



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 60km on a single-mode optical fiber.

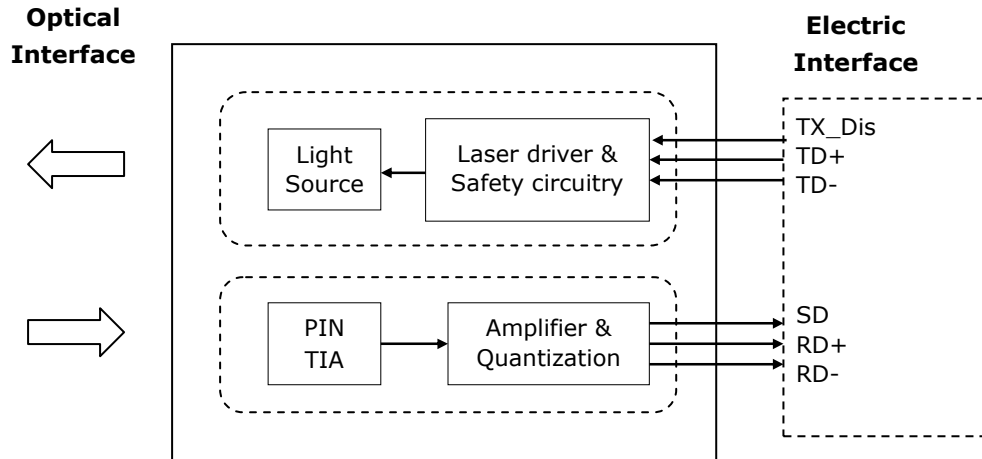
Features

- **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**
- **60km 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	300	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	-5		0	dBm	
Optical Extinction Ratio	E _R	10			dB	
Center Wavelength	λ _C	1270		1360	nm	
Spectral Width (RMS)	Δλ			2.5	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

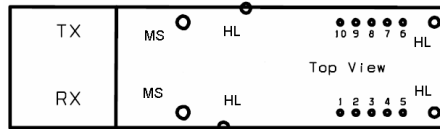
Receiver Electro-Optical Interface

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			-35	dBm	1
Operating Center Wavelength	λ _C	1260		1620	nm	
Signal Detect - Asserted	P _{SDA}			-35	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

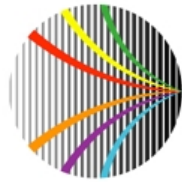
Pin Description



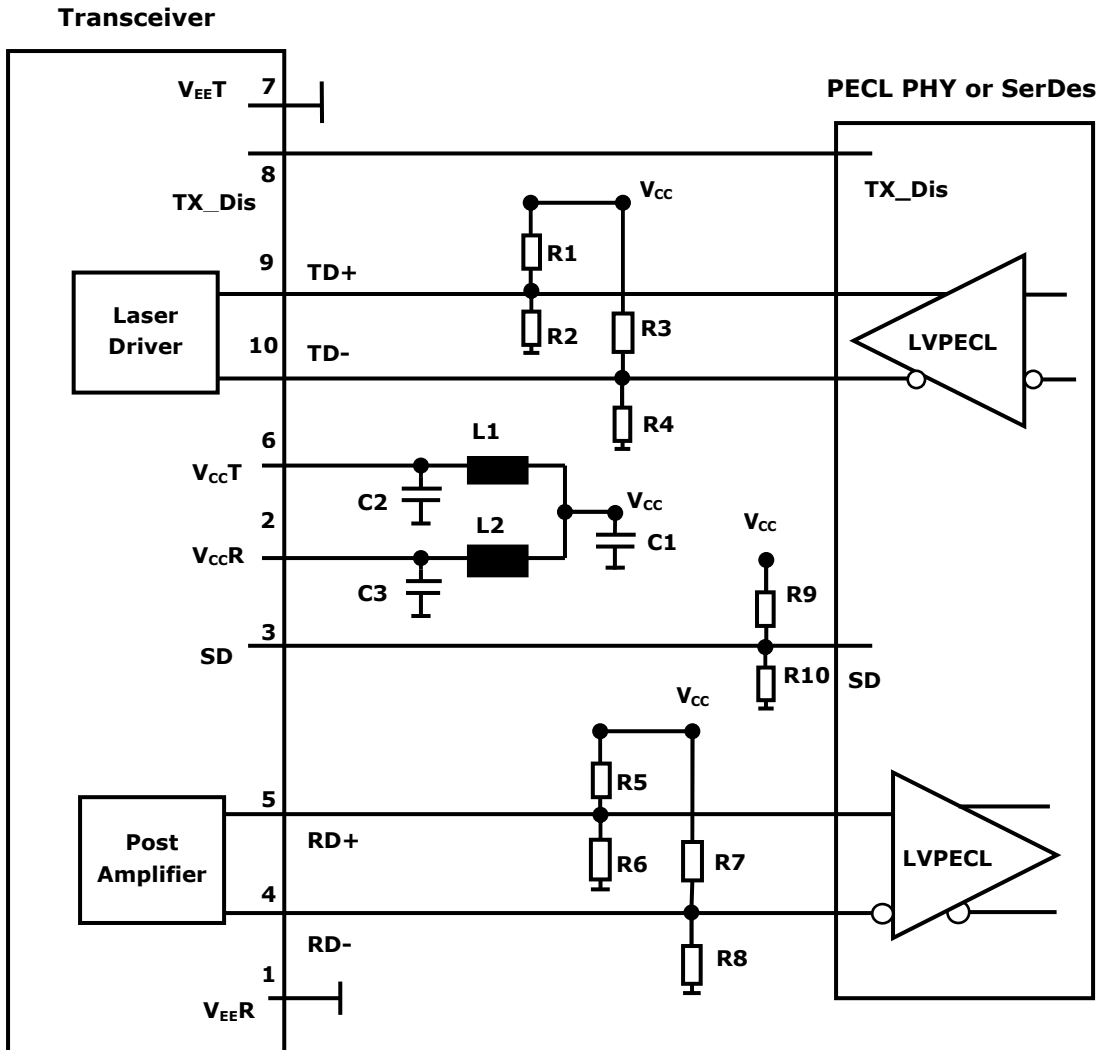
Pin No.	Pin Name	Function	Notes
MS	MS	Mounting Stubs	1
HL	HL	Housing Leads	2
1	V _{EE} R	Receiver Signal Ground	
2	V _{CC} R	Receiver Power Supply	
3	SD	Signal Detect	3
4	RD-	Receiver Data Out Bar	4
5	RD+	Receiver Data Out	4
6	V _{CC} T	Transmitter Power Supply	
7	V _{EE} T	Transmitter Signal Ground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

Notes:

1. 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.
2. The optional transceiver housing leads may be provided for additional signal grounding. These additional grounds may improve signal integrity, EMC, or ESD performance.
3. Normal Operation: Logic "1" Output; Fault Condition: Logic "0" Output.
4. No internal terminations will be provided.
5. 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
6. An internal 50ohm termination will be provided.



Recommended Interface Circuit



Notes:

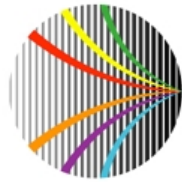
R1/R3/R5/R7/R9=130 ohm (Depends on SerDes chip used.)

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

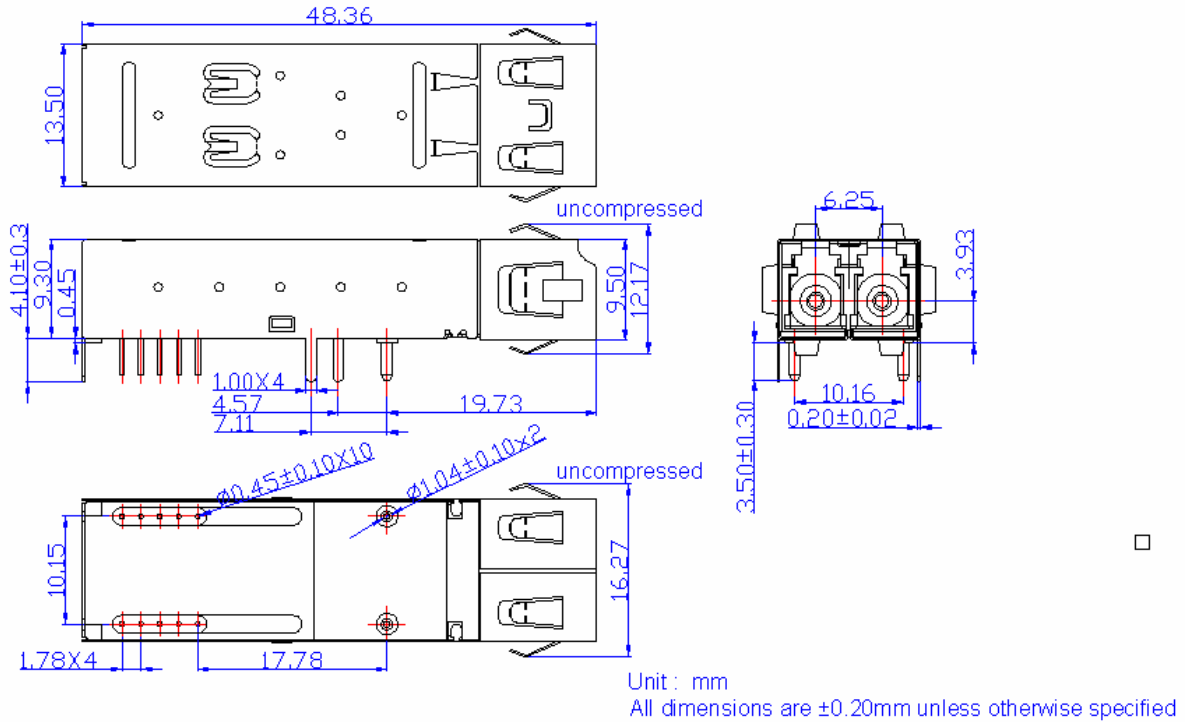
C1=10uF

C2=C3=0.1uF

L1=L2=1uH



Mechanical Dimensions (Units in mm)



Ordering Information

AXFE-1313-11D_x

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

Model No.	Wavelength	LD	I/O	SD	Link	Temp.
AXFE-1313-11D1	1310nm	FP	DC/DC	PECL	60km	0~70°C
AXFE-1313-11D3	1310nm	FP	DC/DC	PECL	60km	-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.