

1.25Gbps Single Fiber Bi-directional SFF 2*10 Transceiver (For 15km point-to-point transmission)

Members of Flexon™ Family



- ◆ Compatible with SFF MSA
- ◆ Refer to IEEE 802.3ah -2004
- ◆ Compatible with Bellcore GR-468
- ◆ Compatible with FDA 21 CFR 1040.10 and 1040.11, Class I
- ◆ Compliant with RoHS

Description

Fiberxon 1.25G single fiber bi-directional SFF transceiver is high performance, cost effective modules, which supports data rate of 1.25Gbps and transmission distance up to 15km.

FTM-9612S-K15EG is normally used in the client side (ONU), which transmits 1310nm optical signal and receives 1490nm optical signal.

FTM-9612S-K15EG is compliant with RoHS.

Features

- ◆ 1.25Gbps bi-directional data links
- ◆ Up to 15km point-point transmission
- ◆ 1310nm FP transmitter and 1490nm PIN receiver for FTM-9612S-K15EG
- ◆ Class I laser product
- ◆ Low EMI and excellent ESD protection
- ◆ SFF 2*10 MSA package (2000 version), SC receptacle
- ◆ Single +3.3V Power Supply
- ◆ FTM-9612S-K15EG Operating Case Temperature
Extended temperature: 0 to +85°C

Applications

- ◆ Gigabit Ethernet Application
- ◆ Point-to-Point FTTX Application
- ◆ Optical network unit(ONU) for Gigabit Ethernet PtoP optical networks(GE-Media Converter)

Standard

Regulatory Compliance

The transceivers have been tested according to American and European product safety and electromagnetic compatibility regulations (See Table 1). For further information regarding regulatory certification, please refer to Flexon™ regulatory specification and safety guidelines, or contact with Fiberxon, Inc. America sales office listed at the end of the documentation.

Table 1 - Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 2(>2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Immunity	IEC 61000-4-3	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.
Component Recognition	UL and CSA	Compatible with standards
RoHS	2002/95/EC 4.1&4.2 2005/747/EC	Compliant with standards ^{note}

Note:

In light of item 5 in Annex of 2002/95/EC, "Pb in the glass of cathode ray tubes, electronic components and fluorescent tubes." and item 13 in Annex of 2005/747/EC, "Lead and cadmium in optical and filter glass.", the two exemptions are being concerned for Fiberxon's transceivers, because Fiberxon's transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Absolute Maximum Ratings

Absolute Maximum Ratings are those values beyond which damage to the devices may occur.

Table 2 – Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T _S	-40	+85	°C	
Operating Case Temperature	T _C	0	+85	°C	
Operating Humidity	H _{OPR}	5	95	%	
Supply Voltage	V _{CC}	0	4.0	V	
Input Voltage	V _{IN}	0	V _{CC}	V	
Receiver Damaged Threshold	V _{RDT}		+3	dBm	
Lead Soldering Temperature		Compliance with soldering temperature profile that satisfied with RoHS			

Recommended Operating Conditions

Table 3 - Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Operating Case Temperature	T_C	0		+85	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}			300	mA	
Data Rate			1.25		Gbps	

FTM-9612S-K15EG (1310nm FP Tx/1490nm PIN Rx for ONU, 15km)

Table 4 –Optical and Electrical Characteristics (Over operating case temperature, $V_{CC}=3.13$ to $3.47V$)

Parameter		Symbol	Min.	Typical	Max.	Unit	Note	
Transmitter								
Centre Wavelength		λ_C	1281	1310	1350	nm		
Average Launch Power		P_{Out}	-6		0	dBm	1	
Launch Power of OFF Transmitter		P_{Off}			-45	dBm		
Spectral width(RMS)	1281nm	$\Delta \lambda$			2.34	nm		
	1286nm				2.66			
	1290nm				2.99			
	1295nm				3.5			
	1297nm							
	1329nm							
	1331nm							
	1340nm				2.77			
	1343nm				2.58			
	1350nm				2.24			
Extinction Ratio		ER	9			dB		
Launch OMA		OMA	-8.2			dBm		
Rise/Fall Time (20%~80%)		t_r / t_f			0.26	ns		
Relative Intensity Noise		RIN_{15OMA}			-113	dB/Hz		
Optical Return Loss tolerance					12	dB		
Total Jitter (TP1 to TP2)		J_{total}			0.334	UI		
Input Differential Voltage		V_{IN}	1000		2400	mV		
Output Optical Eye		IEEE 802.3ah compatible						2
Tx Disable Signal Level	Compatible with LVTTTL input	V_{BIH}	2.0		V_{CC}	V		
	Compatible with LVTTTL input	V_{BIL}	0		0.8	V		
Tx Fault Signal Level	Compatible with LVTTTL output	V_{BIH}	2.0		$V_{CC}+0.3$	V		
	Compatible with LVTTTL output	V_{BIL}	0		0.8	V		

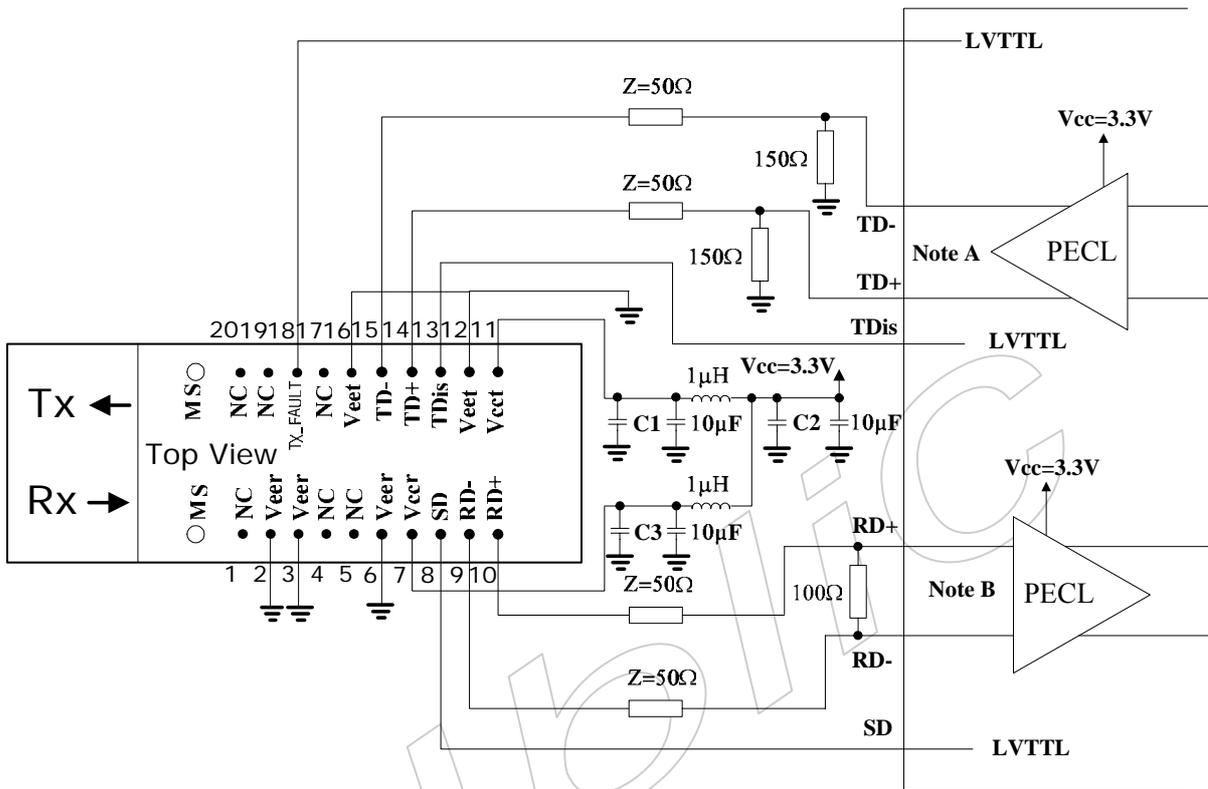
Receiver						
Centre Wavelength	λ_C	1480	1490	1500	nm	
Receiver Sensitivity				-22	dBm	3
Receiver Overload		0			dBm	3
SD De-Assert	SD_D	-35			dBm	
SD Assert	SD_A			-24	dBm	
SD Hysteresis		0.5		4	dB	
Receiver Reflectance				-14	dB	
Output Differential Voltage	V_{OUT}	400		2400	mV	
Signal-Detect Level	Signal Detected Voltage "H" Compatible with LVTTTL input	V_{SDH}	2.0	-	V_{CC}	V
	Signal Detected Voltage "L" Compatible with LVTTTL input	V_{SDL}	0	-	0.8	V

Note:

1. The optical power is launched into SMF.
2. Measured with a PRBS 2^7-1 test pattern @1.25Gbps.
3. $V_{CC}=3.3V$, PRBS 2^7-1 @1.25Gbps, ER=9dB and BER= 1×10^{-12}

Recommended Interface Circuit

Figure 1 shows the recommended interface circuit.



Note: C1=C2=C3=0.1μF or 0.01μF

Note A: Circuit assumes open emitter output

Note B: Circuit assumes high impedance internal bias @ Vcc=1.3V

Figure 1, Recommended Interface Circuit

Pin Definitions

Figure 2 below shows the pin numbering of SFF 2×10 electrical interface. The pin functions are described in Table 5 with some accompanying notes.

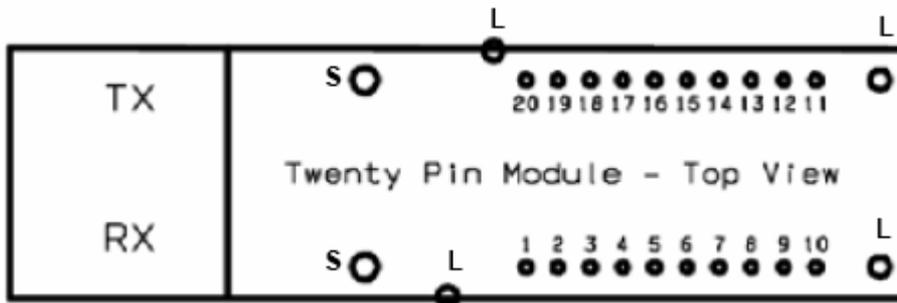


Figure 2, Pin View

Table 5 – Pin Function Definitions

Pin No.	Symbol	I/O	Description	Notes
	S	---	Mount Studs	
	L	---	Housing Leads	
1	NC	---	No Function Definition	
2	Veer	---	Receiver Ground	
3	Veer	---	Receiver Ground	
4	NC	---	No Function Definition	
5	NC	---	No Function Definition	
6	Veer	---	Receiver Ground	
7	V _{ccr}	I	Receiver Power Supply	
8	SD	O	Signal Detect—"H": normal operation; "L" loss of signal	LVTTTL
9	RD-	O	Negative Data Output	LVPECL
10	RD+	O	Passive Data Output	LVPECL
11	V _{cct}	I	Transmitter Power Supply	
12	Veet	---	Transmitter Ground	
13	TDis	I	Transmitter Enable Control—"H": Laser Disable, "L": Laser Enable	LVTTTL
14	TD+	I	Passive Data Input	LVPECL
15	TD-	I	Negative Data Input	LVPECL
16	Veet	---	Transmitter Ground	
17	NC	---	No Function Definition	
18	TX-FAULT	O	Laser Failure Alarm Indication "H": normal operation, "L": Laser Failure	LVTTTL
19	NC	---	No Function Definition	
20	NC	---	No Function Definition	

Mechanical Design Diagram

The mechanical design diagram is shown in Figure 3.

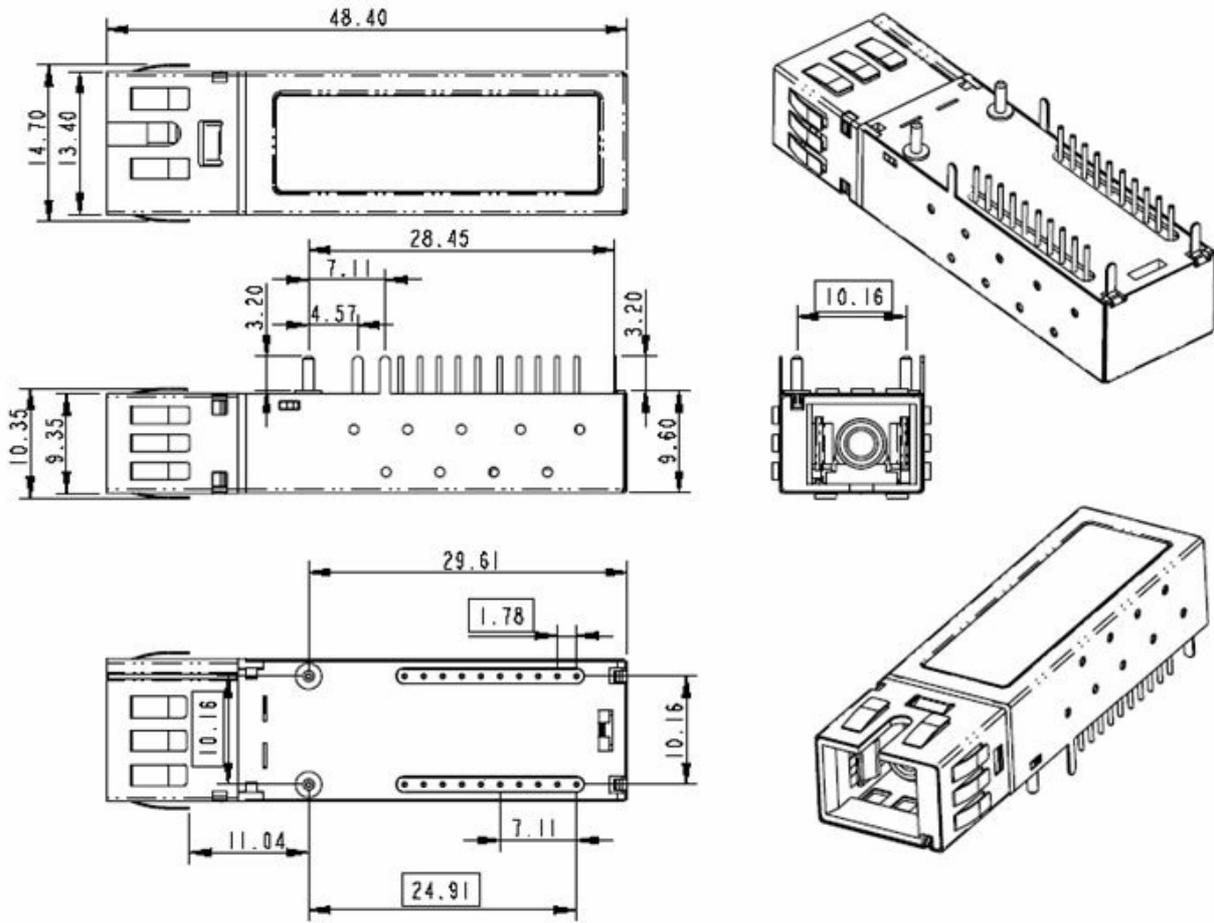
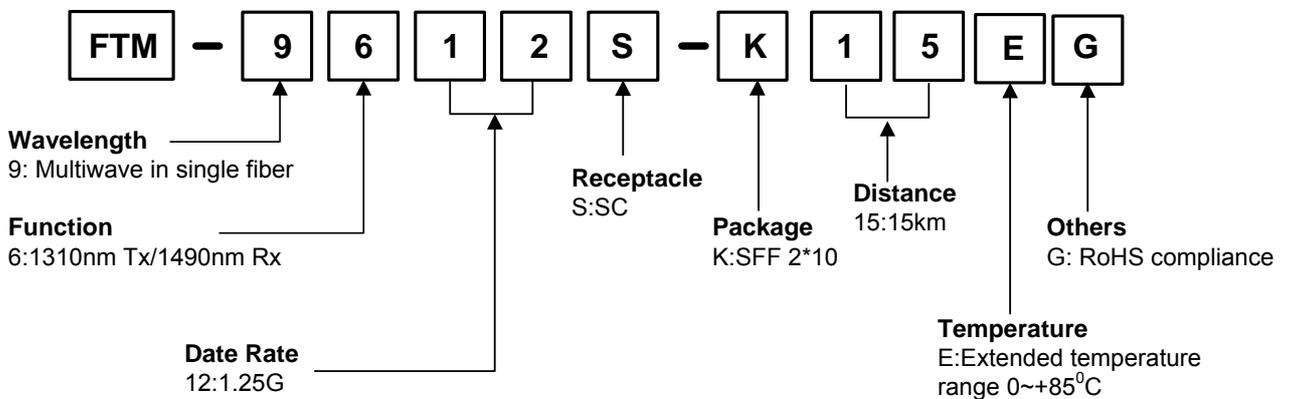


Figure 3, Mechanical Design Diagram of the SFF 2*10 (Unit: mm)

Ordering information



Part No.	Product Description
FTM-9612S-K15EG	1310nm Tx/1490nm RX for ONU, 1.25Gbps, 15km, SFF 2*10, SC receptacle , 0°C~+85°C, RoHS compliance

Related Documents

For further information, please refer to the following documents:

SFF Multi-Source Agreement (MSA)

Obtaining Document

You can visit our website:

<http://www.fiberxon.com>

Or contact with Fiberxon, Inc. America Sales Office listed at the end of documentation to get the latest documents.

Revision History

Revision	Initiate	Review	Approve	Subject	Release Date
Rev. 1a	Solaris.Zhu	Monica Wei	Walker.Weii	Initial datasheet	July 30, 2006
Rev. 1b	Solaris.Zhu	Monica Wei	Walker.Weii	Updated Average Launch Power , Receiver Sensitivity	Sep. 25, 2006
Rev. 1c	Solaris.Zhu	Monica Wei	Walker.Weii	Updated Average Launch Power , Receiver Sensitivity ,Receiver overload and Receiver Damaged Threshold	Nov. 09, 2006
Rev. 1d	Solaris.Zhu	Monica Wei	Walker.Weii	Updated part number from FTM-9612S-K15G to FTM-9612S-K15EG, and deleted FTM-9912S-K15G	Dec 27 2006
Rev. 1e	Solaris.Zhu	Monica Wei	Walker.Weii	Changed Average Launch Power from -7~0dBm to -6~0dBm; Added spec of Input Differential Voltage and Output Differential Voltage; Use SFF MSA 2000 version to replace MAS 1998 version; Update spectral width value	Apr 23 2007
Rev. 1f	Solaris.Zhu	Monica Wei	Walker.Weii	Updated version from preliminary to formal one; Updated TP1 to TP2 Total Jitter spec to 0.334UI	Aug 27 2007

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Contact

U.S.A. Headquarter:

5201 Great America Parkway, Suite 340

Santa Clara, CA 95054

U. S. A.

Tel: 408-562-6288

Fax: 408-562-6289

Or visit our website: <http://www.fiberxon.com>

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