INO has developed a number of hermetic vacuum packaging technologies for MEMS devices based on metallic and ceramic headers. Processes are performed in state-of-the-art semi-automated vacuum furnaces and systems that allow for activation of thin film getters. The ceramic LCC vacuum packaging technology can accommodate uncooled bolometric detectors and other MEMS devices that require a vacuum environment below 10 mTorr. For temperature-sensitive devices, a low temperature process can be used (<175°C). INO’s solid expertise in vacuum technology allows to adapt the vacuum sealing technology to specific device requirements. INO also offers short-series production and technology transfers.

**HERMETIC VACUUM PACKAGING**

**Ceramic LCC Packages**

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**CERAMIC LCC PACKAGES**

**APPLICATIONS**

- LWIR imagers and sensors
- Various MEMS devices such as:
  - Accelerometers
  - Resonators
  - Micromirrors

**BENEFITS**

- High productivity due to batch processing
- Low-cost
- Compact size
- Fluxless technology
- Compatible with temperature sensitive devices
- Flexibility in package geometry, window materials and solder alloys
- Integrated pressure sensors for cavity pressure monitoring

<table>
<thead>
<tr>
<th>Ceramic LCC Package</th>
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<tbody>
<tr>
<td>68 pins</td>
<td>116 pins</td>
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</table>

**R&D CONTRACTS – PROTOTYPING – PREPRODUCTION**

**SHORT-RUN PRODUCTION – TECHNOLOGY TRANSFERS**
# HERMETIC VACUUM PACKAGING

## Ceramic LCC Packages

### TYPICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>CERAMIC LCC 68</th>
<th>CERAMIC LCC 116</th>
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<tbody>
<tr>
<td>Package</td>
<td>Leadless Chip Carrier (LCC)</td>
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</tr>
</tbody>
</table>
| Footprint                | External size: 24 x 24 mm  
Cavity size: 15.8 x 15.8 mm  
Cavity depth: 1.3 mm | External size: 32.3 x 32.3 mm  
Cavity size: 23.2 x 23.2 mm  
Cavity depth: 1.52 mm |
| Number of pins           | 68                                                                            | 116                                                                           |
| Window                   | Germanium and Silicon (Antireflection coating on request)                     |                                                                               |
| Getter                   | SAES PaGeLid                                                                  |                                                                               |
| Pressure                 | <10 mTorr                                                                     |                                                                               |
| Max. process temperature | 175°C or 285°C                                                                |                                                                               |
| Throughput               | 12 packages/run                                                               | 9 packages/run                                                                |
| Hermeticity yield        | > 90%                                                                         |                                                                               |
| Package reliability*     | Shock: MIL-STD-810 method 516  
Vibration: MIL-STD-810 method 516  
Thermal cycling: MIL-STD-810 method 501  
Temperature/humidity: GR-1209-CORE | In progress:  
Shock: MIL-STD-810 method 516  
Vibration: MIL-STD-810 method 516  
Thermal cycling: MIL-STD-810 method 501  
Temperature/humidity: GR-1209-CORE |

*175 °C bonding process reliability under progress

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INO is a world-class center of expertise in industrial applications for optics and photonics, and a leading technology developer and provider of MEMS and MOEMS technologies.

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