

## Lightweight Multilayer Polymer (MLP) Capacitors for Space Missions

### A Stable, Robust Alternative to Ceramic Capacitors Offering High-Reliability and SWaP savings

Quantic Paktron's Angstor® and Capstick® Multilayer (MLP) stacked film capacitors provide an ideal alternative to ceramic capacitors and offer the following key advantages.

#### Comparison of MLP technology v. X7R Ceramic

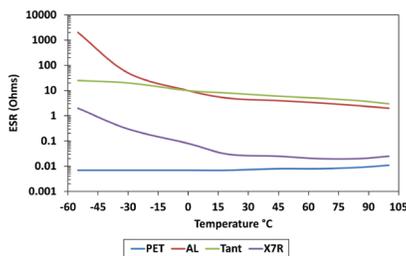
Multilayer Polymer Film [MLP]	X7R Ceramic [MLC]
✓ Stable under voltage	Cap drops 40% at 100 volts bias
✓ Stable under AC voltage	DF increases with AC voltage
✓ Chip is plastic with good TCE	Ceramic body cracks easily
✓ Stable over temperature	DF increases at low temperature
✓ No aging mechanism	Cap drops per decade hour
✓ Resilient under thermal shock	Ceramic body cracks easily
✓ Self-clearing thin electrodes	Thick film electrodes fail short
✓ Stable under mechanical stress	Piezoelectric voltage sensitive
✓ Ultra Low ESR	Low ESR
✓ Dissipation Factor ≤ 1%	Dissipation Factor ≤ 2.5%



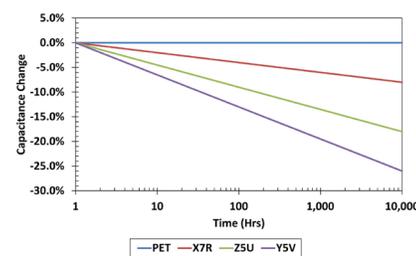
#### TYPICAL CHARACTERISTICS

The following graphs contrast important characteristics of MLP Capsticks to MLC ceramic units in typical, dynamic converter conditions. The electrical stability of the MLP capacitor is clear.

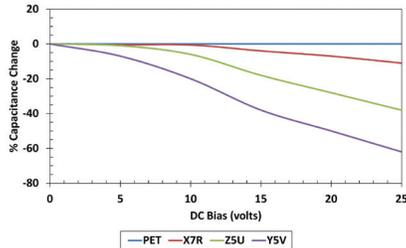
##### ESR vs. Temperature



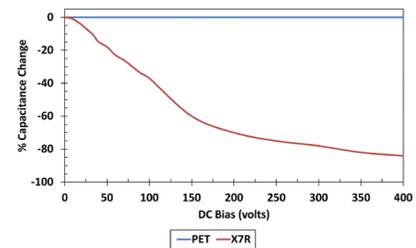
##### Ceramic & PET Film Capacitor Aging



##### % Cap Change vs. DC Bias



##### % Cap Change vs. DC Bias



- Weighs <25% of equivalent MLCC
- -55°- 125°C operating temperature range
- SMD options available
- Meets MIL-202 requirements
- Ultra Low ESR/ESL
- Highest Ripple Current x CV Ratings in industry
- Rugged Construction
- Voltage Ranges  
50- 500VDC  
630-1200VDC
- Cap. Range .1uF to 20uF

About Quantic® Paktron — Quantic® Paktron is one of the oldest capacitor manufacturers in the U.S., a technological leader in multilayer polymer film (MLP) capacitors. Its innovative portfolio addresses mission-critical, "cannot-fail" performance in demanding markets from automotive and commercial to military, space, and telecom. Its branded capacitor products include Capstick® Capacitor (lead-frame capacitor), Surfilm® Capacitor (surface mount chip capacitor), Quencharc® Capacitor (RC networks rubber capacitor), and the Angstor® Capacitor line.