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DID YOU KNOW?

METALIZED POLYPROPYLENE FILM CAPACITORS WITH MAX. OPERATING TEMPERATURE OF 125 °C

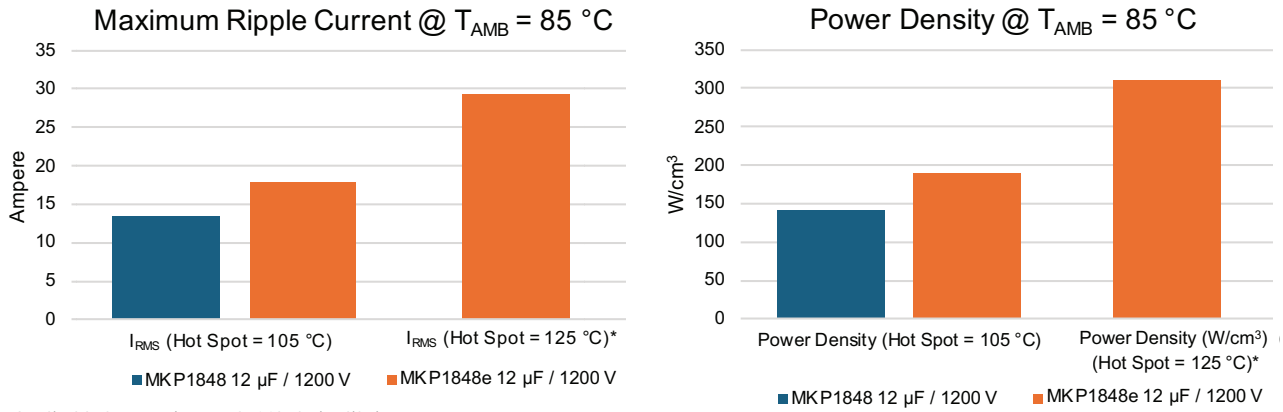
Metalized polypropylene film DC-Link capacitors are often considered to be a reliable, and thus widely recommended, solution for power electronic applications to ensure the high stability of electrical parameters over a long life. As a drawback, however, conventional MKP film capacitors are usually limited to a 105 °C hot spot temperature, which restricts their use in modern power electronic applications that often operate at higher temperatures.

With the new MKP1848e series, Vishay addresses this issue by offering a novel metalized polypropylene film DC-Link capacitor series that expands operating temperatures beyond this limitation. The MKP1848e allows operation up to 125 °C for a limited time, addressing the challenging mission profiles of modern power electronics applications in the automotive and industrial markets. It withstands operating voltages up to 800 V_{DC} at 125 °C, making it particularly suitable for xEV applications in which the high voltage buses are typically biased between 400 V_{DC} and 800 V_{DC}.

DC Voltage Ratings						
U_{NDC} at 70 °C	600 V_{DC}	850 V_{DC}	1100 V_{DC}	1200 V_{DC}	1450 V_{DC}	1600 V_{DC}
U_{NDC} at 85 °C	500 V_{DC}	700 V_{DC}	900 V_{DC}	1000 V_{DC}	1200 V_{DC}	1300 V_{DC}
U_{NDC} at 105 °C	350 V_{DC}	500 V_{DC}	700 V_{DC}	800 V_{DC}	900 V_{DC}	950 V_{DC}
U_{NDC} at 125 °C	250 V_{DC}	400 V_{DC}	500 V_{DC}	600 V_{DC}	700 V_{DC}	800 V_{DC}

Figure 1. MKP1848e DC voltage ratings as a function of temperature

With its ability to operate up to 125 °C, the MKP1848e series also allows designers to drive a higher ripple current through the capacitor in critical operating profiles compared to previous-generation DC-Link film capacitors. Figure 2 depicts a practical example:



* Applicable for a maximum of 500h during lifetime.

Dimensions for both MKP1848 & MKP1848e, 12 µF / 1200 V_{DC}		
Capacitor Dimensions (mm)	W	30
	H	45
	L	42
	Capacitor Volume (cm³)	56.7

Example Operating Conditions for MKP1848 & MKP1848e, 12 µF / 1200 V_{DC}	
Capacitor Rated Voltage (V)	1200
Capacitor Operating Voltage (V)	600
Operating Ambient Temperature (°C)	85

Figure 2. Comparison between the new MKP1848e series and previous DC-Link capacitor generations on a 600 V_{DC} application at an ambient temperature of 85 °C

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In the example shown in Figure 2, a 12 µF capacitor with a rated voltage of 1200 V_{DC} from the previous generation is compared to an MKP1848e with the same capacitance and voltage specification, as well as a similar physical volume.

At an ambient temperature of 85 °C and a permissible hot spot temperature of up to 125 °C, the allowed ripple current doubles compared to the previous DC-Link generation, even if only for a limited time. This results in a higher power density and increases the flexibility of the new MKP1848e for transient, harsh operating modes in applications where the operating voltage is kept within the DC voltage values defined in Figure 1.

To evaluate the right choice of DC-Link capacitors for a given mission profile, please consult our experts at dc-film@vishay.com.

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