

Medium Power Film Capacitors



FE (RoHS Compliant)

DC FILTERING



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.

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

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

$$Q \times \text{tg}\delta_0 \Rightarrow \left[\frac{1}{2} \times C_n \times (V_{\text{peak to peak}})^2 \times f \right] \times \text{tg}\delta_0$$

$\text{tg}\delta_0$ (tan delta)

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

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

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

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

OPERATING TEMPERATURE RANGE

Operating temperature range: -40°C to +100°C

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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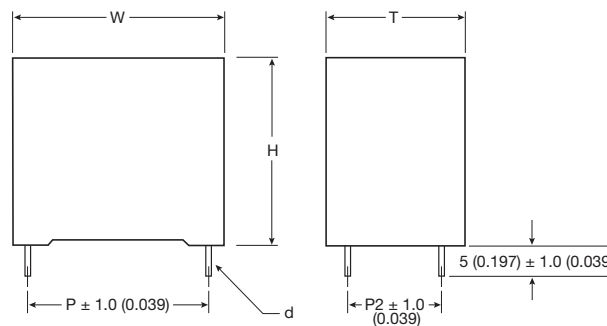
HOW TO ORDER

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



DC FILTERING

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)	0.80 (0.031)
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 & 25°C
Lifetime (ΔC/C ≤ 5%):	100,000hrs @ Ur & 70°C



Medium Power Film Capacitors



FE (RoHS Compliant)

RATINGS AND PART NUMBER REFERENCE – POLYPROPYLENE DIELECTRIC

DC FILTERING

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.



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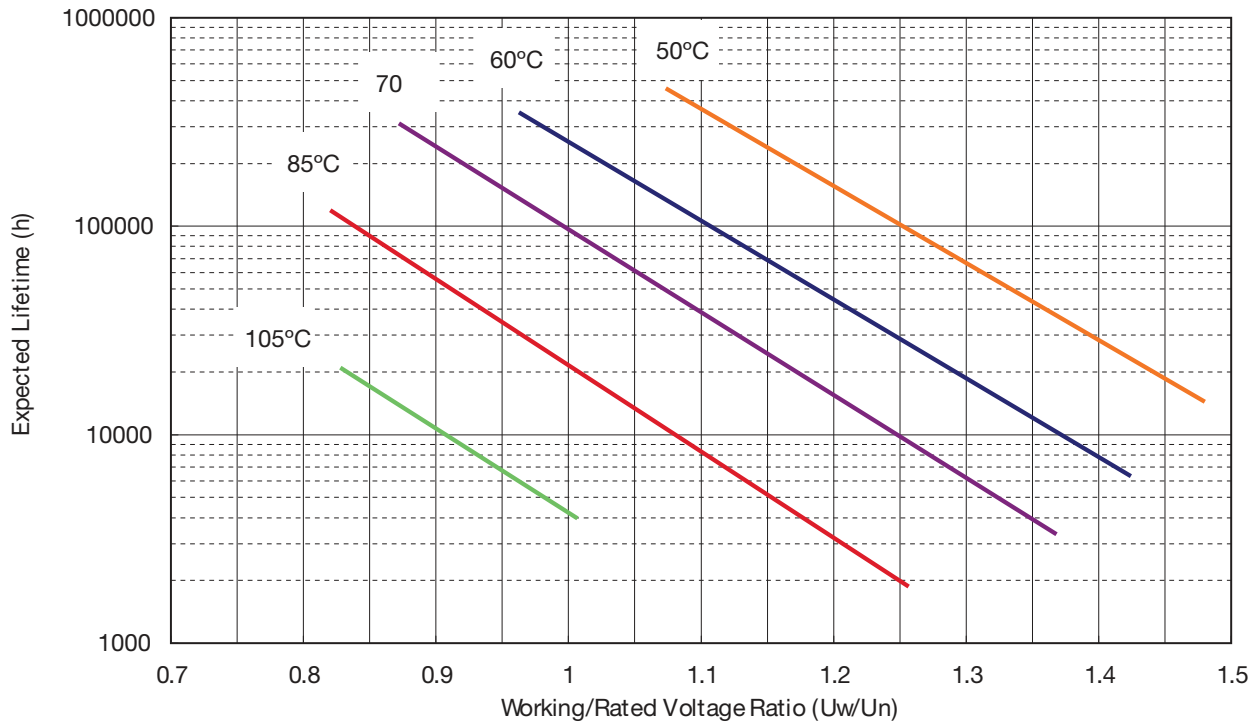
FE (RoHS Compliant)

DC FILTERING

Cap (μ F)	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 $^{\circ}$ 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.

