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Film Capacitors Benefit High-Temperature, High-Energy Applications

[Exxelia's](#) CF-PP140 range of polypropylene film capacitors was developed to address the growing demand for compact, high-energy solutions capable of operating at elevated temperatures in mission-critical environments. Members of this series support operating voltages from 450 V to 1500 V, and offer an energy density of up to 250 J/L while pushing the polypropylene operating temperature up to 140°C. These capacitors feature a standard footprint to ease system integration, making them suitable for constrained electronic architectures (Fig. 1).

According to the vendor, the CF-PP140 series' 140°C operating capability is significantly above the typical 105°C for similar polypropylene film capacitors (PP). Meanwhile, the energy density of the CF-PP140 is said to be approximately 30% above that of competing solutions. For custom designs, energy density can reach 250 J/L, depending on configuration and application constraints, says the company (Fig. 2).

In addition, customizable footprints and integration options are possible to adapt to application-specific constraints and reduce installation time. Other features include self-healing technology whereby advanced self-healing properties clear localized insulation breakdowns, ensuring continuous operation and extended service life. Also, SMD and DIL connection are available on request.

The CF-PP140 capacitor range is intended for demanding applications where thermal constraints, compactness, and reliability are critical. Typical use cases include unmanned aerial vehicles (UAVs), eVTOL aircraft, and heavy vehicles such as agricultural tractors, where power electronics are exposed to high temperatures and limited volume.

Exxelia also offers a higher level of integration by combining a CF-PP140 and busbar from Exxelia SVM into fully customized Power Block capacitors. These tailored blocks can meet customers' specific size and electrical performance requirements, even in the most extreme applications.

For more information, see the CF-PP140 [page](#).

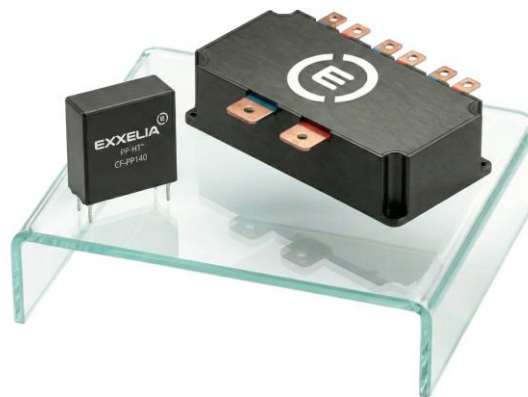


Fig. 1. The CF-PP140 series expands Exxelia's portfolio of film capacitors for harsh environments, addressing the evolving requirements of engineers and procurement teams in aerospace, transportation, and industrial power electronics. The device shown on the left is a discrete capacitor in the series, while the device on the right is a Power Block.

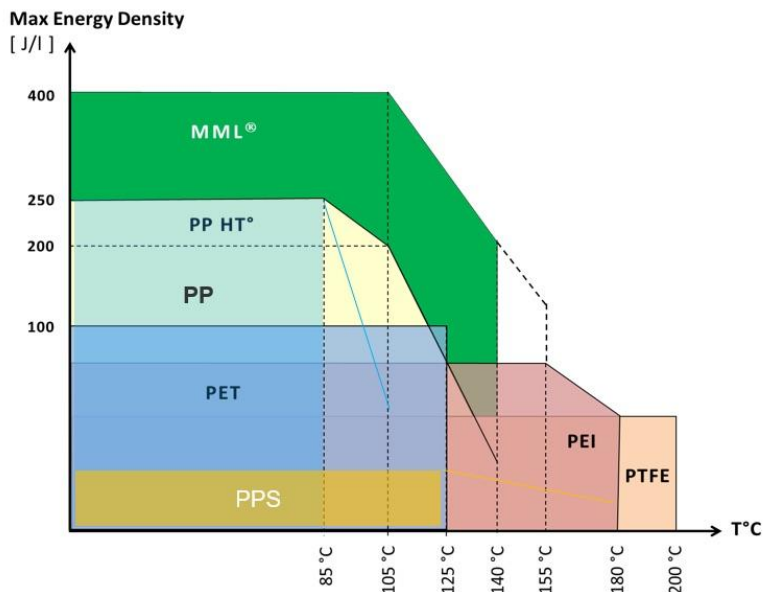


Fig. 2. Comparing the energy density of CF-PP140 polypropylene film with that of other dielectrics. The CF-PP140 series, based on high-temperature polypropylene (PP-HT), is positioned between standard polypropylene and high-temperature polymers. It extends PP operation up to 140°C while maintaining a high energy density (up to 250 J/L). Compared with PET or PPS, CF-PP140 offers higher energy density at elevated temperatures, and compared with PEI or PTFE, it provides a more compact solution with significantly better volumetric efficiency. This balance makes CF-PP140 suitable for space- and temperature-constrained power electronics applications.