AXGD-3454-0M12 2-channel Bi-directional CSFP, 1.25Gbps OLT with Monitoring Interface

Product Overview

The AXGD-3454-0M12 is specifically designed for the high performance integrated two bi-directional links on duplex single-mode fiber. These transceiver modules are compliant with the Compact SFP (CSFP) Multisource Agreement (MSA). An enhanced Digital Diagnostic Monitoring Interface has been incorporated into the Axcen CSFP Transceiver. Real time monitors of temperature, supply voltage, laser bias current, laser average output power and received output power are provided, based on the SFF-8472.

The AXGD-3454-0M12 are CSFP transceivers using the 1310nm PIN-TIA for receiver and the long wavelength (1490nm) DFB laser diode enable data transmission up to 20km on duplex single-mode (9/125μm) optical fiber.

Features

- **Two-channel bi-directional link**
- **Duplex LC receptacle**
- **1490nm DFB transmitter, 1310nm PIN receiver**
- **20km point-to-point transmission**
- **Compact SFP MSA option 2 compliant**
- **SFF-8472 digital diagnostic monitoring interface**
- **1.25Gbps IEEE802.3ah 1000BASE-BX10-D compatible**
- **Serial ID functionality support**
- **Class 1 laser safety standard IEC 60825 compliant**
- **Low power dissipation**

Applications

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

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T_S	-40	+85	℃	
Supply Voltage	V_{CC}	-0.5	4.0	V	
Storage Relative Humidity	RH	5	95	%	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T_C	+0		+70	℃	Refer to ordering information
		-40		+85		
Supply Voltage	VccT VccR	3.1	3.3	3.5	V	
Supply Current	I_{TX} +I_{RX}			500	mA	

Transmitter Electro-Optical Interface

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter Differential Input Voltage	TD +/-	500		2400	mV	
Tx_Fault - High	V_{Fault_H}	2		VccT+0.3	V	
Tx_Fault - Low	V_{Fault_L}	Vee		Vee+0.4	V	
Tx_Disable - High	$V_{Disable\_H}$	2		VccT+0.3	V	
Tx_Disable - Low	$V_{Disable\_L}$	Vee		Vee+0.4	V	
Optical Output Power	P_o	-8		-2	dBm	1
Optical Extinction Ratio	E_R	6			dB	
Center Wavelength	λ_C	1480	1490	1500	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Optical Rise Time	t_r			260	ps	2
Optical Fall Time	t_f			260	ps	2

Notes:

1. Coupling into a 9/125μm single-mode fiber.
2. 20% to 80% value

Receiver Electro-Optical Interface

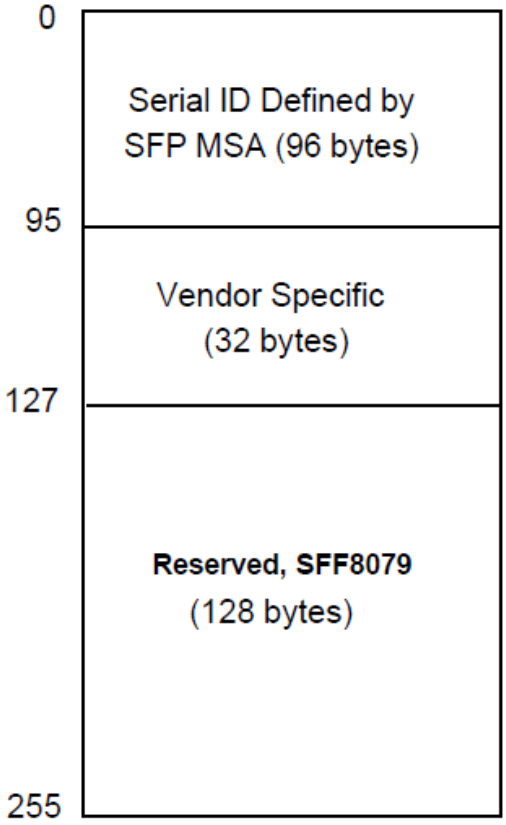
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Receiver Differential Output Voltage	RD+/-	370		2000	mV	
Receiver Overload	$P_{IN}MAX$	-2			dBm	1
Receiver Sensitivity	$P_{IN}MIN$			-23	dBm	1
Operating Center Wavelength	λ_C	1260		1360	nm	
Return Loss	RL	12			dB	
Rx LOS - High	V_{LOS_H}	2		VccR+0.3	V	
Rx LOS - Low	V_{LOS_L}	Vee		Vee+0.4	V	
RX LOS Assert	P_{LOS_A}	-35			dBm	
RX LOS De-Assert	P_{LOS_D}			-23	dBm	
RX LOS Hysteresis	P_{LOS_H}	0.5			dB	

Notes:

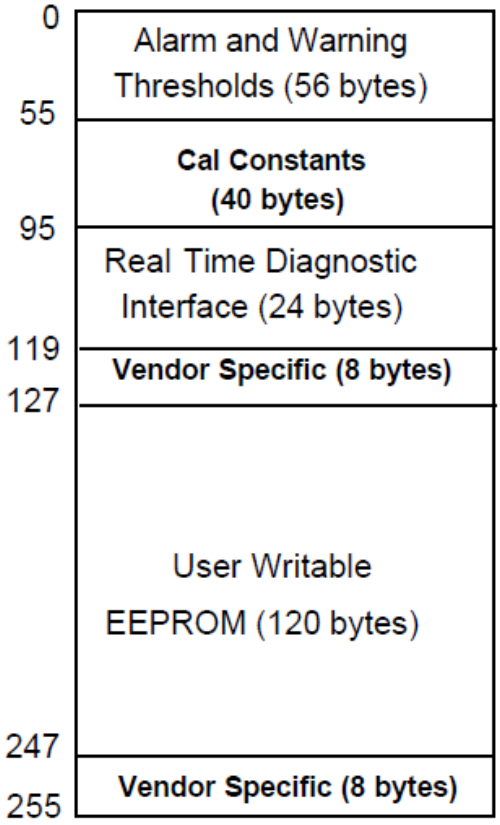
1. With BER better than or equal to 1×10^{-12}, measured in the center of the eye opening with PRBS 2^7 -1

Digital Diagnostic Memory Map

Channel 1: 2 wire address 1010000X (A0h)
Channel 2: 2 wire address 1011000X (B0h)



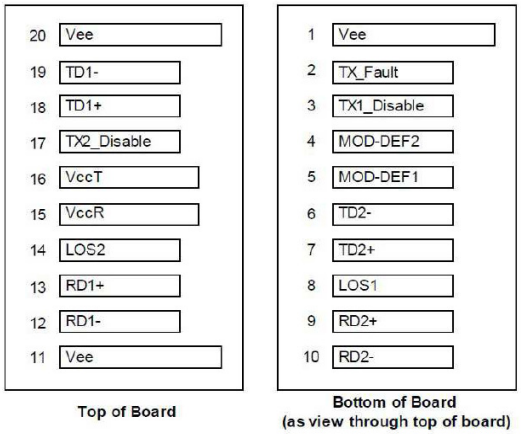
Channel 1: 2 wire address 1010001X (A2h)
Channel 2: 2 wire address 1011001X (B2h)



Digital Diagnostic Monitoring Characteristics

Parameter	Symbol	Accuracy	Unit	Note
Transceiver Temperature	T_{INT}	±3	℃	
Transceiver Supply Voltage	V_{INT}	±3	%	
TX Bias Current	I_{BIAS}	±10	%	
TX Output Power	P_{TX}	±3	dB	
RX Received Optical Power	P_{RX}	±3	dB	

Pin Description



SFP Transceiver Electric Pad Layout

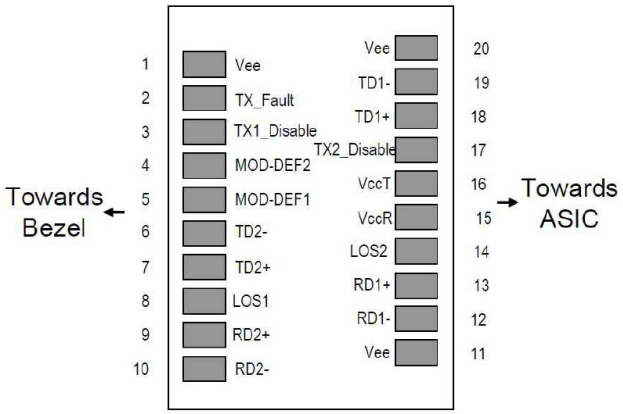


Diagram of Host Board Connector Block Pin Numbers and Names

Pin No.	Pin Name	Function	Plug Seq.	Notes
1	Vee	Transceiver Ground	1	
2	TX_Fault	Transmitter Fault Indication	3	1
3	TX1_Disable	Transmitter Disable of CH1; Turns off transmitter laser output of Ch1	3	
4	MOD-DEF 2	2-wire Serial Interface Data Line (SDA)	3	
5	MOD-DEF 1	2-wire Serial Interface Clock (SCL)	3	
6	TD2-	Inverted Transmit Data Input of Ch2	3	
7	TD2+	Transmit Data Input of Ch2	3	
8	LOS1	Loss of Signal for Ch1	3	2
9	RD2+	Receiver Data Output of Ch2	3	
10	RD2-	Inverted Receiver Data Output of Ch2	3	
11	Vee	Transceiver Ground	1	
12	RD1-	Inverted Received Data Output of Ch1	3	
13	RD1+	Received Data Output of Ch1	3	
14	LOS2	Loss of Signal for Ch2	3	2
15	$V_{CC}R$	Receiver Power	2	
16	$V_{CC}T$	Transmitter Power	2	
17	TX2_Disable	Transmitter Disable of Ch2; Turns off transmitter laser output of Ch2	3	
18	TD1+	Transmitter Data Input of Ch1	3	
19	TD1-	Inverted Transmit Data Input of Ch1	3	
20	Vee	Transceiver Ground	1	

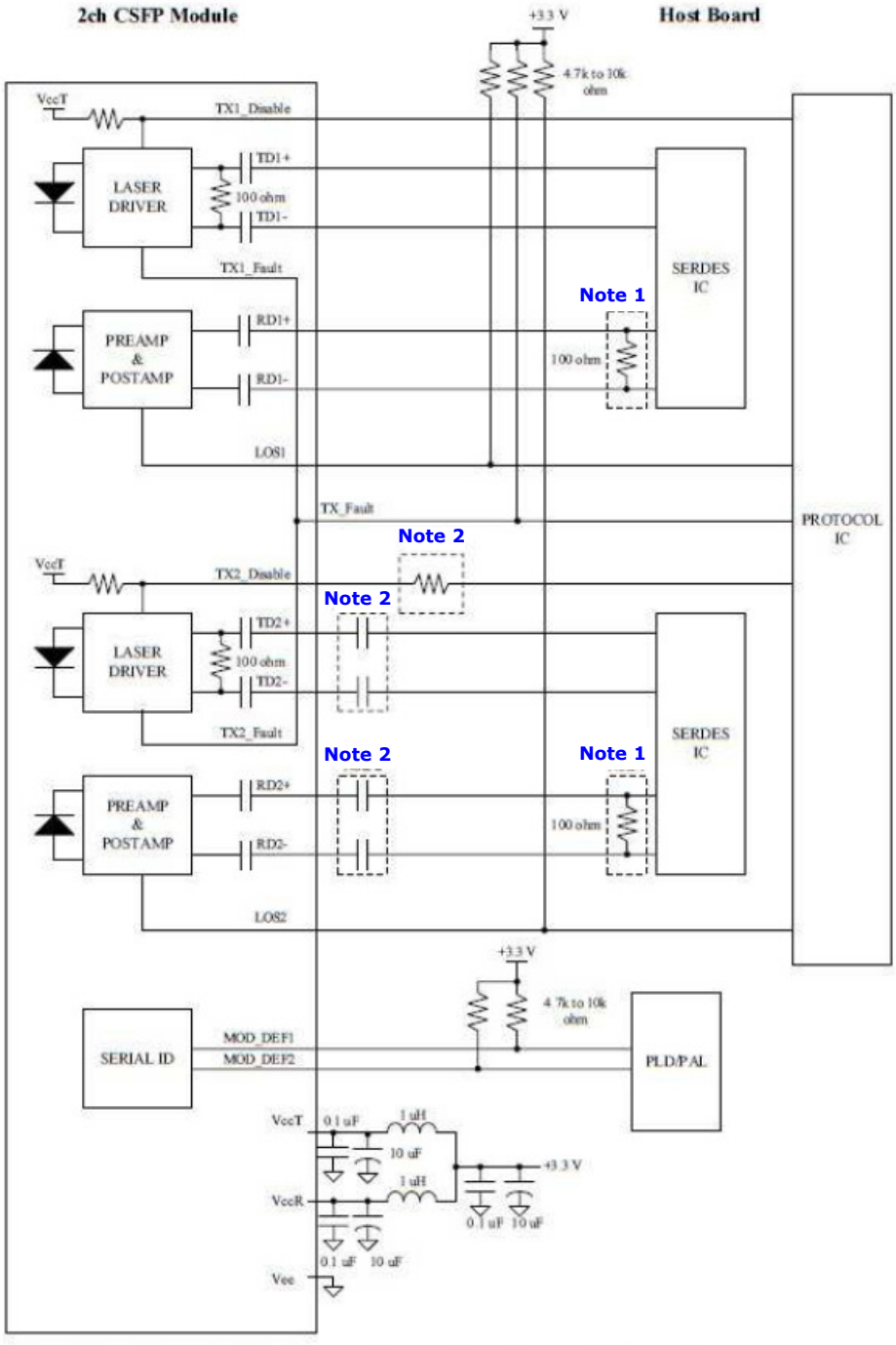
Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1. TX_Fault is internally OR output for TX fault conditions in either channel 1 or channel 2. In order to determine which channel is at fault, the Host can read the internal memory bits for status:
   - Bit2 in (A2h: 110) for TX1 fault
   - Bit2 in (B2h: 110) for TX2 fault

   TX_Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.4V.
2. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K -10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.4V.

Recommended Interface Circuit



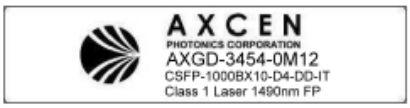
Notes:

1. Consult the SERDES manufacture for the termination method.
2. Protections from incorrect insertion are strongly recommended to prevent circuit damage caused by wrong insertion of conventional SFP or other pin-out option.

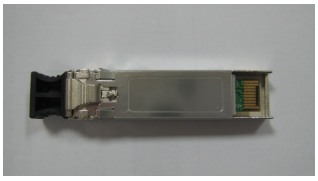
Package Information

Transceiver Side A

Transceiver Front Label



Transceiver Side B



Transceiver Back Label

Plastic PET Box

Front Side

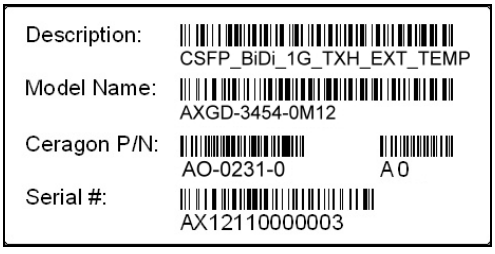
Back Side

Unit Box

Front Side

L x W x H: 11.0cm x 6.5cm x 2.5cm

Unit Box Label

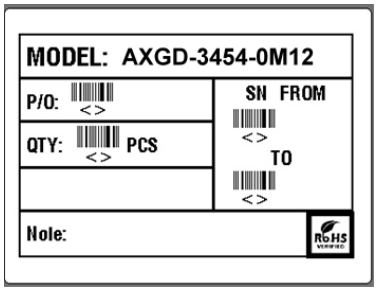


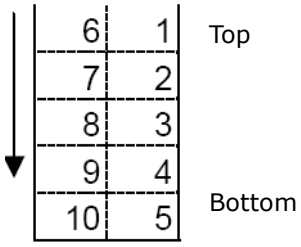
L x W: 3.9cm x 1.9cm

Inner Carton (10 units in an inner carton)

Front Side

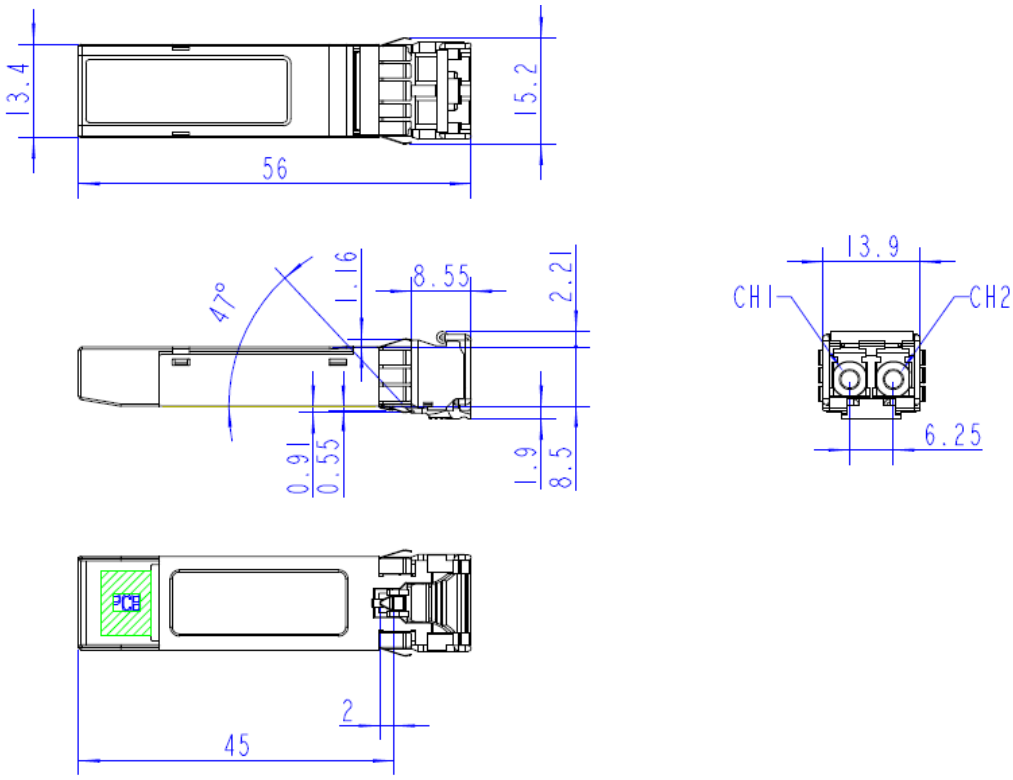
Tray Label





Outer Carton

Mechanical Dimensions (Units in mm)



Unit : mm
All dimensions are ± 0.2 mm unless otherwise specified.

Ordering Information

AXGD-3454-0M12

Model No.	Tx	LD	Rx	I/O	LOS	Link	Temp.
AXGD-3454-0M12	1490nm	DFB	1310nm	AC/AC	TTL	20km	-40~85℃

Revision History

DATE	REV.	CHANGE AUTHORITY	DESCRIPTION OF CHANGE
2015/4/17	1.1	Wallace Hsieh	1. Add single box packaging information.