

# AXCEN

PHOTONICS CORPORATION

## AXFE-1311 125Mbps Single-mode 1310nm, 1x9 ST Transceiver



### Product Overview

The AXFE-1311 family of 1x9 ST 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 ST Multisource Agreement (MSA). These modules are designed to provide 100Base-FX compliant in Fast Ethernet applications.

The AXFE-1311 transceivers using a long wavelength (1310nm) light source enable data transmission up to 60km on a single-mode (9/125 $\mu$ m) optical fiber.

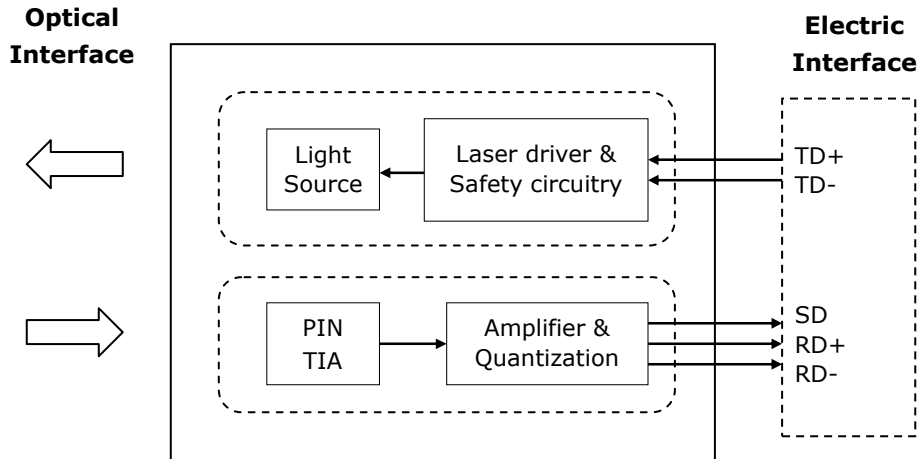
### Features

- Duplex ST receptacle
- 125Mbps IEEE802.3ah 100BASE-LX10 compliant
- 155Mbps ITU-T G957 STM S-1.1/L-1.1 compliant
- 155Mbps SONET OC-3 IR-1/LR-1 compliant
- Single +3.3~5V power supply operation
- DC coupled PECL level inputs and outputs
- PECL signal detect output
- Class 1 laser safety standard IEC 60825 compliant
- 30/60 km link on a single-mode fiber
- Low power dissipation

### Applications

- ATM switches and routers
- Fast Ethernet
- FDDI

**Block diagram**



**Absolute Maximum Ratings**

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	$T_S$	-40	+85	°C	
Supply Voltage	$V_{CCT}$ $V_{CCR}$	-0.5	6.0	V	
Storage Relative Humidity	RH	5	95	%	
Lead Soldering Temperature	$T_{Is}$		260	°C	
Lead Soldering Time	$t_{Is}$		10	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	$V_{CC}$	3.1	3.3	3.5	V	
		4.75	5.0	5.25		
Supply Current	$I_{TX} + I_{RX}$		150	300	mA	



## Transmitter Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Input Voltage – Low	$V_L-V_{CC}$	-1.81		-1.475	V	
Data Input Voltage - High	$V_H-V_{CC}$	-1.165		-0.880	V	
Optical Output Power	30 km	$P_O$	-15		-8	dBm
	60 km		-5		0	
Optical Extinction Ratio	30 km	$E_R$	8.2			dB
	60 km		10			
Center Wavelength	30 km	$\lambda_C$	1261		1360	nm
	60 km		1270		1360	
Spectral Width (RMS)	30 km	$\Delta\lambda$			4	nm
	60 km				2.5	
Optical Rise / Fall Time	$t_r / t_f$			2.0	ns	1
Duty Cycle Distortion	DCD			1.0	ns	
Random Jitter	RJ			0.76	ns	

### Notes:

1. 10% to 90% value

## Receiver Electro-Optical Characteristics

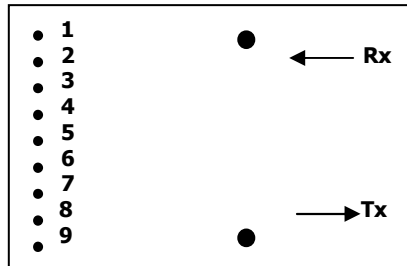
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Overload	$P_{INMAX}$	-5			dBm	1
Receiver Sensitivity	30 km	$P_{INMIN}$			-34	dBm
	60 km				-35	
Operating Center Wavelength	$\lambda_C$	1270		1600	nm	
Receiver Signal Detect – High	$P_{RX\_SDA}$			-35	dBm	
Receiver Signal Detect – Low	$P_{RX\_SDD}$	-45			dBm	
Receiver Signal Detect - Hysteresis	$P_{RX\_SDH}$	1.0			dB	
Receiver Signal Detect Voltage - Low	$V_{SDL}-V_{CC}$	-2		-1.58	V	
Receiver Signal Detect Voltage - High	$V_{SDH}-V_{CC}$	-1.1		-0.74	V	

### Notes:

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



## Pin Description

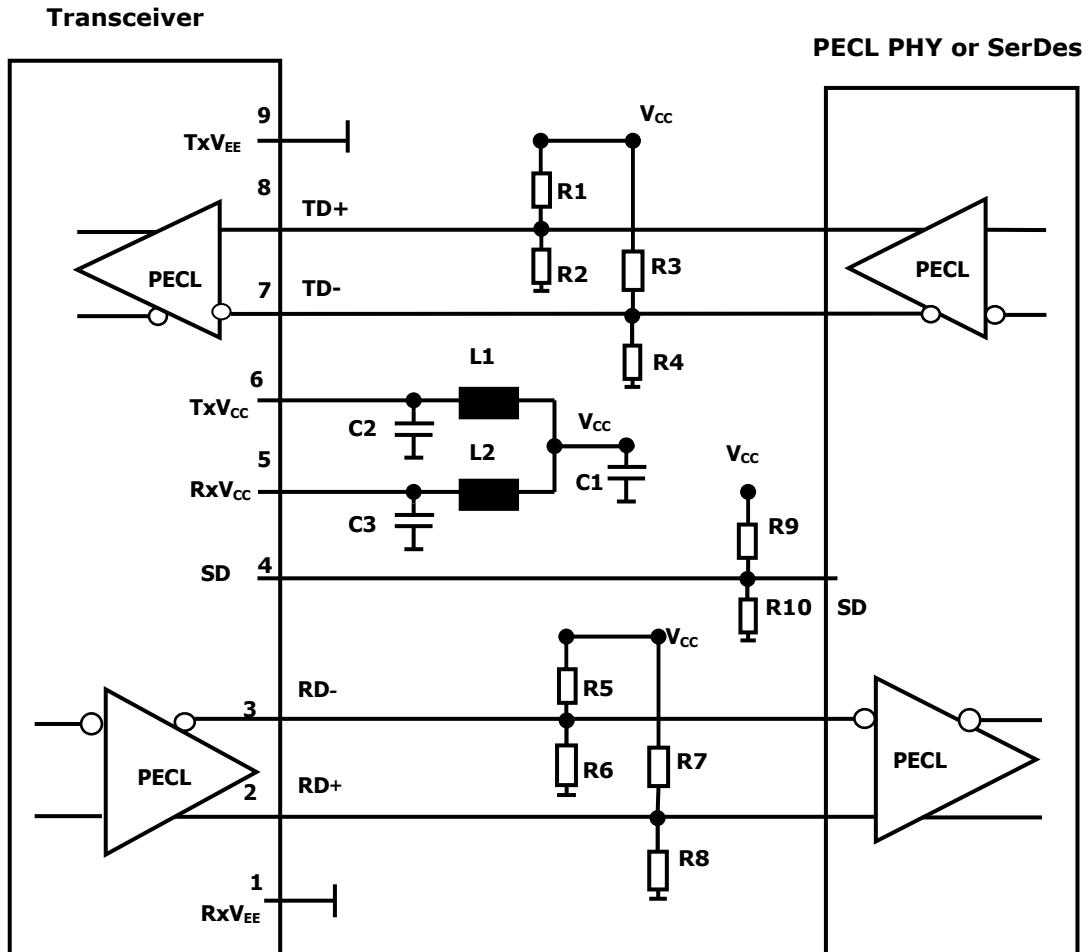


**Top View**

Pin No	Pin Name	Function	Notes
1	RxV <sub>EE</sub>	Receiver signal ground	
2	RD+	Receiver data out	
3	RD-	Receiver data out bar	
4	SD	Signal detect	
5	RxV <sub>CC</sub>	Receiver power supply	
6	TxV <sub>CC</sub>	Transmitter power supply	
7	TD-	Transmitter data in bar	
8	TD+	Transmitter data in	
9	TxV <sub>EE</sub>	Transmitter signal ground	

## Recommended Interface Circuit

### TX DC Coupling / RX DC Coupling, PECL Signal Detect



**Notes:**

R1/R3/R5/R7/R9=130 ohm @3.3V (Depends on SerDes chip used.)

=82 ohm @5V (Depends on SerDes chip used.)

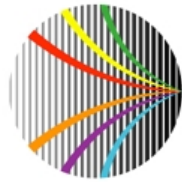
R2/R4/R6/R8/R10=82 ohm @3.3V (Depends on SerDes chip used.)

=130 ohm @5V (Depends on SerDes chip used.)

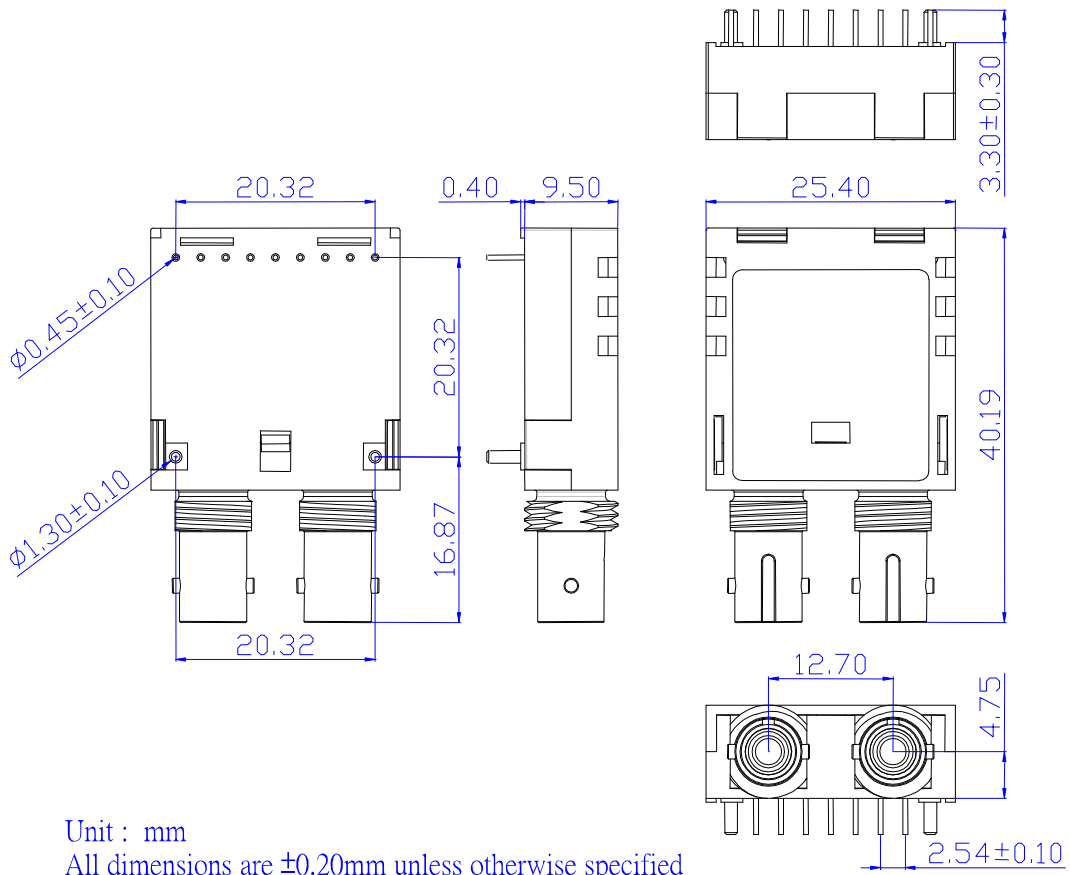
C1=10uF

C2/C3=0.1uF

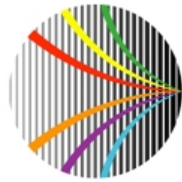
L1=L2=1uH



## Mechanical Dimensions (Units in mm)

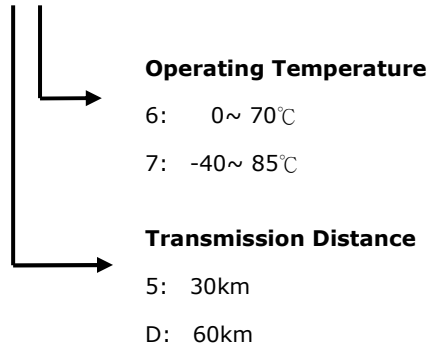


Unit : mm  
All dimensions are  $\pm 0.20$ mm unless otherwise specified



## Ordering Information

### AXFE-1311-0K<sub>xy</sub>



Model No.	Wavelength	LD	I/O	SD	Link	Temp.
AXFE-1311-0K56	1310nm	FP	DC/DC	PECL	30km	0~70°C
AXFE-1311-0K57	1310nm	FP	DC/DC	PECL	30km	-40~85°C
AXFE-1311-0KD6	1310nm	FP	DC/DC	PECL	60km	0~70°C
AXFE-1311-0KD7	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.