

BERYLLIUM OXIDE (BeO) SUBSTRATES AND PACKAGING

Scrantom, Inc. offers a range of materials and processes for use with Beryllium Oxide (BeO) ceramics to meet your custom packaging requirements.

BeO is a lightweight, low loss, high thermal transfer solution for high power RF and DC package designs. Because of its high thermal conductivity, the use of heavy metallic heat sinks is not required. As compared to Aluminum Nitride (AlN), BeO maintains its thermal properties during standard air firing processes. AlN ceramics thermal properties can degrade during processing, resulting in higher thermal impedance. BeO product can be fabricated in substrate or hermetic package configurations. Leaded packages are also available.

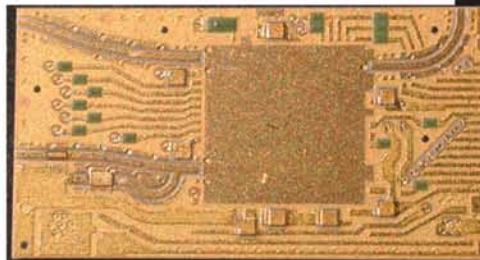
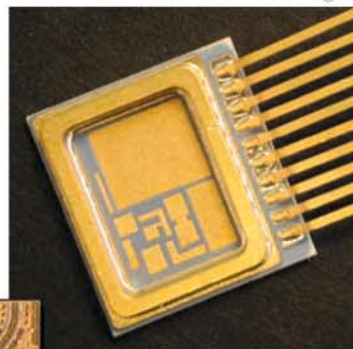
Available Materials:

- Au, Ag, Pt/Au, Pt/Pd/Ag conductors
- Low K dielectrics @ 3.5 to 8
- High K dielectrics @ 20 to 500+
- Resistor films @ Laser trimmed or as fired values
- Hermetic substrate thru hole plugging
- Supports Pb/Sn, Au/Sn and Sn/Ag solders

Available Services:

- One and two sided multilayer circuits
- Laser machining; hole drilling, lapping and sawing
- Hermetic packages with and without leads
- Laser trimmed resistors
- Soldered Ring frame and lead attachment

Hermetic Beo Leaded Package



Two-sided BeO RF substrate with integral capacitors and resistors. High-speed lines are printed on K 3.5 dielectric.

Beryllium Oxide, Alumina and Aluminum Nitride Properties Comparison

| Property | Alumina (99.5%) | Beryllia (99.5%) | Aluminum Nitride |
|---|-----------------|------------------|------------------|
| Dielectric Constant E_r @ 10 GHz | 9.8 | 6.6 | 8.7 |
| Loss Tangent @ 10GHz | .0002 | .0003 | .001 |
| Coefficient of Thermal Expansion (PPM / °C) | 6.7 | 7.5 | 4.5 |
| Thermal Conductivity (W/M-°C) | 37 | 250 | 168 |
| Volume Resistivity (Ohm-Cm) | 10^{14} | 10^{14} | 10^{13} |
| Dielectric Strength (KV/mm) | 7.9 | 14 | >10 |
| Density (gm/cc) | 3.9 | 2.85 | 3.31 |