

# Beam Shapers for Ultra-Fast Lasers

## Overview:

Save costs by improving the efficiency and effectiveness of ultra laser material processing applications. Use a PowerPhotonic component to optimize the spot on the workpiece.

Flat Top Beam Shapers from PowerPhotonic are thin glass windows with a precision freeform surface that are designed to be mounted in a collimated laser beam.

They are a perfect solution to the problem of creating a uniform intensity profile at focus AND keeping the spot size small.

In our product range of beam shapers there are optics that change just the beam profile, optics that change the just shape of the spot, and optics that change BOTH the profile and shape of the spot.

We have standard products compatible with single mode fiber lasers operating at 1070nm and for frequency doubled single mode lasers operating at 535nm.

Our design and manufacturing process makes it easy for variations of standard products to be created.

## The PowerPhotonic effect:

**>95%**

Efficiency possible

**>0.7**

Flatness Factor

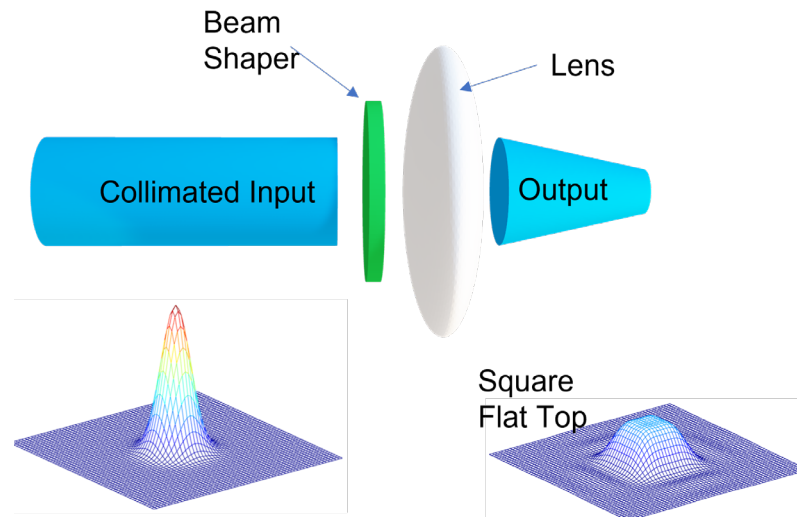
**>25J**

Energy Per Pulse (large beam dia.)

## How it works:

The PowerPhotonic beam shaper is designed to work when it is located in a collimated beam (variants for operation in diverging or converging beams are also possible).

The input beam (Gaussian & single mode) diameter needs to be matched to the design input beam diameter. The beam shaper then redistributes energy within the beam, such that when the beam is focussed, it has the required size, shape and profile.



## Key Features

- Efficient beam conversion
- High power handling
- Cost effective
- Customizable for wavelength
- Customizable for beam size

## Target Applications

- Micro-cutting
- Micro-engraving
- Micro-scribing
- Drilling



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## Standard Products - single mode to square flat top

Part Number	Wavelength (nm)	Input Beam Diameter* (mm)	Output Spot Diameter in $\mu\text{m}$ (100mm lens)
PP-SMSQFT-1070-FS1	1070	2.0	336
PP-SMSQFT-1070-FS2	1070	1.6	420
PP-SMSQFT-535-FS1	535	2.0	168
PP-SMSQFT-535-FS2	535	1.6	210

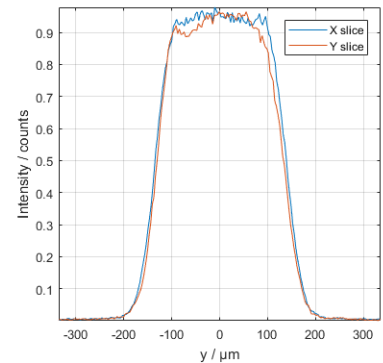
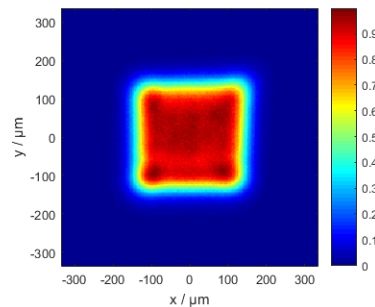
\*  $1/e^2$  Gaussian

## Functional Performance

Parameter	Value
Shaping efficiency	>95%
Flatness factor*	>0.7
Plateau uniformity*	<0.15
Spot size error*	< +/- 3%

\* As defined in ISO 13694:2018

+ Defined as the fraction of power within the primary spot



## General Specifications

Parameter	Value
Part diameter	25.4 +0/-0.1 mm
Optic thickness	1.01 +/- 0.05 mm
AR coating reflectivity	<0.2%

## Custom Options

Standard product designs can be readily modified for specific applications. Custom options include: different input beam diameter, different wavelength (in the window between 380nm and 2 $\mu\text{m}$ ), larger flat top spot, different spot shape, different optic diameter & thickness.

## Sales and Technical Support

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