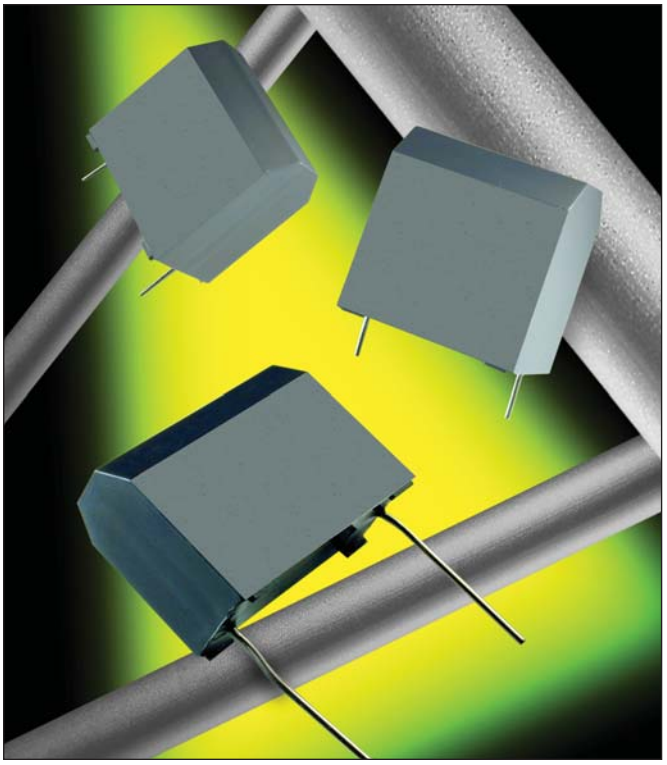
Medium Power Film Capacitors

FFB (RoHS Compliant)



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.

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

with P_d (Dielectric losses) = $Q \times tg\delta_0$

$Q \times tg\delta_0 \Rightarrow [\ ½ \times C_n \times (V_{peak\ to\ peak})^2 \times f\ ] \times tg\delta_0$

$tg\delta_0$ (tan delta)

For polypropylene, $tg\delta_0 = 2 \times 10^{-4}$ for frequencies up to 1MHz and is independent of temperatures.

For polyester, $tg\delta_0$ values are shown in graph 4 on page 3.

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

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.

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HOW TO ORDER

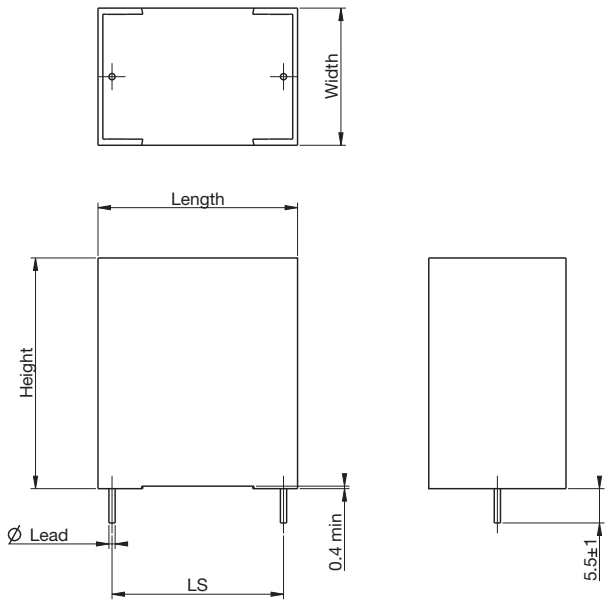
FFB	1	4	D	0336	K	– –
Series	**Case Size** 1 2 3 4 5	**Dielectric** 4 = Polyester 6 = Polypropylene	**Voltage Code** D = 75Vdc E = 100Vdc H = 300Vdc I = 400Vdc J = 525Vdc A = 720Vdc C = 900Vdc L = 1100Vdc	**Capacitance Code** 0 + pF code 0336 = 33µF 0686 = 68µF 0117 = 110µF etc.	**Capacitance Tolerances** K = ±10%	**Lead Styles** – – = 2 Leaded JC = 4 Leaded **Consult Factory for Special Options**

RoHS COMPLIANT

GENERAL DESCRIPTION

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

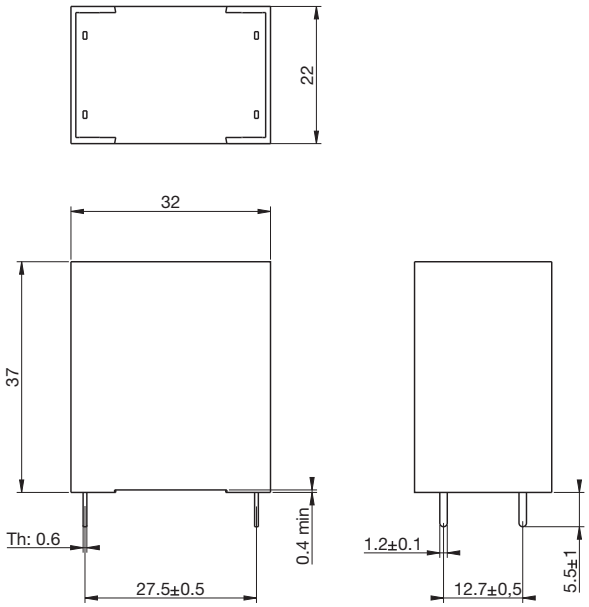
2 LEADED STYLE



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	**PO**	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

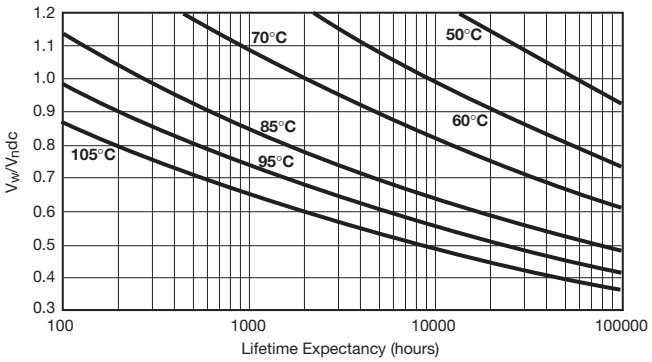
FFB (RoHS Compliant) – Polyester Dielectric

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 $V_n$dc
Capacitance range C_n	6.2µF to 110µF
Tolerance on C_n	±10%
Rated DC voltage $V_n$dc	75 to 400 V
Dielectric	polyester
Max Stray Inductance	20nH

LIFETIME EXPECTANCY vs VOLTAGE AND HOT SPOT TEMPERATURE – POLYESTER DIELECTRIC



Vw = 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)
$V_n$dc 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
$V_n$dc 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
$V_n$dc 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
$V_n$dc 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

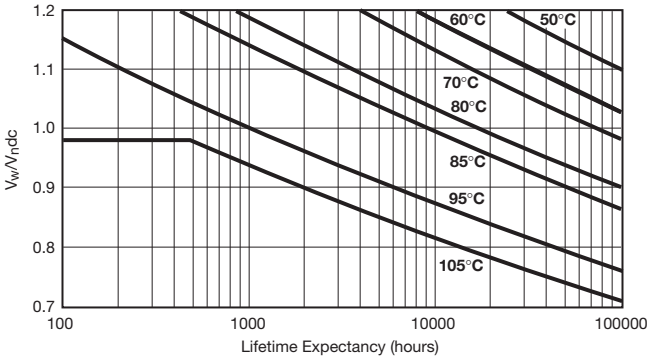
POLYPROPYLENE DIELECTRIC FOR INDUSTRIAL DC FILTERING

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



Vw = Working DC Voltage • Vn = 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)
$V_n$dc 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
$V_n$dc 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
$V_n$dc 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
$V_n$dc 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