

# Medium Power Film Capacitors



## FFVE/FFVI (FFWE/FFWI RoHS Compliant)

DC FILTERING



Not RoHS Compliant



Please select correct termination style.

### GENERAL DESCRIPTION

The FFV capacitor is specifically designed for DC filtering, low reactive power.

The series uses a non-impregnated metallized polypropylene or polyester dielectric, which features a controlled self-healing process, specially treated to have a very high dielectric strength in operating conditions up to 105°C.

The FFV special design gives this series a very low level of stray inductance (18 nH to 40 nH).

Furthermore, the performance levels of the FFVE capacitor makes them a very interesting alternative to electrolytic technology, because they can withstand much higher levels of surge voltage, very high rms current ratings, and longer lifetimes.

### PACKAGING MATERIAL

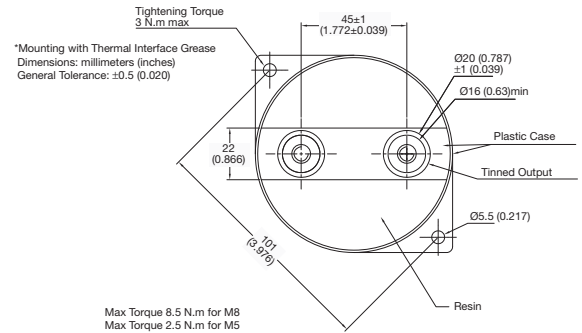
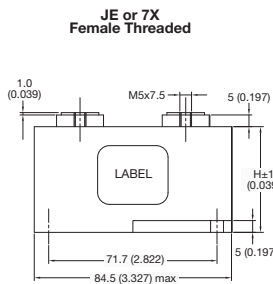
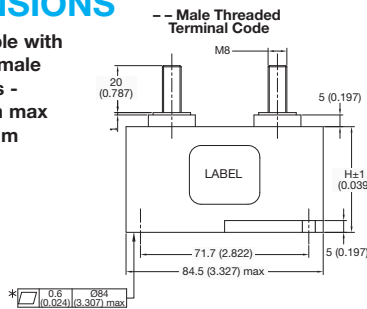
Self-extinguishing plastic case (V0 = in accordance with UL 94) filled thermosetting resin.

Self-extinguishing thermosetting resin (V0 = in accordance with UL 94; I3F1 = in accordance with NF F 16-101).

FFVE capacitors meet the Level 2 requirement of the fire behavior standard NF F 16-102.

### DIMENSIONS

Also available with threaded female connections - M5 x 7.5mm max Torque 2.5Nm



### HOW TO ORDER

**FFVE**

**Series**

FFVE = Standard  
FFVI = Standard  
FFWE = RoHS Compliant  
FFWI = RoHS Compliant

**4**

**Dielectric**

4 = Polyester  
6 = Polypropylene

**H**

**Voltage Code**

H = 300V L = 1000V  
I = 400V (FFVE/FFWE)  
J = 500V L = 1100V (FFVI/FFWI)  
K = 600V U = 1200V  
A = 700V N = 1900V  
B = 800V  
C = 900V

**0187**

**Capacitance Code**

0 + pF code  
0187 = 180µF  
0356 = 35µF etc.

**K**

**Capacitance Tolerances**

K = ±10%

**--**

**Terminal Code**

-- or J7 = Male Threaded  
JE or 7X = Female Threaded

See Ratings and Part Reference Tables for details

### HOT SPOT CALCULATION

See Hot Spot Temperature, page 3.

$\theta_{\text{hot spot}} = \theta_{\text{case}} + (P_d + P_t) \times R_{\text{th}}$   
with  $P_d$  (Dielectric losses) =  $Q \times \text{tg}\delta_0$   
 $Q \times \text{tg}\delta_0 \Rightarrow \left[ \frac{1}{2} \times C_n \times (V_{\text{peak to peak}})^2 \times f \right] \times \text{tg}\delta_0$   
 $\text{tg}\delta_0$  (tan delta)  
For polypropylene,  $\text{tg}\delta_0 = 2 \times 10^{-4}$  for frequencies up to 1MHz and is independent of temperatures. For polyester,  $\text{tg}\delta_0$  values are shown in graph 4 on page 3.

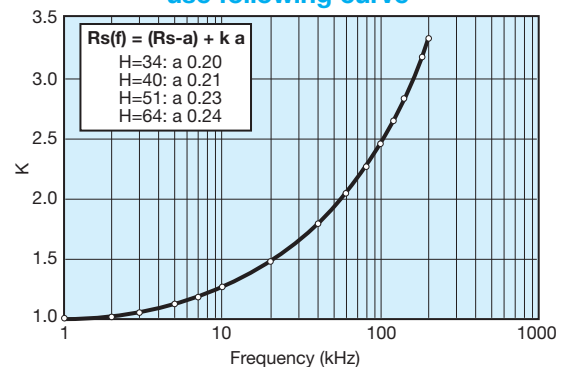
$P_t$  (Thermal losses) =  $R_s \times (I_{\text{rms}})^2$

where  $C_n$  in Farad  $I_{\text{rms}}$  in Ampere  $f$  in Hertz  
V in Volt  $R_s$  in Ohm  $\theta$  in °C  
 $R_{\text{th}}$  in °C/W

$\theta_{\text{case}}$  = bottom center of case

### Rs(f) vs FREQUENCY

For frequency higher than 1 kHz use following curve



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### ELECTRICAL CHARACTERISTICS – FFVE/FFWE POLYESTER DIELECTRIC

|                                                        |                                                           |
|--------------------------------------------------------|-----------------------------------------------------------|
| Working temperature                                    | -40°C to +105°C (according to the power to be dissipated) |
| Capacitance range                                      | 100μF to 400μF                                            |
| Capacitance tolerance                                  | ±10%                                                      |
| Rated DC voltage                                       | 300 to 400 V                                              |
| Test voltage between terminals @ 25°C                  | 1.5 x V <sub>n</sub> dc 10s                               |
| Insulation voltage between shorted terminals and earth | 7 kVrms/60sec/50Hz                                        |
| Dielectric                                             | Polyester                                                 |

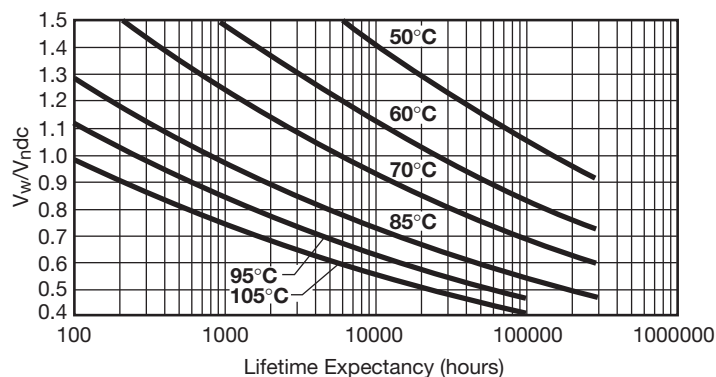
### RATINGS AND PART NUMBER REFERENCE – POLYESTER DIELECTRIC

| Part Number*                                      | Capacitance (μF) | Height     | Irms max. (A) | Ls max. (nH) | Rs (mΩ) | Rth (°C/W) | Typical Weight (g) |
|---------------------------------------------------|------------------|------------|---------------|--------------|---------|------------|--------------------|
| <b>V<sub>n</sub>dc 300 volts (Voltage Code H)</b> |                  |            |               |              |         |            |                    |
| FFVE4H0187K--                                     | 180              | 34 (1.339) | 100           | 18           | 0.8     | 4.7        | 300                |
| FFVE4H1956K--                                     | 195              | 34 (1.339) | 100           | 18           | 0.8     | 4.4        | 300                |
| FFVE4H0257K--                                     | 250              | 40 (1.575) | 100           | 25           | 0.6     | 5.2        | 350                |
| FFVE4H0357K--                                     | 350              | 51 (2.008) | 100           | 32           | 0.8     | 7.2        | 420                |
| FFVE4H0407K--                                     | 400              | 51 (2.008) | 110           | 32           | 0.8     | 7.1        | 420                |
| <b>V<sub>n</sub>dc 400 volts (Voltage Code I)</b> |                  |            |               |              |         |            |                    |
| FFVE4I0107K--                                     | 100              | 34 (1.339) | 80            | 18           | 0.7     | 4.7        | 300                |
| FFVE4I0127K--                                     | 120              | 34 (1.339) | 100           | 18           | 0.6     | 4.1        | 300                |
| FFVE4I0157K--                                     | 150              | 40 (1.575) | 100           | 25           | 0.7     | 5.0        | 350                |
| FFVE4I0187K--                                     | 180              | 51 (2.008) | 80            | 32           | 1.0     | 8.5        | 420                |
| FFVE4I0227K--                                     | 220              | 51 (2.008) | 100           | 32           | 0.9     | 7.2        | 420                |

\*Change "--" to "JE" for female connectors M5 x 7.5mm

Dimensions millimeters (inches)

### LIFETIME EXPECTANCY FFVE POLYESTER



$V_w$ : permanent working or operating DC voltage.



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### ELECTRICAL CHARACTERISTICS – FFVE/FFWE POLYPROPYLENE DIELECTRIC

|                                                        |                                                           |
|--------------------------------------------------------|-----------------------------------------------------------|
| Working temperature                                    | -40°C to +105°C (according to the power to be dissipated) |
| Capacitance range                                      | 12μF to 220μF                                             |
| Capacitance tolerance                                  | ±10%                                                      |
| Rated DC voltage                                       | 600 to 1900 V                                             |
| Test voltage between terminals @ 25°C                  | 1.5 x V <sub>Ndc</sub> 10s                                |
| Insulation voltage between shorted terminals and earth | 7 kVrms/60sec/50Hz                                        |
| Dielectric                                             | Polypropylene                                             |

### RATINGS AND PART NUMBER REFERENCE – POLYPROPYLENE DIELECTRIC

| Part Number*                                       | Capacitance (μF) | Height     | Irms max. (A) | Is max. (nH) | Rs (mΩ) | Rth (°C/W) | Typical Weight (g) |
|----------------------------------------------------|------------------|------------|---------------|--------------|---------|------------|--------------------|
| <b>V<sub>Ndc</sub> 600 volts (Voltage Code K)</b>  |                  |            |               |              |         |            |                    |
| FFVE6K0256K--                                      | 25               | 34 (1.339) | 90            | 18           | 0.7     | 4.3        | 300                |
| FFVE6K0107K--                                      | 100              | 40 (1.575) | 100           | 25           | 0.6     | 4.8        | 350                |
| FFVE6K0157K--                                      | 150              | 51 (2.008) | 110           | 32           | 0.9     | 6.9        | 420                |
| FFVE6K0227K--                                      | 220              | 64 (2.520) | 100           | 40           | 1.0     | 8.4        | 500                |
| <b>V<sub>Ndc</sub> 800 volts (Voltage Code B)</b>  |                  |            |               |              |         |            |                    |
| FFVE6B0666K--                                      | 66               | 40 (1.575) | 100           | 25           | 0.7     | 4.7        | 350                |
| FFVE6B0107K--                                      | 100              | 51 (2.008) | 90            | 32           | 1.0     | 6.7        | 420                |
| FFVE6B0147K--                                      | 140              | 64 (2.520) | 100           | 40           | 1.3     | 8.4        | 500                |
| <b>V<sub>Ndc</sub> 900 volts (Voltage Code C)</b>  |                  |            |               |              |         |            |                    |
| FFVE6C0126K--                                      | 12               | 34 (1.339) | 70            | 18           | 0.9     | 4.4        | 300                |
| FFVE6C0386K--                                      | 38               | 34 (1.339) | 100           | 18           | 1.6     | 3.9        | 300                |
| FFVE6C0476K--                                      | 47               | 40 (1.575) | 100           | 25           | 0.8     | 4.6        | 350                |
| FFVE6C0706K--                                      | 70               | 51 (2.008) | 100           | 32           | 1.2     | 6.7        | 420                |
| FFVE6C0107K--                                      | 100              | 64 (2.520) | 90            | 40           | 1.1     | 8.2        | 500                |
| <b>V<sub>Ndc</sub> 1000 volts (Voltage Code L)</b> |                  |            |               |              |         |            |                    |
| FFVE6L0666KJ7                                      | 66               | 40 (1.575) | 70            | 25           | 1.5     | 5.1        | 350                |
| FFVE6L0107KJ7                                      | 100              | 51 (2.008) | 64            | 32           | 2.0     | 7.3        | 420                |
| FFVE6L0147KJ7                                      | 140              | 64 (2.520) | 51            | 40           | 2.5     | 9.2        | 500                |
| <b>V<sub>Ndc</sub> 1200 volts (Voltage Code U)</b> |                  |            |               |              |         |            |                    |
| FFVE6U0476KJ7                                      | 47               | 40 (1.575) | 66            | 25           | 1.7     | 4.9        | 350                |
| FFVE6U0706KJ7                                      | 70               | 51 (2.008) | 59            | 32           | 2.4     | 7.2        | 420                |
| FFVE6U0107KJ7                                      | 100              | 64 (2.520) | 49            | 40           | 2.9     | 8.9        | 500                |
| <b>V<sub>Ndc</sub> 1900 volts (Voltage Code N)</b> |                  |            |               |              |         |            |                    |
| FFVE6N0156KJ7                                      | 15               | 40 (1.575) | 73            | 25           | 1.1     | 5.2        | 350                |
| FFVE6N0246KJ7                                      | 24               | 51 (2.008) | 73            | 32           | 1.3     | 6.5        | 420                |
| FFVE6N0356KJ7                                      | 35               | 64 (2.520) | 67            | 40           | 1.6     | 8.4        | 500                |

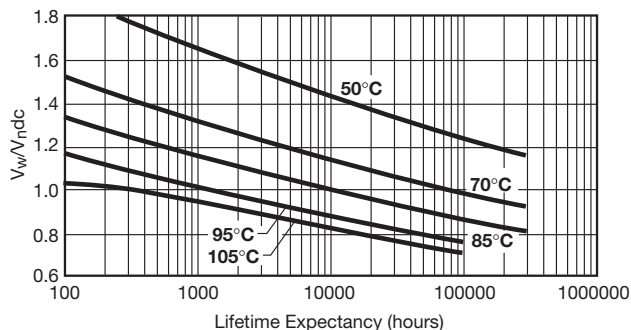
\*Change "--" to "JE" for female connectors M5 x 7.5mm

Dimensions millimeters (inches)

\*Change "J7" to "7X" for female connectors M5 x 7.5mm

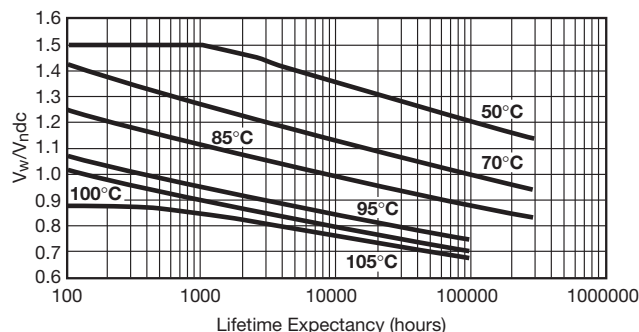
### LIFETIME EXPECTANCY FOR FFVE POLYPROPYLENE

-- and JE



V<sub>w</sub>: permanent working or operating DC-voltage.

J7 and 7X



V<sub>w</sub>: permanent working or operating DC-voltage.

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DC FILTERING

## ELECTRICAL CHARACTERISTICS – FFVI/FFWI POLYPROPYLENE DIELECTRIC

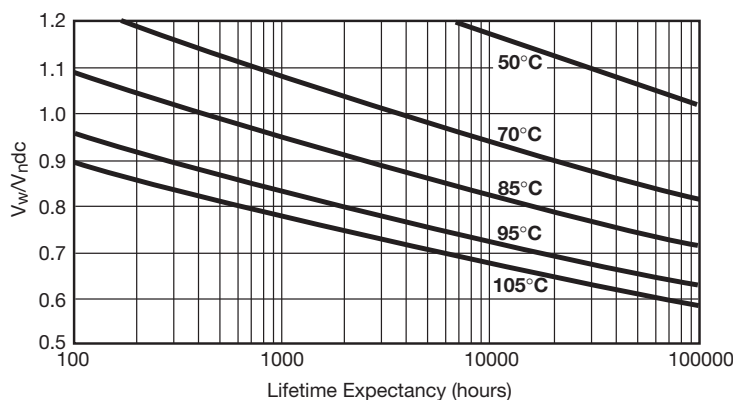
|                                                        |                                                           |
|--------------------------------------------------------|-----------------------------------------------------------|
| Working temperature                                    | -40°C to +105°C (according to the power to be dissipated) |
| Capacitance range                                      | 47µF to 275µF                                             |
| Capacitance tolerance                                  | ±10%                                                      |
| Rated DC voltage                                       | 500 to 1100V                                              |
| Test voltage between terminals @ 25°C                  | 1.25 x $V_{Ndc}$ 10s                                      |
| Insulation voltage between shorted terminals and earth | 7 kVrms/60sec/50Hz                                        |
| Dielectric                                             | Polypropylene                                             |

## RATINGS AND PART NUMBER REFERENCE – POLYPROPYLENE DIELECTRIC

| Part Number*                                            | Capacitance (µF) | Height     | Irms max. (A) | Ls max. (nH) | Rs (mΩ) | Rth (°C/W) | Typical Weight (g) |
|---------------------------------------------------------|------------------|------------|---------------|--------------|---------|------------|--------------------|
| <b><math>V_{Ndc}</math> 500 volts (Voltage Code J)</b>  |                  |            |               |              |         |            |                    |
| FFVI6J1256K--                                           | 125              | 40 (1.575) | 90            | 25           | 0.6     | 5.0        | 350                |
| FFVI6J0207K--                                           | 200              | 51 (2.008) | 90            | 32           | 0.8     | 6.7        | 420                |
| FFVI6J2756K--                                           | 275              | 64 (2.520) | 90            | 40           | 0.9     | 8.7        | 500                |
| <b><math>V_{Ndc}</math> 700 volts (Voltage Code A)</b>  |                  |            |               |              |         |            |                    |
| FFVI6A0107K--                                           | 100              | 40 (1.575) | 100           | 25           | 0.6     | 4.8        | 350                |
| FFVI6A0157K--                                           | 150              | 51 (2.008) | 100           | 32           | 0.9     | 6.9        | 420                |
| FFVI6A0227K--                                           | 220              | 64 (2.520) | 100           | 40           | 1.0     | 8.4        | 500                |
| <b><math>V_{Ndc}</math> 900 volts (Voltage Code C)</b>  |                  |            |               |              |         |            |                    |
| FFVI6C0666K--                                           | 66               | 40 (1.575) | 100           | 25           | 0.7     | 4.7        | 350                |
| FFVI6C0107K--                                           | 100              | 51 (2.008) | 90            | 32           | 1.0     | 6.7        | 420                |
| FFVI6C0147K--                                           | 140              | 64 (2.520) | 100           | 40           | 1.3     | 8.4        | 500                |
| <b><math>V_{Ndc}</math> 1100 volts (Voltage Code L)</b> |                  |            |               |              |         |            |                    |
| FFVI6L0476K--                                           | 47               | 40 (1.575) | 100           | 25           | 0.8     | 4.6        | 350                |
| FFVI6L0706K--                                           | 70               | 51 (2.008) | 100           | 32           | 1.2     | 6.7        | 420                |
| FFVI6L0107K--                                           | 100              | 64 (2.520) | 90            | 40           | 1.1     | 8.2        | 500                |

Dimensions millimeters (inches)

## LIFETIME EXPECTANCY FOR FFVI



$V_w$ : permanent working or operating DC-voltage.

