

NMC-P Series
Soft Terminal Construction
MLCC – Ceramic Chip Capacitor



NMC-P = Soft Term

Benefits of MLCC...

- High Reliability and Stability with Temperature (NPO)
- Low ESR and ESL
- Non-Polar
- Small Size
- Low Cost

Downfalls of MLCC...

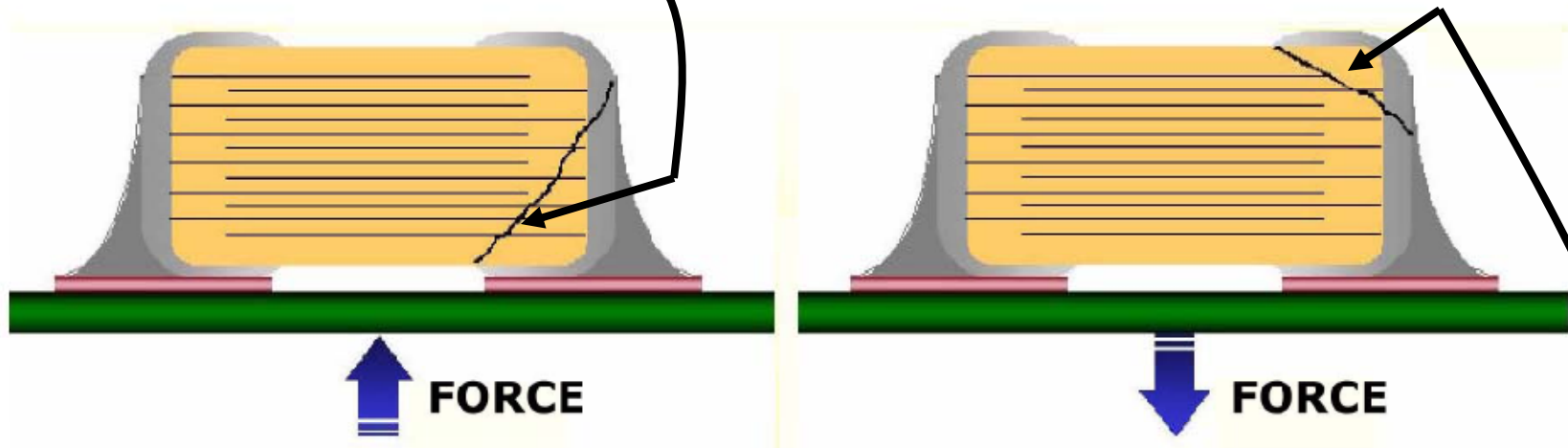
- **Brittle Components – Non-Flexible**
- Voltage Bias Conditions
- Piezoelectric Distortions (acoustic ringing)
- Aging Conditions

Solution:
NMC-P

NMC-P = Soft Term

Standard MLCC cracking due to stress transferred from PCB to mounted MLCC component

Mechanical Stress Cracking



MLCC ceramic body is rigid component. Once mounted, the MLCC will see compressive and tensional stress if the PCB board is flexed. Sufficient stress, in excess of the ceramic body strength, will result in cracking similar to the above examples.

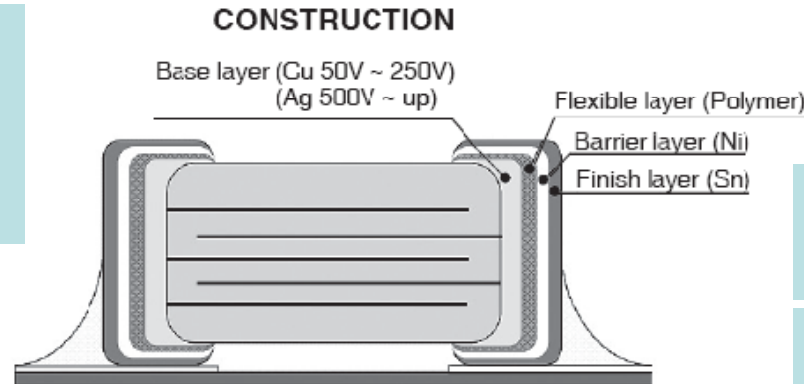
See NIC Guideline: <http://www.niccomp.com/Products/smt/MLCCMechFlex0400.pdf>

MLCC cracking can be seen as latent failures (field failures) as **high leakage current (shorted)** failure mode

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Solution:

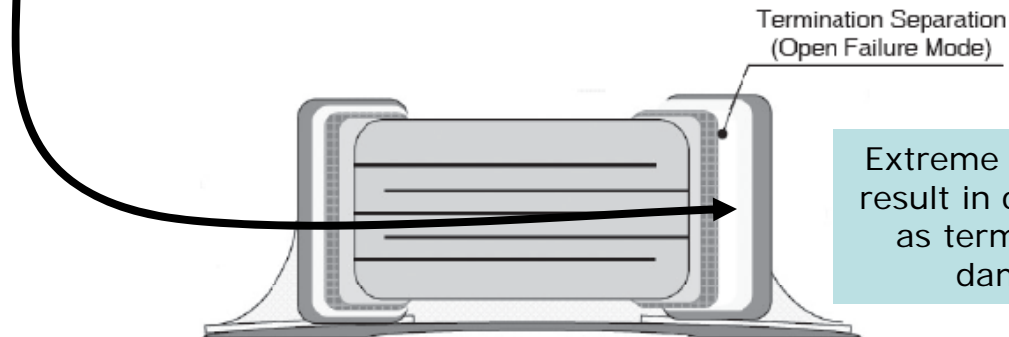
Modify MLCC construction to incorporate flexible "soft terminal" to absorb mechanical stress from PCB



Polymer layer absorbs flexure stress, preventing MLCC cracking (and related failures)

PCB flexure up to **6mm** with soft term (NMC-P)

OPEN MODE FAILURE AS A RESULT OF BENDING STRESS



Extreme PCB flexure (>6mm) will result in open mode (safer) failure as terminal opens, preventing damage to component

NMC-P = Soft Term

Multilayer Ceramic Chip Capacitors

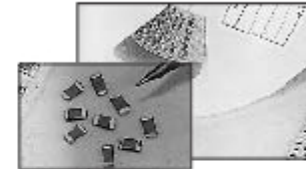
NMC-P Series

FEATURES

- CRACK RESISTANT TERMINATION
- SOFT TERMINATION, OPEN MODE FAILURE
- WIDE VOLTAGE RANGE (16V TO 5KV)
- HIGH CAPACITANCE (UP TO 10 μ F)
- RoHS COMPLIANT
- SAC SOLDER COMPATIBLE**

**RoHS
Compliant**
Includes all homogeneous materials

*See Part Number System for Details



Temperature Coefficient	NPO	X7R
Capacitance Range	2.2pF ~ 0.22 μ F	180pF ~ 10 μ F
Capacitance Tolerance	For 2.2pF ~ 10pF: ± 0.1 pF (B), ± 0.25 pF (C), ± 0.5 pF (D), ± 1 pF (F) Above 10pF: $\pm 1\%$ (F), $\pm 2\%$ (G), $\pm 5\%$ (J), $\pm 10\%$ (K)	$\pm 10\%$ (K) & $\pm 20\%$ (M)
Operating Temperature Range	-55 $^{\circ}$ C ~ +125 $^{\circ}$ C	
Temperature Characteristics	± 30 ppm/ $^{\circ}$ C	$\pm 15\%$ Δ Cap.
Rated Voltages	16Vdc, 25Vdc, 50Vdc, 100Vdc, 200Vdc, 250Vdc, 500Vdc, 630Vdc, 1KVdc, 2Kvdc, 3Kvdc & 5Kvdc	
Q or Dissipation Factor	Q = ≥ 1000 (more than 30pF)* Q = $\geq 400 + 20 \times C$ in pF (30pF and below)*	2.5% max. @ 1KHz, 1.0V \pm 0.2Vrms
Insulation Resistance	10,000Megohm or 500Megohm/ μ F whichever is less @ +25 $^{\circ}$ C	
Dielectric Withstanding Voltage	200% of rated voltage for 5 seconds, 50mA max. (16V ~ 250V) 150% of rated voltage for 5 seconds, 50mA max. (500V ~ 630V) 120% of rated voltage for 5 seconds, 50mA max. (1KV ~ 5KV)	

EXPANDED

- Available in **NPO** & **X7R** Dielectric
- High and Low Voltages Available (**16V ~ 5KV**)
- Wide Capacitance Range (**2.2pF ~ 10uF**)

nic NIC Components Corp.