Finisar

WaveShaper 4000S
Multiport Optical Processor

Future-proof your network

PRODUCT BRIEF

KEY FEATURES

- Based on High Resolution Liquid Crystal on Silicon (LCoS) technology
- Arbitrary Filter Shape
- Control of Filter Dispersion
- Instruments Available for Covering C-band, L-band or C+L-band
- 35 dB Attenuation Control
- Filter bandwidth variable from 10 GHz up to 9 THz
- FlexGrid™ Channel Emulator Software

APPLICATIONS

- Optical Component Emulation
- Pulse Generation and Manipulation
- DWDM System Testing
- Flexgrid System Development
- Optical/Microwave Filtering

OVERVIEW

Now with C+L band coverage

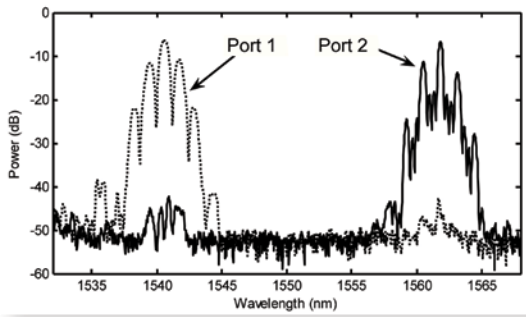
The WaveShaper 4000S Multiport Optical Processor is a 1x4/4x1 programmable optical filter with full control of filter amplitude and phase characteristics.

Covering the entire C- or L-band or the C+L band, the WaveShaper 4000S family combines precise control of filter wavelength, bandwidth, shape and phase with the ability to switch and combine multiple signals in an “Add” or “Drop” configuration.

WaveShaper 4000S Multiport Optical Processor

PROGRAMMABLE FILTER SHAPES

In its simplest application, the WaveShaper 4000S 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.

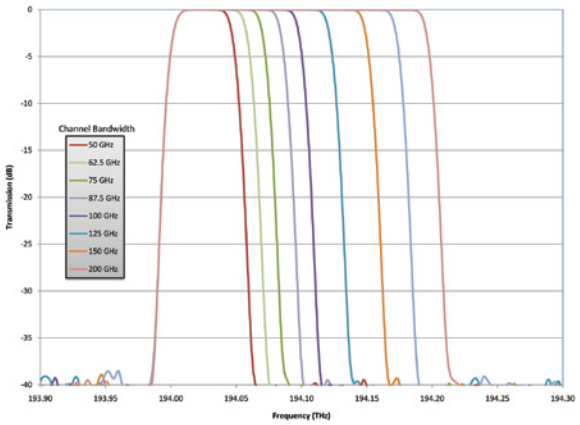


In addition to the classical ‘flat-top’ channel shape, the WaveShaper 4000S supports arbitrary user-generated filter shapes. The required filter profile (both amplitude and phase) can be generated by the user and then loaded into the WaveManager software which translates the user specification into the required filter shape.

PROGRAMMABLE SWITCHING

These arbitrary filter shapes can then be used as the optical switching transfer function within the WaveShaper 4000S (above). Examples of applications of this capability include optical pulse generation and manipulation and the emulation of non-standard multiport optical components.

In particular, the ability of a WaveShaper 4000S to emulate the FlexGrid capability of a Finisar Wavelength Selective Switch, allows the user to prototype advanced optical networks for 400 GHz and higher data rates (right).



WaveShaper 4000S Multiport Optical Processor

SPECIFICATIONS

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

Model		4000S	4000S/L	4000S/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
	Settling Time	500 ms		
Attenuation Control	Attenuation Control Range	0 - 35 dB		
	Attenuation Setting Resolution	0.01 dB		
	Attenuation Setting Accuracy	±1.0 dB from 0-10 dB, ±10 % from 10-30 dB		
Mechanical, Electrical and Environmental	Maximum Total Input Optical Power	+ 27 dBm		
	Max Optical Power per 50 GHz channel	+ 13 dBm		
	Port Configuration	1 x 4, 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 4000S, C-Band, FC/APC Connectors:	WS-AA-4000S-ZZ-H
WaveShaper 4000S, C-Band, FC/UPC Connectors:	WS-AA-4000S-ZZ-F
WaveShaper 4000S/L, L-Band, FC/APC Connectors:	WS-AA-4000S-LB-H
WaveShaper 4000S/X, C+L-Band, FC/APC Connectors:	WS-AA-4000S-XB-H

www.finisar.com/instruments
email: waveshaper@finisar.com

Finisar®
1389 Moffett Park Drive
Sunnyvale, CA 94089
Phone +1 408 458 1000