

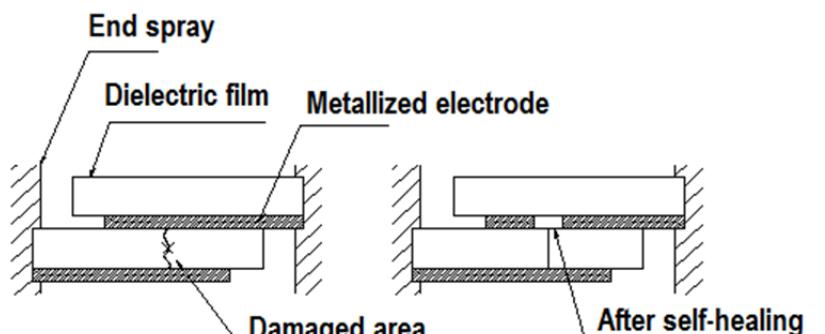
Film capacitors – Segmented film vs Standard metallized film

By Mark Gebbia

Nichicon, a world leader in aluminum electrolytic and aluminum polymer capacitors, is also a leading manufacturer of custom power film capacitors. Nichicon utilizes up-to-date manufacturing techniques to produce capacitors that meet even the most demanding customer requirements. Our power film capacitors are made using high reliability polypropylene film metallized at our own facilities, ensuring the highest quality possible. Segmented metallization is the preferred type of metallization, as it ensures safe operation and long performance.

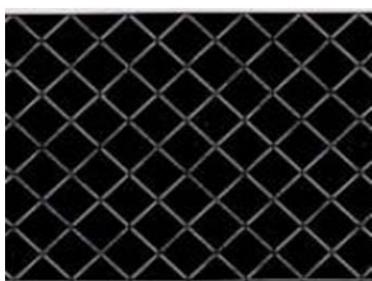
Why segmented metallized film?

Segmented film offers superior self-healing by use of fuses, compared to standard metallization. The fuses offer a controlled capacitance change during a self-healing event, and are specifically designed to both meet the performance requirements of our customer and prevent a dangerous short circuit.

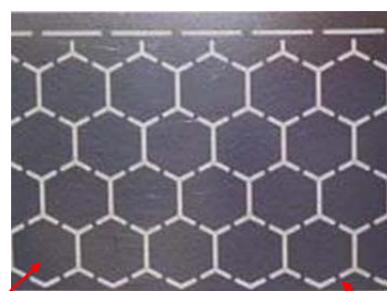


Segmented metallization

Standard mosaic metallization



Customized segmented metallization



Metallized electrode

Fuse part

Other patterns are available to meet customers' requirements.

Safety mechanism operation

Before self-healing



After self-healing



Polypropylene film

When it comes to power films, there is no better choice than polypropylene.

Polypropylene properties include the following:

• High temperature (up to 125°C)	• High reliability
• Low ESR	• Stability with frequency and temperature
• High current	• Low dielectric absorption (recovery voltage)
• High voltage (AC & DC)	• High insulation resistance (leakage current)

A comparison of the different dielectrics illustrates polypropylene's advantages over other types of film.

	Thickness (μ m)	Specific gravity	Melting point (°C)	Dielectric constant	Withstand Voltage (V/ μ m)	Dielectric loss (%)	Cost
Polypropylene (P P)	2.8~12	0.91	169 (Δ)	2.2 (Δ)	450 (\odot)	0.03 (\odot)	○
Polyester (Polyethylene terephthalate = PET)	1.0~21	1.40	257 (○)	3.1 (\odot)	300 (○)	0.3 (Δ)	○
Poly Phenylene Sulfide (P P S)	1.0~25	1.35	284 (\odot)	3.0 (○)	280 (Δ)	0.06 (○)	×
Polyethylene naphthalate (P E N)	1.2~25	1.36	262 (○)	3.1 (\odot)	280 (Δ)	0.3 (Δ)	△

As the above chart shows, the combination of polypropylene's characteristics make it superior to the most commonly used films in capacitors today.

Mr. Gebbia is a 30 year veteran in the passive electronics industry. He is currently Sales Application Engineering Manager at Nichicon (America) Corporation.

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