

HIGH POWER DC VOLTAGE CAPACITORS

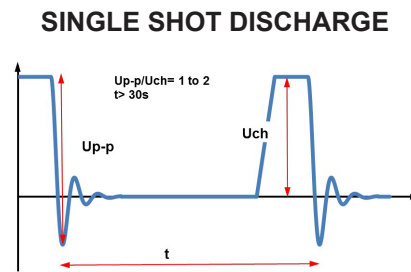
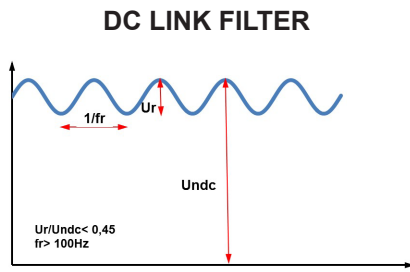
Solutions for High Voltage Variations

AVX Corporation, has developed in the late 80s the FIM technology in order to meet DC link filter applications.

The FIM technology, Metallized polypropylene Film Impregnated with vegetable oil, allows a safe behaviour without short circuit and a soft end of lifetime with solely a drop of capacitance value. This unique feature is due to the Controlled Self Healing property.

The continuous improvement during the last 30 years makes the FIM technology suitable for DC filtering application in rail, industrial markets and for Discharge applications in industrial, research and military markets.

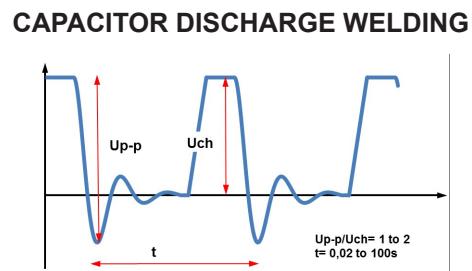
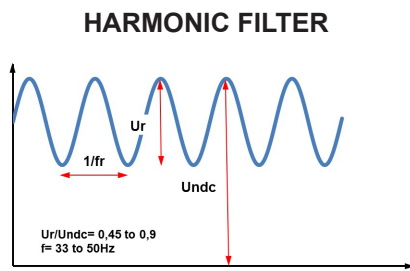
Performances (lifetime, specific energy) and reliability validated by our Return of Experience are the key elements that allow to position AVX as a leader in this Power Capacitor Market. SVV* solution is able to operate under low ripple and low repetition rate as described below.



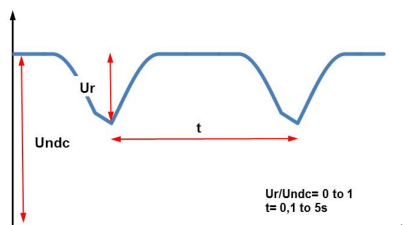
During the last 5 years, one of the aims of our development team has been to improve the performances under operating conditions with high ripple or peak to peak voltage and high recurrence.

HVV* solution is able to withstand more ripple voltage and/or higher repetition rate.

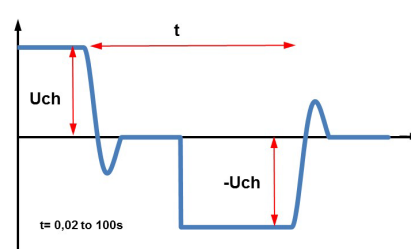
Examples of typical waveforms for different applications:



ENERGY BANK FOR POWER SUPPLY



DUAL POLARITY DISCHARGE



The joint development of a dielectric resin manufacturer with a film manufacturer and AVX, has recently improved its SVV technology in two ways. A new polypropylene film has allowed to extend the operating temperature range up to 95 ° C (instead of 85°C) and more generally to increase the nominal electric field by about 20V / μm.

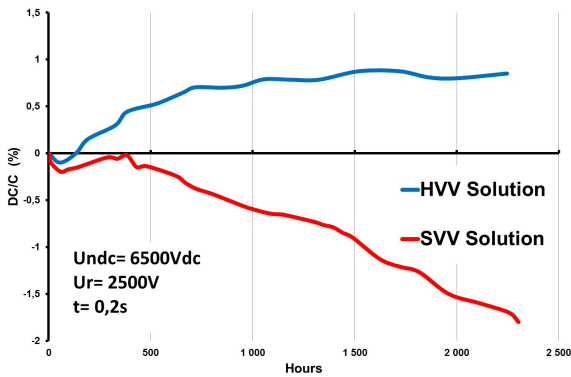
Paradoxically, in the case of high variations of voltage and high repetition rates, the performances did not evolve. For these operating conditions, the capacitor is not dimensioned from a dielectric point of view but galvanic. Indeed, beyond a certain threshold, each voltage variation will erode the metallized electrode. This results in a small loss of capacity by reducing the active surface of the electrodes, depending on the number of cycles. This phenomenon is absolutely not dangerous contrary with dry or gas capacitors, we can observe a slight swelling due to high gassing level of rape seed oil, of the case proportional to the loss of capacity. The capacitor is therefore sized to work below this threshold, which rapidly degrades its energy density.

Since a few years, the demand for high voltage variation (HVV solution) power capacitor applications has increased, particularly for energy bank in the research and industrial sectors. AVX has therefore focused its development to improve the behavior of the galvanic circuit for such applications. The idea was to retain the excellent dielectric performances already acquired and to adapt a new metallized electrode. With HVV solution, the previous SVV performances are always guarantee in term of:

- sufficiently low resistivity to limit losses by Joule effect
- to ensure the same level of operational safety with controlled shelf-healing

This development has been completed and the product is industrially qualified. The following graphs come from qualification tests and data from users.

CAPACITOR DISCHARGE WELDING



CAPACITOR DISCHARGE WELDING

