# 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).
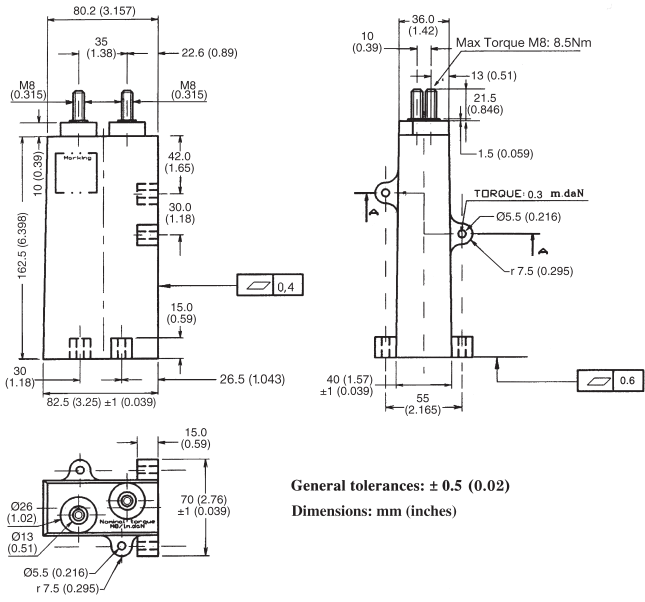
High current DC filtering.

## 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 (Irms 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



General tolerances: ± 0.5 (0.02)

Dimensions: mm (inches)

## MARKING

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

## ELECTRICAL CHARACTERISTICS

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

## HOW TO ORDER

| FSM | 2 | 6 | A | 0546 | K | – – |
|---|---|---|---|---|---|---|
| **Series** FSM = Standard FSN = RoHS Compliant | **Case Size** 2 = Standard | **Dielectric** 6 = Polypropylene | **Voltage Code** A = 750Vdc C = 900Vdc L = 1000Vdc U = 1150Vdc V = 1350Vdc | **Capacitance Code** 0 + pF code 0546 = 54µF 0336 = 33µF 0206 = 20µF etc. | **Capacitance Tolerances** K = ±10% | **Terminal Code** – – = Standard (Male Threaded) |

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

**Typical application**
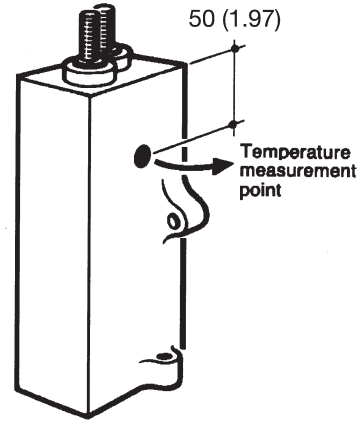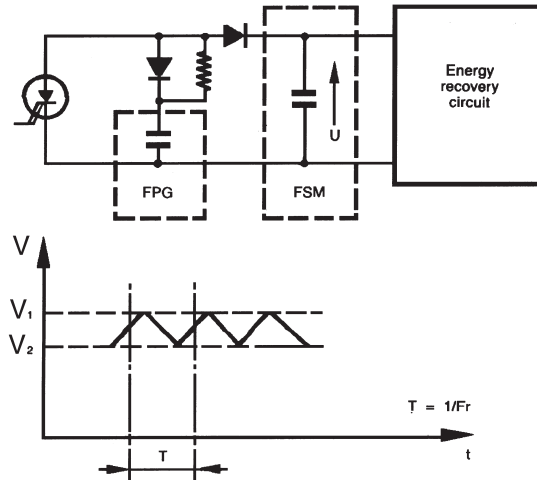


**Choice of voltage:**
$V_1 \leq V_n dc$

**Repetitive surge:**
1.1 $V_n dc$ – 1/3 of the time

**Non-repetitive surge:**
1.3 $V_n dc$ – 1 min./day

**Occasional max. surge:**
2 $V_n dc$ – 100 ms/day for $V_n dc = \leq 1150$ V
1.75 $V_n dc$ – 100 ms/day for $V_n dc = 1350$ 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, Tgδ and the thermal resistance given in the table of values

$$\Delta Ø = P \times Rth \leq 85°C - Ø \text{ ambient}$$

Rth: 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 (ΘB) together with the losses gives the temperature of the hot spot.
$$\Theta = (RthB \times P) + \Theta B \leq 85°C$$
\*Important for series/parallel operations.

**Important**
Due to the modular nature of this capacitors 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 MΩ/C in μF
(1.5 MΩ for C = 20 μF).

## 2) DC FILTERING
Nominal Capacitance

## RATINGS AND PART NUMBER REFERENCE – POLYESTER DIELECTRIC

| Part Number | Capacitance (μF) | $V_n dc$ (V) | Irms max.\* (A) | (I².t) max. (A²s) | Tgδ (f→kHz) (10⁻⁴) | Rs (mΩ) | 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