# NanoSpeed™ Narrow-Band Modulator/VOA

(Protected by U.S. patent 7,403,677B1 and pending patents)

## Product Description

The NS narrow band modulator/VOA provides small signal modulation in additional to electrically controlled attenuation function. The NS series variable optical attenuators are designed to meet the most demanding operation requirements of ultra-high reliability and fast response time with minimum mechanical footprint. This device comes with a miniature integrated driver with a 5 V power and modulation signal.

The NS Series VOA is available in either normally-transparent or normally-opaque configurations.


## Features

- No Moving Parts
- High Reliability
- Solid-State High Speed
- Low Insertion Loss
- Epoxy-Free Optical Path
- Low Power Consumption
- Simple Driver

## Performance Specifications

| NS Variable Optical Attenuator | | Min | Typical | Max | Unit |
|---|---|---|---|---|---|
| Wavelength | | 760 | | 1800 | nm |
| Insertion Loss * | 1260~1800nm | | 0.6 | 1.0 | dB |
| | 960~1200nm | | 1.0 | 1.3 | dB |
| | 760~960nm | | 1.0 | 1.5 | dB |
| Polarization Dependent Loss | | | 0.1 | 0.3 | dB |
| Return Loss | | 45 | 50 | | dB |
| Attenuation Range | | 22 | 28 | 36 | dB |
| Response Time (Rise, Fall) | | | | 300 | ns |
| Modulation Rate (10% depth) | | | 0.8 | 1.6** | MHz |
| Resolution | | | Continuous | | dB |
| Operating Optical Power | | | | 500 | mW |
| Operating Temperature | | | -5 ~ 70 | | °C |
| Storage Temperature | | | -40 ~ 85 | | °C |
| Package Dimension | | | 49.9X7.6X7.6 | | mm |

* Measured without connectors

**Special circuit, Maximum modulation depth is 10% at 1dB attenuation

## Applications

- Power Control
- Power Regulation
- Power Balance
- Instrumentation

RoHS Compliant

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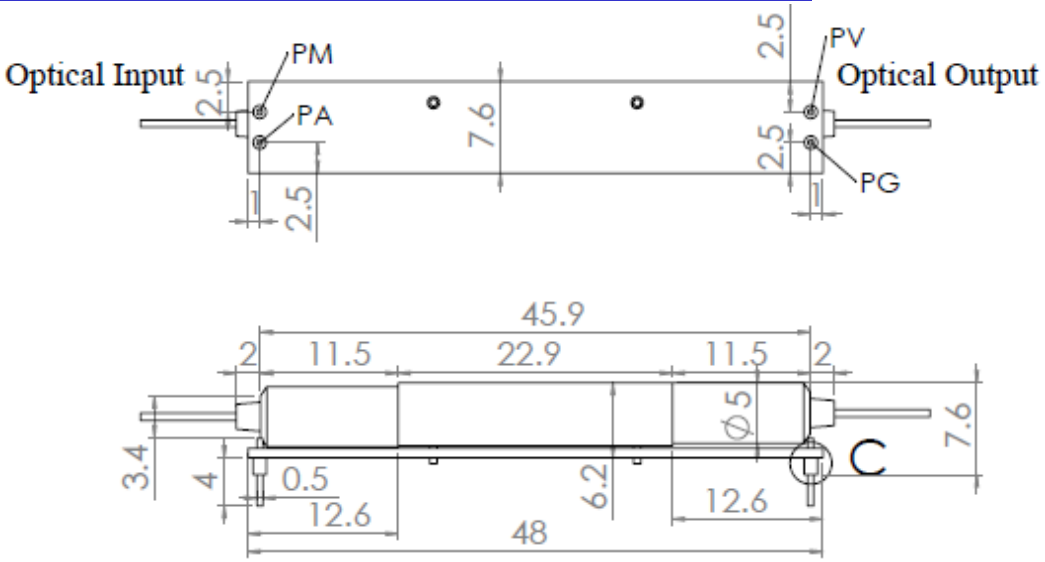
## Mechanical Footprint Dimensions (Unit:mm)




## VOA Pin Definition

PM: Modulation Driving Signal
PA: Attenuation Driving Signal
PV: Vcc +5 Volts
PG: Gnd

## Electrical Performance Specifications

| Parameter | Minimum | Typical | Maximum | Unit | Notes |
|---|---|---|---|---|---|
| Power Supply Current | | | 70 | mA | |
| Power Supply Voltage | 4.75 | 5 | 5.25 | V | |
| Start Up Surge Current | | | 100 | mA | |
| Modulation Signal Pk~Pk | | | 1.6* | V | |
| Modulation Signal Impedance | | 200 | | Ω | 800KHz** |
| Modulation bandwidth | | 200 | | KHz | |
| Attenuation Signal | | | 4.8 | V | |
| Attenuation Signal Impedance | | | 4 | KΩ | |
| Power Consumption | | 325 | 400 | mW | |

* Exceeding limits may damage the board

**200Ω modulation signal Impedance is measured with frequency at the peak modulation frequency

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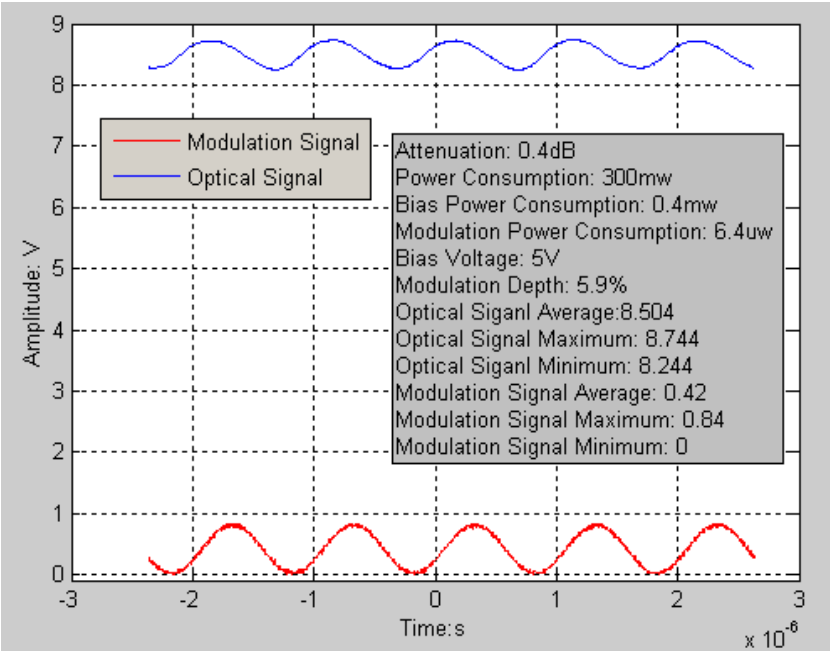
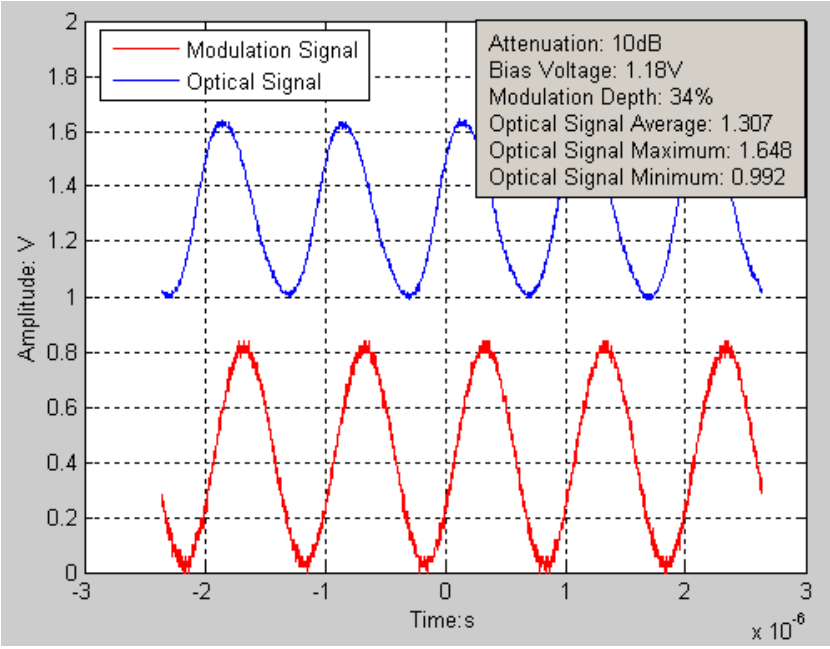
## Typical Modulation Curve

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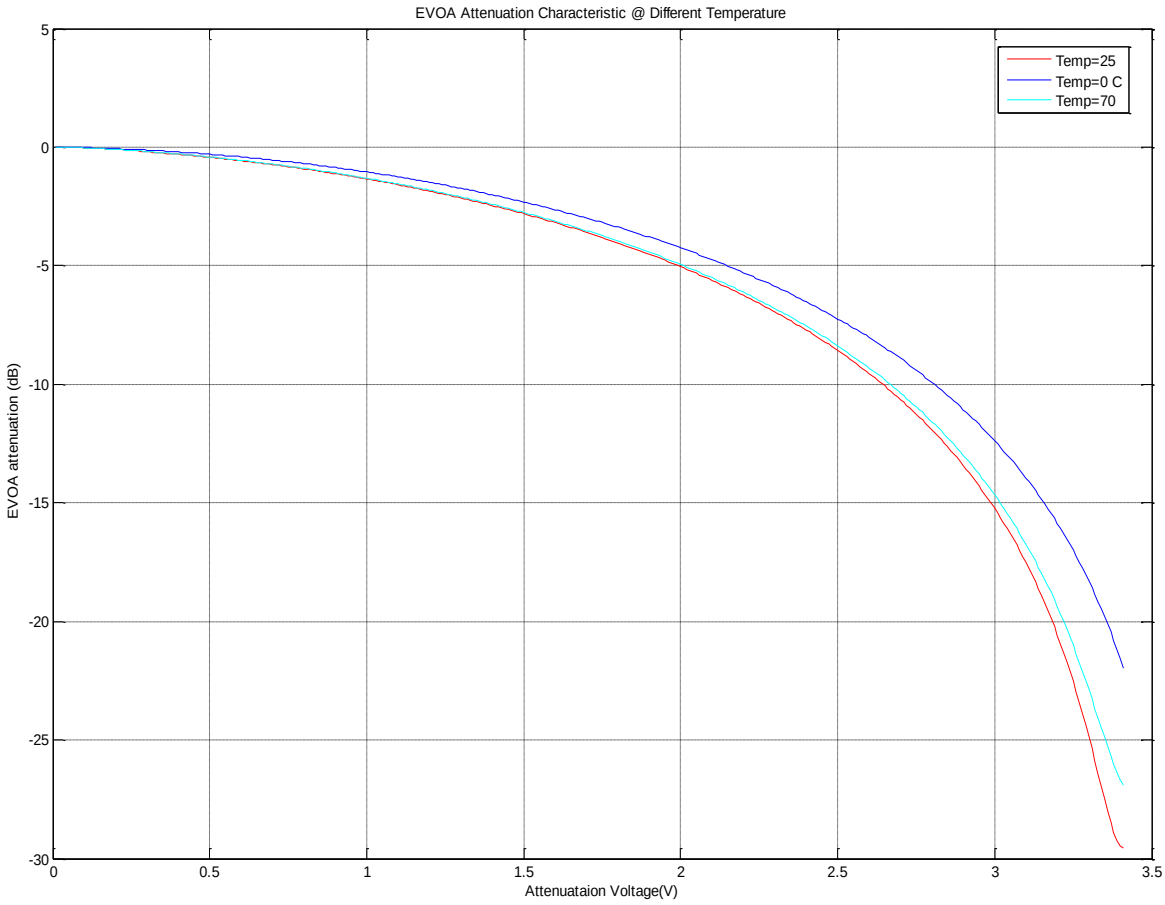
## Typical Curve of Attenuation versus Voltage




## Ordering Information

| NVOA- | 5 2 | ☐ | ☐ | 1 | 1 | ☐ | ☐ | ☐ |
|---|---|---|---|---|---|---|---|---|
| | **Type** | **Wavelength** | **State** | **Package** | **Fiber Type** | | **Fiber Length** | **Connector** |
| | | 1060=1<br>L Band=2<br>1310=3<br>1550=5<br>780=7<br>850=8 | Transparent = 1<br>Opaque = 2 | | SMF-28 =1<br>Special=0 | Bare fiber =1<br>900um loose tube=3<br>Special=0 | 0.25m= 1<br>0.5m = 2<br>1.0 m= 3<br>Special =0 | None = 1<br>FC/PC = 2<br>FC/APC = 3<br>SC/PC = 4<br>SC/APC = 5<br>ST/PC = 6<br>LC = 7<br>Special = 0 |

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