

PRODUCT SPECIFICATION

Part No.:	AC-XFBL-45G10-80/AC-XFBL-54G10-80	
Description:	10G XFP Transceiver, BIDI TX1490nm/RX1550nm 80km 10G XFP Transceiver, BIDI TX1550nm/RX1490nm 80km	
Release Date	Rev.	Revision Change Description
2016/07/16	A0	New Release
2020/12/28	A1	Template Update

Features

- ✧ Supports 9.95Gb/s to 11.3Gb/s bit rates
- ✧ Hot-pluggable XFP footprint
- ✧ Up to 80km for SMF transmission
- ✧ XFI Loopback Mode
- ✧ 1490nm EML laser and APD receiver for AC-XFBL-45G10-80
- ✧ 1550nm EML laser and APD receiver for AC-XFBL-54G10-80
- ✧ Compliant with XFP MSA with single LC receptacle
- ✧ Compatible with RoHS
- ✧ Single +3.3V power supply
- ✧ Power dissipation<2.5W
- ✧ 2-wire interface with integrated Digital Diagnostic monitoring
- ✧ EEPROM with Serial ID Functionality
- ✧ Operating case temperature:
 - ✧ Standard: 0 to +70°C
 - ✧ Industrial: -40 to +85°C
- ✧

Application

- ✧ 10GBASE-BX 10.3125Gb/s Ethernet
- ✧ 10GBASE-BX 9.953Gb/s Ethernet
- ✧ SONET OC-192 SR-1 SDH STM I-64.1

Standard

- ✧ Compliant with SFF-8472
- ✧ Compliant with XFP MSA

Specification

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{cc}	-0.3	4	V
Storage Temperature	T _s	-40	+85	°C
Operating Humidity	-	5	95	%
Signal Input Voltage		V _{cc} -0.3	V _{cc} +0.3	V

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard	0		+70	°C
	Industrial	-40		+85	°C
Power Supply Voltage	V _{cc}	3.135	3.30	3.465	V
Power Supply Current	I _{cc}			850	mA
Data Rate		9.95	10.3	11.3	Gbps
Fiber Length 9/125μm core SMF		-		80	km

Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λ_c	1480	1490	1500	nm	AC-XFBL-45G10-80
		1540	1550	1560	nm	AC-XFBL-54G10-80
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio	SMSR	30	-		dB	
Average Output Power	P _{out}	-1		4	dBm	AC-XFBL-45G10-80
		-1		4	dBm	AC-XFBL-54G10-80
Average Launch power of OFF transmitter	P _{off}			-45	dBm	1
Extinction Ratio	ER	6			dB	
Data Input Swing Differential	V _{IN}	120		820	mV	2
Input Differential Impedance	Z _{IN}	80	100	120	Ω	
Supply Voltage – 1.8V supply	V _{cc2}	1.71		1.89	V	

Supply Voltage – 3.3V supply		Vcc3	3.13		3.47	V	
Supply Current – 1.8V supply		Icc2			200	mA	
Supply Current – 3.3V supply		Icc3			650	mA	
Module total power		P			2.5	W	
Interrupt Assert Delay		Interrupt_on			200	ms	
Interrupt Negate Delay		Interrupt_off			500	us	
Mod_NR Assert / Negate Delay					1	ms	
P-Down reset time			10			us	
XFP Interrupt, Mod_NR	Vol		0		0.4	V	
	Voh		VccHOST-0.5		VccHOST+0.3	V	
P_Down/RST	Vil		-0.3		0.8	V	
	Vih		2.0		Vcc3+0.3	V	
TX Disable	Disable		2		Vcc	V	
	Enable		GND		GND+0.8	V	
Receiver							
Centre Wavelength		λ_c	1540	1550	1560	nm	AC-XFBL-45G10-80
			1480	1490	1500	nm	AC-XFBL-54G10-80
Receiver Sensitivity					-24	dBm	3
Receiver Overload			-6			dBm	3
LOS De-Assert		LOS _D			-25	dBm	
LOS Assert		LOS _A	-38			dBm	
LOS Hysteresis			0.5		4	dB	
Differential Output Impedance		Rout	80	100	120	Ω	
Differential data output swing		Vout,pp	340		850	mV	
Data Output Rise/Fall time		tr/tf		20		ps	
LOS Output Voltage-High		VLOSH	Vcc – 0.5		Vcc	V	
LOS Output Voltage-Low		VLOSL	GND		GND+0.5	V	

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS2³¹-1 test pattern @10312Mbps, BER $\leq 1 \times 10^{-12}$.

Digital Diagnostic Memory Map

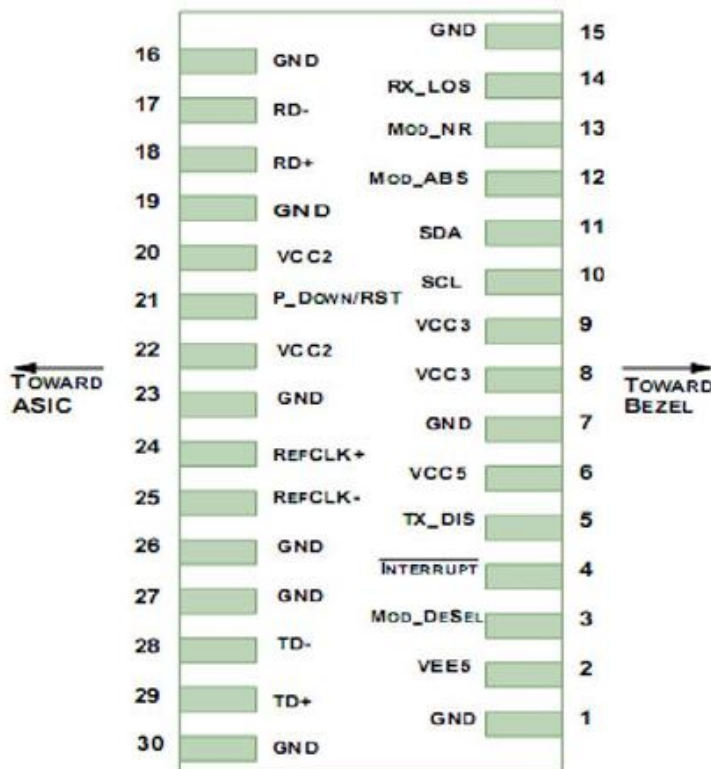
AC-XFBL-45/54G10-80 As defined by the XFP MSA, XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory. For more detailed information including memory map definitions, please see the XFP MSA Specification.

Pin Descriptions



Pin Assignment

Pin	Signal Name	Description	Plug Seq.	Notes
1	GND	Module Ground		1
2	VEE5	Optional –5.2 Power Supply – Not required		
3	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	LVTTL-I	
4	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	LVTTL-O	2
5	TX_DIS	Transmitter Disable; Transmitter laser source turned off	LVTTL-I	
6	VCC5	+5 Power Supply		
7	GND	Module Ground		1
8	VCC3	+3.3V Power Supply		
9	VCC3	+3.3V Power Supply		
10	SCL	Serial 2-wire interface clock	LVTTL-I	2
11	SDA	Serial 2-wire interface data line	LVTTL-I/O	2
12	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	LVTTL-I	2
13	Mod_NR	Module Not Ready; XGIGA defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	LVTTL-I	2
14	RX_LOS	Receiver Loss of Signal indicator	LVTTL-I	2
15	GND	Module Ground		1
16	GND	Module Ground		1
17	RD-	Receiver inverted data output	CML-O	
18	RD+	Receiver non-inverted data output	CML-O	
19	GND	Module Ground		1
20	VCC2	+1.8V Power Supply – Not required		
21	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset Reset; The falling edge initiates a complete reset of the module	LVTTL-I	
22	VCC2	including the 2-wire serial interface, equivalent to a power cycle. +1.8V Power Supply – Not required		
23	GND	Module Ground		1
24	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	PECL-I	3

25	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	PECL-I	3
26	GND	Module Ground		1
27	GND	Module Ground		1
28	TD-	Transmitter inverted data input	CML-I	
29	TD+	Transmitter non-inverted data input	CML-I	
30	GND	Module Ground		1

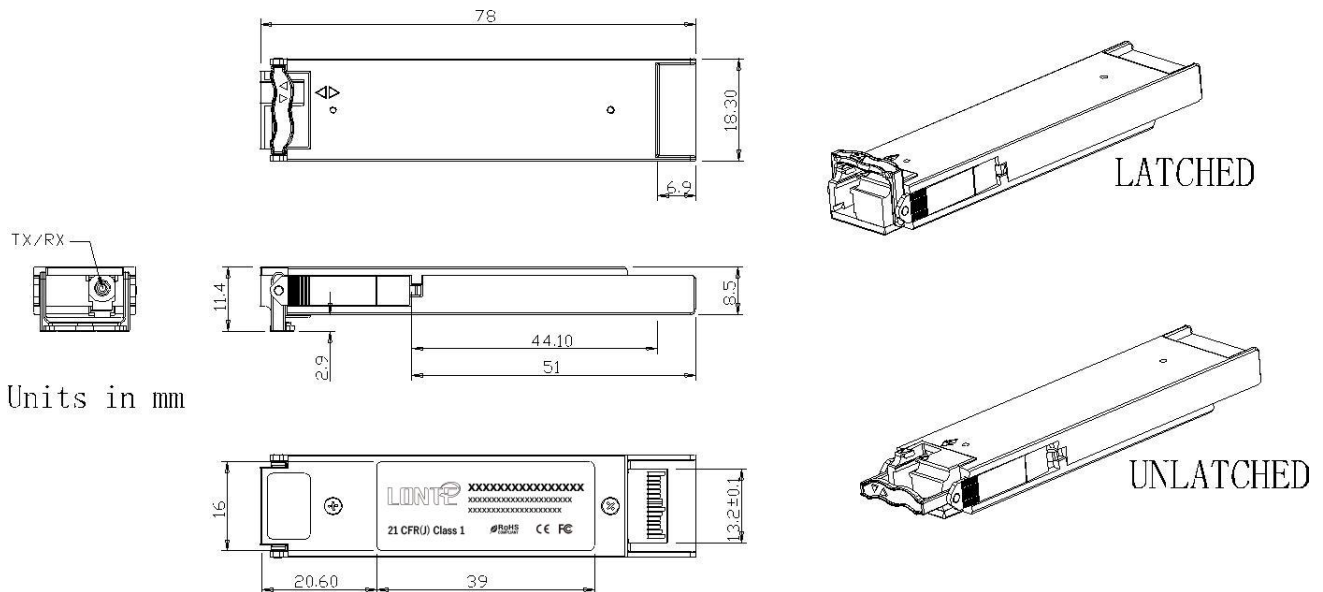
Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 1) Module circuit ground is isolated from module chassis ground within the module.
- 2) Open collector; should be pulled up with 4.7k – 10kohms on host board to a voltage between 3.15V and 3.6V.
- 3) A Reference Clock input is not required by the AC-XFBL-45/54G10-80. If present, it will be ignored.

Package Outline

Dimensions are in millimeters. All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified. (Unit: mm)



Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000Vfor other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard
Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compatible with Class I laser Product

Ordering information

Part. No	Specifications								
	Pack	Rate (Gbps)	Tx (nm)	Po (dBm)	RX (nm)	Sen (dBm)	Temp (°C)	Reach (km)	DDM
AC-XFBL-45G10-80	XFP	10.3125	1490	-1~4	1550	<-24	0~70	80	Y
AC-XFBL-54G10-80	XFP	10.3125	1550	-1~4	1490	<-24	0~70	80	Y
AC-XFBL-45G10-80F	XFP	10.3125	1490	-1~4	1550	<-24	-40~85	80	Y
AC-XFBL-54G10-80F	XFP	10.3125	1550	-1~4	1490	<-24	--40~85	80	Y