

High Temperature Film Capacitor for Automotive Application

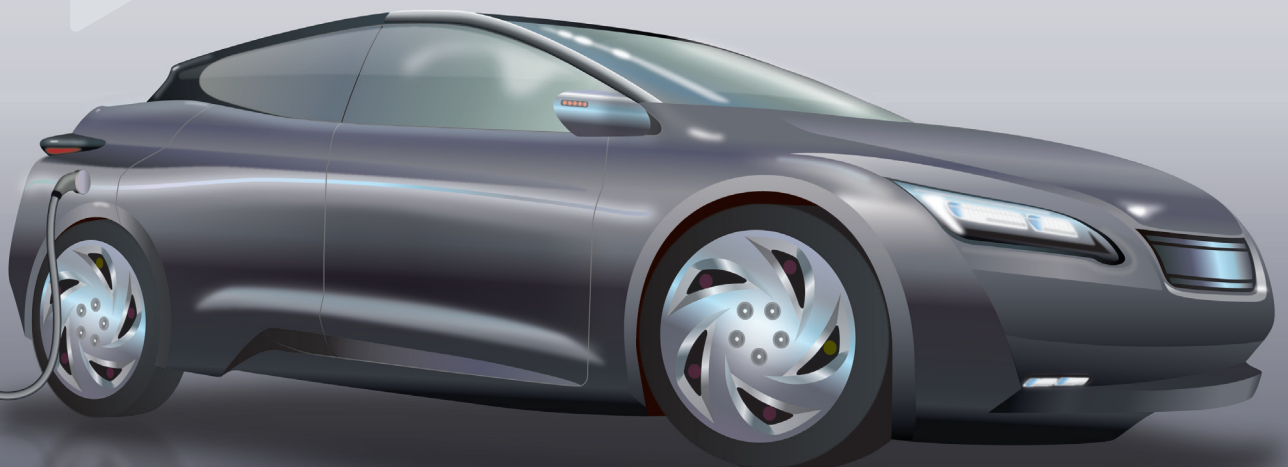
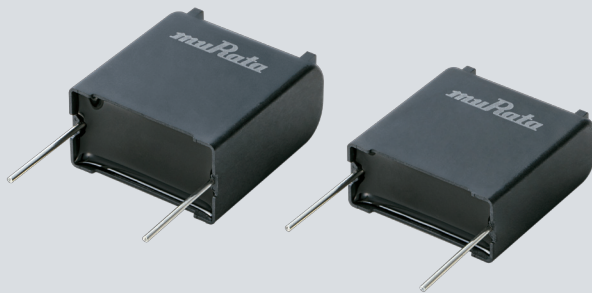
Recommended for smoothing capacitors of xEV power electronics
that require high heat resistance and safety.

EV

HEV

PHEV

FCEV



High Temperature Capacitor FH series that can be used continuously at 125°C

Currently, film capacitors commonly used for automotive applications are generally guaranteed up to 105°C. Murata has recently developed a new high heat resistant film material.

Using this material, we have commercialized a high heat resistance film capacitor that can be used continuously at 125°C with Shizuki Electronic Co., Inc.

Although there was a high heat resistance film capacitor in the past, there was a concern that the self-healing function is hard to work at high temperature and short-circuit failure may result.

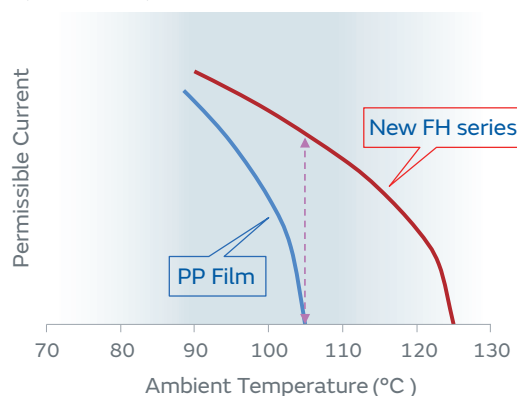
On the other hand, the product developed this time has a self-healing function in high temperature range.

Performances

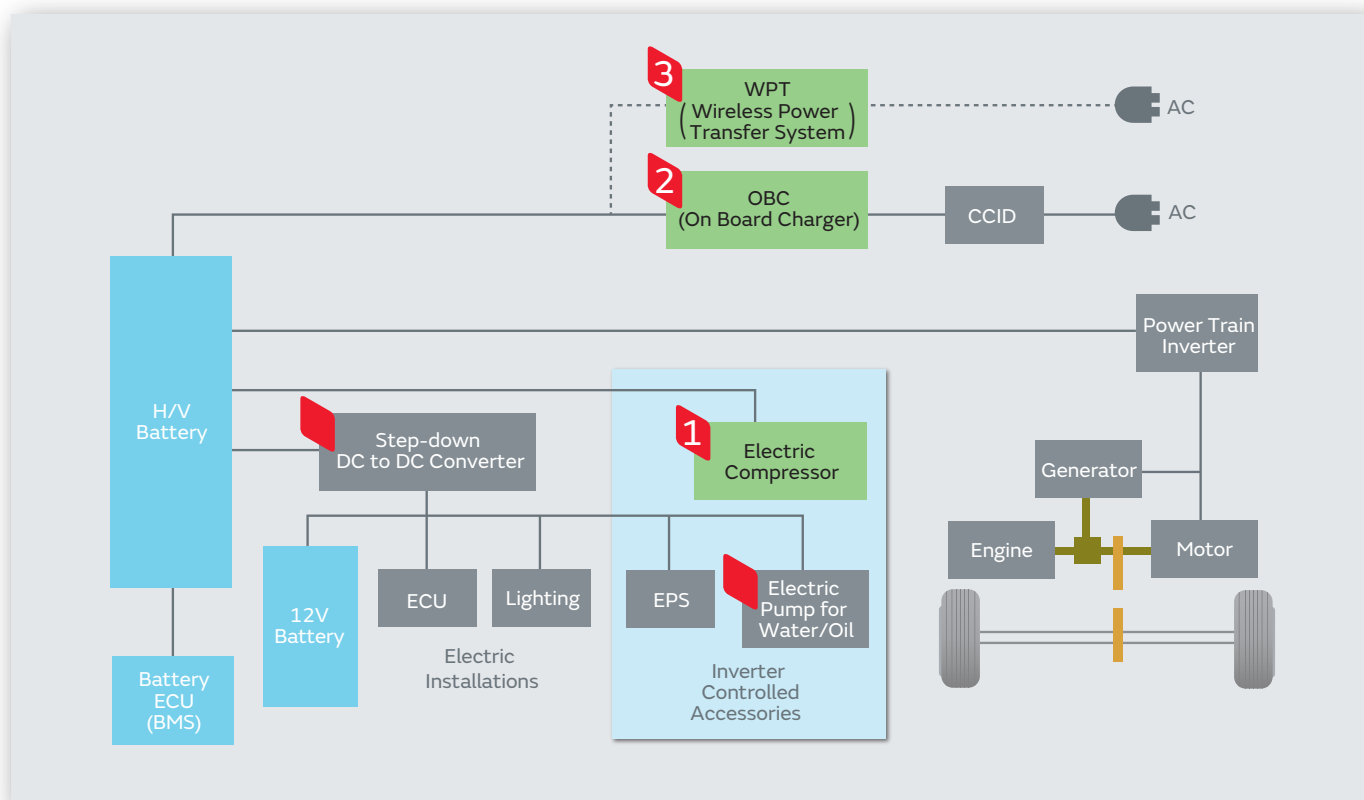
The FH series uses materials with high heat resistance. Therefore, it has a higher allowable ripple current under higher temperature environment than conventional PP film capacitor.

This feature is more prominent in the high frequency range. For example, when the ambient temperature is at 105°C, PP film capacitor would be already on its limit for allowable ripple current, but because of the higher heat resistance of FH series, the allowable ripple current can be increased drastically.

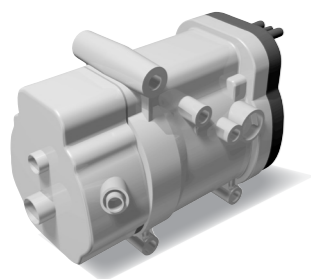
▶ Permissible Current (10-100kHz)



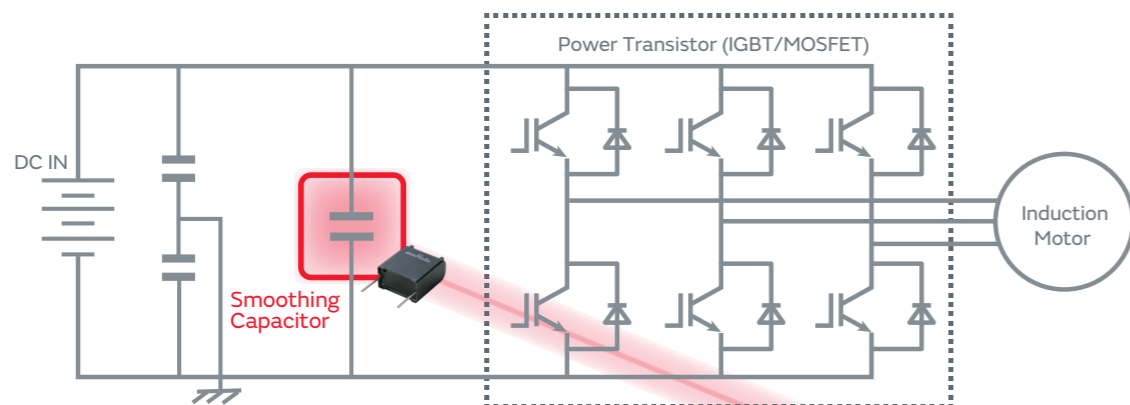
Typical Block Diagram



1 Target Application; Electric Compressor



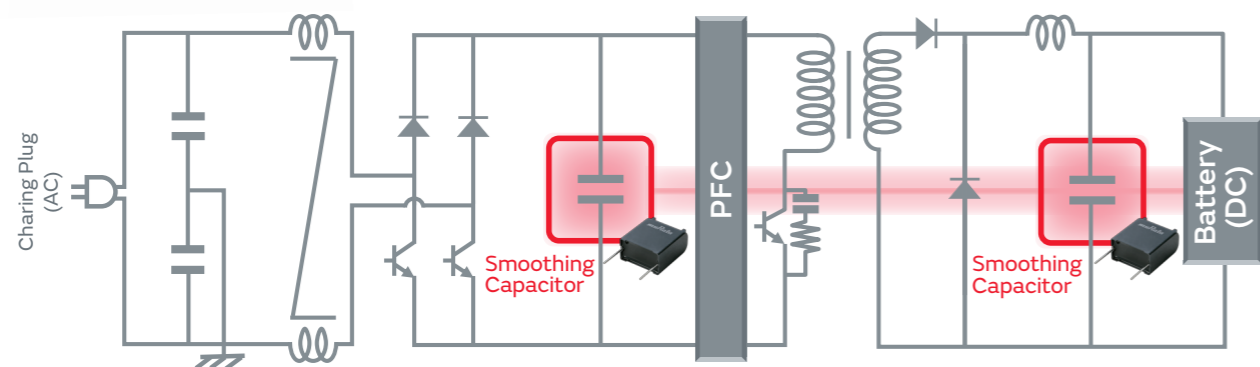
The compressor for air conditioner of xEV is driven by inverter system. In accordance with the trend of electromechanical integration of xEV, simplification of the cooling mechanism, miniaturization, and high power density has also been required to the air conditioner system. Based on the application trends, smoothing capacitors are also required to correspond to higher temperatures than before. Film Capacitor FH series using new high heat resistant dielectric material contributes to high power density of your systems which is required for reliability and safety in high temperature range.



2 Target Application; OBC (On Board Charger)



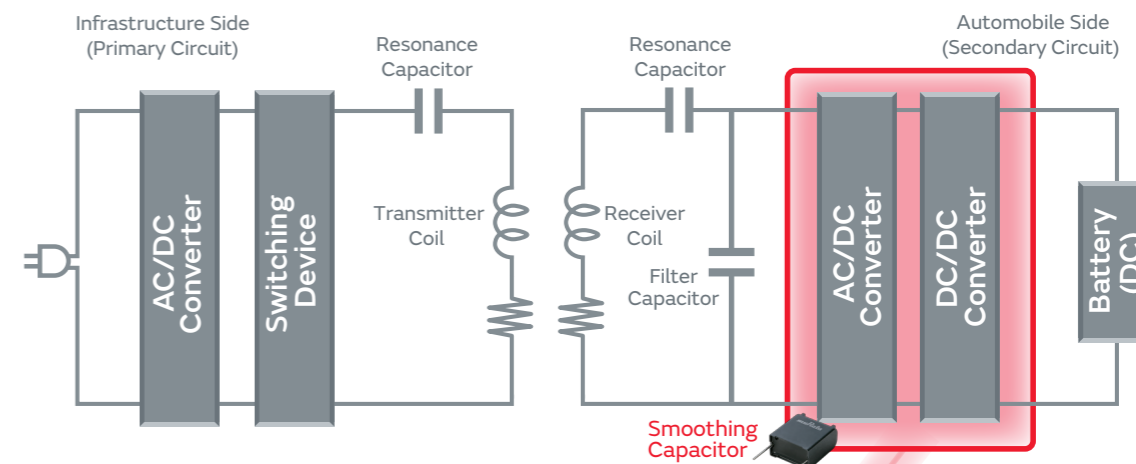
OBC is an AC/DC converter for charging high voltage battery of EV and PHEV. In recent years, soft switching type resonance converters are increasing. The resonance converter is driven at high frequency, and the temperature of the coil part is rising. Due to the miniaturization of OBC, packaging density has promoted, and heat resistance is required for parts. The high heat resistance film capacitor FH series contributes to high density mounting of your OBC system.



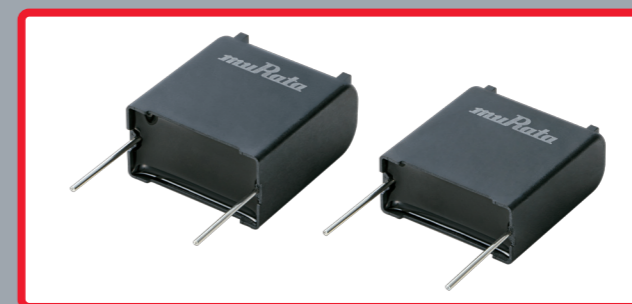
3 Target Application; WPT (Wireless Power Transfer System)



The charger for EV and PHEV is expected to change from the existing wired plugin type to the wireless type. In the wireless type, the resonance system carries out energy conversion at high frequencies, and the temperature of the coil part rises as well. The miniaturization and high-density mounting of WPT is advancing, and high heat resistance film capacitor FH series is suitable as a smoothing capacitor of the secondary circuit.



High Temperature Film Capacitor FH series



Capacitance	4(*), 10, 15, 20μF (*500Vdc only)
Temperature	125°C @ hottest point

Material

High Temperature Capacitors (New Products)

- Enable to use at 125°C continuously
- Functional self-healing at high temperature ranges, leading to an open mode failure



Conventional Film Capacitors

- Guarantee 105°C continuous or less in general (PP)
- Very limited functional self-healing at high temperature ranges, leading to a short mode failure (PPS and PEN)

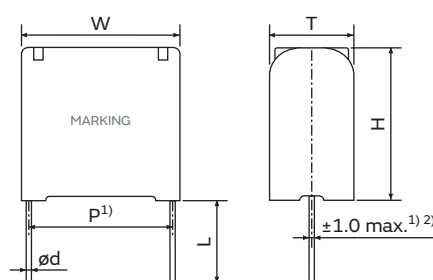
Features

Characteristics of the dielectric film "High temperature" + "High ε"		
Items	PP	New Film
Material	Thermoplastic Resin	Thermosetting Resin
Temperature	85-105°C	125-135°C
εr	2.1-2.2	3 ≤

Characteristics of the Film Capacitor "High Temperature" + "Small"		
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*Continuous use possible at 125°C
 (Maximum permissible temperature: 125 to 135°C/with time limit)

Dimensions



1) The measurement point is within 5mm from the body of component part.
 2) Deviation from the case center position within ±1.0mm.

Specifications

Items	Basic Specifications
Rated Capacitance	4μF(*), 10μF, 15μF, 20μF (*Rated Voltage 500Vdc only)
Rated Voltage	500Vdc, 850Vdc
Operational Life	125°C Rated Voltage 2000h
Biased Humidity	85°C/85%RH Rated Voltage 1000h
Temperature Cycling	-40°C⇔125°C 1000 cycles

Applications

Smoothing capacitor for xEV Power Electronics that require high heat-resistance and safety

- Electric Compressor
- OBC (On Board Charger)
- WPT (Wireless Power Transfer System)

Rated Voltage 500Vdc

Part Number	Capacitance	Dimensions (mm)					
		W	H	T	P	L	d
FHA50Y206KS	20μF	33.0 ±0.5	37.0 ±0.5	18.0 ±0.5	30.0 ±1.0	20.0 ±1.0	1.20 ±0.05
FHA50Y156KS	15μF	33.0 ±0.5	35.5 ±0.5	14.5 ±0.5	30.0 ±1.0	20.0 ±1.0	1.20 ±0.05
FHA50Y106KS	10μF	33.0 ±0.5	35.5 ±0.5	14.5 ±0.5	30.0 ±1.0	20.0 ±1.0	1.20 ±0.05
FHA50Y405KS	4μF	23.0 ±0.5	26.5 ±0.5	12.7 ±0.5	20.0 ±1.0	28.0 ±1.0	1.20 ±0.05

Rated Voltage 850Vdc

Part Number	Capacitance	Dimensions (mm)					
		W	H	T	P	L	d
FHA85Y206KS	20μF	33.0 ±0.5	41.0 ±0.5	23.0 ±0.5	30.0 ±1.0	25.0 ±1.0	1.20 ±0.05
FHA85Y156KS	15μF	33.0 ±0.5	37.0 ±0.5	18.0 ±0.5	30.0 ±1.0	20.0 ±1.0	1.20 ±0.05
FHA85Y106KS	10μF	33.0 ±0.5	35.5 ±0.5	14.5 ±0.5	30.0 ±1.0	20.0 ±1.0	1.20 ±0.05

Global Locations

For details please visit www.murata.com

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Film Capacitor
for Automotive
Application



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- | | |
|---|--|
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| ③ Undersea equipment | ④ Power plant control equipment |
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| ⑦ Traffic signal equipment | ⑧ Disaster prevention/security equipment |
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