We offer substrates deposited with a variety of film pattern such as ceramic (alumina), metal and glass by using Thin film and Thick film technology. Our products are supplied to a wide variety of fields such as communication devices and industrial instruments including satellites, base stations, sensors and consumer devices.

**Thin film circuit substrate (PVD method)**

Circuits are formed in PVD method using vacuum film forming and plating technology.

<table>
<thead>
<tr>
<th>Base material</th>
<th>Ceramic (Alumina), Glass, ALN, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum film</td>
<td>Cr, Ti, Pd, Cu, Au, TaN, etc.</td>
</tr>
<tr>
<td>Plating</td>
<td>Au, Cu, Ni, etc.</td>
</tr>
<tr>
<td>Film thickness / line width</td>
<td>Total thickness 1μm ~ 5μm · Line/Space ≥ 30/30μm</td>
</tr>
</tbody>
</table>

We have produced highly precise and most reliable substrate/circuit board on various materials and can meet any additional requirement you may have such as thin film resistors or protective films.

**Features of MIC (Microwave Integrated Circuit) / HIC (Hybrid Integrated Circuit) substrate**

1. **Most reliable substrate**
   - Capable of providing highly precise substrate mounted in satellites and high speed / large capacity communication devices.
2. **Manufacturing system**
   - With sound assurance system in place, we are capable of consistently manufacturing highly reliable products with short delivery time.
3. **Material processed**
   - Not only ceramic base we are able to make circuits / structure with various materials.

**Thick film circuit substrate (Print method)**

Circuits are formed in print method using thick film paste.

<table>
<thead>
<tr>
<th>Main process</th>
<th>Screen print, Baking, Appearance inspection, Electrical test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base material</td>
<td>Ceramic (Alumina), Glass, PI, PEN, PET, Sheet metal etc.</td>
</tr>
<tr>
<td>Paste</td>
<td>Glass, Ag, Au, Pt, PI, Solder resist, Carbon, etc.</td>
</tr>
<tr>
<td>Film thickness / line width</td>
<td>0.2μm ~ 100μm · Line/Space ≥ 100/120μm</td>
</tr>
</tbody>
</table>

For boards comprised of various materials, we print circuits employing a minute printing method with thick film paste. Multilayer boards are also available.

**Surface-mount print substrate**

1. **Metal substrate**
2. **ITO substrate**
3. **Film substrate**
4. **Ceramic substrate**

(1) Metal Substrate: Form insulation film on metal substrate and do Ag printing
(2) ITO (Indium Tin Oxide) substrate: After patterning transparent conductive film (ITO film), carry out Ag printing
(3) Film substrate: Ag printing with low-temperature baking for curved surface antenna and curved illumination
(4) Ceramic substrate: Substrates to cope with high heat dissipation as in power IC and LED

**Cylindrical side wiring substrate**

- Substrate: Quartz, glass, alumina, metal
- Metal: Ag, Au, Glass protective film
- Manufacturing method: Screen transfer processing and baking
- Film thickness: Rectangular pillar ~20μm Columnar (Round) pillar ~50μm
- Pattern size: L/S ≥ 200/200 (μm)

We can pattern on cylindrical tubes instead of flat materials.