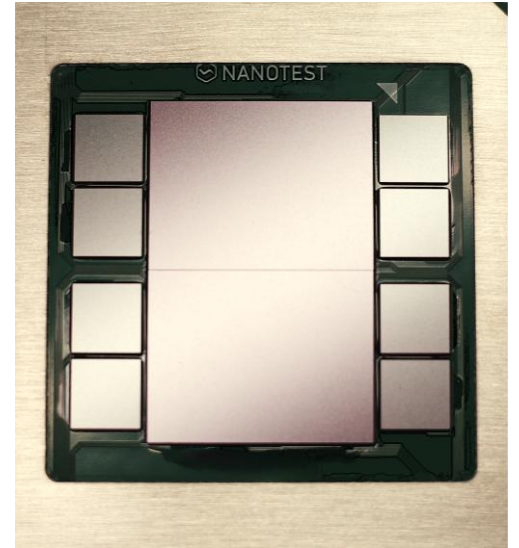


## Description

The **TTV200** is a thermal test vehicle designed to emulate the thermal and power characteristics of modern GPU architecture. With its large **52.5 × 50 mm<sup>2</sup> die area**, the TTV200 provides a versatile and precise platform for advanced thermal testing across a wide range of temperature-related applications.

The **TTV200 module** supports independent control of up to **18 heater zones** (custom design up to 48), enabling the simulation of a wide range of thermal scenarios. The intuitive interface allows easy configuration of temperature profiles and complex test setups.

The package integrates **112 on-die temperature sensors** and additional **8 package temperature sensors**. It consists of 2 main dies, and 8 satellite dies in **chiplet configuration**.



TTV200

## General Information

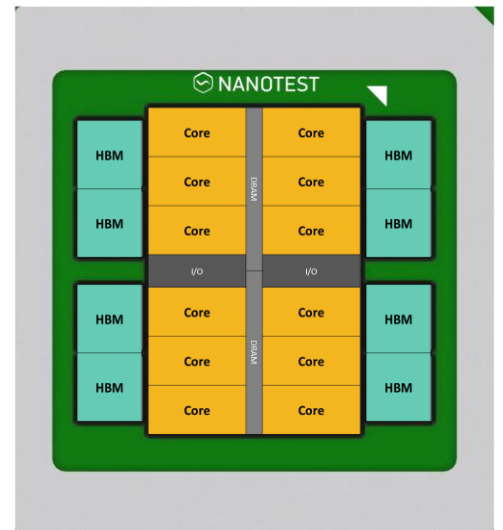
Chip Type	NT20-3k-FC
Chip Configuration	(2x) 10 x 13 matrix   (8x) 4 x 4 matrix
Packaging Technology	Flip Chip
PCB Substrate	MCL-E-705G
Chip Substrate	Undoped Silicon
Chip Surface	Bare Silicon   Backside Metallization
Chip Size	(2x) 32,5 x 50 mm <sup>2</sup>   (8x) 10 x 10 mm <sup>2</sup>

## Heater (Electrical Specification)

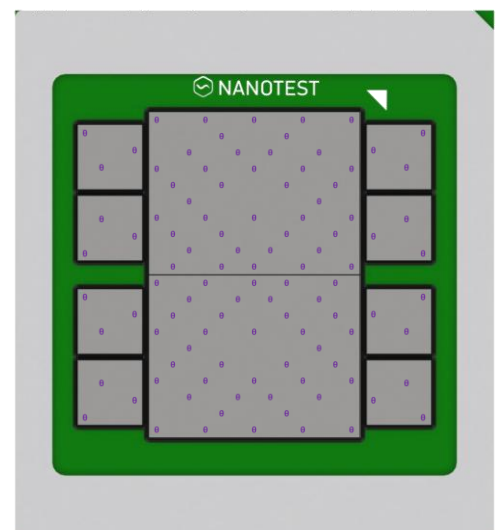
Heater Type	Resistor
Heater Material	Ti 100 nm
Number of Heater Zones	Up to 48
Electrical Resistance	2,3 / 2,8 / 7 / 10,5 Ω
Max Voltage	36 V
Max Current	≤ 24 A
Max Power	7400 W
Power Density	≤ 6.5 W/mm <sup>2</sup>
Max Operating Temperature	125 °C

## Sensor

Sensor Type	Meander-Structured RTD
Sensor Material	Ti 100 nm
Number of Sensors	112 RTD
Resistance Value at RT	(2.9 ± 0.1) kΩ
Sensitivity	10.0 Ω/K
Sensor Connection	4-Wire Sensing
Dimensions (l × w)	820 × 100 μm <sup>2</sup>



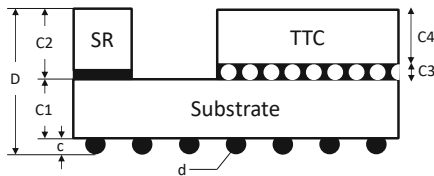
Heater Zone Map



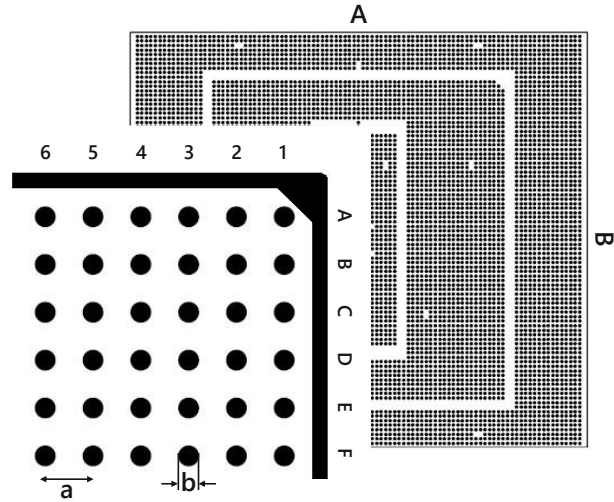
Temperature Sensor Map

# TTV Package

SYMBOL	NOTE	Dimension
A	Package Width	81.0 mm
B	Package Length	73.4 mm
C1	Substrate	2.63 mm
C2	Stiffener	900 $\mu\text{m}$
C3	Bump Height (soldered)	175 $\mu\text{m}$
C4	Die Thickness	725 $\mu\text{m}$
D	Package Height	3.83 $\mu\text{m}$
a	Pitch	800 $\mu\text{m}$
b	SMD-Pad	400 $\mu\text{m}$
c	BGA Height (soldered)	400 $\mu\text{m}$
d	Ball Diameter	500 $\mu\text{m}$



## BGA-Package 8110-Lead (81.0 mm x 73.4 mm)



# TTV200 Module

The **Electronic Test Board (ETB)** provides the electrical interface between the **TTV200 Thermal Test Vehicle** and the **TTV Control Unit (TCU)**. It enables precise heater control, high-density temperature monitoring, and interconnect reliability testing while maintaining a compact and easy-to-integrate measurement setup. The TTV200 module significantly **reduces wiring complexity**, improves **measurement stability**, and simplifies **thermal characterization and long-term reliability testing**.

### Heater Power and Monitoring

- Supporting up to **36 independent heaters**
- 4-wire measurement for accurate **heater power sensing**
- Optional **custom adapters** for flexible heater configurations

### Temperature Sensors

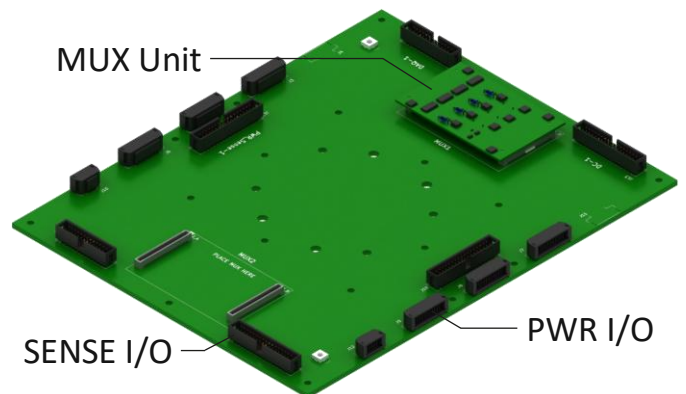
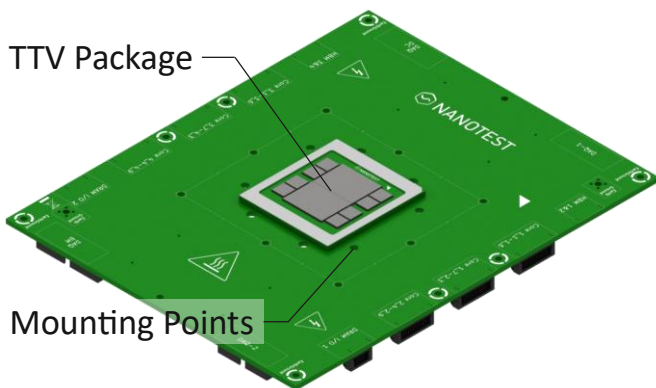
- Access to **104 on-die temperature sensors**
- Additional **8 NTC sensors on the package bottom side**

### MUX-Units

- Plug-in **multiplexer unit (MUX)** enables easy **monitoring of temperature sensors**
- Two MUX units connect directly to the backside of the ETB for a compact and robust system setup

### Interconnect Health Monitoring

- **16 integrated daisy chains** (8 first-level, 8 second level)
- Enables **resistance monitoring** of interconnect



# TTV200 Control Units

## 19" Unit with 6 Power Supplies (TCU6)

Number of Controllable Heater Zones	6
Max. Heating Power (not uniform)	3500 W*
Max. Uniform Heating Power	1500 W (0.6 W/mm <sup>2</sup> )
Operating System	Windows 10 IoT
Rated Supply Voltage Range	100 – 240 V (1-phase AC)
Rated Supply Input Current	20 A
Rated Supply Line Frequency	50 Hz/60 Hz
Weight	30 kg
Dimensions (w x h x d)	44 x 17.5 x 51 cm <sup>3</sup>

\*Not guaranteed with voltage supply below 230 V



TCU6-200

## Rack Unit with 12 Power Supplies (TCU12)

Number of Controllable Heater Zones	12
Max. Heating Power (not uniform)	7400 W
Max. Uniform Heating Power	4800 W (1.9 W/mm <sup>2</sup> )
Operating System	Windows 10 IoT
Rated Supply Voltage Range	380 - 400 V (3-phase AC)
Rated Supply Input Current	32 A CEE Plug
Rated Supply Line Frequency	50 Hz/60 Hz
Power Distribution Unit	Yes, with emergency stop switch
Weight	90 kg
Dimensions (h x w x d)	86 x 60 x 80 cm <sup>3</sup>



TCU12-200

## Rack Unit with 18 Power Supplies (TCU18)

Number of Controllable Heater Zones	18
Max. Heating Power (not uniform)	7400 W
Max. Uniform Heating Power	4800 W (1.9 W/mm <sup>2</sup> )
Operating System	Windows 10 IoT
Rated Supply Voltage Range	380 - 400 V (3-phase AC)
Rated Supply Input Current	32 A CEE Plug
Rated Supply Line Frequency	50 Hz/60 Hz
Power Distribution Unit	Yes, with emergency stop switch
Weight	120 kg
Dimensions (h x w x d)	86 x 60 x 80 cm <sup>3</sup>



TCU18-200

## Application remarks

The offered products 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.