

MEMS MTC Single Mode Fiber Optical Attenuator

9/125 single mode fiber, 500mW



DATASHEET

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The MTC MEMS Optical Attenuator is made as a replacement for the same part number used in customer systems. It based on a micro- electromechanical system (MEMS) chip. The MEMS chip consists of an electrically movable mirror on a silicon support. A voltage applied to the MEMS chip causes the mirror to rotate, which changes the coupling of light between the input and output fibers of the MEMS Optical Attenuator.

Features

- Small Attenuator Package
- Based on Proven MEMS Platform
- Available in Opaque or Transparent Versions
- Qualified to GR-1221

Applications

- OADMs
- MUX/DMUXes
- Band Equalizers
- Channel Equalizers
- Optical Cross-Connects
- Line Cards and Transponders
- Input Power Adjustment in EDFA



Specifications

Parameter		Min	Typical	Max	Unit
Insertion Loss ^[2]				0.6 ^[3]	dB
WDL ^[5]	Superior	0 to 1 dB		0.2 ^[4]	dB
		1 to 5 dB		0.3 ^[4]	
	5 to 10 dB		0.5 ^[4]		
	10 to 20 dB		0.8 ^[3]		
Fine	0 to 20 dB		0.2	dB	
	0 to 15 dB		0.15 ^[4]	dB	
PDL	15 to 20 dB		0.2 ^[3]		
Attenuation Slope				20	dB/V
Back Reflection				-50	dB
Optical Power				500	mW
Response Time				2	ms
Repeatability				0.1	dB
Durability		1 x 10 ⁹			cycles
Fiber Type		9/125 single mode fiber			
Actuation Type		Non-latching			
DC Drive Voltage		0		7	VDC
Voltage Damage Threshold				10	VDC
Resistance		2			MΩ
Power Consumption				20	μW
Operating Temperature ^[4]		-5		70	°C
Storage Temperature		-40		85	°C

Notes:

- [1]. All specifications at room temperature
- [2]. Excluding connector loss. Measured with 3-jumper method or equivalent (See TIA/EIA 526-7)
- [3]. Multi-band adds 0.2 dB
- [4]. Multi-band adds 0.1 dB
- [5]. WDL is defined within Test Wavelength ±20 nm
- [6]. Maximum change of each 2 nm segment within the Test Wavelength ±20 nm
- [7]. Repeatability is defined within 100 cycles

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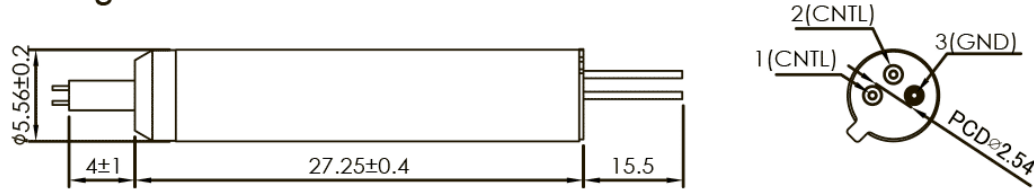
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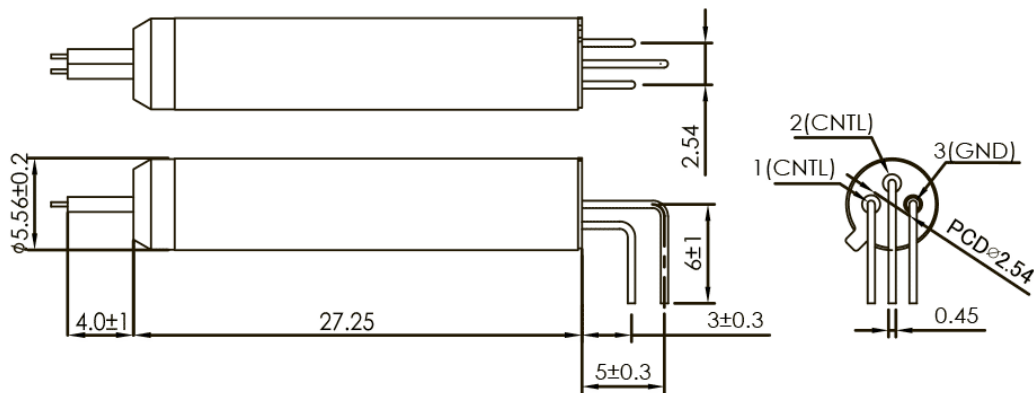
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Mechanical Dimensions (mm)

Straight Pins



Bent Pins



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

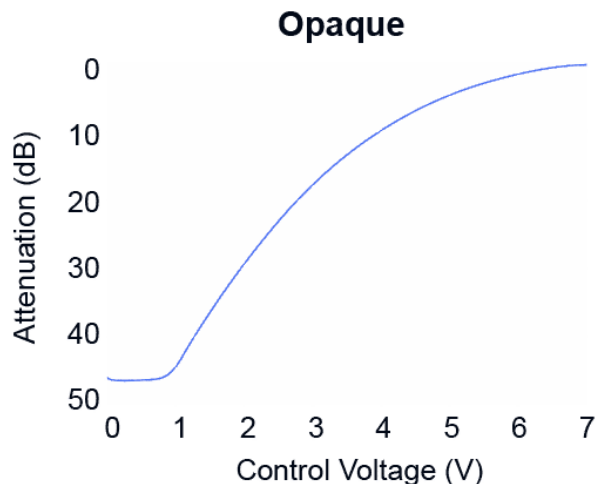
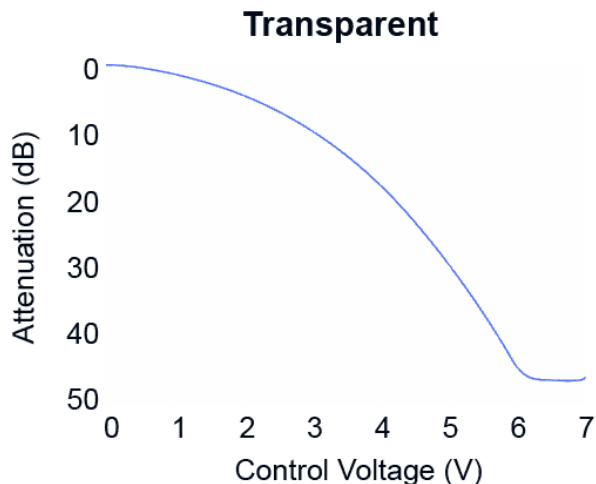
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Typical Response



Ordering Information (Part Number)

Prefix	Attenuator Type *	Test Wavelength	Attenuator Range	Flatness Type	Fiber Type	Fiber Cover	Connector ^[1]	Fiber Length	Pin Bending
MTC-	Transparent = T Opaque = O	1310 = O 1550 = C 1590 = L Special = 0	30 dB = 30 Special = 0	Superior Broad Band = S Fine Narrow Band = F 28dB = 3	9/125 μm SMF = 9	Bare fiber = 2B 0.9mm tube = 9L Special = 0	None = 1 FC/UPC = 2 FC/APC = 3 LC/UPC = 4 LC/APC = 5 SC/UPC = 6 SC/APC = 7 Special = 0	1.0m = 3 Special = 0	Straight Pins = S Bent Pins = B

[1]. The connector cannot be installed directly onto bare fiber, as it is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer can remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SM28 fiber and decreases further with smaller core fibers.

Note:

* **“transparent”** means no attenuation without applying a controlling voltage, the **“opaque”** means the highest attenuation without applying a controlling voltage

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Application Notes

Fiber Core Alignment

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness

Fibers with smaller core diameters ($<5 \mu\text{m}$) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the handling by expanding the core side at the fiber ends.