

# Thermal Analyzer

Thermal Evaluation of Metallized Ceramic Substrates

TE100



Specimen load 10 kg

Sampling rate 100 sampling/sec (max)

Temperature characteristics Resolution  $\geq 0.01^{\circ}\text{C}$

Electrical resistance measurement error  $\pm 0.1\text{m}\Omega$  (range 70-130 $\Omega$ )

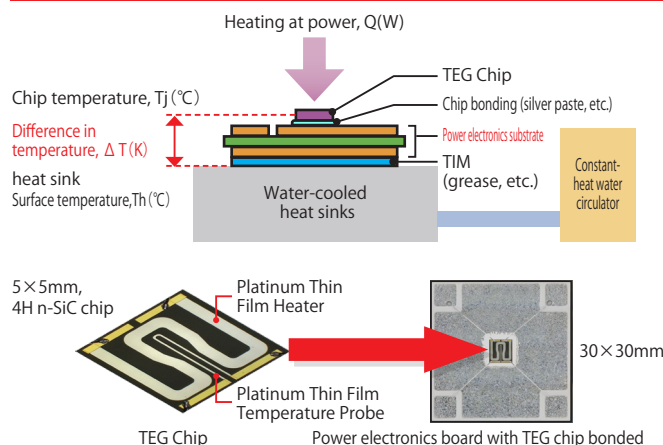
- Evaluates thermal characteristics (thermal resistance) of power device substrates
- Capable of evaluating heat dissipation characteristics due to module structure
- Capable of measuring and evaluating heat dissipation characteristics of individual substrate materials
- Evaluated according to "International Organization for Standardization ISO 4825-1:2023"

## Effective thermal resistance of power electronics board, $R_{th}(\text{K/W})$

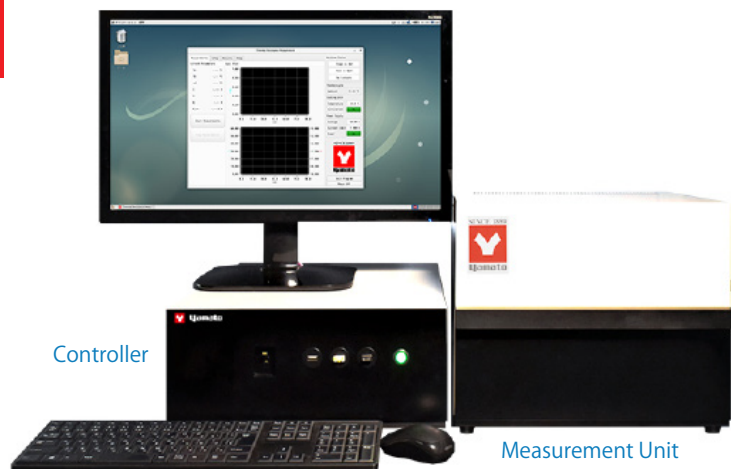
Can be calculated from chip temperature, heatsink surface temperature, and applied power

### Thermal Resistance Calculation Method

$$\text{Formula: } R_{th} = \Delta T / Q$$



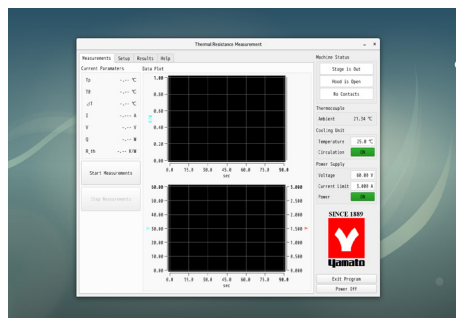
### Equipment Configuration



\* Monitor, keyboard and mouse to be provided by the user

## ANALYSIS SYSTEM (SOFTWARE) AS STANDARD

- Simple operation screen with "Setting", "Measurement", "Result", and "Help"
- Centralized Heating of TEG Chips and cooling by CFA302 Water Circulator



### SPECIFICATION OF TE100

Compatible specimen size (ISO4825-1:2023)		30 x 30 mm
Specimen load		10 kg
Temperature characteristics		Resolution $\geq 0.01^{\circ}\text{C}$
Electrical resistance measurement error		$\pm 0.1\text{m}\Omega$ (70 ~ 130 $\Omega$ )
Sampling rate		100 sampling/sec (max)
Supply voltage		AC100V 50/60Hz
Size	Controller	W380 x D470 x H180mm
	Measurement unit	W380 x D400 x H320mm

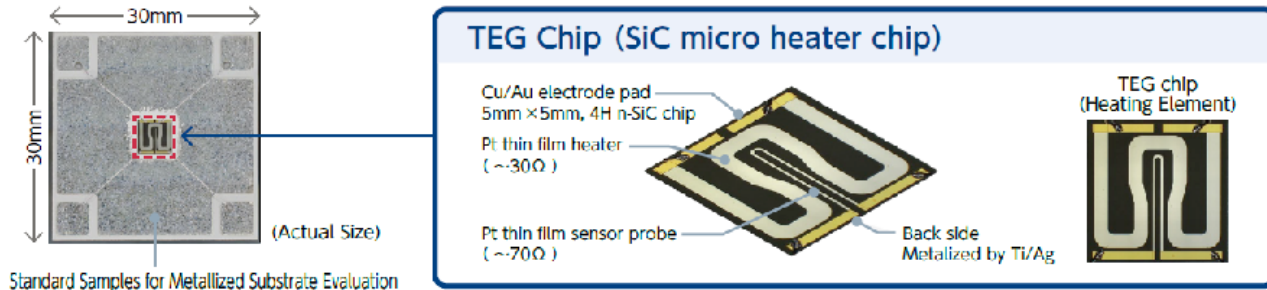
## ISO 4825-1:2023

Fine ceramics (advanced ceramics, advanced technical ceramics) --  
Test method for thermal property measurements of metallized ceramic substrates  
Part 1: Evaluation of thermal resistance for use in power modules.



## TEG CHIP (CONSUMABLE)

The TEG Chip is Attached to a Sample for Evaluation, such as a Metallized Substrate.



### SPECIFICATION OF TEG CHIP

Heat generation intensity	1KW / cm <sup>2</sup>
Maximum input power	about 250W.
Temperature increase rate	1.4×10 <sup>4</sup> K/sec
Size	W5×D5×H0.35mm

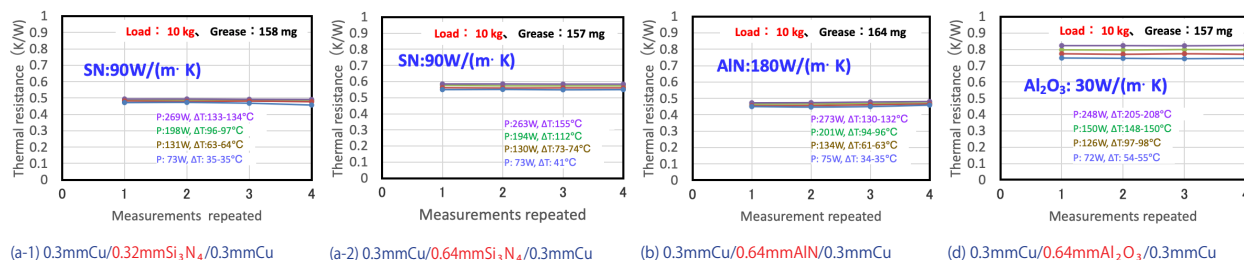
### SPECIFICATION OF CIRCULATOR CFA302

Circulation Method	External Closed System Circulation
Cooling Method	Air cooling
Temperature control range	- 10 ~ 60°C
Power supply	AC100V 13.8A
Size	W380×D565×H725mm



## Thermal property measurements with good reproducibility

Determine slight differences in thermal resistance due to ceramic materials and thicknesses



## What are the target markets for TE100?

- Power semiconductors, such as for automotive, electrical, and railroad applications. It contributes to high thermal conductivity design of semiconductors.
- Ceramic substrate manufacturer
- Heat transfer material manufacturer (grease, heat transfer sheets)
- Diamond attach bonding material manufacturer
- Heat sink manufacturer

## Is TE100 only applicable to metallized ceramic substrates?

It can be applied to ceramic substrates, heat transfer materials, heat sinks, and other power semiconductor components.