NANOTEST
Berliner Nanotest und Design GmbH

TΩCS®

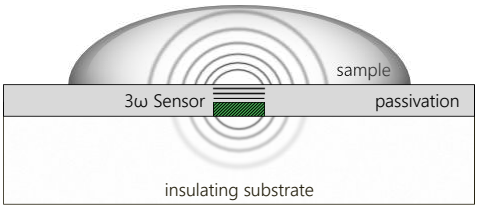
Three Omega Characterization System

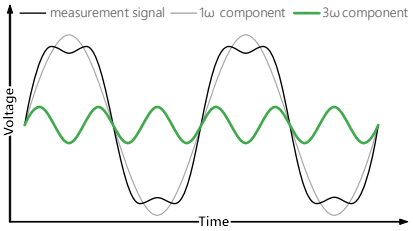
Thermal conductivity characterization done within a minute

A straightforward solution. From solids to liquids.

TOCS is a compact quick testing system for characterization of a wide range of various materials to obtain both, the thermal conductivity and diffusivity, within a few minutes.

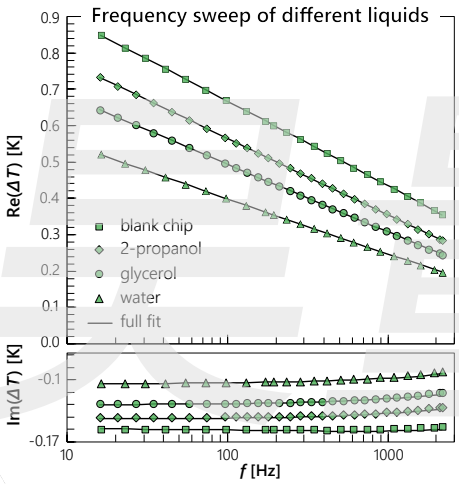
- Liquids and suspensions
- Gels, pastes and filled greases
- Pads and soft materials
- Compact benchtop system
- Re-usable test chips
- External sample holder
- Complete hard- and software solution
- Compatible with any other 3-omega measurement structure





Thermal conductivity and diffusivity

The bi-directional model fit of 3-omega method simultaneously provides thermal conductivity and diffusivity of the tested material. Thermal conductivity, in particular, is available within a minute.



- All-in-one software suite
- Very fast measurement with high reproducability
- Easy sample application
- Curing and non-curing materials
- Measurement in application-specific environment:
  - Vacuum or protective gas
  - Elevated temperatures
  - High atmospheric pressure

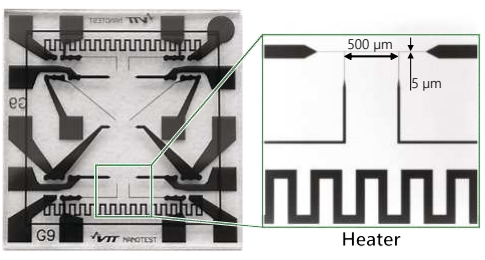
Your system, your rules

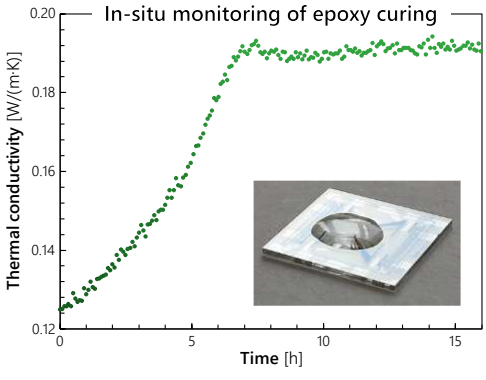
TOCS supports the use of any 3-omega structure as plug and play. Out of the box.

But if you don't have your own chips at hand, do not dispair.
We have the right one for you.

Chip characteristics

- Borosilicate glass chips
- 12 x 12 mm² size
- Three 3-omega sensors
- Two independent heaters
- Low-budget consumable





Berliner Nanotest und Design GmbH
Volmerstraße 9B | 12489 Berlin | Germany

Description

TOCS® is a compact quick-testing benchtop system for characterization of a wide range of various materials to obtain both, the thermal conductivity and diffusivity, within few minutes.

Technical Specification

System

System type	Benchtop material characterization system	
Footprint (w × d)	54 × 40	cm^2
Height	17	cm
Weight	12	kg
Power supply	230 / 50 / 100	VAC / Hz / W

Measurement conditions

		Default chip stage		Heatable chip stage		
		min	max	min	max	
Excitation frequency	single channel	10	40 000	10	40 000	Hz
	triple channel	10	12 000	10	12 000	Hz
Sample temperature	Chip stage in temperature chamber	-10	80	-10	80	°C
	Heating by chip stage	no heating			250	°C
Heating rate		no heating			60	K/min

Measurement

Methodology	bi-directional 3ω (three-omega) method	
Output	Thermal conductivity	W/(m·K)
	Thermal diffusivity	m^2/s
Resolution	0.01	cm^2K/W

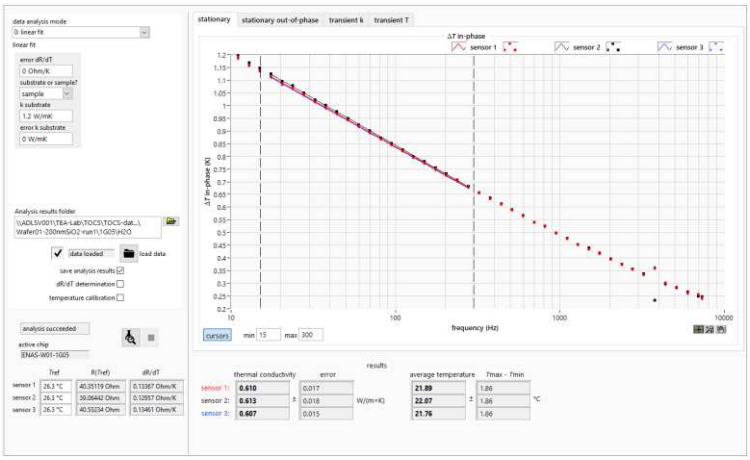
Sample properties

	min	max	
Size (round, diameter)	1	8	mm
Thickness	0.01		mm
Thermal conductivity	0.05	500	W/(m·K)
Thermal diffusivity	0.1	100 000	10^{-9} m^2/s

Measurement accuracy

Thermal conductivitiy	± 1	%
Thermal diffusivity	± 5	%

Software screenshots



Key features

- Quick measurement
- Compact and all-in-one
- Re-usable & disposable test chips
- External & movable chip stage
- Compatibility with any arbitrary 3-omega measurement structure

Key output material and compound properties

- Thermal conductivity
- Thermal diffusivity

Key testing schemes

- Quick test series
- Regular quality screening
- Temperature dependency
- Process structure property correlation
- In-situ curing monitoring
- In-situ aging investigation

Scope of samples

- Low to high viscous material
- Polymers
- Thermal interface material
- Pastes and greases
- Gap pads and gap filler
- Adhesive and cured material
- Mold compound & underfiller