

# Types MCM and MIN SMT Clad RF Capacitors

## Multilayer High Power, High Temperature Mica and PTFE Capacitors



Types MCM and MIN SMT clad PTFE and mica capacitors are top performers for high power applications requiring low inductance at high frequencies and can operate at temperatures up to 200 °C and voltages to 1000 Vdc. Choosing from 16 different configurations offers easy mounting with options for surface mount as well as through-hole and mechanical assembly. To assure high current capability in the smallest capacitors, low-capacitance ratings use polytetrafluorethylene (PTFE) that has ultra-low dielectric absorption - better than polypropylene, polystyrene and NPO ceramic.

### Highlights

- 200 °C rated with no voltage derating
- Wave solderable
- No cracking or delaminating
- CTE  $\approx 18$  ppm/°C compatible with FR4 PCBs
- Highly thermal conductive package
- Gull-wing terminal minimizes stress
- Typical 100 pF ESR,  $<11$  m $\Omega$  @ 100 MHz
- Nonmagnetic for minimal RF loss
- Very low ESL for excellent by-pass action
- Ultra stable: no change with (t), (V) and (f)
- Exact capacitance with tolerances from  $\pm 0.25$  pF

### RoHS Compliant

### Specifications

**Capacitance Range:**  
**Voltage Ratings:**  
**Temperature Range:**  
**Capacitance Tolerance:**  
**Dielectric Strength:**  
**Insulation Resistance:**  
**Aging Rate:**  
**Marking:**

| MCM                                                                                      | MIN         |
|------------------------------------------------------------------------------------------|-------------|
| 1 to 1500 pF                                                                             | 1 to 350 pF |
| 300 to 1000 Vdc                                                                          | 300 Vdc     |
| -55 °C to +200 °C with no voltage derating                                               |             |
| $\pm 0.25$ pF, $\pm 0.5$ pF, $\pm 1$ pF, $\pm 0.5\%$ , $\pm 1\%$ , $\pm 2\%$ , $\pm 5\%$ |             |
| 200% of rated voltage for 5 seconds                                                      |             |
| 1000 M $\Omega$ · $\mu$ F Need not exceed 100,000 M $\Omega$ at 25 °C                    |             |
| None                                                                                     |             |

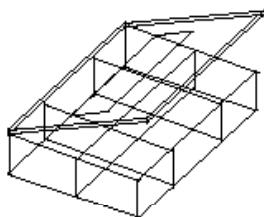
**MIN** - Capacitance in pF and ID letters CD  
**MCM** - Capacitance, ID letters CD and voltage if other than 500 when space permits  
RoHS Compliant - marked in green ink

### Design Kits for Engineers

MIN300VKIT1 300 Vdc  
5 pieces each  
13 ratings 3.3 – 150 pF

MCM500VKIT2  
Nonmagnetic to 500 Vdc  
5 pieces each  
10 ratings 10 – 1000 pF

MCM1000VKIT3 1 kVdc  
5 pieces each  
7 ratings 100 – 750 pF



### Applications

RF Power Amplifiers  
Lasers  
Mobile Radio  
Plasma generators  
MRI Coils  
RF Medical Equipment  
Land Mobile antennas 27 to 900 MHz

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## Ratings Available

| Capacitance<br>(pF) | Voltage<br>Ratings<br>(Vdc) |     |       | Dielectric   |
|---------------------|-----------------------------|-----|-------|--------------|
|                     | 300                         | 500 | *1000 |              |
| MIN02               |                             |     |       |              |
| 1 - 2.9             | X                           |     |       | PTFE         |
| 3 - 9.9             | X                           |     |       | PTFE or Mica |
| 10 - 60             | X                           |     |       | Mica         |
| 61 - 120            | X                           |     |       | Mica         |
| 121 - 180           | X                           |     |       | Mica         |
| 181 - 240           | X                           |     |       | Mica         |
| 241 - 300           | X                           |     |       | Mica         |
| 301 - 350           | X                           |     |       | Mica         |
| MCM01               |                             |     |       |              |
| 1 - 7               |                             | X   | X     | PTFE         |
| 8 - 32              |                             | X   | X     | PTFE or Mica |
| 33 - 250            |                             | X   | X     | Mica         |
| 251 - 500           |                             | X   | X     | Mica         |
| 501 - 750           |                             | X   | X     | Mica         |
| 751 - 1000          |                             | X   |       | Mica         |
| 1001 - 1280         |                             | X   |       | Mica         |
| 1281 - 1500         | X                           |     |       | Mica         |

\*1000 V available in MCM01-001 and -009 style

## Part Numbering System

**MCM01** — **001** **C** **D** **101** **J** — **T** **F**  
**or**  
**MIN02**  
**Type** **"dash"** **Configuration** **Temperature Coefficient \*** **Rated Voltages (Vdc)** **Capacitance (pF)** **Capacitance Tolerance\* (pF or %)** **Packaging** **RoHS Compliant**

C = 300 Vdc  
 D = 500 Vdc  
 F = 1000 Vdc

090 = 9  
 9R2 = 9.2  
 100 = 10  
 101 = 100  
 (751) = 751  
 102 = 1000

A = ±1 pF 2 - 200 pF  
 B = ±0.25 pF 1 - 50 pF  
 D = ±0.5 pF 1 - 100 pF  
 E = ±0.5 % > 100 pF  
 F = ±1 % > 33 pF  
 G = ±2% > 11 pF  
 J = ±5% > 11 pF  
 K = ±10% > 11 pF

-T = Tape  
 Blank = Bulk

Blank = Not specified  
 F = Compliant

| Style | Capacitance Range | Temperature Characteristic |
|-------|-------------------|----------------------------|
| C     | 1 pF to 20 pF     | ±200 ppm/°C                |
| D     | 21 pF to 56 pF    | ±100 ppm/°C                |
| E     | 57 pF to 1500 pF  | -20 to +100 ppm/°C         |

\*TC code letter is left blank for PTFE items

Measured at 1 MHz for ≤1000 pF and 1 kHz for >1000 pF

▲ Most Popular Series, other's available, consult factory  
 1 Surface mount and T&R  
 2 1kV

| MCM01               | MIN02             |
|---------------------|-------------------|
| ▲001 <sup>2</sup>   | ▲002 <sup>1</sup> |
| ▲009 <sup>1,2</sup> |                   |
| ▲010                |                   |

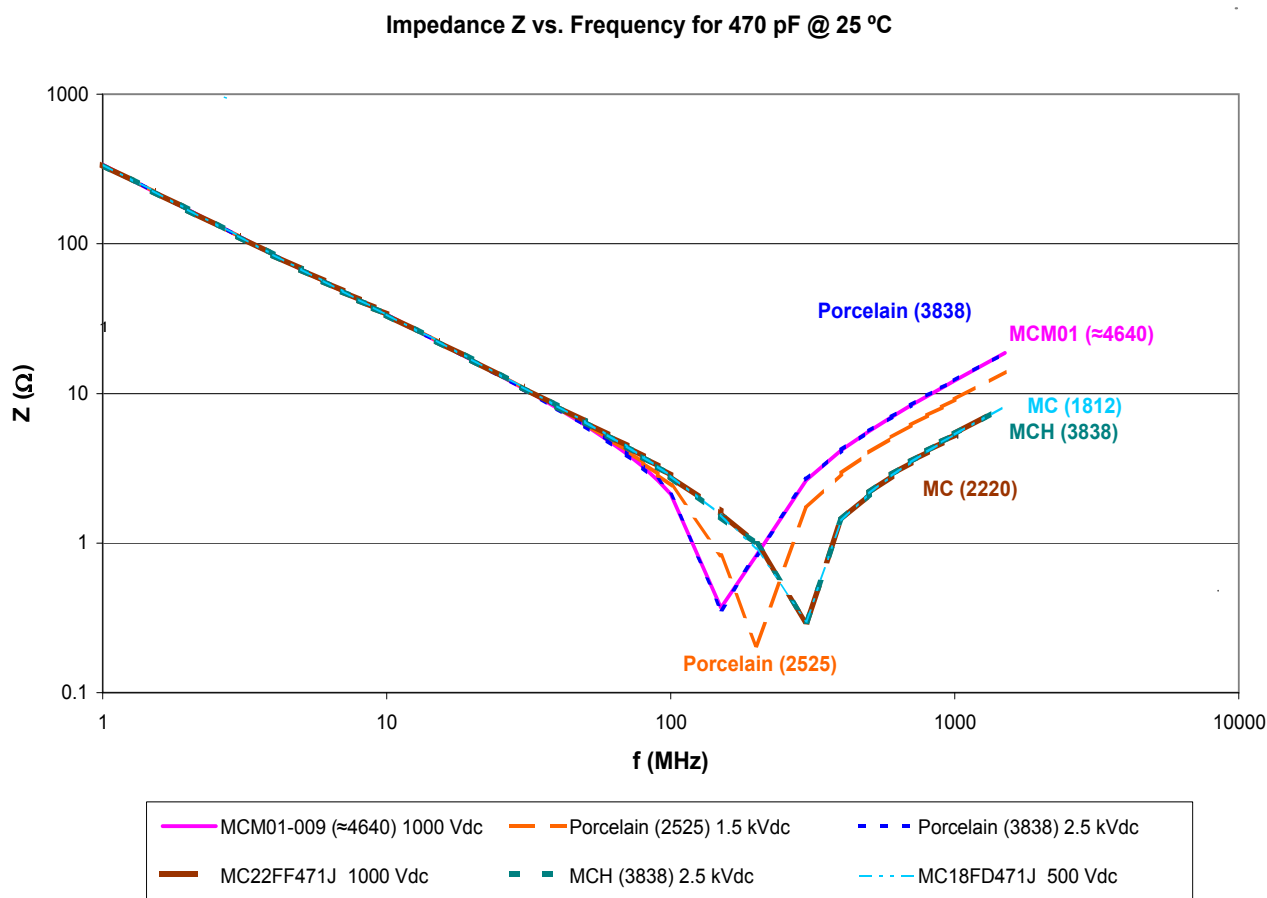
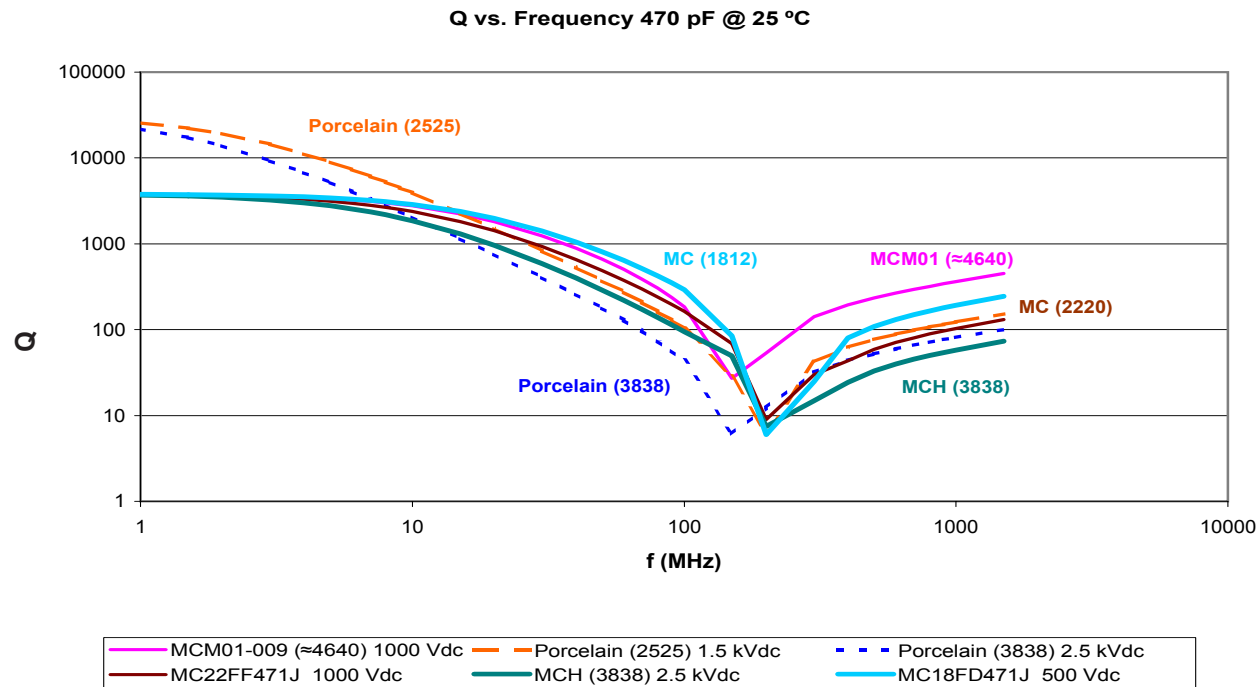
### ESR vs. Frequency for 470 pF



### Current Rating (IRMS) for 470 pF at 60 °C Rise



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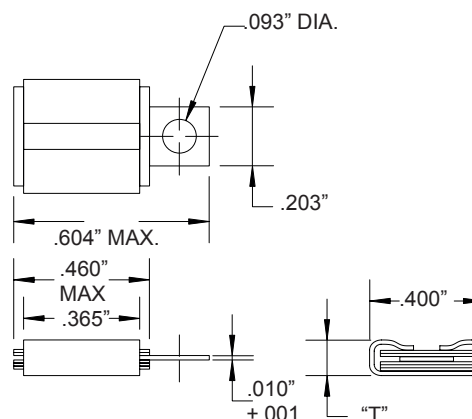
## Outline Drawings for Popular Items

**MIN02-002**



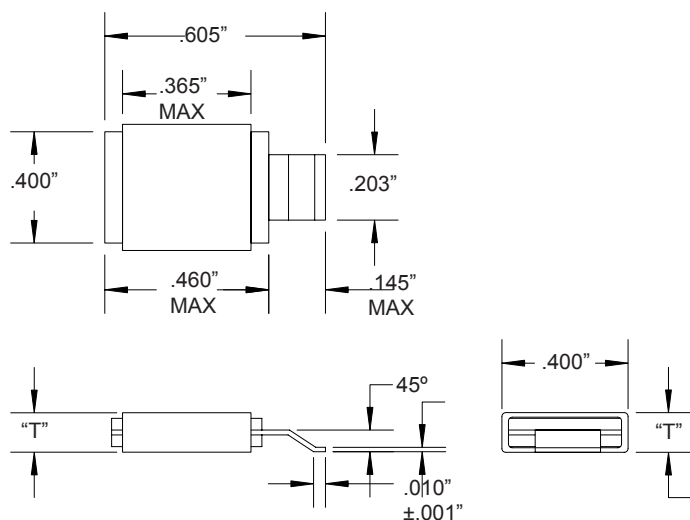
"T" (thickness) depending on capacitance value = .065 to .125 $\pm$ .015

**MCM01-001**



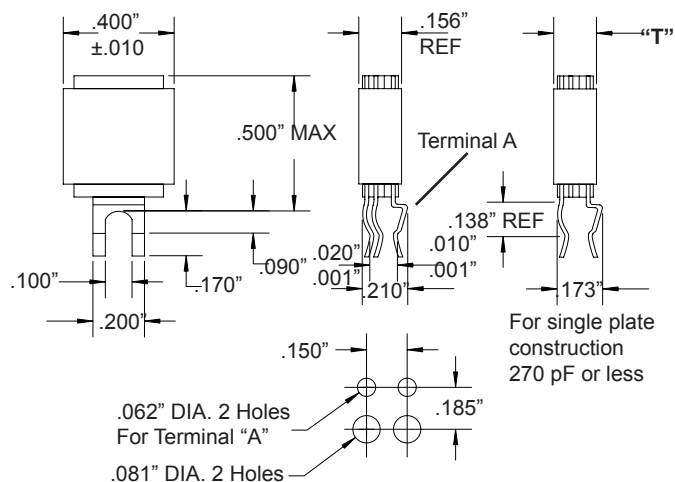
"T" (thickness) depending on capacitance value = .110 to .165 $\pm$ .015

**MCM01-009**



"T" (thickness) depending on capacitance value = .110 to .165 $\pm$ .015

**MCM01-010**



"T" (thickness) depending on capacitance value = .110 to .165 $\pm$ .015

"T" varies with capacitance

# Types MCM and MIN SMT Clad RF Capacitors

## Standard Minimum Quantities

## Tape Specifications

Bulk Pack: 100 pieces per bag

Reel Pack: 500 pieces per reel



| Tape Dimensions (mm)  |    |      |      |    |     |      |
|-----------------------|----|------|------|----|-----|------|
| Case                  | W  | A    | B    | P1 | F   | t    |
| MIN02-002<br>< 150 pF | 16 | 5.56 | 8.18 | 8  | 7.5 | 2.16 |
| MIN02-002<br>≥ 150 pF | 16 | 5.66 | 8.10 | 8  | 7.5 | 3.20 |

Note: 24 mm tape for MCM01-009 and 32 mm tape for MCM01-004 are available upon request.

## Solder Profile

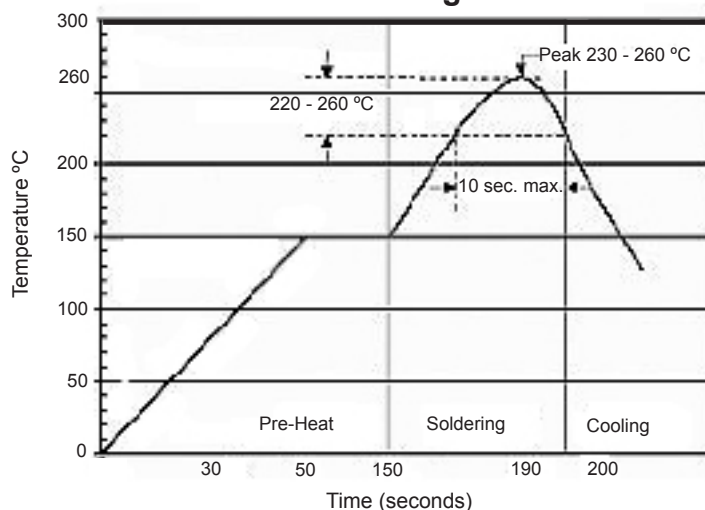
### Specifications:

### Lead free finish

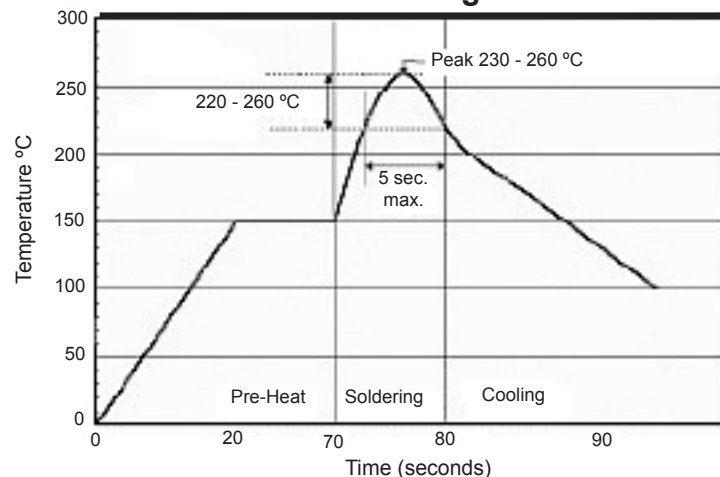
### Case and Terminal Material:

Silver plated, copper flashed, brass

### Reflow Soldering Method



### Wave Soldering Method



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