A FERRO COMPANY

TECHNICAL DATA SHEET
"K"-3000 X7R/X8R dielectric
"LF K3000 X7R/X8R"

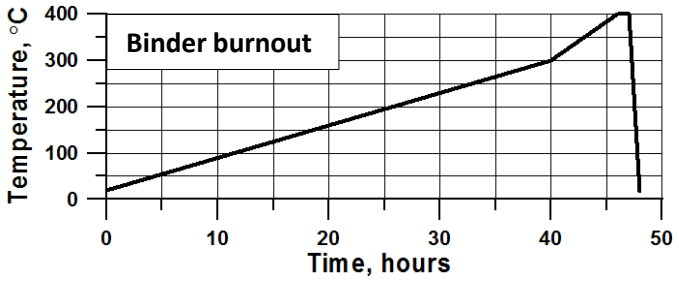
LF K3000 X7R/X8R is an environmentally friendly low fire X7R/X8R dielectric with enhanced dielectric properties and excellent reliability. The dielectric offers the highest dielectric constant, K~3000, among any commercially available X8R-type PME dielectric compositions. LF K3000 X7R/X8R is RoHS compliant (not formulated with lead or cadmium) and compatible with up to 85% Ag / 15% Pd electrode systems.

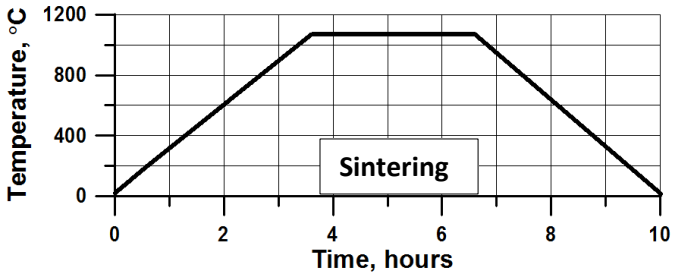
Key Features

- Environmentally friendly (RoHS compliant)
- Highest dielectric constant among commercially available X8R-type dielectrics
- Excellent dielectric reliability based on 8x rated 180°C and 2x rated 250°C HALT tests for 100+ hours
- Very high insulation resistance to 200°C
- Compatible with up to 85% Ag / 15% Pd electrode systems
- Excellent lot to lot uniformity

Typical powder properties

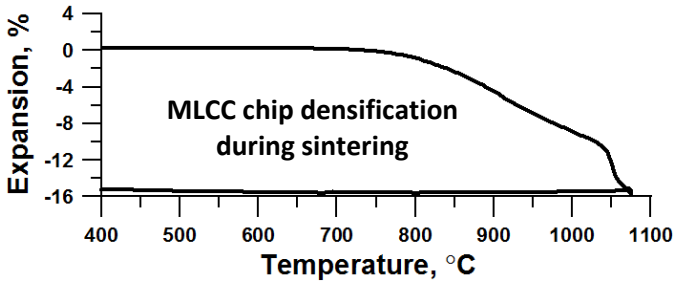
Powder density, g/cm³	≥ 5.80
Surface area, m²/g	2.10 ± 0.60
Particle size, µm	
D_{90}	≤ 1.70
D_{50}	0.60 ± 0.15
D_{10}	0.35 ± 0.15
LOI (650°C, 6 hours), %	≤ 0.30





Sintering conditions

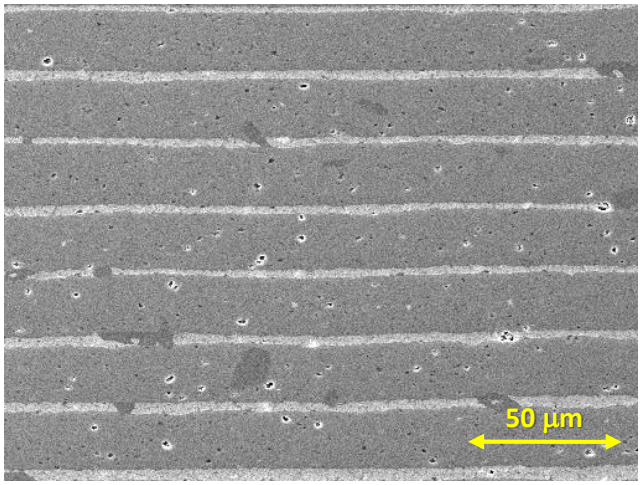
- Binder burnout up to 400°C in air
- Sintering 1080°C ± 20°C/3 hours in air
- Heating rate 5°C/min
- Open ZrO_2 setter
- Fired density ≥ 5.8 g/cm³

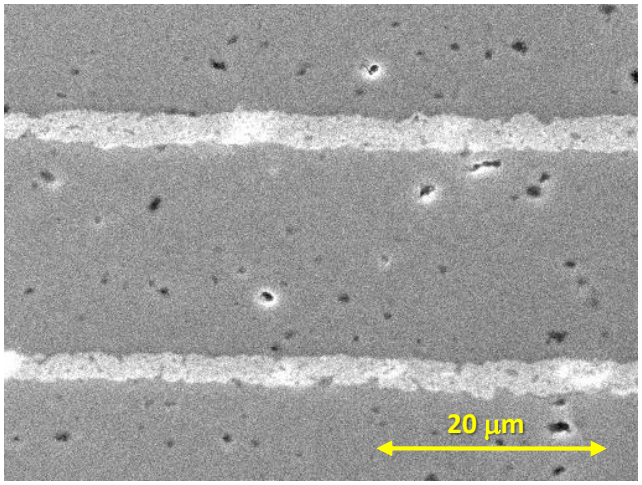


MRA - committed to excellence in multi-layer ceramic device technology.

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, µm/m*K — 12.1

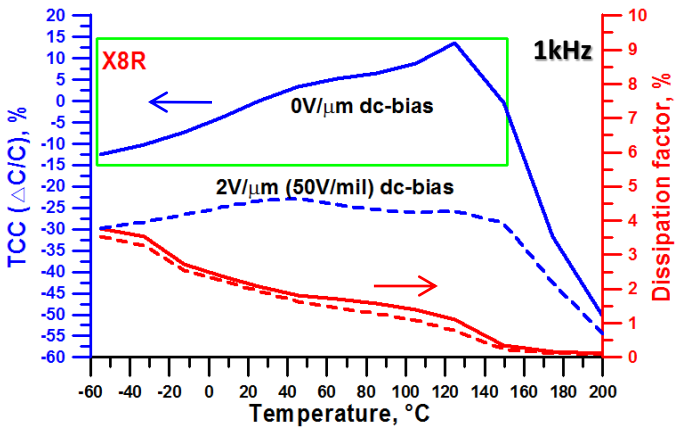
Typical MLCC characteristics

- Chip size — 0805
- Active layers — 10
- Electrode: 80% Ag / 20% Pd
- Dielectric thickness, µm — ~20
- Dielectric constant — 3050 ± 250
- Dissipation factor, % — ≤ 2.0 @ 1kHz, 1Vrms
- Insulation resistance (IR), ΩM*µF:
  - -25°C — > 10,000
  - - 125°C — > 1,000
- HALT (180°C/400Vdc/100hours) — Passed (No Degradation)
- Dielectric withstanding voltage, V/µm — ≥ 40

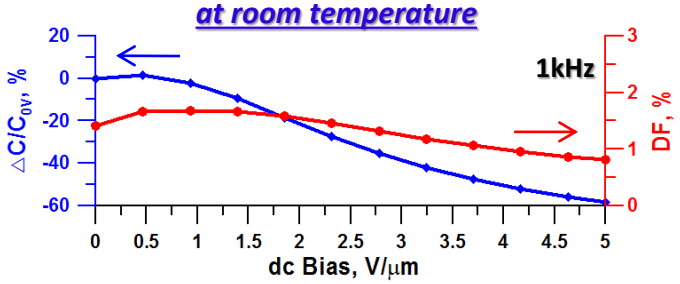
TCC X8R (±15% from -55°C to +150°C)

Temperature and voltage variation of capacitance

(50V rated MLCC chips)



Voltage variation of capacitance at room temperature



The data presented is based on our research and is considered to be fair representation of this product.
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