Fiber Tip Micro Collimator (OCT) Distance < 3 mm

Micro diameter 125 mm, 350–2600 nm, < 3 mm working distance

DATASHEET

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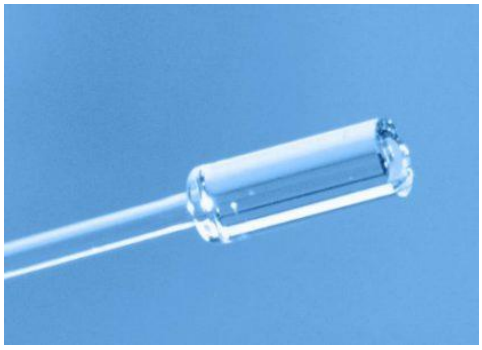

We manufacture fiber-end fused lenses by fusing a precisely controlled length of graded-index (GRIN) fiber directly to the fiber tip, enabling ultra-miniature collimators for specialized applications. This design not only provides efficient beam collimation but also reduces optical power density at the fiber–air interface, allowing significantly higher transmitted power from the fiber core in a compact form factor. Using proprietary beam-shaping technology, a high-quality end cap is formed with minimal insertion loss. Polarization-maintaining (PM) fiber end lenses are a key specialty, and a side-output option is available by attaching a micro-prism at the collimator tip to redirect light laterally. We offer GRIN fiber options of 100/125 µm (NA 0.14), 230/250 µm (NA 0.17), and 230/250 µm (NA 0.20). These collimators are uncoated (no AR coating), enabling broadband operation across the full transmission range of quartz glass, with a working distance varying slightly as a function of wavelength. This type of collimator is widely used in Optical Coherence Tomography (OCT) systems, and a side-firing version is available using a compact 0.3 × 0.3 mm prism for lateral beam emission.

Features

- Micro diameter 125 µm
- <3mm working distance
- High Optical Efficiency
- Low Internal Reflection
- Low Distortion
- Low Cost
- Patented Technology

Applications

- Imaging, OCT
- Fiber Collimator
- Optical System
- Optical Coupling

RoHS COMPLIANT

Specifications

Parameter	Min	Typical	Max	Unit
Insertion Loss [1]		< 0.2		dB
Operation Wavelength	600		1800	nm
Optical Power			5	W
Internal Back Reflection		≤ –70		dB
End Surface Back Reflection	–20		–70	dB
Outer Diameter (OD)	1.8 mm, 1.0 mm, 0.25 mm, and 0.125 mm			mm
Beam Size (at waist)	10		100	µm
Working Distance (WD)	0		5	mm

Notes:

[1]: Excluding connectors

Beam Size and working Distance

For optical collimators, there are two important parameters to describe optical performance. One is the working distance and the other is beam size. Since the light emitted from the fiber lens is a Gaussian beam, the beam has a minimum spot diameter at its waist which is defined as the beam size. The distance from the beam waist position to the fiber lens surface is defined as the working distance. The working distance and beam size are related. Selecting a longer working distance produces a larger beam size. Two examples appear on page 2.

PLEASE SPECIFY EITHER DESIRED WORKING DISTANCE OR BEAM SIZE. AGILTRON WILL ESTIMATE THE OTHER PARAMETER.

One can not select both since they are related.

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

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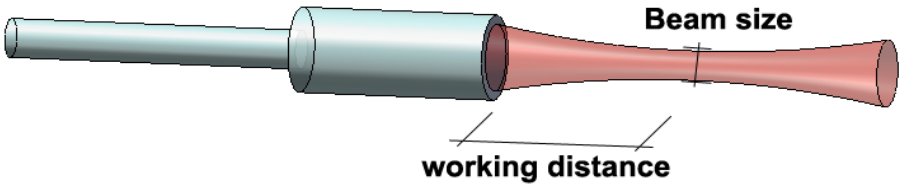
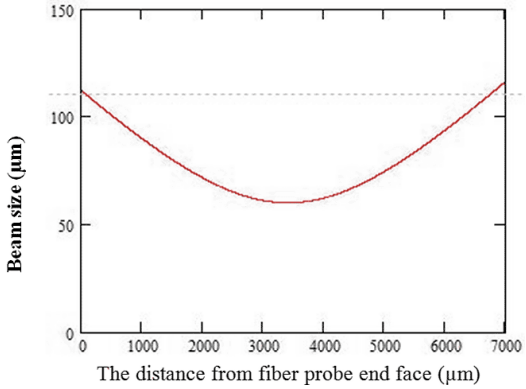
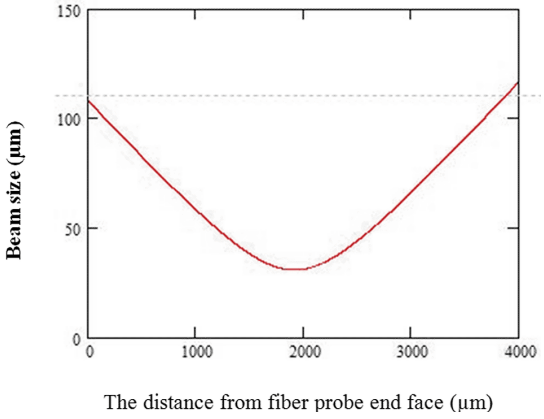
Miniature OCT Fiber Probe



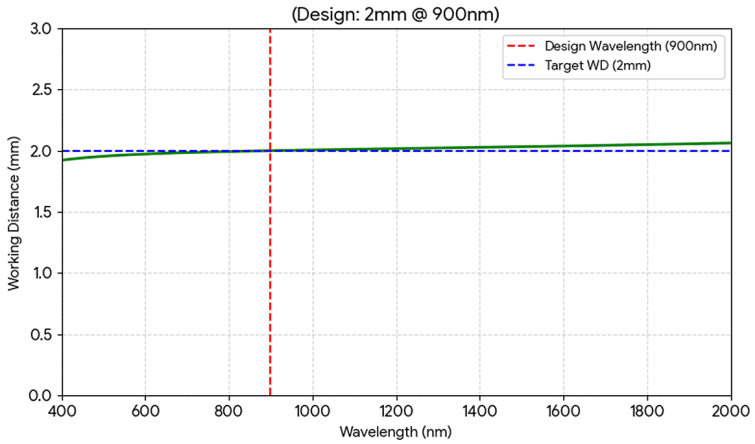
Example I:
The working distance of 3.5 mm has a best focus beam size of 60 µm.



Example II:
The working distance of 2.0 mm has a best focus beam size of 35 µm.



Example II:
The working distance vs Wavelength for Design: 2mm @900nm.



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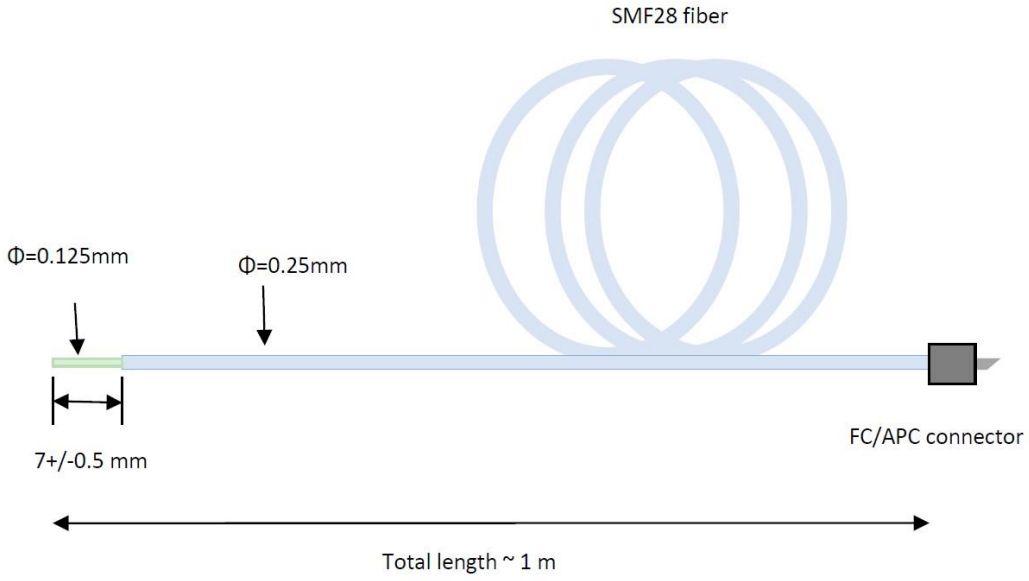
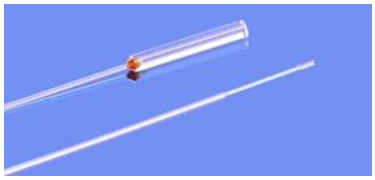
Lens tip fiber pigtails schematic drawing

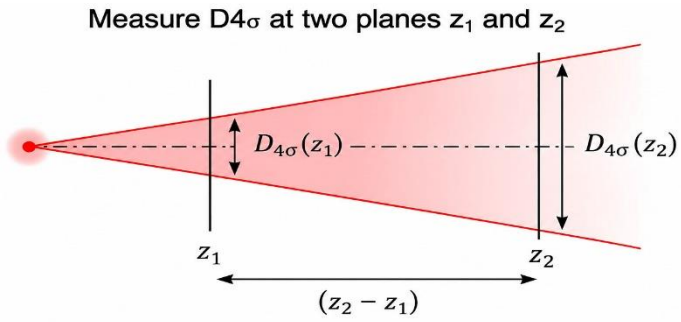




Straight

Side Exit

Diverging Optical Collimators



$$\theta \text{ (half-angle)} = \frac{D_{4\sigma}(z_2) - D_{4\sigma}(z_1)}{2\,(z_2 - z_1)}$$

For some applications, fiber collimators are required to produce a diverging output beam with a specified divergence half-angle, θ. The divergence angle is commonly characterized using the second-moment (D4σ) beam-divergence method, as illustrated above by measuring the beam diameter at two specified positions. Agiltron produces this type of diverging fiber collimators as special orders.

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Ordering Information (Part Number)

	☐	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Wavelength**	**Probe Diameter [1]**	**Working Distance [2]**	**Coating**	**Type**	**Face Angle**	**Fiber Type**	**Fiber Length**	**Connector [3]**
FLES-	1310 nm = 3 1550 nm = 5 850 nm = 8 980 nm = 9 1060 nm = 1 550 nm = F 650 nm = 6 780 nm = 7 450 nm = 4 400 nm = C 350 nm = 2	1.2mm glass = 1 0.125mm glass = 2 0.250mm glass = 3 0.5mm metal = 5 1.8mm glass = 8	1mm = 1 2mm = 2 3mm = 3 Special = 0	None = 1 Polyimide = 5 Polymer = 3	Straight = 0 Side Exit = 1	0° = 0 8° = 8 Special = 9	***Select from below table***	0.25m = 1 0.5m = 2 1.0m = 3 3.0m = 4 5.0m = 5 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]: Must > 0.125 mm for working distance > 1 mm.

[2]: Beam size is a function of wavelength and working distance. Once you select these two parameters, we will provide you a list of possible spot sizes.

[3]: The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber 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 may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

Fiber Type Selection

1	**SMF-28**	B	**PM1550**	M	**GIF 50/125mm**
2	**SMF-28e**	C	**PM1950**	N	**GIF 62.5 mm**
3	**Corning XB**	D	**PM1310**	O	**106/125mm**
4	**SM450**	E	**PM400**	P	**FG105LCA**
5	**SM1950**	F	**PM480**	Q	**FG50LGA**
6	**SM600**	G	**PM630**	R	**STP 50/125**
7	**Hi780**	H	**PM850**		
8	**SM800**	I	**PM980**		
9	**Hi980**	J	**PM780**		
A	**Hi1060**	K	**PM350**		
		L	**PM405**		

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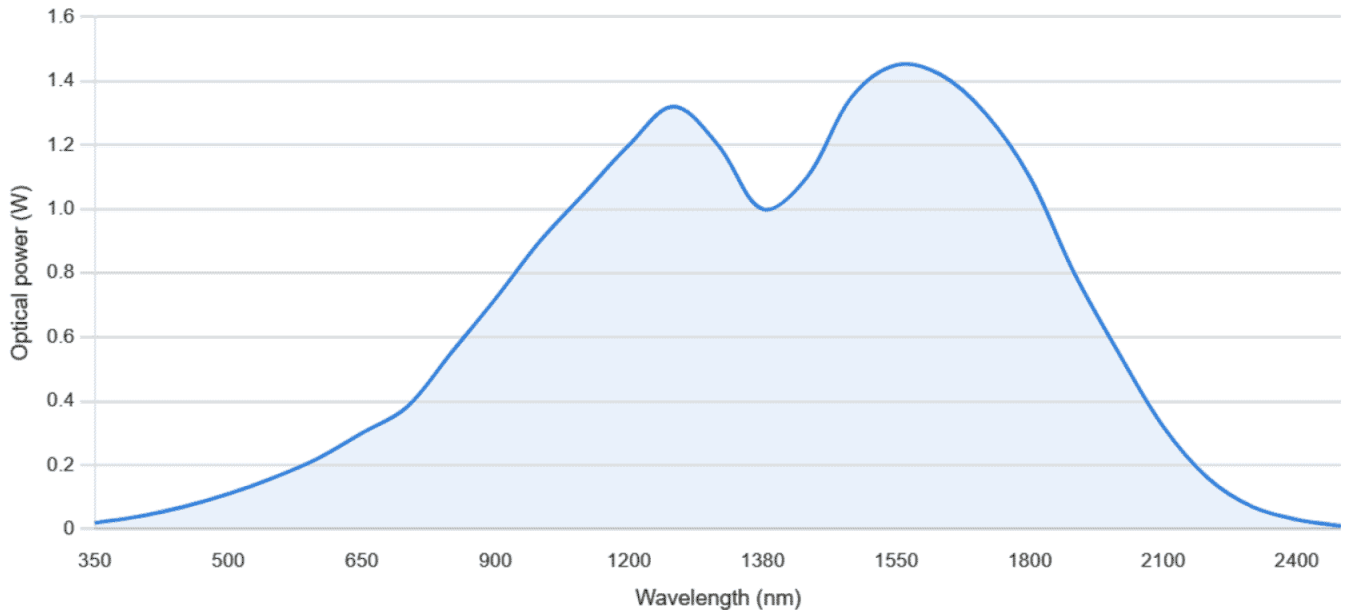
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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