

## Mil Qualified & DSCC Certified SMPS Capacitor Assemblies

API Technologies' Spectrum Control line of MIL-PRF-49470 qualified and DSCC 87106 certified Switch Mode Power Supply capacitors are designed to provide superior performance in high frequency switching applications. These capacitors are ideal for high energy density products found in both military and commercial markets.

- Capacitance values 0.01 $\mu$ F to 47 $\mu$ F
- Leaded parts safeguard against thermal and mechanical stresses

API's High-speed SMPS capacitors have the following characteristics when compared to other capacitive elements:

- Lower Equivalent Series Resistance (ESR)
- Lower Equivalent Series Inductance (ESL)
- Lower ripple voltage and less self heating

### Dielectric Characteristics

API offers SMPS capacitors in two basic dielectric classes, with individual designs tailored to meet specific performance characteristics.

Dielectric Type	Stability Class	Description
BP (NPO/COG)	Ultra Stable Class I	Effects on electrical properties are minimal with variations in operating temperature, voltage, frequency or time. Used in applications which require stable performance.
BQ, BR and BX	Stable Class II	Class II dielectrics will exhibit a predictable shift in performance characteristics when exposed to variations in temperature, voltage, frequency or time. Selected for applications where blocking, coupling, by-passing and frequency discriminating elements are used. Offers higher capacitance than Class I (COG).

### SMPS Part Numbering System

Example: **SMP3X124KENMB00**

The part number shown represents a size 3 SMPS capacitor. The ceramic type will be BX, capacitance value is 120,000 pF, with a tolerance of  $\pm 10\%$ . The voltage rating is 500 VDC, termination will be "N" style leads and the parts will receive marking/ bulk packaging.

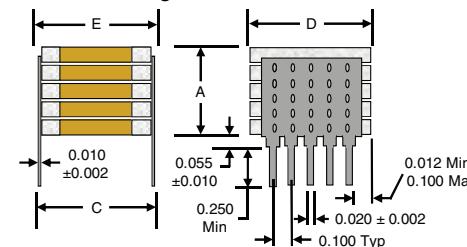
<b>SMP3</b>	<b>X</b>	<b>124</b>	<b>K</b>	<b>E</b>	<b>N</b>	<b>M</b>	<b>B</b>	<b>00</b>
Case Size	Ceramic Code	EIA Cap Code	EIA Cap Tolerance	Voltage Rating	Termination	Marking	Packaging	Special Requirements
SMP3	P: BP	Example: 120,000 pF	J: $\pm 5\%$	Z: 25 VDC	J: Leads in	M: Marked	T: Tape & Reel	GA:87106
SMP4	Q: BQ		K: $\pm 10\%$	A: 50 VDC	L: Leads out	U: Unmarked	F: Foam carrier/ boxed	Group A
SMP5	R: BR		M: $\pm 20\%$	B: 100 VDC	N: Leads straight		W: Waffle	HR:Hi-Rel*
	X: BX			C: 200 VDC				
				E: 500 VDC				

\* HR: Hi-Rel designation reflects MIL-PRF-49470, level B, QPL approval

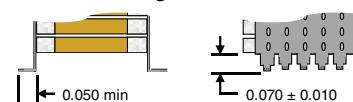


Style/Size	Dimensions					
	A max	B max	C $\pm 0.025"$	D $\pm 0.025"$	E max	Leads/ Side
SMP-3 (in) (mm)	0.650 16.50	0.715 18.16	0.450 11.42	1.050 26.65	0.500 12.69	10
SMP-4 (in) (mm)	0.650 16.50	0.715 18.16	0.400 10.15	0.400 10.15	0.440 11.17	4
SMP-5 (in) (mm)	0.650 16.50	0.715 18.16	0.250 6.35	0.250 6.35	0.300 7.62	3

N Lead Configuration



L Lead Configuration



J Lead Configuration



6/M Surface Mount Configuration



# Military/Hi-Rel & Commercial/Industrial Grade SMPS Capacitor Assemblies

API Technologies' Spectrum Control brand offers high reliability/military grade and commercial/industrial grade capacitors designed to provide superior performance in high frequency switch mode power supply applications. These capacitors are ideal for bulk capacitance and pulsing applications and are available in a range of different footprints and mounting configurations. The high reliability/military grade is based on the design principals and test requirements defined by MIL-PRF-49470.

- Leaded options safeguard against thermal and mechanical stresses in larger package sizes
- Capacitance values 0.01  $\mu\text{F}$  to 150  $\mu\text{F}$
- Stable Class II, BX, BR, BQ and X7R dielectric materials offer reliable operation and predictable performance characteristics related to temperature, frequency and voltage

API's line of Spectrum Control high-speed Switch Mode Power Supply capacitors have the following characteristics when compared to other capacitor technologies:

- Lower Equivalent Series Resistance (ESR)
- Lower Equivalent Series Inductance (ESL)
- Lower ripple voltage and less self heating

## Electrical Characteristics

VTC	WVDC	Maximum Capacitance Value									
		2225	2425	3530	3640	3940	4540	5550	6560	7565	44105
X7R	50	156	156	276	396	476	566	826	127	157	157
X7R	100	685	685	126	186	206	256	396	566	686	586
X7R	200	475	475	685	825	106	126	156	256	336	276
X7R	500	155	155	275	395	395	475	685	825	126	126
BX	50	475	565	106	126	156	185	276	396	576	476
BX	100	215	335	475	575	825	825	125	186	226	276
BR	200	125	155	255	395	395	475	685	106	126	126
BQ	500	564	684	125	155	185	185	275	475	565	565

## Dimensions (Refer to drawings on page 14)

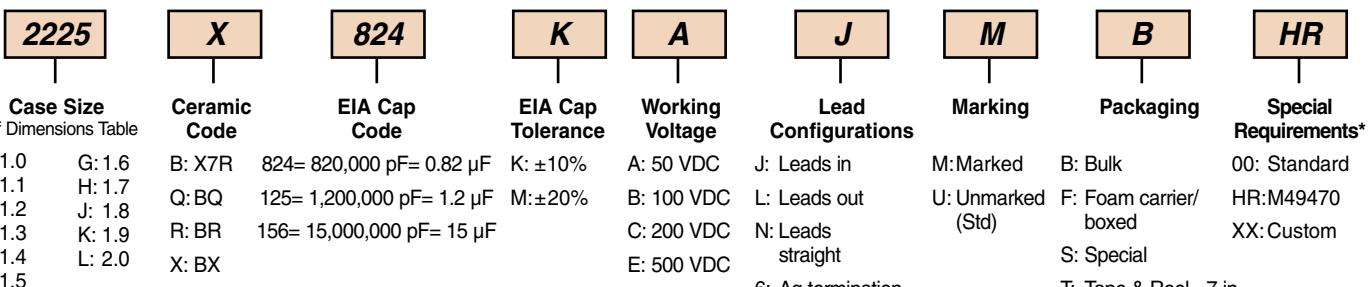
Dimensions in (mm)	Case Size									
	2225	2425	3530	3640	3940	4540	5550	6560	7565	44A5
C $\pm 0.025$ (0.635)	0.235 (5.97)	0.250 (6.35)	0.360 (9.14)	0.370 (9.40)	0.400 (10.16)	0.460 (11.68)	0.560 (14.22)	0.660 (16.76)	0.760 (19.30)	0.450 (11.42)
D Min - Max	0.224–0.275 (5.69–6.99)	0.224–0.275 (5.69–6.99)	0.275–0.325 (6.99–8.26)	0.350–0.425 (8.89–10.80)	0.350–0.425 (8.89–10.80)	0.350–0.425 (8.89–10.80)	0.450–5.25 (11.43–13.34)	0.550–0.625 (13.97–15.88)	0.600–0.675 (15.24–17.15)	0.950–1.075 (24.13–27.31)
E Max	0.300 (7.62)	0.300 (7.62)	0.420 (4.67)	0.430 (10.92)	0.440 (11.17)	0.530 (13.46)	0.630 (16.00)	0.730 (18.54)	0.830 (21.08)	0.500 (12.70)
A Max	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)	0.650 (16.51)
# Leads/Side	3	3	3	4	4	4	5	6	6	10

Note: C dimension for non-leaded chip capacitors equals dimension specified less the thickness of the leads or 0.020" total

## SMPS Part Numbering System

Example: 2225X824KAJMBHR

The part number shown represents a 2225 size SMPS capacitor. The ceramic type is X7R / BX, capacitance value is 0.82  $\mu\text{F}$ , with a tolerance of  $\pm 10\%$ . The voltage rating is 50 VDC, termination is "J" style leads, Group A testing is M49470 Group A, Subgroups 1 & 2 and the parts will receive marking / bulk packaging.



For dimensions  $\geq 1.000"$

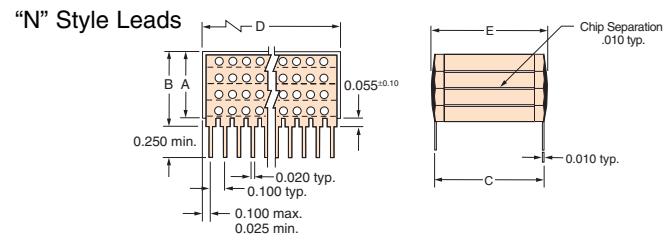
Substitute letters above eg.

44A5 = 44105 chip size

Additional package sizes, capacitance values and higher voltage ratings available, please contact factory.

\* 00 Designation reflects sample visual / mechanical inspection, plus 100% Capacitance, DF, DWV & IR testing @ +25°C  
HR designation reflects Group A, Subgroups 1 & 2 inspection per MIL-PRF-49470

# SMPS Specifications



"J" Style Leads

"L" Style Leads

	BP				BX				BR				BQ			
	Working Volts DC				Working Volts DC				Working Volts DC				Working Volts DC			
Cap Value ( $\mu\text{F}$ )	500	200	100	50	500	200	100	50	500	200	100	50	500	200	100	50
0.01																
0.012																
0.015																
0.018																
0.022																
0.027																
0.033																
0.039																
0.047																
0.056																
0.068																
0.082																
0.10																
0.12																
0.15																
0.18																
0.22																
0.27																
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KEY:



SMP-3

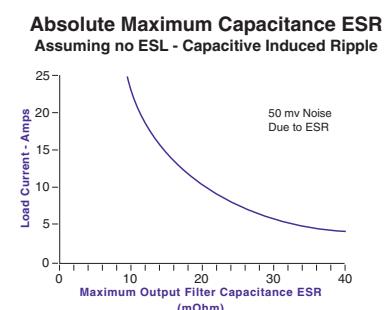
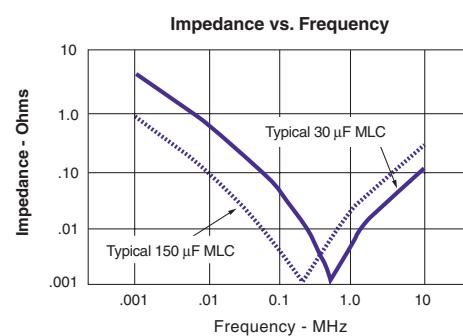
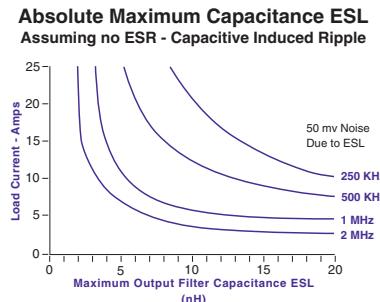
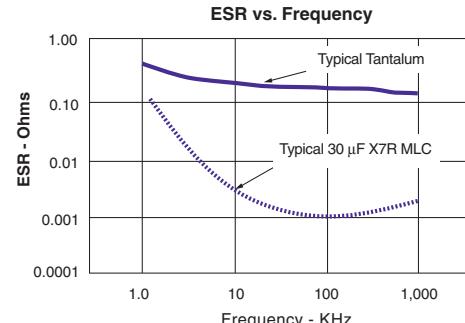
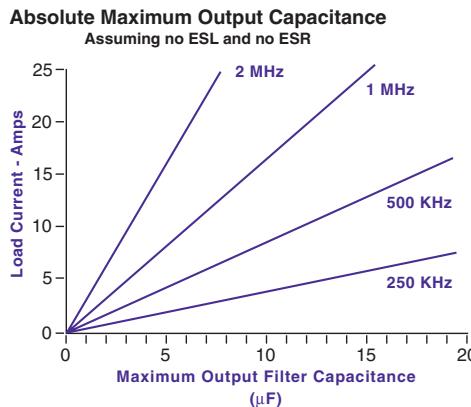


SMP-4



SMP-5

# SMPS Capacitor Electrical Testing



Test Group	Test Order	Test	Test Method	Post Test Requirements	Sampling Procedure
Group A	1	Visual and Mechanical			13 samples 0 failures  100%
	2	Materials, Designs, Construction and Workmanship			
	3	Physical Dimensions and Marking			
	4	Capacitance and Dissipation Factor	MIL-STD-202 Method 305		
	5	Dielectric Withstanding Voltage	MIL-STD-202 Method 301, 2.5x DCWV except 500V @ 1.5x		
	6	Insulation Resistance	MIL-STD-202 Method 302 @ DCWV, 25 C	>100,000 megohms or 1,000 megohm- $\mu\text{F}$ , whichever is less	
Group B Sub Grp I	1	Voltage and Temperature Limits			12 samples 1 failure
	2	Resistance to Solvents	MIL-STD-202 Method 215		
	3	Immersion	MIL-STD-202 Method 104 test condition B	No mechanical damage. Dielectric strength, capacitance, df and 25 C IR to original limits	
	4	Terminal Strength	MIL-STD-202 Method 211 test condition A. Case codes 1-4, 6-5 lbs case code 5-4 lbs	No evidence of loosening or rupturing of terminals	
Group B Sub Grp II	1	Resistance to Soldering Heat	MIL-STD-202 Method 210 N lead style test condition B, J and L styles test condition I	No mechanical damage. Dielectric strength, capacitance, df and 25 C IR to original limits	12 samples 1 failure
	2	Moisture Resistance	MIL-STD-202 Method 106, 20 cycles	No mechanical damage. Dielectric strength, capacitance, df and 25 C IR to original limits	
Group B Sub Grp III	1	Life	MIL-STD-202 Method 108, 1000 hrs. 2x DCWV except 1.2x 500 DCWV	No mechanical damage. Dielectric strength, capacitance, df, 125 C IR and 25 C IR to original limits	12 samples 1 failure
Optional		Solderability Group A			
		Thermal Shock and Voltage Conditioning			



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

#### Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помошь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помошь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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