

TWENTY-SEVENTH ANNUAL



TestConX™

Archive

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Innovative Resin-Based Materials with Superior Micromachinability and Functional Properties

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Mesa, Arizona • March 1–4, 2026



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 - TZ3300(Normal, Low Dk, Low CTE)
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Four development policies

TZ3300 Standard Grade

- ◆ Low water absorption and minimal dimensional change.
- ◆ Highest CTI, ideal for high current sockets.
- ◆ Low dielectric constant for high frequency.
- ◆ High heat resistance for high temperature environments.

Conductive Grade

- ◆ Low resistivity offers anti-static performance, preventing short circuits and probe insertion/removal issues.
- ◆ Enables fine processing of 50µm or less.

New Materials Overview

Low Dk/Df grade

- ◆ Very low Dk and Df.
⇒ Suitable for high frequency sockets, reducing signal loss.
- ◆ Allows 100µm level processing.
- ◆ THERPLIM base resin ensures low water absorption and minimal Dk decrease.

Low CTE grade

- ◆ Achieved CTE of 5 ppm.
- ◆ Elastic modulus > 10 GPa for high rigidity.
- ◆ Laser processing and drilling evaluations ongoing.
- ◆ Ideal for probe cards and high-precision parts.

Four development policies

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- ◆ Enables fine processing of 50µm or less.

New Materials Overview

Low Dk/Df grade

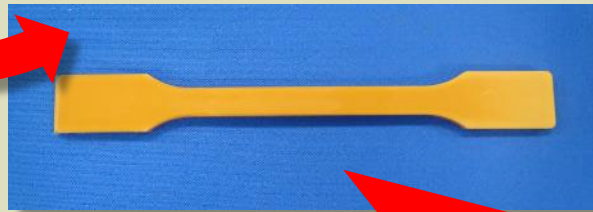
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Low CTE grade

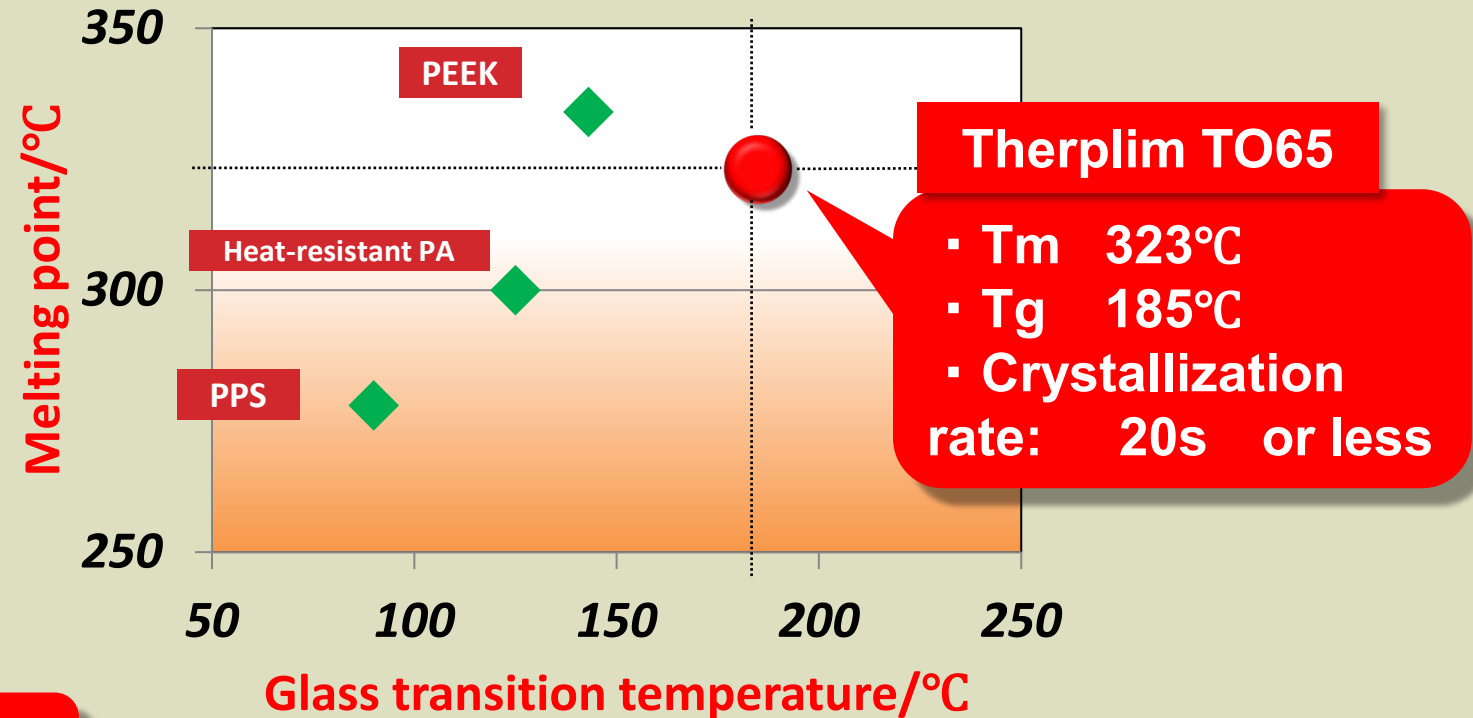
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Thermophysical properties of Therplim

 THERPLIM



Various molding methods including injection molding are possible.



Micromachining grade development concept

+ Special Ceramics

+ MGC compounding technology

= We are developing various new fine-processing base materials for test sockets and more.

Progress since last year.



- ✓ High Tm/Tg resin.
- ✓ Low water absorption.
- ✓ Good electrical properties. etc.

Standard Grade

- ✓ Deeper investigation into laser processing

Low Dk/Df grade

- ✓ Broadened study of L1 diel.
- ✓ New materials with Dk 2.5

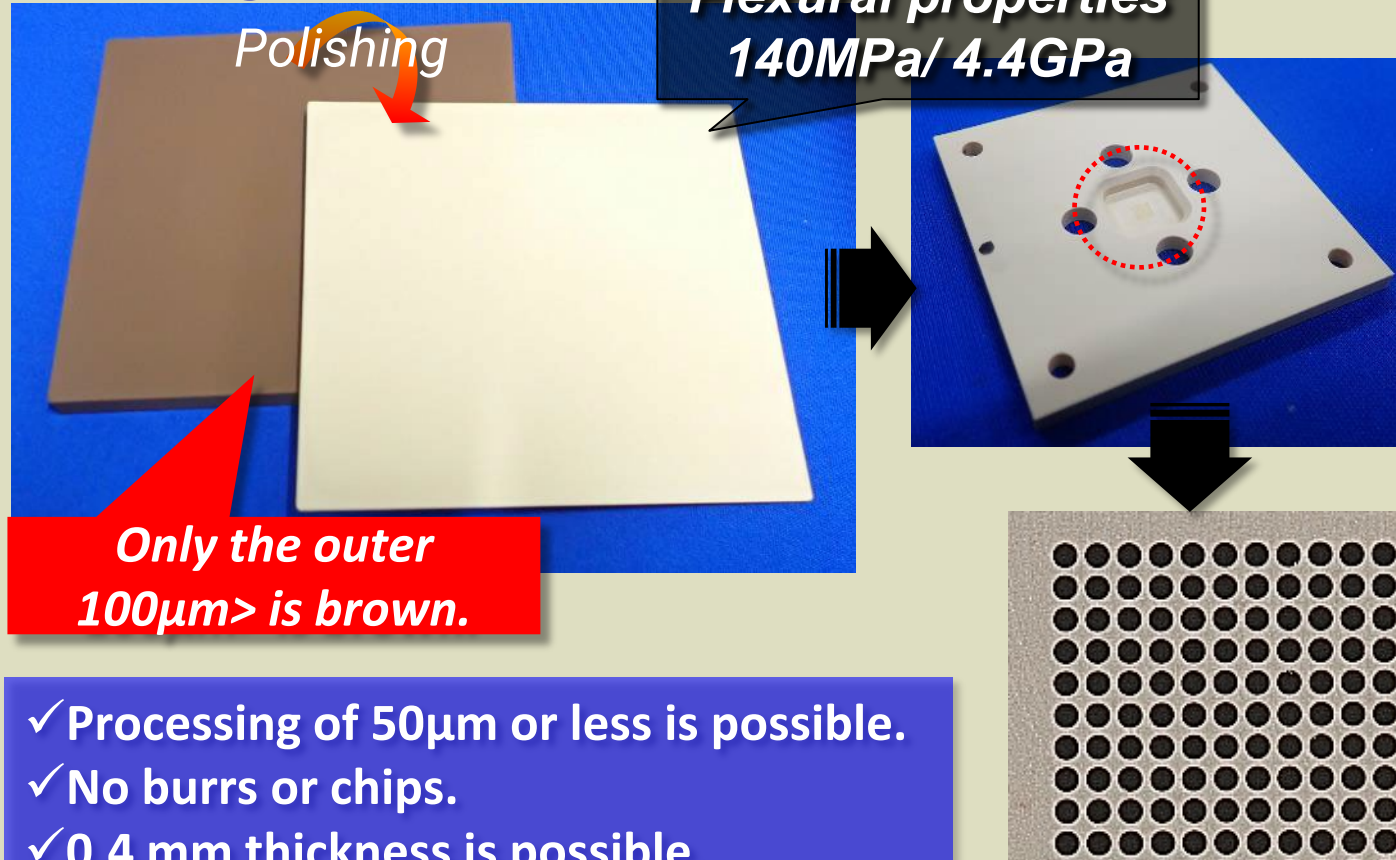
Low CTE grade

- ✓ Achieving CTE $\approx$ 5 ppm

We'll introduce our proven main grades, high-demand Low Dk/Df grades, and next-gen grades in development.

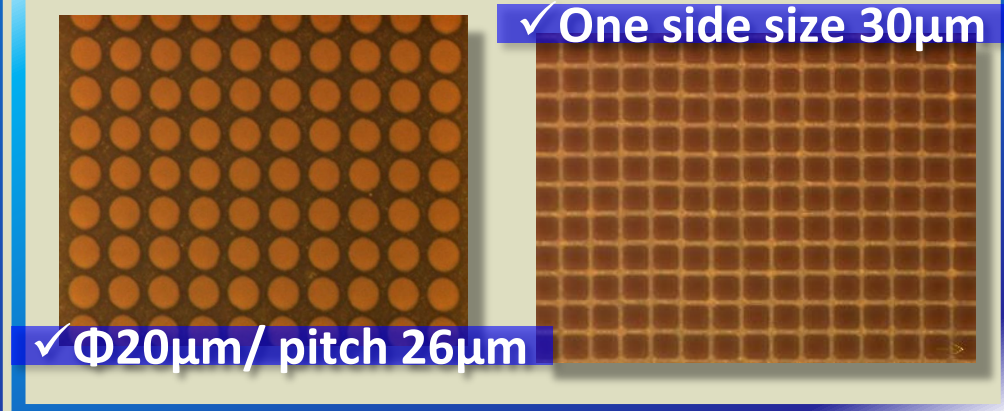
Typical properties of TZ3300

【 Drilling 】



- ✓ Processing of 50μm or less is possible.
- ✓ No burrs or chips.
- ✓ 0.4 mm thickness is possible.

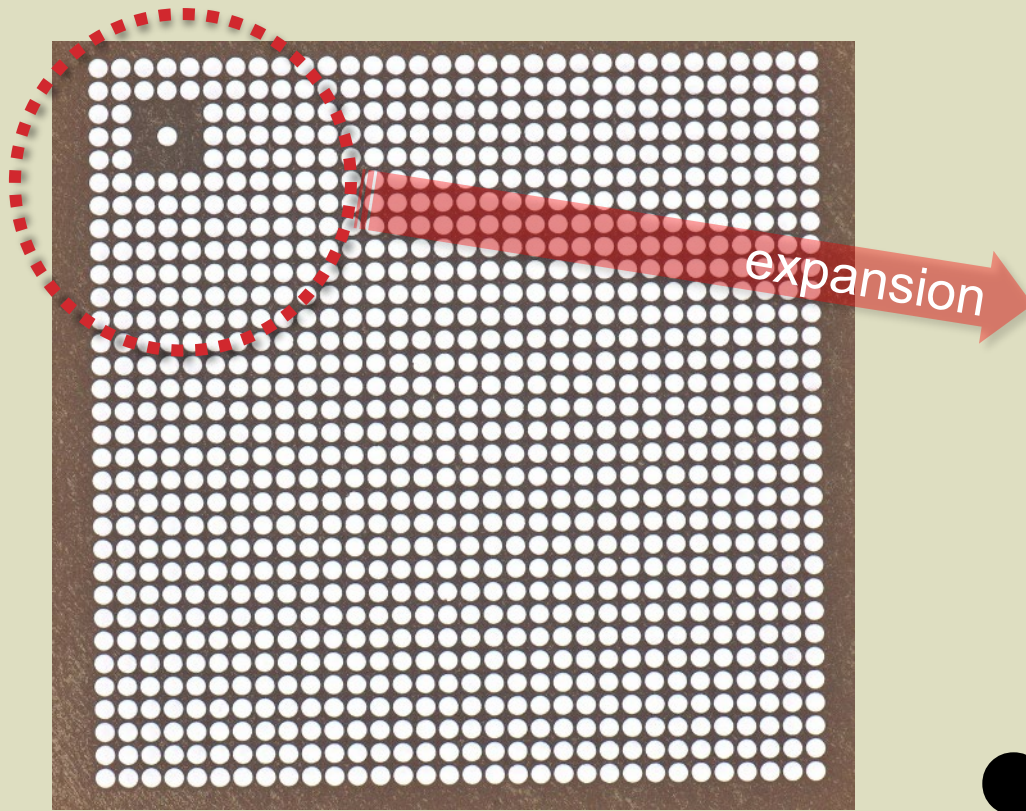
【 Laser 】



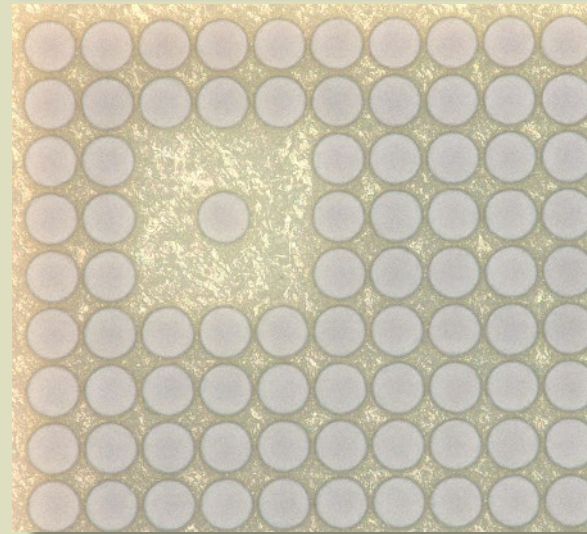
	TZ3300	PEEK base
CTI (comparative tracking index)	600V (Highest Rating)	150~200V
Water absorption * 23°C/24h in water	0.06%	0.08%

● Suitable for standard test sockets as well as high-current test sockets.

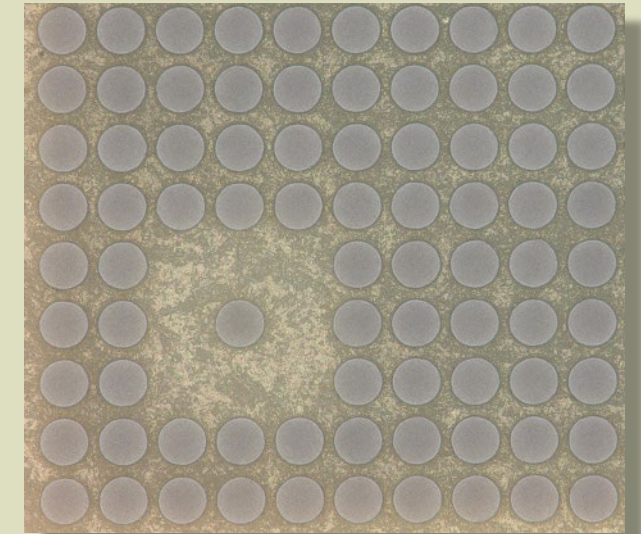
Machining example of TZ3300 【 Laser 】



✓ Laser entrance surface



✓ Laser exit surface



● There were no burrs and no wall defects.

Hole diameter/pitch : $25\mu\text{m} / 31\mu\text{m}$
.: Wall Thickness $6\mu\text{m}$

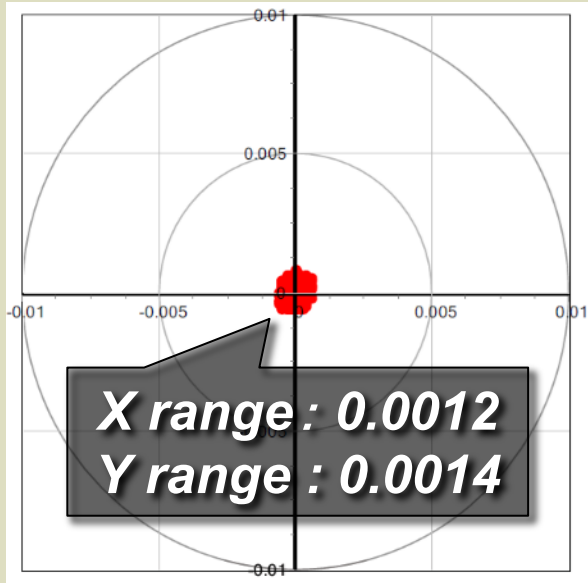
Processed part plate thickness : 0.2mm

Hole pattern : 32x32 1016 holes

Provided by **KT** KOYO TECHNOS

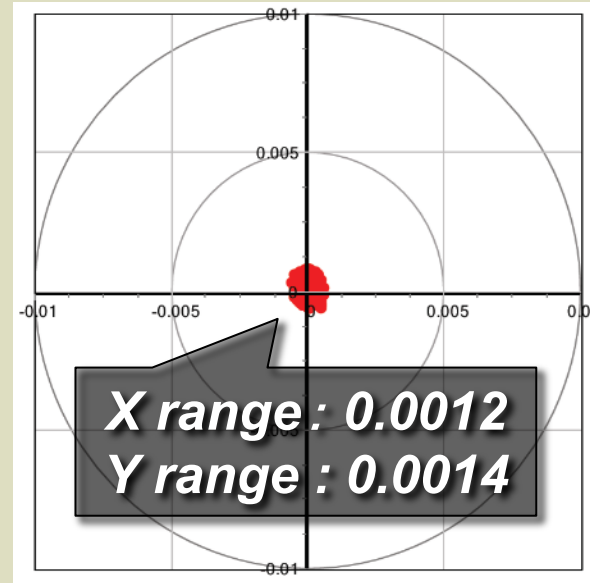
Machining example of TZ3300 【 Laser 】

✓ Laser entrance surface



* Hole diameter range/
24.4 to 25.3 μm

✓ Laser exit surface

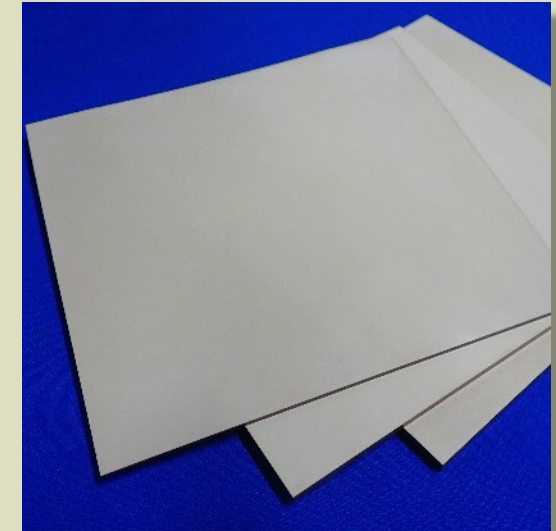


* Hole diameter range/
24.3 to 25.4 μm

● **Hole position accuracy is also very good.**

Provided by **KT KOYO TECHNOS**

To support various microfabrication products,
we have expanded our sheet size lineup.



✓ Sample size

- 70 × 70 × 4mmt
- 100 × 100 × 6mmt
- 150 × 150 × 2.5/3.5/5.5mmt
- Maximum 500 × 500 × 10mmt

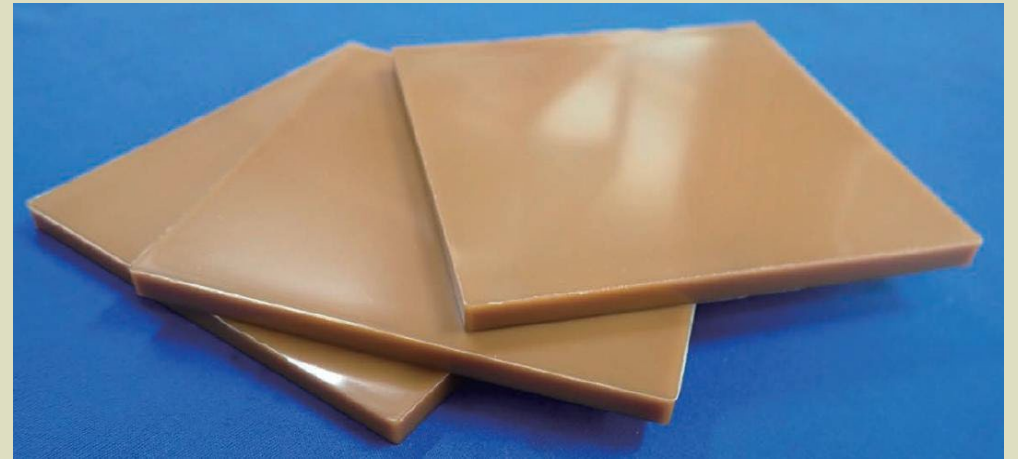
Typical properties of TZ3300-L1 【Low Dk/Df】

	TZ3300-L1
Permittivity /Dk	2.7
Loss tangent /Df	0.0028
CTI (V)	≥600
Water Absorption (%) * 24h immersion	0.08
Flexural Strength (MPa)	125
Flexural Modulus (GPa)	2.8

Dk/Df Measurement method: *Cavity resonator method (10GHz)*

Measurement conditions: 23°C/50%Rh

Measurement size: 1mm × 2mm × 70mm (Cutting from plate)

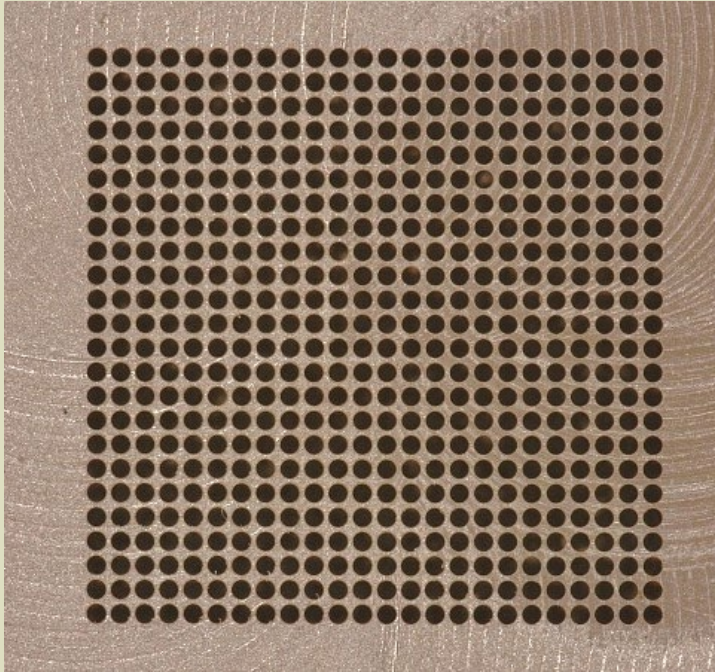


✓ Sample size

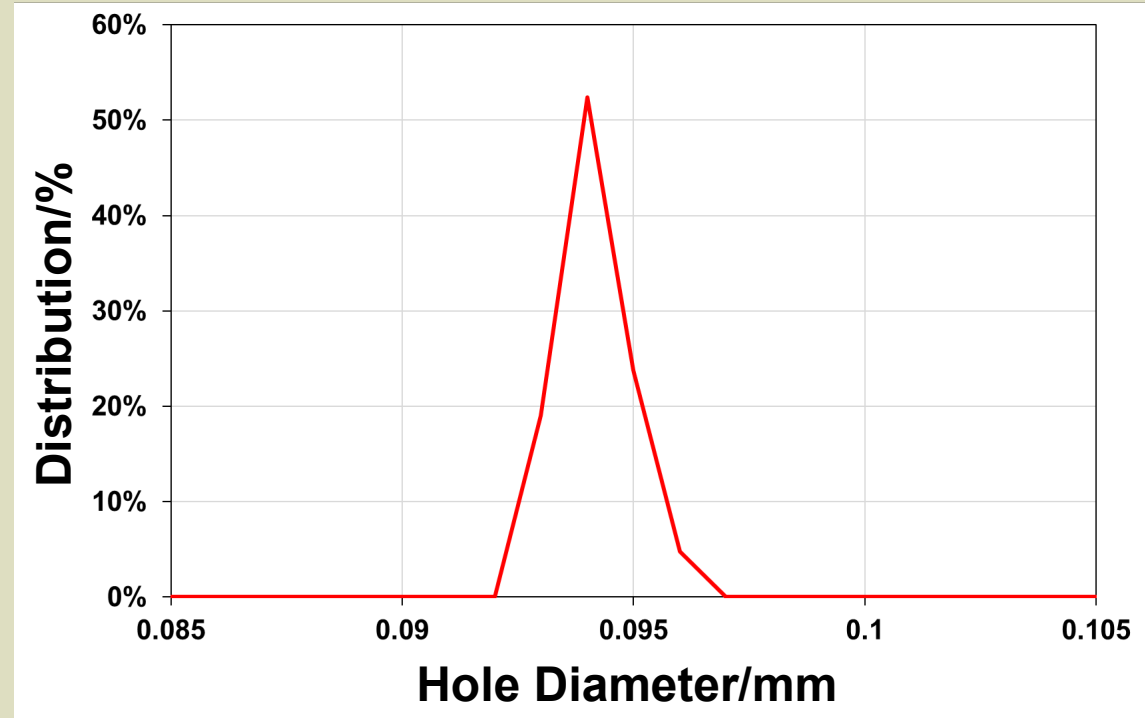
- 100 × 100 × 6mmt
- 150 × 150 × 3.5mmt
- Maximum 500 × 500 × 30mmt

- Last year we introduced two grades, L1 and L2, but we're now focusing on L1, which offers the best overall balance of properties.

Machining example of TZ3300-L1 【 Drilling 】



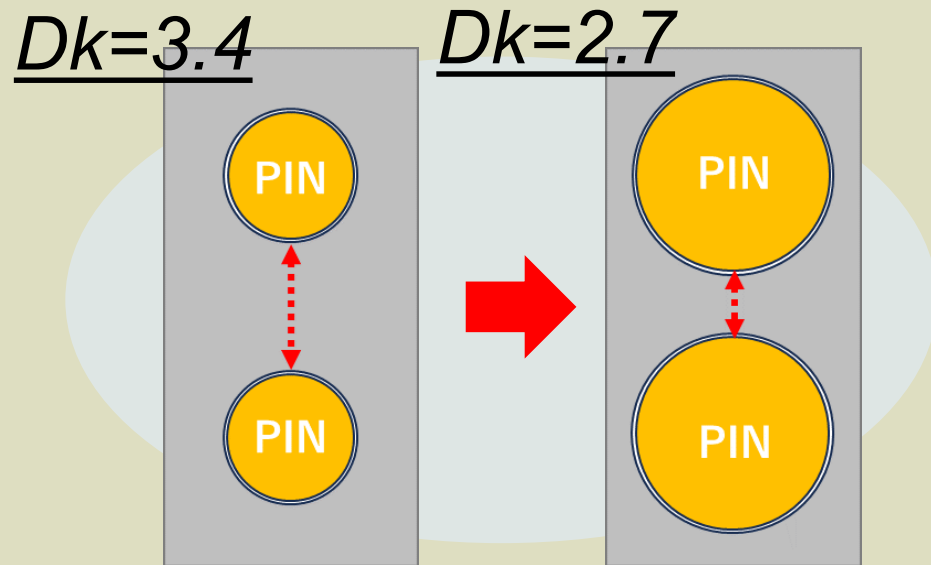
- ✓ $\phi 100\mu\text{m}$ /pitch $120\mu\text{m}$
- ✓ No burrs or chips



Advantages of low Dk materials

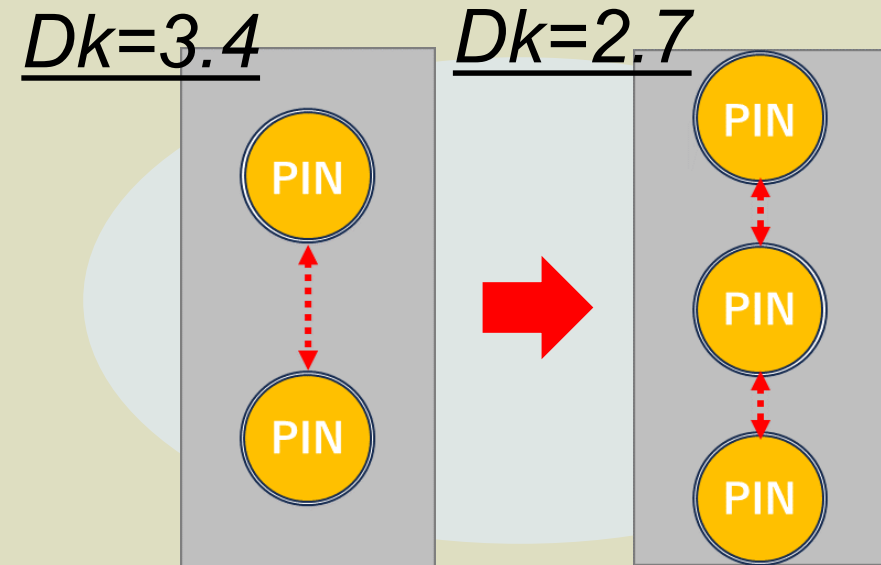
Suppressing crosstalk between adjacent pins enables "Wall Shrinkage"

I. Pogo Pin diameter can be increased.



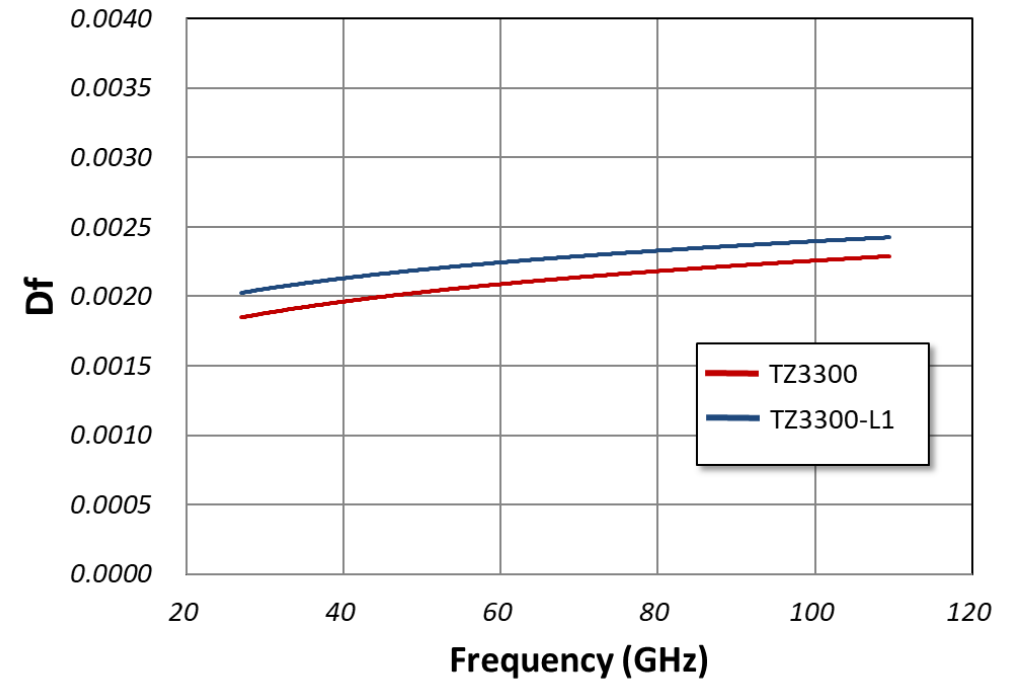
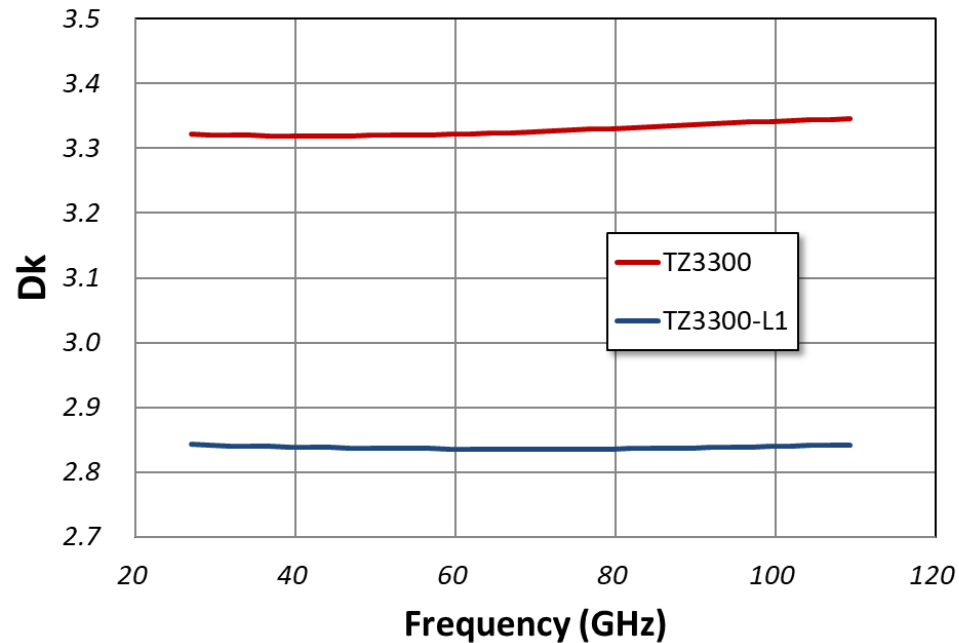
Significant cost reduction is possible.

II. High integration of Pogo Pins



Increased design freedom and miniaturization are possible.

Frequency dependence of dielectric properties



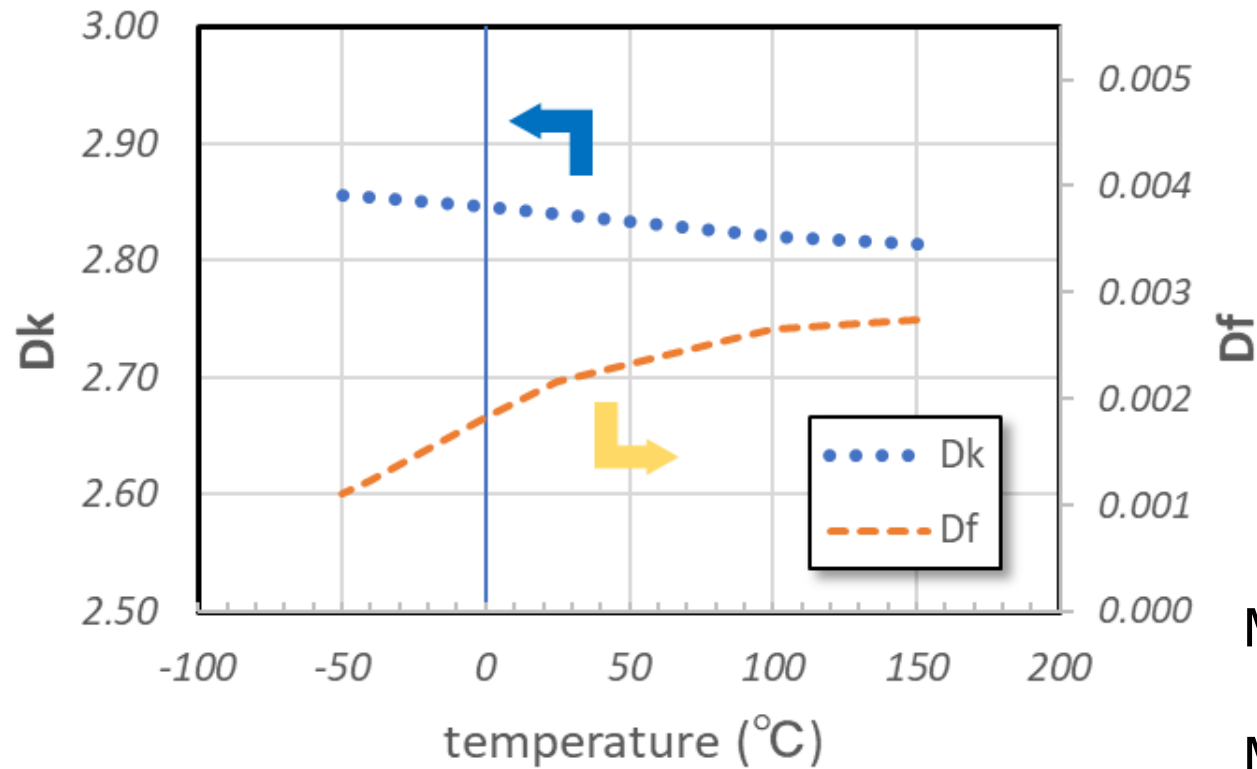
Measurement method: *Fabry-Perot cavity method*

Measurement conditions: 25~110GHz, 21 °C/43%Rh

● **Dk remains stable up to the high-frequency range beyond 100 GHz.**

* Compared with the Cavity resonator method, the Fabry-Perot resonator and split-cylinder resonator methods yield higher values.

Temperature dependence of dielectric properties



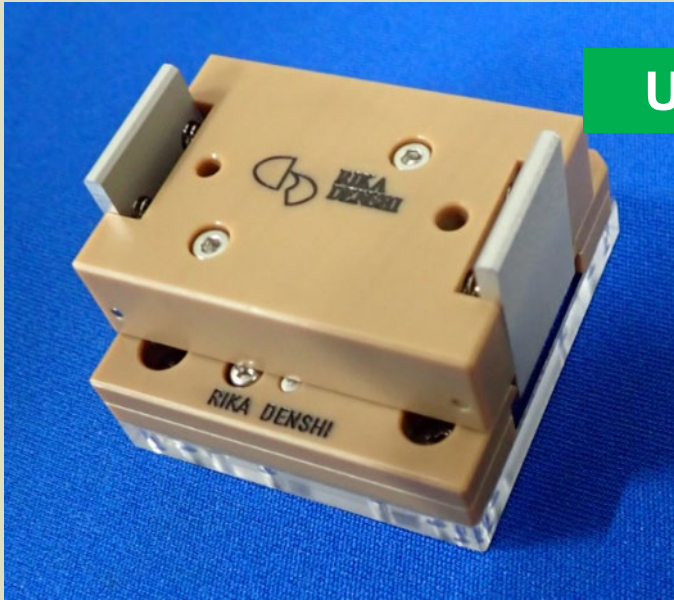
Measurement method:

Split Cylinder Resonator Method (10GHz)

Measurement conditions: -50 ~ 150°C

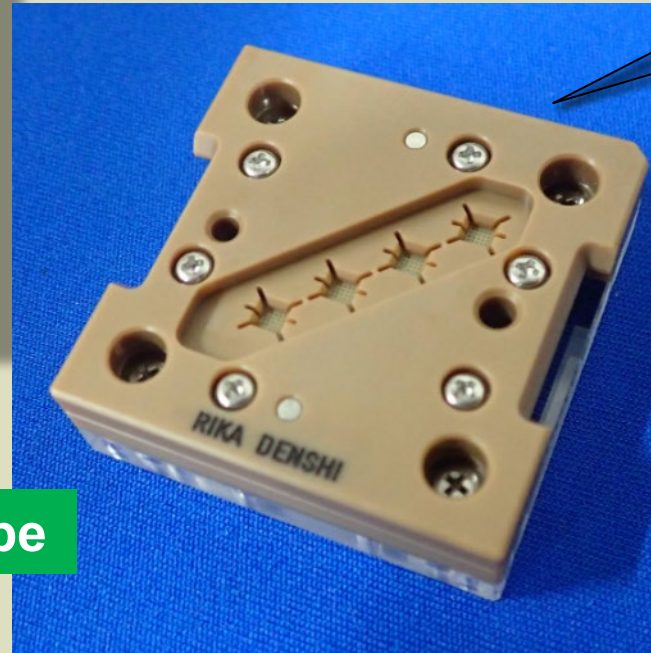
- Dk stays low across the full temperature range, from low to high.
Df shows only a limited increase at higher temperatures.

Sample examples of TZ3300-L1 products



Using TZ3300-L1

High frequency BGA type



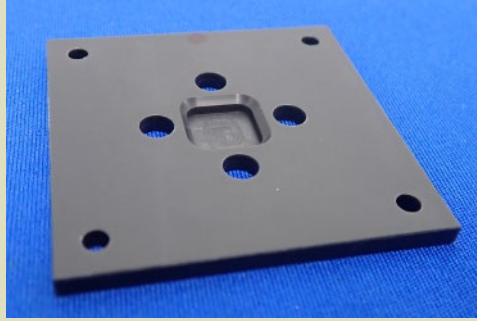
$\phi 0.3\text{mm}$ (Pitch-0.4mm)
5x5 holes, quadruple specification

Provided by
RIKA DENSHI CO., LTD.

● Can be used for high frequency test sockets.

Typical properties of TZ3300-HL 【Low Dk/Df】

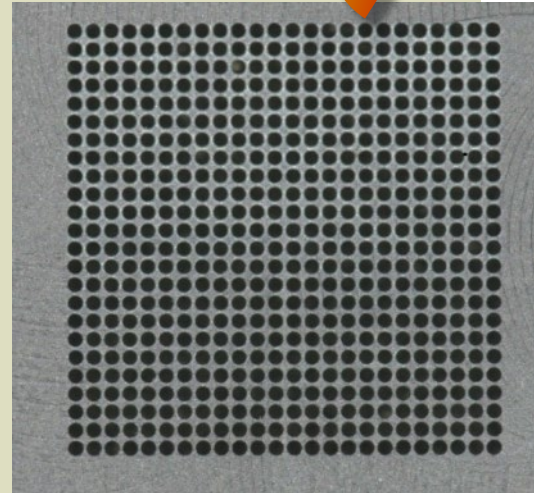
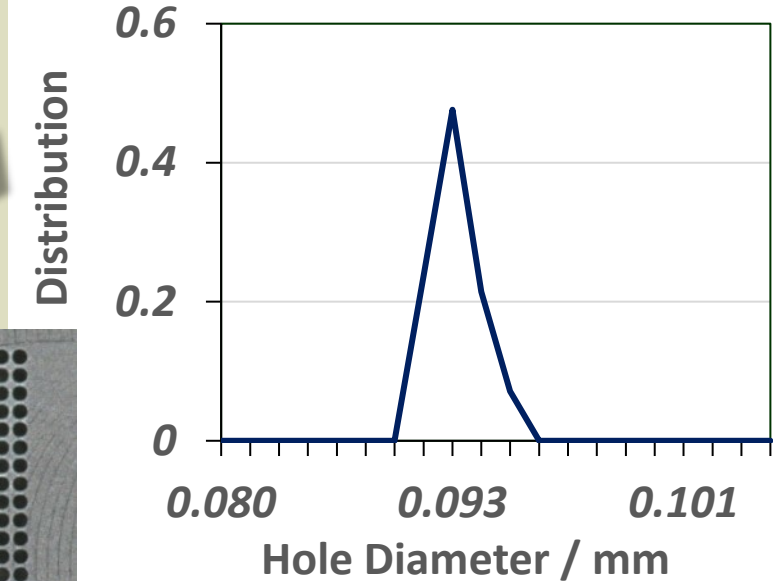
Low Dk/ Df and High Heat resistance grade



✓ Sample size

- 100 × 100 × 6mmt
- 150 × 150 × 3.5mmt
- Maximum 500 × 500 × 15mmt

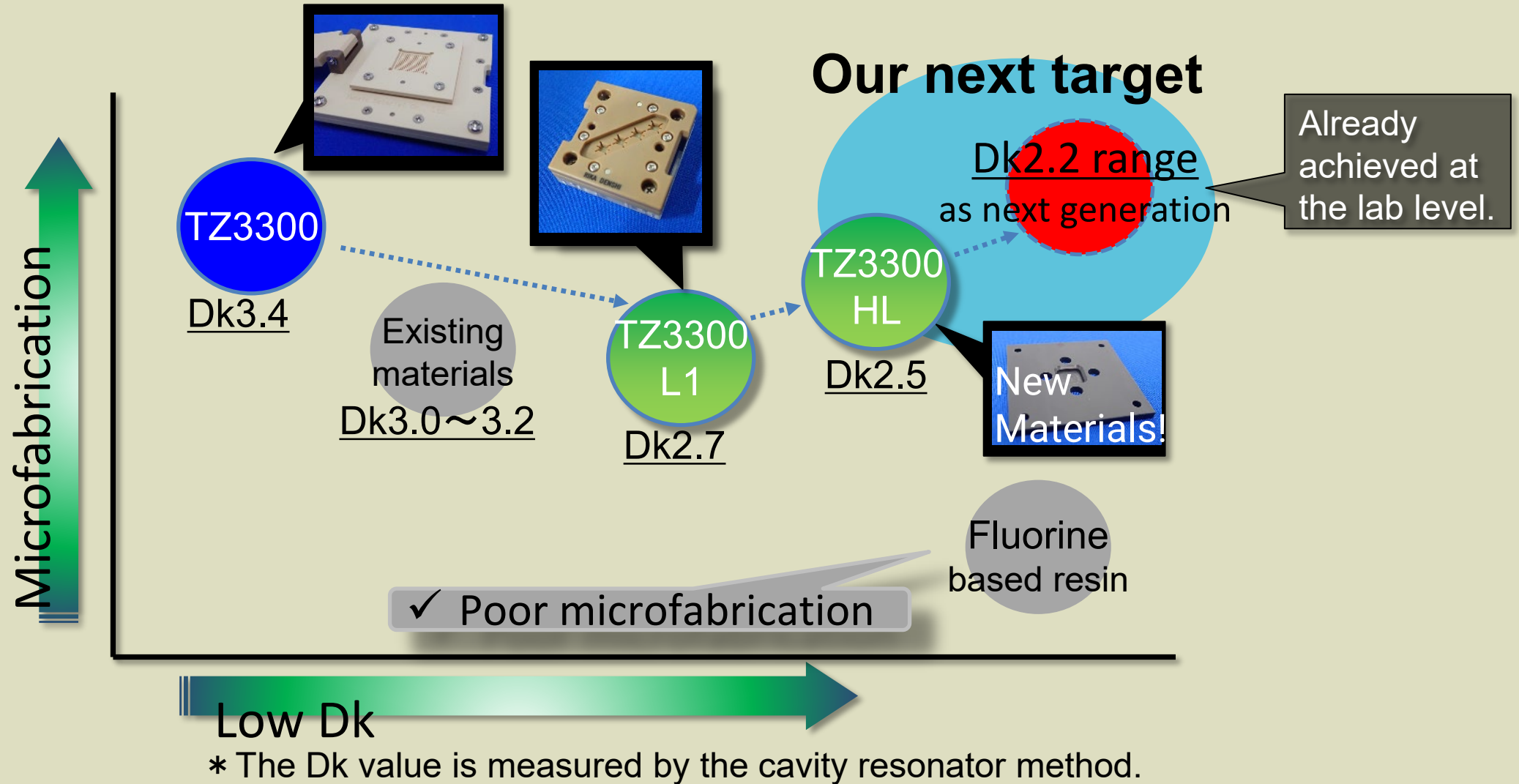
	TZ3300-HL
Tg (°C)	>200
Permittivity /Dk	2.5
Loss tangent /Df	0.003
Water Absorption (%) ※24h immersion	0.08
Flexural Strength (MPa)	121
Flexural Modulus (GPa)	3.3



- ✓ $\phi 100\mu\text{m}$ /pitch 120 μm
- ✓ No burrs or chips

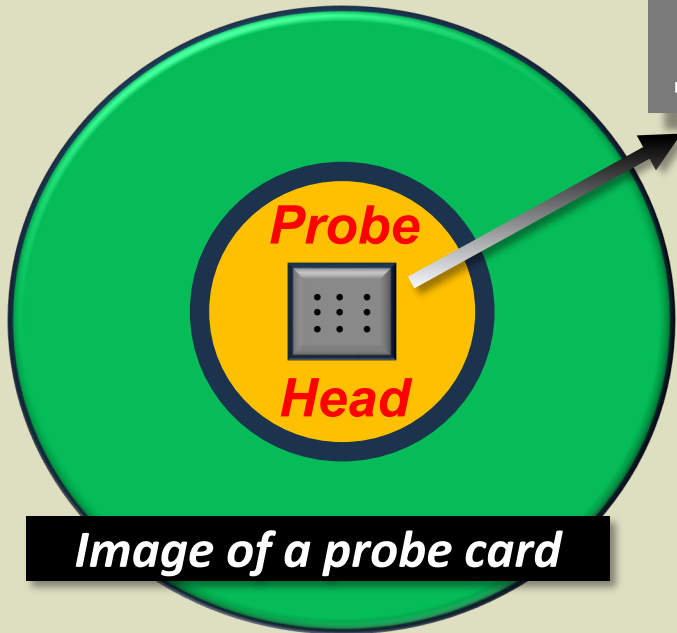
● Developed as a next-generation low-dielectric grade. Mass production is being ramped up.

Development plan for low Dk grade



Concept of the TZ3300-S 【Low CTE】

- Required characteristics of the base material for the probe head...
 - ⇒ Low CTE (*Coefficient of Thermal Expansion*) / less than 10ppm
 - ⇒ Low Water absorption
 - ⇒ Good laser and Drill processability
- The performance requirements are high, and ceramics are used in most cases.

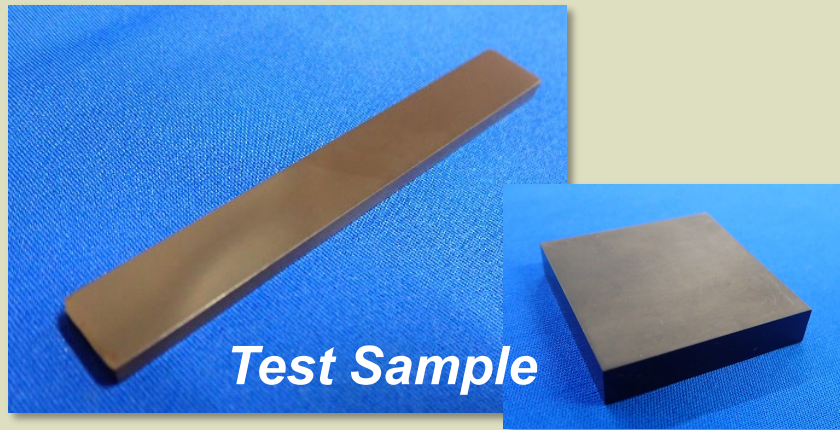


+ Special Ceramics

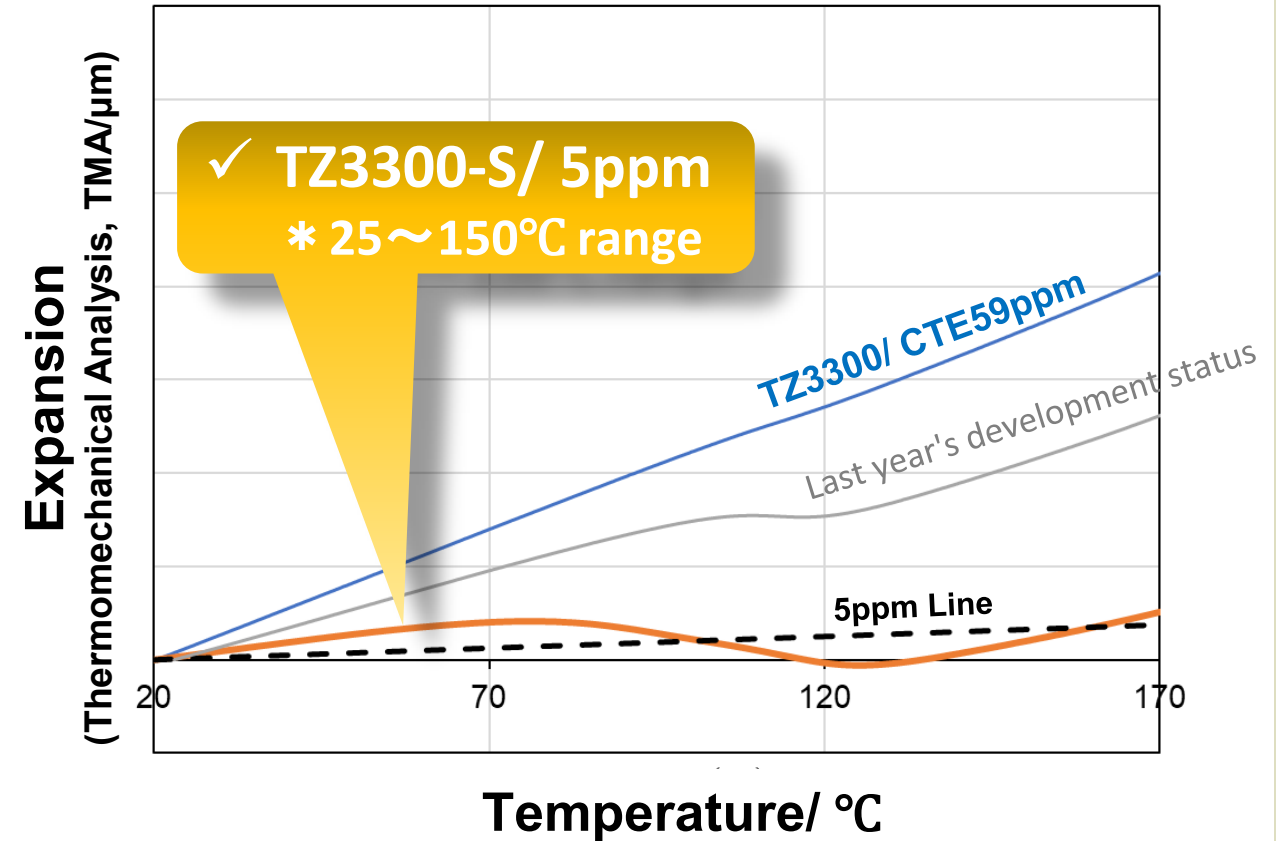
+ MGC compounding technology

⇒ Tackling the challenge of a completely new resin material.

Typical properties of TZ3300-S 【Low CTE】



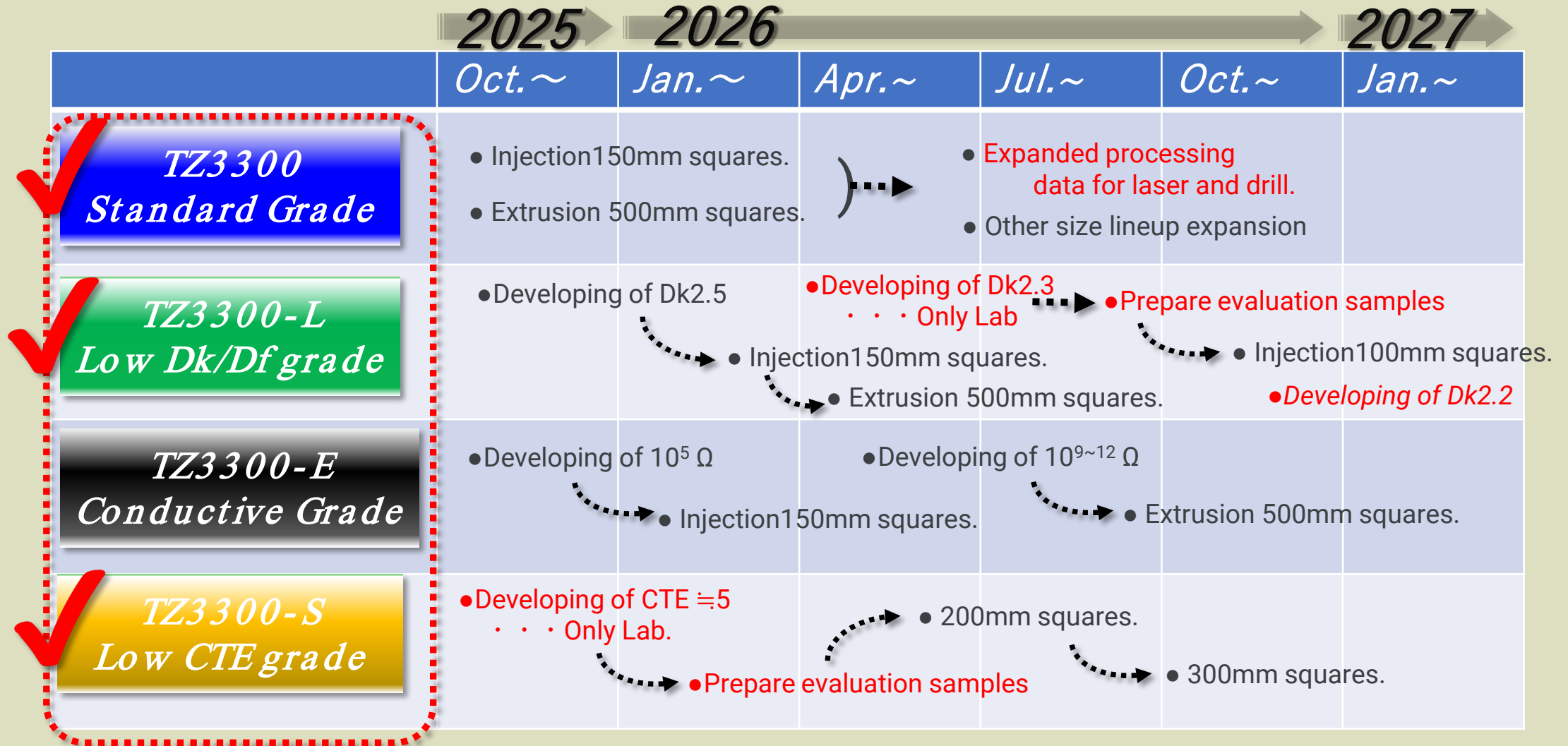
	TZ3300-S
CTE (ppm) * 25~150°C	≒5
Water Absorption (%) * 24h immersion	<0.1
Flexural Modulus (GPa)	>13 GPa



● We've already achieved an average CTE at the 5 ppm level.

⇒ There are temperature-dependent shrinkage variations. We're working to reduce them.

Conclusion



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