

CHARCROFT ELECTRONICS



mica capacitors SPECIFICATION GUIDE

MICA CAPACITORS SPECIFICATION GUIDE

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INTRODUCTION

Charcroft Silvered Mica Capacitors are designed and manufactured to the highest standards. Intended for applications in professional and military equipment, these quality components are available in standard ranges in resin moulded and resin dipped formats. Resin moulded capacitors are made in axial and radial configurations and resin dipped in radial only. For special applications such as pulse-forming networks, high-current and high-frequency circuits Charcroft manufacture special silvered Mica Capacitors to precise customer requirements.

There is a whole range of technical advantages to be gained through the use of Charcroft Mica Capacitors

including: circuit stability over full equipment life, small size, high insulation resistance, low value through to high value capacitance (4 to 100,000pF as standard – higher values are available on request), low capacitance change with temperature, high Q, and high resistance to radiation (gamma rays in atomic plants) for aircraft and missile equipments.

They are available for applications demanding high quality and precision such as oscillator, logic and transmission circuits, d.c. voltage blocking, filters, delay lines and pulse forming networks.

CUSTOM MICA CAPACITORS

- **High Voltage**

Up to 1000V at 100°C is standard in most of the listed sizes. Higher voltages are available to special order.

- **High Frequency/High Current**

The currents passing through capacitors in certain circuits are significantly higher than shown in the power rating table. To cater for these onerous duties special units are designed from the loading information, supplied by the customer.

- **High Temperature**

All the materials used in our capacitors will operate at 100°C and in certain designs up to 250°C.

- **Capacitance Selection**

Normal marking is of capacitance and tolerance. Capacitors can be individually marked with the exact capacitance value.

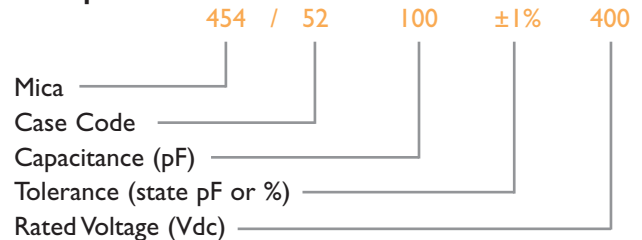
- **Pulse**

This is a more onerous duty than steady state high voltage. Special designs are available.

ORDERING INSTRUCTIONS

- **Resin Moulded and Dipped Mica Capacitors**

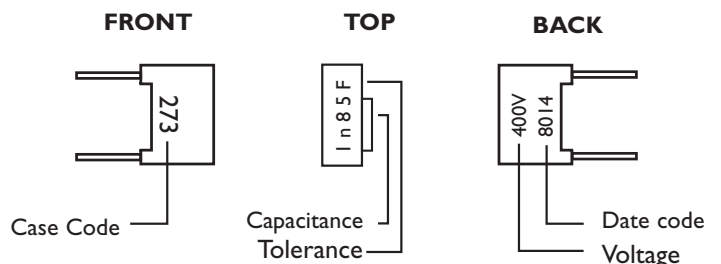
Example



- **Marking**

All capacitors are marked with capacitance value, tolerance and d.c. rated voltage. The decimal point and unit of capacitance are represented by the letters 'p' (picoFarads) or 'n' (nano Farads). Moulded types are supplied with date code CEL logo and case size. Customers' individual requirements including top edge coding of capacitance are available on request.

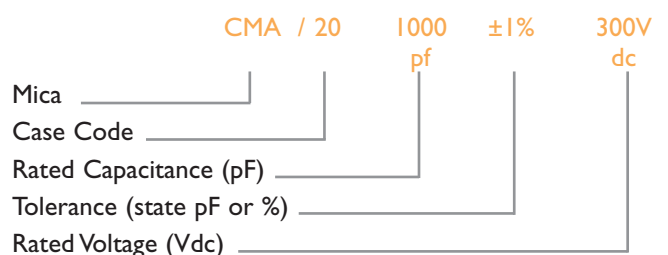
Typical Coding of Moulded Radial Capacitor



- **Mil Style Mica Capacitors**

The CM and DM range styles have markings in accordance with BS CECC 31300 Clause 1.4.

Ordering information



QUICK REFERENCE GUIDE

• Key

* See main body of catalogue for breakdown of voltages and associated pF ranges applicable here.

RESIN DIPPED RADIAL

Charcrott. Product Code	Voltages Offered	Temperature Range	Capacitance Range over all voltages*	Wire Spacing
49	100; 125; 250; 400	-55° to + 100°C	4 to 800	5.1
50	100; 125; 250; 400	-55° to + 100°C	4 to 1000	7.6
51	100; 125; 250; 400	-55° to + 100°C	6 to 10000	7.6
52	100; 125; 250; 400	-55° to + 100°C	6 to 10000	10.2
53	100; 125; 250; 400	-55° to + 100°C	2000 to 20000	15.2
54	125; 400	-55° to + 100°C	10000 to 30000	20.3
250	125; 400	-55° to + 100°C	4 to 6000	10.2

RESIN MOULDED RADIAL

Charcrott. Product Code	Voltages Offered	Temperature Range	Capacitance Range over all voltages*	Wire Spacing
60	100; 125; 250; 400	-55° to + 100°C	4 to 300	5.1
61	100; 125; 250; 400	-55° to + 100°C	101 to 1000	5.1
62	100; 125; 250; 400	-55° to + 100°C	4 to 2000	7.6
63	100; 125; 250; 400	-55° to + 100°C	251 to 2000	7.6
65	100; 250; 400	-55° to + 100°C	4.7 to 820	5.1
66	100; 250; 400	-55° to + 100°C	821 to 1800	5.1
67	100; 250; 400	-55° to + 100°C	4 to 680	5.1
68	100; 250; 400	-55° to + 100°C	4 to 1500	5.1
273	100; 125; 250; 400	-55° to + 100°C	4 to 3000	10.2
274	100; 125; 250; 400	-55° to + 100°C	2001 to 10000	10.2
275	100; 125; 250; 400	-55° to + 100°C	5001 to 22000	10.2
276	100; 125; 250; 400	-55° to + 100°C	8001 to 33000	10.2
22	100; 125; 250; 400	-55° to + 100°C	4 to 2000	10.2
23	100; 125; 250; 400	-55° to + 100°C	1001 to 5000	10.2
28	100; 125; 250; 400	-55° to + 100°C	5001 to 50000	15.2
31	100; 125; 250; 400	-55° to + 100°C	5001 to 50000	15.2
36	100; 125; 250; 400	-55° to + 100°C	10000 to 60000	20.3
41	100; 250; 400	-55° to + 100°C	10000 to 100000	30.5

RESIN MOULDED AXIAL

Charcrott Product Code	Voltages Offered	Temperature Range	Capacitance Range over all voltages*	Wire Spacing
46	100; 125; 250; 400	-55° to + 100°C	4 to 300	-
47	100; 125; 250; 400	-55° to + 100°C	4 to 1000	-
4880	100; 125; 250; 400	-55° to + 100°C	4 to 1000	-
4881	100; 125; 250; 400	-55° to + 100°C	251 to 2000	-
4882	100; 125; 250; 400	-55° to + 100°C	4 to 5000	-
4885	100; 125; 250; 400	-55° to + 100°C	4 to 10000	-
4886	100; 125; 250; 400	-55° to + 100°C	5001 to 50000	-
4887	100; 125; 250;	-55° to + 100°C	5001 to 100000	-
4888	100; 125; 250;	-55° to + 100°C	10000 to 100000	-

MIL STYLE – DM STYLE RADIAL

Charcrott Product Code	Voltages Offered	Rated Temperature	Capacitance Range over all voltages*	Wire Spacing
DM 10	300; 500	125°C	4 to 300	See p.9
DM 15	300; 500	125°C	4 to 820	
DM 19	300; 500	125°C	430 to 8100	
DM 20	300; 500	125°C	150 to 12000	
DM 30	300; 500	125°C	2000 to 30000	

MIL STYLE – CME STYLE AXIAL

Charcrott Product Code	Voltages Offered	Rated Temperature	Capacitance Range over all voltages*	Wire Spacing
CME 15	300; 500	100°C	10 to 619	-
CME 20	300; 500	100°C	470 to 5100	-
CME 30	300; 500	100°C	470 to 12000	-
CME 35	300; 500	100°C	7501 to 16000	

Boxed Radials (HF Power)

Charcrott Product Code	Voltages Offered	Temperature Range	Capacitance Range over all voltages*	Wire Spacing
CS 12	300; 500; 1000	-55°C to +125°C	10 to 3500	27.9

TECHNICAL SUMMARY

SPECIFICATIONS

ENVIRONMENTAL CLASSIFICATION

Resin Moulded	55/100/21
Resin Dipped	55/100/4
Mil Style Dipped	55/125/21
Mil Style Moulded	55/100/21

CATEGORY TEMPERATURE RANGE

Resin Moulded	-55°C to -100°C	Rated Temperature 70°C
Resin Dipped	-55°C to -100°C	Rated Temperature 70°C
Mil Style Moulded	-55°C to -100°C	Rated Temperature 100°C
Mil Style Dipped	-55°C to -125°C	Rated Temperature 125°C
Low Air Density		2kN/m ²
Vibration - Frequency		10 to 2,000 Hz
- Displacement		0.75mm
- Acceleration		98m/s ² (10g)
- Duration		6 hours
Bumping - Acceleration		390m/s ²
- No. of bumps		4,000
Solderability (BS 2011 Test 2T)		2 secs without ageing 3 secs with ageing
Resistance to soldering heat		350°C for 3 seconds

DC VOLTAGE RATINGS

	Resin Moulded and Resin Dipped				Mil Style		
Rated Voltages (Ur)	(V)	100	125	250	400	300	500
Category Voltages Uc	(V)	63	80	160	250	-	-
Proof test Voltages	(V)		3 Ur		2 Ur	2 Ur	2 Ur

Minimum insulation resistance **BS 9070**

≤ 0.04μF - - 25000 MΩ

> 0.04μF - - 1000 ΩF

Maximum dissipation factor, Tan δ

≥4 pF to ≤ 100 pF measured at 100 kHz - - - 0.002

>100pF to ≤1000pF measured at 100 kHz - - 0.001

>1000pF measured at 1 kHz - - - - - - - - 0.001

CECC 31 301

≤10000pF - - 100000 MΩ

>10000pF - - 1000 ΩF

<10 pF measured at 100 kHz - - - - - - - 0.005

>10 to ≤25pF measured at 100 kHz - - - 0.003

>25 to ≤100pF measured at 100 kHz - - 0.002

>100 to ≤1000pF measured at 100 kHz - 0.001

RESIN DIPPED AND RESIN MOULDED

Temperature coefficient of capacitance (-55°C to +100°C)

Capacitance range pF	Test frequency kHz	Temperature Coefficient PPM/°C
>50 to ≤100	100	-20 to +100
>100 to ≤1000	100	-20 to +50
>1000	1	-20 to +50

MIL STYLE

Temperature coefficient of capacitance (-55°C to +100°C Axial Moulded +125°C Radial Dipped)

Capacitance pF	Temperature Coefficient 10 ⁻⁶ /°C	Cyclic Drift
50≥C _R	-200 to +200	±(0.5% +0.1 pF)
50<C _R ≤100	-100 to +100	±(0.3% +0.1 pF)
100<C _R ≤500	-20 to +100	±(0.1% +0.1 pF)
500<C _R	- 0 to + 70	±(0.05% +0.1 pF)

Construction Data

Manufactured from superior quality mica plates with fire-on silver electrodes, Charcroft Mica Capacitors have fully bonded plates which are further reinforced by edge-bonding. Terminal wires are securely soldered to the reinforced area with a high melting-point solder. To provide a high degree of humidity and mechanical protection, all capacitors are encapsulated in thermo-setting resin, or high temperature thermoplastic.

Robustness of terminations

These are specially designed and manufactured to our own unique specification to ensure safe handling, installation and use in equipment. Solder-coated copper-wire terminations are incorporated in all Charcroft silvered Mica requirements to meet the robustness of termination requirements of BS 2011.

Resistance to solvents

The encapsulation and coding materials used in the manufacture of mica capacitors are specially selected to withstand the solvents commonly employed for cleaning and flux removal in PCB applications.

Circuit Design Considerations

All Charcroft silvered mica capacitors are, as their name implies, manufactured on a base dielectric of mica. As an inert inorganic natural material which is as old as the earth itself, mica provides circuit designers with the highly desirable quality of long-term stability.

Temperature changes in terms of ppm/°C are small. For precise figures, see individual capacitor type sections.

Capacitance change with time in comparison with other dielectric types is very low – better than 0.01% after one year of operation.

Changes in dissipation factor (tan δ) with temperature are very small.

Another benefit of Charcroft silvered mica capacitors, is good Q at high frequencies, this results from the constructional features of these components, and the basic quality of the raw materials used.

Moulded radial capacitors are provided with stand-off feet to ensure stability during flow soldering, and to prevent moisture traps between the components and the PCB. In addition, flux vapours have plenty of space to escape, preventing blow holes in the soldered joints.

The Charcroft modular range (Codes 273-276) are designed specifically for circuit boards, to give a fixed capacitor height and lead spacing over a wide capacitance range of 4 to 33,000pF.

The physical shape – rectangular – of resin moulded units, ensures optimum economy of space on PCB's and in potted circuits.

The Charcroft miniature moulded range and the Mil Styles DME 10 and DME 15 have been designed such that they can be packaged on tape and reel for automatic insertion.

Typical Performance

Dissipation Factor ($\tan \delta$) at 1 kHz

at	-30°C	2×10^{-4}
at	+20°C	3×10^{-4}
at	+70°C	5×10^{-4}

Temperature coefficient of capacitance

$+20 \pm 15 \text{ ppm/}^\circ\text{C}$

Capacitance change with frequency between

1 kHz and 400 kHz 0.1%

Insulation resistance of 500 pF capacitor after

1 min electrification

at 20°C $1 \times 10^6 \text{ M}\Omega$

Long term stability 0.03%

Power Ratings for Resin

Moulded Capacitors

Notes

1. The maximum current depends on edge connections and electrodes, so for each physical design, the factors are different and are expressed as mA/pF.

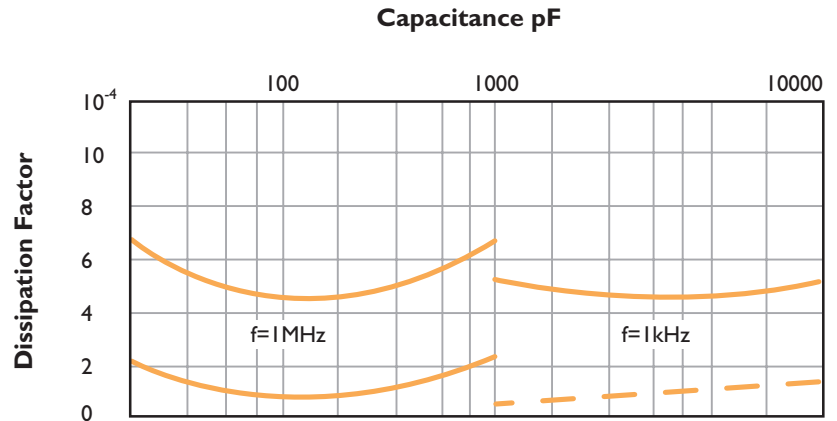
2. The flow of current will produce internal heating, and the application of voltage to give this current creates dielectric losses. The dissipation of heat depends on local conditions, but as a simple guide, the values shown will produce a temperature rise of about 10°C in ambients up to 85°C . Some de-rating would be required above 85°C .

3. In estimating the power rating of a capacitor, both current and VA (volts x amps) limits must be met.

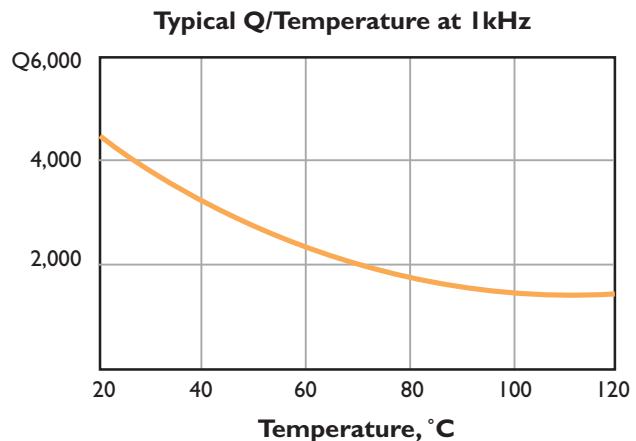
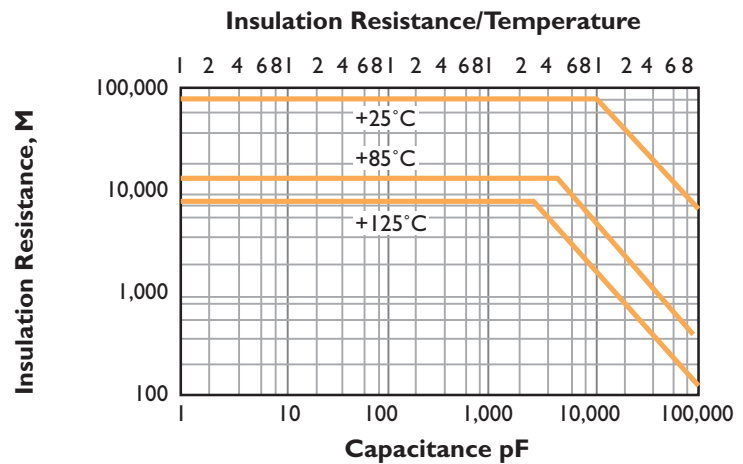
4. The alternating voltage must not exceed the ionisation inception level, which can be as low as 200V rms. Also the peak/peak value of the alternating wave must not exceed the d.c. rated voltage.

RoHS Compliance

All parts supplied as standard are NON RoHS compliant. If you require RoHS compliant parts please ask the sales desk for availability.



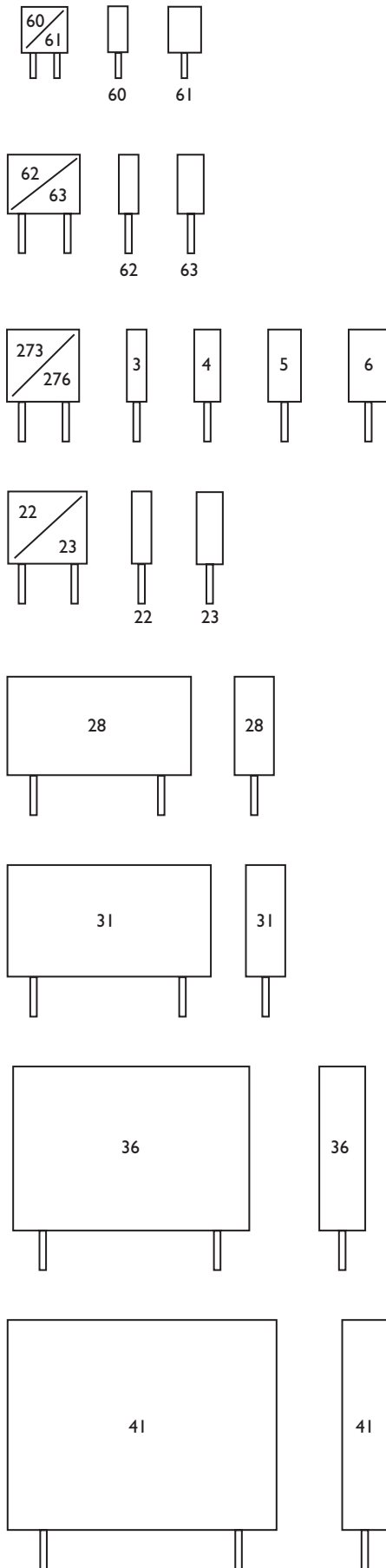
70% of all capacitors fall within the hatched area of the above curve



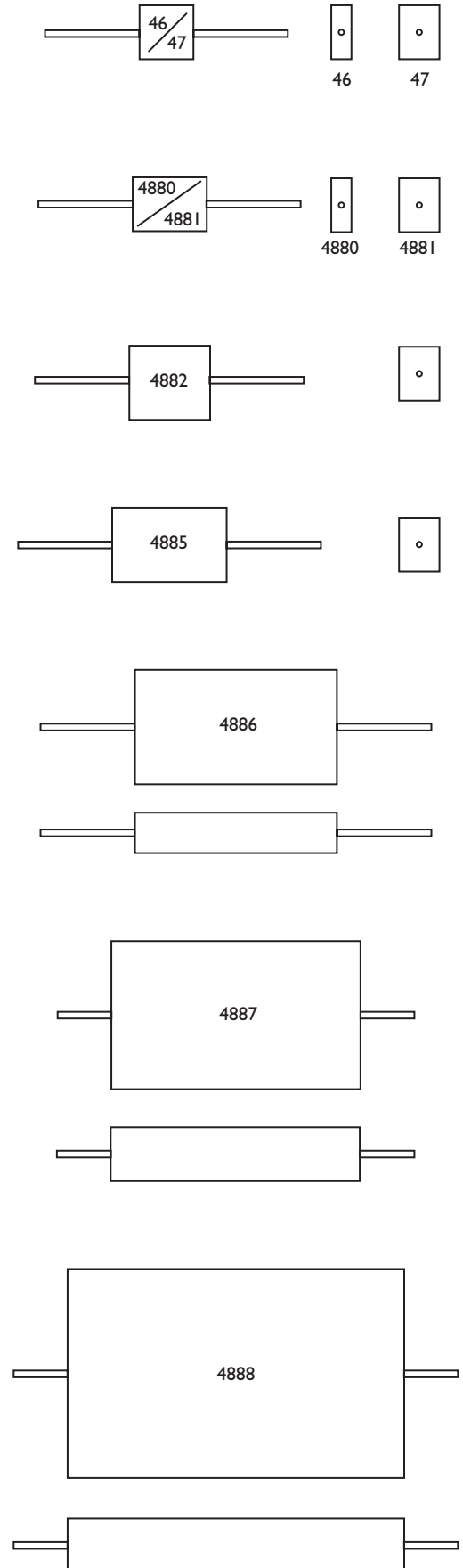
Case Size	Max VA	Max Current mA/pF
60	50	
61	60	1.6
62	70	1.0
63	80	
22	80	0.6
23	100	
273	100	
274	120	0.5
275	140	
276	160	
31	340	0.3
36	520	0.16
41	820	0.12

SIZE GUIDE

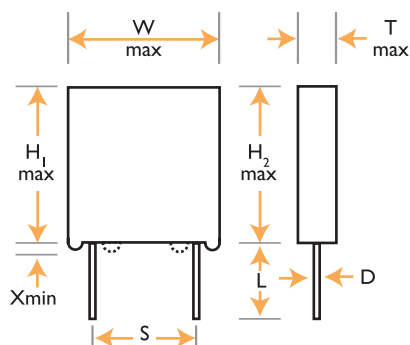
MOULDED RADIAL



MOULDED AXIAL



MOULDED RADIAL



L:25mm nom. Other lengths to special order.

PRODUCT DATA

Capacitance Tolerance

<100pF±pF	Standard
≥100pF±1%	
<100pF±1/2pF	To Special
≥100pF±1/2%	Order

NB. For those applications not requiring close tolerance, capacitors can be supplied up to ±5%.

Typical Performance

Dissipation Factor (tan δ) at 1kHz	
at -30°C	2×10^{-4}
at +20°C	3×10^{-4}
at +70°C	5×10^{-4}
Temperature coefficient of capacitance	+20±15ppm/°C
Capacitance change with frequency between 1 kHz and 400 kHz	0.1%
Insulation resistance of 500 pF capacitor after 1 min electrification at 20°C	$1 \times 10^6 M\Omega$

Category Temperature Range

-55°C to +100°C

Environmental Classification

Resin Moulded 55/100/21

Charcroft miniature moulded capacitors have been designed for PCB application when space is a premium. All units have been designed with a nominal 5.0mm minimum spacing and can be supplied on tape and reel for automatic insertion if required.

MOULDED RADIAL CAPACITOR DATA

Charcroft Product Reference Code	Dimensions (mm)						
	W	H1	H2	X	T	S*	D
62	12.0	8.8	9.2	0.3	3.6	7.6	0.6
63					5.2		
273					3.4		
274	12.7	12.2	12.5	0.4	5.3	10.2 ±0.3	0.6
275					7.8		
276					10.4		
22	13.2	9.9	10.3	0.3	3.6	10.2	0.6
23					5.2		
28	26.0	15.2	16.2	0.8	7.5	15.2	0.8
31	30.0	17.8	18.8	0.8	6.8	15.2	0.8
36	32.8	25.4	26.4	0.8	8.5	20.3	0.8
41	44.2	31.8	32.8	0.8	8.5	30.5	0.9

*Tolerance on S: ±0.4 except where otherwise stated.

Charcroft Product Reference Code

Capacitance Range in pF for DC Voltages of

Reference Code	Ur at 70°C		Uc at 100°C
	100/125V	400V	
	63/80V	250V	
62	251 to 2000	4 to 250	
63	1001 to 2000	251 to 1000	
273	2001 to 3000	4 to 2000	
274	3001 to 10000	2001 to 5000	
275	10001 to 22000	5001 to 8500	
276	22001 to 33000	8501 to 13000	
22	1001 to 2000	4 to 1000	
23	2001 to 5000	1001 to 3000	
28	7001 to 50000	5001 to 22000	
31	20000 to 50000	5001 to 20000	
36	-	10000 to 60000	
41	-	30000 to 100000	

MINIATURE MOULDED RADIAL

MINIATURE MOULDED CAPACITOR DATA

Charcroft Product Reference Code	Dimensions (mm)						
	W	H1	H2	X	T	S*	D
60	8.9	7.6	8.0	0.3	3.6	5.1	0.5
61					5.2		
65	10.0	10.5	10.8	0.3	2.5	5.0	0.6
66	10.0	10.5	10.8	0.3	53.5	5.0	0.6
67	7.6	-	7.6	-	2.5	5.0	0.6
68	7.6	-	7.6	-	3.8	5.0	0.6

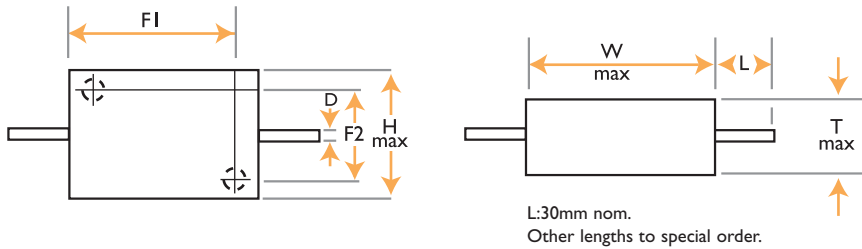
*Tolerance on S: ±0.4 except where otherwise stated

Charcroft Product Reference Code

Capacitance Range in pF for DC Voltages of

Reference Code	Ur at 70°C		Uc at 100°C
	100/125V	400V	
	63/80V	250V	
60	101 to 300	4 to 100	
61	301 to 1000	101 to 300	
65	-	4 to 820	
66	-	821 to 1800	
67	4 to 680	4 to 200	
68	4 to 1500	4 to 430	

MOULDED AXIAL



Charcroft Product

Capacitance Range in pF for DC Voltages of

Reference Code

Ur at 70°C
100/125V 400V
Uc at 100°C

Dimensions (mm)

	63/80V	250V	W	H	T	D
46	101 to 300	4 to 100	8.9	7.9	3.6	0.5
47	301 to 1000	101 to 300	8.9	7.9	5.2	0.5
4880	251 to 1000	4 to 250	12.0	9.2	3.6	0.6
4881	1001 to 2000	251 to 1000	12.0	9.2	5.2	0.6
4882	1001 to 5000	4 to 3000	13.2	10.3	5.2	0.6
4885	1000 to 10000	4 to 5000	18.3	11.9	6.0	0.8
4886	10000 to 50000	5001 to 20000	30.0	18.8	6.8	0.8
4887		5001 to 60000	38.5	23.4	8.33	0.9
4888		10000 to 100000	52.8	32.8	8.33	0.9

PRODUCT DATA

Capacitance Tolerance

<100 pF ± 1 pF	Standard
≥100 pF ± 1%	
<100 pF ± 1/2 pF	To Special
≥100 pF ± 1/2 %	Order

N.B. For those applications not requiring close tolerance, capacitors can be supplied up to ±5%.

Typical Performance

Dissipation Factor (tan δ) at 1kHz	
at -30°C	2 × 10 ⁻⁴
at +20°C	3 × 10 ⁻⁴
at +70°C	5 × 10 ⁻⁴
Temperature coefficient of capacitance	+20±15ppm/°C
Capacitance change with frequency between 1kHz and 400 kHz	0.1%
Insulation resistance of 500 pF capacitor after 1 min electrification at 20°C	1×10 ⁶ MΩ

Category Temperature Range

-55°C to +100°C

Environmental Classification

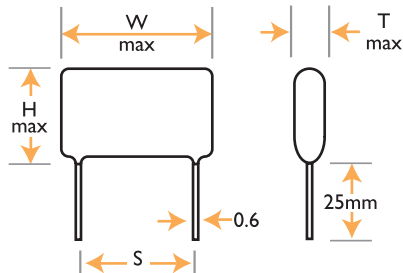
Resin Moulded 55/100/21

Variations Available

To special order on types 4887 and 4888 only. Two 6BA clearance holes can be provided.

Type	F1	F2
4887	31.8	16.0
4888	46.0	25.4

DIPPED RADIAL



Charcroft Product

Capacitance Range in pF for DC Voltages of

Dimensions (mm) relating to above

Reference Code

Ur at 70°C
125V 400V
Uc at 100°C
80V 250V

	80V	250V	W max	H max	T max	S ±1
49	4 to 1000	4 to 300	7.6	6.4	3.8	5.1
50	500 to 1000	4 to 500	10.4	10.8	4.8	7.6
51	6 to 2000	6 to 1000	13.0	12.2	4.8	7.6
	2001 to 6000	1001 to 2000	13.0	12.2	5.1	7.6
	6001 to 10000	2001 to 5000	13.0	12.2	6.5	7.6
52	2001 to 6000	6 to 2000	13.3	12.2	5.1	10.2
	6001 to 10000	2001 to 5000	13.3	12.2	6.5	10.2
53	10000 to 20000	2000 to 10000	27.9	21.1	5.8	15.2
54		10000 to 30000	30.5	28.7	9.1	20.3
250	4 to 3000	4 to 1800	13.3	9.0	3.5	10.2
	3001 to 4800	1801 to 2700	13.3	9.0	5.0	10.2
	4801 to 6000	2701 to 4000	13.3	9.0	6.4	10.2

PRODUCT DATA

Capacitance Tolerance

<100 pF ± 1 pF	Standard
≥100 pF ± 1%	
<100 pF ± 1/2 pF	To Special
≥100 pF ± 1/2 %	Order

N.B. For those applications not requiring close tolerance, capacitors can be supplied up to ±5%.

Typical Performance

Dissipation Factor (tan δ) at 1 kHz	
at -30°C	2 × 10 ⁻⁴
at +20°C	3 × 10 ⁻⁴
at +70°C	5 × 10 ⁻⁴
Temperature coefficient of capacitance	+20±15ppm/°C
Capacitance change with frequency between 1kHz and 400 kHz	0.1%
Insulation resistance of 500 pF capacitor after 1 min electrification at 20°C	1×10 ⁶ MΩ

Category Temperature Range

-55°C to +100°C

Environmental Classification

Resin Dipped 55/100/4

Termination

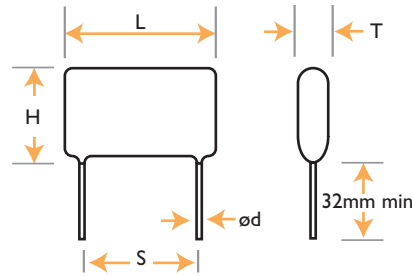
Solder coated copper wire. Cropped leads to 5mm min. to special order.

DIPPED RADIAL (MIL STYLE)

Description

High reliable mica capacitors with radial leads and multiple dipcoating ensuring high mechanical strength and excellent climatic performance. Careful selection of all raw materials and constant monitoring of processes and equipment ensures an overall uniform level of quality required by the stringent requirements of professional and military equipments.

Charcroft DM capacitors offer long term stability, close tolerance, small temperature coefficient of capacitance, and minimum losses (high Q factor). They have been designed for the following applications: logic and transmission circuits, pulse forming networks, delay lines, filters, d.c. voltage blocking, timing circuits, high reliable electronic instruments for flight electronics, measuring and test devices, navigation etc. The different sizes are in accordance with MIL Styles DM10, DM15, DM19, DM20, DM30 and DM42.



PRODUCT DATA

Capacitance Range

2.2 pF to 100,000 pF

Capacitance Tolerance

Cr ≤ 100 pF ± 1 pF Standard

Cr > 100 pF ± 1%, 2%, 5%

To Special Order

Cr ≤ 100 pF ± 0.5 pF

Cr > 100 pF ± 0.5%

Insulation Resistance

Cr < 10000 pF: R ins > 100000 MΩ

Cr > 10000 pF: RC ≥ 1000s

Rated Voltage 300 Vdc and 500 Vdc

Rated Temperature 125°C

Climatic category -55/125/21

Temperature Coefficient of Capacitance

Capacitance pF	Temperature Coefficient 10%/°C	Capacitance Drift
-------------------	--------------------------------------	----------------------

50 ≥ Cr -200 to +200 +(0.5%+0.1 pF)

50 < Cr ≤ 100 -100 to +100 +(0.3%+0.1 pF)

100 < Cr ≤ 500 -20 to +100 +(0.1%+0.1 pF)

500 < Cr -0 to +70 +(0.5%+0.1 pF)

Tangent of loss Angle

Capacitance pF	Tangent of loss angle	Measurement frequency
Cr < 10	0.005 max	100 kHz
10 ≤ Cr ≤ 25	0.003 max	100 kHz
25 < Cr ≤ 100	0.002 max	100 kHz
100 < Cr ≤ 1000	0.001 max	100 kHz
1000 < Cr	0.001 max	1 kHz

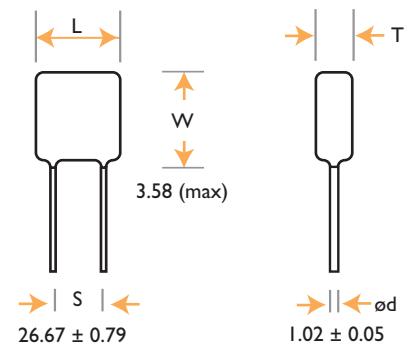
Capacitors rated at 500Vdc are suitable for use as 300Vdc rated devices

*Tolerance on wire diameter: -0.05mm+10%

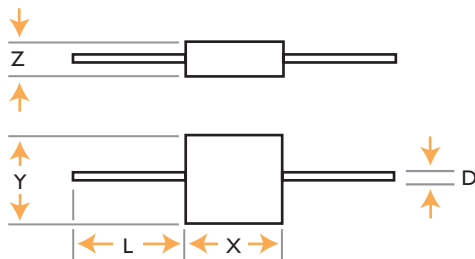
Charcroft Product Ref Code	Capacitance Range pF		Dimensions (mm)			S±0.4 Suffix A E		Ød* Suffix A E	
	Ur=300Vdc	Ur=500Vdc	L max	H max	T max				
DM10		4 to 68	9.1	8.3	4.8	3.6	5.0	0.4	0.5
		69 to 130	9.4	8.6	5.0	3.6	5.0	0.4	0.5
		131 to 180	9.6	9.1	5.3	3.6	5.0	0.4	0.5
		181 to 250	9.9	9.4	5.5	3.6	5.0	0.4	0.5
DM15		2.2 to 62	11.4	9.1	4.3	6.0	5.0	0.6	0.6
		63 to 130	11.4	9.1	4.5	6.0	5.0	0.6	0.6
		131 to 200	11.6	9.4	4.8	6.0	5.0	0.6	0.6
		201 to 240	11.6	9.6	5.0	6.0	5.0	0.6	0.6
	511 to 680	241 to 390	11.9	10.1	5.3	6.0	5.0	0.6	0.6
	681 to 750		11.9	10.1	5.5	6.0	5.0	0.6	0.6
	751 to 907		11.9	10.1	5.8	6.0	5.0	0.6	0.6
		391 to 470	12.1	10.1	5.8	6.0	5.0	0.6	0.6
		471 to 510	12.4	10.6	6.0	6.0	5.0	0.6	0.6
DM19		430 to 620	16.5	13.0	5.1	8.7	7.5	0.8	0.8
		621 to 910	16.5	13.0	5.3	8.7	7.5	0.8	0.8
		911 to 1300	16.8	13.2	5.6	8.7	7.5	0.8	0.8
		1301 to 1600	16.8	13.5	5.8	8.7	7.5	0.8	0.8
		1601 to 2000	17.0	13.5	6.1	8.7	7.5	0.8	0.8
		2001 to 2400	17.0	13.7	6.6	8.7	7.5	0.8	0.8
		2401 to 3600	17.0	14.2	7.6	8.7	7.5	0.8	0.8
	4300 to 5100	3601 to 4300	17.5	14.5	8.4	8.7	7.5	0.8	0.8
	6801 to 7400	4301 to 4700	17.8	14.7	8.9	8.7	7.5	0.8	0.8
	7401 to 8100	4701 to 5100	18.0	15.0	9.4	8.7	7.5	0.8	0.8
DM20		150 to 620	19.0	12.7	4.8	11.1	11.0	0.8	0.8
		621 to 1200	19.0	12.9	5.0	11.1	11.0	0.8	0.8
		1201 to 1600	19.0	12.9	5.3	11.1	11.0	0.8	0.8
		1601 to 2200	19.3	13.2	5.5	11.1	11.0	0.8	0.8
		2201 to 2400	19.5	13.4	6.3	11.1	11.0	0.8	0.8
		2401 to 2700	19.5	13.7	6.6	11.1	11.0	0.8	0.8
		2701 to 3000	19.5	13.7	6.8	11.1	11.0	0.8	0.8
		3001 to 3300	19.8	13.9	7.1	11.1	11.0	0.8	0.8
		3301 to 3600	19.8	13.9	7.3	11.1	11.0	0.8	0.8
		3601 to 3900	19.8	14.2	7.6	11.1	11.0	0.8	0.8
		3901 to 4300	19.8	14.2	7.8	11.1	11.0	0.8	0.8
		4301 to 4700	20.0	14.2	8.1	11.1	11.0	0.8	0.8
		4701 to 5100	20.0	14.4	8.3	11.1	11.0	0.8	0.8
		5101 to 5600	20.0	14.4	8.6	11.1	11.0	0.8	0.8
		5601 to 6200	20.0	14.7	8.8	11.1	11.0	0.8	0.8
		6201 to 6800	20.3	14.9	9.3	11.1	11.0	0.8	0.8
	10001 to 11000		20.3	14.9	9.6	11.1	11.0	0.8	0.8
		6801 to 7500	20.3	15.2	9.9	11.1	11.0	0.8	0.8
	11001 to 12000		20.3	15.2	10.1	11.1	11.0	0.8	0.8
		7501 to 8200	20.5	15.4	10.4	11.1	11.0	0.8	0.8
		8201 to 9100	20.5	15.7	10.9	11.1	11.0	0.8	0.8
		9101 to 10000	20.8	16.0	11.4	11.1	11.0	0.8	0.8
DM30		2000 to 3900	21.8	19.6	6.6	11.1	10.0	1.0	1.0
		3901 to 6800	22.1	19.8	7.6	11.1	10.0	1.0	1.0
		6801 to 9100	22.4	20.1	8.4	11.1	10.0	1.0	1.0
		9101 to 12000	22.6	20.3	9.2	11.1	10.0	1.0	1.0
		12001 to 15000	22.9	20.6	9.9	11.1	10.0	1.0	1.0
	22001 to 24000		22.9	20.8	10.4	11.1	10.0	1.0	1.0
	24001 to 27000	15001 to 18000	23.1	20.8	10.9	11.1	10.0	1.0	1.0
	27001 to 30000		23.4	21.1	11.7	11.1	10.0	1.0	1.0
		18001 to 22000	23.6	21.3	12.2	11.1	10.0	1.0	1.0

DIPPED RADIAL (MIL STYLE)

Charcroft Product Ref Code	Capacitance Range pF Ur=500Vdc	DC Rated Voltage	Dimensions (mm)			S±0.79 Suffix E	Ød* ±0.05 Suffix E
			L max	H max	T max		
DM42	5000 to 8000	500	35.56	21.84	6.60	26.67	1.02
	8001 to 12000	500	35.56	21.84	6.86	26.67	1.02
	12001 to 15000	500	35.81	21.84	7.11	26.67	1.02
	15001 to 18000	500	35.81	22.10	7.37	26.67	1.02
	18001 to 20000	500	36.07	22.10	7.62	26.67	1.02
	20001 to 22000	500	36.07	22.35	7.87	26.67	1.02
	22001 to 24000	500	36.32	22.35	8.13	26.67	1.02
	24001 to 27000	500	36.32	22.35	8.38	26.67	1.02
	27001 to 30000	500	36.58	22.61	8.89	26.67	1.02
	30001 to 33000	500	36.58	22.61	9.14	26.67	1.02
	33001 to 36000	500	36.83	22.86	9.65	26.67	1.02
	36001 to 39000	500	36.83	22.86	10.16	26.67	1.02
	39001 to 43000	500	37.08	23.11	10.67	26.67	1.02
	43001 to 47000	500	37.34	23.11	11.43	26.67	1.02
	47001 to 51000	500	37.59	23.37	11.94	26.67	1.02
	51001 to 56000	500	37.08	23.11	10.67	26.67	1.02
	56001 to 62000	300	37.34	23.37	11.43	26.67	1.02
	62001 to 68000	300	37.59	23.37	11.94	26.67	1.02
	68001 to 75000	100	37.34	23.11	11.18	26.67	1.02
	75001 to 82000	100	37.59	23.37	11.68	26.67	1.02
	82001 to 100,000	100	38.10	23.88	12.70	26.67	1.02



MOULDED AXIAL (MIL STYLE)



Capacitance Range Related to Case Size and Voltage

Case Size

Rated Voltage (uR)

	300 Vdc	500 Vdc
CME 15	511 to 619 pF	10 to 510 pF
CME 20	620 to 5100 pF	470 to 3600 pF
CME 30	3000 to 12000 pF	470 to 7500 pF
CME 35	12001 to 16000 pF	7501 to 11000 pF

Case Size

Dimensions (mm)

	X (max)	Y (max)	Z (max)	L	ØD-0.5+10%
CME 15	13.5	7.9	5.6	30 min	0.6
CME 20	20.0	11.9	5.6	30 min	0.8
CME 30	21.0	21.0	7.1	30 min	1.0
CME 35	21.0	21.0	8.7	30 min	1.0

PRODUCT DATA

Capacitance Tolerance

C ≤ 100 pF ± 1 pF Standard

C > 100 pF ± 1%, 2%, 5%

To Special Order

C ≤ 100 pF = ± 1/2 pF

Insulation Resistance

Cr ≤ 10000 pF: Rins ≥ 10000 MΩ

Cr ≤ 10000 pF: RC ≥ 1000s

Rated Voltage 300Vdc and 500Vdc

Rated Temperature 100°C

Climatic category -55/100/21

Temperature Coefficient of Capacitance

Capacitance pF Temperature Coefficient 10⁶/°C Capacitance Drift

50 ≥ Cr -200 to +200 ± (0.5%+0.1 pF)

50 < Cr ≤ 100 -100 to +100 ± (0.3%+0.1 pF)

100 < Cr ≤ 500 -20 to +100 ± (0.1%+0.1 pF)

500 < Cr -0 to +70

Tangent of loss Angle

Capacitance pF Tangent of loss angle Measurement frequency

Cr < 10 0.005 max 100 kHz

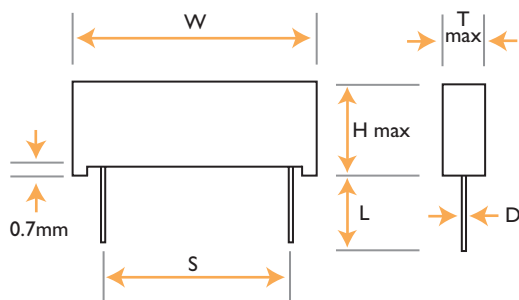
10 ≤ Cr ≤ 25 0.003 max 100 kHz

25 < Cr ≤ 100 0.002 max 100 kHz

100 < Cr ≤ 1000 0.001 max 100 kHz

1000 < Cr 0.001 max 1 kHz

BOXED RADIAL (HF POWER)



Charcroft Product	Dimensions in mm				
Reference Code	W±.5	H	T	S	D
CS12	32	10.7	6.4	27.9	1.0
Capacitance and voltage ratings					
10 - 600 pF	750 Vrms		1000 Vdc		
601- 950 pF	500 Vrms		1000 Vdc		
951-3500 pF	300 Vrms		500 Vdc		
Capacitance tolerance ±1% or 1 pF whichever is greater					
Maximum current	<200 pF	8.5A		≥200 pF	10A
Maximum power	2 KVA at 85°C free air				
Frequency range	up to 30 MHz				
Temperature coefficient	0 to +70 p.p.m./°C				
Climatic category	55/125/21				
Maximum dissipation factor					
CpF	f	Tan Delta			
10 - 20	1 MHz	0.002			
20 - 1000	1 MHz	0.001			
>1000	100 KHz	0.001			

Description

The CS12 has a low loss Mica dielectric, making it suitable for use in equipment such as transmitter filters which involve high alternating voltages, high frequencies and high currents.

The internal construction of the capacitor ensures that the rated voltage is well below the voltage where ionisation discharges occur.

A very small change in Mica capacitance with temperature ensures that the capacitance remains within the stated tolerance over the entire working temperature range.

Internal heating is also minimal in this capacitor due to the very low dielectric losses of Mica and the controlled thickness of silver electrodes.

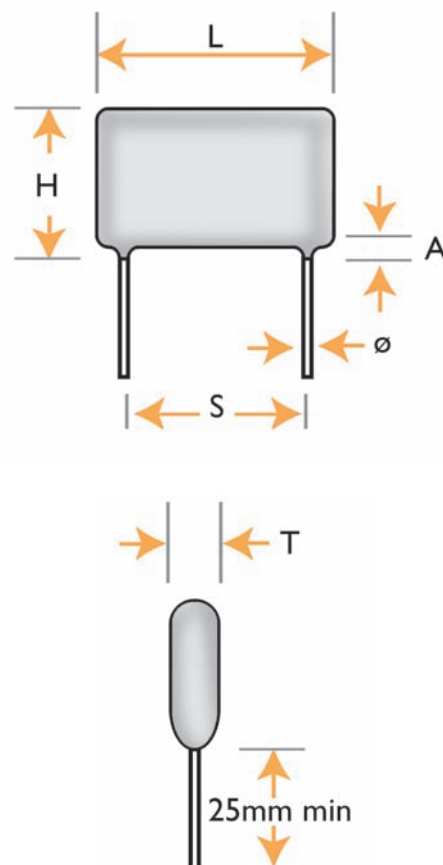
RESIN DIPPED SILVER MICA

Style	Capacitance Range pF	Max Dimensions (mm)			Lead Dimensions (mm)		
		L	H	T	A	S+1.0mm	Ø+0.1
M6	2.2 to 68	12.7	8.0	3.6	2.0	8.0	0.5
M12	82 to 220	16.5	11.5	3.8	2.5	12.0	0.5
M37	270 to 560	27.0	17.0	3.8	3.0	19.5	0.6
M50	680 to 10000	27.0	22.0	3.8	3.0	19.5	0.6

Specification

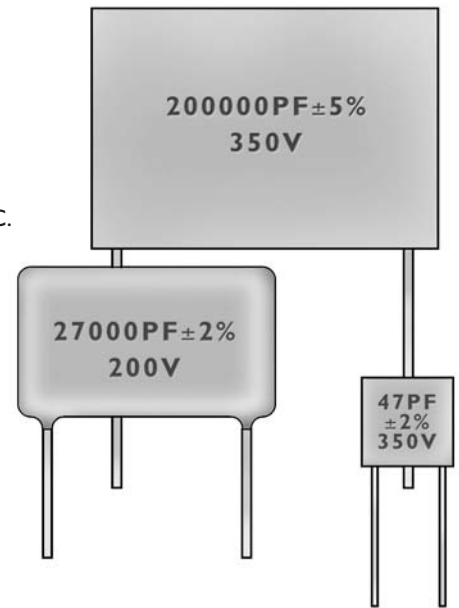
Encapsulation	Epoxy Resin Dipped
Lead Wires	Solder plated annealed copper wire
Coding	Capacitance, Tolerance, Voltage
Tolerances Available	<50pF ± 0.5pF >50pF ± 1%
Operating Temperatures	-20 to 100°C
Voltages Available	Standard 350v
Power Factor (tan d) Max	<100pF :0.003 at 1MHz 100pF to 1000p :0.003 at 1KHz >1000pF :0.002 at 1KHz
I.R.	Measured at DC working voltage 50,000 M minimum
Proof Test Voltage	Twice working voltage
Temperature Coefficient	-20 to + 100 ppm/°C
Drift of Capacitance	±(0.1% + 0.1pF)

PRODUCT CODE:	e.g.	M37	350	n3	F
STYLE:					
VOLTAGE:					
CAPACITANCE:					
TOLERANCE:					



SINTERED SILVERED MICA PROFESSIONAL GRADE

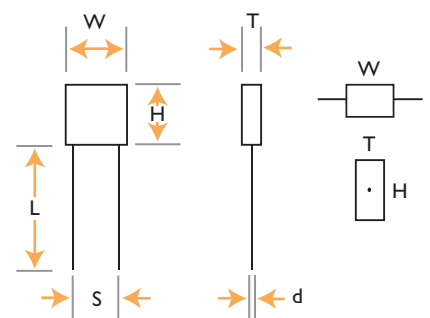
Temperature Range	-55°C to +100°C for insulated and moulded types. -30°C to +70°C for waxed types.
Insulation Resistance	Test point 'A' (IR) 25000 megohms or 1000 ohm farads minimum, whichever is the lower. Test point 'B' (case resistance, for insulated and moulded types only) 10000 megohms minimum. Test voltage 100 ±15 VDC for capacitors rated between 100 VDC and 500 VDC. 500 ±50 VDC for capacitors rated over 500 VDC.
Temperature Coefficient	-20ppm to +100ppm per °C for C >50pF but <100pF. -20ppm to +50ppm per °C for C >100pF. BS9077 : 1971 Refers. The average T.C is +30ppm per °C.
Dissipation Factor	0.003 maximum at 1MHz for C >10pF but <25pF. 0.002 maximum at 1MHz for C >25pF but <1000pF. 0.001 maximum at 1KHz for C >1000pF. BS9077 : 1971 Refers.
Humidity Rating	Moulded MS3220 H6 to DEF 5011 (56 days). All others H5 to DEF 5011 (21 days). These results are obtained for both accelerated damp heat and long-term heat. Resin Insulated H3 to DEF 5011 (Climatic).
Capacitance Stability	When tested as required by DEF 5132 all units meet the stipulated limits typically achieving 0.15%.
Lead Termination	All units use solder-coated copper wire which meets the requirements of BS2011 Test 2T (3) without ageing.
Ordering Information	The type number, finish (moulded, insulated, waxed), lead configuration (radial or axial), capacitance value, tolerance and D.C. working voltage should be quoted on each order, e.g. MS611 – moulded – axial – 470pF ±1% - 350 VDC. MS2515 – insulated – radial – 0.02 µF ±1% - 200 VDC.



MOULDED TYPES

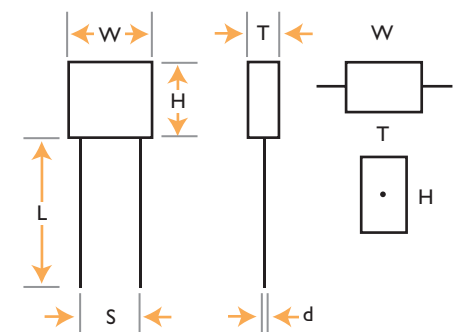
MS89 4 to 1000pF

Capacity pF	Volts	W max	T max	L min	S	d	H max
4 - 100	350	8.9mm	3.6mm	25mm	5.1mm	0.51mm	7.9mm
4 - 250	125						
101 - 300	350	8.9mm	5.2mm	25mm	5.1mm	0.51mm	7.9mm
251 - 1000	125						



MS119 4 to 1500pF

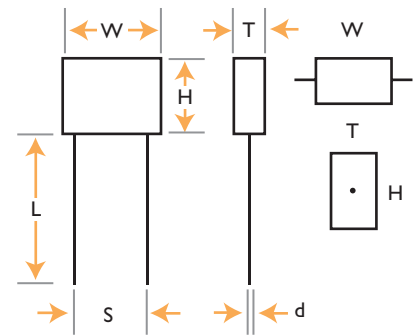
Capacity pF	Volts	W DC	T	L min	S	d	H max
4 - 250	350	12.0mm	3.6mm	25mm	7.6mm	0.61mm	9.2mm
4 - 500	125						
251 - 500	350	12.0mm	5.2mm	25mm	7.6mm	0.61mm	9.2mm
501 - 1500	125						



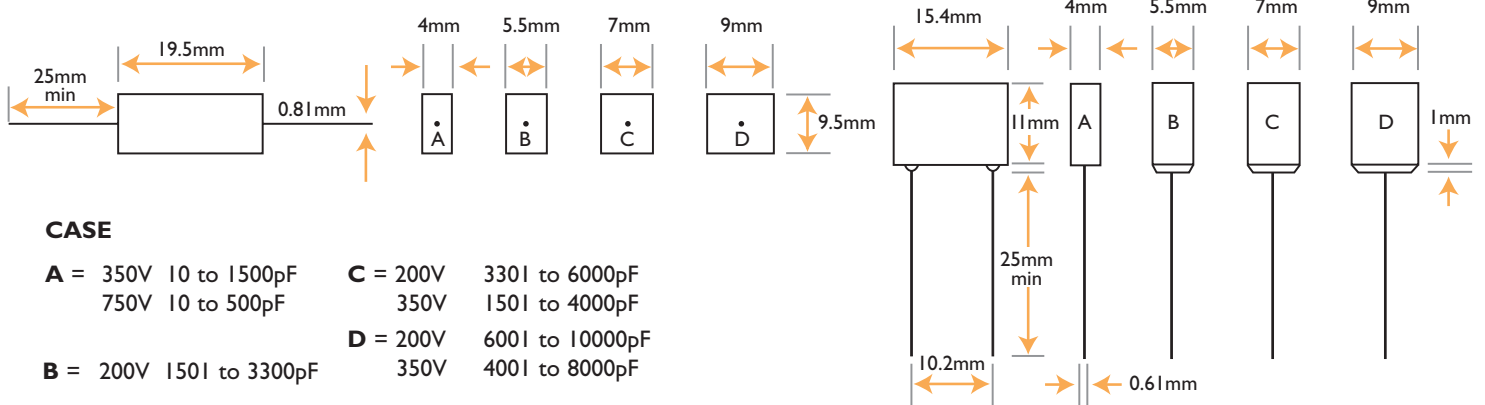
SINTERED SILVERED MICA PROFESSIONAL GRADE

MS 139 6 to 3000pF

Capacity pF	Volts D	W max	T max	L min	S	d	H max
4 - 500	350	13.2mm	3.6mm	25mm	10.2mm	0.61mm	10.3mm
4 - 1500	125						
501 - 1500	350	13.2mm	5.2mm	25mm	10.2mm	0.61mm	10.3mm
1501 - 3000	125						



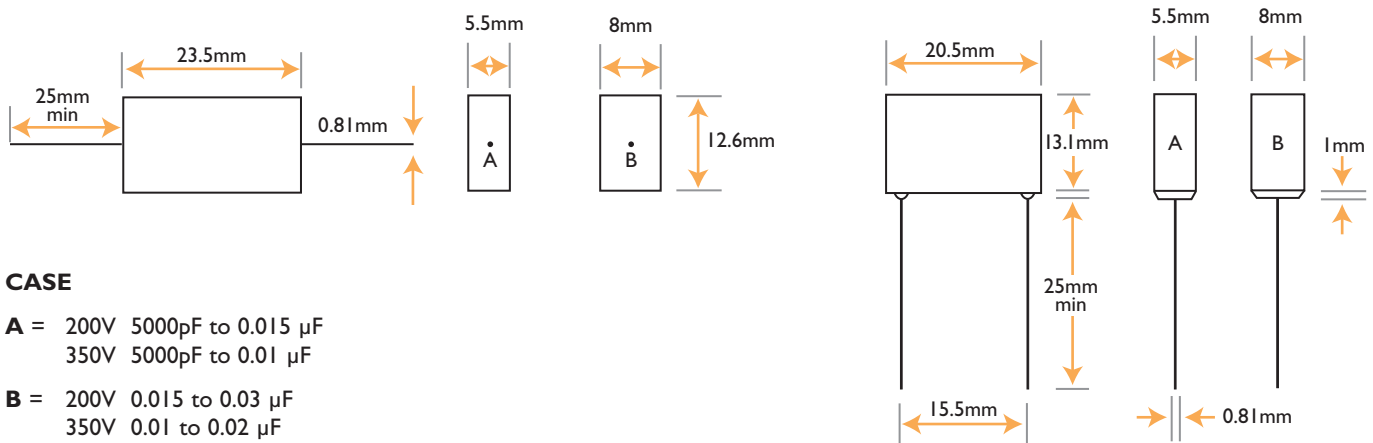
MS 611 10 to 10000pF



CASE

A = 350V 10 to 1500pF
750V 10 to 500pF
B = 200V 1501 to 3300pF
C = 200V 3301 to 6000pF
350V 1501 to 4000pF
D = 200V 6001 to 10000pF
350V 4001 to 8000pF

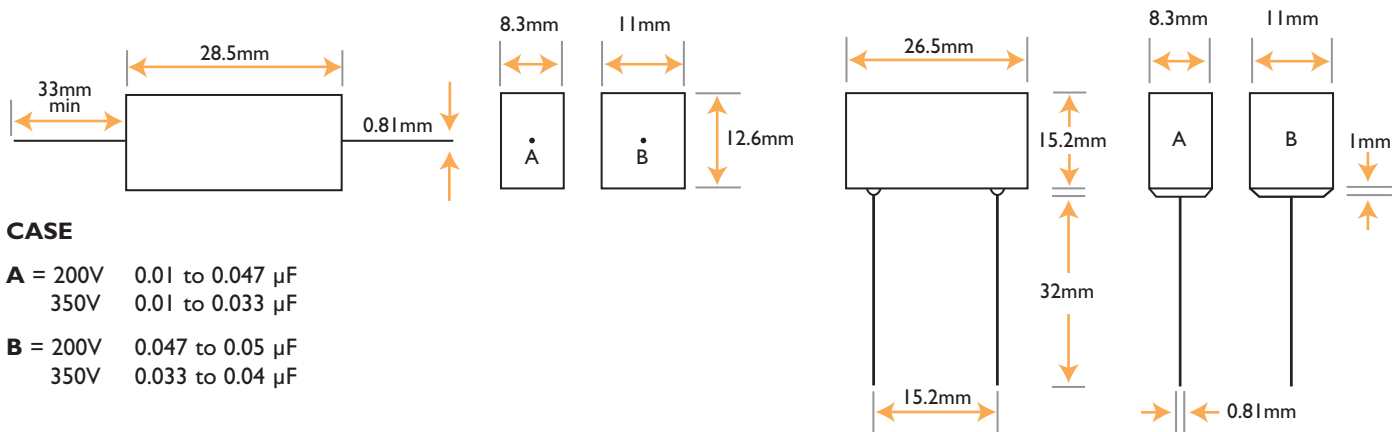
MS 1510 5000pF to 30000pF



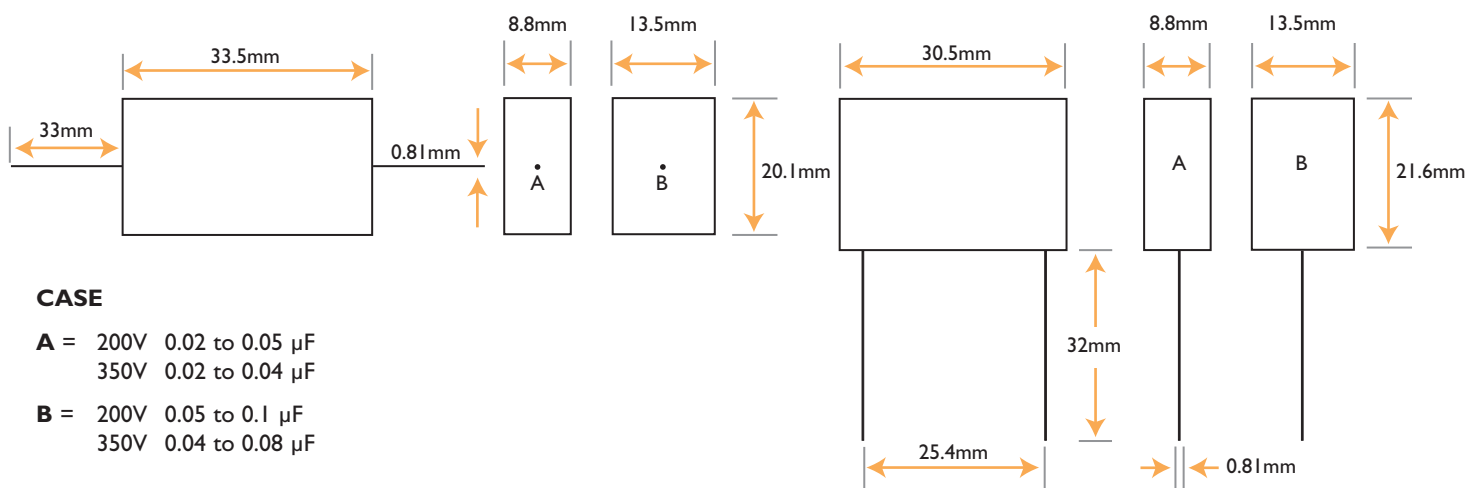
CASE

A = 200V 5000pF to 0.015 μ F
350V 5000pF to 0.01 μ F
B = 200V 0.015 to 0.03 μ F
350V 0.01 to 0.02 μ F

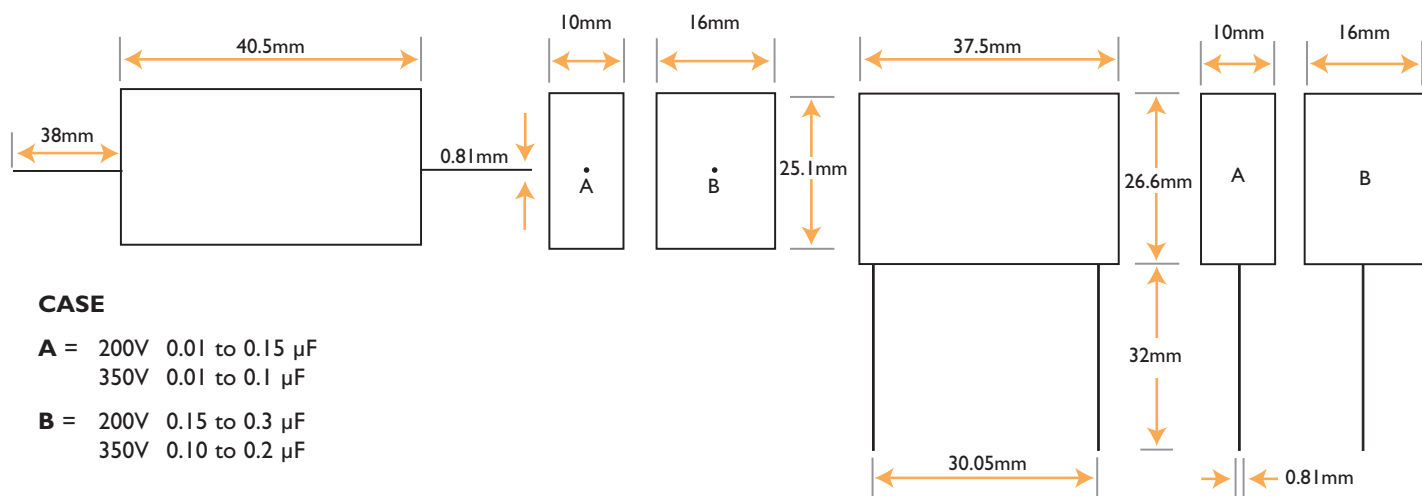
MS 2010 0.01 to 0.05 μF



MS 2515 0.02 to 0.1 μ F



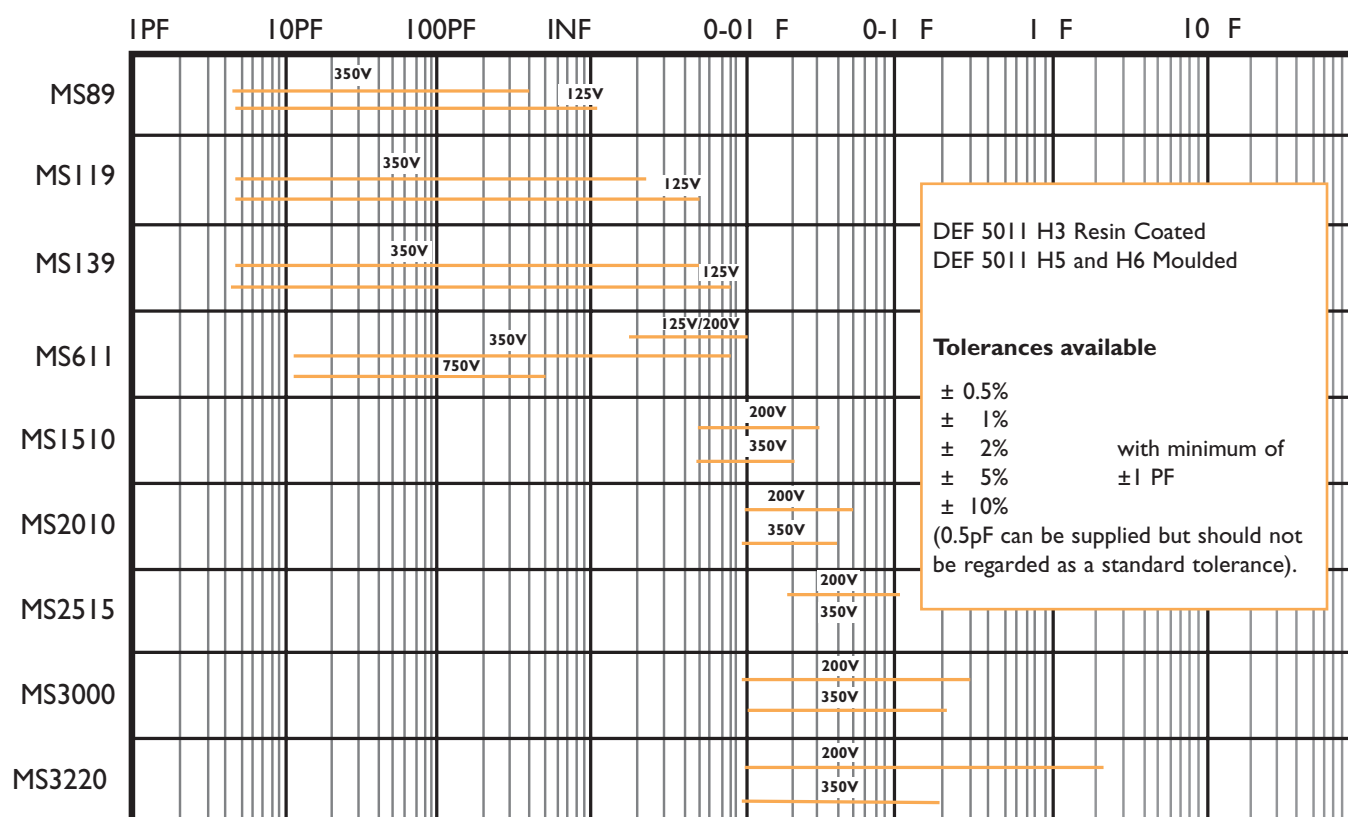
MS 3000 0.01 to 0.3 μF



SINTERED SILVERED MICA PROFESSIONAL GRADE

MS 3220 0.01 μ F to 0.5 μ F (200V) 0.01 μ F to 0.2 μ F (350V)

Volts	Capacity	Dimensions 'T'
350	0.01-0.05 μ F	9.5mm
200	0.01-0.075 μ F	"
350	0.050-0.10 μ F	14.3mm
200	0.075-0.15 μ F	"
350	0.10-0.20 μ F	19.0mm
200	0.15-0.25 μ F	"
200	0.25-0.50 μ F	33.2mm



This chart enables rapid selection of the appropriate capacitor to be carried out. The smaller physical sizes are at the top of the chart and the largest at the bottom.

NOTES

All these capacitors are constructed from high quality mica plates with fired-on silver electrodes. The individual blades are stacked and fired together under pressure, bonding them into a stable robust block. The end wires are soldered on with special solders to maintain the highest possible Q. They are finally moulded into convenient packages or fluid bed coated, using high grade resins to provide excellent humidity protection. The finished capacitor as a result is compact, robust, extremely stable and has a low temperature coefficient. The wide variety of case forms allows

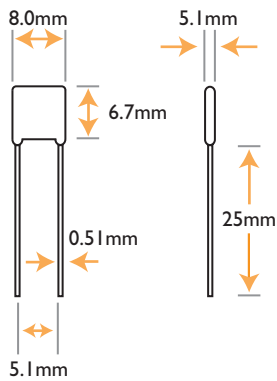
the designer complete flexibility in his constructional methods. These capacitors are used in all grades of professional equipment from military to industrial. They are approved for use in telephone and telegraph equipments and are used as standards by instrument manufacturers. They find application wherever a need for a stable high Q capacitor occurs. Special versions can be engineered to meet difficult design problems.

NOTE

Large numbers of these capacitors have been made for use by the Services. In consequence N.A.T.O. stock numbers are available for a comprehensive range of values and tolerances.

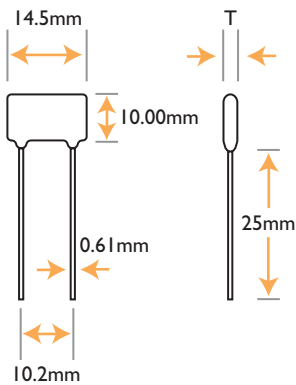
RESIN OR WAX INSULATED TYPES

MS 89



4-400 pF	350 Volts
400-700 pF	200 Volts
700-1000 pF	125 Volts

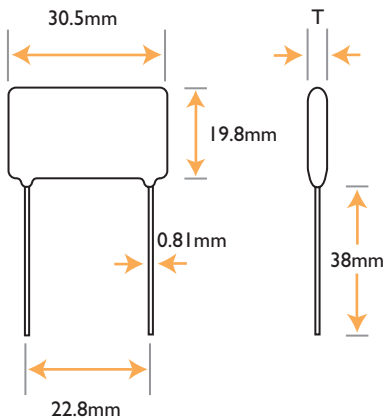
MS 611



T = 3.5mm (1000 pF)
6.6mm (10000 pF)

750V	10-500 pF	125V up to 10000 pF
350V	10-5600 pF	
200V	1500-8000 pF	

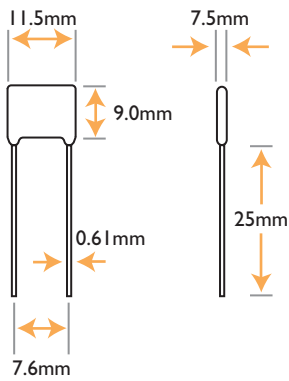
MS 2515



T = 4mm (5000 pF)
11.5mm (0.1 μ F)

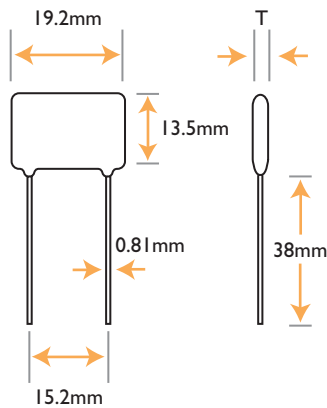
350V	5000 pF - .08 μ F
200V	5000 pF - 0.1 μ F20V

MS 119



4-2000 pF	350 Volts
2000-3500 pF	200 Volts
3500-4700 pF	125 Volts

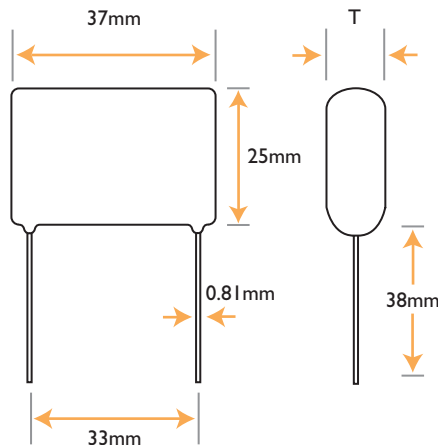
MS 1510



T = 3.8mm (5000 pF)
6.5mm (0.03 μ F)

350V	2000 pF - .02 μ F
200V	2000 pF - .03 μ F

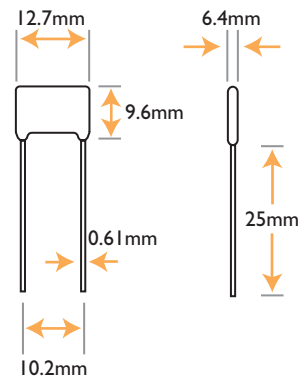
MS 3220



T = 8mm (0.1 μ F)
15mm (0.2 μ F)

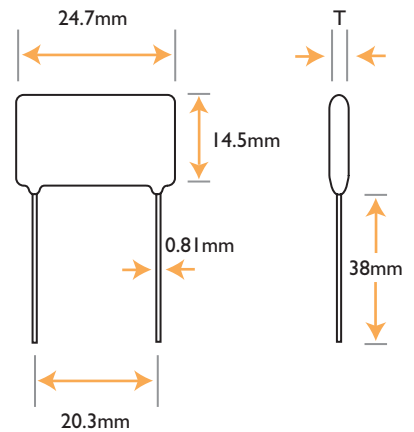
350V	.01 - 0.15 μ F
200V	.01 - 0.2 μ F

MS 139



10-5000 pF	350 Volts
3000-6800 pF	200 Volts
3000-8000 pF	125 Volts

MS 2010



T = 3.5mm (4700 pF)
10.5 mm (0.05 μ F)

350V	3000 pF - .04 μ F
200V	3000 pF - .05 μ F

NOTE

'T' dimensions are typical. Wire centres are nominal ± 0.4 mm. Wire diameters are nominal. All other dimensions are maximum.

NOTES

All these types can be made with axial leads but only in a wax finish. Wire centres are toleranced at point of exit from coating. Specified wire lengths are minimum. Wax finish only is suggested for "potting" purposes.

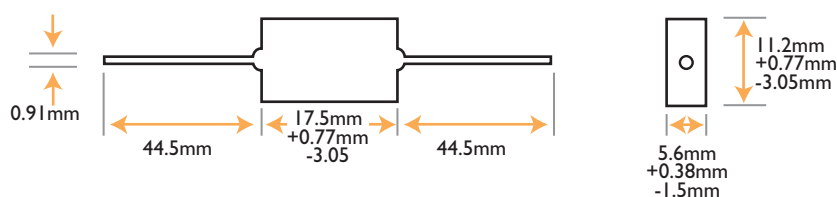
MICA STYLE CMMIG/CMM3Y PROFESSIONAL GRADE

ELECTRICAL SPECIFICATION

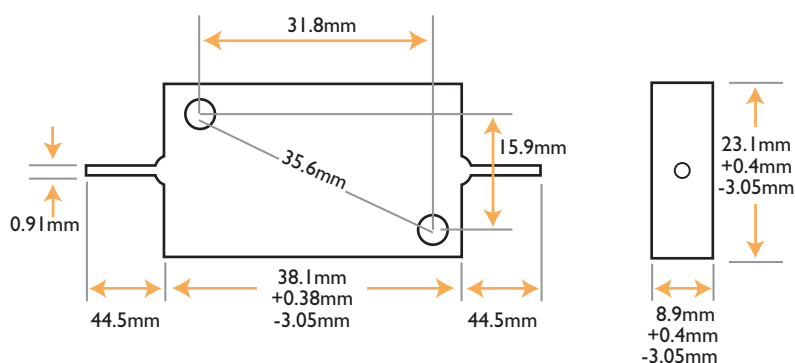
Temperature Range	-55°C to +100°C.
Insulation Resistance	25000 megohms minimum at 500VDC.
Dissipation Factor	0.003 maximum at 1MHz. For values of 1000pF or less. 0.003 maximum at 1kHz. For values over 1000pF.
Capacitance Stability	0.5% maximum when tested to DEF5132.
Scintillation	None. When measured in a tuned circuit at 2MHz. Not applicable to values above 1000pF.
Humidity Classification	H1 to DEF5132 (56 days) class 40/100.
Temperature Coefficient	Less than +60 parts per million per °C.
Construction And Finish	Silvered mica capacitor moulded in epoxide synthetic resin.
Ordering number Information	Use joint service number or NATO number (see overleaf) or alternatively type followed by capacitance, tolerance and working DC voltage, e.g. CMMIG 1000pF $\pm 2\%$ 350VDC.



CMMIG



CMM3Y



Type	Capacitance Range pF	D. C. Working	D. C. Test Voltage	Tolerance Voltage
CMMIG	470 - 1500 10 - 470	350 750	1000 2250	$\pm 1\%$ $\pm 2\%$ $\pm 5\%$ $\pm 10\%$ $\pm 20\%$ with a minimum tolerance of $\pm 1\text{pF}$ for values under 100pF
CMM3Y	4700 - 10000	350	1000	

Part No CMMIG

Capacitance Voltage Rating

D.C. at 760 mm. Hg.

750v.	Tolerance	Joint Service Catalogue Number			
		40/100	H1	40/70	H2
10 pF	±10%	5910-99-0123900		5910-99-0123632	
12 pF	±10%	5910-99-0123901		5910-99-0123633	
15 pF	±10%	5910-99-0123902		5910-99-0123634	
18 pF	±10%	5910-99-0123903		5910-99-0123635	
22 pF	±5%	5910-99-0123904		5910-99-0123636	
22 pF	±10%	5910-99-0123905		5910-99-0123637	
27 pF	±5%	5910-99-0123906		5910-99-0123638	
27 pF	±10%	5910-99-0123607		5910-99-0123639	
33 pF	±5%	5910-99-0123608		5910-99-0123640	
33 pF	±10%	5910-99-0123909		5910-99-0123641	
39 pF	±5%	5910-99-0123910		5910-99-0123642	
39 pF	±10%	5910-99-0123911		5910-99-0123643	
47 pF	±5%	5910-99-0123912		5910-99-0123645	
47 pF	±10%	5910-99-0123913		5910-99-0123646	
56 pF	±2%	5910-99-0123914		5910-99-0123647	
56 pF	±5%	5910-99-0123915		5910-99-0123648	
56 pF	±10%	5910-99-0123916		5910-99-0123649	
68 pF	±2%	5910-99-0123917		5910-99-0123650	
68 pF	±5%	5910-99-0123918		5910-99-0123651	
68 pF	±10%	5910-99-0123919		5910-99-0123652	
82 pF	±2%	5910-99-0123920		5910-99-0123653	
82 pF	±5%	5910-99-0123921		5910-99-0123654	
82 pF	±10%	5910-99-0123922		5910-99-0123655	
100 pF	±2%	5910-99-0123923		5910-99-0123656	
100 pF	±5%	5910-99-0123924		5910-99-0123657	
100 pF	±10%	5910-99-0123925		5910-99-0123658	
120 pF	±2%	5910-99-0123926		5910-99-0123659	
120 pF	±5%	5910-99-0123927		5910-99-0123660	
120 pF	±10%	5910-99-0123928		5910-99-0123661	
150 pF	±2%	5910-99-0123929		5910-99-0123662	
150 pF	±5%	5910-99-0123930		5910-99-0123663	
150 pF	±10%	5910-99-0123931		5910-99-0123664	
180 pF	±2%	5910-99-0123932		5910-99-0123665	
180 pF	±5%	5910-99-0123933		5910-99-0123666	
180 pF	±10%	5910-99-0123934		5910-99-0123667	
220 pF	±2%	5910-99-0123667		5910-99-0123668	
220 pF	±5%	5910-99-0123936		5910-99-0123669	
220 pF	±10%	5910-99-0123937		5910-99-0123670	
270 pF	±2%	5910-99-0123938		5910-99-0123671	
270 pF	±5%	5910-99-0123639		5910-99-0123672	
270 pF	±10%	5910-99-0123940		5910-99-0123673	
330 pF	±2%	5910-99-0123941		5910-99-0123674	
330 pF	±5%	5910-99-0123942		5910-99-0123675	
330 pF	±10%	5910-99-0123943		5910-99-0123676	
390 pF	±2%	5910-99-0123944		5910-99-0123677	
390 pF	±5%	5910-99-0123945		5910-99-0123678	
390 pF	±10%	5910-99-0123946		5910-99-0123679	
470 pF	±2%	5910-99-0123947		5910-99-0123680	
470 pF	±5%	5910-99-0123948		5910-99-0123681	
470 pF	±10%	5910-99-0123949		5910-99-0123682	

**Capacitance Voltage Rating
D.C. at 760 mm. Hg.**

350 v.

	Tolerance	Joint Service Catalogue Number	
		40/100	H1
		40/70	H2
560 pF	±2%	5910-99-0123950	5910-99-0123473
560 pF	±5%	5910-99-0123951	5910-99-0123476
560 pF	10%	5910-99-0123952	5910-99-0123478
680 pF	±2%	5910-99-0123953	5910-99-0123490
680 pF	±5%	5910-99-0123954	5910-99-0123497
680 pF	±10%	5910-99-0123955	5910-99-0123494
820 pF	±2%	5910-99-0123956	5910-99-0123512
820 pF	±5%	5910-99-0123957	5910-99-0123518
820 pF	±10%	5910-99-0123958	5910-99-0123516
.001 µF	±2%	5910-99-0124700	5910-99-0124002
.001 µF	±5%	5910-99-0124701	5910-99-0124006
.001 µF	±10%	5910-99-0124702	5910-99-0124019
.0012 µF	±10%	5910-99-0124703	5910-99-0124085
.0015 µF	±5%	5910-99-0124704	5910-99-0124102
.0015 µF	±10%	5910-99-0124705	5910-99-0124109

Part No CMM3Y

470 pF	±2%	5910-99-0123959	5910-99-0113519
470 pF	±5%	5910-99-0123960	5910-99-0113520
470 pF	±10%	5910-99-0123961	5910-99-0113521
560 pF	±2%	5910-99-0123962	5910-99-0113522
560 pF	±5%	5910-99-0123963	5910-99-0113523
560 pF	±10%	5910-99-0123964	5910-99-0113524
680 pF	±2%	5910-99-0123965	5910-99-0113525
680 pF	±5%	5910-99-0123966	5910-99-0113526
680 pF	±10%	5910-99-0123967	5910-99-0113527
820 pF	±2%	5910-99-0123511	5910-99-0113528
820 pF	±5%	5910-99-0123969	5910-99-0113529
820 pF	±10%	5910-99-0123970	5910-99-0113530
.001 µF	±2%	5910-99-0124005	5910-99-0113531
.001 µF	±5%	5910-99-0124707	5910-99-0113532
.001 µF	±10%	5910-99-0124708	5910-99-0113533
.0012 µF	±2%	5910-99-0124086	5910-99-0113534
.0012 µF	±5%	5910-99-0124710	5910-99-0113535
.0012 µF	±10%	5910-99-0124711	5910-99-0113536
.0015 µF	±2%	5910-99-0124103	5910-99-0113537
.0015 µF	±5%	5910-99-0124713	5910-99-0113538
.0015 µF	±10%	5910-99-0124714	5910-99-0113539
.0018 µF	±2%	5910-99-0124118	5910-99-0113540
.0018 µF	±5%	5910-99-0124716	5910-99-0113541
.0018 µF	±10%	5910-99-0124717	5910-99-0113542
.0022 µF	±2%	5910-99-0124189	5910-99-0113543
.0022 µF	±5%	5910-99-0124719	5910-99-0113544
.0022 µF	±10%	5910-99-0124720	5910-99-0113545
.0027 µF	±2%	5910-99-0124211	5910-99-0113546
.0027 µF	±5%	5910-99-0124722	5910-99-0113547
.0027 µF	±10%	5910-99-0124723	5910-99-0113548
.0033 µF	±2%	5910-99-0124251	5910-99-0113549
.0033 µF	±5%	5910-99-0124725	5910-99-0113550
.0033 µF	±10%	5910-99-0124726	5910-99-0113551
.0039 µF	±2%	5910-99-0124262	5910-99-0113552
.0039 µF	±5%	5910-99-0124728	5910-99-0113553
.0039 µF	±10%	5910-99-0124729	5910-99-0113554
.0047 µF	±2%	5910-99-0124288	5910-99-0113555
.0047 µF	±5%	5910-99-0124731	5910-99-0113556
.0047 µF	±10%	5910-99-0124732	5910-99-0113557

**Capacitance Voltage Rating
D.C. at 760 mm. Hg.**

350 v.

	Tolerance	Joint Service Catalogue Number			
		40/100	H1	40/70	H2
.0056 μ F	$\pm 2\%$	5910-99-0124331		5910-99-0113558	
.0056 μ F	$\pm 5\%$	5910-99-0124734		5910-99-0113559	
.0056 μ F	$\pm 10\%$	5910-99-0124735		5910-99-0113560	
.0068 μ F	$\pm 2\%$	5910-99-0124350		5910-99-0113561	
.0068 μ F	$\pm 5\%$	5910-99-0124737		5910-99-0113562	
.0068 μ F	$\pm 10\%$	5910-99-0124738		5910-99-0113563	
.0082 μ F	$\pm 2\%$	5910-99-0124364		5910-99-0113564	
.0082 μ F	$\pm 5\%$	5910-99-0124740		5910-99-0113565	
.0082 μ F	$\pm 10\%$	5910-99-0124741		5910-99-0113566	
.01 μ F	$\pm 2\%$	5910-99-0124372		5910-99-0113567	
.01 μ F	$\pm 5\%$	5910-99-0124743		5910-99-0113568	
.01 μ F	$\pm 10\%$	5910-99-0124744		5910-99-0113569	

NOTE

Other values and tolerances are available between the maximum and minimum limits given in the above tables.
A complete list of joint service numbers is available from the codification authorities.

• Material Content

Mica capacitors do not normally contain hazardous materials.
The main constituents are:-

Multilayer mica stack:

- Mica
- Printed silver electrodes
- Silver/glaze end terminations

Assembled stack:

- Solder
- Solder coated copper or nickel lead wires.
- Epoxy resin (moulded or dipped, as shown on data sheet).

Additional small quantities of the following materials may be present:

Wax type impregnants - to improve the electrical performance of the capacitor.

Thermal plastic sleeve or flexible epoxy dip - to provide additional mechanical and environmental protection.

• Physical Form

These capacitors are normally rectangular in shape with axial or radial leads. The surface finish of the capacitor may be moulded resin, conformal epoxy coat or wax dip.

• Intrinsic Properties

Operating

Mica capacitors are non-polar and may therefore be used with d.c. of either polarity. When operated within the rated conditions a long period of satisfactory operation can be obtained with a normal failure rate probability.

Non-Operating

Cracking or damage to the encapsulation may lead to premature failure due to ingress of material such as moisture and cleaning fluids, or to stress transmitted to the multilayer mica stack. An excessive force applied to the terminal wires will produce an open circuit failure.

• Fire Characteristics

Primary

Any component subjected to abnormal power dissipation may :
1 self ignite. **2** become red hot. **3** break open or explode, emitting flaming or red hot materials, solid, liquid or gaseous.
The component maximum safe power should not be exceeded.
Where test results are available and specifications agreed, guidance on power limits will be specified on the data sheet.

Secondary

Induced ignition may occur from an adjacent burning or red hot component.

The resin formulations used on the standard moulded mica capacitors are chosen so as to be fire retardant.

When subjected to excessive heat, the encapsulant, impregnation material and internal surface coatings can ignite and emit organic decomposition products which may be toxic. Conformance of mica capacitors with national and international specifications is as stated on the data sheet.

• Handling

No special risks are involved in handling these capacitors.
Normal care should be taken in handling the pointed ends of terminal wires.

• Storage

Apart from a very low random failure rate after long periods of storage, there are no known modes of failure under normal storage conditions.

All capacitors will withstand any environmental condition within their rating for the periods given in the detail specifications.

Storage for longer periods under high humidity conditions may affect the leakage current of resin protected capacitors.

Solderability may also be affected by storage in excess of one year under high temperatures (>40°C) or humidities (> 80% R.H.) The limits of solderability after ageing to BS 2011 (part 2t, method 3) are specified on the data sheet.

• Disposal

No special hazards are involved in disposal. Incineration of resin encapsulated mica capacitors can cause emission of toxic fumes.

• Unsafe use

Most failures are of a passive nature and do not represent a safety hazard. A hazard may, however, arise if this failure causes a dangerous malfunction of the equipment in which the capacitor is employed. Circuits should be designed to fail safe under the normal modes of failure.

The usual failure mode is an increase in leakage current or short circuit. Other possible modes are change of capacitance, increase in dissipation factor (and impedance) or an open-circuit.

Operations outside the ratings quoted in the data sheets represent unsafe use.

RELATED DOCUMENTS

• BS 1852 (IEC 62)

Marking code for resistors and capacitors.

• BS 2011

Basic environmental testing procedures.

• BS 6001

Sampling procedures and tables for inspection by attributes.

• BS 9000

General requirements for electronic components of assessed quality.

• BS 9070

Fixed capacitors of assessed quality:@

Generic data and methods of test.

Section 1. Principles and mandatory procedure.

Section 2. General rules for drafting detail specifications.

Section 7. Mica dielectric capacitors.

• IEC 68-2

Basic environmental testing procedures.

Part 2. Tests.PD 2

• PD 9002

Component selection guide:

Qualified products list of electronic components of assessed quality.

• CECC 30000: 1975 (BSE 9070)

Generic specification.

• BS CECC 31300

Sectional specification.

• Draft IEC 286-2 (BS 6062-2)

Packaging of Electronic Components for Automatic Handling - Radial Leads.



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