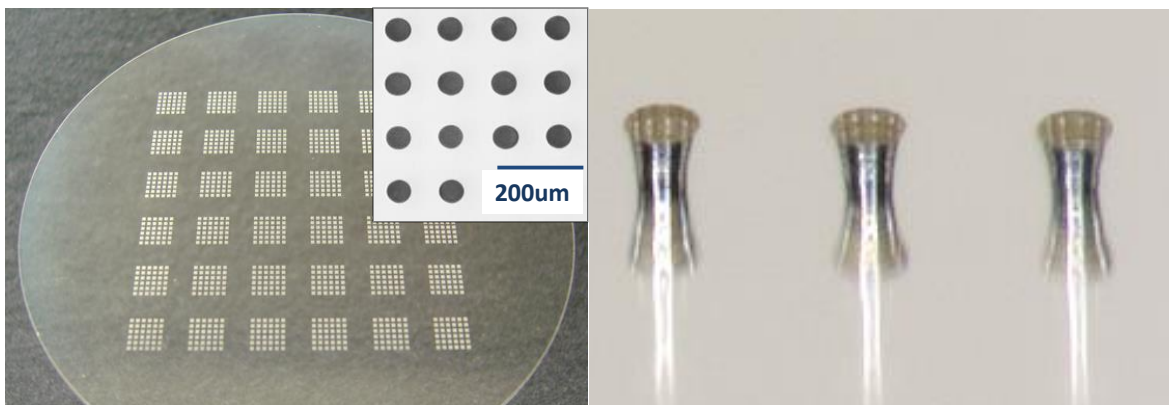


## NSG Group Successfully Develops Microscopic TGV (Through Glass Via) Glass Substrate

TOKYO (January 11, 2018) NSG Group has developed a microscopic TGV (Through Glass Via) glass substrate which will be on display at the 47<sup>th</sup> INTERNEPCON JAPAN\*<sup>1</sup> to be held January 17-19, 2018 at Tokyo Big Sight.

Attracting attention as a next-generation material for electronic substrate, TGV is a 0.1~1 mm-thick glass substrate with ultra-high density miniature through holes with a diameter of 10~100 microns.



TGV substrate and through holes

Through holes (magnified view)

Due to an expanded use of large-capacity video data, there's an increasing demand for thinner and faster small electronic devices that can operate with less power. Because of its smooth surface, thermal stability, electrical insulation performance and transparency, glass is a suitable material for building a high-performance electronic substrate.

While a drill or a laser are typically used for making multiple microscopic holes through the glass, these tools had difficulty in making uniformly shaped holes at a practical speed and cost without damaging the glass.

Based on its proprietary technology and experience, NSG Group has simultaneously developed a glass material suitable for a glass interposer (GIP\*<sup>2</sup>) and a practical processing method capable of shaping high-quality holes. Preparatory work for practical applications of TGV is ongoing while the company is presenting proposals to customers.

\*1 **The Exhibition**

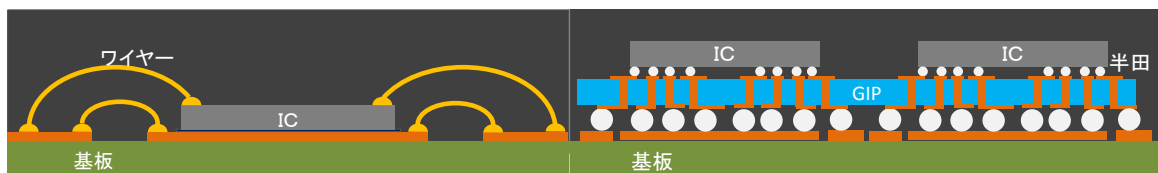
The 47<sup>th</sup> INTERNEPCON JAPAN – Electronics Manufacturing & Packaging Technology Exhibition – (generally called the NEPCON JAPAN 2018) to be held for 3 days from January 17 to 19, 2018 at Tokyo Big Sight (<http://www.nepcon.jp/>)

\*2 **Glass Interposer (GIP)**

An interposer is a type of electronic substrate that plays the role of relaying between IC components and electronic substrate. Its structure having many miniature through holes makes it possible to manufacture higher-density electronic substrates. It also enables packaging called the 2.5 dimensional packaging method that piles up substrates by using a wiring structure with vertical through holes for a next-generation electronic substrate that closely packs multiple ICs on the substrate. This technology is under development by many companies for putting high-density electronic substrates into practical usage.

Materials for use as interposer include, besides glass, epoxy resin and other organic materials as well as silicon. In particular, compared to organic materials, glass has many benefits such as smooth surface and lesser warpage. Glass also allows larger size processing suited to volume production. GIP is therefore expected to become a next-generation electronic substrate.

Figure 1. Comparison of different packaging technologies (conventional method and interposer-based 2.5 dimensional packaging method)



conventional packaging method

Next-generation (2.5 dimensional) packaging method

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