Radial-Leaded Snubber Mike Capacitors

Cap. pF	Dimensions, in. L	H	T	S	d	Catalog Number	Ipk Amps	Irms, 85°C 100kHz	250kHz	500kHz	1MHz	2.5MHz	5MHz
						1000 Vdc (350 Vac)							
100	.43	.46	.15	.23	.032	CDV16FF101J03	23	.022	.055	.11	.22	.55	.92
150	.43	.46	.15	.23	.032	CDV16FF151J03	34	.033	.082	.16	.33	.82	1.1
220	.43	.46	.15	.23	.032	CDV16FF221J03	50	.048	.12	.24	.48	1.2	1.4
330	.45	.47	.16	.23	.032	CDV16FF331J03	74	.073	.18	.36	.73	1.8	1.8
470	.45	.47	.16	.23	.032	CDV16FF471J03	100	.10	.26	.52	1.0	2.1	2.1
680	.46	.50	.18	.23	.032	CDV16FF681J03	150	.15	.37	.75	1.5	2.7	2.7
1000	.46	.50	.18	.23	.032	CDV16FF102J03	220	.22	.55	1.1	2.2	3.2	3.2
1500	.46	.50	.18	.23	.032	CDV16FF152J03	330	.33	.82	1.6	3.3	3.9	3.9
2200	.47	.52	.25	.23	.032	CDV16FF222J03	600	.48	1.2	2.4	4.8	5.3	5.3
3000	.47	.52	.25	.23	.032	CDV16FF302J03	825	.66	1.6	3.3	6.2	6.2	6.2
3300	.72	.59	.38	.34	.032	CDV19FF332J03	700	.73	1.8	3.6	5.5	5.5	5.5
4700	.76	.63	.46	.34	.032	CDV19FF472J03	1000	1.0	2.6	4.6	6.5	6.5	6.5
6800	.80	.89	.36	.44	.040	CDV30FF682J03	2100	1.5	3.7	5.5	7.8	7.8	7.8
8200	.81	.90	.39	.44	.040	CDV30FF822J03	2500	1.8	4.1	5.8	8.2	8.2	8.2
10000	.82	.91	.42	.44	.040	CDV30FF103J03	3000	2.2	4.4	6.2	8.7	8.7	8.7
						1500 Vdc (400 Vac)							
100	.77	.85	.25	.43	.040	CDV30FH101J03	46	0.025	0.063	0.13	0.25	0.63	1.3
150	.77	.85	.25	.43	.040	CDV30FH151J03	68	0.038	0.094	0.19	0.38	0.94	1.9
220	.77	.85	.25	.43	.040	CDV30FH221J03	100	0.055	0.14	0.28	0.55	1.4	2.8
330	.77	.85	.25	.43	.040	CDV30FH331J03	150	0.083	0.21	0.41	0.83	2.1	3.1
470	.77	.85	.25	.43	.040	CDV30FH471J03	210	0.12	0.30	0.59	1.2	3.0	3.5
680	.77	.85	.25	.44	.040	CDV30FH681J03	310	0.17	0.43	0.85	1.7	3.9	3.9
1000	.77	.86	.26	.43	.040	CDV30FH102J03	460	0.25	0.63	1.3	2.5	4.4	4.4
1500	.78	.87	.28	.43	.040	CDV30FH152J03	680	0.38	0.94	1.9	3.8	4.9	4.9
2200	.79	.88	.31	.43	.040	CDV30FH222J03	1000	0.55	1.4	2.8	5.5	5.5	5.5
3300	.80	.89	.35	.43	.040	CDV30FH332J03	1500	0.83	2.1	4.1	6.3	6.3	6.3
4700	.81	.90	.38	.43	.040	CDV30FH472J03	2100	1.2	3.0	4.9	7.0	7.0	7.0
6800	.83	.92	.42	.43	.040	CDV30FH682J03	3100	1.7	3.9	5.5	7.8	7.8	7.8
8200	.84	.93	.46	.43	.040	CDV30FH822J03	3700	2.1	4.1	5.8	8.2	8.2	8.2

Snubber- Mike Specifications and Application Guide

Capacitance Tolerance ±5% is standard. Capacitance is within tolerance when measured at these frequencies:

1–1000 pF @ 1 MHz
> 1000 pF @ 1 kHz

Dissipation Factor is equal to DF=2πfRC, where f is the test frequency, R is the equivalent series resistance, and C is the capacitance. Limits are

Capacitance	Dissipation Factor
100-1000 pF	0.00075 max at 1 MHz
1200-3300 pF	0.0014 max at 1 kHz
3900-9100 pF	0.0013 max at 1 kHz
10,000 pF	0.0012 max at 1 kHz

Quality Factor Q is the reciprocal of dissipation factor.

Insulation Resistance is no less than 100 GΩ at 25°C and 10 GΩ at 125°C.

Pulse Capability The brass clips used in Snubber Mike capacitors allow them to endure huge transient currents. All are capable of withstanding an unlimited number of pulses with a dV/dt of 100,000 V/µs tested per IEC 60384-1. dV/dt ratings are below:

Rated Volts	Types: CD16 CDV16	CDV19	CD30 CDV30
	dV/dt maximum, V/µs		
500	275000		152000
1000	275000	213000	303000
1500			455000

The peak current rating in amps is the rated capacitance in µF times the dV/dt rating.

$$Ipk = C(dV/dt)$$

Maximum Current Snubber Mike capacitors can handle high ac current and voltage. Capacitors rated 500 Vdc can withstand 300 Vac; 1000 Vdc, 350 Vac; and 1500 Vdc and higher, 400 Vac. Maximum current is determined by either the voltage rating or temperature rise from power.

Typically voltage rating determines the maximum current for frequencies 500 kHz and lower. The current as a function of voltage is

$$I=2\pi(Vac)(f)(C)$$

I = capacitor current, A ac
Vac = rated ac voltage, V ac
f = frequency of current, MHz
C = rated capacitance, µF

For higher frequencies, temperature rise from power dissipation determines maximum current. Case temperature may increase 15°C without affecting performance. Use the table below to calculate the current required for a 15°C rise using rated capacitance, C in pF and frequency, fin MHz.

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Type	Current	Max A ac
CD15	$0.0073(C^{.8})$	$\sqrt{f}$
CD19	$0.034(C^{.6})$	$\sqrt{f}$
CD30	0.085	$\sqrt{Cf}$
CDV19	0.095	$\sqrt{Cf}$
CDV30	$0.55\ (C^{.3})$	$\sqrt{f}$

The above applies up to 1 MHz. The 1 MHz current is the absolute maximum rating.

Below is an alternate way to calculate the current required for a 15°C rise, based on case area and Equivalent Series Resistance (ESR).

$I = 0.12\sqrt{\Delta TA/R}$

I = capacitor current, A ac

ΔT = temperature rise, 15°C

A = case area, in^2

R = ESR, Ω

The ESR of CDE mica capacitors is quite low, less than 0.1Ω at 1 MHz for 1000 pF and up. But the ESR varies inversely with frequency and capacitance. Typically, the ESR is less than 60/fC(MHz-pF or kHz-nF) for frequencies below a megahertz. ESR increases 3 to 5% ºC with temperature.

The ratings show voltage-limited maximum current crossing over to temperature-limited maximum current at higher frequencies.

Withstanding Voltage is 2 times the rated voltage, and can be applied up to 5 seconds without damage.

Surge Voltage: Standard dipped capacitors will withstand 500 Vdc max peak transients above rated voltage. For example, in flyback regulators with less than 500 Vdc bias, you may use 500 Vdc-rated capacitors provided that the switching transient peaks are less than 1,000 V.

Voltage Coefficient: The change in capacitance from 0 volts to rated voltage is less than 0.1%.

Temperature Coefficient and Capacitance Drift: Measure the capacitors' capacitance at 25 ºC, –55 ºC, 25 ºC, 125 ºC and at 25 ºC after stabilizing at each temperature. The temperature coefficient will be 35 ±35 ppm/°C and the capacitance will be the initial value ±(.05%+.1 pF).

Marking Per EIA RS153 and includes CD manufacturer's name, Nominal capacitance in pF, Capacitance tolerance, and DC working voltage if other than 500 V.

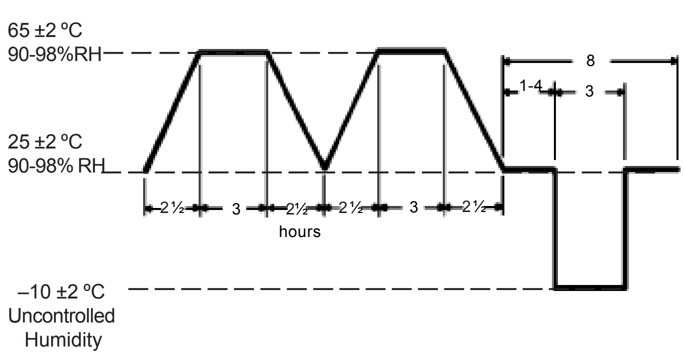
Solderability After an 8-hour steam aging, coat leads with rosin flux (R) and immerse in molten 245°C ±5°C 60/40 tin lead solder. Solder coverage will be no less than 95% when examined at 10X magnification.

Life Test Subject the capacitors to maximum operating temperature (+125 or + 150°C) with 1.5 times rated voltage applied for 2000 hours. There will be no visual damage and the capacitors will meet these after-test limits: Withstanding voltage and insulation resistance initial requirements, capacitance change ±1 % maximum, and DF 150% initial limit maximum.

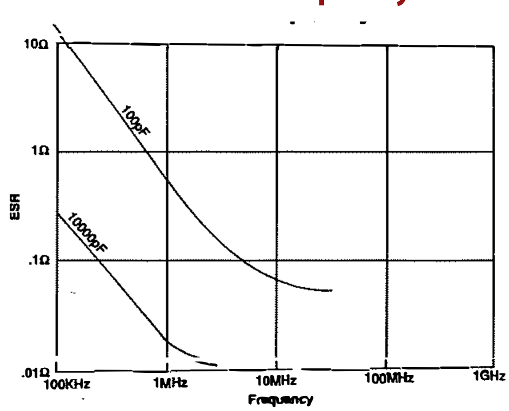
Moisture Resistance Capacitors will meet the requirements of MIL-STD-202, Method 106 as outlined here and diagrammed below. Refer to MIL-STD-202 for details.

1. Dry capacitors for 24 hours in a 50±2°C oven and then allow to stabilize at room temperature.
2. Subject the capacitors to 10 24- hour continuous cycles with relative humidity and temperature as shown.
3. 24 hours after completion of the last cycle the capacitors will show no visual damage and will meet these after-test limits: Withstanding voltage initial requirement, insulation resistance 30 GΩ minimum, capacitance change ±1 %maximum, and DF 150% initial limit maximum.

24-Hour Moisture Resistance Cycle



ESR vs. Frequency



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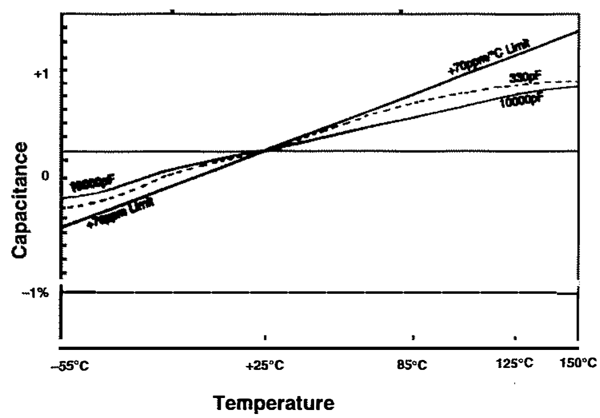
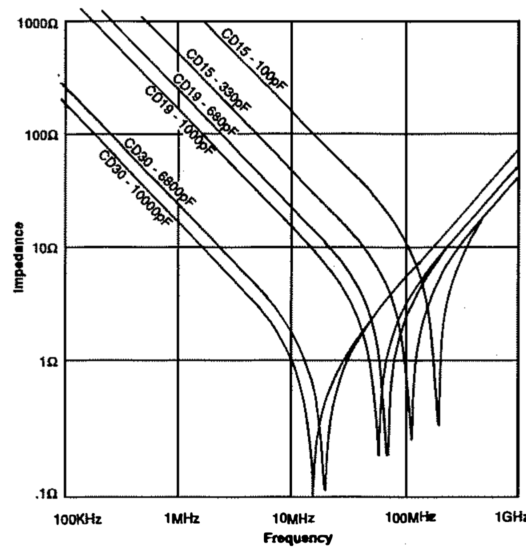
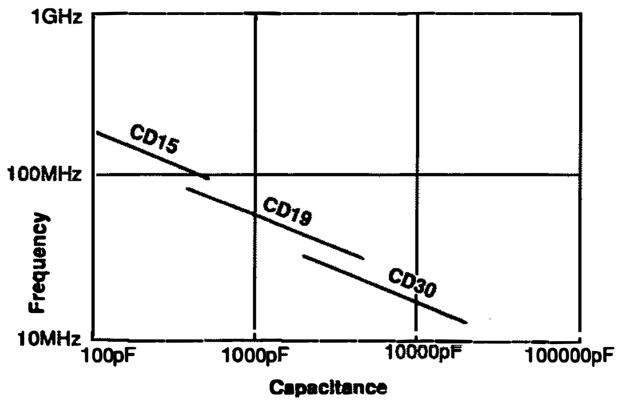
Capacitance vs. Temperature



Impedance vs. Frequency



Self-Resonant Frequency



Kit of 64 popular ratings Kit #5

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