

Applications & Cases

Film capacitors

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Compact film capacitors for converters



PROFILE | PCC μ P Photo: Superjuli

Film capacitors of type PCC μ P are manufactured as customer-specific products in a wide variety of geometries for converters in automotive and industrial applications.

Voltages	25 to 100 V DC
Capacitances	10 to 100 μ F
ESR	Maximum 4 m Ω at 100 kHz
I_{rms}	Up to 25 A at 100 kHz, 25 °C
Temperature range	-40 to +135 °C Reflow solderable to 240 °



Modern automotive electronics requires more and more DC/DC converters. These usually convert the supply voltage of 14 or 42 V to various voltage levels for a steadily growing number of electrical subsystems in the vehicle. Here the new, compact PCC μ P chip capacitor from EPCOS acts as a smoothing and storage capacitor. It can also be used for space-saving converters in industrial electronics.

The PCC μ P (power capacitor chip, micro power) has been developed to meet the automobile industry's demands for high temperature stability, high vibration resistance and effective noise suppression. Its compact design is based on tried and tested stacked film technology. The capacitor is available not only with terminal wires, but also with solder tags that ensure high current-handling capacity and low inductance. The PCC μ P covers the capacitance range from 10 to 100 μ F for rated voltages from 25 to 100 V. It is therefore ideal not only for modern automotive electronics, but also for industrial applications in the corresponding voltage ranges.

Design and production

The dielectric of the capacitor - which, like all film capacitors, is self-healing - is made of polyester suitable for the temperature range from -40 to +135°C and metalized with aluminum. The film is wound around a wheel in several layers. Ultrathin films are used to achieve the high volumetric capacitance characteristic of the PCC μ P. After two metallic contact layers (one of aluminum, the other a tin-copper alloy) have been sprayed onto the film, the resulting ring of film is automatically sawn apart and the parts trimmed to the required capacitance. Finally, the solder tags are welded in place.

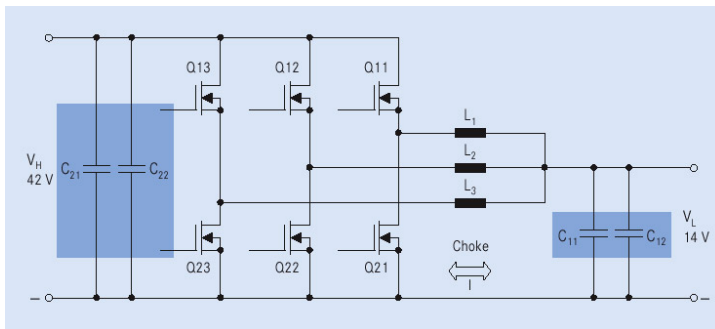
Two configurations are available for the SMD terminals. Bent-in tags are suitable for reflow soldering at up to 240 °C. A low-shrinkage film is used as the dielectric so that the high temperatures do not cause excessive expansion of the

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capacitor. If the tags are bent out, contacts can be applied by welding. The external finish of the capacitor is formed by a polyester film cemented to the stacked winding.

High currents, low ESR

This design also enables the capacitor to handle high currents (up to 25 A rms at 25 °C and 100 kHz, peak currents up to 1800 A). It simultaneously features a low equivalent series resistance of less than 4 mΩ at 100 kHz and low equivalent series inductance. Thanks to the very flexible range of sizes and the variety of terminal options available, EPCOS can supply an optimized chip capacitor for every application. Series B32552 to B32558-PET offer an advance selection with standardized lead spacings of 15, 22.5 and 27.5 mm. Component height depends on the capacitance required. If sufficient quantities are ordered, capacitors can be supplied with wider lead spacings up to 40 mm. Particularly low-profile and wide capacitors are thus available whose low insertion height will make them particularly interesting to the automotive electronics industry.



Applications

The primary application of the PCC μ P capacitors will be found in DC/DC converters for automotive engineering. They can also be used as boost capacitors for starter generators, link-circuit capacitors for low-power converters - also in industrial electronics - and in switch-mode power supplies for telecom applications.

Product positioning and availability

The PCC μ P is a further development of the PCC concept, on which chip capacitors of exceptionally compact dimensions with high pulse and current-handling capability are based. So the PCC μ P complements the PCC LP (low-power) and PCC HP (high-power) versions introduced earlier for the voltage range up to 100 V. The PCC μ P is manufactured on a customer-specific basis.