



MRA Laboratories, Inc.

# TECHNICAL DATA SHEET "K"-100 COG dielectric "VLF-101M"

VLF-101M is an environmentally friendly, very low fire COG dielectric with dielectric constant of about 100. This dielectric is not formulated with cadmium or lead compounds. VLF-101M exhibits an excellent dielectric breakdown strength, 90%Ag / 10%Pd electrode compatibility, and enhanced resistivity to plating chemical attack. VLF-101M is an excellent choice for range extension of COG product lines.

## Key Features

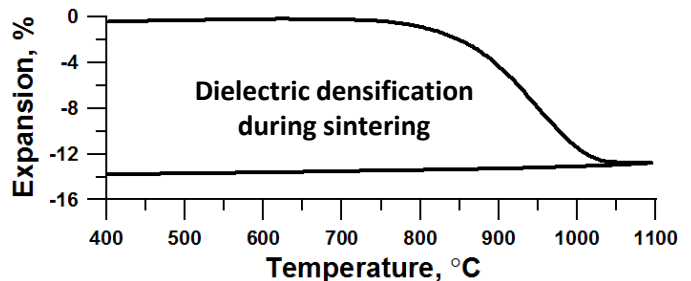
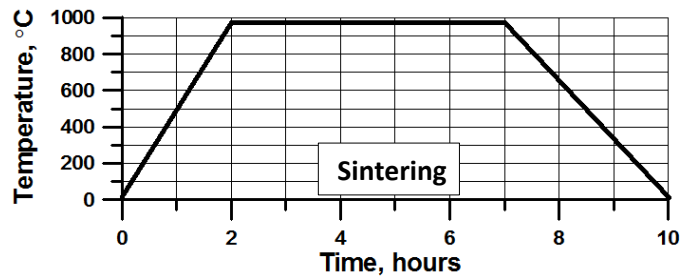
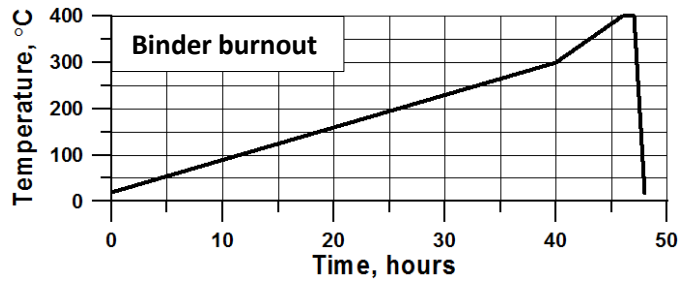
- ❖ Environmentally friendly (RoHS compliant)
- ❖ Dielectric constant around 100
- ❖ Compatible with 90% Ag / 10% Pd electrode systems
- ❖ Excellent dielectric breakdown strength
- ❖ Enhanced resistance to chemical attack during plating
- ❖ Excellent lot to lot uniformity

### Typical powder properties

- Powder density, g/cm<sup>3</sup> **≥ 5.40**
- Surface area, m<sup>2</sup>/g **6.00 ± 1.00**
- Particle size, μm
  - D<sub>90</sub> **≤ 1.50**
  - D<sub>50</sub> **0.50 ± 0.10**
  - D<sub>10</sub> **0.30 ± 0.10**
- LOI (650°C, 6 hours), % **≤ 1.00**

### Sintering conditions

- Binder burnout up to 400°C in air
- Sintering 950°C ± 10°C/5 hours in air
- Heating rate 10°C/min
- Open ZrO<sub>2</sub> setter
- Fired density ≥ 5.30 g/cm<sup>3</sup>



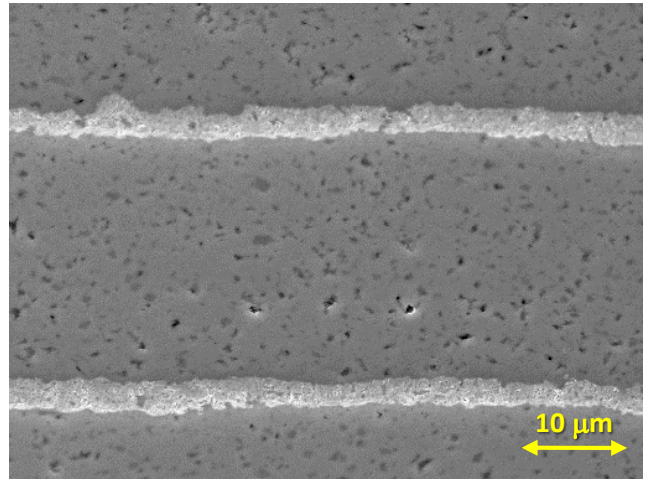
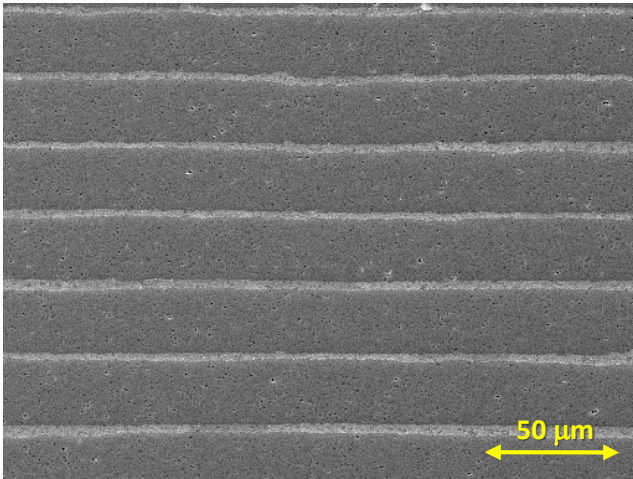
**MRA - committed to excellence in  
multi-layer ceramic device technology.**

ISO 9001:2015

BUREAU VERITAS  
Certification



## Typical cross-sectional microstructure of sintered MLCC chip



### Mechanical properties of the dielectric

- Coefficient of thermal expansion from 200°C to 600°C,  $\mu\text{m}/\text{m}^*\text{K}$  **9.08**

### Typical MLCC characteristics

- Chip size **0805**
- Active layers **10.5**
- Electrode: **95% Ag / 5% Pd**
- Dielectric thickness,  $\mu\text{m}$  **~24**
- Dielectric constant  **$100 \pm 5$**
- Dissipation factor, %  **$\leq 0.04$  @ 1kHz, 1Vrms**  
 **$\leq 0.08$  @ 1MHz, 1Vrms**
- Insulation resistance (IR),  $\text{M}\Omega^*\mu\text{F}$  :
  - 25°C (50Vdc) **> 2500**
  - 125°C (50Vdc) **> 1000**
- HALT (180°C/200Vdc/100hours) **Passes (No degradation)**
- Dielectric withstanding voltage,  $\text{V}/\mu\text{m}$   **$\geq 100$**

### Temperature variation of capacitance

**TCC COG ( $\pm 30\text{ppm}/^\circ\text{C}$  from  $-55^\circ\text{C}$  to  $+125^\circ\text{C}$ )**

*The data presented is based on our research and is considered to be fair representation of this product. MRA makes no warranties, expressed or implied, as to its accuracy and assumes no liability out of its use by others.*

## **MRA Laboratories, Inc.**

**15 Print Works Drive, Adams, MA, 01220, USA**

**Tel: (413) 743-3927, Fax: (413) 743-0305, E-mail: [mra@mralabs.com](mailto:mra@mralabs.com), Web: [www.mralabs.com](http://www.mralabs.com)**