

Attracting Tomorrow



# Product presentation – ModCap HF

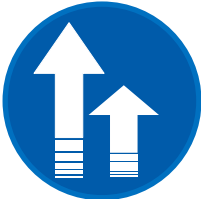
DCR Modular | New Modular High Frequency Series



TDK Electronics AG  
FILM ESPEC HP  
Málaga, Spain  
Sept 1st, 2022

# Introducing the New Modular HF series Highlights

## Switch it faster !!!



The most powered design  
with highest power density



Reduce time to market  
& lead time



Cost saving solution  
Reduce weight & volume



Ultra low ESR vs frequency

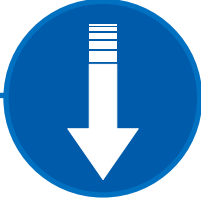


**MODCAP HF**

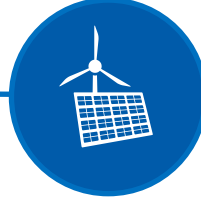
Product developed  
fire and smoke compliant



Low inductance (8 nH)  
to avoid use of additional  
snubbers



Renewable energies &  
Traction (SiC)

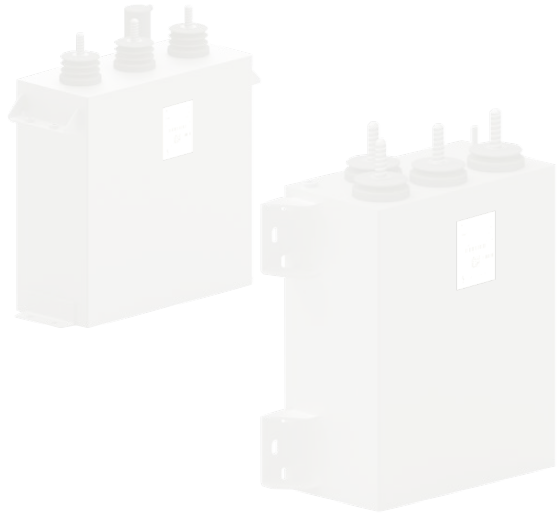


Finite elements analysis



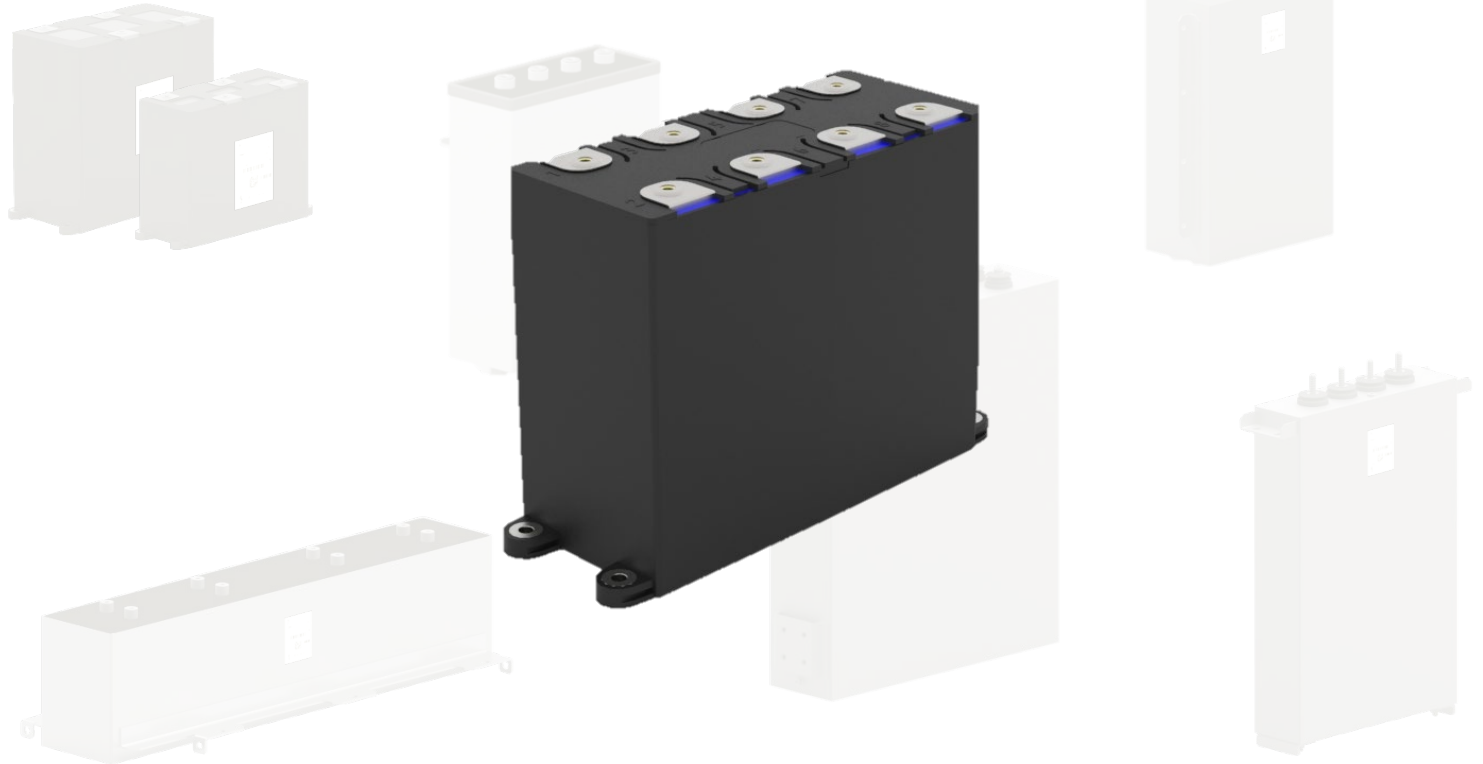
# ModCap HF series | B25647

~ AC FILTER



MKK-HP

= DC-LINK / DC FILTER

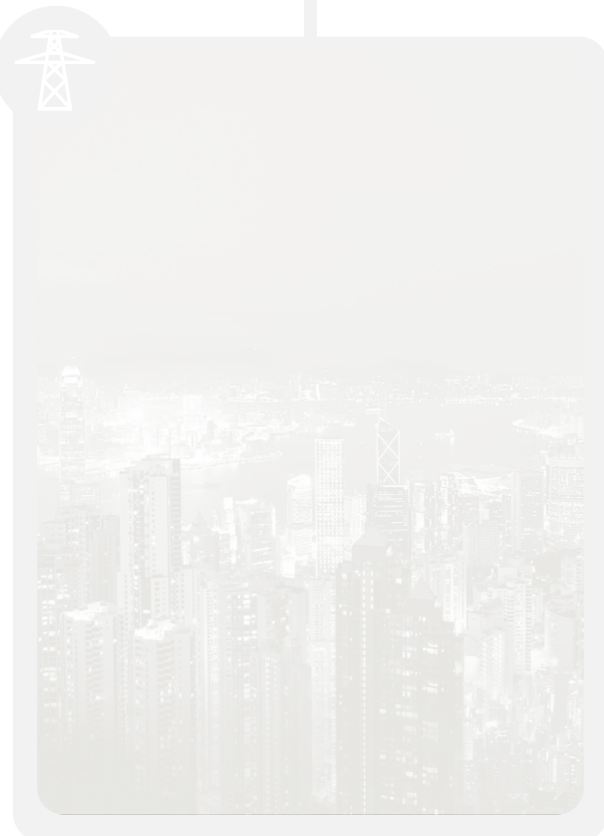


ModCap HF / MKK-DCR / MKK-DCi-R / MKK-DCi-H

# ModCa HF series | B25647

## DC-Link applications

Energy transmission



Renewable energies



Traction



Industry



# General overview

## B25647 series

= ModCap HF (dry-modular-high frequency)

NEW



### Features

- Capacitance range from 640  $\mu\text{F}$  up to 1850  $\mu\text{F}$  and voltage from 900 V up to 1,600 V
- Low ESL (8 nH)
- Temperature range up to 90 °C hotspot
- IEC 61071, IEC 61881-1, EN 45545-2 HL3 R23 (fire and smoke), UL recognized
- Filled with polyurethane resin (dry technology)
- Plastic case (opened), 8 terminals construction
- Flat windings

### Benefits

- High power density, high frequency performance
- Modular concept for parallelization
- Snubber avoidance / low voltage overshoot
- Lifetime up to 200,000 hours
- Finite elements analysis available for the whole series
- Specially recommended for SiC semiconductors
- Reduced time to market & lead time

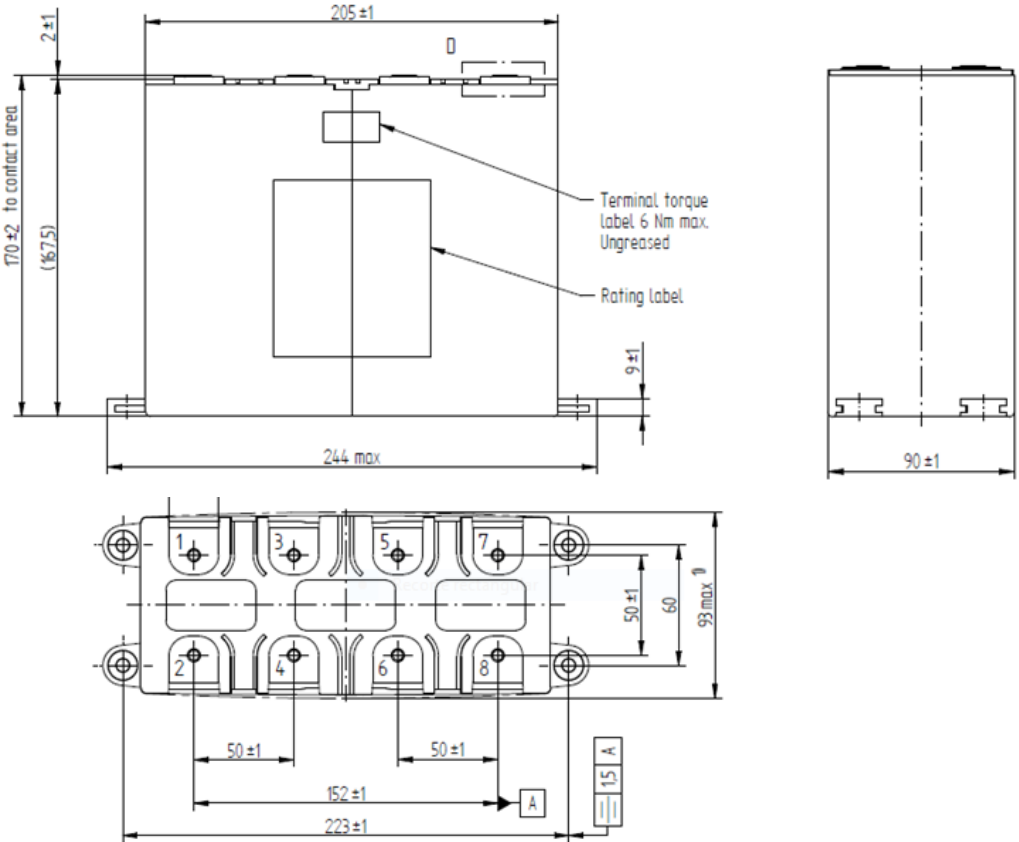


Recommended applications

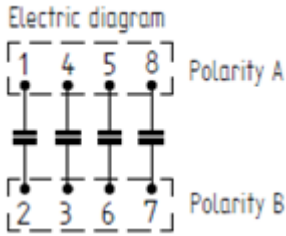
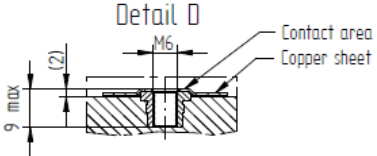
# Construction C

## Simplified drawing & 3-D

**Main dimensions: 243 x 169.5 x 90 mm**



**Terminal**



**3D**

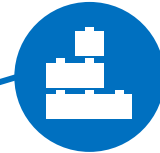


# Highlights: HF performance, Ultra low ESL & higher operation temperature

## Compact power unit



- Capacitors can be mounted very close to the power modules to reduce loop inductance.

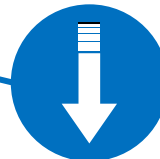


→ **Compact and scalable solution specially designed for SiC semiconductors**



→ **Less investment on cooling**

- Very short connection between capacitor and semi-conductor

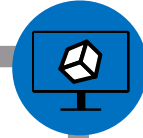


→ **Ultra Low inductance (8nH)**

→ **Snubber capacitors avoidance and suppression of HF resonance**

# Electromagnetic behavior of Modular HF Series

## Electromagnetic: modelling



## Customer benefits

### Customer Input

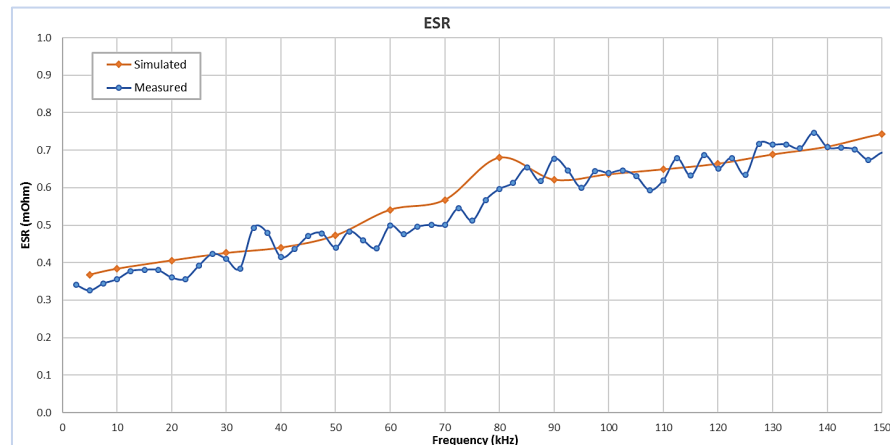
Current-frequency spectrum

### TDK Input

Capacitor design

### Simulation

Capacitor electrical model: including ESL and ESR Vs Freq  
Total losses and its internal distribution (must for accurate thermal simulation)

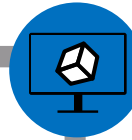
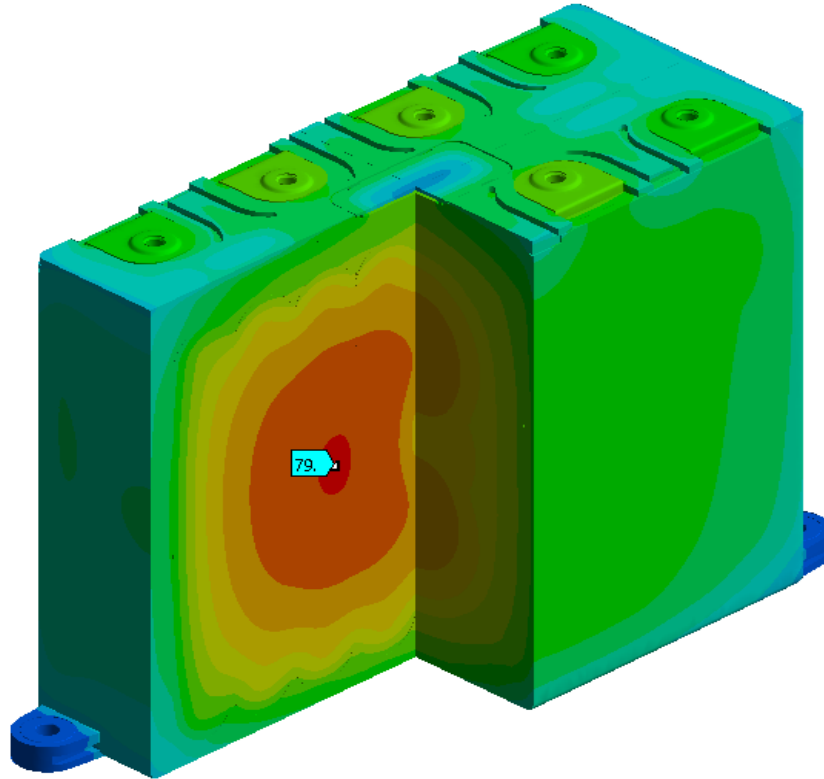
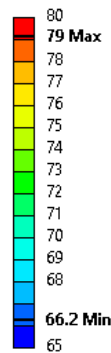


- Electromagnetic model available for specific simulation according to current-frequency spectrum defined by the customer.
- Capacitor electrical model available in time and frequency domain
- Losses at defined current-frequency spectrum and its internal distribution
- Graphs with simulated ESR fully available for further thermal calculations by calculating losses all along the complete range of frequency



## Thermal: hot spot & temperature mapping

B: ModCapHF\_75mm  
Temperature  
Type: Temperature  
Unit: °C  
Time: 1 s



## Customer benefits

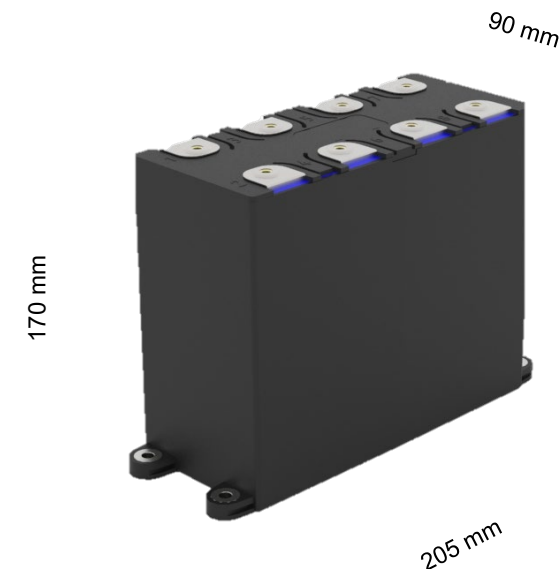
- Thermal model available for specific simulation according to spectrum and boundary conditions defined by the customer.
- Thermal simulations to be integrated as part of the type test report.
- Thermal Simulations may reduce the complexity and time of technical approvals, no further specific thermal stability test on lab.
- Detailed Temperature mapping allows customer to estimate in advance hot spot areas
- Thermal Simulation to be done as per specific customer requirements (customized current spectrum and thermal boundary conditions)
- Heating Transference from bus bar may be analyzed in advance

# ModCap HF

## Ordering Code System

### ModCap HF: Construction C

Nominal voltage (V)	Capacitance $\pm 10\%$ ( $\mu\text{F}$ )	Nominal current (A)	Surge current (kA)	Repetitive peak current (kA)	Dimensions (LxWxH, mm)	Construction	Part Number
900	1850	210	225	5	205x90x170	C	<b>B25647A9198K003</b>
1000	1520	200	220	5	205x90x170	C	<b>B25647A1158K003</b>
1100	1200	190	215	5	205x90x170	C	<b>B25647A1128K003</b>
1250	940	180	210	5	205x90x170	C	<b>B25647A1947K003</b>
1350	880	170	205	5	205x90x170	C	<b>B25647A1887K003</b>
1600	640	160	200	5	205x90x170	C	<b>B25647A1647K003</b>



Get more info [here](#)



[www.tdk-electronics.tdk.com](http://www.tdk-electronics.tdk.com) · Get more info [here](#)