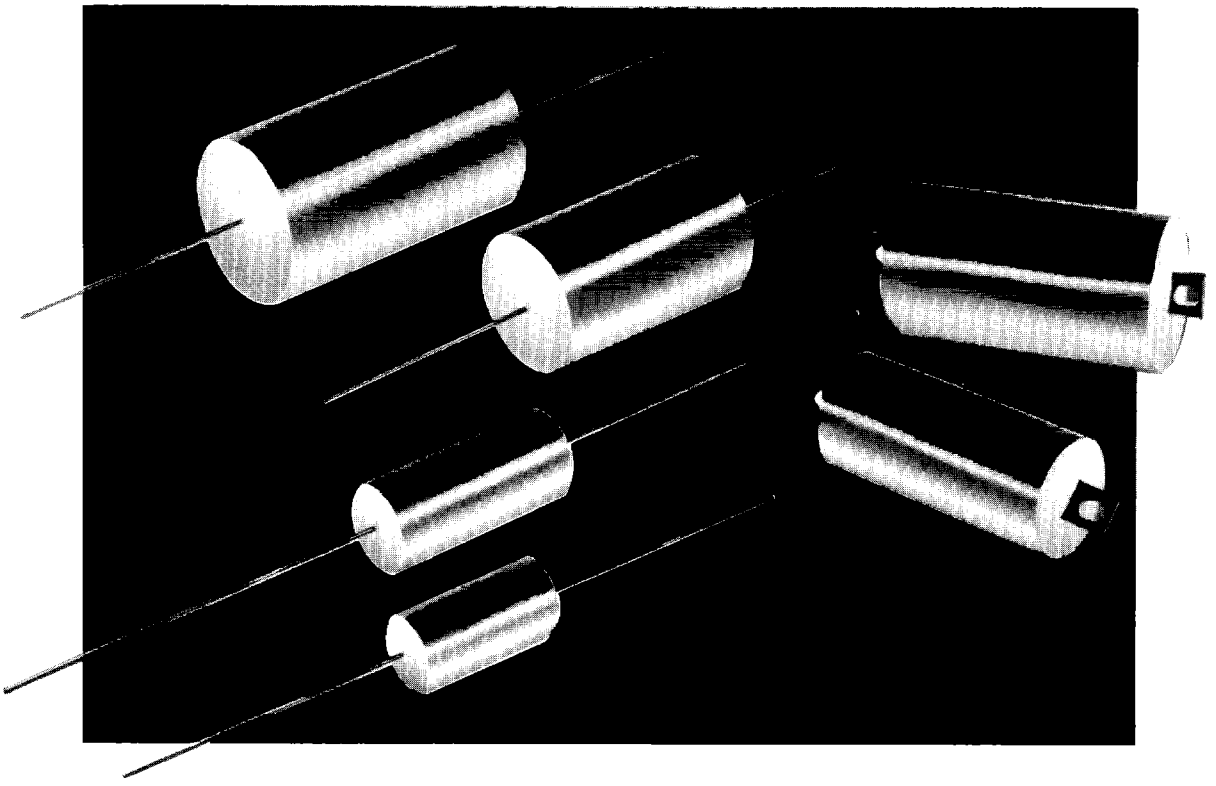
Type 5MP Switch-Mode Power Supply Capacitors

Metallized Polypropylene and Military Styles CFR13 and CFR14.

Capacitors



Type 5MP capacitors have been developed by Electronic Concepts for use in switching power supplies. These metallized polypropylene capacitors are manufactured by using special techniques in order to achieve the optimum characteristics for high current, high capacitance, low ESR applications.

For filter designs where capacitance of 50 mfd or less is suitable for the circuit, type 5MP affords the opportunity to utilize capacitors with ESR's orders of magnitude better than those of electrolytics, thus providing the opportunity to improve general system design. These unique capacitors also exhibit none of the "roll-off" of capacitance with frequency often associated with electrolytics.

In addition to the features which make type 5MP particularly suitable for switching applications, they are also characterized by low losses. Other advantages of polypropylene are long term stability, retrace, low dielectric absorbtion, and high insulation resistance.

ELCIS009

ELECTRONIC CONCEPTS®

Specifications

INTERNAL CONSTRUCTION

Extended foil winding (non-inductive)

ENCLOSURE

Mylar tape outerwrap

TERMINAL STRENGTH

There shall be no mechanical damage to the capacitor or terminals when tested in accordance with paragraph 4.7.14 of MIL-C-55514.

SOLDERABILITY

Capacitors shall be tested in accordance with method 208 of MIL-STD-202 and shall conform to the solid-wire termination criteria thereof.

The following details shall apply:

A. Number of terminations of each capacitor to be tested – 2.

B. Depth of immersion in flux and solder- both terminals shall be immersed to within 0.125 inch of the capacitor body.

ENVIRONMENTAL

These capacitors shall meet or exceed the requirements of MIL-C-55514 for all the following:

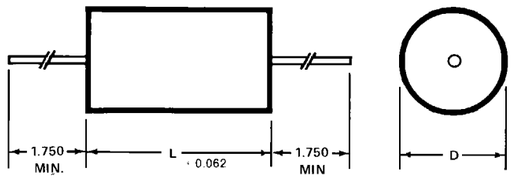
Vibration	(Para. 3.16)
Immersion	(Para. 3.21)
Shock	(Para. 3.17)
Moisture Resistance	(Para. 3.22)
Life	(Para. 3.23)

Electronic Concepts, Inc. is qualified as a supplier for the MIL versions CFR13 and CFR14 capacitors. These capacitors are manufactured to meet the requirements of MIL-C-55514 9. MIL designations are shown in the table at right. The last two characters of the MIL designations (CFR13ALB106) specify capacitance tolerance and failure rate respectively (CFR13ALB106KM).

Capacitance tolerance: M = 20%, K = 10% and J = 5%.

Failure rate level: M, P, R or S.

EC Type 5MP12 Military Style CFR13



All dimensions are in inches.

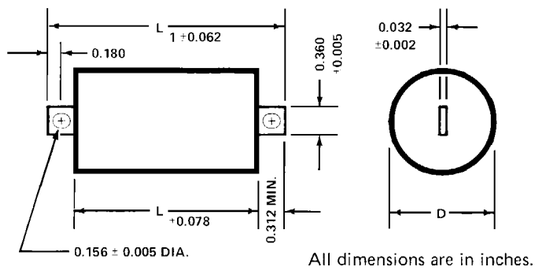
Catalog Numbering System

5MP 12 D 106 K

- TYPE
- STYLE — Wrap and fill axial leads
- VOLTAGE — D = 100 VDC; F = 200 VDC; J = 400 VDC
- CAPACITANCE — Expressed in Picofarads, the first two digits are significant figures. The third is the number of zeros. (e.g., 106 equals 10,000,000 pF)
- TOLERANCE — M-20% K-10% J-5% Closer Tolerances upon request

	Commercial EC Part Number	Equivalent Military Designation	Capacitance nominal in MFD	D Diameter	L Length	Lead Dia.	ESR Ohms 20-100 kHz Max	Maximum ripple current (AMPS RMS) 20-100 kHz case temperature +25°C	+35°C	+45°C	+55°C	+65°C	+75°C	+85°C	Resonant Frequency in kHz	I PEAK	DVDT
100 VDC	5MP12D105-	CFR13ALB105--	1.0	.469 ± .062	.750	.032	.015	9.2	8.5	7.8	7.0	6.0	4.9	4.5	1065	407	407
	5MP12D205-	CFR13ALB205--	2.0	.534 ± .062	.938	.032	.012	10.8	10.0	9.1	8.2	7.0	5.8	5.3	703	528	264
	5MP12D305-	CFR13ALB305--	3.0	.624 ± .093	.938	.040	.011	12.1	11.2	10.3	9.2	8.0	6.5	5.9	574	790	263
	5MP12D505-	CFR13ALB505--	5.0	.640 ± .093	1.250	.040	.010	13.8	12.7	11.6	10.4	9.0	7.4	6.7	385	828	166
	5MP12D106-	CFR13ALB106--	10.0	.805 ± .093	1.500	.040	.009	15.0	15.0	14.2	12.7	11.0	9.0	8.2	248	1280	128
	5MP12D206-	CFR13ALB206--	20.0	.875 ± .125	2.250	.040	.008	15.0	15.0	15.0	15.0	13.6	11.1	10.0	141	1517	76
	5MP12D306-	CFR13ALB306--	30.0	1.075 ± .125	2.250	.040	.006	15.0	15.0	15.0	15.0	15.0	12.4	11.4	115	2277	76
	5MP12D506-	(Not available)	50.0	1.375 ± .125	2.250	.040	.004	15.0	15.0	15.0	15.0	15.0	13.6	12.4	89	3795	76
200 VDC	5MP12F105-	CFR13ALC105--	1.0	.450 ± .062	1.250	.032	.020	7.3	7.3	7.3	7.3	7.2	5.9	5.4	861	250	250
	5MP12F205-	CFR13ALC205--	2.0	.605 ± .093	1.250	.032	.015	12.0	12.0	11.3	10.1	8.7	7.1	6.5	609	498	249
	5MP12F305-	CFR13ALC305--	3.0	.654 ± .093	1.500	.040	.013	15.0	13.8	12.6	11.3	9.8	8.0	7.3	452	576	192
	5MP12F505-	CFR13ALC505--	5.0	.769 ± .093	1.750	.040	.011	15.0	15.0	14.7	13.1	11.4	9.3	8.5	323	782	156
	5MP12F106-	CFR13ALC106--	10.0	.905 ± .125	2.250	.040	.009	15.0	15.0	15.0	15.0	13.8	11.3	10.3	200	1139	114
	5MP12F206-	CFR13ALC206--	20.0	1.315 ± .125	2.250	.040	.006	15.0	15.0	15.0	15.0	15.0	14.1	12.8	141	2277	114
400 VDC	5MP12J105-	CFR13ALE105--	1.0	.620 ± .093	1.500	.040	.019	9.5	9.5	9.5	9.5	9.5	7.8	7.1	784	319	319
	5MP12J205-	CFR13ALE205--	2.0	.802 ± .093	1.750	.040	.015	15.0	15.0	15.0	13.4	11.6	9.5	8.7	511	521	260
	5MP12J305-	CFR13ALE305--	3.0	.961 ± .125	1.750	.040	.012	15.0	15.0	15.0	15.0	13.1	10.7	9.8	417	781	260
	5MP12J505-	CFR13ALE505--	5.0	1.067 ± .125	2.250	.040	.010	15.0	15.0	15.0	15.0	15.0	12.5	11.4	283	950	190
	5MP12J106-	CFR13ALE106--	10.0	1.543 ± .125	2.250	.040	.006	15.0	15.0	15.0	15.0	15.0	15.0	14.1	200	1898	190

EC Type 5MP16 Military Style CFR14



All dimensions are in inches.

Catalog Numbering System

5MP 16 D 106 K

- TYPE
- STYLE — Wrap and fill lug termination
- VOLTAGE — D = 100 VDC; F = 200 VDC; J = 400 VDC
- CAPACITANCE — Expressed in Picofarads, the first two digits are significant figures. The third is the number of zeros. (e.g., 106 equals 10,000,000 pF)
- TOLERANCE — M-20% K-10% J-5% Closer Tolerances upon request

	Commercial EC Part Number	Equivalent Military Designation	Capacitance nominal in MFD	D Diameter	L Length	L_1	ESR Ohms 20-100 kHz Max	Maximum ripple current (AMPS RMS) 20-100 kHz case temperature +25°C	+35°C	+45°C	+55°C	+65°C	+75°C	+85°C	Resonant Frequency in kHz	I PEAK	DVDT
100 VDC	5MP16D105-	CFR14LLB105--	1.0	.469 ± .062	.922	1.640	.015	10.3	9.5	8.7	7.8	6.7	5.5	5.0	949	407	407
	5MP16D205-	CFR14LLB205--	2.0	.534 ± .062	1.110	1.828	.012	12.0	11.0	10.0	8.9	7.8	6.3	5.8	617	528	264
	5MP16D305-	CFR14LLB305--	3.0	.624 ± .093	1.110	1.828	.011	13.3	12.3	11.2	10.0	8.7	7.1	6.5	504	790	263
	5MP16D505-	CFR14LLB505--	5.0	.640 ± .093	1.422	2.140	.010	14.8	13.7	12.5	11.2	9.7	7.9	7.2	347	828	166
	5MP16D106-	CFR14LLB106--	10.0	.805 ± .093	1.672	2.390	.009	17.8	16.5	15.0	13.5	11.7	9.5	8.7	227	1280	128
	5MP16D206-	CFR14LLB206--	20.0	.875 ± .125	2.422	3.140	.008	21.6	20.0	18.3	16.4	14.2	11.6	10.6	133	1517	76
	5MP16D306-	CFR14LLB306--	30.0	1.075 ± .125	2.422	3.140	.006	24.3	22.5	20.5	18.4	15.9	13.0	11.9	108	2277	76
	5MP16D506-	(Not available)	50.0	1.375 ± .125	2.422	3.140	.004	29.6	27.3	25.5	23.6	20.6	20.0	19.7	84	3795	76
200 VDC	5MP16F105-	CFR14LLC105--	1.0	.450 ± .062	1.422	2.140	.020	7.3	7.3	7.3	7.3	7.3	6.4	5.8	776	250	250
	5MP16F205-	CFR14LLC205--	2.0	.605 ± .093	1.422	2.140	.015	14.3	13.3	12.1	10.8	9.4	7.7	7.0	548	498	249
	5MP16F305-	CFR14LLC305--	3.0	.654 ± .093	1.672	2.390	.013	15.9	14.7	13.5	12.0	10.4	8.5	7.8	414	576	192
	5MP16F505-	CFR14LLC505--	5.0	.769 ± .093	1.922	2.640	.011	18.3	17.0	15.5	13.9	12.0	9.8	8.9	299	782	156
	5MP16F106-	CFR14LLC106--	10.0	.905 ± .125	2.422	3.140	.009	22.4	20.7	18.9	16.9	14.6	12.0	10.9	188	1139	114
	5MP16F206-	CFR14LLC206--	20.0	1.315 ± .125	2.422	3.140	.006	27.4	25.4	23.2	20.7	17.9	14.7	13.4	133	2277	114
400 VDC	5MP16J105-	CFR14LLE105--	1.0	.620 ± .093	1.672	2.390	.019	9.5	9.5	9.5	9.5	9.5	8.3	7.5	716	319	319
	5MP16J205-	CFR14LLE205--	2.0	.802 ± .093	1.922	2.640	.015	15.0	15.0	15.0	14.2	12.3	10.0	9.1	472	521	260
	5MP16J305-	CFR14LLE305--	3.0	.961 ± .125	1.922	2.640	.012	21.1	19.5	17.8	15.9	13.8	11.3	10.3	386	781	260
	5MP16J505-	CFR14LLE505--	5.0	1.067 ± .125	2.422	3.140	.010	24.4	22.6	20.6	18.5	16.0	13.1	11.9	265	950	190
	5MP16J106-	CFR14LLE106--	10.0	1.543 ± .125	2.422	3.140	.006	30.0	27.8	25.4	22.7	19.7	16.1	14.7	188	1898	190

Characteristics

OPERATING TEMPERATURE RANGE

-55°C to +105°C without derating.

INSULATION RESISTANCE

When measured at the applicable test temperature, and rated voltage, after 2 minutes electrification, the insulation resistance shall equal or exceed the following values:

Megohm X Microfarads	+25°C	+85°C	+105°C
	300,000	30,000	3,000
Except the Insulation resistance in megohms need not exceed	500,000	50,000	5,000

DISSIPATION FACTOR

When measured at the frequency specified for capacitance measurement, the dissipation factor shall not exceed 0.1%.

CAPACITANCE CHANGE

The Capacitance change vs. temperature for these capacitors shall not exceed the following:

Temperature Degrees C.	-55	+25	+105
Percent Change	+2.0	0	-4.0
Typical	+1.6	0	-2.2

DIELECTRIC STRENGTH

Capacitors shall withstand a DC potential of twice rated voltage for one minute through a limiting resistance of 100 ohms/volt without damage or breakdown.

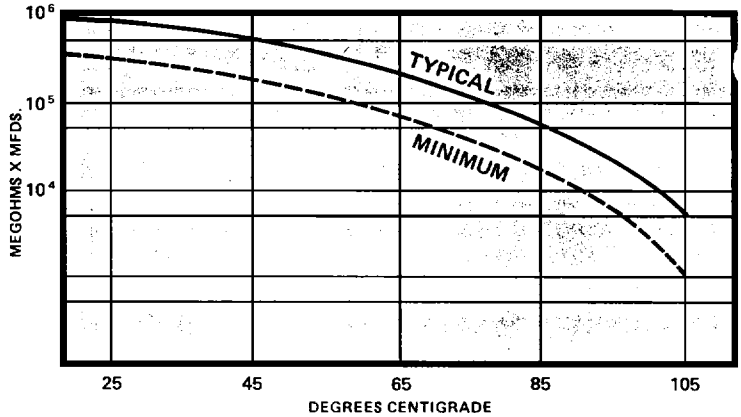
CAPACITANCE TOLERANCE

Standard tolerance is ±10%. Tolerances of ±20% and ±5% are available.

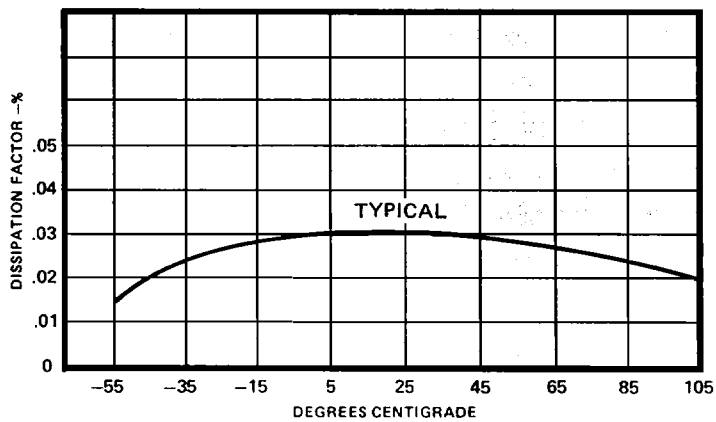
NOTE: *Capacitance shall be measured at 25°C, and at or referred to a frequency of 1 KHZ for all values.*

ELECTRICAL CHARACTERISTICS VS TEMPERATURE

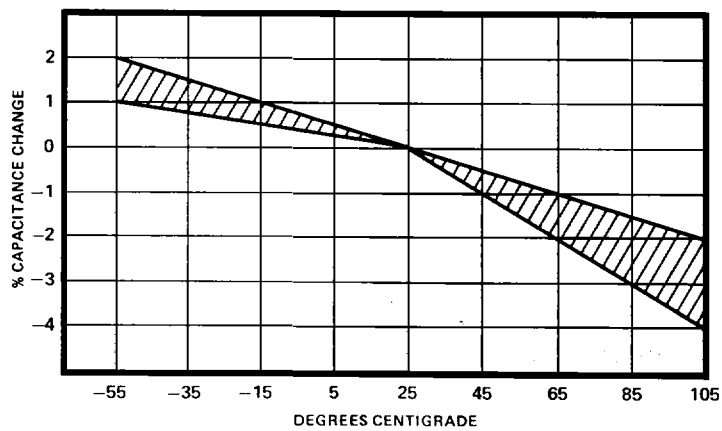
INSULATION RESISTANCE vs. TEMPERATURE



DISSIPATION FACTOR vs. TEMPERATURE



CAPACITANCE CHANGE vs. TEMPERATURE



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