Delivering Thermal Intelligence®

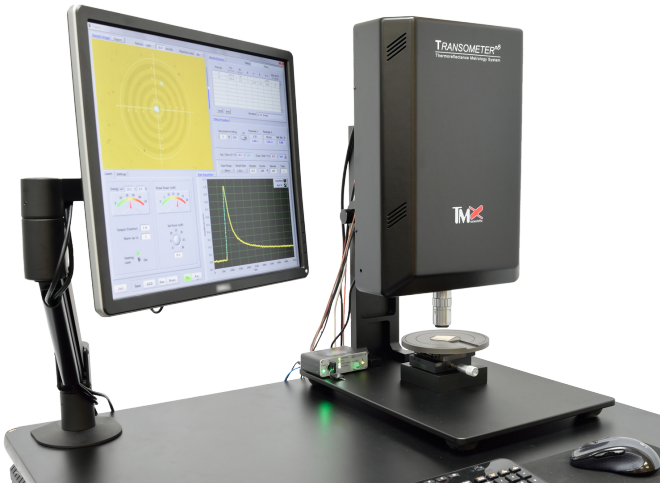
Product Data Sheet

Transometer™

A Metrology System for Material Characterization

The Transometer is a non-contact metrology system that measures the thermal conductivity and interface resistance of thin-films and bulk materials. Its same-side *pump and probe* approach collects experimental data from a test sample and extracts up to two unknown parameters from matched computational models of equivalent structures. These unknown parameters can include thermal conductivity, interface thermal resistance, and/or layer thickness. The Transometer can even determine the thickness of opaque thin-film layers!

This powerful system comes in a compact and turnkey package, ready for measuring without any additional components. The intuitive interface is easy to learn, and a typical measurement takes less than 30 seconds. So whether you are measuring the thermal properties of semiconductors, dielectrics, or metallic thin-films or the thermal properties of fluids, the Transometer is the perfect tool for material characterization applications.



Features

- Compact, turnkey system
- Simultaneously extracts both the thermal conductivity and the interface resistance in a single measurement
- Uses the physics of thermal reflectance to detect small temperature changes on a sample's surface
- Ideal for ultra-thin-film semiconductor and dielectric materials
- High accuracy and repeatability
- Non-contact, fully optical approach
- High sensitivity — can even capture thermal conductivity variations due to different doping levels
- Measures thickness of opaque materials
- Measurement area less than 0.2 mm
- Typical measurement takes less than 30 seconds
- Optional automated sample scan and temperature control
- TransoViewer™ analysis software included

903 N. Bowser Rd, Suite 340 ▪ Richardson, TX 75081 ▪ +1.214.884.8830 ▪ www.tmxscientific.com

Transometer™ N8 Specifications

Performance	
Thermal Conductivity Range	0.2 - 400 W/m·K
Minimum Interface Resistance	0.1×10^{-8} $m^2 \cdot K/W$
Accuracy	2.5%
Repeatability	1.2%
Measurement time	< 30 s, typical
Sample	
Materials	Semiconductors, dielectrics[1], metals, fluids[1]
Surface Preparation	Mirror-like, absorptive top layer for optimal signal to noise ratio (ideally 100-200 nm thick gold)
Maximum Surface Roughness (RMS)	1.0 µ in. (.025 µm)
Minimum Size (L x W)	0.2 × 0.2 in. (5 × 5 mm)
Hardware	
Heating Laser, Pulsed	
Wavelength	Visible
Pulse width HHFW	10 ns
Heating Energy on Sample	Variable, 0 - 50 µJ
Minimum Measurement Spot	~ Ø .008 in. (0.2 mm), which determines minimum sample area
Probing Laser, CW	
Wavelength	Visible
Power Needed on Sample	< 10 mW, which adds negligible energy to sample
Field of View	.012 × .009 in. (317 × 238 µm)
Magnification	20X
Working Distance	0.79 in. (20 mm)
Thermal Chuck Temperature Range[2]	50°F - 248°F (10°C to 120°C) (can go lower in non-condensing environments)
X-Y sample positioning	Manual: 0.98 × 0.98 in. (25 × 25 mm) Automated[2]: 5.9 × 5.9 in., (150 × 150 mm, 0.001 accuracy)
Physical and Electrical	
Measurement Station Dimensions H × W × D	60 × 36 × 36 in. (152 × 91 × 91 cm)
Measurement Station Weight	250 lb (114 kg)
Sample Holder	Passive Chuck: Ø 6.0 in. (15.2 cm) chuck Thermal Chuck[2]: Ø 4.0 in. (10.2 cm) chuck with vacuum holes[3]
Operating Environment	41°F - 86°F (5°C - 30°C) 20 - 60% relative humidity, non-condensing
Power Requirement	Low voltage, 110 - 240 VAC, 50/60 Hz, < 1000 W typical

1) A top gold absorption layer is required if the material of interest is transparent
2) Optional feature
3) Optional vacuum pump required