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INFORMATION SHEET

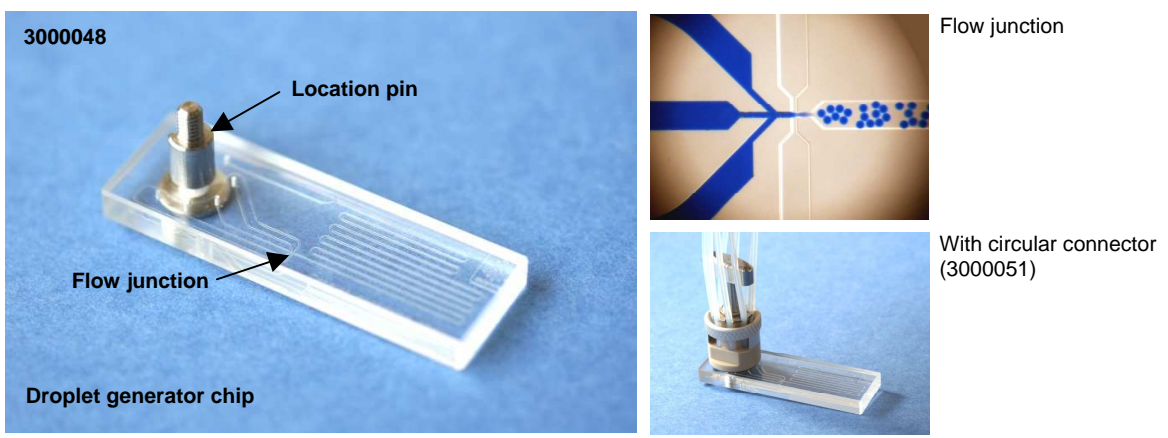
Part name	Mitos Droplet Generator Chip	Part number	3000211 3000048
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Description

The Mitos Droplet Generator Chip is a glass microfluidic device designed for generating droplets made up of one, two or three reagents. Applications include monodispersed droplet formation, emulsion formation and Janus particle formation. The chip is supplied with a location pin, as shown below. The location pin allows connection to the Mitos Circular Connector (3000051). The chip is available in two channel depths:

- Standard Chip: 100µm
- Special Order Chip: 50µm

The 50µm chip is not recommended to new users of microfluidic chips, as a care is required to prevent channel blockage.

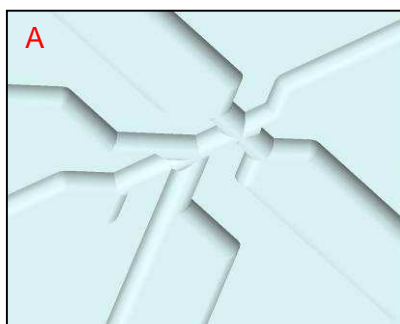
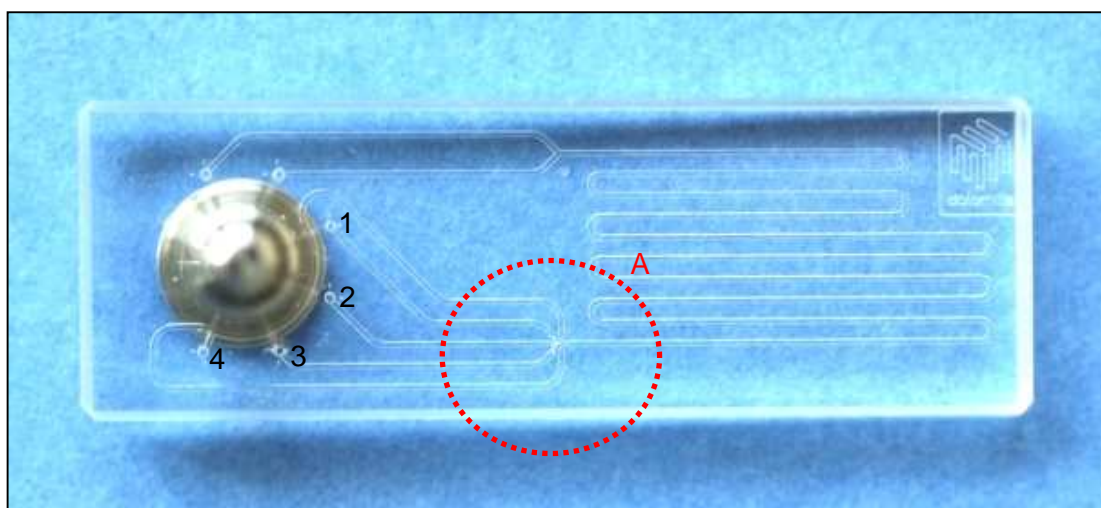
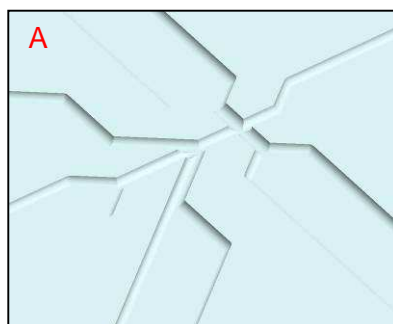


Benefits

- High droplet production rate
- Extremely consistent droplet size
- Automatic alignment of connections
- Quick connect and release
- High visibility
- Range of hydrophobic and hydrophilic coatings
- Compact
- Wide temperature and pressure range
- Excellent chemical compatibility

	Chip Specification	Standard Chip 3000211	Special Order Chip 3000048
1	Number of inputs	4	4
2	Number of outputs	2	2
3	Channel cross-section at junction, (depth x width)	100 μ m x 105 μ m	50 μ m x 55 μ m
4	Wide channel cross-section, (depth x width)	100 μ m x 300 μ m	50 μ m x 250 μ m
5	Channel length after junction	197mm	197mm
6	Volume of channel after junction	5.9 μ l	2.5 μ l
7	Back pressure with 100 μ l/min flow (water)	0.2bar	1.5bar
8	Surface roughness of channels (R_a)	5nm	5nm
9	Chip size (length x width x thickness)	45mm x 15mm x 4mm	45mm x 15mm x 4mm
10	Chip top layer thickness	2.0mm	2.0mm
11	Chip base layer thickness	2.0mm	2.0mm
12	Operating pressure	20bar	20bar
13	Material	Glass	Glass
14	Fabrication process	HF etching and thermal bonding	HF etching and thermal bonding

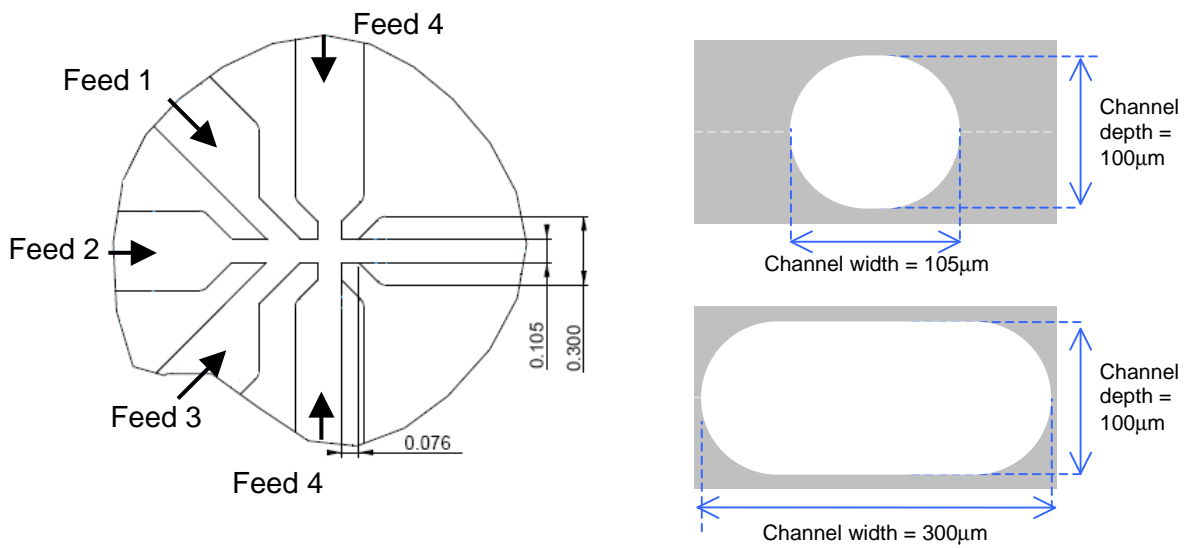
Channel geometry

100 μ m etch depth (3000211)50 μ m etch depth (3000048)

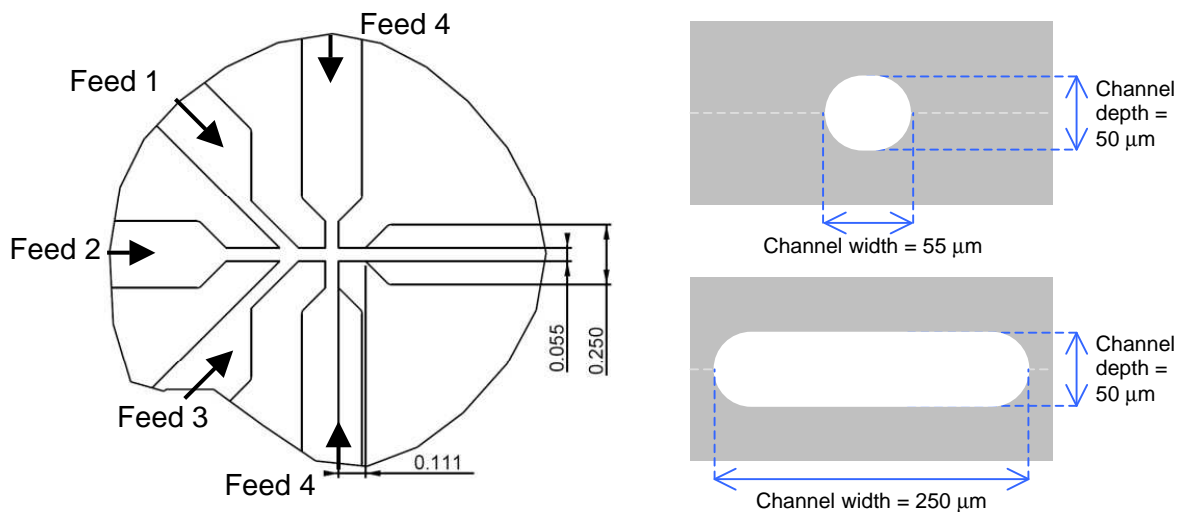
Above: Plan view of droplet generator chip

Far left: A 3D view of the lower glass layer with a 100 μ m etch depth.

Near left: A 3D view of the lower glass layer with a 50 μ m etch depth.



Left: 3000211 layout of flow junction, Right: Cross-section with of the isotropically etched channels in junction.



Left: 3000048 layout of flow junction, Right: Cross-section of the isotropically etched channels in junction.

Droplet formation

The size, consistency, and production rate of droplet formation is a function of several physical parameters, including:

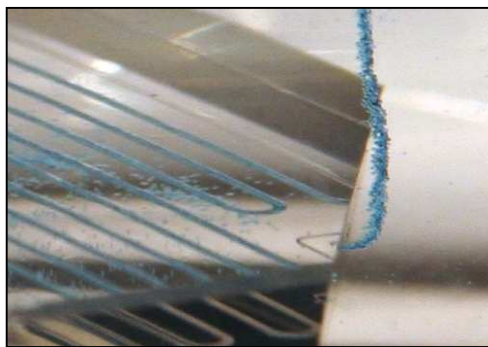
- Viscosity and surface tension of the various fluids
- Presence of surfactants
- Miscibility of the fluids
- Use of hydrophobic or hydrophilic coating on channel walls (see below)
- Total Flow rate and relative flow rate of each fluid
- Stability of flow rate (highly consistent flow rate = very monodispersed droplets)

If you would like more information on droplet formation, please ask for Dolomite's guide to successful droplet formation.

The chips typically form droplets of around 20 – 150µm in diameter. Droplet production rates of up to 12,000 droplets per second have been produced in a single channel. Droplet consistency can be extremely good, for example ranging from 72-74 µm in one application. However, consistent droplet formation requires a pump with a smooth and stable output. Dolomite has worked on many droplet forming projects, so please contact for advice.

Custom options

Dolomite can also offer additional customisation, for example, the top layer or base layer can be left un-etched giving a semi-circular channel cross-section. The chip can also be fabricated in quartz for improved optical transmission. Please contact Dolomite for further information.



This image shows a droplet chip with a diced edge submerged in water. This allows a flow of oil droplets into the water.

Custom

surface coatings

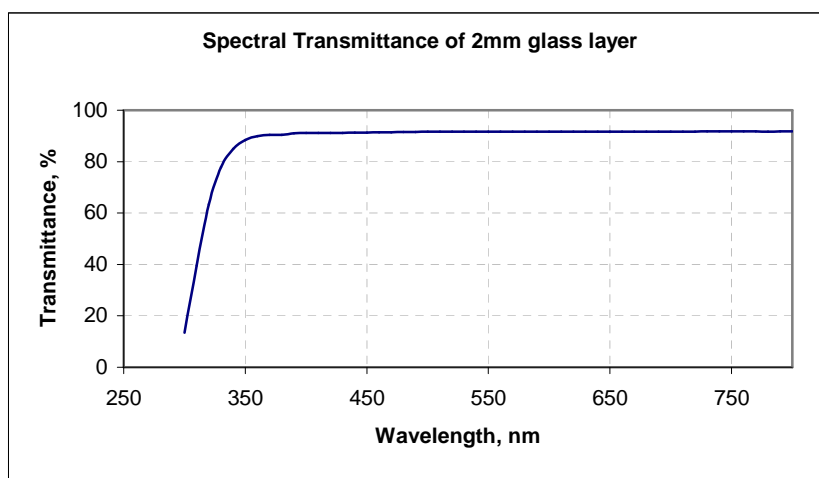
The standard channel surface is hydrophilic and it should be noted that the channel coating is critical to successful formation of droplets.

The chip can also be supplied with:

- Hydrophobic coating on channel surfaces
- Platinum coating on channel surfaces
- Other custom coatings are also possible

For further information or advice please contact Dolomite.

Optical transmission





Similar Products

Dolomite offers several other products for droplet formation, these include:

- The Mitos T-Junction Chip (3000014)
- The Mitos Droplet Junction Chip (3000158)

Product datasheets can be found on the Dolomite website, alongside all its latest products.