KOA®

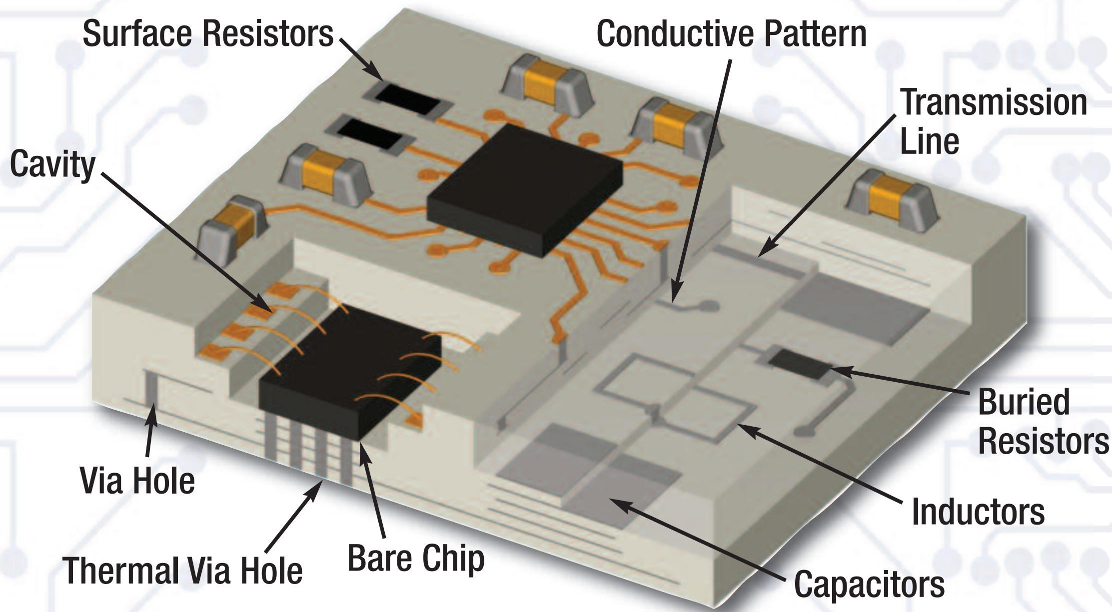
KOA SPEER ELECTRONICS, INC.

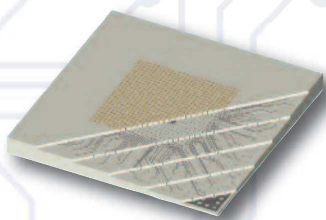
LTCC Multilayer Substrate
LTCC Package

Low Temperature Co-fired Ceramics

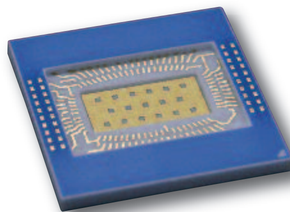
Multilayer Ceramics & Cavity Packages
Enable Complex Module Creation

- **Optimal for Bare Chip Modules**
  - Highly controlled dimensions and flatness
  - Low thermal expansion enhances use of ICs
- **High Frequency Performance**
  - Ceramics with low dielectric constant and loss
  - Low ohm silver conductor
- **Miniaturization & Integration**
  - Multilayer and multi-cavity structures
  - Surface and buried printed resistors
- **Environmental Reliability**
  - High heat and moisture resistance (zero water absorption)
  - No outgassing - Dust-free - Impermeable

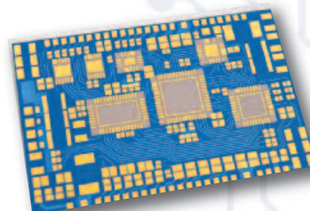




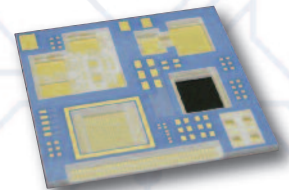
Interposer



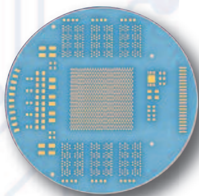
Semiconductor Package

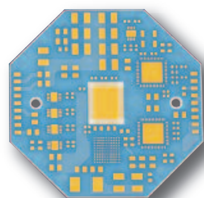


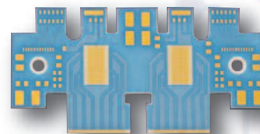
Multi-Chip Module

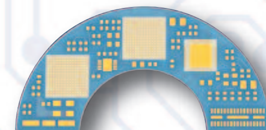


Multi-Cavity









Special Shapes

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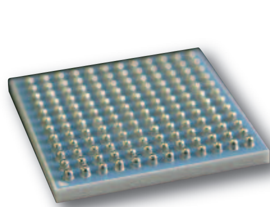
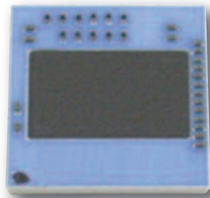
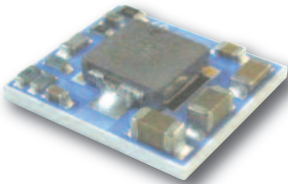
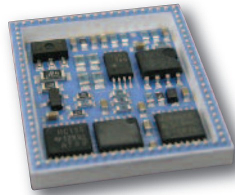
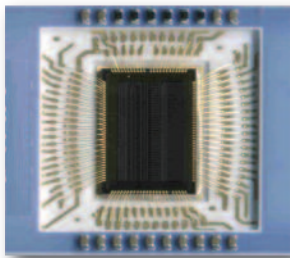

BGA


Resin Sealing


DC-DC Converter


Sensor Module


Wire Bonding

Pilot to Mass Production, Module Assembly

Module Assembly

- Total support from design to assembly
- Reliability test on request

High Flexibility

- Small to large volume production
- Low initial cost

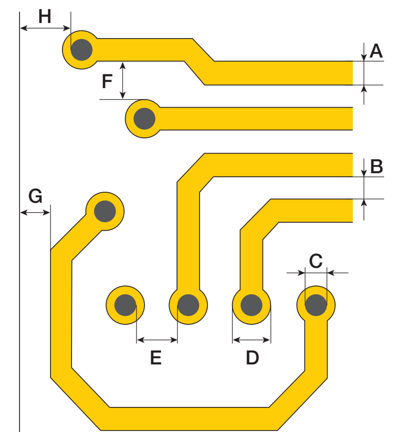
Material Characteristics

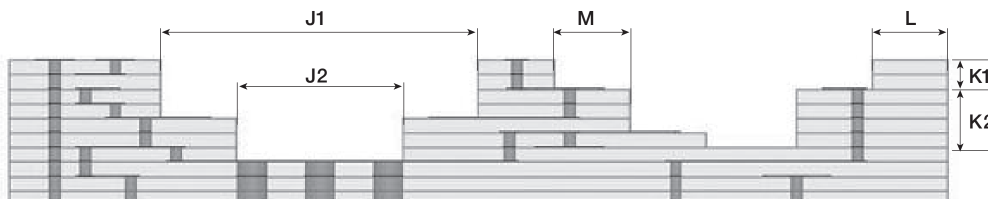
PARAMETER	CHARACTERISTICS
Bending Strength	250 MPa
Thermal expansion coefficient	5.5 ppm/K
Thermal conductivity	3 W/m•K
Insulation resistance	>10^{13} Ω•cm
Dielectric constant	7 at 1MHz
Dielectric loss	<0.003 at 1MHz
Resistivity of buried conductor	Ag : 2.5 μΩ•cm
Density	2.8 g/cm^3
Surface roughness Ra	<0.4 μm
Withstanding voltage	>15 kV/mm
Layer thickness	80/100/125 μm

Design Rule

SYMBOL	PARAMETER	STANDARD	SPECIAL
A	Line width	0.06mm Min.	0.05mm Min.
B	Line to line spacing	0.06mm Min.	0.05mm Min.
C	Via diameter	0.1mm, 0.15mm	0.6mm Min.
D	Via pad diameter	C+0.05mm Min.	Padless
E	Via to via spacing	0.02mm Min.	0.08mm Min.
F	Via to line spacing	0.125mm Min.	0.175mm Min.
G	Part edge to conductor spacing	0.2mm Min.	0.10mm Min.
H	Part edge to via pad spacing	0.3mm Min.	0.15mm Min.
J1, J2	Cavity width	0.6mm Min.	0.20mm Min.
K1, K2	Cavity depth	0.1mm Min.	0.08mm Min.
L	Cavity wall thickness	0.5mm Min.	–
M	Shelf width in the cavity	0.5mm Min.	0.1mm Min.

SURFACE/INNER PATTERN





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