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# ModCap HF

## DCR Modular | New Modular High Frequency Series

**TDK Electronics Components**
CAP Business Group • Product Marketing
Malaga, Spain
31/01/2024

# Introducing the New Modular HF Series Highlights

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TDK

Product developed according to fire safety standards

Very low ESL (<8 nH) to avoid use of additional snubbers

Renewable energies & Traction (SiC)

Ultra low ESR vs frequency

## ModCap HF

Sustainable product ISCC certified

Powered design with high power density

Reduce time to market & lead time

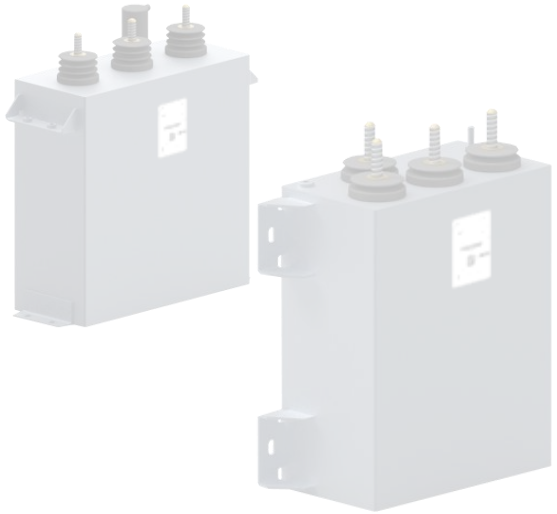
Cost saving solution Reduce weight & volume

Finite elements analysis

**Switch it faster!**

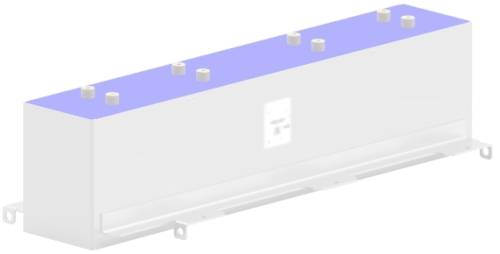
# ModCap™ HF series | B25647A*

## ~ AC filter



MKK HP

## = DC link/DC filter




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

# ModCap HF Series B25647A*
# DC-link Applications

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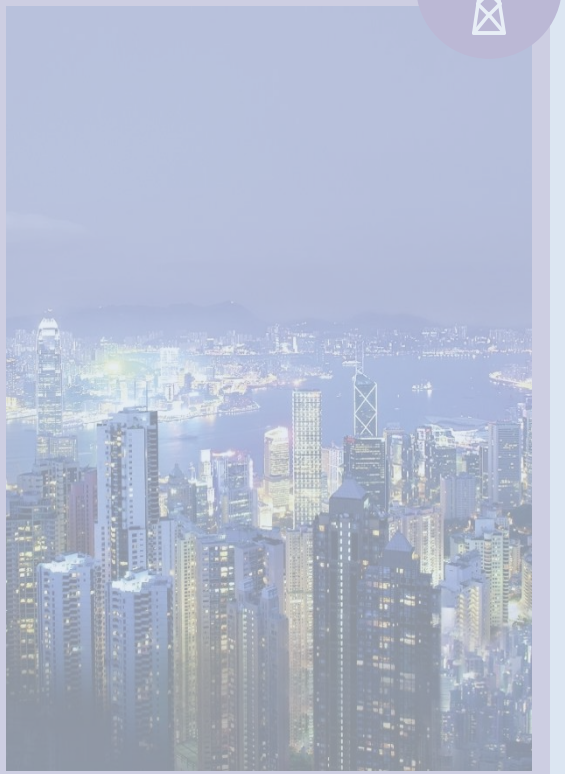
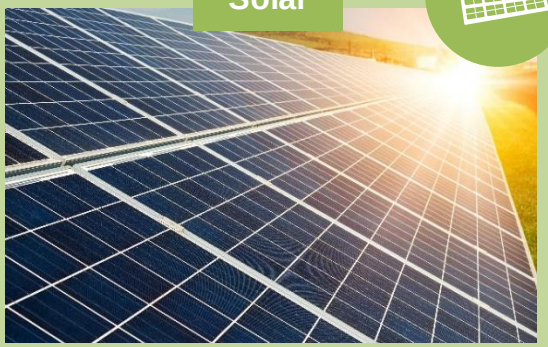
## Energy transmission



## Renewable energies

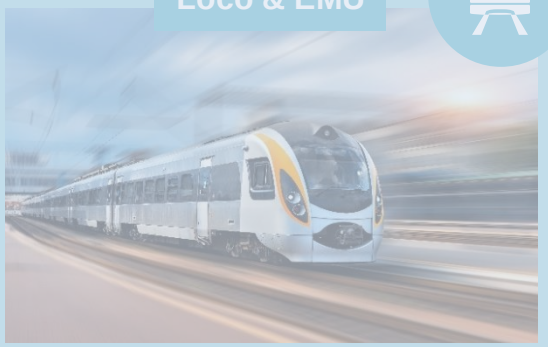
### Solar



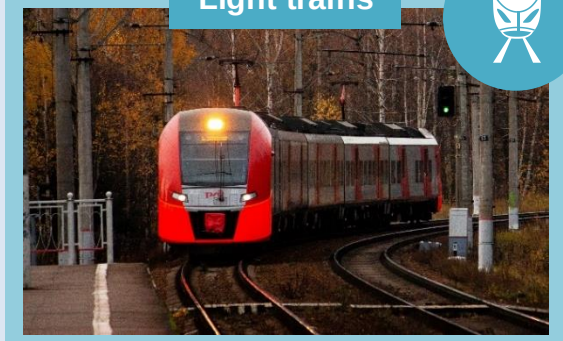
### Wind

## Traction

### Loco & EMU



### Light trains



## Industry

### LV

### MV

# General Overview
# B25647A* Series

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## ModCap HF (dry-modular-high frequency)

NEW

UL Recognized

Recommended applications

### Features

- Capacitance range from 660 up to 1900 µF and voltage from 900 up to 1,600 V
- Very 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

# Construction C
# Simplified Drawing & 3-D

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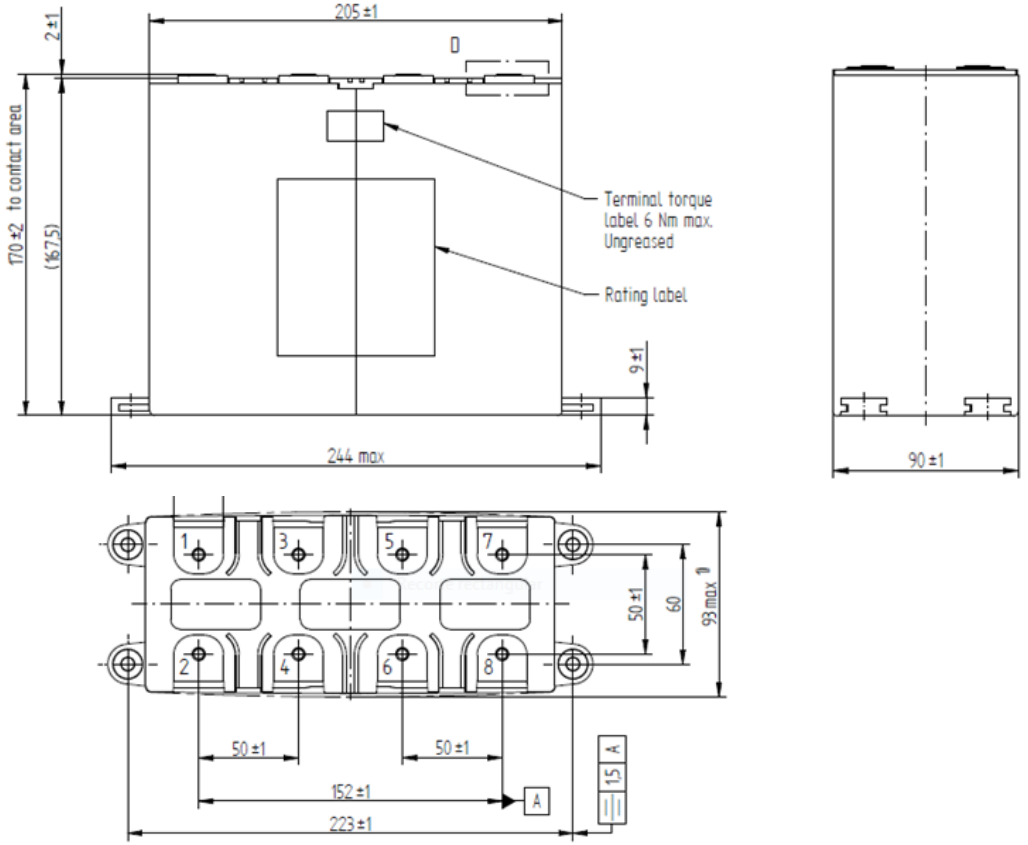
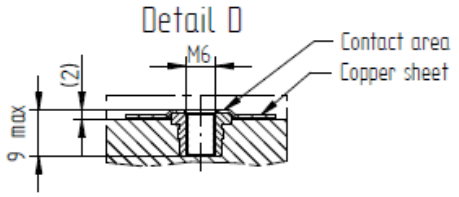
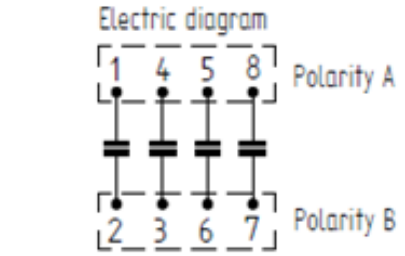
## Main dimensions: 243 x 169.5 x 90 mm




## Terminal




# Highlights: HF Performance, Ultra Low ESL & Higher Operation Temperature

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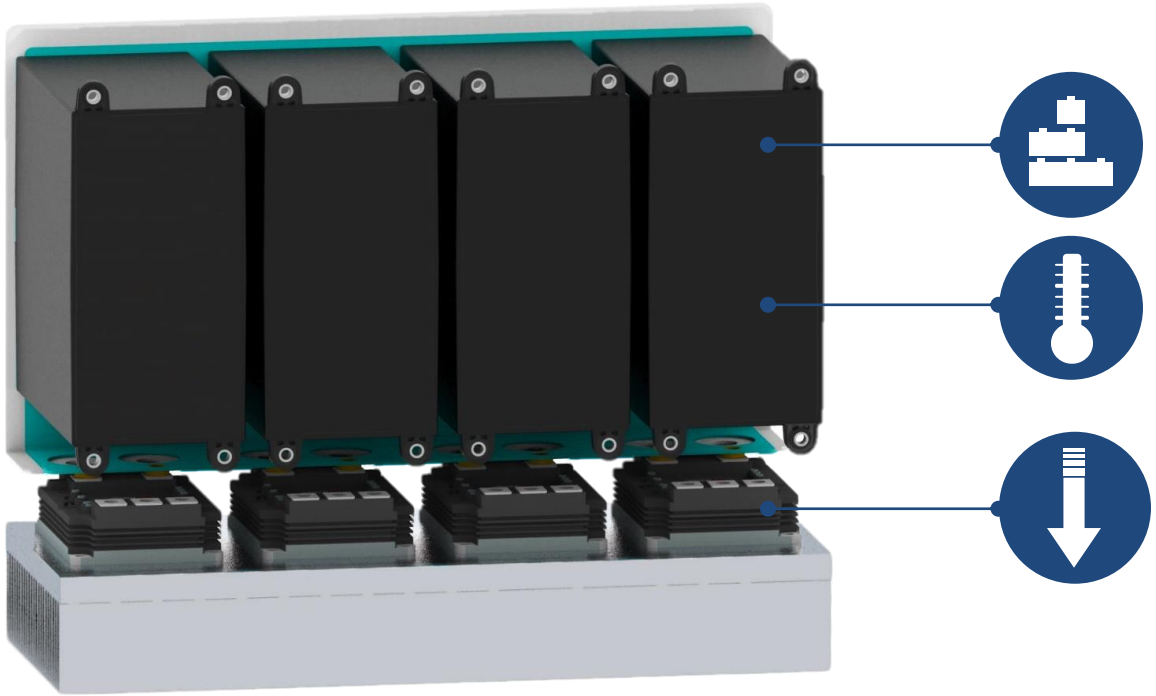
## Compact power unit



- 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 semiconductor
  - ➔ **Very low ESL (<8 nH)**
  - ➔ **Snubber capacitors avoidance and suppression of HF resonance**

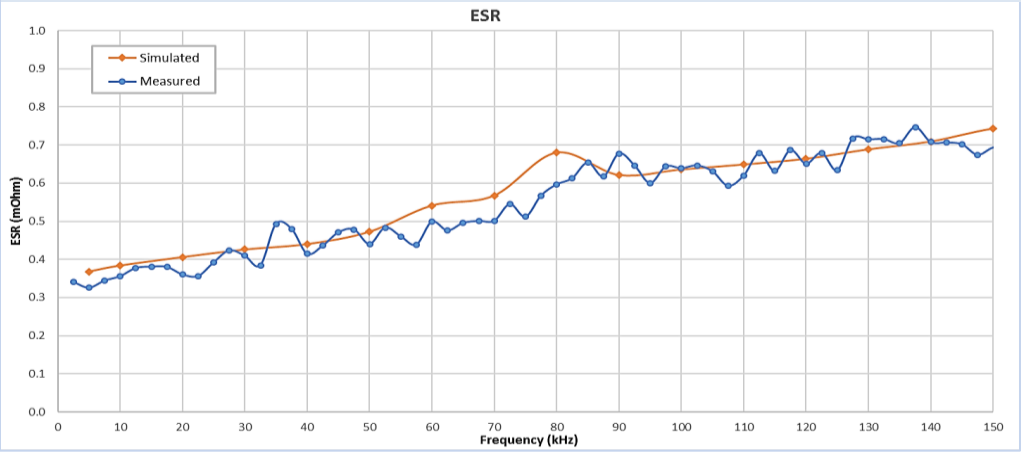
# Electromagnetic Behavior of Modular HF series

## Electromagnetic: Modelling

**Customer input**
Current-frequency spectrum

**TDK input**
Capacitor design

**Simulation**
Capacitor electrical model: including ESL and ESR vs frequency
Total losses and its internal distribution (must for accurate thermal simulation)

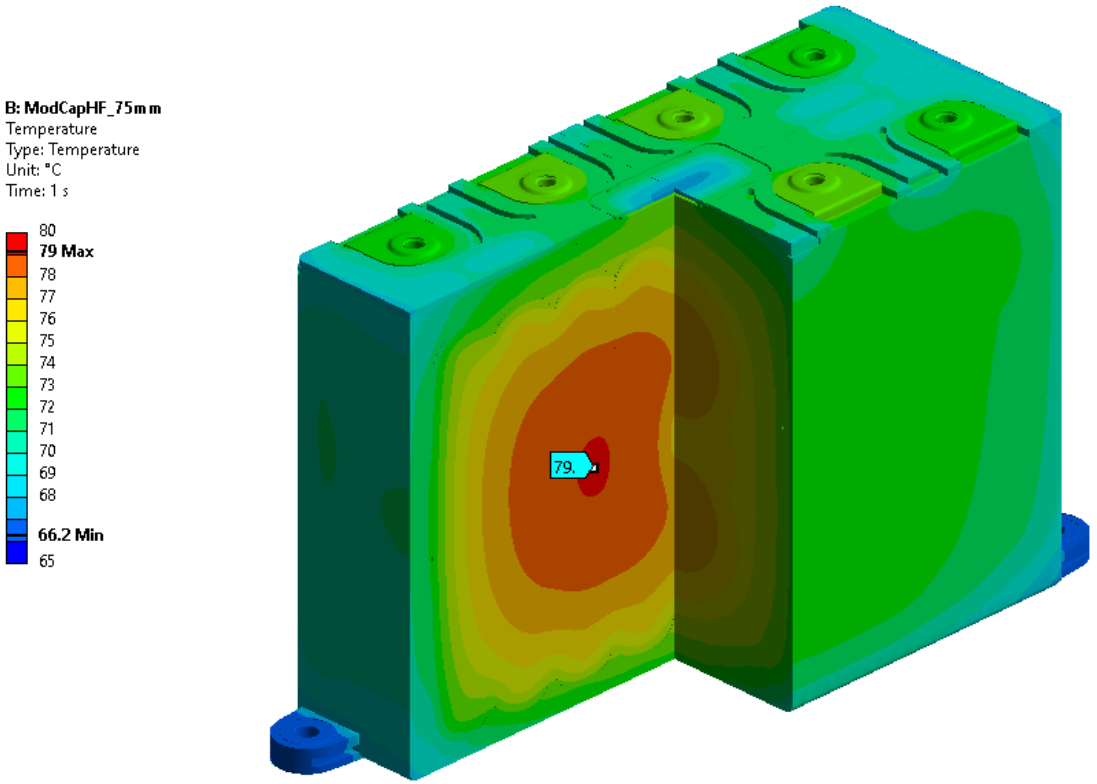



## Customer benefits

- 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 Behavior of Modular HF series

## Thermal: Hot spot & temperature maping




## 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

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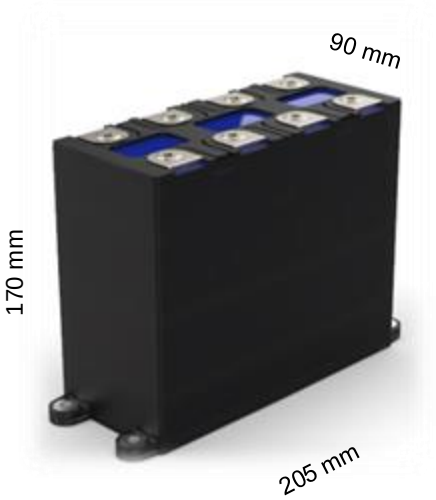
| Nominal voltage (V) | Capacitance ±10% (µF) | Nominal current (A) | Surge current (kA) | Repetitive peak current (kA) | Dimensions (L x W x H, mm) | Con-struction | Part number |
|---|---|---|---|---|---|---|---|
| 900 | 1900 | 210 | 225 | 5 | 205 x 90 x 170 | C | **B25647A9198K003** |
| 1000 | 1550 | 200 | 220 | 5 | 205 x 90 x 170 | C | **B25647A1158K003** |
| 1100 | 1200 | 190 | 215 | 5 | 205 x 90 x 170 | C | **B25647A1128K003** |
| 1250 | 970 | 180 | 210 | 5 | 205 x 90 x 170 | C | **B25647A1977K003** |
| 1350 | 925 | 170 | 205 | 5 | 205 x 90 x 170 | C | **B25647A1927K403** |
| 1600 | 660 | 160 | 200 | 5 | 205 x 90 x 170 | C | **B25647A1667K003** |

**ModCap HF: Construction C**




Get more info here

www.tdk-electronics.tdk.com