

# Variable Slope Attenuators

## VSA Series



### Key Features

- Low insertion loss
- Wide attenuation slope range
- Available in low and high contrast variants
- Available in positive or negative slope variants
- Low tuning voltage
- Mountable on a PCB

### Applications

- Remove cumulative error function from amplifiers and filters
- Correct variations in amplifier gain profile due to add-drop multiplexing and Raman effect
- Balance channel power in reconfigurable networks

### Compliance

- Telcordia GR 1209 and 1221

The JDSU variable slope attenuator (VSA) equalizes uneven gain profiles inherent to the use of optical amplifiers. The VSA is Telcordia GR 1209 and 1221 compliant and uses hermetic sealing for increased resistance to environmental extremes. It is available in low contrast and high contrast variants, and offers excellent positive or negative slope optical performance in either the C or L bands.

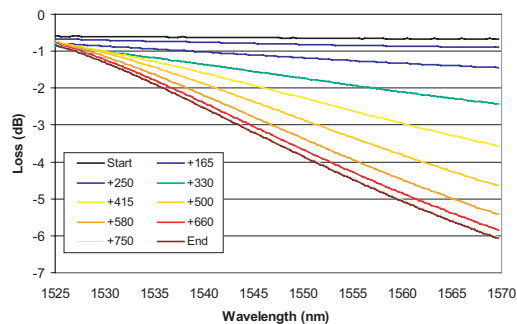
The attenuation slope is precisely tuned using a stepper motor driven by an external IC driver. The stepper motor adjusts the slope in small, uniform step sizes, thus providing high resolution. The VSA is compact in size and can easily be mounted on a printed circuit board (PCB). It requires minimum voltage. The electrical pins extrude from the bottom of the package.

The spectral diagram on next page shows the transmission spectrum after passing through the VSA. Both positive and negative slope profiles are available.

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## Performance

(Note: Negative slope and low contrast variant)



## Specifications

Parameter		High Contrast	Low Contrast
Optimized wavelength range			
C band		1530 to 1560 nm	1528 to 1565 nm
L band		1570 to 1610 nm	1568 to 1609 nm
Insertion loss at minimum slope <sup>1,2</sup>	Maximum	1.3 dB	1.3 dB
Insertion loss at maximum slope <sup>1,2</sup>	Maximum	2.2 dB	2.0 dB
Loss contrast at maximum slope <sup>1</sup>	Minimum	7.0 dB	4.0 dB
Minimum loss slope <sup>1</sup>	Maximum	0.02 dB/nm	0.02 dB/nm
Linearity	Maximum	1.0 dB (absolute)	0.5 dB (absolute)
Polarization dependent loss	Maximum	0.25 dB	0.25 dB
Polarization mode dispersion		0.1 ps	0.1 ps
Return loss <sup>1</sup>	Minimum	40 dB	35 dB
Repeatability <sup>3</sup>	Typical	0.003 dB/nm	0.002 dB/nm
Resolution	Typical	0.003 dB/nm	0.002 dB/nm
Backlash	Typical	0.003 dB/nm	0.002 dB/nm
Fiber type		SMF-28 with 900 $\mu\text{m}$ buffered jacket or 250 $\mu\text{m}$ bare fiber	
Maximum optical power	Maximum	200 mW	200 mW
Dimensions (W x H x D) <sup>4</sup>		25 x 12 x 50 mm	25 x 12 x 50 mm
Operating temperature		-5 to 70 °C	-5 to 70 °C
Storage temperature		-40 to 85 °C	-40 to 85 °C

1. Excluding connectors.

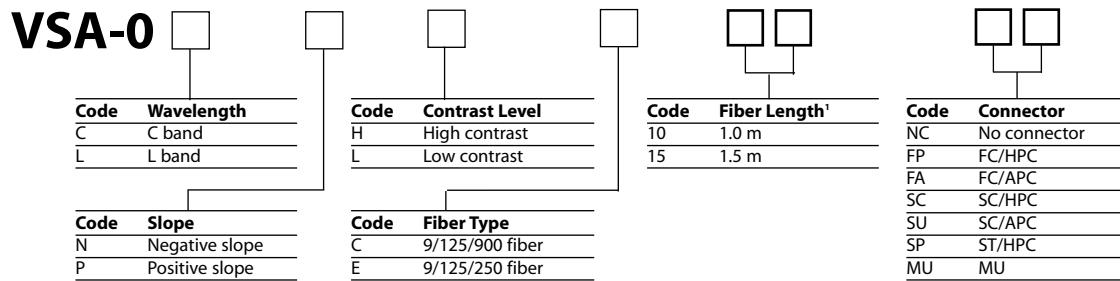
2. Measured at  $\lambda_{\text{MIN}}$  for negative slope and at  $\lambda_{\text{MAX}}$  for positive slope.

3. With reference to potentiometer voltage at 25 °C.

4. Excluding strain relief and connector pins.

**Ordering Information**

For more information on this or other products and their availability, please contact your local JDSU account manager or JDSU directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at [customer.service@jdsu.com](mailto:customer.service@jdsu.com).

**Sample: VSA-0CNHC10NC**


1. Other fiber length available upon request.

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