Product presentation – ModCap MF

DCR Modular | New Modular Standard Series
Introducing the New Modular Standard series

Highlights

- The most compact solution with highest energy density
- Reduce time to market & lead time
- Cost saving solution
- Reduce losses based on low ESR vs frequency
- Product developed fire and smoke compliant
- Low inductance (<14 nH) to avoid use of additional snubbers
- Traction, industrial drives & renewable energies
- Finite elements analysis
ModCap series | B25645

= DC-LINK / DC FILTER

ModCap / MKK-DCR / MKK-DCi-R / MKK-DCi-H
ModCap series | B25645
DC-Link applications

Energy transmission

Renewable energies
- Solar
- Wind

Traction
- Loco & EMU
- Light train

Industry
- LV
- MV

Applications:
- Renewable energies
  - Solar
  - Wind
- Traction
  - Loco & EMU
  - Light train
- Industry
  - LV
  - MV
General overview
B25645 series

ModCap (dry-modular)

Features
- Capacitance range from 335 µF up to 3900 µF and voltage from 900 V up to 2,300 V
- Low ESL <14 nH
- Temperature range up to 90 °C hotspot
- IEC 61071, IEC 61881-1, EN 45545-2 HL3 R23 (fire and smoke)
- Filled with polyurethane resin (dry technology)
- Plastic case (opened)
- Flat windings

Benefits
- High energy density, ultra compact solution
- Modular concept for parallelization
- Snubber avoidance / low voltage overshoot
- Lifetime up to 200,000 hours
- Finite elements analysis available for the whole series
- Cost oriented solution
- Reduced time to market & lead time

Recommended applications
Construction A
Simplified drawing & 3-D

Main dimensions: 243 x 169.5 x 90 mm

Terminal

3D

No active insulation between 1-3 and 2-4
Construction B
Simplified drawing & 3-D

Main dimensions: 258 x 215 x 115 mm

Terminal

3D

Electric diagram

No active insulation between 1-3 and 2-4
Highlights: Compactness, low ESL & higher operation temperature

- Capacitors can be mounted very close to the power modules to reduce loop inductance.
  - Ultra compact solution
- Very short connection between capacitor and semi-conductor
  - Low inductance
  - Possible snubber capacitors avoidance
Electromagnetic behavior of Modular Standard Series

Electromagnetic: modelling

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)

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 Standard Series

Thermal: hot spot & temperature mapping

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

Boundary conditions considered:
- Capacitance: 1 mF
- Current: 155 A
- Power losses: 11 W
- DeltaT = 15 K

Current spectrum considered

- Busbar temp: 80 °C
- Natural convection
# ModCap Ordering Code System

<table>
<thead>
<tr>
<th>Nominal voltage (V)</th>
<th>Capacitance ±10% (µF)</th>
<th>Nominal current (A)</th>
<th>Surge current (kA)</th>
<th>Repetitive peak current (kA)</th>
<th>Dimensions (LxWxH, mm)</th>
<th>Construction</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>900</td>
<td>2075</td>
<td>200</td>
<td>225</td>
<td>5</td>
<td>205x90x170</td>
<td>A</td>
<td>B25645A9218K003</td>
</tr>
<tr>
<td></td>
<td>3900</td>
<td>155</td>
<td>250</td>
<td>5</td>
<td>220x115x215</td>
<td>B</td>
<td>B25645A9398K003</td>
</tr>
<tr>
<td>1000</td>
<td>1705</td>
<td>190</td>
<td>220</td>
<td>5</td>
<td>205x90x170</td>
<td>A</td>
<td>B25645A1178K003</td>
</tr>
<tr>
<td></td>
<td>3210</td>
<td>150</td>
<td>245</td>
<td>5</td>
<td>220x115x215</td>
<td>B</td>
<td>B25645A1328K003</td>
</tr>
<tr>
<td>1100</td>
<td>1330</td>
<td>180</td>
<td>215</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A1138K003</td>
</tr>
<tr>
<td></td>
<td>2525</td>
<td>140</td>
<td>240</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A1258K003</td>
</tr>
<tr>
<td>1250</td>
<td>1045</td>
<td>170</td>
<td>210</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A1118K003</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>135</td>
<td>235</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A1198K003</td>
</tr>
<tr>
<td>1350</td>
<td>980</td>
<td>160</td>
<td>205</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A1108K013</td>
</tr>
<tr>
<td></td>
<td>1865</td>
<td>130</td>
<td>230</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A1188K003</td>
</tr>
<tr>
<td>1600</td>
<td>710</td>
<td>150</td>
<td>200</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A1757K003</td>
</tr>
<tr>
<td></td>
<td>1375</td>
<td>120</td>
<td>225</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A1138K013</td>
</tr>
<tr>
<td>1800</td>
<td>525</td>
<td>140</td>
<td>195</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A1567K003</td>
</tr>
<tr>
<td></td>
<td>1025</td>
<td>115</td>
<td>220</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A1108K003</td>
</tr>
<tr>
<td>2000</td>
<td>415</td>
<td>130</td>
<td>185</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A2447K003</td>
</tr>
<tr>
<td></td>
<td>820</td>
<td>110</td>
<td>210</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A2827K003</td>
</tr>
<tr>
<td>2300</td>
<td>335</td>
<td>120</td>
<td>175</td>
<td>5</td>
<td>243x169.5x90</td>
<td>A</td>
<td>B25645A2367K003</td>
</tr>
<tr>
<td></td>
<td>670</td>
<td>105</td>
<td>200</td>
<td>5</td>
<td>258x215x115</td>
<td>B</td>
<td>B25645A2677K003</td>
</tr>
</tbody>
</table>

Get more info [here](#)