



## **AXGE-1651 1.25Gbps Single Fiber Bi-directional, 1x9, SC Receptacle, ONU Transceiver**



### **Product Overview**

The AXGE-1651 family of 1x9 transceiver modules is specifically designed for the high performance integrated duplex data link over single-mode optical fiber. These transceiver modules are compliant with the Multisource Agreement (MSA). These modules are designed to provide 1000Base-BX10 compliant in Fast Ethernet applications.

The AXGE-1651 BiDi 1x9 transceivers using a 1310nm FP laser diode and 1550nm PIN diode enable data transmission up to 20km on a single-mode (9/125 $\mu$ m) optical fiber.

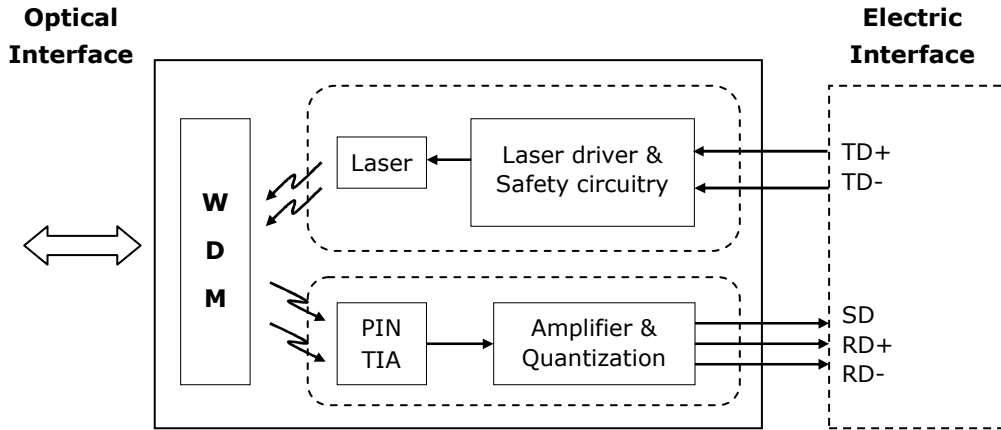
### **Applications**

- **FTTx**
- **Gigabit Ethernet**
- **High speed I/O for file server**
- **Switch backbone application**

### **Features**

- **1.25Gbps bi-directional single fiber link**
- **Low Profile plastic molded package**
- **Single SC receptacle**
- **1310nm FP transmitter, 1550nm PIN receiver**
- **1.25Gbps IEEE 802.3ah 1000BASE-BX10-U compliant**
- **Single +3.3V power supply operation**
- **DC or AC coupling PECL level inputs and outputs**
- **PECL or TTL signal detect output**
- **Class 1 laser safety standard IEC 60825 compliant**
- **10km/20km link on a single-mode fiber**
- **Low power dissipation**

**Block diagram**



The transceiver is fundamentally consisted by two parts: transmitter and receiver. The transmitter features LVPECL differential data inputs (TD+ and TD-). The receiver features LVPECL differential data outputs (RD+ and RD-) and LVPECL or TTL for signal detect output (SD).

**Absolute Maximum Ratings**

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T <sub>S</sub>	-40	+85	°C	
Supply Voltage	V <sub>CC</sub> T V <sub>CC</sub> R	-0.5	4.0	V	
Storage Relative Humidity	RH	5	95	%	
Lead Soldering Temperature	T <sub>IS</sub>		260	°C	
Lead Soldering Time	t <sub>IS</sub>		10	sec	

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T <sub>C</sub>	0		70	°C	Refer to ordering information
		-40		85		
Supply Voltage	V <sub>CC</sub>	3.1	3.3	3.5	V	
Supply Current	I <sub>TX</sub> + I <sub>RX</sub>		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	10km	$P_O$	-9		-3	dBm	1
	20km		-8		-2		
Optical Extinction Ratio		$E_R$	9			dB	
Center Wavelength		$\lambda_C$	1270	1310	1355	nm	
Spectral Width (RMS)		$\Delta\lambda$			2.5	nm	
Optical Rise / Fall Time		$t_r / t_f$			260	ps	2
Total Contributed Jitter		TJ			227	ps	

**Notes:**

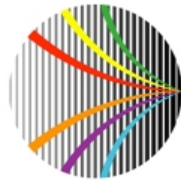
1. Coupling into a 9/125 $\mu$ m single-mode fiber.
2. 20% to 80% value

### Receiver Electro-Optical Characteristics

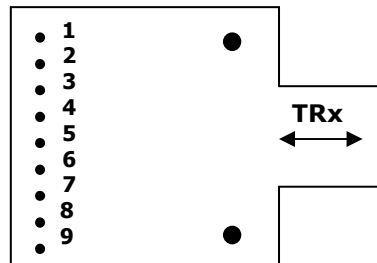
Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Overload		$P_{INMAX}$	-2			dBm	1
Receiver Sensitivity	10km	$P_{INMIN}$			-20	dBm	1
	20km				-23		
Operating Center Wavelength		$\lambda_C$	1480		1580	nm	
Receiver Output Voltage - Low		$V_{OL}-V_{CC}$	-2		-1.58	V	
Receiver Output Voltage - High		$V_{OH}-V_{CC}$	-1.1		-0.74	V	
Receiver Signal Detect – Low		$P_{RX\_SDD}$	-35			dBm	
Receiver Signal Detect – High		$P_{RX\_SDA}$			-23	dBm	
Receiver Signal Detect - Hysteresis		$P_{RX\_SDH}$	0.5			dB	

**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

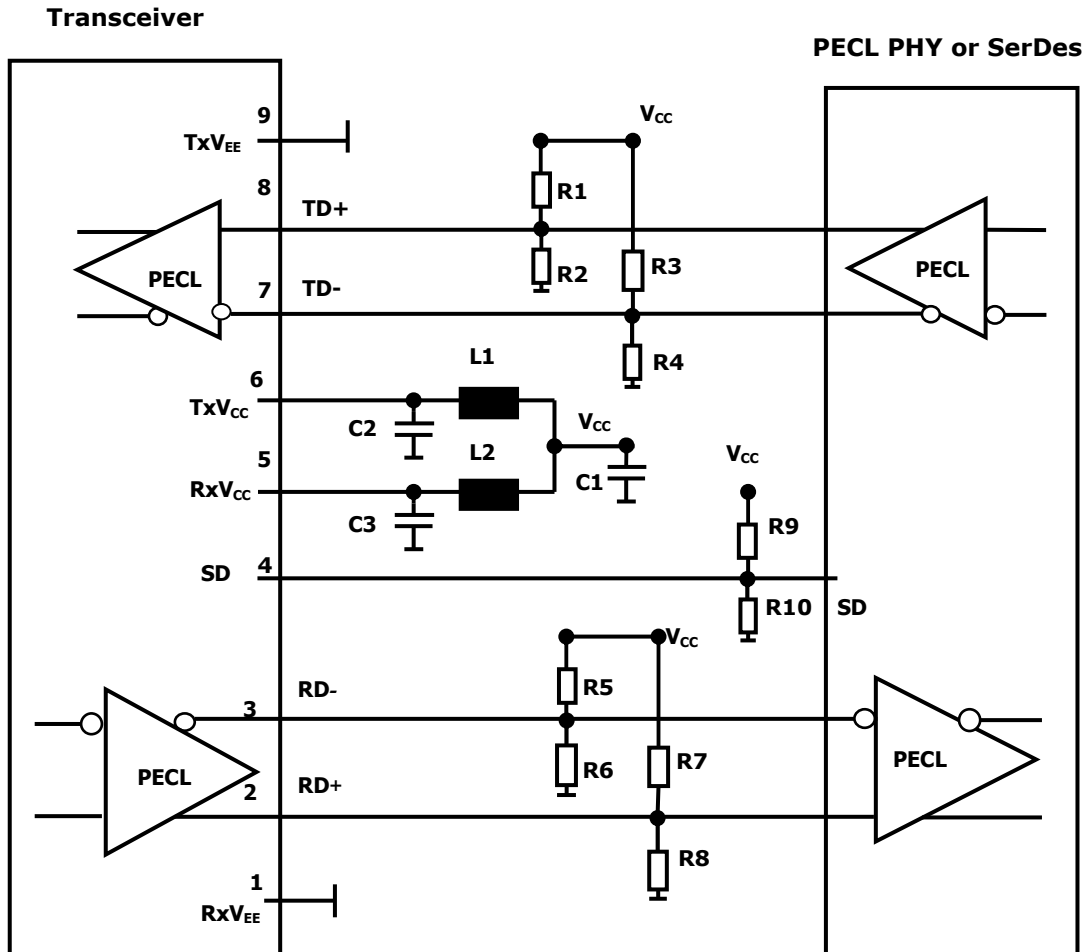


**Top View**

Pin No	Pin Name	Function	Notes
1	RxV <sub>EE</sub>	Receiver signal ground	
2	RD+	Receiver data out	PECL
3	RD-	Receiver data out bar	PECL
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	PECL
8	TD+	Transmitter data in	PECL
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.)**

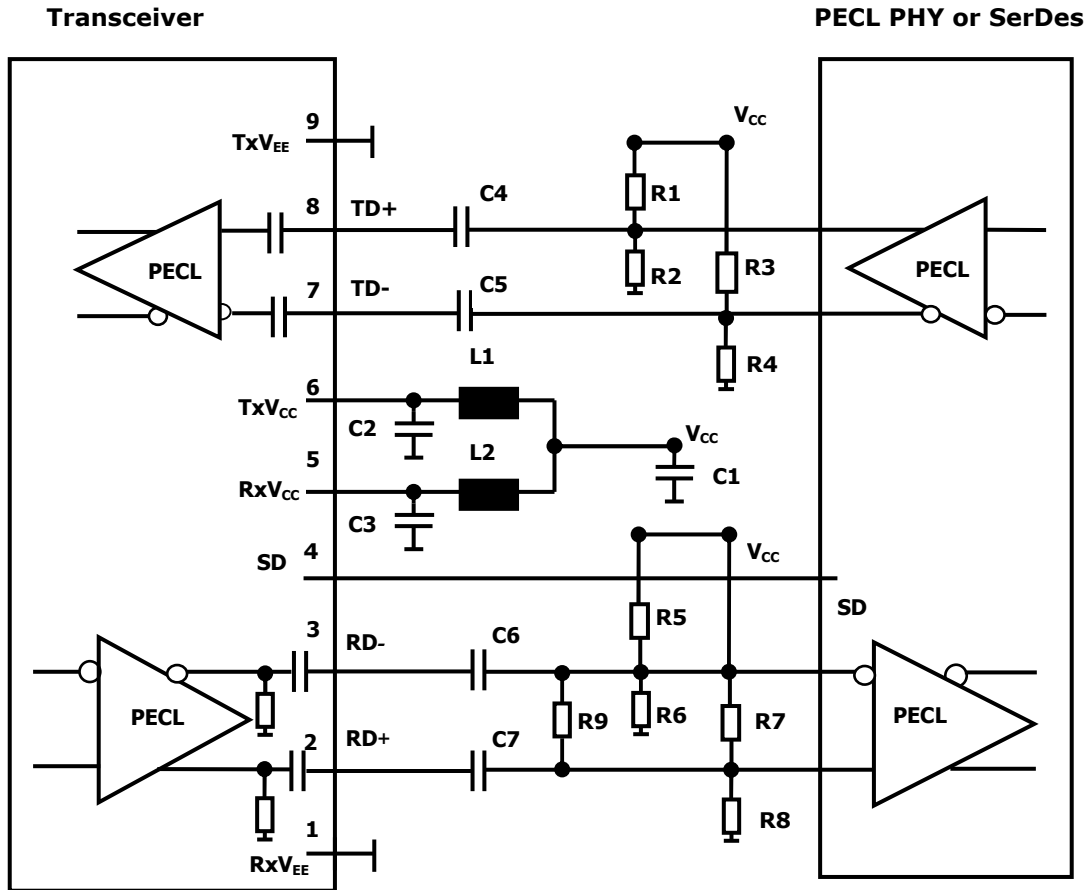
**=130 ohm @5V (Depends on SerDes chip used.)**

**C1=10uF**

**C2/C3=0.1uF**

**L1=L2=1uH**

### TX AC Coupling / RX AC Coupling, TTL 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.)**

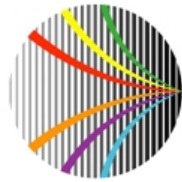
**=130 ohm@5V (Depends on SerDes chip used.)**

**R9 =100 ohm (Depends on SerDes chip used.)**

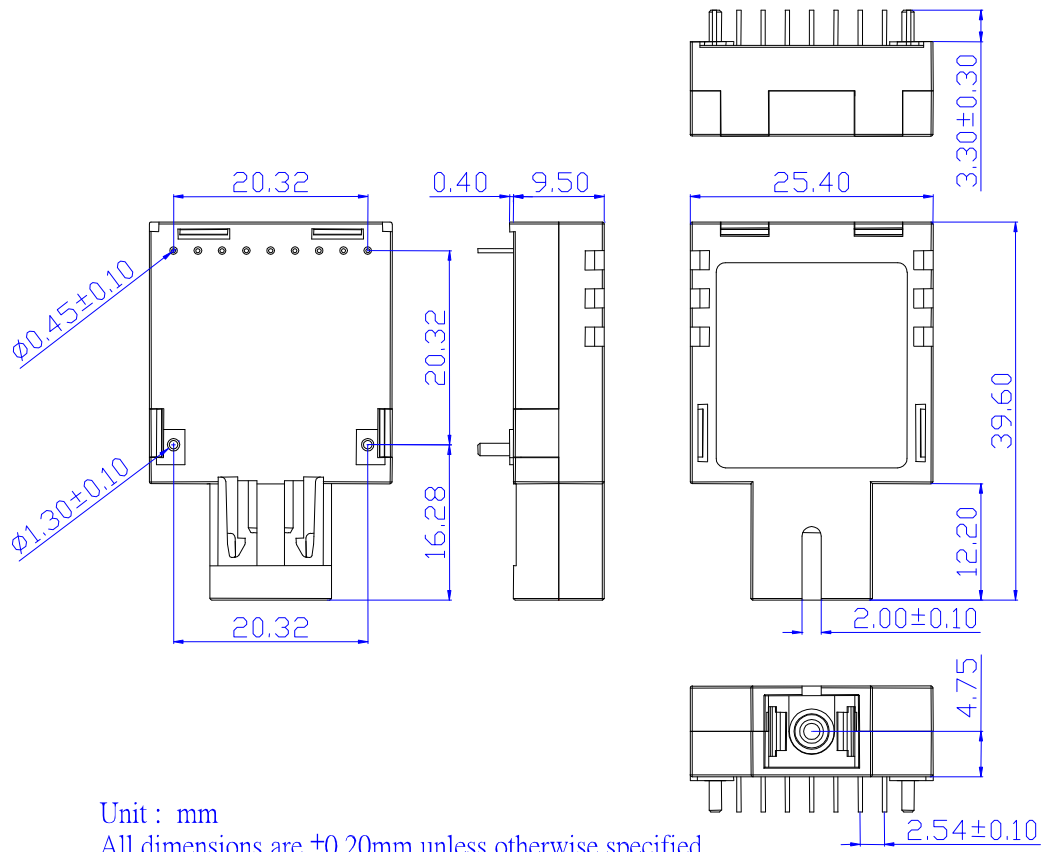
**C1=10uF**

**C2/C3/C4/C5/C6/C7=0.1uF**

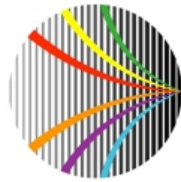
**L1=L2=1uH**



## Mechanical Dimensions (Units in mm)

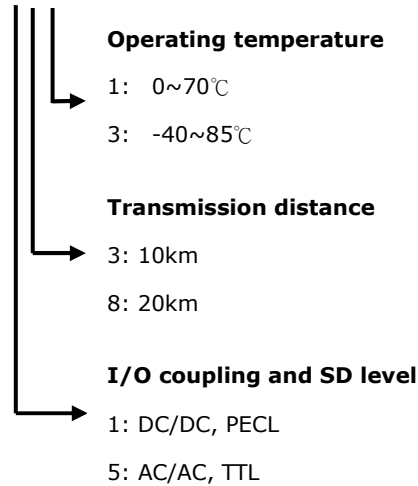


Unit : mm  
All dimensions are  $\pm 0.20$ mm unless otherwise specified



## Ordering Information

### AXGE-1651-0xyz



Model No.	Tx	LD	Rx	I/O	SD	Link	Temp.
AXGE-1651-0131	1310nm	FP	1550nm	DC/DC	PECL	10km	0~70°C
AXGE-1651-0133	1310nm	FP	1550nm	DC/DC	PECL	10km	-40~85°C
AXGE-1651-0181	1310nm	FP	1550nm	DC/DC	PECL	20km	0~70°C
AXGE-1651-0183	1310nm	FP	1550nm	DC/DC	PECL	20km	-40~85°C
AXGE-1651-0531	1310nm	FP	1550nm	AC/AC	TTL	10km	0~70°C
AXGE-1651-0533	1310nm	FP	1550nm	AC/AC	TTL	10km	-40~85°C
AXGE-1651-0581	1310nm	FP	1550nm	AC/AC	TTL	20km	0~70°C
AXGE-1651-0583	1310nm	FP	1550nm	AC/AC	TTL	20km	-40~85°C