

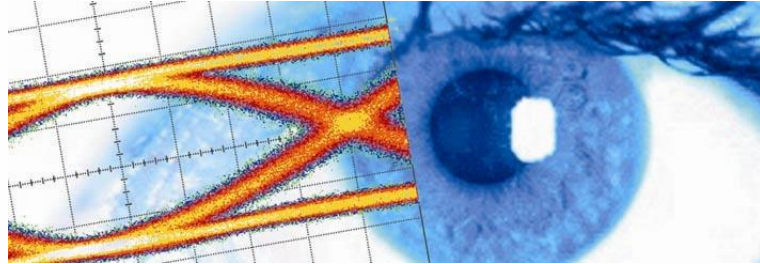


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Datasheet

SHF 46120 A

Optical Transmitter





Description

The SHF 46120 A is a stand alone optical transmitter unit.

This optical transmitter converts electrical signals into optical signals at a data rate of up to 50 Gbps in ASK (amplitude shift keying) format.

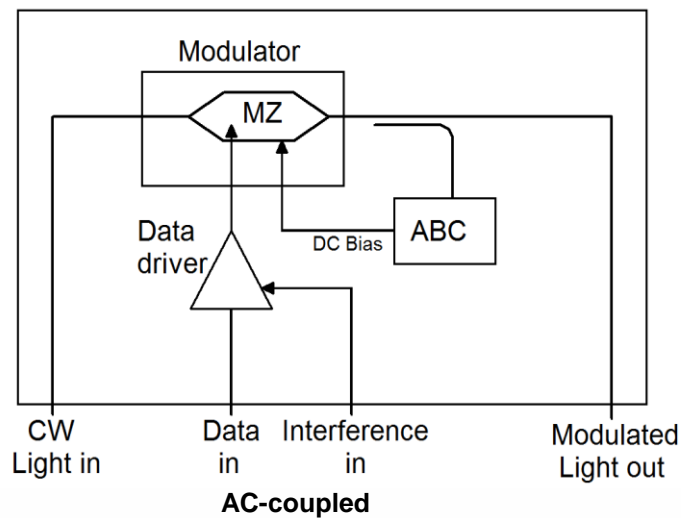
The main element of the SHF 46120 A is a thermally stable Chirp-free Lithium Niobate Mach-Zehnder modulator which is driven by an individually optimized amplifier.

The temperature stable modulator and an automatic bias circuit ensure high stability of the output signal.

Features

- 50 Gbps optical data streams
- < 9 ps rise and fall time digital optical signals at 44 Gbps
- Modulators' bias condition controlled automatically
- SONET/SDH compatible
- Stressed eye generation for optical compliance testing
- Interference input to set the Vertical Eye Closure Penalty (VECP)

Functional block diagram





Specifications – SHF 46120 A

Parameter	Unit	Min.	Typ.	Max.	Conditions
Absolute Maximum Ratings					
Optical Input Power	dBm			17	
Data Input Level	V _{pp} (dBm)			2 10	NRZ data
Interference Input Level	V _{pp} (dBm)			2 10	
DC Input Voltage (Data & Interference Input)	V			6	
Optical Parameters					
Wavelength Range	nm	1550 & 1310			
Insertion Loss	dB		5	6	connector to connector, maximum transmission without modulation
DC Extinction Ratio	dB		20		
Return Loss	dB		tbd		
Electrical and electro-optical parameters					
Electro-Optical Bandwidth of Modulator	GHz	18			-3dB electrical
Min. Bit Rate	Gbps			2	
Max. Bit Rate		44	50		
Electrical Return Loss of Data Input	dB		-10	-7	1 MHz – 20 GHz
Data Input Level	V _{pp} (dBm)		0.2 (-10) 0.3 (-6.5) 0.4 (-4)		ExtRatio = 6 dB ExtRatio = 10 dB ExtRatio = 12 dB
Dynamic Extinction Ratio	dB	12	13		Data input level : 0.4 V ... 0.5 V, ≤ 44 Gbps
	dB	10			Data input level : 0.4 V ... 0.5 V, ≤ 50 Gbps
Dynamic Signal to Noise Ratio		16 12	18		≤ 44 Gbps ≤ 50 Gbps
Output Rise and Fall Times	ps		9	10	20%...80% as displayed on oscilloscope
Output Timing Jitter <RMS>	ps		1.0	1.2	Measured with SHF Pattern Generator, precision timebase DCA. De-embedded from 44 Gbps NRZ electrical data source
Crossing NRZ	%	45	50	55	
Interference Input					
Frequency Range Interference Input	Hz	50 K		700 M	
Input Voltage Interference Input	V _{pp}			1	
Auto-bias control (ABC)					
Dither Signal Frequency	kHz		10		



General specifications

Parameter	Unit	Min.	Typ.	Max.	Conditions
Weight	kg		0.82		
Dimensions (W x H x D)	mm		115 x 64 x 174		w/o Frontpanel - Connectors
Power Consumption	W		10		
Operating Temperature	°C	10		35	
Electrical Data Input Connector					K (2.9mm) female
Interference Input Connector					K (2.9mm) female
Optical Connectors			FC/PC		PMF in, key aligned to slow axis, SMF out



Stressed eye generation

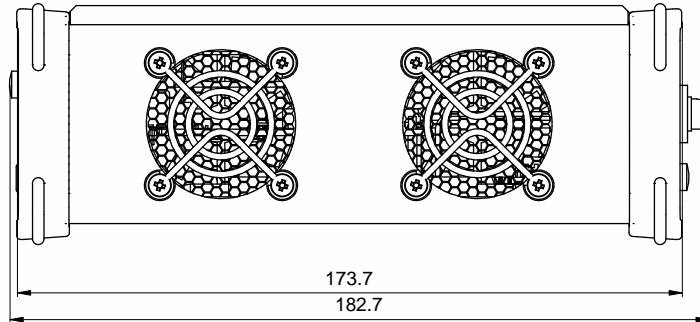
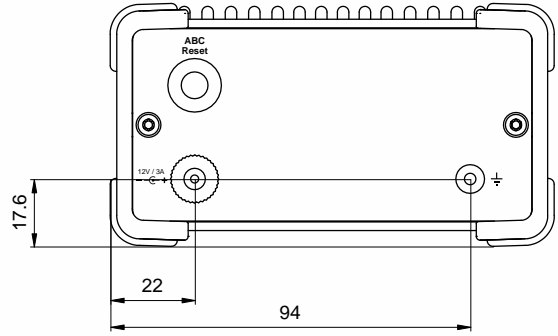
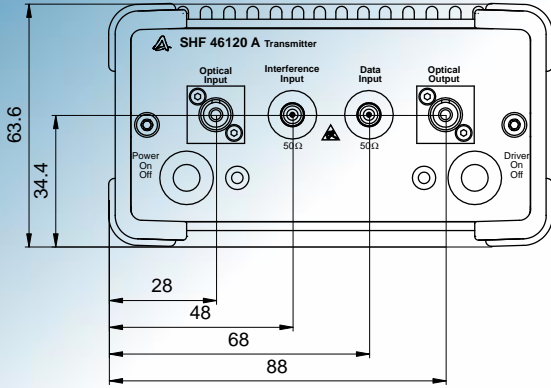
When driving the transmitter with an input signal below the compression level of ~ 500 mVpp, a stable but impaired eye diagram is generated.

Additional stress can be superposed by adding an external interference signal via a dedicated interference input.

44 GBit/s	No interferer	200 mV _{pp} interference	400 mV _{pp} interference	600 mV _{pp} interference
Best signal quality 650 mV drive amplitude	 S/N: 16.9 ExtRatio: 11.8 dB	Interference has no significant influence on signal		
380 mV drive amplitude	 S/N: 13 ExtRatio: 11.1 dB	Interference has no significant influence on signal	 S/N: 11.8 ExtRatio: 10.9 dB	 S/N: 11.3 ExtRatio: 10.6 dB
280 mV drive amplitude	 S/N: 8.6 ExtRatio: 9.3 dB	 S/N: 8.3 ExtRatio: 9.2 dB	 S/N: 7.4 ExtRatio: 9.2 dB	 S/N: 6.4 ExtRatio: 9.1 dB
200 mV drive amplitude	 S/N: 7 ExtRatio: 6.0 dB	 S/N: 6.1 ExtRatio: 6.0 dB	 S/N: 5 ExtRatio: 6.2 dB	 S/N: ~3.5 ExtRatio: ~6 dB



Outline Drawing



All dimensions are specified in millimeters (mm).