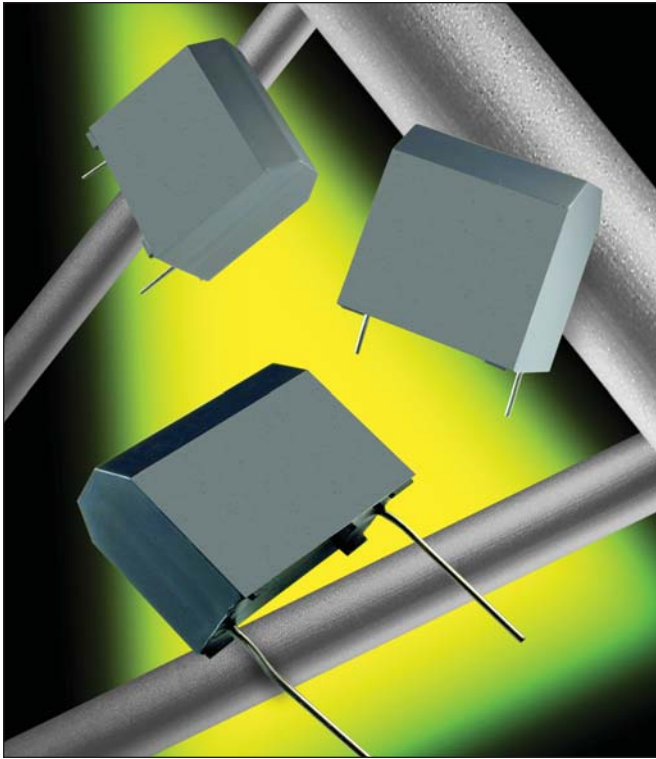


Medium Power Film Capacitors



FFB (RoHS Compliant)

DC FILTERING



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; I3F2 = in accordance with NF F 16-101).

STANDARDS

- IEC 61071-1, IEC 61071-2: Power electronic capacitors
- IEC 60384-16: Fixed metallized polypropylene film dielectric DC capacitors
- IEC 60384-16-1: Fixed metallized polypropylene film dielectric DC capacitors Assessment level E
- IEC 60384-17: Fixed metallized polypropylene film dielectric AC and pulse capacitors
- IEC 60384-17-1: Fixed metallized polypropylene film dielectric AC and pulse capacitors Assessment level E
- IEC 60384-2: Fixed metallized polyester capacitors

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

This is a dry solution for polypropylene and dry or wet for polyester.

The FFB has been designed for printed circuit board mounting. Furthermore, their performances allow to be a very interesting alternative to electrolytic technology because they can withstand much higher levels of surge voltage.

APPLICATIONS

The FFB capacitor is particularly designed for DC filtering, low reactive power.

HOT SPOT CALCULATION

See *Hot Spot Temperature*, page 3.

$$\theta_{\text{hot spot}} = \theta_{\text{ambient}} + (P_d + P_t) \times R_{\text{th}}$$

with P_d (Dielectric losses) = $Q \times \text{tg}\delta_0$
 $Q \times \text{tg}\delta_0 \Rightarrow [\frac{1}{2} \times C_n \times (V_{\text{peak to peak}})^2 \times f] \times \text{tg}\delta_0$
 $\text{tg}\delta_0$ (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.

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

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

WORKING TEMPERATURE

(according to the power to be dissipated) -55°C to +105°C

LIFETIME EXPECTANCY

One unique feature of this technology (as opposed to electrolytics) is how the capacitor reacts at the end of its lifetime. Unlike aluminum, electrolytics film capacitors do not have a catastrophic failure mode. Film capacitors simply experience a parametric loss of capacitance of about 2%, with no risk of short circuit.

Please note that this is theoretical, however, as the capacitor continues to be functional even after this 2% decrease.



Medium Power Film Capacitors



FFB (RoHS Compliant)

HOW TO ORDER

FFB
|

Series

1
|

Case Size
1
2
3
4
5

4
|

Dielectric
4 = Polyester
6 = Polypropylene

D
|

Voltage Code
D = 75Vdc
E = 100Vdc
H = 300Vdc
I = 400Vdc
J = 525Vdc
A = 720Vdc
C = 900Vdc
L = 1100Vdc

0336
|

Capacitance Code
0 + pF code
0336 = 33µF
0686 = 68µF
0117 = 110µF
etc.

K
|

Capacitance Tolerances
K = ±10%

--
|

Lead Styles
-- = 2 Leaded
JC = 4 Leaded

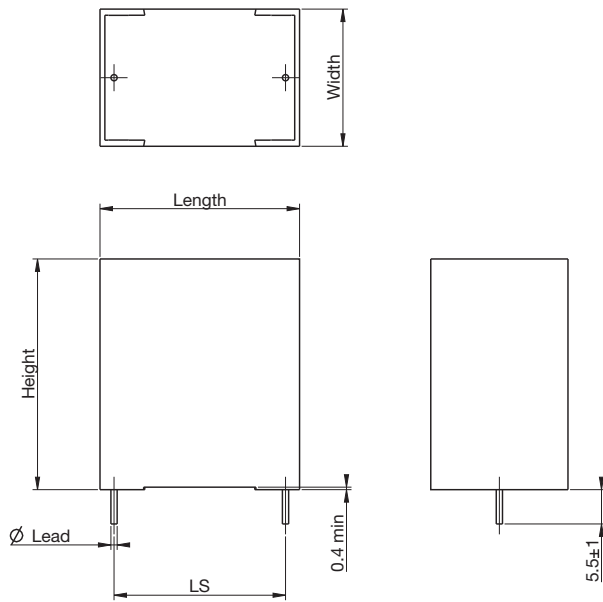
Consult Factory for Special Options



DC FILTERING

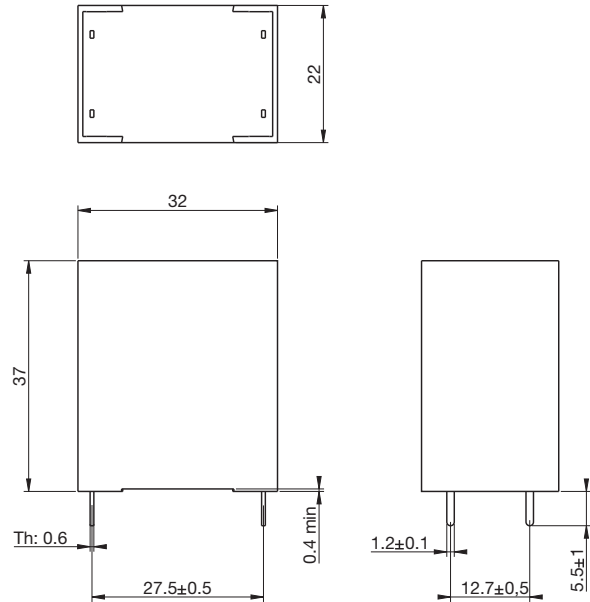
GENERAL DESCRIPTION

CASE STYLE: P0; 18; 19; 26; R68
2 LEADED STYLE



General Tolerance: ±0.5mm

CASE STYLE: R68
4 LEADED STYLE



General Tolerance: ±0.5mm

DIMENSIONS: millimeters

| Case Size | Case Style | Length (mm) | Width (mm) | Height (mm) | Dimensions lead (mm) | LS (mm) |
|-----------|-------------------------------------|-------------|------------|-------------|----------------------|---------|
| 1 | P0 | 31.1 | 13.0 | 22.4 | Ø 0.80 | 27.5 |
| 2 | 18 | 31.1 | 14.6 | 25.7 | Ø 0.80 | 27.5 |
| 3 | 19 | 31.1 | 17.3 | 29.8 | Ø 0.80 | 27.5 |
| 4 | 26 | 31.1 | 20.8 | 31.3 | Ø 1.00 | 27.5 |
| 5 | R68 2 Leaded Style | 32.0 | 22.0 | 37.0 | Ø 1.00 | 27.5 |
| | R68 4 Leaded Style | 32.0 | 22.0 | 37.0 | 1.20 x 0.60 | 27.5 |



Medium Power Film Capacitors



FFB (RoHS Compliant) – Polyester Dielectric

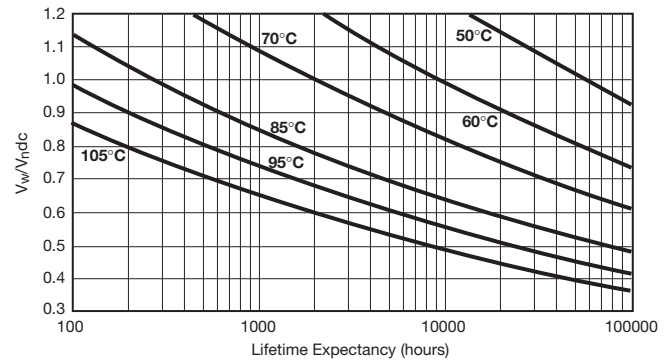
DC FILTERING

POLYESTER DIELECTRIC FOR LOW VOLTAGE DC FILTERING

ELECTRICAL CHARACTERISTICS – POLYESTER DIELECTRIC

| | |
|---------------------------------------|------------------------|
| Climatic category | 55/105/56 (IEC 60068) |
| Test voltage between terminals @ 25°C | 1.5 x V _{Ndc} |
| Capacitance range C _n | 6.2µF to 110µF |
| Tolerance on C _n | ±10% |
| Rated DC voltage V _{Ndc} | 75 to 400 V |
| Dielectric | polyester |
| Max Stray Inductance | 20nH |

LIFETIME EXPECTANCY vs VOLTAGE AND HOT SPOT TEMPERATURE – POLYESTER DIELECTRIC



V_w = Permanent working or operating DC voltage.

RATINGS AND PART NUMBER REFERENCE – POLYESTER DIELECTRIC

| Part Number | Capacitance (µF) | Case Style | I _{rms} max. (A) | R _s (mΩ) | R _{th} (°C/W) | Typical Weight (g) |
|--|------------------|-------------------|---------------------------|---------------------|------------------------|--------------------|
| V_{Ndc} 75V Vrms max.: 45 volts Voltage Code: D | | | | | | |
| FFB14D0336K-- | 33 | PO | 3 | 3 | 40.7 | 15 |
| FFB24D0476K-- | 47 | 18 | 4.3 | 2 | 33.3 | 20 |
| FFB34D0686K-- | 68 | 19 | 6.2 | 1.7 | 29.9 | 25 |
| FFB44D0826K-- | 82 | 26 | 7.4 | 1.6 | 26.7 | 32 |
| FFB54D0117K--* | 110 | R68 (2 terminals) | 10 | 1.4 | 22.9 | 40 |
| FFB54D0117KJC* | 110 | R68 (4 terminals) | 10 | 1.4 | 22.9 | 40 |
| V_{Ndc} 100V Vrms max.: 60 volts Voltage Code: E | | | | | | |
| FFB14E0206K-- | 20 | PO | 2.6 | 3 | 40.5 | 15 |
| FFB24E0276K-- | 27 | 18 | 3.5 | 2.5 | 33.3 | 20 |
| FFB34E0396K-- | 39 | 19 | 5 | 2 | 29.8 | 25 |
| FFB44E0476K-- | 47 | 26 | 6 | 1.7 | 26.6 | 32 |
| FFB54E0686K-- | 68 | R68 (2 terminals) | 9 | 1.4 | 22.8 | 40 |
| FFB54E0686KJC | 68 | R68 (4 terminals) | 9 | 1.4 | 22.8 | 40 |
| V_{Ndc} 300V Vrms max.: 90 volts Voltage Code: H | | | | | | |
| FFB14H0755K-- | 7.5 | PO | 2.4 | 16 | 40.7 | 15 |
| FFB24H0116K-- | 11 | 18 | 3.6 | 11 | 33.5 | 20 |
| FFB34H0166K-- | 16 | 19 | 5.2 | 8 | 29.9 | 25 |
| FFB44H0186K-- | 18 | 26 | 6 | 7 | 27.1 | 32 |
| FFB54H0276K-- | 27 | R68 (2 terminals) | 9 | 5 | 22.9 | 40 |
| FFB54H0276KJC | 27 | R68 (4 terminals) | 9 | 5 | 22.9 | 40 |
| V_{Ndc} 400V Vrms max.: 105 volts Voltage Code: I | | | | | | |
| FFB14I0625K--* | 6.2 | PO | 2.5 | 17 | 40.5 | 15 |
| FFB24I0755K--* | 7.5 | 18 | 3.1 | 14 | 33.5 | 20 |
| FFB34I0126K--* | 12 | 19 | 5 | 9 | 29.9 | 25 |
| FFB44I0156K--* | 15 | 26 | 6.2 | 7 | 26.4 | 32 |
| FFB54I0206K--* | 20 | R68 (2 terminals) | 8.2 | 5.5 | 22.8 | 40 |
| FFB54I0206KJC* | 20 | R68 (4 terminals) | 8.2 | 5.5 | 22.8 | 40 |

(*) Polyester dielectric film wet silicone



Medium Power Film Capacitors



FFB (RoHS Compliant) – Polypropylene Dielectric

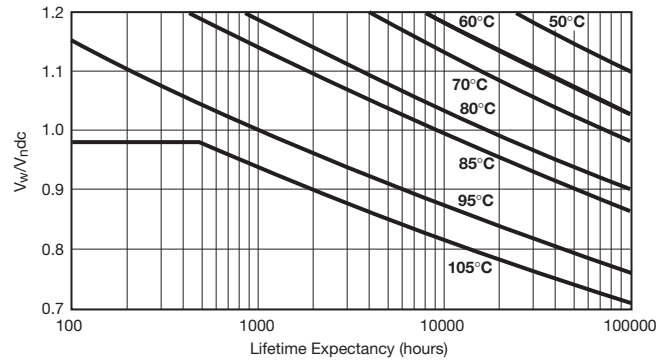
POLYPROPYLENE DIELECTRIC FOR INDUSTRIAL DC FILTERING

These capacitors have been designed principally for high and medium power DC filtering applications.

ELECTRICAL CHARACTERISTICS – POLYPROPYLENE DIELECTRIC

| | |
|---------------------------------------|-------------------------|
| Climatic category | 55/105/56 (IEC 60068) |
| Test voltage between terminals @ 25°C | 1.5 x V _n dc |
| Capacitance range C _n | 1.5µF to 13µF |
| Tolerance on C _n | ±10% |
| Rated DC voltage V _n dc | 525 to 1100 V |
| Dielectric | polypropylene |

LIFETIME EXPECTANCY vs VOLTAGE AND HOT SPOT TEMPERATURE – POLYPROPYLENE DIELECTRIC



V_w = Working DC Voltage • V_n = Rated DC Voltage

RATINGS AND PART NUMBER REFERENCE – POLYPROPYLENE DIELECTRIC

| Part Number | Capacitance (µF) | Case Style | I _{rms} max. (A) | R _s (mΩ) | R _{th} (°C/W) | Typical Weight (g) |
|---|------------------|-------------------|---------------------------|---------------------|------------------------|--------------------|
| V_ndc 525V Vrms max.: 105 volts Voltage Code: J | | | | | | |
| FFB16J0395K-- | 3.9 | PO | 5.1 | 30 | 45.7 | 15 |
| FFB26J0565K-- | 5.6 | 18 | 7.4 | 21 | 36.4 | 20 |
| FFB36J0825K-- | 8.2 | 19 | 10.9 | 15 | 32.6 | 25 |
| FFB46J0106K-- | 10 | 26 | 12 | 12 | 29.8 | 32 |
| FFB56J0136K-- | 13 | R68 (2 terminals) | 12 | 9 | 24.3 | 40 |
| FFB56J0136KJC | 13 | R68 (4 terminals) | 16.7 | 9 | 24.3 | 40 |
| V_ndc 720V Vrms max.: 120 volts Voltage Code: A | | | | | | |
| FFB16A0335K-- | 3.3 | PO | 5.0 | 31 | 45.0 | 15 |
| FFB26A0435K-- | 4.3 | 18 | 6.5 | 24 | 36.2 | 20 |
| FFB36A0625K-- | 6.2 | 19 | 9.4 | 17 | 32.7 | 25 |
| FFB46A0755K-- | 7.5 | 26 | 11.4 | 14 | 29.9 | 32 |
| FFB56A0106K-- | 10 | R68 (2 terminals) | 12 | 11 | 24.2 | 40 |
| FFB56A0106KJC | 10 | R68 (4 terminals) | 15.2 | 11 | 24.2 | 40 |
| V_ndc 900V Vrms max.: 150 volts Voltage Code: C | | | | | | |
| FFB16C0205K-- | 2 | PO | 3.6 | 41 | 45.7 | 15 |
| FFB26C0275K-- | 2.7 | 18 | 4.9 | 30 | 36.6 | 20 |
| FFB36C0395K-- | 3.9 | 19 | 7.2 | 21 | 32.9 | 25 |
| FFB46C0515K-- | 5.1 | 26 | 9.3 | 16 | 29.7 | 32 |
| FFB56C0685K-- | 6.8 | R68 (2 terminals) | 12 | 12 | 24.1 | 40 |
| FFB56C0685KJC | 6.8 | R68 (4 terminals) | 12.5 | 12 | 24.1 | 40 |
| V_ndc 1100V Vrms max.: 180 volts Voltage Code: L | | | | | | |
| FFB16L0155K-- | 1.5 | PO | 3.3 | 45 | 45.2 | 15 |
| FFB26L0185K-- | 1.8 | 18 | 3.9 | 40 | 36.5 | 20 |
| FFB36L0245K-- | 2.4 | 19 | 5.3 | 28 | 33.4 | 25 |
| FFB46L0305K-- | 3 | 26 | 6.6 | 23 | 30.2 | 32 |
| FFB56L0475K-- | 4.7 | R68 (2 terminals) | 10.3 | 15 | 24.1 | 40 |
| FFB56L0475KJC | 4.7 | R68 (4 terminals) | 10.3 | 15 | 24.1 | 40 |



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