

PRODUCT BRIEF

KEY FEATURES

- ▶ Based on High Resolution Liquid Crystal on Silicon (LCoS) technology
- ▶ Arbitrary Filter Shape
- ▶ Control of Filter Dispersion
- ▶ 35 dB Attenuation Control
- ▶ Filter bandwidth variable from 10 GHz to 9 THz, depending on model

APPLICATIONS

- ▶ Optical Component Testing
- ▶ Transceiver Testing
- ▶ DWDM System Testing
- ▶ Laser Pulse Compression
- ▶ Optical/Microwave Filtering

OVERVIEW

The WaveShaper 1000S Programmable Optical Filter is a programmable optical filter with full control of the control of filter amplitude and phase characteristics.

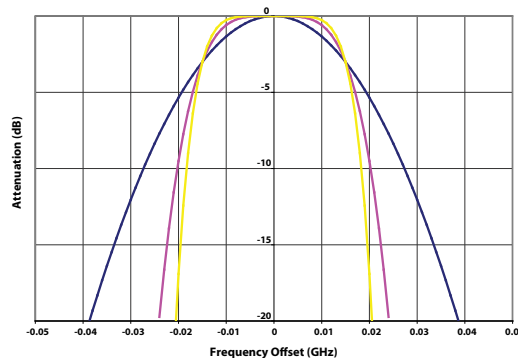
Covering the C- or L-band or the C+L-band, the WaveShaper 1000S provides all the functionality of the WaveShaper 100S and in addition allows precise control of filter shape and phase to provide a unique capability for optical R&D and production test.



WaveShaper 1000S Programmable Optical Filter

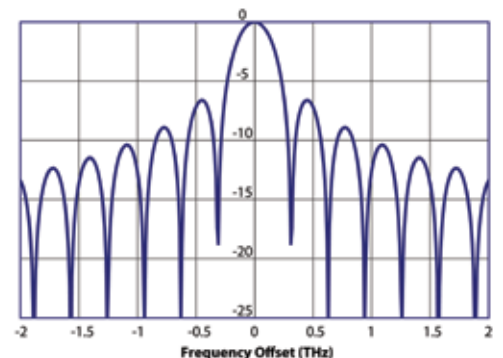
PROGRAMMABLE FILTER SHAPES

In its simplest application, the WaveShaper 1000S is a fully programmable, flat-top optical filter with bandwidth programmable in 1 GHz increments from 10 GHz up to the whole C+L-band (depending on model) and center frequency programmable in 1 GHz increments over the whole band. Band-stop and optical comb filters are also supported, as is attenuation control on a per-channel basis up to 35 dB.



In addition to the classical 'flat-top' channel shape, the WaveShaper 1000S also supports Gaussian and arbitrary user-generated filter shapes. The required filter profile (both amplitude and phase) can be generated by the user and then loaded into the WaveManager software which translates the user specification into the required filter shape.

This programmability provides great flexibility for testing high bit-rate (40 G and above) systems and components where the amplitude and dispersion characteristics of the filter play a critical role in the performance of an optical system. Optical power control is also supported for user-defined filters.



WaveShaper 1000S Programmable Optical Filter

SPECIFICATIONS

All Specifications are guaranteed except where stated as typical (typ).

Model	1000S	1000S/L	1000S/X	
Operating Frequency Range	191.250 THz to 196.275 THz (1527.4 nm to 1567.5 nm)	186.35 THz to 191.0 THz (1569.6 nm - 1608.7 nm)	187.275 THz to 196.275 THz (1527.4 nm - 1600.8 nm)	
Loss and Dispersion (Note 2)	Insertion Loss (incl. connectors)	6.5 dB (typ. 4.5 dB)		
	Insertion Loss Non-Uniformity	0.7 dB (typ. 0.5 dB)	0.7 dB (typ. 0.5 dB) (Note 1)	1 dB (typ.)
	Polarization Dependent Loss (PDL)	0.7 dB (typ. 0.2 dB)		1 dB (typ.)
	Return Loss	> 25 dB		
	Group Delay Ripple	< ± 0.75 ps		
	First-Order PMD (DGD)	< 0.5 ps (typ. < 0.25 ps)		
	Chromatic Dispersion	< ±10 ps/nm		
Filter Control (Note 2)	Filter Shape	Arbitrary		
	Filter Bandwidth	10 GHz to 5 THz	10 GHz to 4.65 THz	20 GHz to 9 THz
	Center Frequency Setting Resolution	1 GHz (8 pm)		
	Center Frequency Setting Accuracy	± 2.5 GHz		± 5 GHz
	Bandwidth Setting Resolution	1 GHz (8 pm)		
	Bandwidth Setting Accuracy	± 5 GHz		± 10 GHz
	Bandwidth Setting Repeatability	± 2.5 GHz		± 5 GHz
	Group Delay Control Range	- 25 ps to + 25 ps		- 15 ps to + 15 ps
Attenuation Control	Settling Time	500 ms		
	Attenuation Control Range	0 - 35 dB		
	Attenuation Setting Resolution	0.01 dB		
Mechanical, Electrical and Environmental	Attenuation Setting Accuracy	±1.0 dB from 0-10 dB, ±10 % from 10-30 dB		
	Maximum Total Input Optical Power	+ 27 dBm		
	Max Optical Power per 50 GHz channel	+ 13 dBm		
	Port Configuration	1 x 1, bidirectional		
	Operating Temperature	15 °C to 35 °C		
	Operating Humidity	10 % to 90 %		
	Operating Voltage	100 V to 240 V		
	Power Consumption	< 50 VA		
	Communications Interface	USB 2.0		
	Connector Type	FC/APC, FC/UPC		
Size	241 x 88 x 316 mm ³ (Rack Mount units: 269 x 88 x 316 mm ³)			
Weight	3.8 kg			

Notes: 1. Specification is valid over the Frequency Range of 187.0 to 191.0 THz. From 186.35 to 187.0 THz the Insertion Loss Non-Uniformity is <1.0 dB max.
2. Measured over 60 GHz passband on a 100 GHz flat-top filter unless specified.

Part Numbers: WaveShaper 1000S, C-Band, FC/APC Connectors:
WaveShaper 1000S, C-Band, FC/UPC Connectors:
WaveShaper 1000S/L, L-Band, FC/APC Connectors:
WaveShaper 1000S/X, C+L-Band, FC/APC Connectors:

WS-AA-1000S-ZZ-H
WS-AA-1000S-ZZ-F
WS-AA-1000S-LB-H
WS-AA-1000S-XB-H

Further configurations available upon request!

Ordering Information:

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