

# PROLABS – SFP-H10GB-ACUXM

## 11GBd Active Copper SFP+ (Small Form Pluggable) Transceiver

### Key Features

- Up to 11 GBd bi-directional data links
- 24AWG through 30 AWG cable available
- Dual SFP+ Connectors
- Industry standard small form pluggable (SFP+) package
- Spans up to 15 meters
- Hot Pluggable
- Single power supply 3.3V
- RoHS Compliance
- Operating temperature range: 0°C to 70°C

### Applications

- 10G Ethernet
- 10G Fiber Channel



### Introduction

#### SFP-H10GB-ACUXM Overview

PROLABS's SFP-H10GB-ACUXM Active Copper SFP+ transceivers are designed for operation in short connection using Fiber Channel and 10G Ethernet networking equipment. It is integrated with Amphenol Spectra Strip SkewClear cable, the completed assembly spans 15 meters and operates up to 11GBd. The transmitter pre-emphasis can be configured to best compensate for different cable lengths. Active copper assemblies are typically used in host systems that do not employ EDC

### Ordering information

<i>Part Number</i>	<i>Description</i>
<b>SFP-H10GB-ACUxM</b>	11GBd Active Copper SFP+

**Compatible Ordering Information**

Base code	OEM Vendor	Prolabs Ordering SKU	Product Description	
<b>SFP-H10GB-ACU0.5M</b>	<b>Generic</b>	ACU0.5M-SFP-10G-C	10G SFP+ Active Cable 0.5m	
	<b>HP Server</b>	487649-B21-C	10G SFP+ Active Cable 0.5m	
<b>SFP-H10GB-ACU10M</b>	<b>Avaya</b>	AA1403018-C	10G SFP+ Active Cable 10m	
	<b>BTN/IBM</b>	90Y9436-C	10G SFP+ Active Cable 10m	
	<b>Cisco</b>	SFP-H10GB-ACU10M-C	10G SFP+ Active Cable 10m	
	<b>F5 Networks</b>	F5-UPG-SFPC+-10M-C	10G SFP+ Active Cable 10m	
	<b>Fortinet</b>	SP-CABLE-ADASFP+10M-C	10G SFP+ Active Cable 10m	
	<b>Generic</b>	ACU10M-SFP-10G-C	10G SFP+ Active Cable 10m	
	<b>HP ProCurve</b>	J9286B-C	10G SFP+ Active Cable 10m	
	<b>Huawei</b>	SFP-H10G-AC10M-C	10G SFP+ Active Cable 10m	
	<b>Intel</b>	XDACBL10M-C	10G SFP+ Active Cable 10m	
	<b>Juniper</b>	EX-SFP-10GE-DAC-10M-C	10G SFP+ Active Cable 10m	
			QFX-SFP-DAC-10MA-C	10G SFP+ Active Cable 10m
		<b>ZTE</b>	SFP+-Cable-10M-C	10G SFP+ Active Cable 10m
	<b>SFP-H10GB-ACU1M</b>	<b>Brocade</b>	10G-SFPP-TWX-0101-C	10G SFP+ Active Cable 1m
<b>BTN/IBM</b>		95Y0323-C	10G SFP+ Active Cable 1m	
<b>Cisco</b>		SFP-H10GB-ACU1M-C	10G SFP+ Active Cable 1m	
<b>F5 Networks</b>		F5-UPG-SFPC+-1M-C	10G SFP+ Active Cable 1m	
<b>Fortinet</b>		SP-CABLE-ADASFP+1M-C	10G SFP+ Active Cable 1m	
<b>Generic</b>		ACU1M-SFP-10G-C	10G SFP+ Active Cable 1m	
<b>HP Server</b>		487652-B21-C	10G SFP+ Active Cable 1m	
<b>Juniper</b>		QFX-SFP-DAC-1MA-C	10G SFP+ Active Cable 1m	
<b>SFP-H10GB-ACU2M</b>	<b>Brocade</b>	10G-SFPP-TWX-0201-C	10G SFP+ Active Cable 2m	
<b>SFP-H10GB-ACU3M</b>	<b>Avaya</b>	AA1403019-C	10G SFP+ Active Cable 3m	
	<b>Brocade</b>	10G-SFPP-TWX-0301-C	10G SFP+ Active Cable 3m	
	<b>BTN/IBM</b>	95Y0326-C	10G SFP+ Active Cable 3m	
	<b>Cisco</b>	SFP-H10GB-ACU3M-C	10G SFP+ Active Cable 3m	
	<b>F5 Networks</b>	F5-UPG-SFPC+-3M-C	10G SFP+ Active Cable 3m	
	<b>Fortinet</b>	SP-CABLE-ADASFP+3M-C	10G SFP+ Active Cable 3m	
	<b>Generic</b>	ACU3M-SFP-10G-C	10G SFP+ Active Cable 3m	
	<b>HP Server</b>	487655-B21-C	10G SFP+ Active Cable 3m	
	<b>Juniper</b>	QFX-SFP-DAC-3MA-C	10G SFP+ Active Cable 3m	
<b>SFP-H10GB-ACU5M</b>	<b>Avaya</b>	AA1403020-C	10G SFP+ Active Cable 5m	
	<b>Brocade</b>	10G-SFPP-TWX-0501-C	10G SFP+ Active Cable 5m	
	<b>BTN/IBM</b>	95Y0329-C	10G SFP+ Active Cable 5m	
	<b>Cisco</b>	SFP-H10GB-ACU5M-C	10G SFP+ Active Cable 5m	
	<b>F5 Networks</b>	F5-UPG-SFPC+-5M-C	10G SFP+ Active Cable 5m	
	<b>Fortinet</b>	SP-CABLE-ADASFP+5M-C	10G SFP+ Active Cable 5m	
	<b>Generic</b>	ACU5M-SFP-10G-C	10G SFP+ Active Cable 5m	
	<b>Juniper</b>	QFX-SFP-DAC-5MA-C	10G SFP+ Active Cable 5m	
<b>SFP-H10GB-ACU7M</b>	<b>Brocade</b>	10G-SFPP-TWX-0701-C	10G SFP+ Active Cable 7m	
	<b>Cisco</b>	SFP-H10GB-ACU7M-C	10G SFP+ Active Cable 7m	
	<b>F5 Networks</b>	F5-UPG-SFPC+-7M-C	10G SFP+ Active Cable 7m	
	<b>Fortinet</b>	SP-CABLE-ADASFP+7M-C	10G SFP+ Active Cable 7m	
	<b>Generic</b>	ACU7M-SFP-10G-C	10G SFP+ Active Cable 7m	
	<b>HP Server</b>	487658-B21-C	10G SFP+ Active Cable 7m	
	<b>Huawei</b>	SFP-H10G-AC7M-C	10G SFP+ Active Cable 7m	
	<b>Intel</b>	XDACBL7M-C	10G SFP+ Active Cable 7m	
	<b>Juniper</b>	EX-SFP-10GE-DAC-7M-C	10G SFP+ Active Cable 7m	
			QFX-SFP-DAC-7MA-C	10G SFP+ Active Cable 7m
		<b>ZTE</b>	SFP+-Cable-7M-C	10G SFP+ Active Cable 7m

**Specification**

PRODUCT SELECTION			
SFP-H10GB-ACUXM		SFP-H10GB-ACUXM	
CABEL LENGTH	X	CABLE LENGTH	X
7M	7	10M	10

absolute maximum ratings						
<i>Parameter</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Remarks</i>
storage temperature	Ts	-40		85	*C	
supply voltage	Bs	-0.5		6	V	
operating current	Lop			400	mA	
relative humidity	RH	0		85	%	non-condensing

GENERAL SPECIFICATIONS						
<i>Parameter</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Remarks</i>
data rate	DR	0.155		11	GBd	
bit error rate	BER			10 <sup>-12</sup>		
case operating temp	Top	0		70	*c	
supply voltage	Vcc	3.15	3.3	3.6	V	
supply current	Icc		100	300	Ma	

## Specification

**ELECTRICAL CHARACTERISTICS –TRANSMITTER**

VCC= 3.15 V to 3.6 V, TOP = 0 °C to 70 °C

<i>Parameter</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Remarks</i>
Input differential impedance	$R_{IN}$			100	$\Omega$	
Transmit Disable Voltage	$V_D$	$V_{CC}-1.5$		$V_{CC}$	V	
Transmit Enable Voltage	$V_{EN}$	$V_{EE}$		$V_{EE}+0.8$	V	
Transmit Disable Assert Time				10	$\mu s$	

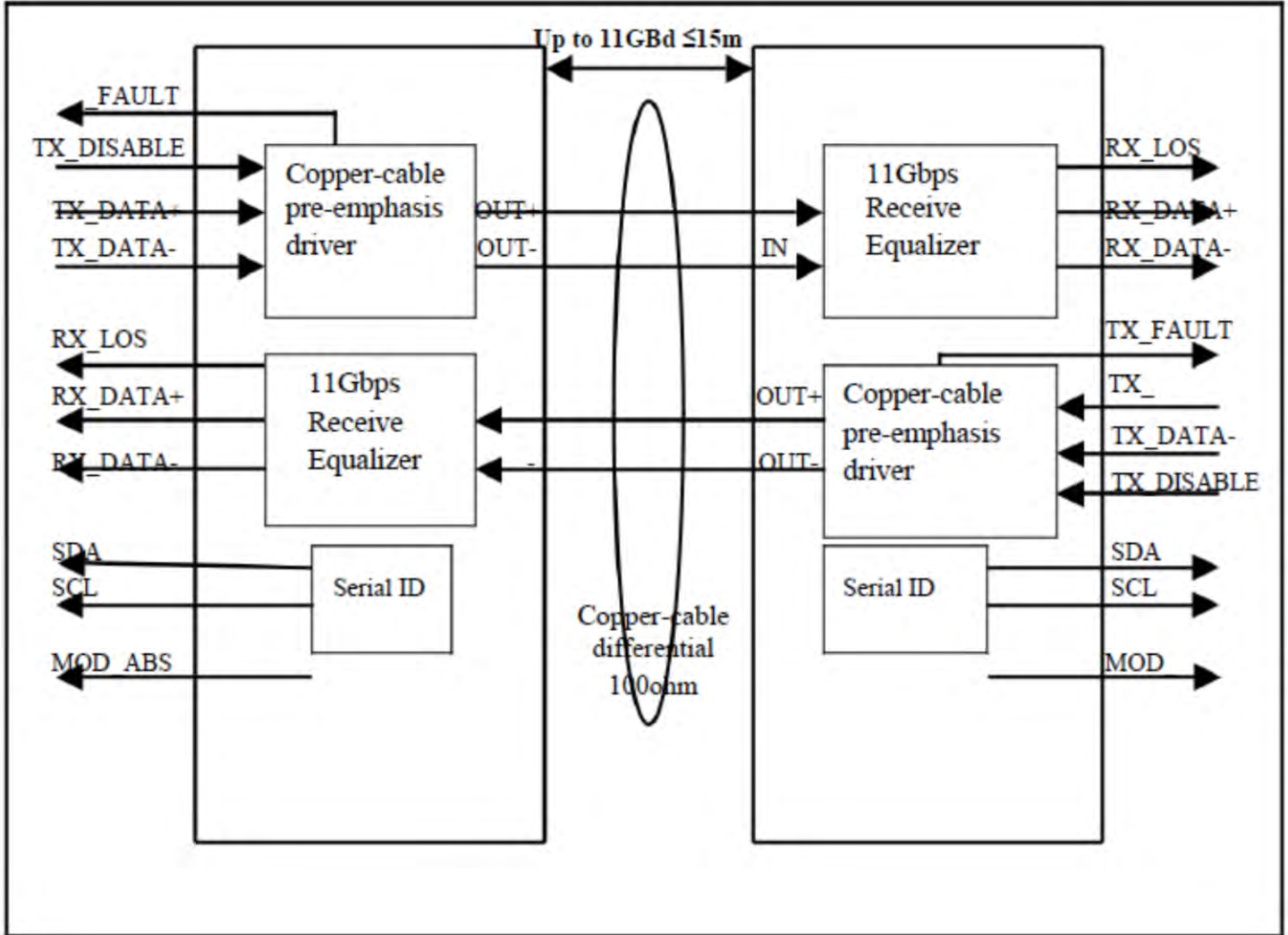
**Electrical Characteristics - Receiver**

VCC=3.15V to 3.6V, TC=0°C to 70°C

<i>Parameter</i>	<i>Symbol</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>	<i>Remarks</i>
Single ended data output swing	$V_{OUT\_PP}$	175	300	600	mV	
Data output rise time (20%-80%)	$T_R$		30		ps	
Data output fall time (20%-80%)	$T_F$		30		ps	
LOS Fault	$V_{LOS\_Fault}$	2		$V_{CC\_HOST}$	V	
LOS Normal	$V_{LOS\_normal}$	$V_{EE}$		$V_{EE}+0.5$	V	

**Specification**

**Block Diagram of Transceiver**

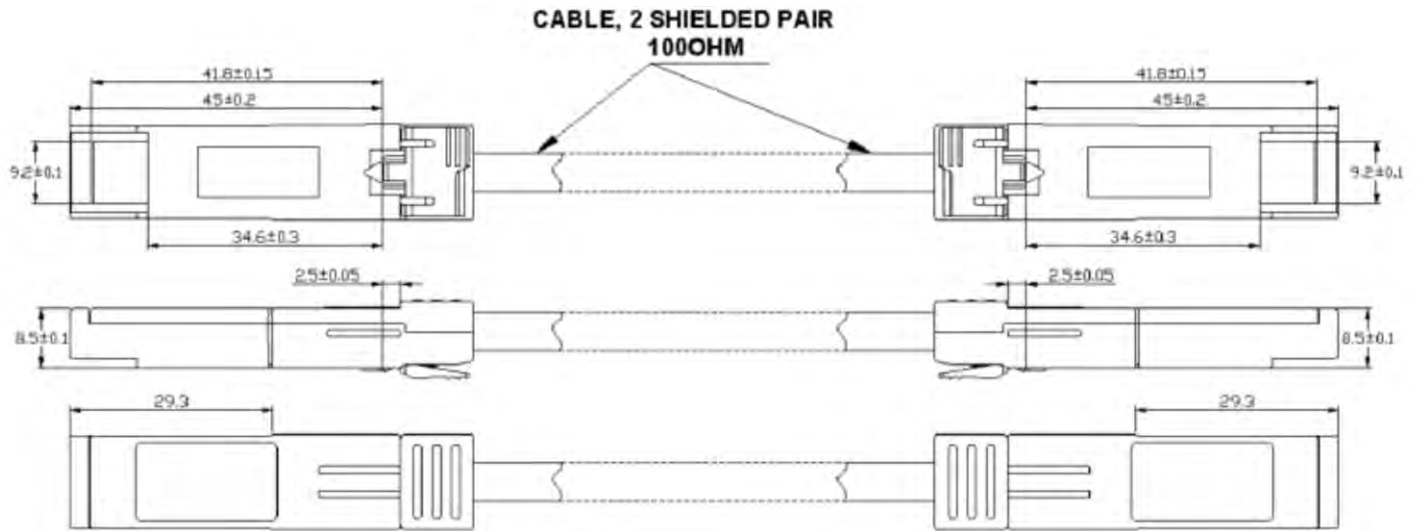


Active cable assembly has signal amplification and equalization in the assembly. Active copper assemblies are typically used in host systems that do not employ EDC. Active SFP+ cable assemblies also incorporate Rx LOS and Tx Disable features.

Active cable assembly has built-in MCU, offer a number of additional host-management capabilities. I2C (Inter-IC bus protocol) interface and on-board EEPROM features enable the host to detect or configure specific performance characteristics.

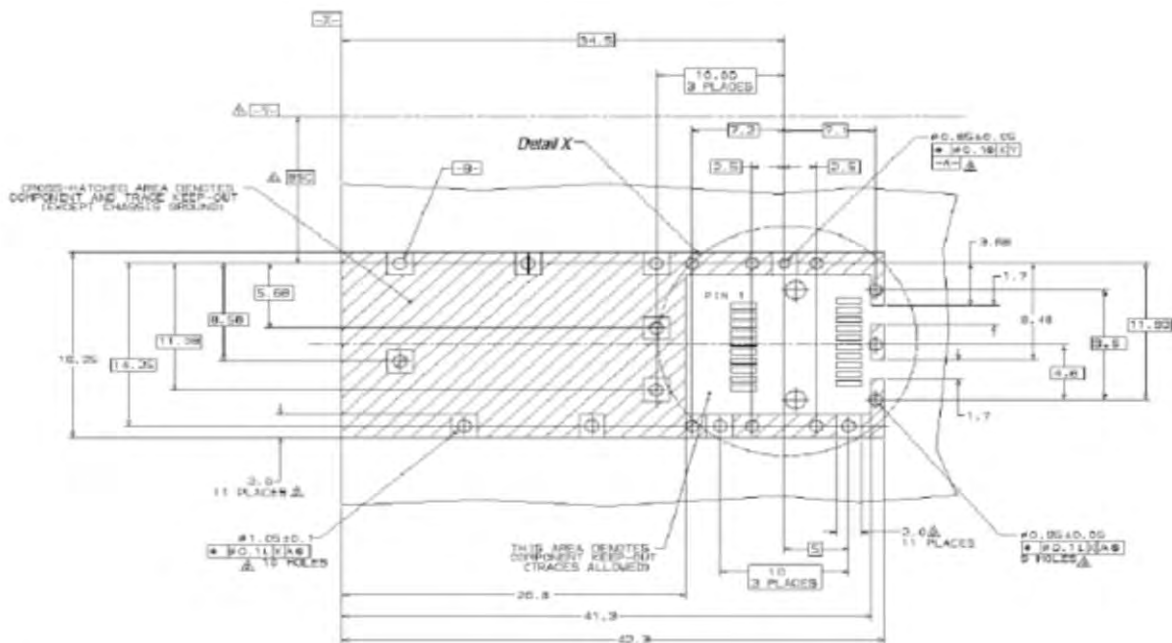
Specification

DIMENSIONS

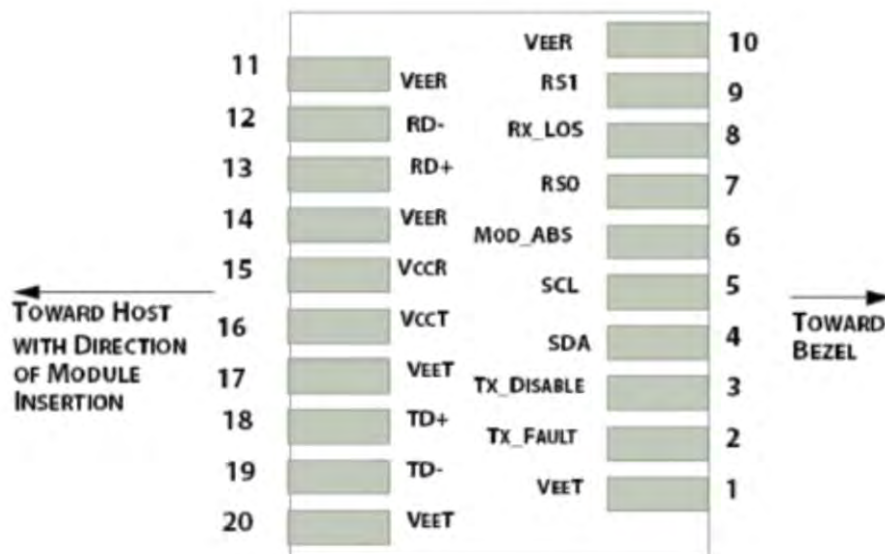
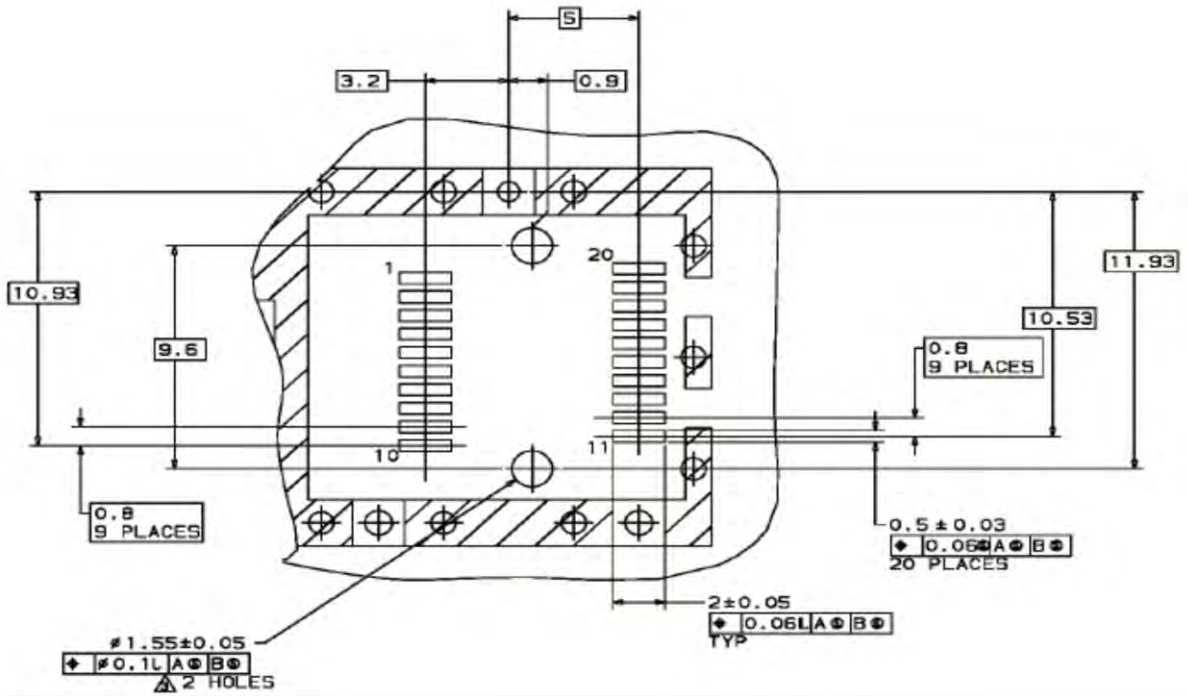


**ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED  
UNIT: mm**

PCB LAYOUT RECOMMENDATION

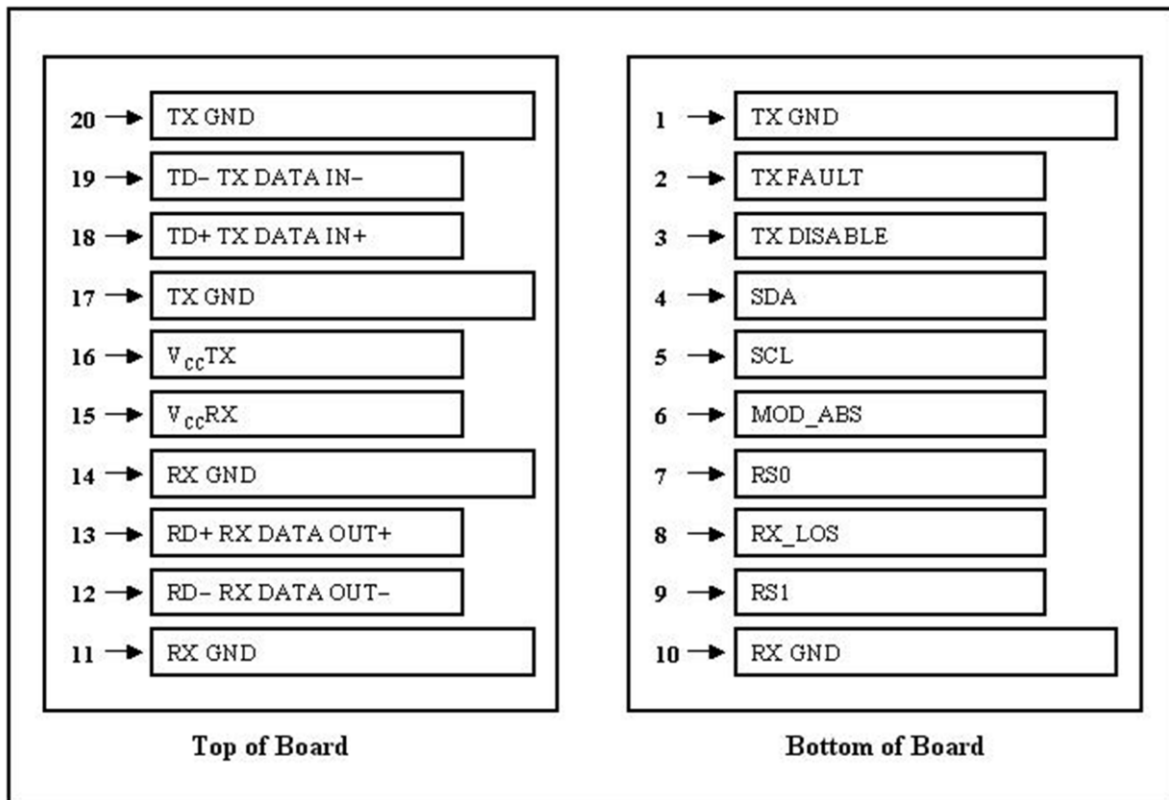


-  Datum and Basic Dimension Established by Customer
-  Vias and Vias are Chassis Ground, 11 Places
-  Through Holes are Unplated

**Specification**
**ELECTRICAL PAD LAYOUT**


**Specification**

**Electrical Pad Layout**





**Specification**

Pin Assignment			
<i>PIN #</i>	<i>Symbol</i>	<i>Description</i>	<i>Remarks</i>
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	
2	T <sub>FAULT</sub>	Transmitter Fault.	
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disable on high or open	
4	SDA	Data line for serial ID	
5	SCL	Clock line for serial ID	
6	MOD_ABS	Module Absent. Grounded within the module	
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	
9	RS1	No connection required	
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	
15	V <sub>CCR</sub>	Receiver power supply	
16	V <sub>CCT</sub>	Transmitter power supply	
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	

**References**

1. IEEE standard 802.3ae. IEEE Standard Department, 2005.
2. Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module "SFP+" – SFF-8431 (FC-PH/PH2/PH3).