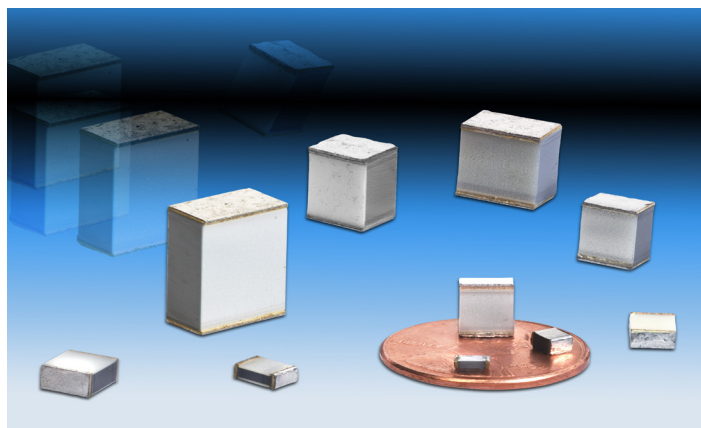


Type FCN Surface Mount Film Capacitors

Stable Stacked Metallized Film (PEN) Chips for Reflow Soldering



Type FCN capacitors are designed for applications requiring a general purpose SMT capacitor with stable temperature and frequency characteristics similar to polyester film capacitors. They are ideal for applications such as EMI noise filtering, power supply input/output filters, audio or signal coupling, and IC power bus bypassing or decoupling. FCN SMT capacitors have a non-inductive stacked metallized PEN film construction which results in a low ESR and excellent high frequency performance.

Highlights

- Designed for reflow soldering
- Withstands 150% of rated voltage for 60 seconds
- Stacked metallized polyethylene naphthalate (PEN) film
- Performs like polyester capacitors
- Nonmagnetic and lead-free

Type FCN SMT capacitors are the general purpose line of CDE's surface mount product offerings. They range in capacitance from .001 μF to 1.0 μF , and they are available in voltage ratings up to 400 Vdc.

Specifications

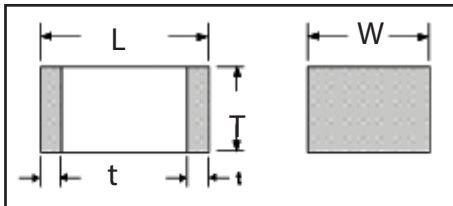
Capacitance Range	1000 pF to 1.0 μF (1kHz at $\leq 5 \text{ Vrms}$)
Capacitance Tolerance	$\pm 5\%$ (J), $\pm 10\%$ (K) (See Ratings)
Rated Voltage	16, 50, 100, 250 & 400 Vdc
Dissipation Factor ($\tan \delta$)	1.0% Max. (1 kHz at 5 Vrms)
Operating Temperature Range	16, 50, 100Vdc ($< 0.012 \mu\text{F}$); -55°C to $+105^\circ\text{C}$ 100 Vdc ($\geq 0.012 \mu\text{F}$), 250, 400 Vdc; -40°C to $+85^\circ\text{C}$
Surface Temperature	16 V & 50 V & 100 V $\leq 0.01 \mu\text{F}$: 240 $^\circ\text{C}$ max 100 V $\geq 0.012 \mu\text{F}$, 250 V & 400 V: 230 $^\circ\text{C}$ max
Insulation Resistance	C $> 0.33 \mu\text{F}$: IR = 1000 $\text{M}\Omega \cdot \mu\text{F}$ Min. C $\leq 0.33 \mu\text{F}$: IR $\geq 3000 \text{ M}\Omega$
Construction	Stacked metallized polyphenylene sulfide (PPS) film. Terminations are lead free with a Sn-Ag-Cu solder finish.
Withstand Voltage	16 V & 50 V, 100 V $\leq 0.01 \mu\text{F}$: 175% rated voltage, 5 s 100 V $\geq 0.012 \mu\text{F}$, 250 V and 400 V: 150% rated voltage, 5 s
Life Test	1000 h at rated temp. & 125% rated voltage Δ Capacitance: +1%, -6% max Dissipation Factor: 1.1% max IR: 1000 $\text{M}\Omega \cdot \text{min}$ (C $> 0.33 \mu\text{F}$, 300 $\text{M}\Omega \cdot \mu\text{F}$ min) No significant visual damage
Resistance to Soldering Heat	5 s at max capacitor surface temperature Δ Capacitance: $\pm 5\%$ max Dissipation Factor: 1.1% max IR: 1000 $\text{M}\Omega \cdot \text{min}$ (C $> 0.33 \mu\text{F}$, 300 $\text{M}\Omega \cdot \mu\text{F}$ min) Voltage withstanding: 1.5 times rated voltage, 1 min. No significant visual damage.
Moisture Resistance	500 h at 85 $^\circ\text{C}$ and 85% RH Δ Capacitance: $\pm 10\%$ max Dissipation Factor: 2% max IR: 10 $\text{M}\Omega \cdot \text{min}$ (C $> 0.33 \mu\text{F}$, 3 $\text{M}\Omega \cdot \mu\text{F}$ min) Voltage withstanding: 1.3 times rated voltage, 1 min. No significant damage
RoHS Compliant	

Type FCN Surface Mount Film Capacitors

Part Numbering System

FCN	1206	A	102	J	H2		Tape	Tape	Reel
Type	Case Size	Voltage	Capacitance	Tolerance	Packaging	Code	Width (mm)	Diameter [in.(mm)]	Quantity
FCN	1206	C = 16 Vdc	102 = 0.001 μ F	J = $\pm$ 5%	K1	=	8	7 (178)	4000
	1913	H = 50 Vdc	223 = 0.022 μ F	K = $\pm$ 10%	J1, J2	=	8	7 (178)	3000
	2416	A = 100 Vdc	474 = 0.47 μ F		H1, H2	=	8	7 (178)	3000
	2420	E = 250 Vdc			H3	=	8	7 (178)	2000
	2820	G = 400 Vdc			G1, G2, G3	=	8	7 (178)	2000
	3022				E1, E2	=	12	13 (330)	3000
	3925				E3, E4	=	12	13 (330)	2000
	3931				D1, D2	=	12	13 (330)	3000
	6031				D3, D4, D5	=	12	13 (330)	2000
	6040				B, Z	=	12	13 (330)	1500
					U, V, X, Y	=	16	13 (330)	1000
					S, T	=	24	13 (330)	750

Outline Drawing



t = 0.014 $\pm$ 0.008 in. (0.35 $\pm$ 0.2 mm)

For 0.001 μ F – 0.01 μ F, 100 V, t = 0.026 $\pm$ 0.012 in. (0.62 $\pm$ 0.3 mm)

Ratings

Rated Voltage: 16 Vdc (12 Vac)		Operating Temperature Range: -55 to +105°C		
Capacitance Range: 0.12 to 0.47 μF		Dielectric Withstand Voltage: 28 Vdc for 5 seconds		
Capacitance Tolerance: ± 5% (J)		Insulation Resistance (20°C, 10 Vdc, 60 Seconds); For $C \leq 0.33 \mu\text{F}$, I.R. $\geq 3000 \text{ Meg}\Omega$ For $C > 0.33 \mu\text{F}$, I.R. = 1000 MegW•μF Min.		
D.F. (20°C, 1 kHz): $\leq 1\%$				
Max. capacitor surface temperature: 40°C				
Capacitance (μF)	CDE P.N.	L ±.008 (±0.2) [in.(mm)]	W ±.012 (±0.3) [in.(mm)]	T ±.008 (±0.2) [in.(mm)]
0.12	FCN1913C124J-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.15	FCN1913C154J-E2	0.189 (4.8)	0.130 (3.3)	0.079 (2.0)
0.18	FCN1913C184J-E2	0.189 (4.8)	0.130 (3.3)	0.079 (2.0)
0.22	FCN1913C224J-E4	0.189 (4.8)	0.130 (3.3)	0.094 (2.4)
0.27	FCN2416C274J-D1	0.236 (6.0)	0.161 (4.1)	0.071 (1.8)
0.33	FCN2416C334J-D2	0.236 (6.0)	0.161 (4.1)	0.079 (2.0)
0.39	FCN2416C394J-D3	0.236 (6.0)	0.161 (4.1)	0.094 (2.4)
0.47	FCN2416C474J-D4	0.236 (6.0)	0.161 (4.1)	0.110 (2.8)

Type FCN Surface Mount Film Capacitors

Rated Voltage: 50 Vdc (40 Vac)		Operating Temperature Range: -55 to +105°C		
Capacitance Range: 0.056 to 0.22 µF		Dielectric Withstand Voltage: 87.5 Vdc for 5 seconds		
Capacitance Tolerance: ± 5% (J)		Insulation Resistance (20°C, 50 Vdc, 60 Seconds); I.R. ≥ 3000 Megohm		
D.F. (20°C, 1 kHz): ≤ 1%				
Max. capacitor surface temperature: 210°C				
Capacitance (µF)	CDE P.N.	L ±.008 (±0.2) [in.(mm)]	W ±.012 (±0.3) [in.(mm)]	T ±.008 (±0.2) [in.(mm)]
0.056	FCN1913H563J-E2	0.189 (4.8)	0.130 (3.3)	0.079 (2.0)
0.068	FCN1913H683J-E2	0.189 (4.8)	0.130 (3.3)	0.079 (2.0)
0.082	FCN1913H823J-E4	0.189 (4.8)	0.130 (3.3)	0.094 (2.4)
0.10	FCN1913H104J-E3	0.189 (4.8)	0.130 (3.3)	0.110 (2.8)
0.12	FCN2416H124J-D1	0.236 (6.0)	0.161 (4.1)	0.071 (1.8)
0.15	FCN2416H154J-D2	0.236 (6.0)	0.161 (4.1)	0.079 (2.0)
0.18	FCN2416H184J-D3	0.236 (6.0)	0.161 (4.1)	0.094 (2.4)
0.22	FCN2416H224J-D4	0.236 (6.0)	0.161 (4.1)	0.110 (2.8)

Rated Voltage: 100 Vdc (63 Vac)		Operating Temperature Range: -55 to +105°C		
Capacitance Range: 0.001 to 0.010 μF		Dielectric Withstand Voltage: 175 Vdc for 5 seconds		
Capacitance Tolerance: ± 5% (J)		Insulation Resistance (20°C, 100 Vdc, 60 Seconds); I.R. ≥ 3000 MegΩ		
D.F. (20°C, 1 kHz): ≤ 1%				
Max. capacitor surface temperature: 240°C				
Capacitance (μF)	CDE P.N.	L ±.008 (±0.2) [in.(mm)]	W ±.008 (±0.2) [in.(mm)]	T ±.008 (±0.2) [in.(mm)]
0.001	FCN1206A102J-H2	0.126 (3.2)	0.063 (1.6)	0.043 (1.1)
0.0012	FCN1206A122J-H2	0.126 (3.2)	0.063 (1.6)	0.043 (1.1)
0.0015	FCN1206A152J-H2	0.126 (3.2)	0.063 (1.6)	0.043 (1.1)
0.0018	FCN1206A182J-H2	0.126 (3.2)	0.063 (1.6)	0.043 (1.1)
0.0022	FCN1206A222J-H2	0.126 (3.2)	0.063 (1.6)	0.043 (1.1)
0.0027	FCN1206A272J-H2	0.126 (3.2)	0.063 (1.6)	0.043 (1.1)
0.0033	FCN1206A332J-H3	0.126 (3.2)	0.063 (1.6)	0.059 (1.5)
0.0039	FCN1206A392J-H3	0.126 (3.2)	0.063 (1.6)	0.059 (1.5)
0.0047	FCN1206A472J-H3	0.126 (3.2)	0.063 (1.6)	0.059 (1.5)
0.0056	FCN1210A562J-G2	0.126 (3.2)	0.098 (2.5)	0.059 (1.5)
0.0068	FCN1210A682J-G2	0.126 (3.2)	0.098 (2.5)	0.059 (1.5)
0.0082	FCN1210A822J-G3	0.126 (3.2)	0.098 (2.5)	0.083 (2.1)
0.01	FCN1210A103J-G3	0.126 (3.2)	0.098 (2.5)	0.083 (2.1)

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Rated Voltage: 100 Vdc (63 Vac)		Operating Temperature Range: -40 to +85°C		
Capacitance Range: 0.012 to 1.0 μF		Dielectric Withstand Voltage: 150 Vdc for 60 seconds		
Capacitance Tolerance: ± 10% (K)		Insulation Resistance (20°C, 100 Vdc, 60 Seconds); For C ≤ 0.33 μF:I.R. ≥ 3000 MegΩ For C > 0.33 μF:I.R. = 1000 MegW•μF Min.		
D.F. (20°C, 1 kHz): ≤ 1%				
Max. capacitor surface temperature: 230°C				
Capacitance (μF)	CDE P.N.	L ±.008 (±0.2) [in.(mm)]	W ±.012 (±0.3) [in.(mm)]	T ±.008 (±0.2) [in.(mm)]
0.012	FCN1913A123K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.015	FCN1913A153K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.018	FCN1913A183K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.022	FCN1913A223K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.027	FCN1913A273K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.033	FCN1913A333K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.039	FCN1913A393K-E1	0.189 (4.8)	0.130 (3.3)	0.055 (1.4)
0.047	FCN1913A473K-E2	0.189 (4.8)	0.130 (3.3)	0.079 (2.0)
0.056	FCN1913A563K-E2	0.189 (4.8)	0.130 (3.3)	0.079 (2.0)
0.068	FCN1913A683K-E4	0.189 (4.8)	0.130 (3.3)	0.094 (2.4)
0.082	FCN1913A823K-E3	0.189 (4.8)	0.130 (3.3)	0.110 (2.8)
0.10	FCN2416A104K-D1	0.236 (6.0)	0.161 (4.1)	0.071 (1.8)
0.12	FCN2416A124K-D3	0.236 (6.0)	0.161 (4.1)	0.094 (2.4)
0.15	FCN2416A154K-D4	0.236 (6.0)	0.161 (4.1)	0.110 (2.8)

Capacitance (µF)	CDE P.N.	L ±.016 (±0.4) ² [in.(mm)]	W ±.016 (±0.4) [in.(mm)]	T ±.012 (±0.3) [in.(mm)]
0.18	FCN2820A184K-Z	0.280 (7.1)	0.197 (5.0)	0.079 (2.0)
0.22	FCN2820A224K-Z	0.280 (7.1)	0.197 (5.0)	0.094 (2.4)
0.27	FCN2820A274K-Z	0.280 (7.1)	0.197 (5.0)	0.114 (2.9)
0.33	FCN2820A334K-Z	0.280 (7.1)	0.197 (5.0)	0.138 (3.5)
0.39	FCN3022A394K-X	0.303 (7.7)	0.217 (5.5)	0.134 (3.4)
0.47	FCN3022A474K-X	0.303 (7.7)	0.217 (5.5)	0.157 (4.0)
0.56	FCN3925A564K-V	0.386 (9.8)	0.248 (6.3)	0.118 (3.0)
0.68	FCN3925A684K-V	0.386 (9.8)	0.248 (6.3)	0.142 (3.6)
0.82	FCN3925A824K-V	0.386 (9.8)	0.248 (6.3)	0.169 (4.3)
1.0	FCN3925A105K-V	0.386 (9.8)	0.248 (6.3)	0.201 (5.1)

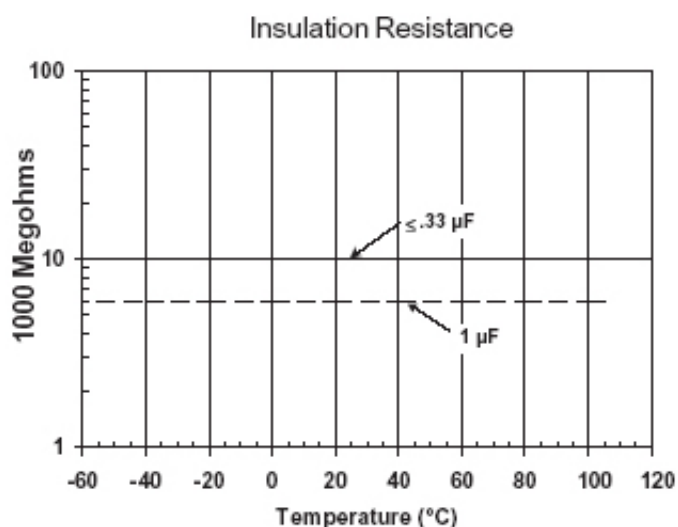
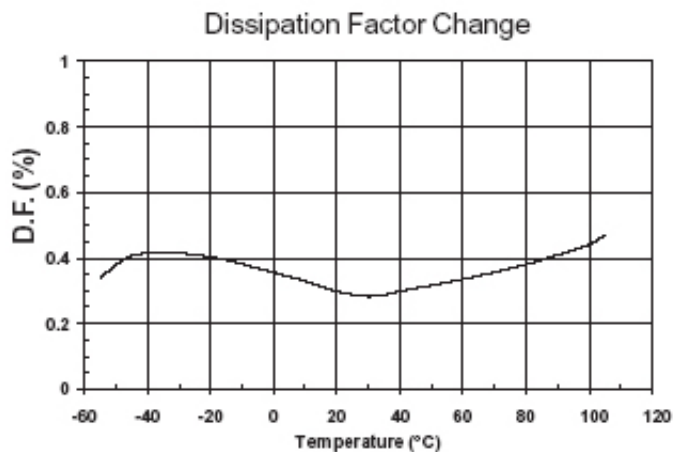
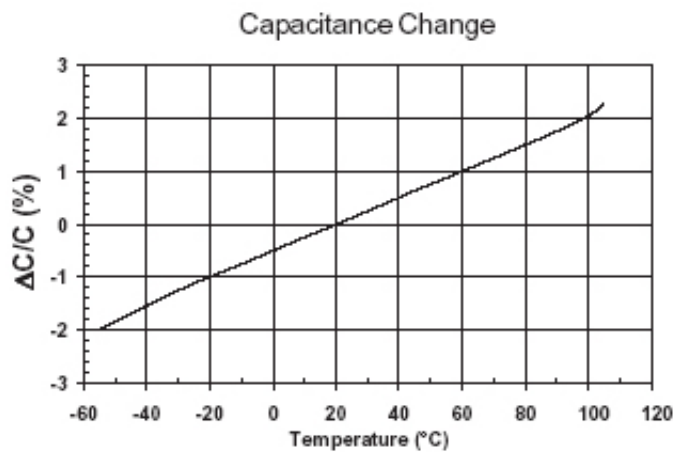
Type FCN Surface Mount Film Capacitors

Cap (μ F)	Catalog Part Number	L in (mm)		W in (mm)		T in (mm)	
250 Vdc							
0.12	FCN2420E124K-B *	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.197	(5.0)	0.177	(4.5)
0.15	FCN2825E154K-Y	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.248	(6.3)	0.138	(3.5)
0.18	FCN2825E184K-Y	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.248	(6.3)	0.161	(4.1)
0.22	FCN2825E224K-Y	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.248	(6.3)	0.201	(5.1)
0.27	FCN3925E274K-V	0.386 $\pm$.020	(9.8 $\pm$ 0.5)	0.248	(6.3)	0.154	(3.9)
0.33	FCN3925E334K-V	0.386 $\pm$.020	(9.8 $\pm$ 0.5)	0.248	(6.3)	0.189	(4.8)
0.39	FCN3931E394K-U	0.386 $\pm$.020	(9.8 $\pm$ 0.5)	0.315	(8.0)	0.173	(4.4)
0.47	FCN3931E474K-U	0.386 $\pm$.020	(9.8 $\pm$ 0.5)	0.315	(8.0)	0.209	(5.3)
0.56	FCN6031E564K-T	0.598 $\pm$.020	(15.2 $\pm$ 0.5)	0.315	(8.0)	0.146	(3.7)
0.68	FCN6031E684K-T	0.598 $\pm$.020	(15.2 $\pm$ 0.5)	0.315	(8.0)	0.173	(4.4)
0.82	FCN6040E824K-S	0.598 $\pm$.020	(15.2 $\pm$ 0.5)	0.394	(10.0)	0.165	(4.2)
1.0	FCN6040E105K-S	0.598 $\pm$.020	(15.2 $\pm$ 0.5)	0.394	(10.0)	0.201	(5.1)
400 Vdc							
0.001	FCN1913G102J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0012	FCN1913G122J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0015	FCN1913G152J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0018	FCN1913G182J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0022	FCN1913G222J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0027	FCN1913G272J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0033	FCN1913G332J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0039	FCN1913G392J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0047	FCN1913G472J-E1	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.055 $\pm$.008	(1.4 $\pm$ 0.2)
0.0056	FCN1913G562J-E2	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.079 $\pm$.008	(2.0 $\pm$ 0.2)
0.0068	FCN1913G682J-E2	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.079 $\pm$.008	(2.0 $\pm$ 0.2)
0.0082	FCN1913G822J-E4	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.094 $\pm$.008	(2.4 $\pm$ 0.2)
0.01	FCN1913G103J-E3	0.189 $\pm$.008	(4.8 $\pm$ 0.2)	0.130 $\pm$.012	(3.3 $\pm$ 0.3)	0.110 $\pm$.008	(2.8 $\pm$ 0.2)
0.012	FCN2416G123J-D2	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.161 $\pm$.012	(4.1 $\pm$ 0.3)	0.079 $\pm$.008	(2.0 $\pm$ 0.2)
0.015	FCN2416G153J-D3	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.161 $\pm$.012	(4.1 $\pm$ 0.3)	0.094 $\pm$.008	(2.4 $\pm$ 0.2)
0.018	FCN2416G183J-D4	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.161 $\pm$.012	(4.1 $\pm$ 0.3)	0.110 $\pm$.008	(2.8 $\pm$ 0.2)
0.022	FCN2416G223J-D5	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.161 $\pm$.012	(4.1 $\pm$ 0.3)	0.126 $\pm$.012	(3.2 $\pm$ 0.3)
0.027	FCN2420G273J-B	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.197 $\pm$.016	(5.0 $\pm$ 0.4)	0.118 $\pm$.012	(3.0 $\pm$ 0.3)
0.033	FCN2420G333J-B	0.236 $\pm$.008	(6.0 $\pm$ 0.2)	0.197 $\pm$.016	(5.0 $\pm$ 0.4)	0.142 $\pm$.012	(3.6 $\pm$ 0.3)
0.039	FCN2820G393J-Z	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.197 $\pm$.016	(5.0 $\pm$ 0.4)	0.126 $\pm$.012	(3.2 $\pm$ 0.3)
0.047	FCN2820G473J-Z	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.197 $\pm$.016	(5.0 $\pm$ 0.4)	0.150 $\pm$.012	(3.8 $\pm$ 0.3)
0.056	FCN2825G563J-Y	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.248 $\pm$.016	(6.3 $\pm$ 0.4)	0.142 $\pm$.012	(3.6 $\pm$ 0.3)
0.068	FCN2825G683J-Y	0.280 $\pm$.016	(7.1 $\pm$ 0.4)	0.248 $\pm$.016	(6.3 $\pm$ 0.4)	0.173 $\pm$.012	(4.4 $\pm$ 0.3)
0.082	FCN3925G823J-V	0.386 $\pm$.016	(9.8 $\pm$ 0.4)	0.248 $\pm$.016	(6.3 $\pm$ 0.4)	0.134 $\pm$.012	(3.4 $\pm$ 0.3)
0.1	FCN3925G104J-V	0.386 $\pm$.016	(9.8 $\pm$ 0.4)	0.248 $\pm$.016	(6.3 $\pm$ 0.4)	0.157 $\pm$.012	(4.0 $\pm$ 0.3)
0.12	FCN3931G124J-U	0.386 $\pm$.016	(9.8 $\pm$ 0.4)	0.315 $\pm$.016	(8.0 $\pm$ 0.4)	0.150 $\pm$.012	(3.8 $\pm$ 0.3)
0.15	FCN3931G154J-U	0.386 $\pm$.016	(9.8 $\pm$ 0.4)	0.315 $\pm$.016	(8.0 $\pm$ 0.4)	0.181 $\pm$.012	(4.6 $\pm$ 0.3)

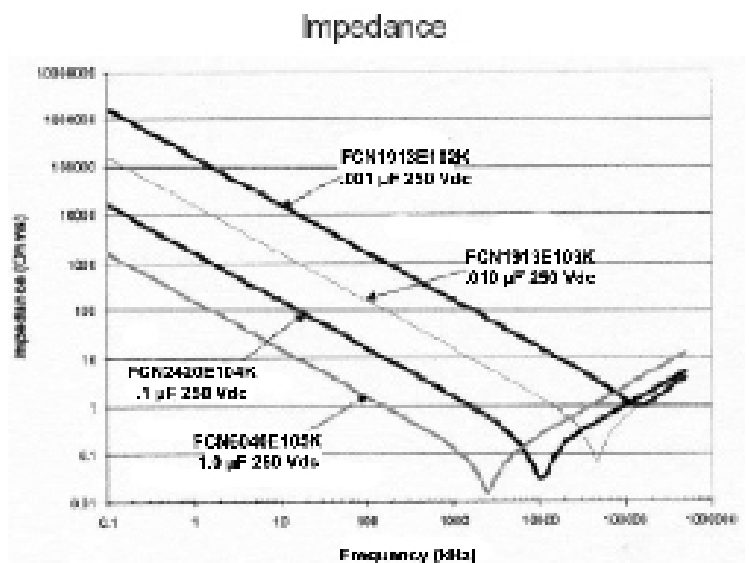
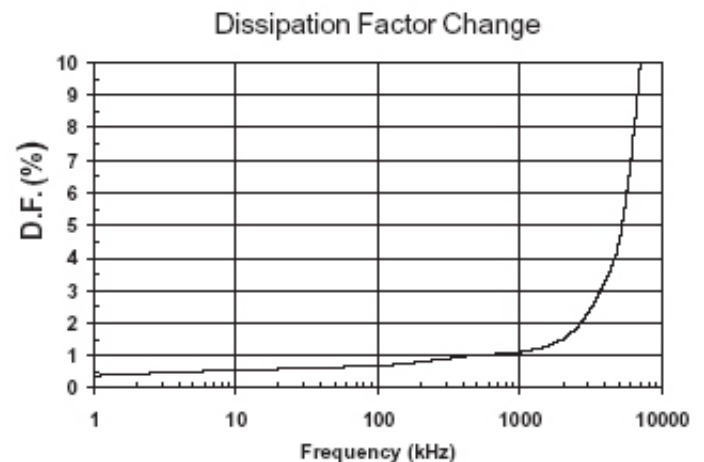
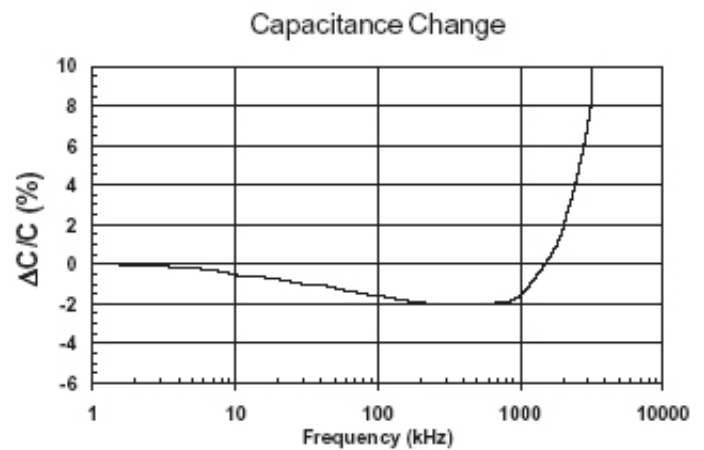
* also available in 5% (J) tolerance

Type FCN Surface Mount Film Capacitors

Typical Temperature Characteristics

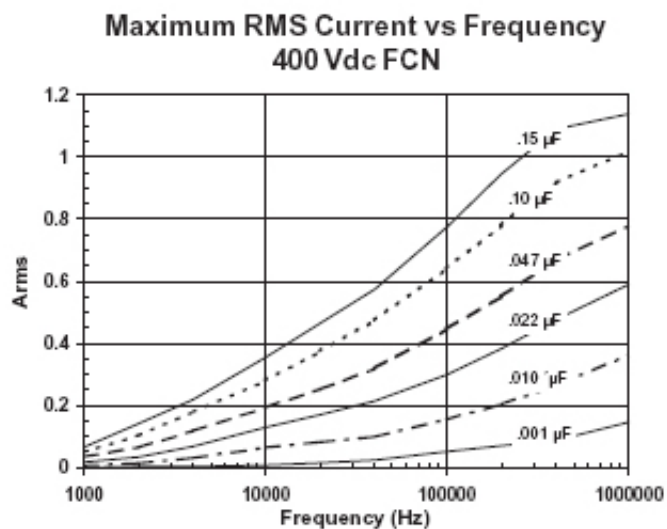
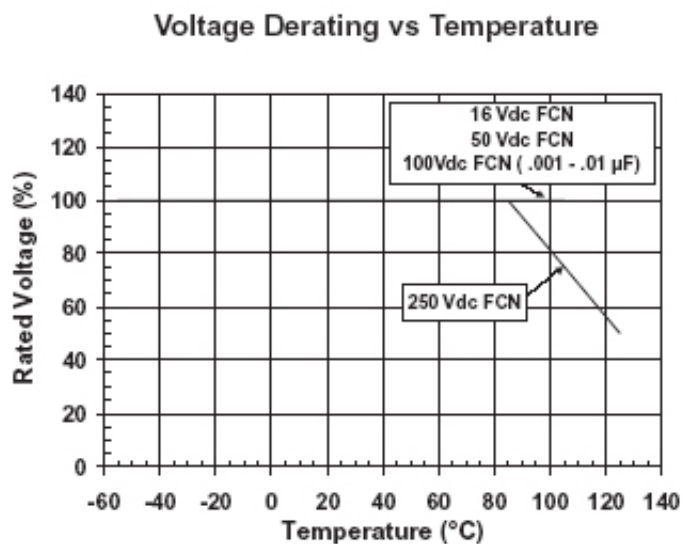
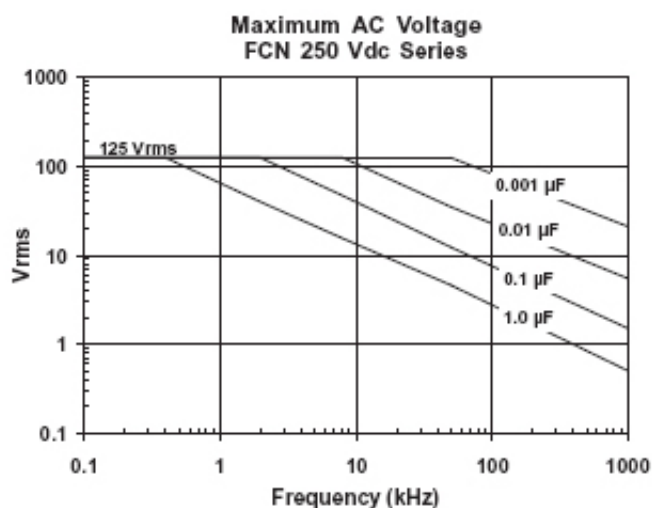
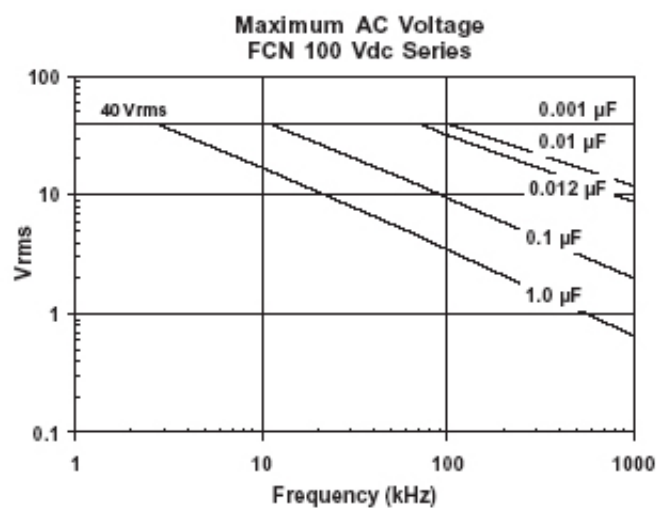
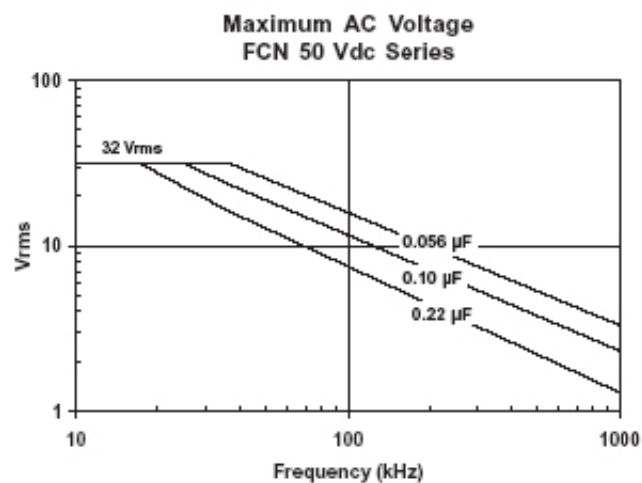
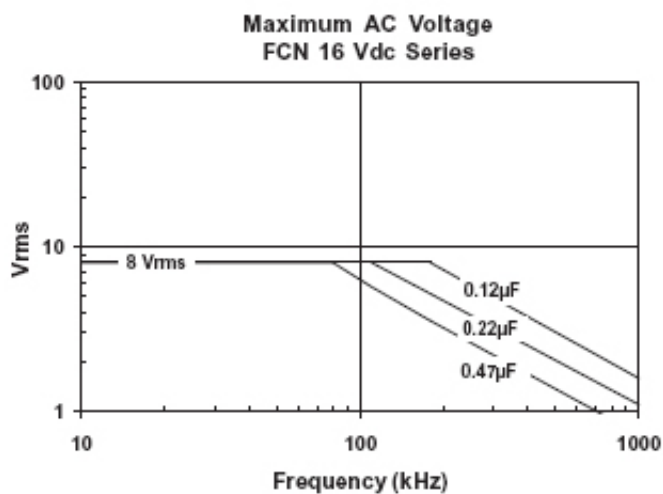


Typical Frequency Characteristics



Type FCN Surface Mount Film Capacitors

Vrms vs. Frequency Characteristics



Type FCN Surface Mount Film Capacitors

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