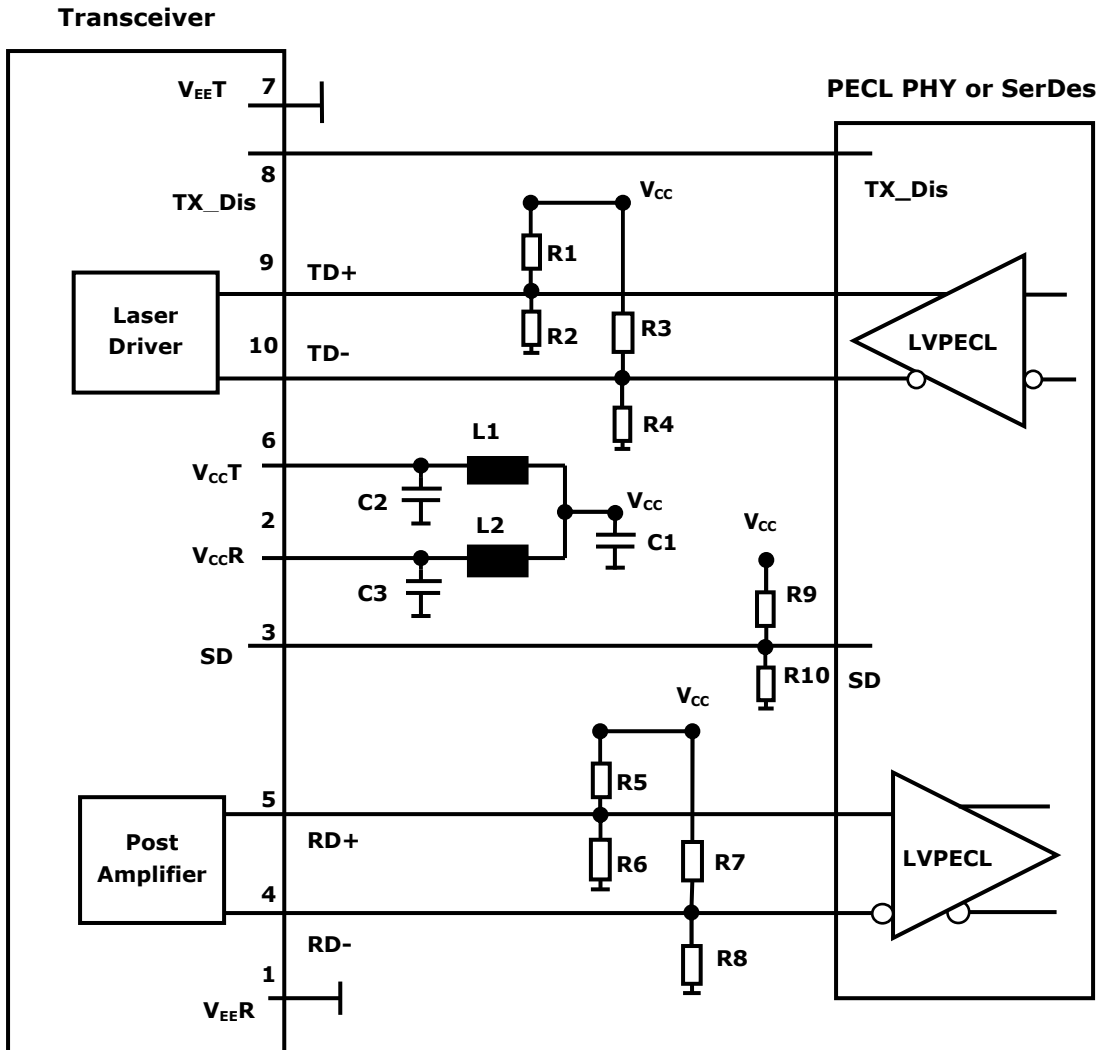
Pin No.	Pin Name	Function	Notes
MS	MS	Mounting Stubs	1
HL	HL	Housing Leads	2
1	V _{EE} R	Receiver Signal Ground	
2	V _{CC} R	Receiver Power Supply	
3	SD	Signal Detect	3
4	RD-	Receiver Data Out Bar	4
5	RD+	Receiver Data Out	4
6	V _{CC} T	Transmitter Power Supply	
7	V _{EE} T	Transmitter Signal Ground	
8	TX_Dis	Transmitter Disable Control	5
9	TD+	Transmitter Data In	6
10	TD-	Transmitter Data In Bar	6

Notes:

- The mounting stubs are provided for transceiver mechanical attachment to the circuit board. They may also provide an optional connection of the transceiver to the equipment chassis ground.
- The optional transceiver housing leads may be provided for additional signal grounding. These additional grounds may improve signal integrity, EMC, or ESD performance.
- Normal Operation: Logic "1" Output; Fault Condition: Logic "0" Output.
- No internal terminations will be provided.
- Transmitter Disabled: $(V_{CC}T - 1.3V) < V < V_{CC}T$
Transmitter Enabled: $V_{EE}T < V < (V_{EE}T + 0.8V)$ or open circuit
- An internal 50ohm termination will be provided.



Recommended Interface Circuit



Notes:

R1/R3/R5/R7/R9=130 ohm (Depends on SerDes chip used.)

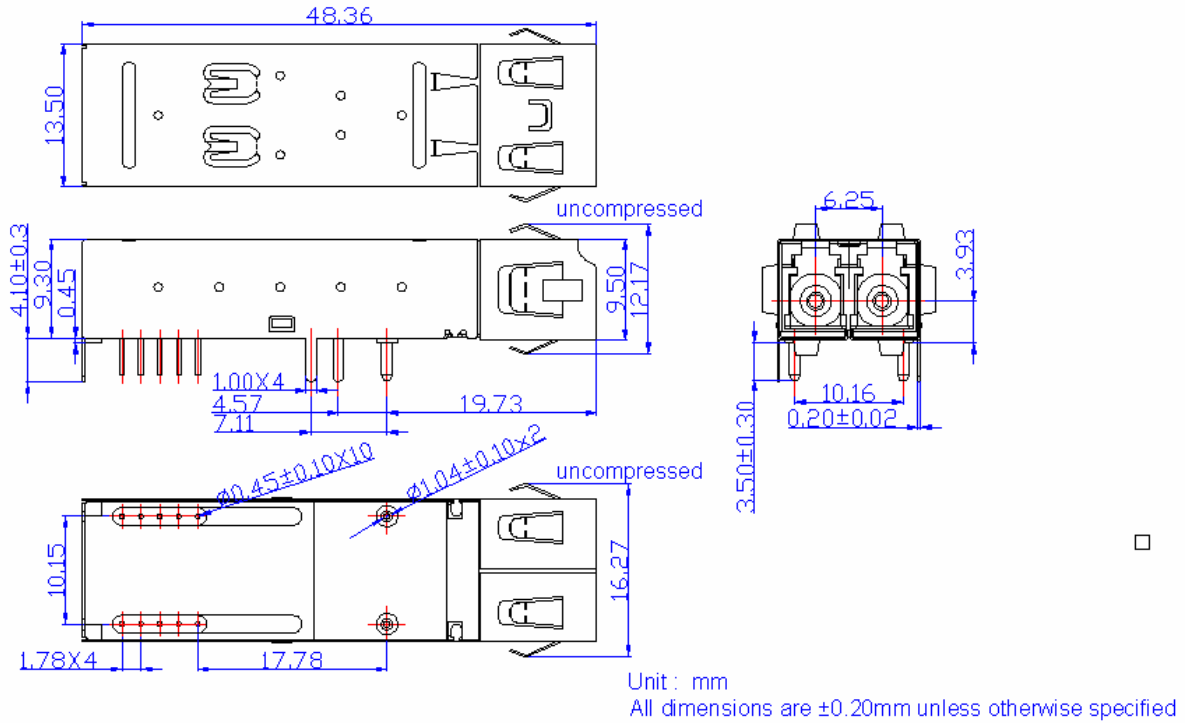
R2/R4/R6/R8/R10=82 ohm (Depends on SerDes chip used.)

C1=10uF

C2=C3=0.1uF

L1=L2=1uH

Mechanical Dimensions (Units in mm)



Ordering Information

AXFE-1313-115x

Operating Temperature
 1: 0~70°C
 3: -40~85°C

Model No.	Wavelength	LD	I/O	SD	Link	Temp.
AXFE-1313-1151	1310nm	FP	DC/DC	PECL	30km	0~70°C
AXFE-1313-1153	1310nm	FP	DC/DC	PECL	30km	-40~85°C

NOTE:

Distances are indicative only. Attenuation of 0.40 dB/km is used for the link length calculations. To calculate a more precise link budget based on specific conditions in your application, please refer to the Optical Specifications in Page#3