

# UltraVOA™ SFP Module

Mellanox's UltraVOA SFP Module is a single channel Variable Optical Attenuator (VOA) in a standard pluggable SFP MSA package. It uses silicon photonics to deliver reliable solid-state current controlled optical attenuation enabling ultra-fast control of signal levels in optical networks. The VOA consists of a reliable silicon p-i-n diode structure built across a silicon optical waveguide. As current is applied through the diodes, the free carriers in the waveguide absorb photons, creating a current-controlled variable attenuation.

Because the physical effect is based on electronic control, the response time of the VOA is fast—less than 1  $\mu$ s in typical situations. The module includes an integrated 5% tap and photodiode for monitoring the optical output signal and an internal EEPROM memory with stored factory calibration data. This data can be communicated via the I2C communications protocol through the SFP connector. This VOA is well suited to the most demanding applications in metro and long-haul transmission applications. The high speed of these VOAs makes them particularly useful for optical transient suppression and analog signal modulation applications.

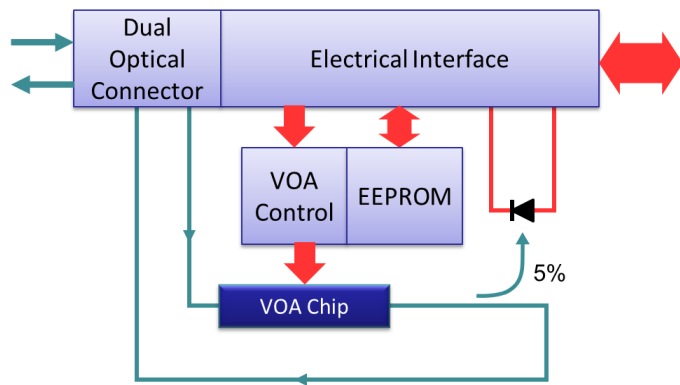


Figure 1. Schematic Diagram of UltraVOA SFP Module

Table 1 - Optical Specifications

Specification	Units	Min	Typical	Max	Notes
Operating Wavelengths	nm	1520		1570	
Insertion Loss	dB		2.0	2.5	BOL
Operational Attenuation	dB	0		25	
Response Time (0-25 dB)	$\mu$ s		1.0	2.0	10 – 90% step response
PDL (0-10 dB Attenuation)	dB			0.6	
PDL (10-25 dB Attenuation)	dB			0.8	



## HIGHLIGHTS

### KEY FEATURES

- High Speed <1  $\mu$ s
- Attenuation range >25 dB
- Solid State Design
- Internal Monitoring Photodiode
- SFP MSA Package

### APPLICATIONS

- Channel power equalization
- Optical transient suppression
- Analog signal modulation
- Power control in WDM and agile networks

### COMPLIANCE

- Telcordia Qualified - based on GR468
- RoHS 6/6 Compliant

Specification	Units	Min	Typical	Max	Notes
Wavelength Dependence Loss	dB			1.0	At 10 dB attenuation
Optical Return Loss	dB	40		-50	Channel to channel
Chromatic Dispersion	ps/nm	-0.05		0.05	0 dB attenuation
PMD	ps		0.1	0.2	0 dB attenuation
Optical Input Power/Ch	dBm			+17	
Attenuation Variation With Temperature	dB/°C			0.10	At 10 dB attenuation
Attenuation Stability	dB	-0.25		0.25	Constant temperature and wavelength over 1 hour

Table 2 - Electrical Specifications

Specification	Units	Min	Max	Notes
Device Power Dissipation	mW		750	
VOA Operating Voltage	V		5.0	
Start up Surge Current	A		0.1	
Maximum VOA Control Voltage	V	0	3.0	

Table 3 - Environmental Specifications

Specification	Units	Min	Max	Notes
Operating Temperature	°C	-5	70	
Operating Humidity	°C	5	85	
Transport & Storage Temperature	°C	-40	85	
Transport & Storage Humidity	% RH	5	95	Non-Condensing

Table 4 - Tap (5%) and Photo Diode Specifications

Specification	Units	Min	Max	Notes
Tap/PD Directivity	dB	25		
Responsively	mA/W	35		Relative to output power of the VOA
PD Bandwidth	GHz	1.0		At 5V bias, 50 Ohm, -3dB
PD Dark Current	nA		1.0	
Photodiode Capacitance	pF		8	

Ordering Part Number	Description
K100-4100-00-00	UltraVOA – SFP Module



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