



Description

The TOCS-R2 chips are designed for bidirectional 3-omega measurements using Nanotest's TOCS® system. Chips can be purchased as single chips or as wafers. On each wafer there are four different chip types, which will be described in detail on the next pages.

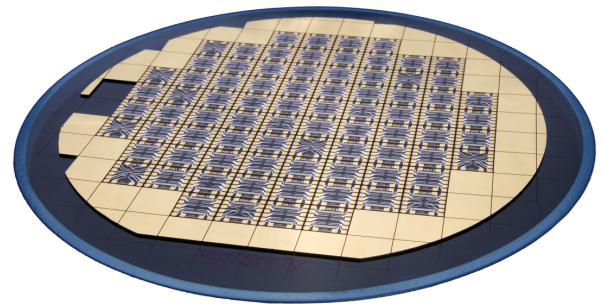


Figure 1 Wafer with TOCS-R2 chips.

Technical Specification

Wafer

| | | |
|------------------------|---|-----------------|
| Fabrication technology | Thin film | |
| Wafer material | Glass, thermal conductivity 1.2 W/(m·K) | |
| Wafer size | 150 | mm |
| | 6 | inch |
| Wafer thickness | 700 | µm |
| Cell size | 12 x 12 | mm ² |

Sensor

| | | |
|---|--|-----|
| Sensor type | line resistor | |
| Sensor material | aluminium | |
| Sensing method | four-terminal sensing | |
| Sensor thickness | 100 | nm |
| Sensor width | 5-15 (depending on chip-type) | µm |
| Resistance value | 35-45 | Ω |
| Temperature coefficient of resistance of sensor | (2.8-3.8)·10 ⁻³ | 1/K |
| Passivation | Silicon oxide (100 µm, 200 µm or 300 µm depending on wafer). | |

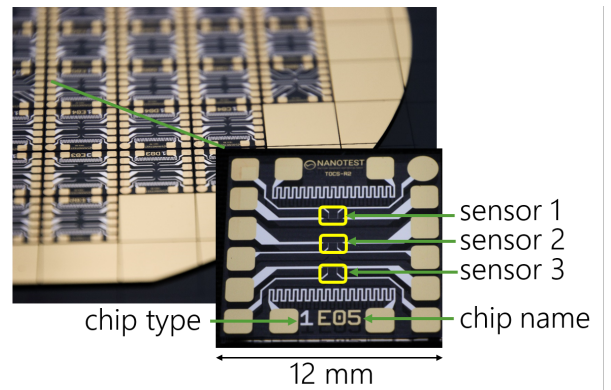


Figure 2 TOCS-R2 chips and chip name.

Chip selection guide

There are 4 different types of chips on the wafer. The chip type is indicated on each chip, as displayed in Figure 2. The location of the chips on the wafer is shown in Figure 3.

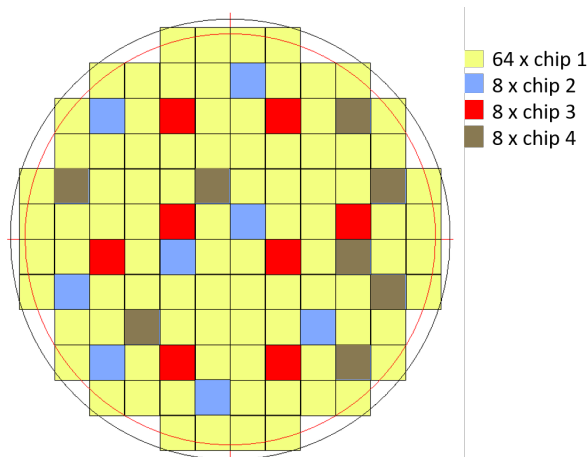


Figure 3 Location of the different chip types on the wafer.

Chip Type 1

This chip type is designed for cross-plane thermal conductivity measurements based on the bidirectional 3-omega method as described, e.g. in Cahill, D. G., *Rev. Sci. Instrum.* **61**, 802-808 (1990), Grosse, C. *et al.*, *Sensors and Actuators A* **278**, 33-42 (2018), DOI: 10.1016/j.sna.2018.05.030 or Lubner, S. D. *et al.*, *Rev. Sci. Instrum.* **86**, 014905 (2015) or Dames, C., *Annual Review of heat transfer*. **16**, 7-49 (2013). It is the main chip type for TOCS. The layout is shown in Figure 4.

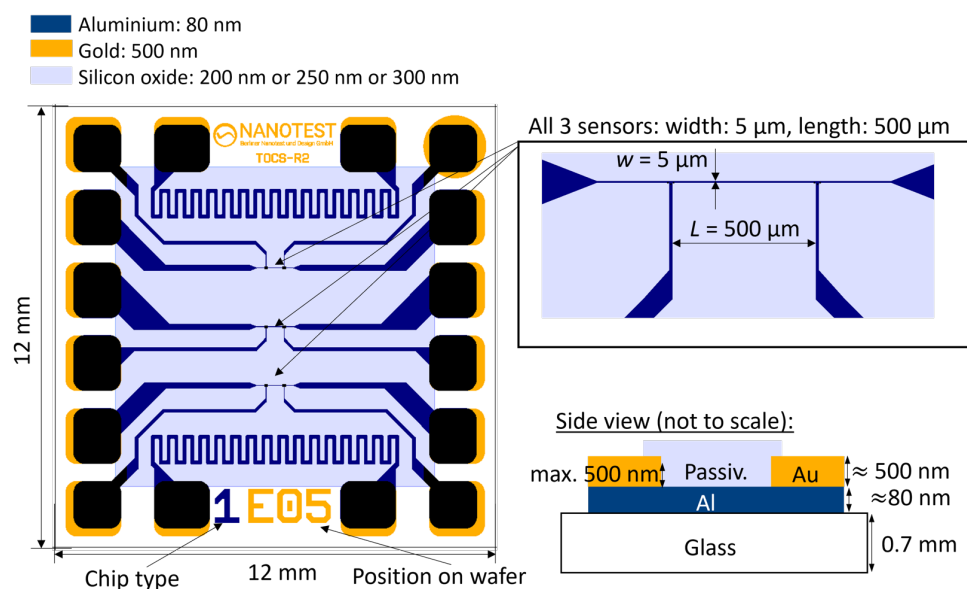


Figure 4 Chip type 1

Application remarks

All offered chips are supposed to be used for characterization purposes. The application of the data from the test die to a functional system lies in the responsibility of the user. Nanotest makes no warranty, express or implied including the implied warranties of merchantability and fitness for a particular purpose, that the user's system designed using that data will perform as intended.