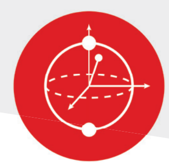
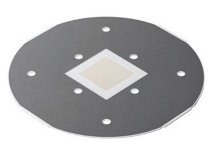
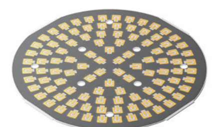


IC PACKAGES & LIDS
FOR QUANTUM COMPUTING

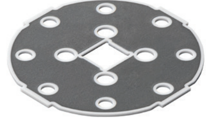
SUPERCONDUCTING

MULTILAYER CERAMIC PCB





Flip chip substrate

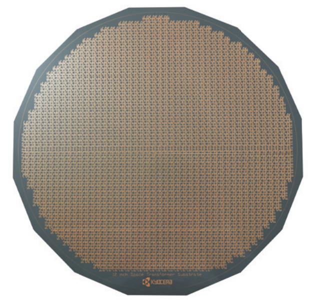


Wire bonding substrate

FEATURES

- HTCC (Material A473)
- CTE 6.9 ppm at RT -400 °C
- Through-hole (optional)
- Metal / RF connector attachment available
- Wire bond / Flip chip assembly pad design
- Sapphire heat sink (optional)

WAFER SIZE CERAMIC PCB



FEATURES

- HTCC (Material ST300)
- CTE 4.7 ppm at RT -400 °C
- Thin-film metallization on multilayer ceramics
- Good rigidity / flatness

SAPPHIRE SUBSTRATE

FEATURES

- High thermal conductivity >100 W/mK at low temperature
- Low dielectric loss at cryogenic environment
- High precision processing: laser machining/ drilling

Material properties in cryogenic environment are under evaluation.

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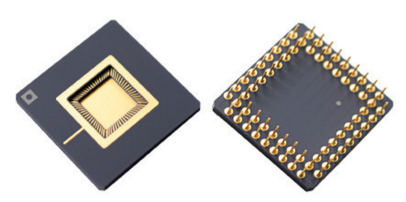
IC PACKAGES & LIDS
FOR QUANTUM COMPUTING

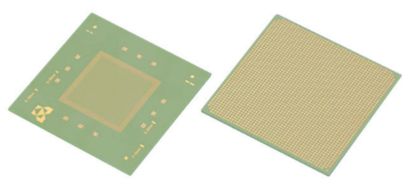
CERAMIC PGA PACKAGE



FEATURES

- HTCC (Material A440)
- CTE 7.1 ppm at RT -400 °C
- Hermetic sealing available
- Flexible structure design

CERAMIC LGA PACKAGE

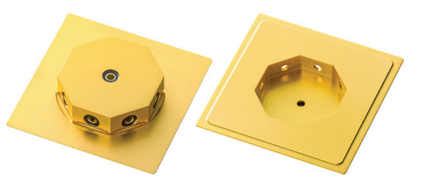


FEATURES

- LTCC (Material GL773)
- CTE 11.7 ppm at RT -400 °C
- Copper conductor
- High-density routing

MULTI-SIDED WINDOW LID

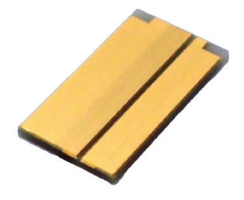
under development



FEATURES

- AR coated window
- Hermetic sealing available
- Flexible window size & location
- Open-tooled package available for set use (lid customized)

ALUMINUM NITRIDE CARRIER



FEATURES

- High thermal conductivity
- AuSn pre-solder available
- Open-tooled design available

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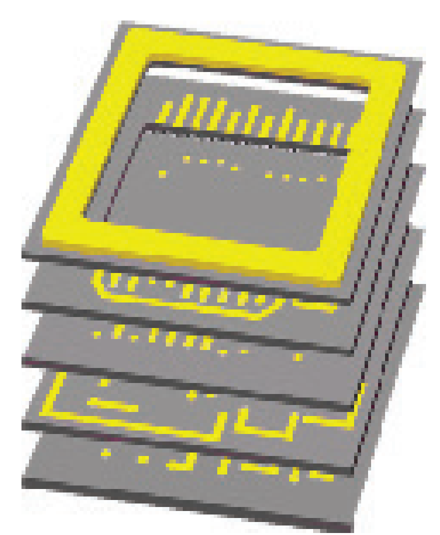
WHAT CAN KYOCERA´S CERAMICS DO?

METALIZATION & LAMINATION

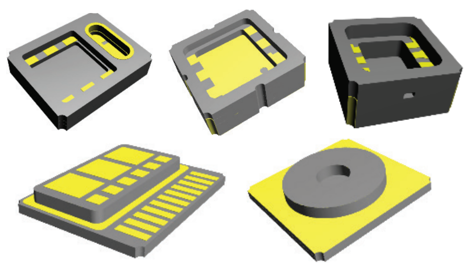
High density routing with vertical connection by metal via:



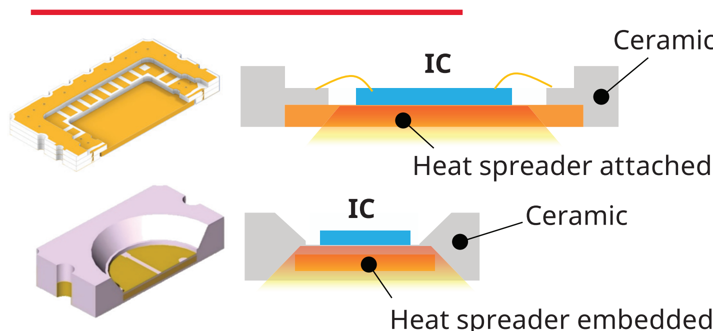
VARIOUS MATERIAL PROPERTIES

- High CTE material (close to PCB)
  CTE: 11.7 ppm/K
- Low CTE material (close to silicon)
  CTE: 3.4 ppm/K
- High heat dissipation material
  Thermal conductivity: 150 W/mK
- High robustness material
  Flexural strength: 740 MPa

STRUCTURE FLEXIBILITY



CERAMICS + METAL ATTACHMENT

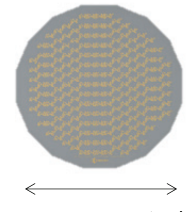


ULTRA SMALL SIZE CAVITY PACKAGE

1 mm
0.8 mm

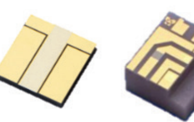
(Wall width: 0.1 mm)

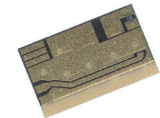
VERY LARGE SIZE SUBSTRATE



300 mm (12 inch)

THIN FILM METAL ON CERAMICS





- Thin film metal on AlN
- AuSn pre-solder available
- Thick Cu option enable high current

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