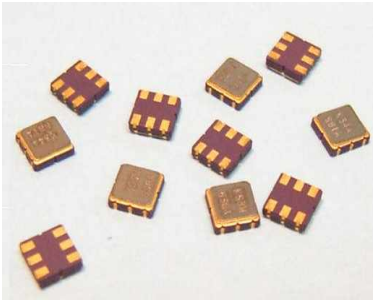
n ABSTRACT

Leadless Chip Ceramic Carrier (LCCC) mainly used on packing active or passive components such as crystal, oscillator, SAW filter, TCXO, VCXO, IC and other sensitive components. These components are widely applied to automobile, telecommunication, computer, electronics products and home appliances.



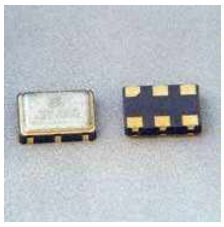
n APPLICATIONS AND FEATURES

Quartz Crystal

Key Specifications/Special Features:

- Frequency range: 6MHz to 60MHz
- Resonant impedance: 40-80 ohms
- Frequency tolerance: +/-10ppm to +/-50ppm
- Temperature tolerance: +/-5ppm to +/-50ppm
- Operating temperature: -10 to +60 deg. C
- Load capacitance: 10pF - infinity
- Drive level: 2uW-500uW
- Insulation resistance: 500 Mohms/DC100V
- Package: SMD0705, SMD0603, SMD0503
- Load capacitance: customized design (10pF-infinity)

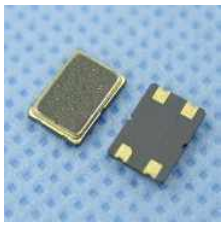
VCXO



Key Specifications/Special Features:

- Frequency range: 2.00MHz to 36.00MHz
- Operating voltage (VDD): 5.0V +/-10%, 3.3V +/-10%
- Output pulse form: HCMOS
- Operating temperature: -10 to +60 degrees Celsius, or -20 to 70 degrees Celsius
- Storage temperature: -40 to +85 degrees Celsius
- Frequency stability: +/-30ppm, +/-50ppm, +/-100ppm
- Pulling range: 100ppm (5.0V), 80ppm (3.3V)
- Duty cycle: 45%:65%
- Rise/fall time: 10ns
- Low voltage: 10% VDD
- High voltage: 90%
- Output load: 15pF

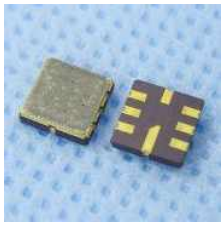
TCXO



Key Specifications/Special Features:

- Frequency range: 1.00MHz to 150.00MHz
- Operating voltage (VDD): 5.0V +/-10%, 3.3V +/-10%
- Output pulse form: HCMOS or TTL
- Operating temperature: 0 to +70 deg. C, or -40 to 85 deg. C
- Storage temperature: -55 to +125 deg. C
- Frequency stability: +/-30ppm, +/-50ppm, +/-100ppm
- Pulling range: 100ppm (5.0V), 80ppm (3.3V)
- Duty cycle: 45%:65%
- Rise/Fall time: 10ns
- Low voltage: 10% VDD
- High voltage: 90%
- Output load: 15pF
- Dimensions: 7 x 5 x 1.2mm

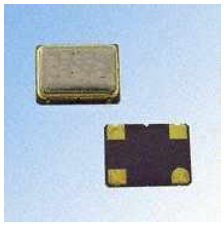
SAW Filter



Key Specifications/Special Features:

- Nominal 180 deg-phase at resonance, reliable performance
- Fundamental mode
- Quartz frequency stabilization in transmitter or local oscillators
- Reliable and cost-effective SAW filters
- Center frequency range: 139MHz to 280MHz
- Insertion loss: as low as 3.0dB max

Crystal Oscillator

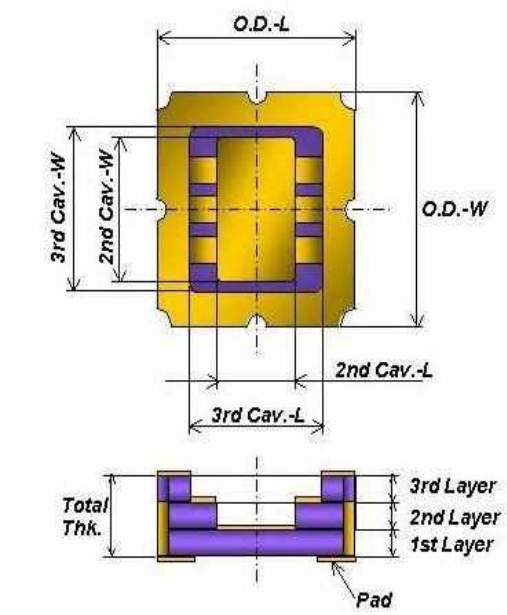


Key Specifications/Special Features:

- Center frequency: 6.00MHz to 80.00MHz
- Holder type: crystal SMD 4 pads, 5 x 3.2/6 x 3.5/5 x 7
- Mode of oscillation: fundamental/3 rd overtime
- Load capacitance: 5pF to 9999pF
- Operating temperature: -20 degrees Celsius to + 70 degrees Celsius
- Storage temperature: -40 degrees Celsius to + 85 degrees Celsius
- Drive level: 300uW max
- This test shall be performed under temperature at 25 3 degrees Celsius
- Frequency tolerance: +/- 20ppm
- Frequency stability: +/- 50ppm
- Series resistance: 50 ohm max.
- Shunt capacitance: 7.0 pF max.
- Insulation resistance: 500meg. ohm min/DC 100V +/- 15V DC
- Aging: +/- 5ppm/year
- Measuring instrument: SAUNDERS 250B network

n SPECIFICATIONS

Package Dimension

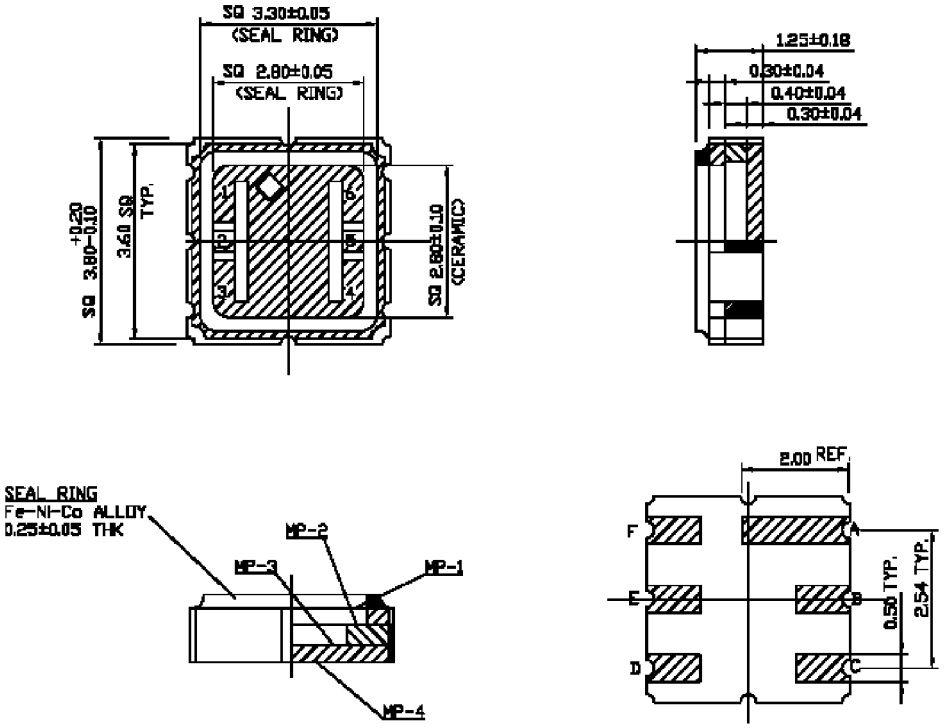


O.D.		2nd Cavity		3rd Cavity		# of Pads
L	W	L	W	L	W	
2.50	2.00	1.70	1.20	1.70	1.20	4-6
3.00	3.00	1.75	2.30	2.30	2.30	6-8
3.80	3.80	2.10	3.00	3.00	3.00	6-8
5.00	3.20	2.30	1.70	-	-	4
5.00	5.00	3.40	4.10	4.10	4.10	3-6
6.00	3.50	4.80	2.50	-	-	4-6
7.00	5.00	6.00	3.35	6.00	4.00	4-12
7.50	5.10	3.80	3.20	5.60	3.20	4-6
9.10	7.10	7.10	4.10	7.10	5.10	10

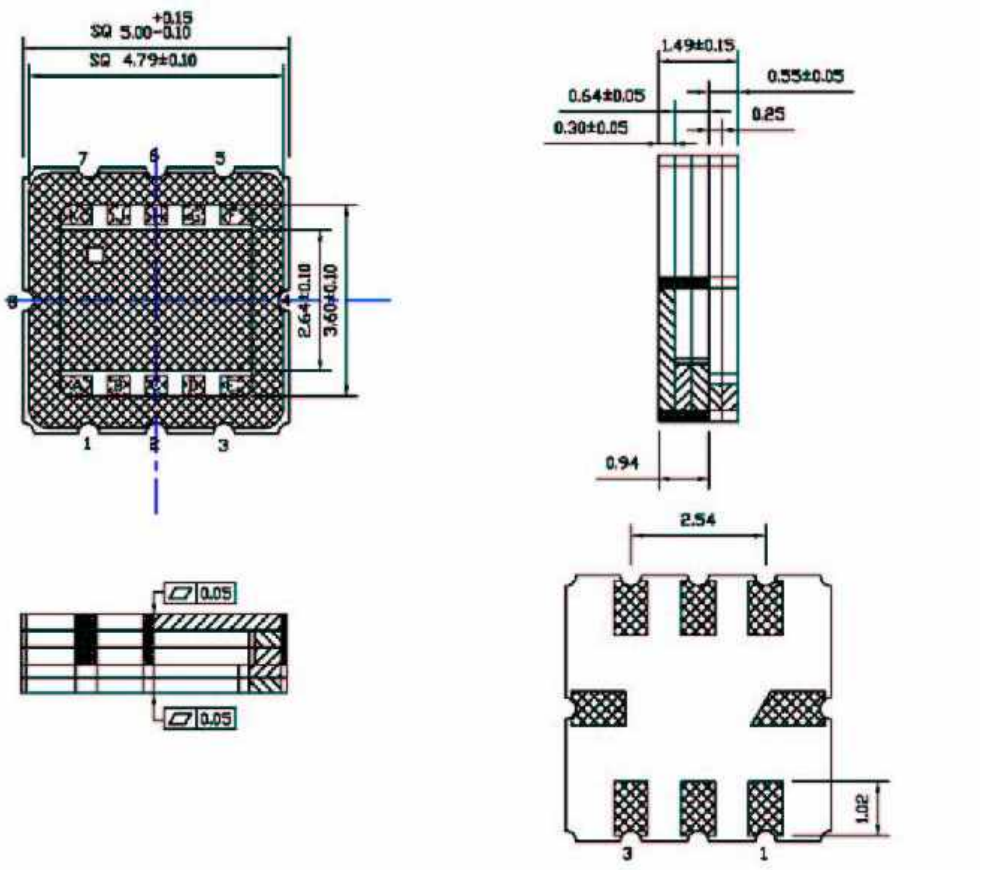
Available layer thickness:

0.15, 0.20, 0.25, 0.30, 0.38, 0.40, 0.50 [mm]

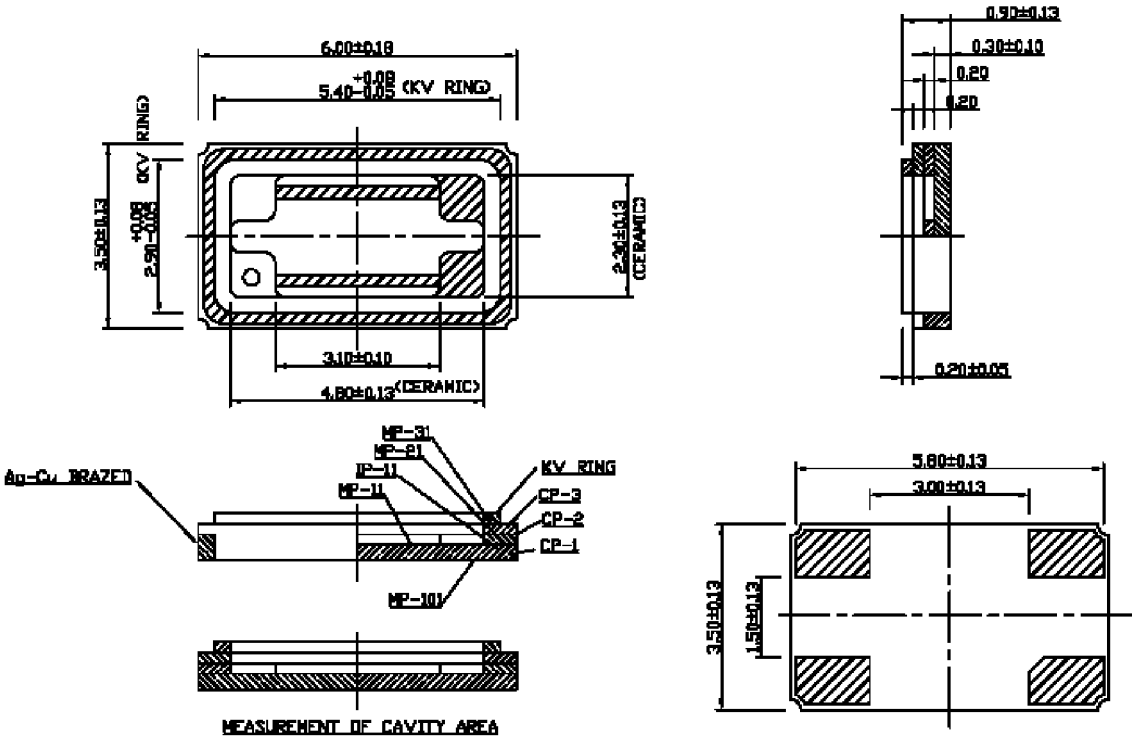
3.8x3.8 SAW Package



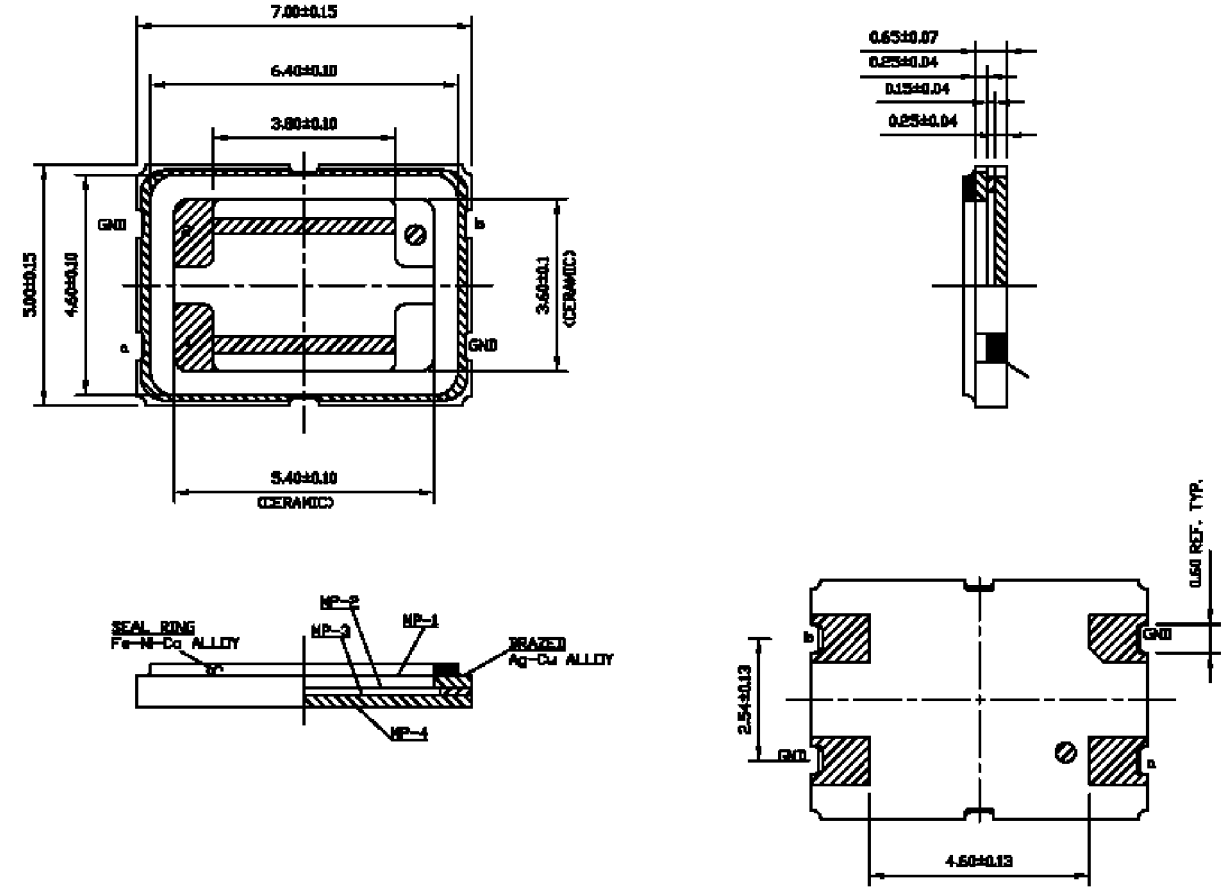
5x5 Package



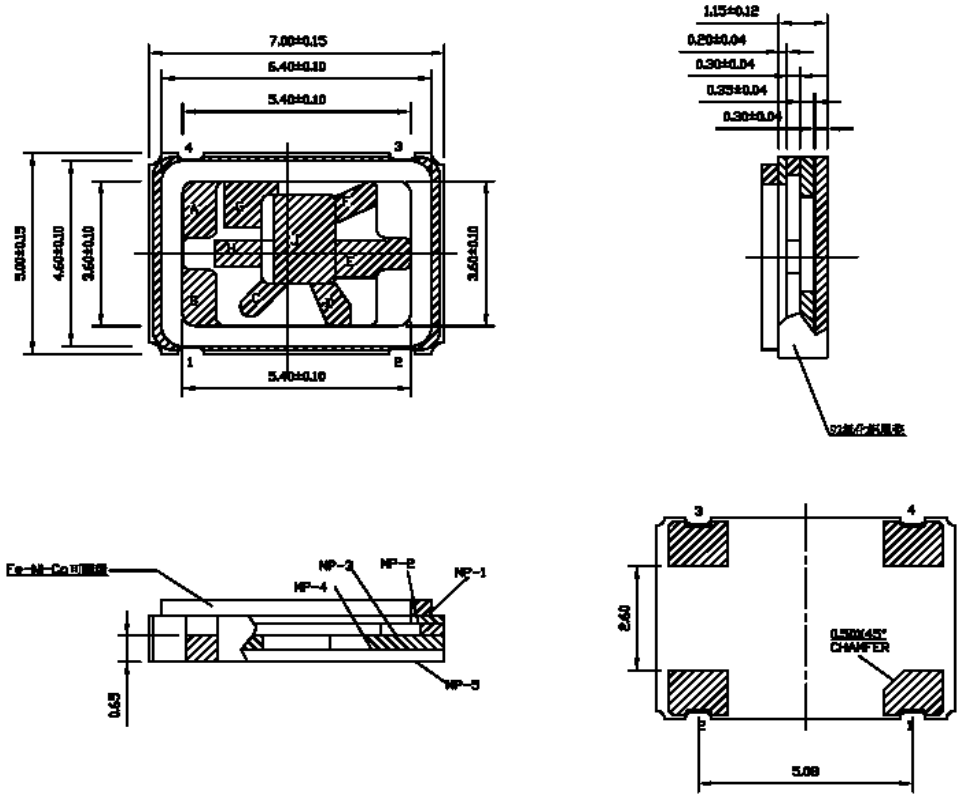
6x3.5 Package



7x5 Crystal Package



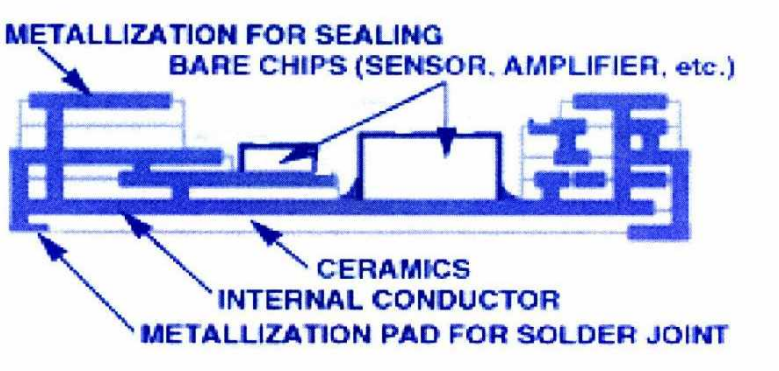
7x5 Oscillator Package



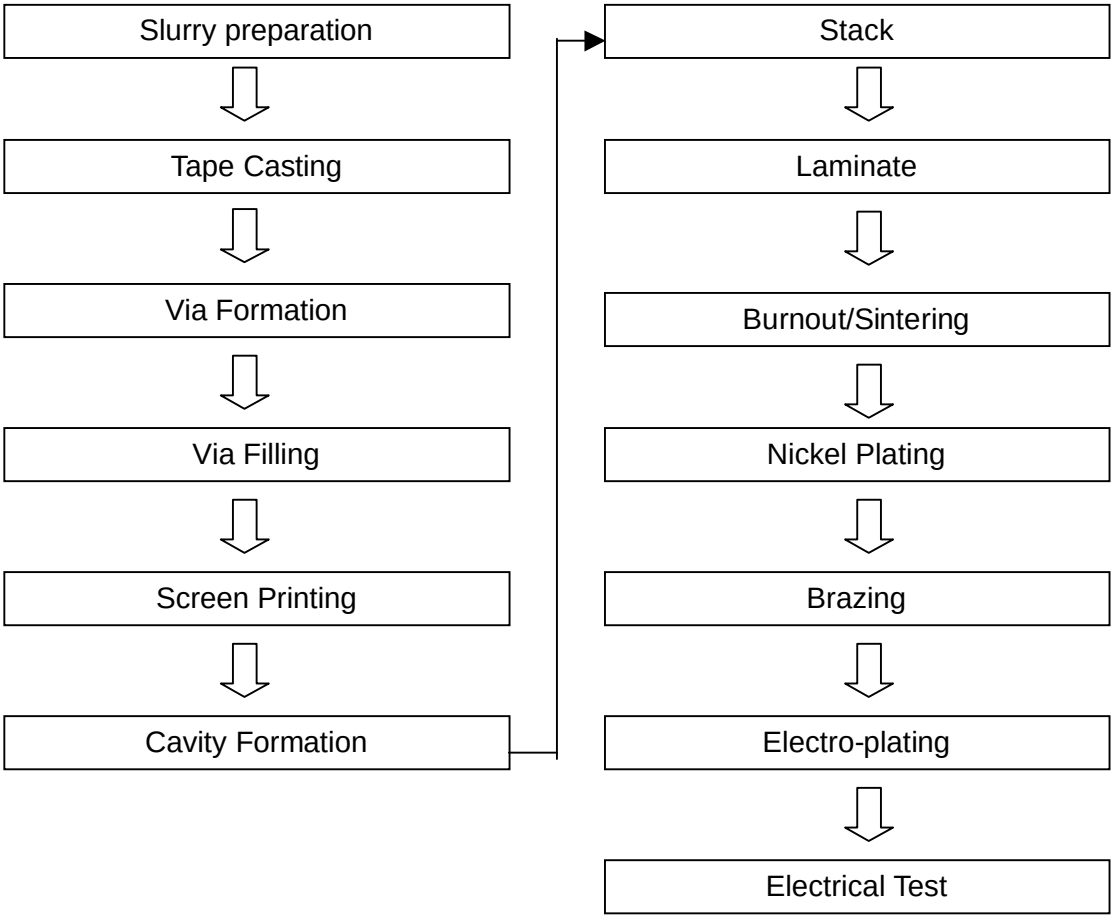
n LTCC STRUCTURE

A thinner, smaller surface mount type leadless package is indispensable for electronic components which have an open air cavity structure for crystal quartz, SAW filter, and DPX applications. Skymos offers a variety of open tool products to meet the market demands. We offer full support of our high frequency design technology to provide an optimized package for your requirements.

Structure of Multilayer Package (LCCC)



n LCCC PRODUCTION PROCESS



n LTCC TECHNOLOGY

Aluminum oxide is the most common materials for LCCC production. It has a feature of high strength, high thermal conductivity, excellent electrical properties and low cost.

Choices of inner electrode material are limited to the sintering properties of aluminum oxide. As the sintering temperature of aluminum oxide is very high, therefore the inner electrode material must be high temperature endurable, like Tungsten (W) and Molybdenum (Mo). Ceramic and the inner electrode materials will be sintered at a fully hydrogen/nitrogen atmosphere. After sintering, nickel and gold will be plated on the exposed terminals. The Kovar ring will be welded onto the carrier by brazing.

LCCC is a castle-like design. Metal will be plated on the concave surface and also the terminals under the carrier bottom. The cover lid can be made of ceramic or metal. After installing the chip and covering the lid, the carrier will provide a sealed environment for the chip.

n INQUIRY AND CONTACT

Your inquiry is greatly appreciated; please enclose your design and requirements to us for a prompt service and competitive offer.