# MEDIUM & HIGH POWER FILM CAPACITORS FOR POWER ELECTRONICS

## TUNING

<table>
<thead>
<tr>
<th>Series</th>
<th>Filp/Type</th>
<th>Production Date</th>
<th>Features</th>
<th>Applications</th>
</tr>
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<tbody>
<tr>
<td>FFH</td>
<td>(Multi-compliant)</td>
<td>25 – 2000</td>
<td>High capacitance, classified for medium power</td>
<td>Suitable for use in motor drives and traction (EV, HEX, Power)</td>
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## HIGH POWER

### DC FILTERING

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<td>High capacitance, classified for medium power</td>
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<tr>
<td>FFD</td>
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<td>High capacitance, classified for medium power</td>
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## ENERGY STORAGE AND DISCHARGE CAPACITORS

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<td>USOP</td>
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<td>25 – 2000</td>
<td>High capacitance, classified for medium power</td>
<td>Suitable for use in motor drives and traction (EV, HEX, Power)</td>
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<td>USiOS</td>
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<td>25 – 2000</td>
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## ELECTROLYTIC ALTERNATIVE

**AVX POWER FILM - APPLICATIONS EXAMPLES**

- **Solar PV**
- **Statcoms (Static Compensator)**
- **Inductive Heating**
- **Motor Drives**
- **Traction**
- **High Voltage Direct Current (HVDC)**

**Film vs Aluminium**

- **LIFETIME EXPECTANCY FOR A TYPICAL POWER FILM CAP**

- **AMPERES**
  - **USOS**
  - **USOFS**
  - **USOFS**

- **DC**
  - **USOFS**

**AVX PRODUCT GUIDE FOR MEDIUM & HIGH POWER FILM CAPACITORS**

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**Design Specification** | **Quotation** | **Final Design & Leadtime**

**Prototype/Production** | **Approval/Production** | **Shipment**

- **http://www.avx.com**

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While power film capacitors remain functional throughout their operating life, the initial capacitance value will decrease at a rate dependent upon the applied voltage and hot spot temperature. Our standard designs provide >95% capacitance loss at 100,000 hours lifetime at nominal voltage and a 75ºC hot spot temperature, while applications for designs can be provided on request. Various series of AVX Medium/High Power Capacitors are available for DC Filtering, Protection, Pulse Discharge, Tuning, AC Filtering and Storage applications. RoHS products are available for many medium power film series.

<table>
<thead>
<tr>
<th>Series</th>
<th>Technical Data</th>
<th>Features</th>
<th>Applications</th>
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<tbody>
<tr>
<td>FRC</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: A – P</td>
<td>Switch Mode Power Supplies, Small Signal Circuits, DC-Link capacitors for UPS systems</td>
</tr>
<tr>
<td>FSB</td>
<td>Rated DC Voltage: 300VDC – 650VDC</td>
<td>Case size: 1.5μF – 1500μF</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FBB</td>
<td>Rated DC Voltage: 75VDC – 400VDC</td>
<td>Case size: 4.7μF – 35μF</td>
<td>DC-Link capacitors for UPS systems, Motor drives, control circuits for AC inverter</td>
</tr>
<tr>
<td>FFB</td>
<td>Rated DC Voltage: 250VDC – 2000VDC</td>
<td>Case size: 3.3μF – 100μF</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FMS</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: 0.01μF – 0.47μF</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
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<tr>
<td>FFN</td>
<td>Rated DC Voltage: 300VDC – 650VDC</td>
<td>Case size: 2.4Arms – 10Arms</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
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<tr>
<td>FFVS</td>
<td>Rated DC Voltage: 19Arms – 76Arms</td>
<td>Case size: 6.2μF to 110μF</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FFF</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: 1.0Arms – 22.0Arms</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FFFC</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: 0.1μF – 10μF</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FFV</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: 4.0Arms – 21Arms</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FFVH</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: 5.0Arms – 23Arms</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
</tr>
<tr>
<td>FFVB</td>
<td>Rated DC Voltage: 600VDC – 1900VDC</td>
<td>Case size: 0.1μF – 10μF</td>
<td>Motor drives, control circuits for AC inverter, Protection of IGBTs</td>
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For medium power (dry) technology, controlled self-healing is achieved by utilizing a segmented metallization pattern where the film surface is divided into several million elementary capacitor elements individually protected by “fuse gates”. These ensure failsafe operation over design lifetime. Ripple current is extremely low, between 8 and 13nH. AVX FFG series capacitors exhibit high surge voltage protection properties.

Custom applications for motor drives, control circuits for AC inverter, Protection of IGBTs (SMPS). The PP series is designed for high frequency, high surge voltage applications found in the fields of Photovoltaic inverters, Aerospace, Industrial applications, Battery Storage, Battery management, etc.

EQUIVALENT CIRCUIT

FEATURES AND BENEFITS

For medium power (dry) technology, controlled self-healing is achieved by utilizing a segmented metallization pattern where the film surface is divided into several million elementary capacitor elements individually protected by “fuse gates”. These ensure failsafe operation over design lifetime of the capacitor.

High voltage (all dielectric) uses high-purity vegetable oil to ensure controlled self-healing for rated voltages up to 1500VAC.

Dry oil impregnated technologies and without free oil.

Highly reliable and consistent products.

No denaturing over operating temperature range: -40ºC to +105ºC (see individual data sheets).

High peak current and high energy options.

Polypropylene and polyester dielectric designs available.

RMS Ratings are available for most medium power products.

APPLICATIONS

MEDIUM & HIGH POWER CAPACITORS

FOR POWER ELECTRONICS

| MEDIUM POWER
| --- |
| MEDIUM & HIGH POWER CAPACITORS FOR POWER ELECTRONICS
| Product Selection Guide

AXV has been a world leader in high performance film capacitor technology design for over 30 years. We produce both dry-wound capacitors, from 75Vdc to 3kVdc (Medium Power Family) and oil-impregnated capacitors from 1.5kV to 100kV (High Power Family).

A key feature of AVX Medium & High Power is Controlled Self-healing technology. This enables the capacitors to continue to function without catastrophic failure by effectively insulating any microscopic conduction sites within the dielectric.

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A key feature of AVX Medium & High Power is Controlled Self-healing technology. This enables the capacitors to continue to function without catastrophic failure by effectively insulating any microscopic conduction sites within the dielectric.
certificates of registration are available for many medium power film series.

The FFV3 capacitors are designed for DC filtering, high rms current and high temperature applications beyond the limits of standard capacitors designed for use in high frequency, high temperature applications.

The FFB capacitor is designed for DC filtering low frequency applications and is used in inverters, motors and high power devices.

The FFB series features a polypropylene dielectric with controlled self-healing and impedance features, with low serial inductance and high RMS ripple current capability.

The FM series features a leaded, non-inductively wound capacitor, with an option of hole leads for PCB assembly, with an option for printed circuit board mounting. The series uses a non-impregnated metallized polypropylene dielectric.

The FSV series is used for protection for applications with low serial inductance, low capacitance, high frequency, high ripple current capability, high reliability, high temperature operation, high voltage applications, and high voltage power supplies.

The FLA has been designed with a combination of an internal design and high quality dielectric. The FLA series is a high quality design, allowing use of the products up to 1900VDC. FLA series capacitors are available in three phase and single phase.
AVX has been a world leader in high performance film capacitor technology design for over 30 years. We produce both dry-wound capacitors, from 75µF to 3kVdc (Medium Power Frequency) and oil-immersed capacitors from 1.9kV to 10kV (High Power Frequency). A key feature of AVX Medium & High Power is Controlled capacitor technology design for over 30 years. We have been a world leader in high performance film MEDIUM & HIGH POWER CAPACITORS

- Defense/Aero/Research
- Industrial/Professional
- Traction
- Automotive

such as:

For medium power (dry) technology, controlled self-healing is achieved by utilizing a segmented Elementary Capacitor weak area

FEATURES AND BENEFITS

- Tuning, AC filtering and Storage applications.
- RoHS available for DC filtering, Protection, Pulse Discharge.
- Nominal voltage and a 70ºC hot spot temperature, while maintaining the appropriate capacitor performance.
- Our standard designs provide RoHS compliant Custom Design.

FFVE/FFVI
- FHC
- FM

3000VDC – 1400VDC
- Rated DC Voltage:
- Case size:
- 75VDC – 1100VDC
- Capacitance Range:
- Ripple Current:
- 1.5μF – 1500μF
- Capacitance Range:
- Ripple Current:
- 600VDC – 1900VDC
- Capacitance Range:
- Ripple Current:
- 3.3μF – 100μF
- Capacitance Range:
- Ripple Current:
- 5μF – 160μF
- Capacitance Range:
- Ripple Current:
- 3.3μF – 100μF
- Capacitance Range:
- Ripple Current:
- 12μF – 400μF
- Capacitance Range:
- Ripple Current:
- 5μF – 160μF
- Capacitance Range:
- Ripple Current:
- 3.3μF – 100μF
- Capacitance Range:
- Ripple Current:
- 12μF – 400μF

Induction Heating
- • Industrial Motor
- • Protection of gate turn-off thyristor (G.T.O.)
- • PFC & AC Filtering
- • Motor Drives
- • UPS Systems
- • Electronic Lighting
- • Snubber
- • Across the Line
- • Tuning
- • High frequency

While power film capacitor remain functional throughout their life, the initial capacitance value will decrease at a rate dependent upon the applied voltage and hot spot temperature. Our standard designs provide < 5% capacitance loss at 100,000 hours lifetime at nominal voltage and a 70ºC hot spot temperature, while application and design can be provided on request. Various series of AVX Medium/High Power Capacitors are available for DC Filtering, Protection, Pulse Discharge, AC Filtering and Storage applications. RoHS products are available for many medium power film series.
MEDIUM & HIGH POWER CAPACITORS FOR POWER ELECTRONICS
Product Selection Guide

**HIGH POWER**

**DC FILTERING**
- **TRAFIM**
  - Rated DC Voltage: 200kVDC – 600kVDC
  - Capacitance Range: 130μF – 15500μF
- **DISFIM**
  - Rated DC Voltage: 1200VDC – 6000VDC
  - Capacitance Range: 800μF – 15μF

**ENERGY STORAGE AND DISCHARGE CAPACITORS**
- **DISIF**
  - Rated DC Voltage: 1200VDC – 6000VDC
  - Capacitance Range: 10μF – 1000μF

**TUNING**
- **FILFIM**
  - Rated DC Voltage: 56kVDC – 100kVDC
  - Capacitance Range: 2.6μF – 612μF

**ENERGY STORAGE AND DISCHARGE CAPACITORS**
- **FAV**
  - Capacitance Range: 1.5μF – 60μF
- **FIM**
  - Capacitance Range: 17μF – 100μF

**ELECTROLYTIC ALTERNATIVE**
- **AVX POWER FLIM**
  - Applications Examples:
    - Solar PV
    - Static Synchronous Compensator (Static VAR)
    - Inductive Heating
    - Motor Drives
    - High Voltage Direct Current (HVDC)

**LIFETIME EXPECTANCY FOR A TYPICAL POWER FILM CAP**

**AVX PRODUCT GUIDE FOR MEDIUM & HIGH POWER FILM CAPACITORS**

**A KYOCERA GROUP COMPANY**
MEDIUM & HIGH POWER CAPACITORS FOR POWER ELECTRONICS
Product Selection Guide

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<td>FFH (RoHS compliant)</td>
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<td>Low temperature greatly reduces capacitance drift in high power applications.</td>
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<tr>
<td>FFHV (RoHS compliant)</td>
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<td></td>
<td></td>
<td>Low &amp; high frequency applications</td>
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<tr>
<td>FFHV (RoHS compliant)</td>
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<td>Medium frequency applications</td>
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HIGH POWER

DC FILTERING

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ELECTROLYTIC ALTERNATIVE

AVX POWER FILM – APPLICATIONS EXAMPLES

FILM VS ALUMINIUM

LIFETIME EXPECTANCY FOR A TYPICAL POWER FILM CAP

MEDIUM & HIGH POWER CAPACITORS FOR POWER ELECTRONICS

Custom Products are available to most series. Contact PowerFilm@avx.com or fill out the following custom form http://www.avx.com/docs/Catalog/whiteSheet.pdf

Design Specifications Quotation Final Design & Leadtime Prototyping Production Shipping

AVX PRODUCT GUIDE FOR MEDIUM & HIGH POWER FILM CAPACITORS

http://www.avx.com