Medium Power Film Capacitors

FE (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

The FE series uses a non-impregnated metallized polypropylene dielectric specially treated to have a very high dielectric strength in operating conditions up to 100°C.

The FE has been designed for printed circuit board mounting. FE series performance characteristics make them a viable alternative to aluminum electrolytic technology due to much lower ESR and much higher surge voltage capability (dv/dt).

APPLICATIONS

The FE 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.

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

OPERATING TEMPERATURE RANGE

Operating temperature range: -40ºC to +100ºC

LIFETIME EXPECTANCY

One unique feature of this technology (versus aluminum electrolytics) is how the capacitor reacts at the end of its lifetime.

Unlike aluminum electrolytic film capacitors do not have a catastrophic failure mode. Film capacitors simply experience a parametric loss of capacitance of about 2% from initial value, with no risk of short circuit.

The capacitor continues to be functional even after this 2% decrease.

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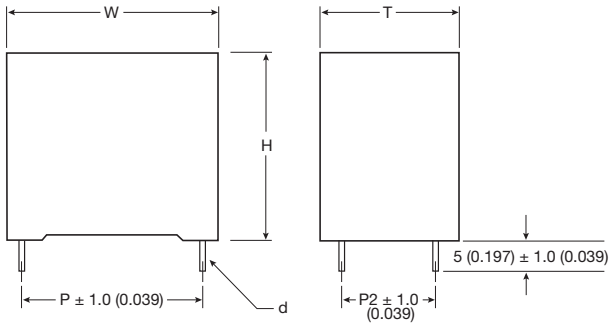
HOW TO ORDER

FE	27	G	6	K	0685	K	A
Series	**Pitch**	**Case**	**Dielectric**	**Voltage**	**Cap**	**Tolerance**	**Pitch P2**
FE	27 = 27.5 (1.083) 37 = 37.5 (1.476) 52 = 52.5 (2.067)	G L H M J N K P	6 = Polypropylene	J = 550V A = 700V B = 800V C = 900V K = 1000V L = 1100V P = 1200V	µF Code	J = ±5% K = ±10% M = ±20%	A = 10.2 (0.402) B = 20.3 (0.799)

RoHS COMPLIANT

DIMENSIONS: millimeters (inches)



millimeters (inches)

Case Size	W	H	T	P	P2	d
G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	1.20 (0.047)
H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)
J	42.5 (1.673)	37.0 (1.457)	28.0 (1.102)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)
K	42.5 (1.673)	40.0 (1.575)	20.0 (0.787)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)
L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)
M	42.5 (1.673)	45.0 (1.771)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)
N	57.5 (2.264)	45.0 (1.771)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)
P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)

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	40/100/56 (IEC 60068)
Test voltage between terminals @ 25°C	1.5 x $V_n$dc
Capacitance range C_n	3.3µF to 75µF
Tolerance on C_n	±5%, ±10%, ±20%
Rated DC voltage $V_n$dc	550V to 1200V
Dielectric	Polypropylene
Insulation Resistance:	>3,000 MΩ.µF/C after 1 minute electrification @ 100 Vdc & 25ºC
Lifetime (ΔC/C ≤ 5%):	100,000hrs @ Ur & 70ºC

Medium Power Film Capacitors

FE (RoHS Compliant)

RATINGS AND PART NUMBER REFERENCE – POLYPROPYLENE DIELECTRIC

Cap (µF)	Rated Voltage (V)	AVX Part Number	Case Size	W ±0.50 (0.020)	H ±0.50 (0.020)	T ±0.50 (0.020)	P ±1.00 (0.039)	P2 ±1.00 (0.039)	d ±0.05 (0.002)	dv/dt Volt/usec	I peak Amps	I rms Amps	ESR mOhms	Ls nH	Rth °C/W	Packaging Qty.
Voltage V,DC 550V Voltage Code: J																
15	550	FE27G6J0156*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	27.0	475.0	13.0	5.5	27.0	16.1	80
20	550	FE37K6J0206*A	K	42.5 (1.673)	40.0 (1.575)	20.0 (0.787)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	19.0	380.0	12.5	6.5	30.0	14.8	56
25	550	FE37J6J0256*A	J	42.5 (1.673)	37.0 (1.457)	28.0 (1.102)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	19.0	475.0	13.0	6.0	30.0	14.8	35
30	550	FE37J6J0306*A	J	42.5 (1.673)	37.0 (1.457)	28.0 (1.102)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	19.0	570.0	14.5	5.5	30.0	13.0	35
35	550	FE37M6J0356*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	19.0	665.0	16.0	5.0	33.0	11.7	44
40	550	FE37M6J0406*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	19.0	760.0	16.0	5.0	33.0	11.7	44
50	550	FE52N6J0506*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	12.5	625.0	15.0	6.0	35.0	11.1	25
60	550	FE52N6J0606*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	12.5	750.0	16.0	5.5	35.0	10.7	25
75	550	FE52P6J0756*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	12.5	937.5	17.0	5.0	37.0	10.4	20
Voltage V,dc 700V Voltage Code: A																
12	700	FE27G6A0126*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	31.0	372.0	12.5	5.5	27.0	17.5	80
15	700	FE37H6A0156*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	21.0	315.0	10.0	8.0	30.0	18.8	49
20	700	FE37J6A0206*A	J	42.5 (1.673)	37.0 (1.457)	28.0 (1.102)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	21.0	420.0	12.0	6.0	30.0	17.4	35
22	700	FE37L6A0226*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	21.0	462.0	14.0	5.5	30.0	13.9	42
25	700	FE37L6A0256*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	21.0	525.0	14.5	5.0	30.0	14.3	42
30	700	FE37M6A0306*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	21.0	630.0	17.0	4.0	33.0	13.0	44
40	700	FE52N6A0406*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	14.5	580.0	14.0	6.0	35.0	12.8	25
45	700	FE52N6A0456*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	14.5	652.5	15.5	5.5	35.0	11.4	25
50	700	FE52P6A0506*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	14.5	725.0	16.0	5.0	37.0	11.7	20
55	700	FE52P6A0556*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	14.5	797.5	18.0	4.5	37.0	10.3	20
60	700	FE52P6A0606*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	14.5	870.0	19.0	4.0	37.0	10.4	20
Voltage V,dc 800V Voltage Code: B																
10	800	FE27G6B0106*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	36.0	360.0	11.5	9.5	27.0	11.9	80
12	800	FE37H6B0126*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	24.0	288.0	9.5	10.5	30.0	15.8	49
15	800	FE37K6B0156*A	K	42.5 (1.673)	40.0 (1.575)	20.0 (0.787)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	24.0	360.0	11.0	10.5	30.0	11.8	56
20	800	FE37L6B0206*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	24.0	480.0	14.0	5.5	30.0	13.9	42
22	800	FE37M6B0226*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	24.0	528.0	15.5	5.0	33.0	12.5	44
25	800	FE37M6B0256*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	24.0	600.0	16.5	4.5	33.0	12.2	44
30	800	FE52N6B0306*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	16.5	495.0	13.0	7.5	35.0	11.8	25
40	800	FE52P6B0406*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	16.5	660.0	15.5	5.5	37.0	11.4	20
47	800	FE52P6B0476*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	16.5	775.5	17.5	5.0	37.0	9.8	20
Voltage V,dc 900V Voltage Code: C																
7.5	900	FE27G6C0755*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	41.5	311.3	10.5	14.5	27.0	9.4	80
10	900	FE37H6C0106*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	28.0	280.0	9.5	11.5	30.0	14.5	49
15	900	FE37L6C0156*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	28.0	420.0	12.0	7.5	30.0	13.9	42
20	900	FE37M6C0206*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	28.0	560.0	15.0	5.5	33.0	12.1	44
25	900	FE52N6C0256*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	18.5	462.5	12.0	9.5	35.0	11.0	25
35	900	FE52P6C0356*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	18.5	647.5	15.5	6.5	37.0	9.6	20
50	900	FE52P6C0506*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	35.0	1750.0	16.0	5.0	12.6	35.0	20.0
Voltage V,dc 1000V Voltage Code: K																
6.8	1000	FE27G6K0685*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	47.0	319.6	12.0	13.5	27.0	7.7	80
7.5	1000	FE37H6K0755*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	31.0	232.5	11.0	13.5	30.0	9.2	49
9.0	1000	FE37K6K0905*A	K	42.5 (1.673)	40.0 (1.575)	20.0 (0.787)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	31.0	279.0	12.0	13.0	30.0	8.0	56
10	1000	FE37K6K0106*A	K	42.5 (1.673)	40.0 (1.575)	20.0 (0.787)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	31.0	310.0	12.0	12.5	30.0	8.3	56
12	1000	FE37L6K0126*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	31.0	372.0	13.0	9.0	30.0	9.9	42
15	1000	FE37M6K0156*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	31.0	465.0	15.0	7.5	33.0	8.9	44
22	1000	FE52N6K0226*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	21.0	462.0	14.0	7.0	35.0	10.9	25
30	1000	FE52P6K0306*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	21.0	630.0	15.0	6.5	37.0	10.3	20
Voltage V,dc 1100V Voltage Code: L																
4.7	1100	FE27G6L0475*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	70.0	329.0	9.6	9.5	27.0	17.1	80
5.0	1100	FE27G6L0505*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	70.0	350.0	13.0	6.1	27.0	14.6	80
6.8	1100	FE37H6L0685*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	45.0	306.0	12.0	13.5	30.0	7.7	49
7.5	1100	FE37H6L0755*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	45.0	337.5	12.5	11.5	30.0	8.3	49
10	1100	FE37L6L0106*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	45.0	450.0	15.0	8.5	30.0	7.8	42
12	1100	FE37M6L0126*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	45.0	540.0	16.5	7.0	33.0	7.9	44
20	1100	FE52N6L0206*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	23.0	460.0	15.0	8.5	35.0	7.8	25
22	1100	FE52P6L0226*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	23.0	506.0	16.5	7.5	38.0	7.3	20
25	1100	FE52P6L0256*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	23.0	575.0	17.0	6.5	38.0	8.0	20
30	1100	FE52N6L0306*B	N	57.5 (2.26)	45.0 (1.77)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	35.0	1050	12.0	15.0	15.0	7.0	25

Dimensions in millimeters (inches)
* Insert K for 10% capacitance tolerance (standard): J = +5% and M = +20% tolerances available on request.
Values outside this standard range may be available – please contact AVX for any special requirements.
AVX reserves the right to supply capacitors to a tighter capacitance tolerance or higher voltage rating, in the same case size.

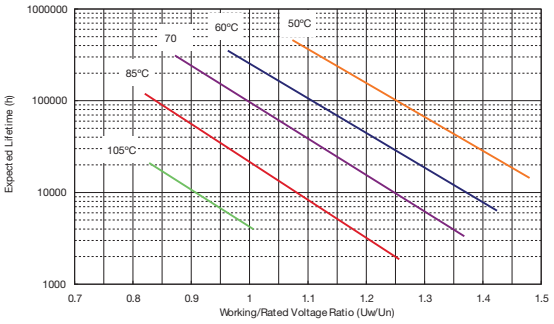
Medium Power Film Capacitors

FE (RoHS Compliant)

Cap (µF)	Rated Voltage (V)	AVX Part Number	Case Size	W ±0.50 (0.020)	H ±0.50 (0.020)	T ±0.50 (0.020)	P ±1.00 (0.039)	P2 ±1.00 (0.039)	d ±0.05 (0.002)	dv/dt Volt/usec	I peak Amps	I rms Amps	ESR mOhms	Ls nH	Rth °C/W	Packaging Qty.
Voltage V,dc 1200V Voltage Code: P																
3.3	1200	FE27G6P0335*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	80.0	264.0	8.2	12.5	27.0	17.8	80
4.0	1200	FE27G6P0405*A	G	32.0 (1.260)	37.0 (1.457)	22.0 (0.866)	27.5 (1.083)	10.2 (0.402)	0.80 (0.031)	80.0	320.0	9.0	10.5	27.0	17.6	80
4.7	1200	FE37H6P0475*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	55.0	258.5	7.3	19.5	30.0	14.4	49
5.0	1200	FE37H6P0505*A	H	42.5 (1.673)	33.5 (1.319)	22.0 (0.866)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	55.0	275.0	7.5	16.5	30.0	16.2	49
6.8	1200	FE37L6P0685*A	L	42.5 (1.673)	44.0 (1.732)	24.0 (0.945)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	55.0	374.0	9.0	14.0	30.0	13.2	42
7.5	1200	FE37J6P0755*A	J	42.5 (1.673)	37.0 (1.457)	28.0 (1.102)	37.5 (1.476)	10.2 (0.402)	1.20 (0.047)	55.0	412.5	9.8	11.0	30.0	14.2	35
10	1200	FE37M6P0106*B	M	42.5 (1.673)	45.0 (1.772)	30.0 (1.181)	37.5 (1.476)	20.3 (0.799)	1.20 (0.047)	55.0	550.0	12.0	8.0	35.0	13.0	44
12	1200	FE52N6P0126*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	35.0	420.0	10.0	13.5	35.0	11.1	25
15	1200	FE52N6P0156*B	N	57.5 (2.264)	45.0 (1.772)	30.0 (1.181)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	35.0	525.0	11.0	10.5	35.0	11.8	25
20	1200	FE52P6P0206*B	P	57.5 (2.264)	50.0 (1.969)	35.0 (1.378)	52.5 (2.067)	20.3 (0.799)	1.20 (0.047)	35.0	700.0	14.0	8.0	35.0	9.6	20

Dimensions in millimeters (inches)
* Insert K for 10% capacitance tolerance (standard): J = +5% and M = +20% tolerances available on request.
Values outside this standard range may be available – please contact AVX for any special requirements.
AVX reserves the right to supply capacitors to a tighter capacitance tolerance or higher voltage rating, in the same case size.

Typical Lifetime* Characteristics



*Lifetime is the number of operating hours required for the capacitor to lose 3% of its initial value.