

# Cu direct plating technology on quartz glass for RF application

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## ABSTRACT

For applications such as high-speed transmission, 5G & 6G communication, and new optical devices, a substrate that does not absorb moisture, has small CTE, and has less warpage is required. This presentation will show direct wet Cu metallization on Quartz Glass TGV (thru-glass via) technology for antenna and RF device application trends without any PVD seed layer. Silica glass has a very small CTE, high T<sub>g</sub>, and very good high frequency properties. Previously, direct plating of Cu onto quartz was extremely difficult.

It is believed that conformal metallization on quartz glass with the highly conductive thick Cu material is expected to enhance the performance of RF electronic devices in the new avionics system. Cu direct plating can be used not only for vias but also for 3D shapes such as cavities.

**Keywords:** Quartz Glass, TGV, Avionics Antenna, RF device, direct wet Cu plating

	<b>fused silica</b>
$\alpha_{25C-300C}$ / ppm/K	0.55
T <sub>g</sub> / °C	1600
typical surface roughness (RMS)	10nm
dielectric constant, $\epsilon'$	3.8
$\tan\delta$ @ 10GHz	0.00006

<b>Cu peel off test</b>	<b>All wet process</b>
Non Alkaline Glass	
0.86 kN/m @ AH 5.5g /m <sup>3</sup> (24% @ 25°C)	
0.45 kN/m @ Water drop test	
0.80 kN/m After 125 °C / 96 hr	
Fused Silica Glass	
0.30 kN /m	<b>New!!</b>
<b>Via AR (Aspect Ratio)</b>	
AR = 20    Via size: min 20 um	
www.koto-jp.com	<b>77 years Glass history</b>
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