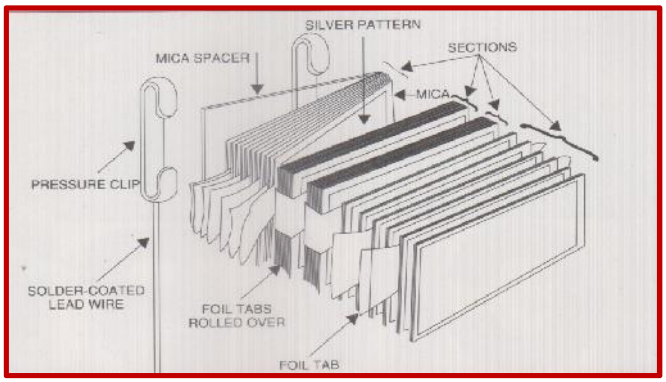
DIPPED MICA CAPACITOR

Mica capacitors are as near to the perfect model of a capacitor as one can as one can acquire commercially. Schematically the DM capacitor is classic combination of flat mica dielectric and the extended conductive metal foil on each surface, electricaly it is hard to beat. It has been said that if all other capacitors suddenly evaporated and only the mica was left, mica could do any risk. Of course this is not very practical because electronic economics would take a terrible beating. But here we have the second oldest capacitor known to man (the Leyden jar is less than one year older) and the mica capacitor hangs in there doing its assigned tasks.



Why is the mica capacitor so good?
One needs to look no further than the basic dielectric. Mica is a inert inorganic material, formed million of years ago by the awesome pressure of the earth's creation. Mica is a exceptional stable material and this stability which makes mica so desirable in capacitors.

Stability is what makes the mica so widely used in RF circuitry. Once selected and installed, mica stays there doing its job. This is also one of the reasons micas are widely specified in precision instruments and provides rock solid stability and there is another point, accuracy. Capacitance tolerance to ± 0.5 % are available at a very little extra expense (above 100 pF, of course) .

The dipped mica capacitor is made of a series of thin mica sheets with pure silver deposited on each side in precise pattern and location. The sheets are then stacked with conductive foil between each sheet. The extension of foil is folded towards one end the entire stack clamped under pressure. The terminals take off in direction from the stack to form a 'radial' configuration. The stack is soldered to yield improved performance at the higher frequencies. The soldered units are vacuum impregnated with a specially selected low-loss epoxy resin. Multiple coats of powder epoxy are applied using the fluidized bed system which yields superior environmental protection.

CMR exercise close control on the quality of mica from the stage of extraction from the mines, thus ensuring the use of only the finest quality of mica for the capacitors.
Careful desgin and the latest manufacturing techniques make possible the high reliability characteristics, required in the most critical applications.

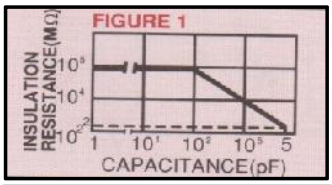
Lead Wire Material:
Tin-plated electric annealed copper wire.

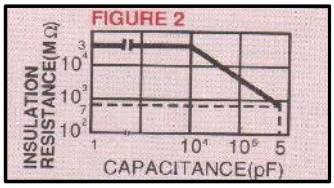
Solder Ability
When immersed in molten solder for 2 ± 0.5 seconds at 230 ± 5° C, at least 75 percent of the led wire shall be covered with a new smooth solder coating.

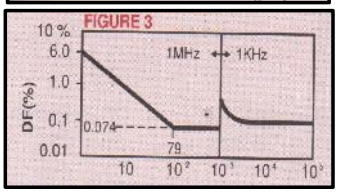
Operating Temperature Range
-55° C to + 125° C

Withstanding Voltage
200 % of the rated voltage shall be applied for 1 to 5 seconds. The limiting value of surge current should not be exceeding 50 mA.

Insulation Resistance
When measured at 50±5V for capacitors rated at 50 V or at 100 ± 10 V for those of other ratings, the insulation resistance shall exceed the value shown in Fig. 1.







Capacitance
When measured at1 MHz (for C<1,000 pF) or 1 KHz (for C >1,000 pF) and 1 - 5 Vrms, the capacitance shall be within the specified tolerance.

Dissipation factor
D factor shall not exceed the values shown in Fig. 3.

Vibration Grade
The capacitance shall be subjected to a harmonic motion having an amplitude of 1.5 mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. The entire frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute and the motion shall be applied for the period of 1 hour in each

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3 mutually perpendicular directions. After testing, electrical measurement shall be performed.
Insulation Resistance: Shall exceed the value shown in Fig. 2.
D Factor: Shall satisfy the value in Fig. 3.
Capacitance Change: shall not exceed ± 1% or 1 pF, whichever is greater.

Soldering Heat Resistance
Immerging both leads within 2 - 2.5 mm of the capacitor in the molten solder for 3 ± 0.5 seconds at at 270 ± 5° C
Withstanding Voltage: Capacitors shall withstand twice the rated voltage for 1 to 5 seconds without damage arcing or break down.
Capacitance Change: shall not exceed ± 1% or 1 pF, whichever is greater.

Moisture Resistance
Capacitors shall be subjected to a temperature of 40 ± 2° C at 90 - 95 % relative humidity for 240 ± 8 hours.
Withstanding Voltage: Capacitors shall withstand twice the rated voltage for 1 to 5 seconds without damage arcing or break down.
Insulation Resistance: Shall not be less than the value shown in Fig. 2.
Dissipation Factor: Shall not exceed 150 % of the value in Fig. 3
Capacitance Drift: shall not exceed ± 1% or 1 pF, whichever is greater.

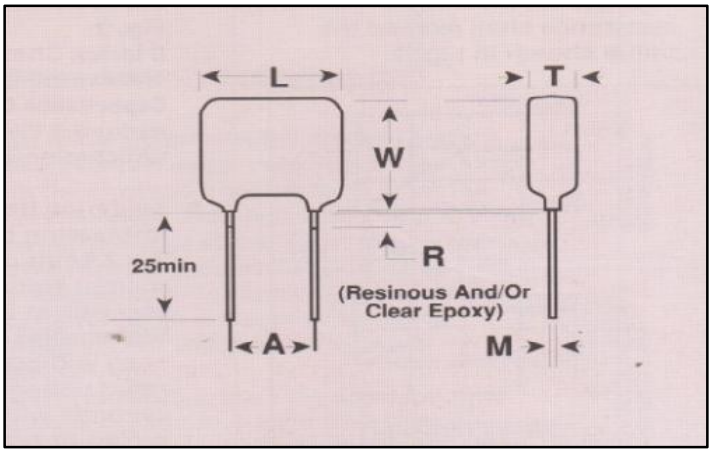
Thermal Shock and Immersion Cycling
After 5 cycles of temperature sequence: - 55 +0/-3 °C (30 min) - room temperature (3 minutes max.) + 125+3/-0 °C (30 min) - room temperature (3 min. max.) Capacitor shall be subjected to 2 cycles of immersion sequence:
65 +5/-0 °C for 15 minutes and 0 ± 3 °C saturated salt solution for 15 minutes. Afterward, capacitors shall be washed in running water, wiped off and kept it normal temperature prior to measurement.
Visual Examination: There shall be no crack & other damage.
Withstanding Voltage: Capacitors shall withstand twise the rated voltage for 1 to 5 seconds without damage, arcing or break down.
Insulation Resistance: Shall not be less than the value shown in Fig. 2.
Dissipation Factor: Shall not exceed 150 % of the value in Fig. 3
Capacitance Drift: shall not exceed ± 1% or 1 pF, whichever is greater.

Life
Capacitors shall be subjected to a temperature of 125 °C with 150 % of rated voltage for 200 +48/-0 hours.after testing the following requirement should be satisfied.
Visual Examination: There shall be no crack or other mechanical damage.
Withstanding Voltage: Capacitors shall withstand twice the rated voltage for 1 to 5 seconds without damage arcing or break down.
Insulation Resistance: Shall not be less than the value shown in Fig. 1.
Dissipation Factor: Shall not exceed 150 % of the value in Fig. 3
Capacitance Drift: shall not exceed ±3% for characteristic C & ±2% for characteristic D,E,F or 1 pF, whichever is greater.

Moisture Resistance
Capacitors shall be subjected to a temperature of 40 ± 2° C at 90 - 95 % relative humidity with rated votage applied for 500 +48/-0 hours. After being maintained at normal tempereture & humidity for a period of 4 to 24 hours, the following requirements shall be satisfied.
Visual Examination: There shall be no crack and other mechanical damage.
Withstanding Voltage: Capacitors shall withstand twice the rated voltage for 1 to 5 seconds without damage, arcing or break down.
Insulation Resistance: Shall not be less than the value shown in Fig. 2.
Dissipation Factor: Shall not exceed twice the value in Fig. 3
Capacitance Drift: shall not exceed ± 1% or 1 pF, whichever is greater.

D I M E N S I O N A L D E T A I L S

Dimensions			
Size	**A** ± 0.7	**M**	**R** Max.
DM05	3.0	0.4	3.2
DM10	3.5	0.4	3.2
DM15	6.0	0.6	3.2
DM19	9.0	0.8	3.6
DM20	11.0	0.8	3.6
DM30	11.0	1.0	4.4
DM42	27.0	1.0	4.4



Applicable Temperature Characteristic					
Capacitance pF	**D** (±0.5pF)	**F** (±1 %)	**G** (±2 %)	**J** (± 5 %)	**K** (± 10 %)
0 - 3	C	-	-	-	-
5 - 10	C	-	-	-	C
12 -18	C	-	-	C	C
20 - 24	-	-	-	CDE	CDE
27 - 47	-	-	CDE	CDE	CDE
51 - 82	-	CDE	CDE	CDE	CDE
> 91	-	CDEF	CDEF	CDEF	CDEF

Applicable Temperature Characteristic					
Capacitance pF	**D** (±0.5	**F** (±1 %)	**G** (±2 %)	**J** (± 5 %)	**K** (± 10 %)
0 - 3	C	-	-	-	-
5 - 10	C	-	-	-	C
12 -18	C	-	-	C	C
20 - 24	-	-	-	CDE	CDE

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DM 05

Maximum Dimensions

Capacitance (pF)	300 WV			100 WV			50 WV		
	L	W	T	L	W	T	L	W	T
5 - 82	7.1	7.1	4.6	7.1	7.1	4.6	7.1	7.1	4.0
9 - 160	7.4	7.4	4.9	7.4	7.4	4.9	7.1	7.1	4.0
180 - 330	7.6	7.6	5.1	7.6	7.6	5.1	7.1	7.1	4.6
360 - 430	-	-	-	7.6	7.6	5.1	7.4	7.4	4.9

DM 10

Maximum Dimensions

Capacitance (pF)	500 WV			300 WV			100 WV		
	L	W	T	L	W	T	L	W	T
1 - 24	9.2	8.4	4.8	9.2	8.4	4.8	9.2	8.4	4.8
27 - 75	9.4	8.6	4.9	9.4	8.6	4.9	9.4	8.6	4.9
82 - 110	9.4	8.9	5.1	9.4	8.6	5.1	9.4	8.6	4.9
120 - 160	9.7	9.1	5.3	9.7	8.9	5.1	9.4	8.9	5.1
180 - 270	9.9	9.6	5.6	9.9	9.5	5.6	9.7	9.5	5.4
300 - 360	-	-	-	9.9	9.9	5.8	9.9	9.7	5.6

DM 15

Maximum Dimensions

Capacitance (pF)	500 WV			300 WV			100 WV		
	L	W	T	L	W	T	L	W	T
1 - 62	11.4	9.1	4.3	11.4	9.1	4.3	11.4	9.1	4.3
68 - 100	11.7	9.1	4.6	11.7	9.1	4.6	11.7	9.1	4.6
110 - 240	11.7	9.6	5.1	11.7	9.6	5.1	11.7	9.6	5.1
270 - 430	12.0	9.9	5.3	11.7	9.6	5.1	11.7	9.6	5.1
470 - 620	12.2	10.4	5.9	11.7	9.6	5.1	11.7	9.6	5.1
680 - 750	12.7	10.9	6.4	12.0	9.9	5.3	12.0	9.9	5.3
820 - 910	-	-	-	12.0	10.2	5.6	12.0	10.2	5.6
1000 - 1200	-	-	-	12.7	10.9	6.4	12.4	10.7	6.1
1300 - 1500	-	-	-	-	-	-	12.7	11.0	6.4

DM 19

Maximum Dimensions

Capacitance (pF)	500 WV			300 WV			100 WV		
	L	W	T	L	W	T	L	W	T
47 - 330	16.3	12.7	4.8	16.3	12.7	4.8	16.3	12.7	4.8
360 - 470	16.3	12.9	5.1	16.3	12.9	5.1	16.3	12.9	5.1
510 - 620	16.5	12.9	5.1	16.5	12.9	5.1	16.5	12.9	5.1
680 - 910	16.5	12.9	5.3	16.5	12.9	5.3	16.5	12.9	5.3
1000 - 1100	16.5	13.2	5.6	16.5	13.2	5.6	16.5	13.2	5.6
1200 - 1300	16.8	13.2	5.6	16.8	13.2	5.6	16.8	13.2	5.6
1500 - 1600	16.8	13.5	5.8	16.8	13.5	5.8	16.8	13.5	5.8
1800 - 2000	17.0	13.5	6.1	17.0	13.5	6.1	17.0	13.5	6.1
2200 - 2400	17.0	13.7	6.6	17.0	13.7	6.6	17.0	13.7	6.6
2700 - 3000	17.3	14.0	7.1	17.0	13.7	6.6	17.0	13.7	6.6
3300 - 3600	17.3	14.2	7.6	17.3	13.7	6.9	17.3	13.7	6.9
3900 - 4300	17.5	14.5	8.4	17.3	14.0	7.1	17.3	14.0	7.1
4700 - 5100	18.0	15.0	9.4	17.3	14.0	7.6	17.3	14.0	7.6
5600 - 6800	-	-	-	17.5	14.5	8.4	17.5	14.5	8.4
7500 - 8200	-	-	-	-	-	-	17.8	14.7	8.9

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DM 20

Maximum Dimensions

Capacitance (pF)	500 WV			300 WV			100 WV		
	L	W	T	L	W	T	L	W	T
47 - 620	19.0	12.7	4.8	19.0	12.7	4.8	19.0	12.7	4.8
680 - 1200	19.0	13.0	5.1	19.0	13.0	5.1	19.0	13.0	5.1
1300 - 1600	19.3	13.0	5.3	19.3	13.0	5.3	19.3	13.0	5.3
1800 - 2200	19.3	13.2	5.6	19.3	13.2	5.6	19.3	13.2	5.6
2400 - 3000	19.6	13.7	6.9	19.6	13.7	6.9	19.6	13.7	6.9
3300 - 3600	19.8	14.0	7.4	19.6	13.7	6.9	19.6	13.7	6.9
3900 - 4300	19.8	14.2	7.9	19.6	13.7	6.9	19.6	13.7	6.9
4700 - 5100	20.1	14.5	8.4	19.8	14.0	7.1	19.8	14.0	7.1
5600 - 6200	20.1	14.7	8.9	19.8	14.2	7.6	19.8	14.2	7.4
6800 - 7500	20.3	15.2	9.9	20.1	14.5	8.4	19.8	14.2	7.6
8200 - 10000	20.8	16.0	11.4	20.3	15.0	9.4	20.1	14.5	8.6
11000 - 12000	-	-	-	20.6	15.2	10.2	20.3	14.7	9.1
13000 - 15000	-	-	-	-	-	-	20.6	15.2	10.2
16000 - 18000	-	-	-	-	-	-	20.8	15.7	11.2

DM 30

Maximum Dimensions

Capacitance (pF)	500 WV			300 WV			100 WV		
	L	W	T	L	W	T	L	W	T
470 - 1000	19.3	21.3	5.8	19.3	21.3	5.8	19.3	21.3	5.8
1100 - 2000	19.6	21.6	6.1	19.6	21.6	6.1	19.6	21.6	6.1
2200 - 3000	19.6	21.8	6.3	19.6	21.8	6.3	19.6	21.8	6.3
3300 - 3900	19.6	21.8	6.6	19.6	21.8	6.6	19.6	21.8	6.6
4300 - 5100	19.8	21.8	7.1	19.8	21.8	6.9	19.8	21.8	6.9
5600 - 6800	19.8	22.1	7.6	19.8	21.8	6.9	19.8	21.8	6.9
7500 - 9100	20.1	22.3	8.4	19.8	22.1	7.1	19.8	22.1	7.1
10000 - 12000	20.3	22.6	9.1	20.1	22.1	7.1	20.1	22.3	7.9
13000 - 15000	20.6	22.9	9.9	20.1	22.3	8.4	20.1	22.3	8.4
16000 - 18000	20.8	23.1	10.9	20.3	22.6	9.1	20.3	22.6	9.1
20000 - 22000	21.3	23.6	12.2	20.6	22.9	9.9	20.6	22.6	9.4
24000 -30000	-	-	-	21.1	23.4	11.7	20.8	23.1	10.7
33000 - 36000	-	-	-	-	-	-	21.1	23.4	11.4
39000 - 40000	-	-	-	-	-	-	21.3	23.4	11.9

DM 42

Maximum Dimensions

Capacitance (pF)	500 WV			300 WV			100 WV		
	L	W	T	L	W	T	L	W	T
16000 - 18000	35.8	22.1	7.4	35.8	22.1	7.4	35.8	22.1	7.1
20000 - 22000	36.1	22.1	7.6	36.1	22.1	7.4	35.8	22.1	7.4
24000 -327000	36.3	22.3	7.6	36.1	22.3	7.9	35.8	22.1	7.9
30000 - 36000	36.8	22.9	9.6	36.6	22.6	8.9	36.1	23.3	7.9
39000 - 43000	37.1	23.1	10.7	36.8	22.9	9.4	36.3	23.3	8.4
47000 - 51000	37.6	23.4	11.9	37.1	22.9	10.2	36.6	22.6	9.1
56000 - 68000	-	-	-	37.6	23.4	11.9	37.1	22.9	10.4
75000 - 82000	-	-	-	-	-	-	37.6	23.4	12.7
91000 - 10000	-	-	-	-	-	-	38.1	23.9	12.7