



**Innovative  
Sensor Technology**

physical. chemical. biological.



# MICRO-HEATERS

For precise heating of solids, liquids and gases





APPLIANCE



AUTOMOTIVE



HUMIDIFICATION UNITS



LASER MANUFACTURING

**Precise, reliable and cost-efficient: IST AG micro heaters are tailor-made to your application's needs.**

## The Perfect Fit for any Application

Micro heaters are used in devices requiring a small but accurate heat source with precise temperature control, such as optical interactive assistance systems.

They are a precision heat source for gas and humidity sensors, biopsy or tissue samples for medical analysis, or used in malignant tumor treatment.

Each micro heater is individually customized and designed to fit your application's requirements.

### Benefits & Characteristics

Our micro heaters combine high-precision and long-term stability with a wide temperature range from -50 °C up to +800° C and feature numerous benefits:

- Fast response times
- High temperature stability
- Long-term stability
- Overheating protection
- High precision
- Targeted heating of tiny spaces
- Tailor-made to fit customer's application

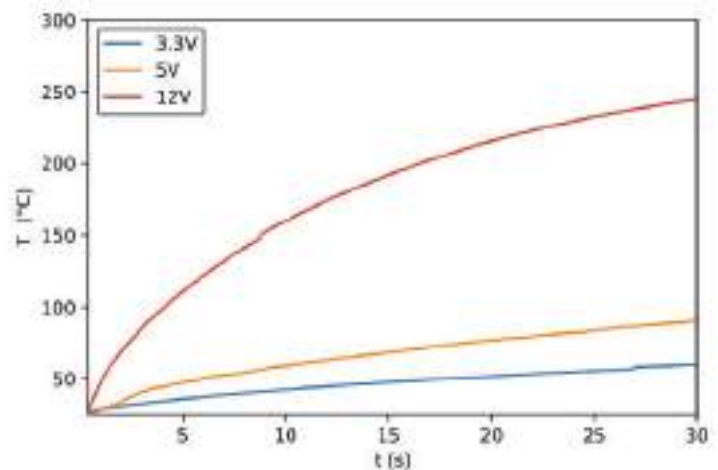


### Thick-Film Micro-Heaters

Resistance: 12 Ohm  $\pm$ 10%  
 Dimensions: 13 mm x 16 mm x 0.63 mm  
 Heating Material: PTC resistor  
 Substrate: Al<sub>2</sub>O<sub>3</sub>  
 Temperature range: -50 °C up to +800 °C  
 Heat up time: >100 °C in 10 sec  
 Power density: at 800 °C / Steady state

Heat up times for different supply voltages (graphic)

Red: 12.0 V  
 Yellow: 5.0 V  
 Blue: 3.3 V





LIFE SCIENCE



MEDICAL



3D-PRINTING

## Patterning

IST AG micro heaters can be tailored to any application to enable an even heat distribution across a small surface. They allow for targeted heating of tiny spaces.

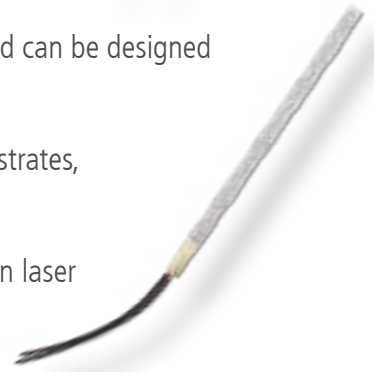


## Special Form Factors

The possibilities for chip shapes as well as the geometry of heating patterns are endless and can be designed to fit precisely into any application.

We design the micro heater to fit the application's profile offering a wide selection of substrates, from alumina to zirconia.

Whether round, polygons, long and thin or square, the substrates can be cut with precision laser into any two-dimensional shape, providing the form factor needed to fit the application.



## Substrates

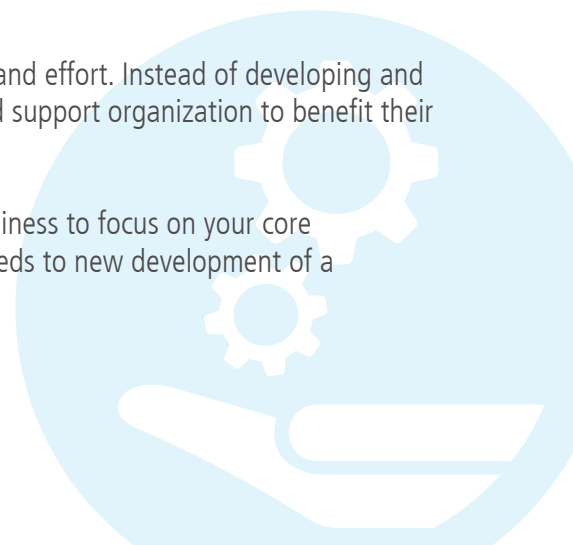
Various substrate materials can be utilized to be compatible with objects to be heated. Thermal conductivity, which influences the heat transfer from heater to object, varies for different substrates. Depending on the requirements the choice of will be made from the following selection: ceramic alumina, zirconia, sapphire, steel, copper, polyimide, aluminum nitride or silicon wafer. Ceramic substrates, for example, have excellent corrosion resistance and the highest operating temperature range.

The heat transfer from heater to object, varies for different substrates. Stainless steel has the lowest value of about 15 W/mK, aluminum nitride has the highest value up to 220 W/mK.

## Development & Technology Partner

Working with IST AG as innovation partner saves our customers a lot of time and effort. Instead of developing and manufacturing a sensor component, they can simply acquire our expertise and support organization to benefit their own product.

Benefit from an agile co-creation of a sensor with IST AG and enable your business to focus on your core competence: From simple adaptations of our sensors to fit your application's needs to new development of a tailor-made sensor – from early prototyping to series manufacturing.



# CUSTOMIZED SENSOR SOLUTIONS FOR YOUR APPLICATION

Benefit from an agile co-creation of a sensor with IST AG and enable your business to focus on your core competence: From simple adaptations of our sensors to fit your application's needs to new development of a tailor-made sensor – from early prototyping to series manufacturing.

## SUBSTRATES

- Alumina
- Zirconia
- Sapphire
- Steel
- Copper
- Polyimide
- Aluminium nitride
- Silicon

## METAL THIN FILM

- Pt
- Rh
- Ti
- Ni
- W
- Cr
- Ag
- Au
- Al
- Mo
- Alloys

## DIELECTRIC THIN FILM

- SiO<sub>2</sub>
- Si<sub>3</sub>N<sub>4</sub>
- Ta<sub>2</sub>O<sub>5</sub>
- Polyimide

## DESIGN

- Concept
- Material choice
- Technology choice
- Design of layout

## METAL THICK FILM

- Pt
- Au
- Ag
- Alloys

## CONNECTION

- Enameled Cu wire, Ø 0.2 mm
- Ag-wire, Ø 0.25 mm
- Ni/Au-wire, Ø 0.2 mm
- Pt-wire, Ø 0.2 mm
- Cu/Ag-wire, PTFE insulated
- Cu/Ag-wire, Peek insulated
- Cu/Ag stranded, PTFE-insulated
- and many more

## ASSEMBLY

- Electrical final testing
- Optical final testing
- ESD testing
- Packaging
- Additional assembly

## PACKAGING

- Welding\*
- Bonding
- Soldering\*
- Hot-melt
- Injection molding

## DIELECTRIC THICK FILM

- Glass
- Organic polymers

## PATTERING

- Photolithography
- Laser trimming
- Dry & wet etching

