

# AXCEN

PHOTONICS CORPORATION

## AXFE-3511 125Mbps Single-mode 1550nm, 1x9 ST Transceiver



### Product Overview

The AXFE-3511 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 long reach link in Fast Ethernet applications.

The AXFE-3511 transceivers using a long wavelength (1550nm) DFB LD enable data transmission up to 120km on a single-mode optical fiber.

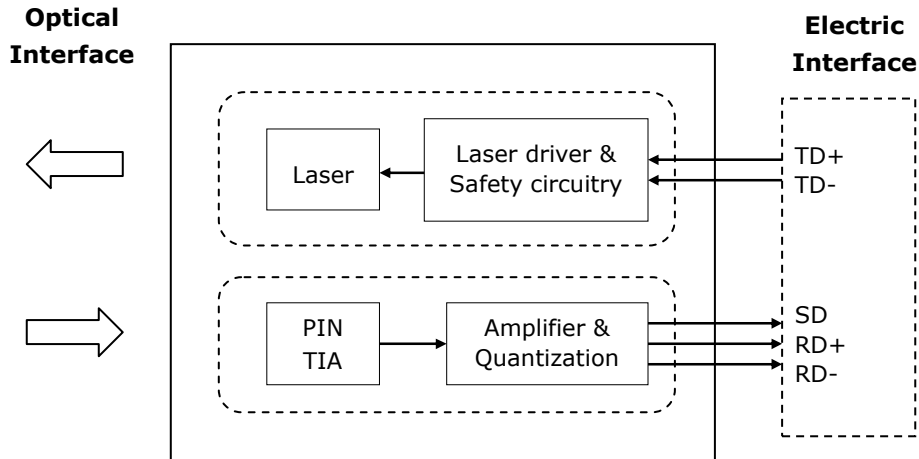
### Features

- Duplex ST receptacle
- 125Mbps IEEE802.3u Fast Ethernet compatible
- 155Mbps ITU-T G.957 STM L-1.2 compatible
- 155Mbps SONET OC-3 LR-2 compatible
- 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
- 100 / 120 km reach
- Low power dissipation

### Applications

- ATM switches and routers
- Fast Ethernet
- SONET/SDH switch infrastructure

### 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	100km	$P_O$	-5		0	dBm	
	120km		0		+5		
Optical Extinction Ratio		$E_R$	10			dB	
Center Wavelength		$\lambda_C$	1520	1550	1580	nm	
Spectral Width (-20dB)		$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio		SMSR	30			dB	
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

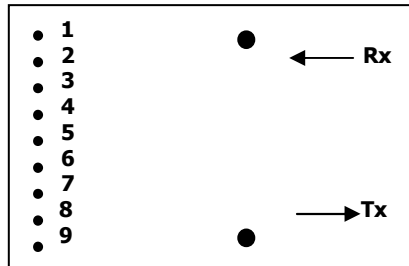
Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Overload		$P_{INMAX}$	0			dBm	1
Receiver Sensitivity	100km	$P_{INMIN}$			-35	dBm	1
	120km				-35		
Operating Center Wavelength		$\lambda_C$	1260		1620	nm	
Receiver Signal Detect – High		$P_{RX\_SDA}$			-35	dBm	
Receiver Signal Detect – Low		$P_{RX\_SDD}$	-45			dBm	
Receiver Signal Detect - Hysteresis		$P_{RX\_SDH}$	0.5			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

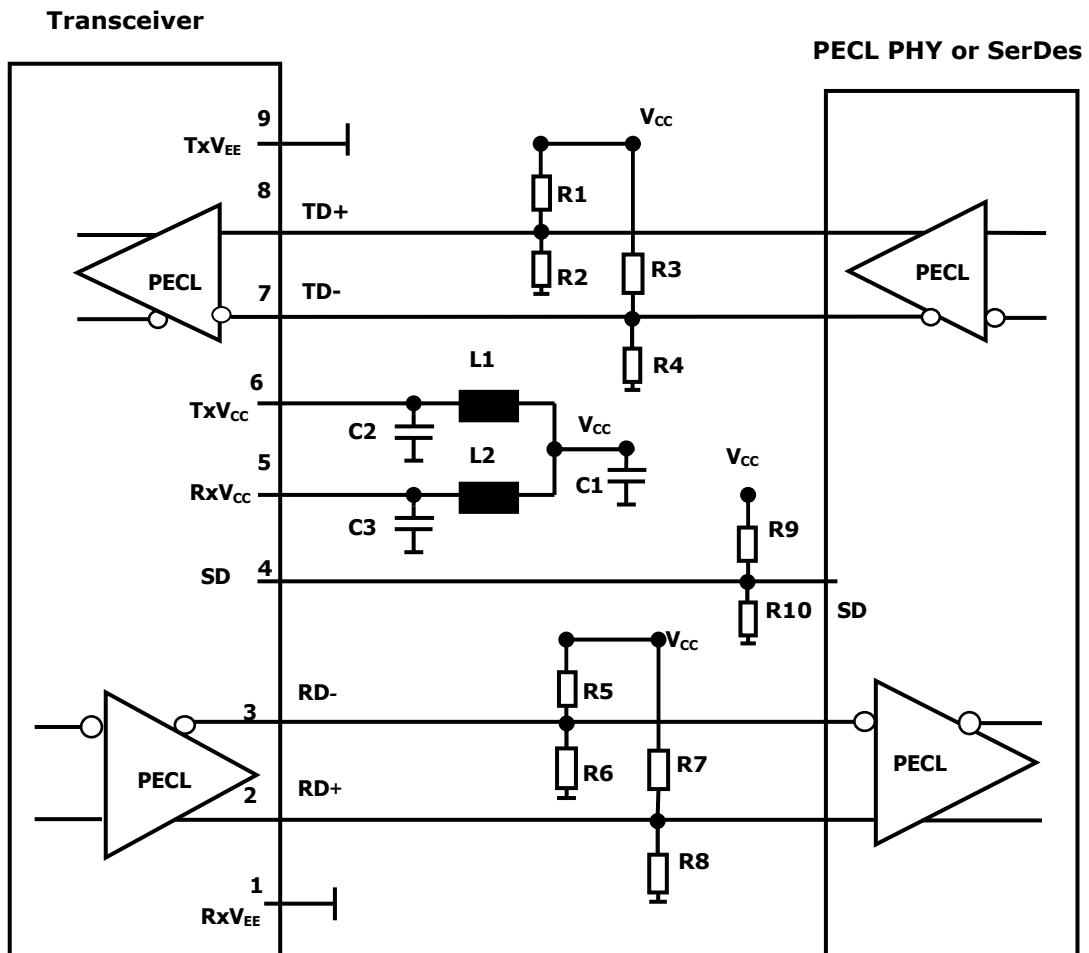


**Top View**

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.)**

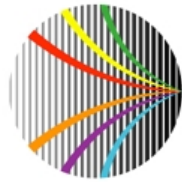
**R2/R4/R6/R8/R10=82 ohm @3.3V (Depends on SerDes chip used.)**

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

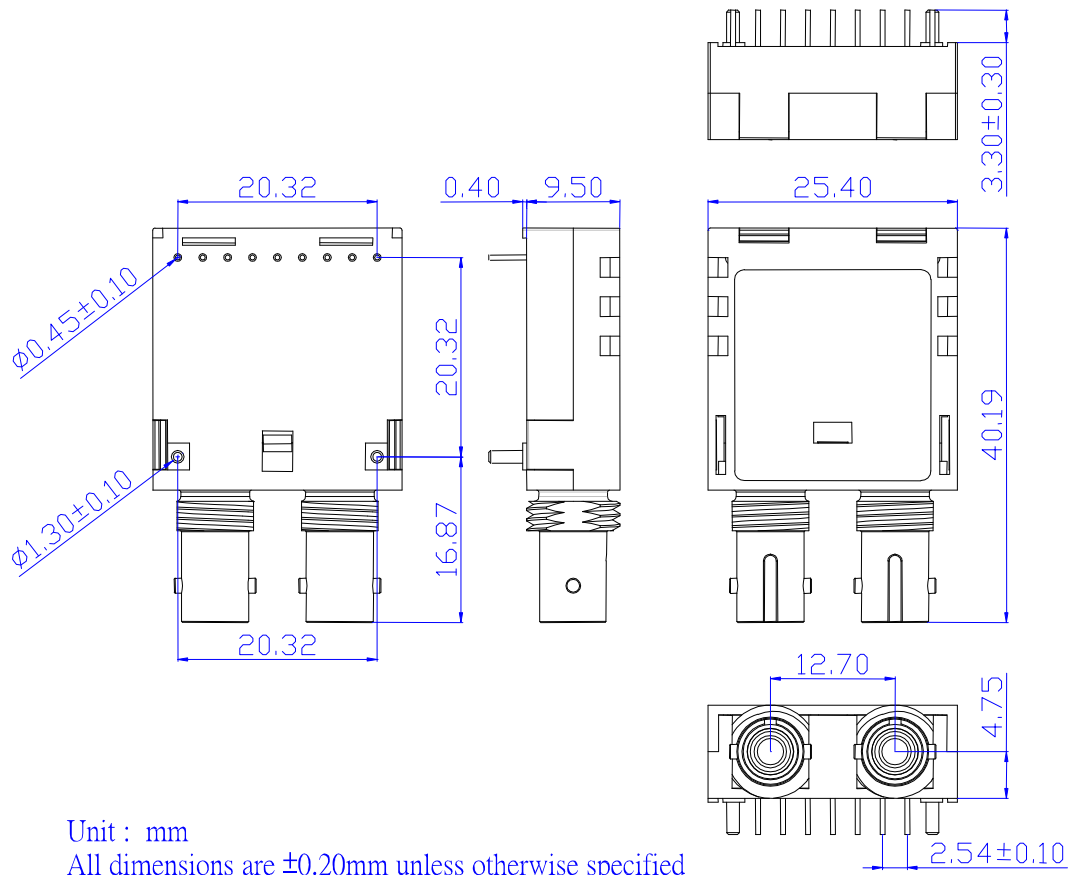
**C1=10uF**

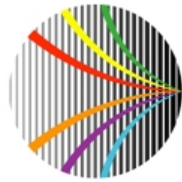
**C2/C3=0.1uF**

**L1=L2=1uH**



## Mechanical Dimensions (Units in mm)





## Ordering Information

### AXFE-3511-0K<sub>xy</sub>



#### Operating Temperature

6: 0~70°C

7: -40~85°C

#### Transmission Distance

K: 100 km

E: 120 km

Product Code	Wavelength	LD	I/O	SD	Link	Temp.
AXFE-3511-0KK6	1550nm	DFB	DC/DC	PECL	100km	0~70°C
AXFE-3511-0KK7	1550nm	DFB	DC/DC	PECL	100km	-40~85°C
AXFE-3511-0KE6	1550nm	DFB	DC/DC	PECL	120km	0~70°C
AXFE-3511-0KE7	1550nm	DFB	DC/DC	PECL	120km	-40~85°C

#### NOTE:

Distances are indicative only. Attenuation of 0.25 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.