

# Types MCH and MCHN Multilayer High RF Power Capacitors

## 2500 & 4000 Volt RF Capacitors for Medical Imaging Coils, Plasma Generators, VHF/UHF Power Amplifiers and Antenna Tuning with Nonmagnetic Option



The flexible aluminum silicate dielectric eliminates cracking and permits soldering to 260 °C. These high voltage, RF capacitors need no voltage derating at temperatures up to 125 °C and voltages to 4000 Vdc. Exceptionally low ESR and superior thermal qualities set the MCH/MCHN chip capacitors apart from ordinary RF capacitors.

### Highlights

- No thermal cracking
- FR4 compatible and wave solderable
- Extremely high Q above 50 MHz
- Nonmagnetic option available
- Ultra stable: no change with (t), (V) and (f)
- Excellent for tuning and impedance matching
- High flashover level
- Withstands 2 mm bend test
- Better than porcelain

### Applications

- MRI Coils
- RF Ablation Systems
- Transmitters
- RF Generators
- Antenna Tuning
- Lasers
- RF Power Amplifiers
- MRI Generators

### Specifications

### RoHS Compliant

#### Capacitance and Voltage Ratings:

10 – 220 pF at 4kVdc and 270 – 1000 pF at 2500 Vdc (other ratings available)

#### Capacitance Tolerance:

±5% standard (±2% available)

#### Temperature Range:

–55 °C to +125 °C (with no voltage derating)

#### Case Size:

3838 (9.7 x 9.7 mm)

#### Temperature Characteristics:

Temp. Coefficient	Cap Drift
0 to +50 ppm/°C	±(0.05%+0.1 pF)

### Engineering Design Kits

MCH2500VKIT8, MCH4000VKIT10

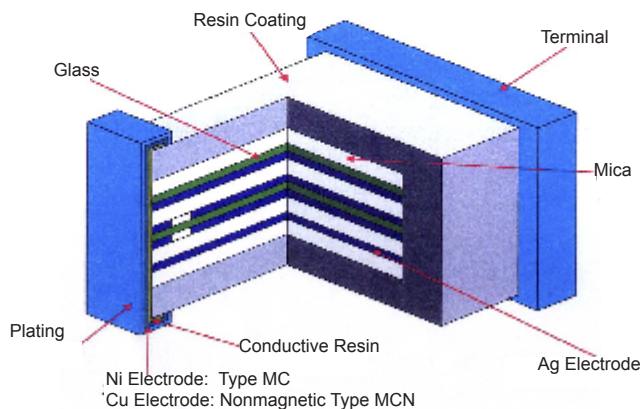
Nonmagnetic MCHN2500VKIT9, MCHN4000VKIT11



2500 V kits 5 each of 8 values 270 to 1000 pF

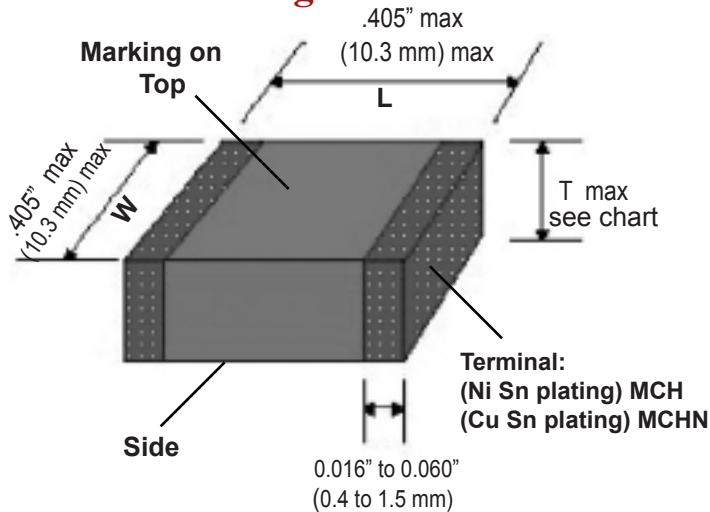
4000 V kits 5 each of 10 values 10 – 220 pF

### High Q, Low ESR Multilayer Construction for RF Power Applications



# Types MCH and MCHN Multilayer High RF Power Capacitors

## Outline Drawing



## Soldering Pattern



## Part Numbering System

<b>MCH</b>	<b>38</b>	<b>F</b>	<b>K</b>	<b>271</b>	<b>J</b>	<b>-Y</b>
Type	Case Code	Temperature Coefficient	Voltage	Capacitance	Tolerance	Package
MCH = Standard MCHN = Nonmagnetic	38 = .380x.380	F=0 to +50 ppm/°C	K = 2500 Vdc M=4000 Vdc	100 = 10 pF 271 = 270 pF 102 = 1000 pF	J = ±5% G = ±2% D = ± 0.5 pF	Blank = Bulk (100 per bag) -Y = Tray pack (100 per tray)

## Ratings (additional ratings available)

RoHS Compliant

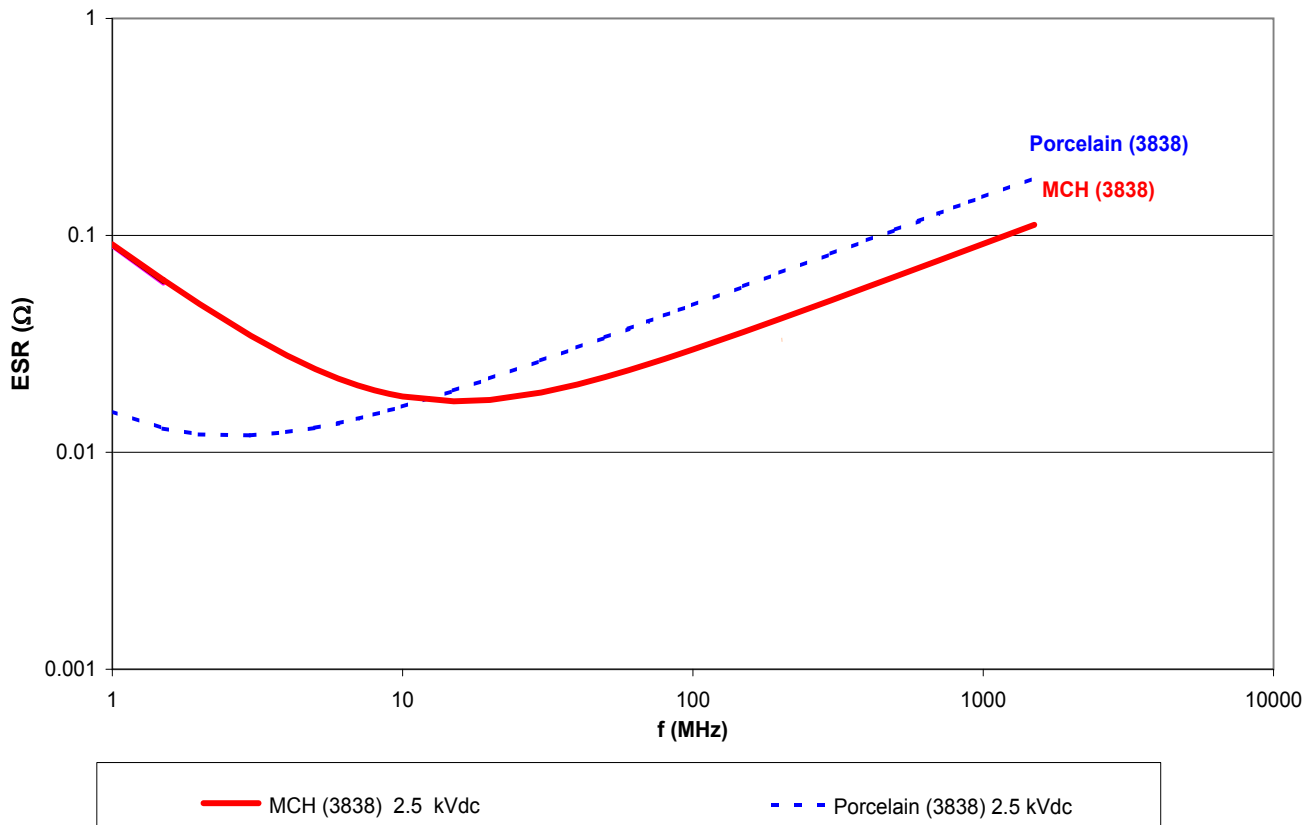
Cap (pF)	Catalog Part Number*	Voltage (Vdc)	Length Inches (mm)	Width Inches (mm)	T max Inches (mm)
10	MCH38FM100D-Y	4000 Vdc	0.380 +0.025 / -0 (9.65 mm +0.65 / - 0)	0.380 +0.025 / -0 (9.65 mm +0.65 / -0)	0.080 (2.03 mm)
12	MCH38FM120J-Y				
15	MCH38FM150J-Y				
18	MCH38FM180J-Y				
22	MCH38FM220J-Y				
27	MCH38FM270J-Y				
33	MCH38FM330J-Y				
39	MCH38FM390J-Y				
47	MCH38FM470J-Y				
56	MCH38FM560J-Y				
68	MCH38FM680J-Y				
82	MCH38FM820J-Y				
100	MCH38FM101J-Y				
120	MCH38FM121J-Y				
150	MCH38FM151J-Y				
180	MCH38FM181J-Y				
220	MCH38FM221J-Y				
270	MCH38FK271J-Y	2500 Vdc			0.160 (4.06 mm)
330	MCH38FK331J-Y				
390	MCH38FK391J-Y				
470	MCH38FK471J-Y				
560	MCH38FK561J-Y				
680	MCH38FK681J-Y				
820	MCH38FK821J-Y				
1000	MCH38FK102J-Y				
					0.240 (6.10 mm)
					0.270 (6.86 mm)

\*For nonmagnetic version change P/N prefix to MCHN

# Types MCH and MCHN Multilayer High RF Power Capacitors

## Typical Performance Data

ESR vs. Frequency for 470 pF



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



# Types MCH and MCHN Multilayer High RF Power Capacitors

## Typical Performance Data

Q vs. Frequency 470 pF @ 25 °C

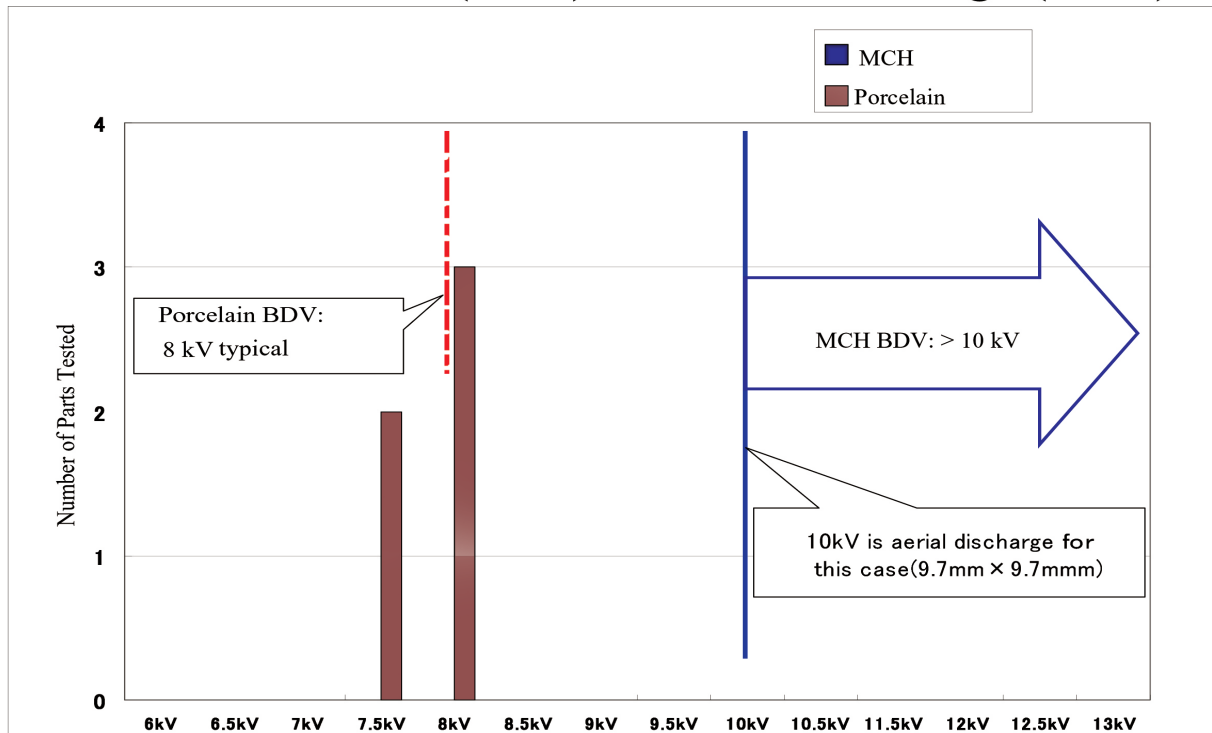


Impedance vs. Frequency for 470 pF @ 25 °C



## Typical Performance Data

### MCH vs. Porcelain (3838) Breakdown Voltage (BDV)



### Environmental Specifications

**Humidity (No Load):** +40 °C ±2 °C @ 90% to 95% RH, 500 hrs. Measure after 24 hrs, cap is ±3% of initial, DF ≤150% of original, IR 3x10<sup>4</sup> MΩ, no visual damage

**Storage Method:** Store at 0 to +40 °C at ≤60% RH, use within 6 months of receipt, if 6 months is exceeded, check solderability

### Electrical Specifications

**Dielectric Strength:** **2500 Vdc:** 1.5 x Rated Voltage for 5 seconds  
**4000 Vdc:** 1.2 x Rated Voltage for 5 seconds

**Dissipation Factor (DF):** ≤0.1% @ 1 MHz and ≤5 Vrms

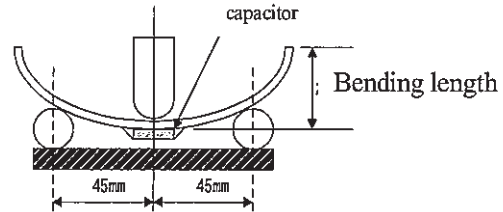
**Insulation Resistance:** 100K MΩ minimum @ 500 Vdc ±10%

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## Mechanical Specifications

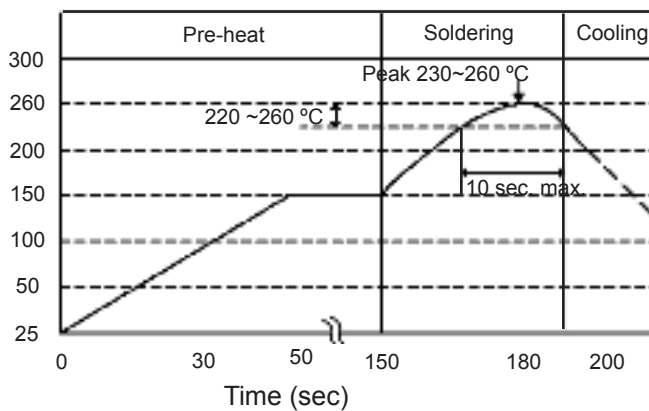
### Bending Test:

Mount the capacitor as shown below and press the ram bar until a 2.0 mm deflection is achieved. There will be no visual damage and the capacitors will meet the limits of methods JIS 5102 8.11 and AEC-Q200-005 without cracking or visual damage.



## Soldering Specifications

### Reflow Solder Profile



### Wave Solder Profile



### Hand Soldering Method

- SnPb or SnAgCu recommended solder
- Do not use strong acid type flux with RM or RMS
- Soldering iron tip temperature should be 280 °C to 350 °C ≤ 5 sec.
- 80 Watt iron or less
- Iron tip should not touch chip terminals



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