

# Medium Power Film Capacitors

## FSM (FSN RoHS Compliant) New Design can use FFV Range



### APPLICATIONS

Recovery capacitor for G.T.O. switching (secondary snubber or clamp capacitor).  
High current DC filtering.

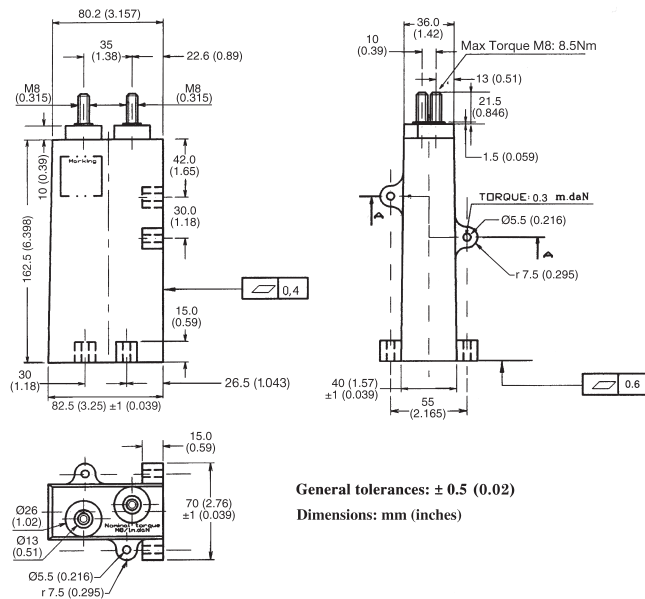
### FEATURES

Metallized polypropylene dielectric specially treated to withstand high DC voltage stresses up to 85°C.  
Controlled self-healing.  
Internal geometry and connections specially developed for high currents (I<sub>rms</sub> up to 100 A).  
No liquid impregnant.  
Special metallization for DC voltage and high currents.

### PACKAGING MATERIAL

Self-extinguishing rectangular plastic case (in accordance with UL 94 VO) (12 kV/50 Hz isolation).  
Filled with thermosetting resin.  
M8 outputs.  
Fixing in two planes.  
Vibrations and shocks resistant to IEC 60077.  
Average weight 0.95 kg.

### DIMENSIONS



### MARKING

Logo TPC  
FSM  
Capacitance and tolerance in clear  
Nominal voltage in clear  
RMS current in clear  
Date of manufacture (IEC coding)

### HOW TO ORDER

**FSM** Series  
FSM = Standard  
FSN = RoHS Compliant

**2** Case Size  
2 = Standard

**6** Dielectric  
6 = Polypropylene

### ELECTRICAL CHARACTERISTICS

Climatic category	40/085/56
Working temperature	-40°C to +85°C (according to the power to be dissipated)
Capacitance range C <sub>n</sub>	20µF to 54µF
Tolerance on C <sub>n</sub>	±10%
Rated DC voltage V <sub>Ndc</sub>	750 to 1350 V
Allowable overvoltages	V <sub>s</sub> = 1.1 V <sub>Ndc</sub> – 1/3 of the time 1.3 V <sub>Ndc</sub> – 1 min./day 2 V <sub>Ndc</sub> – 100 ms/day for V <sub>Ndc</sub> ≤ 1150 V 1.75 V <sub>Ndc</sub> – 100 ms/day for V <sub>Ndc</sub> = 1350 V
DC test voltage between 10s at 20°C ± 15°C terminals	V <sub>dc</sub> – 1.5 V <sub>Ndc</sub> (IEC 61071)
RMS current	I <sub>rms</sub> max. = 65 to 105 A
Impulse current	I <sub>t</sub> max. = 100 to 270 A <sup>2</sup> s
Tangent of loss angle	Tgδ: see table of values
Series inductance L <sub>s</sub>	≤ 25 nH
Thermal resistance	R <sub>th</sub> ambient/hot spot = 9.2°C/W R <sub>th</sub> case/hot spot = 3.3°C/W
Dielectric	Polypropylene

<b>A</b> Voltage Code A = 750Vdc C = 900Vdc L = 1000Vdc U = 1150Vdc V = 1350Vdc	<b>0546</b> Capacitance Code 0 + pF code 0546 = 54µF 0336 = 33µF 0206 = 20µF etc.	<b>K</b> Capacitance Tolerances K = ±10%	<b>--</b> Terminal Code -- = Standard (Male Threaded)
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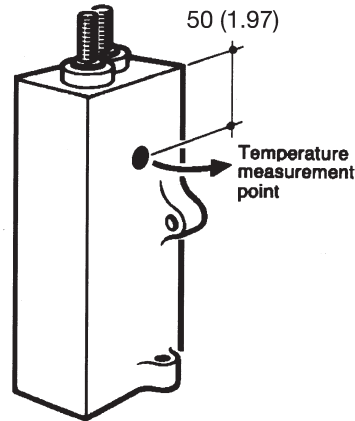
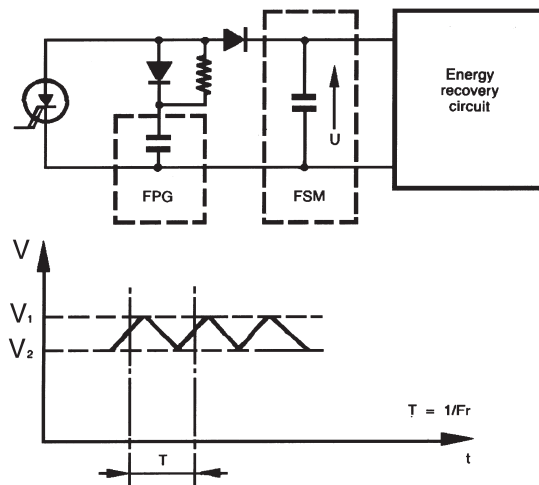
# Medium Power Film Capacitors

FSM (FSN RoHS Compliant)  
New Design can use FFV Range

DC FILTERING

## 1) RECOVERY OF G.T.O. SWITCHING ENERGY

Typical application



### Choice of voltage:

$$V_1 \leq V_{ndc}$$

### Repetitive surge:

$$1.1 V_{ndc} - 1/3 \text{ of the time}$$

### Non-repetitive surge:

$$1.3 V_{ndc} - 1 \text{ min./day}$$

### Occasional max. surge:

$$2 V_{ndc} - 100 \text{ ms/day for } V_{ndc} \leq 1150 \text{ V}$$

$$1.75 V_{ndc} - 100 \text{ ms/day for } V_{ndc} = 1350 \text{ V}$$

### RMS current limits:

The currents given in the tables are maximum. The thermal limits of the dielectric (85°C) must be respected.

The self-heating can be calculated from the series resistance,  $Tg\delta$  and the thermal resistance given in the table of values

$$\Delta\theta = P \times R_{th} \leq 85^\circ\text{C} - \theta_{\text{ambient}}$$

$R_{th}$ : is given for still air with the capacitor not being subjected to any other heat source.

$$P = (I_{rms})^2 \times R_s + \frac{\pi}{2} \times C (V_1 - V_2)^2 \times f_r \times 10^{-4}$$

### Temperature measuring point\*

Measurement of the case temperature ( $\theta_B$ ) together with the losses gives the temperature of the hot spot.

$$\theta = (R_{thB} \times P) + \theta_B \leq 85^\circ\text{C}$$

\*Important for series/parallel operations.

### Important

Due to the modular nature of this capacitor series parallel assemblies can be made to increase the capacitance and/or voltage.

Ensure that suitable sized connections are used so that the capacitors will not be overheated. The inductance of the connections must be low enough to ensure equal current sharing of capacitors in parallel.

For series assemblies, connect resistor across each capacitor. Optimal resistance value will be:

$$R \# 30 \text{ M}\Omega/\text{C in } \mu\text{F} \\ (1.5 \text{ M}\Omega \text{ for } C = 20 \mu\text{F}).$$

## 2) DC FILTERING

Nominal Capacitance

## RATINGS AND PART NUMBER REFERENCE – POLYESTER DIELECTRIC

Part Number	Capacitance ( $\mu\text{F}$ )	$V_{ndc}$ (V)	$I_{rms}$ max.* (A)	$(I^2 \cdot t)$ max. ( $\text{A}^2\text{s}$ )	$Tg\delta$ (f→kHz) ( $10^{-4}$ )	$R_s$ (m $\Omega$ )	Typical Weight (g)
FSM26A0546K--	54	750	105	270	2 + 3.4 f	1	9500
FSM26C0446K--	42	900	100	220	2 + 2.8 f	1.05	9500
FSM26L0336K--	33	1000	95	170	2 + 2.3 f	1.1	9500
FSM26U0286K--	28	1150	85	150	2 + 2 f	1.15	9500
FSM26V0206K--	20	1350	65	100	2 + 1.6 f	1.25	9500

\*Function of power dissipation

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