XFP 10G 1550nm 120Km

SLXF-1055-120

Description

Sourcelight 120km XFP Transceiver is designed for 10G SDH/SONET and 10G Fiber Channel applications. The transmitter section incorporates a cooled EML laser, and the receiver section consists of an APD photodiode integrated with a TIA, Integrated low power dual CDR with Electronic Dispersion Compensation (EDC). The EDC for 10Gb/s 1550nm Links Project initiates the standardization of optical links that benefit from the technical and economic advantages of EDC, extending the reach of present 10Gb/s 1600ps/nm (80km) technology to 2400ps/nm (120km). This module can be used to compensate channel impairments caused by either single mode fiber up to 120 km with EDFA.

Features

- XFP MSA Rev 4.5 Compliant
- Data rate from 9.95Gbps to 11.095Gbps
- Reference Clock Options
- Cooled 1550 nm EML and APD receiver
- link length up to 120km (with EDFA)
- 2400ps/nm Dispersion Tolerance for 120km Single mode fiber
- +1.8V,+3.3V,+5V Supply Voltage
- Low Power Dissipation 3.5W Maximum
- XFI and lineside loopback Mode Supported
- -5ºC to 70ºC Operating Case Temperature
- Diagnostic Performance Monitoring of module temperature, Supply Voltages, laser bias current, transmit optical power, and receive optical power
- RoHS6 compliant (lead free)

Applications

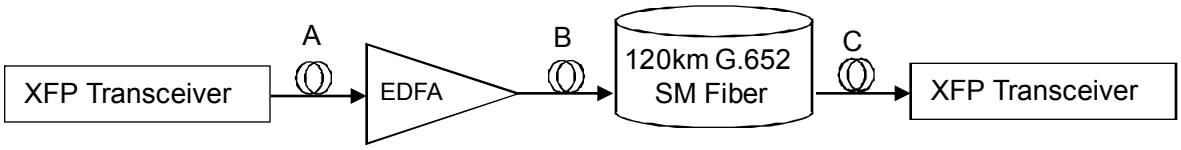
- SONET OC-192&SDH STM 64 (with/with out FEC)
- 10GBASE ZR/ZW (with/without FEC)
- 10G Fiber Channel

Ordering information

Part Number	Product Description
SLXF-1055-120-A	XFP 10Gbps, 1550nm, 120km with EDFA, -5ºC ~ +70ºC without built-in reference clock, support multi-data rate, which can be available for both SONET/SDH and 10G Ethernet if the host device provides reference clock
SLXF-1055-120-B	XFP 10Gbps, 1550nm, 120km with EDFA, -5ºC ~ +70ºC with fixed built-in reference clock for both SONET/SDH and 10G Ethernet, if the host device doesn't provide reference clock

*See page 5 – 6 note3

Application note



A: module output power: 0 ~ +4dBm
B: EDFA: Pout t ≤+11dBm
C: Output after link ≤2400ps/nm, Pout ≥ -21dBm

Module Block Diagram

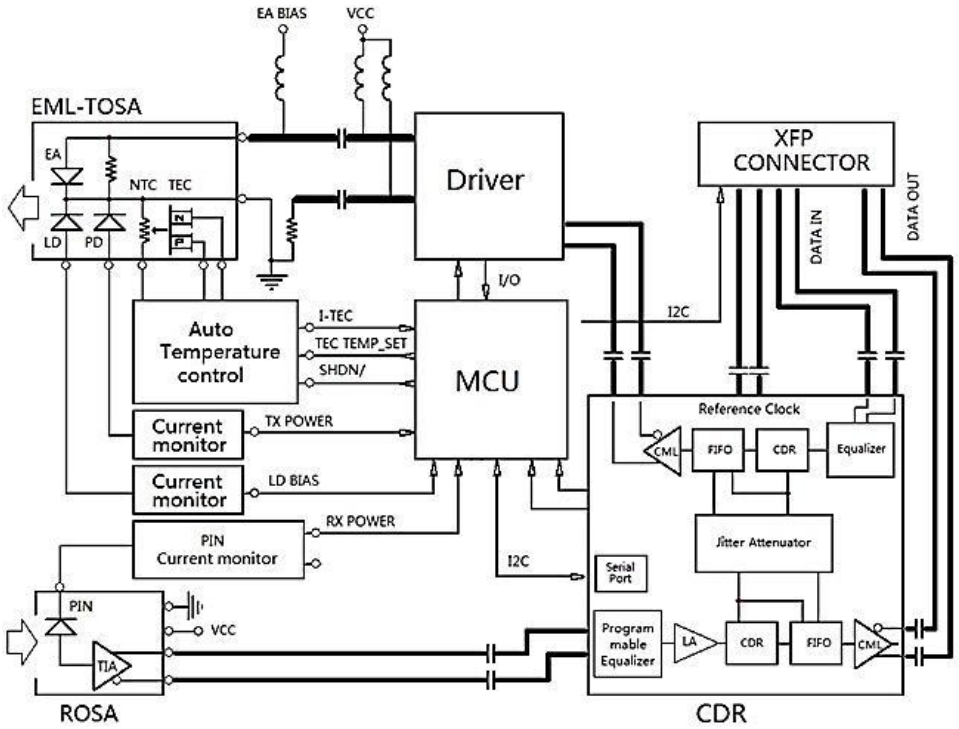


Figure1. Module Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage 1	Vcc3	-0.5	4.0	V
Supply Voltage 2	Vcc5	-0.5	6.0	V
Supply Voltage 3	Vcc2	-0.5	2	V
Storage Temperature	Tst	-40	85	ºC
Case Operating Temperature	Top	-5	70	ºC

Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage 1	Vcc3	3.13	3.3	3.47	V
Supply current 1	Icc3	-	-	420	mA
Supply Voltage 2	Vcc5	4.75	5	5.25	V
Supply current 2	Icc5	-	-	350	mA
Supply Voltage 3	Vcc2	1.71	1.8	1.89	V
Supply current 3	Icc2	-	-	700	mA
Operating Case temperature	Tca	-5	-	70	ºC
Module Power Dissipation	Pm	-	-	3.5[1]	W

Note:

1. Maximum total power value is specified across the full temperature and voltage range.

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength [1]	λ_c	1530		1565	pm
Optical Transmit Power	Po	0	-	+4	dBm
Optical Transmit Power (disabled)	PTX_DIS	-	-	-30	dBm
Extinction Ratio	ER	8.2	-	-	dB
Jitter Generation(P-P)	JG P-P	-	-	0.1	UI
Jitter Generation(RMS)	JG RMS	-	-	0.01	UI
Spectral Width (-20dB)	$\Delta\lambda 20$	-	-	0.3	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Relative Intensity Noise	RIN	-	-	-130	dB/Hz
Eye Mask	Compliant with ITU-T G.691 STM-64 eye mask				

Note:

1. Wavelength stability is achieved within 60 seconds (max) of power up.
2. BER=10^-12; PRBS 2^31-1@9.95Gbps

Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Input differential impedance	Rim	-	100	-	Ω
Differential data Input	VtxDIFF	120	-	850	mV
Transmit Disable Voltage	VD	2.0	-	Vcc3+0.3	V
Transmit Enable Voltage	Ven	0	-	+0.8	V
Transmit Disable Assert Time	Vn	-	-	10	us

Receiver Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Receiver Sensitivity [1] 9.953~10.3125Gb/s	Rsen1	-	-	-24	dBm
Receiver Sensitivity [1] 10.5~11.095Gb/s	Rsen2			-23	dBm
Maximum Input Power	RX-overload	-7	-	-	dBm
Input Operating Wavelength	λ	1270	-	1600	nm
Reflectance	Rrx	-	-	-27	dB
Loss of Signal Asserted	LOS_A	-34	-	-	dBm
Path penalty at 2400 ps/nm 9.953~10.3125Gb/s	DP1			2.5	dBm
Path penalty at 2400 ps/nm 10.5~11.095Gb/s	DP2			3	dBm
Loss of Signal Asserted	LOS_A	-34	-	-	dBm
LOS De-Asserted	LOS_D	-	-	-24	dBm
LOS Hysteresis	LOS_H	0.5	-	-	dB

Note:
1. BER=10^-12, PRBS 2^31-1

Receiver Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Output differential impedance	Rom	-	100	--	Ω
Differential Output Swing	Vout P-P	350	-	850	mV
Rise/Fall Time [1]	Tr / Tf	24	-	40	ps
Loss of Signal –Asserted	VOH	2	-	Vcc3+0.3-	V
Loss of Signal –Negated	VOL	GND	-	GND+0.5	V

Note:
1. 20%-80%;

Reference Clock (Optional)

Parameter	Symbol	Min	Typical	Max	Unit
Clock Differential Input Impedance	CI	80	100	120	Ω
Differential Input Amplitude (p-p)	DCA	640	-	1600	mV
Reference Clock Duty Cycle	RCY	40	-	60	%
Reference Clock Rise/Fall Time [1]	Tr/Tf	200	-	1250	ps
Reference Clock Frequency	*fu*	-	Baud/64	-	MHz

Note:
1. 20%-80%;

Pin Descriptions

Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – **Not required**	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to, respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTL-I/O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready;	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply	
21	LVTTL-I	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 including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.6V.
3. Reference Clock input is Options: When the host board provides Reference clock, Baudrate=RefClock x 64. But when the host board does not provide Reference clock, A Crystal Oscillator must be installed inside the module, Crystal Oscillator frequency is exactly 1/64 of the Baudrate, and you must specify your host board Baudrate, after leaving the factory, Crystal Oscillator frequency will not be changed. Further details are available from any Sourcelight sales representative.

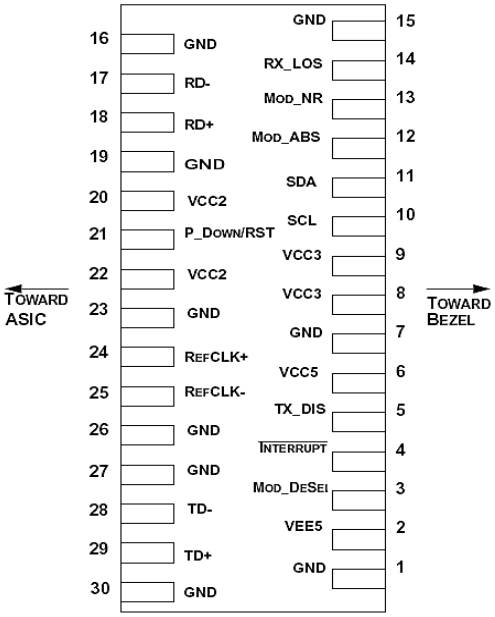


Figure 2: Electrical Pin-out Details

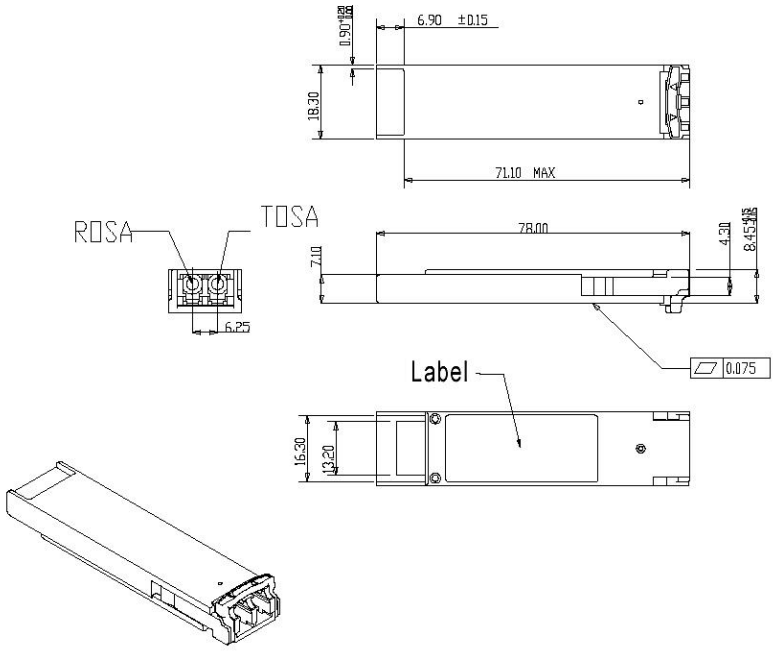


Figure3. Mechanical Specifications

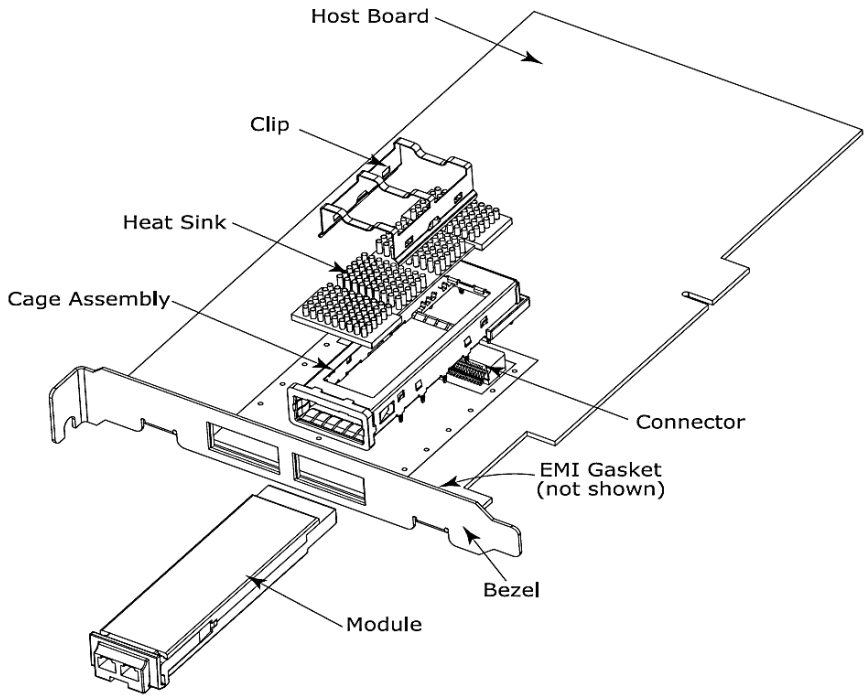


Figure4. XFP Mechanical Components

The mechanical components defined:

1. The module, clip and connector dimensions are constant for all applications. While the bezel, cage assembly, EMI gasket and heat sink can be designed and/or adjusted for the individual application.
2. The relatively small form factor of the XFP module combined with an adaptable heatsink option allows host system design optimization of module location, heatsink shape/dimension/fins design, and airflow control. The module can be inserted and removed from the cage with the heat sink and clip attached.

References

1. 10 Gigabit Small Form Factor Pluggable Module (XFP) Multi-Source Agreement (MSA), Rev 4.5 – August 2005. Documentation is currently available at http://www.xfpmsa.org/
2. IEEE802.3ae – 2002
3. ITU-T G.709 / ITU-T G.959.1 http://www.itu.int/
4. Telcordia GR-253-CORE