

# MakroPor

## Macroporous Silicon FactSheet

### PORE GEOMETRIES

The planar pore geometry can be predefined so that periodic arrangements as well as more complex structures including trenches and cavities can be formed. Without prestructuring, the pore arrangement is driven by self organization. Due to the fixed pore distance, the size and distance distribution is more precise for the predefined structures.

strictly ordered

naturally ordered

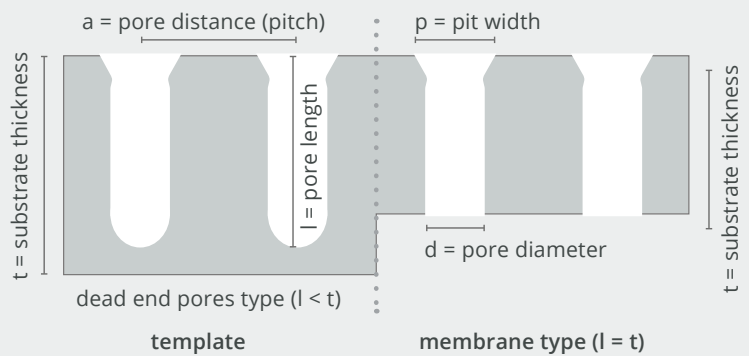


### STANDARD PARAMETERS

Our standard lithographies utilize  $p = 0.5 a$ .

A funnel shaped pore entrance followed by a small bottleneck (length in the range of the pore diameter) will be formed on top of the pore structures.

Two types of structures are available: „Dead end type“ pores inside bulk silicon substrate and „membrane type“.



### POSTPROCESSING

**Different optional post processing steps available:** Substrate lift-off for the generation of both side opened membranes, anisotropic pore shaping, laser dicing.



Laserdicing



isotropic/anisotropic pore shaping

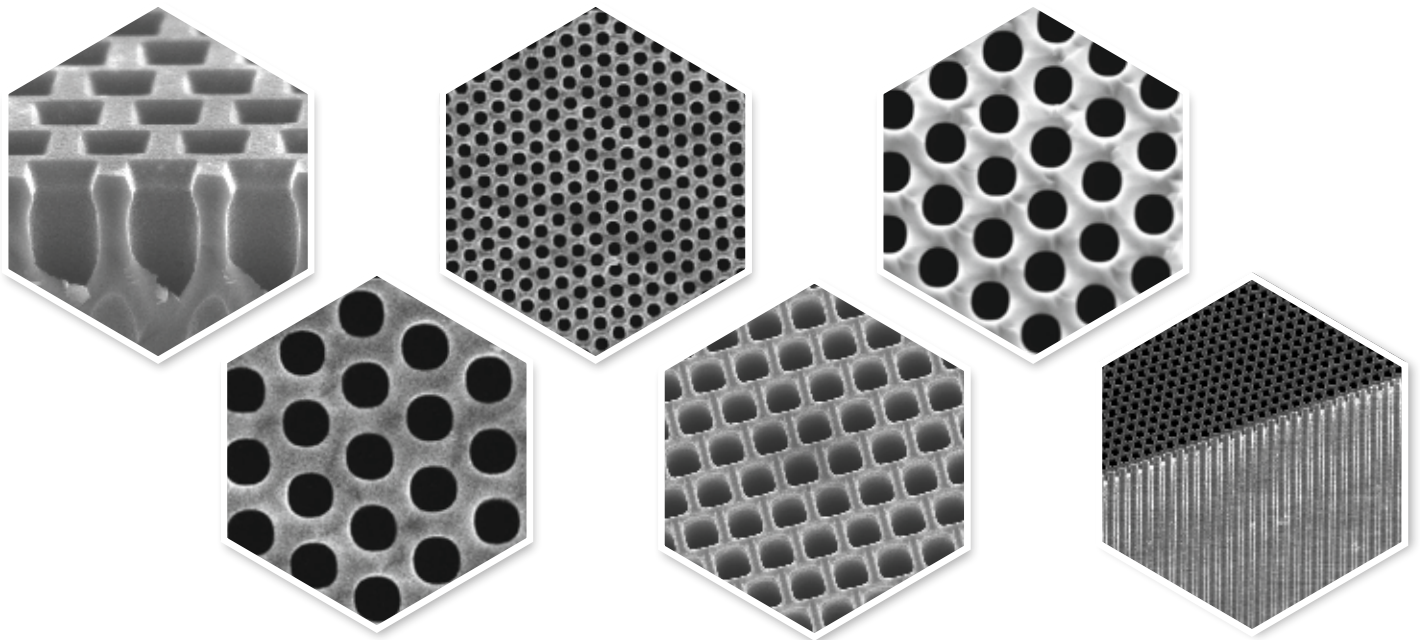
### MACROPOROUS SILICON TECHNICAL DATA

Pore geometry	trigonal, square, honeycomb-custom defined lithography including trenches, rims, cavities etc.
Pore distance ( <b>a</b> )	standard stock material: $a = 1.5 \mu\text{m}$ , $4.2 \mu\text{m}$ trigonal lattice, $a = 12 \mu\text{m}$ square lattice
Pore diameter ( <b>d</b> )	$0.8 \mu\text{m}$
Porosity ( <b>p</b> )	20–60 %
Pore length ( <b>l</b> )	1–500 $\mu\text{m}$ (depending on substrate thickness)
Chips size	Up to 6" diameter. Custom sizes/shapes via laserdicing. Small scale custom process development possible

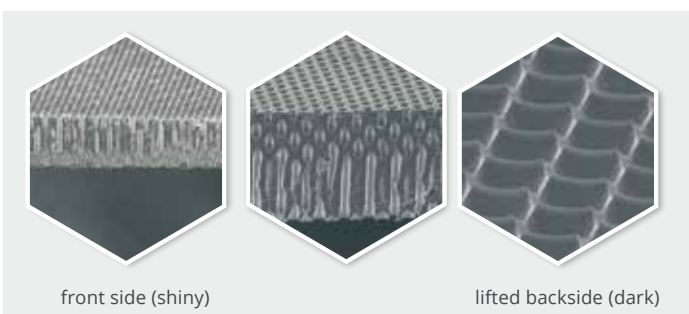
## STANDARD STOCK MATERIAL - DETAILS

Interpore distance	1.5 $\mu\text{m}$	4.2 $\mu\text{m}$	12 $\mu\text{m}$
Pore diameter (standard)	1 $\mu\text{m}$	2.5 $\mu\text{m}$	5 $\mu\text{m}$
Standard widening	-	-	8 $\mu\text{m}$
Available widening	up to 1.2 $\mu\text{m}$	up to 3.5 $\mu\text{m}$	up to 10 $\mu\text{m}$
Pore arrangement	trigonal	trigonal	cubic
Porosity	40-60 %	20-60 %	20-50 %
Membrane thickness, standard	50, 200 $\mu\text{m}$ (lift off)	50, 200 $\mu\text{m}$ (lift off)	15 (lift off), 350, 500 $\mu\text{m}$ (flat)
Membrane thickness, acceptable	25 $\mu\text{m}$ -200 $\mu\text{m}$	25 $\mu\text{m}$ -500 $\mu\text{m}$	-
Membrane size	up to 6" wafer with dia. 130 mm valid region	up to 6" wafer with dia. 130 mm valid region	up to 6" wafer with dia. 130 mm valid region
Standard tolerances of $\pm 10\%$	✓	✓	✓

## APPEARANCE AND DIMENSIONS



## THIN FREE STANDING MEMBRANES BY DIRECT LIFT OFF DURING PORE ETCHING



Lifted backsides are sensitive to mechanical handling. Abrasion of silicon nanotips is visible as brown "scratches" on the surface but have minor effect on the underlying pores.

**We suggest using vacuum tweezers on the front side or polymer tweezers on the side faces.**