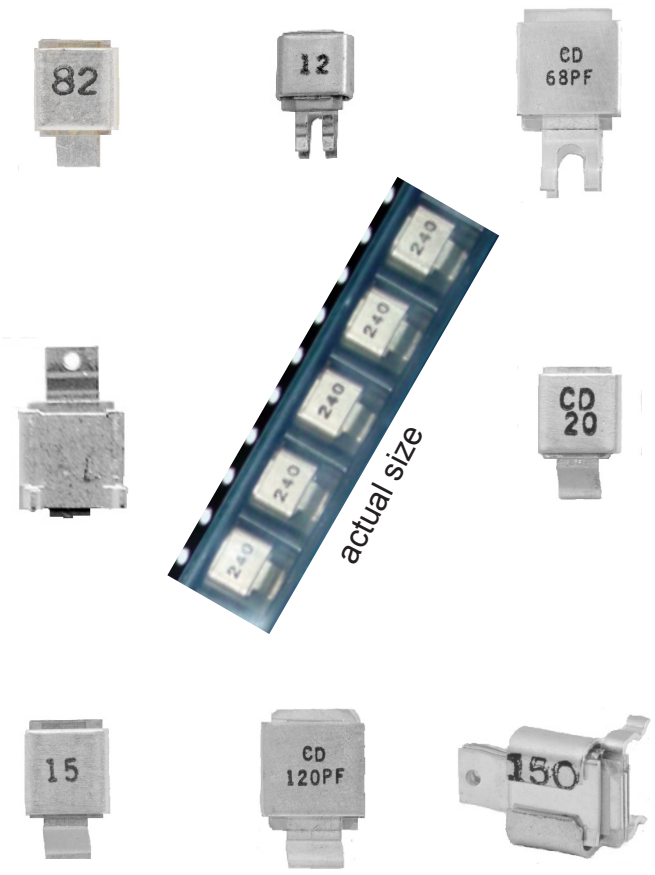
Types MCM and MIN SMT Clad RF Capacitors

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 ºC 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 ºC rated with no voltage derating
- Wave solderable
- No cracking or delaminating
- CTE ≈ 18 ppm/ºC compatible with FR4 PCBs
- Highly thermal conductive package
- Gull-wing terminal minimizes stress
- Typical 100 pF ESR, <11 mΩ @ 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 ±0.25 pF
- RoHS Compliant

Specifications

RoHS Compliant

Complies with the EU Directive 2002/95/EC requirement restricting the use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent chromium (Cr(VI)), PolyBrominated Biphenyls (PBB) and PolyBrominated Diphenyl Ethers (PBDE).

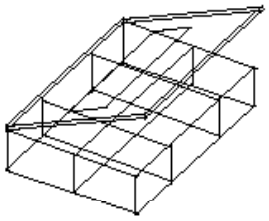
	MCM	MIN
Capacitance Range:	1 to 1500 pF	1 to 350 pF
Voltage Ratings:	300 to 1000 Vdc	300 Vdc
Temperature Range:	–55 ºC to +200 ºC with no voltage derating	
Capacitance Tolerance:	±0.25pF, ±0.5 pF, ±1 pF, ±0.5%, ±1%, ±2%, ±5%	
Dielectric Strength:	200% of rated voltage for 5 seconds	
Insulation Resistance:	1000 MΩ•µF Need not exceed 100,000 MΩ at 25 ºC	
Aging Rate:	None	
Marking:	**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

Types MCM and MIN SMT Clad RF Capacitors

Ratings Available

Capacitance (pF)	Voltage Ratings (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 or MIN02 Type	— "dash"	001 Terminal Configuration	C Temperature Coefficient * (mica only)	D Rated Voltages (Vdc)	101 Capacitance (pF)	J Capacitance Tolerance* (pF or %)	—	T Packaging	F RoHS Compliant
			C	C = 300 Vdc	090 = 9	A = ±1 pF 2 - 200 pF		–T = Tape	Blank = Not
			D	D = 500 Vdc	9R2 = 9.2	B = ±0.25 pF 1 - 50 pF		Blank = Bulk	specified
			E	F = 1000 Vdc	100 = 10	D = ±0.5 pF 1 - 100 pF			F = Compliant
					101 = 100	E = ±0.5 % > 100 pF			
					(751) = 751	F = ±1 % > 33 pF			
					102 = 1000	G = ±2% > 11 pF			
						J = ±5% > 11 pF			
						K = ±10% > 11 pF			

MCM01	MIN02
▲001[2]	▲002[1]
▲009[1,2]	
▲010	

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

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

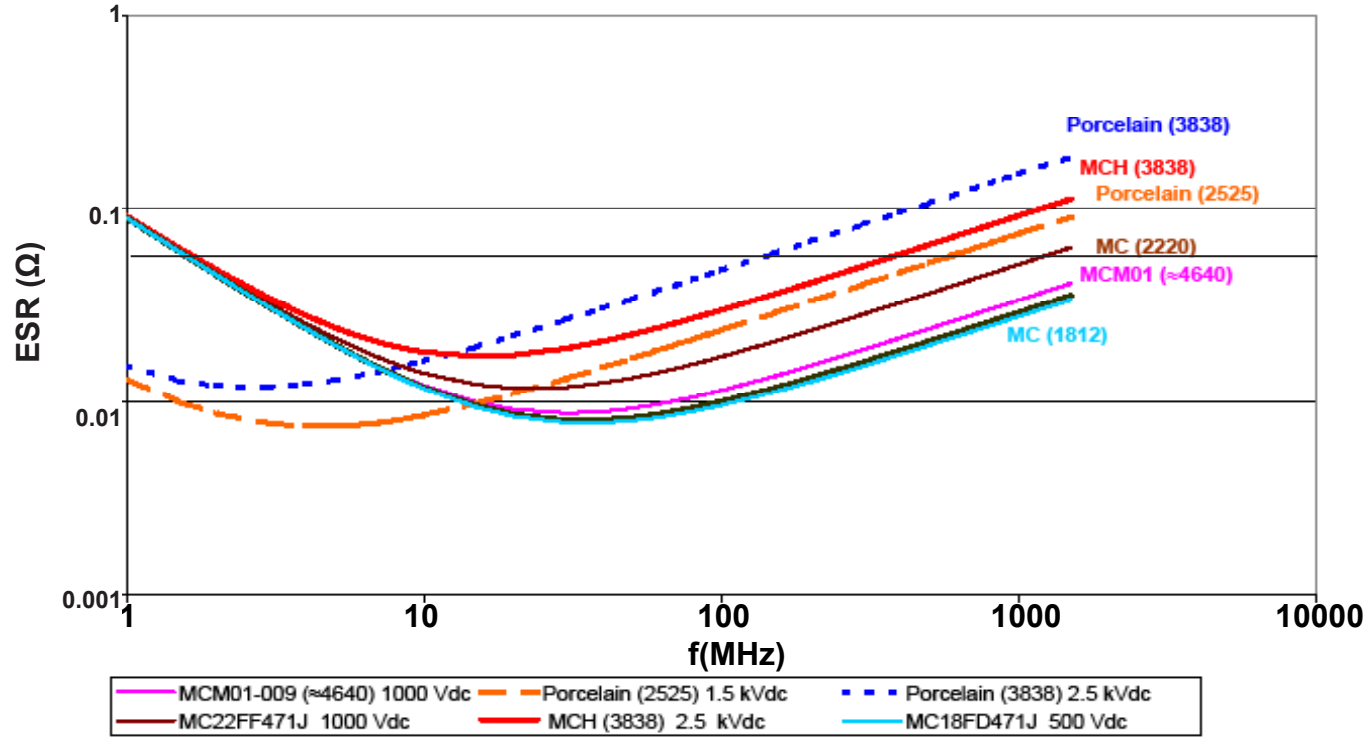
*TC code letter is left blank for PTFE items

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

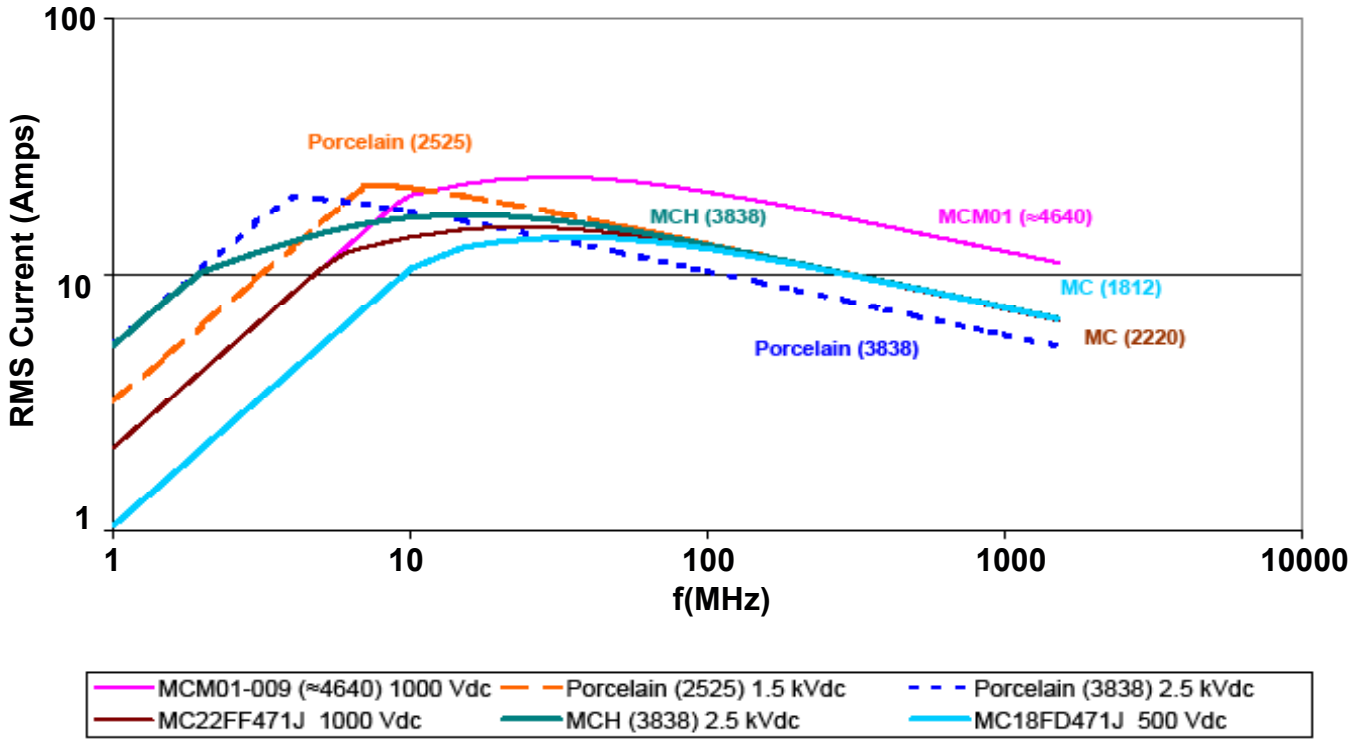
Typical Performance Data

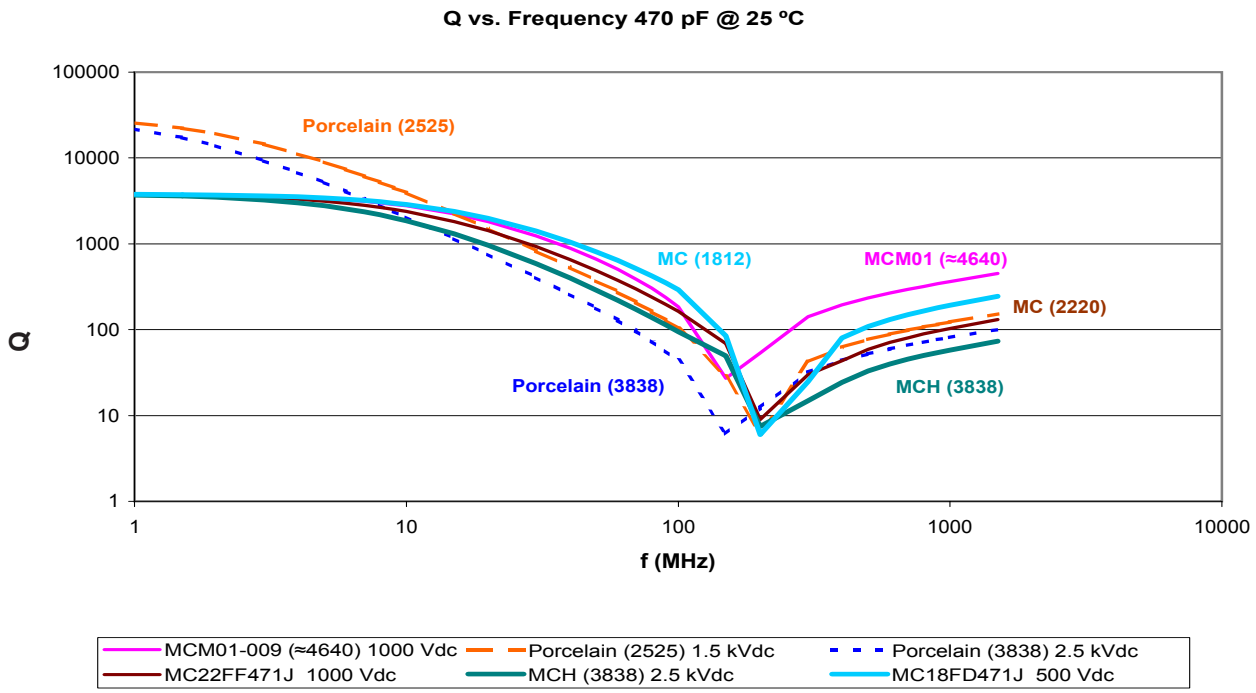
click here to see additional rating charts

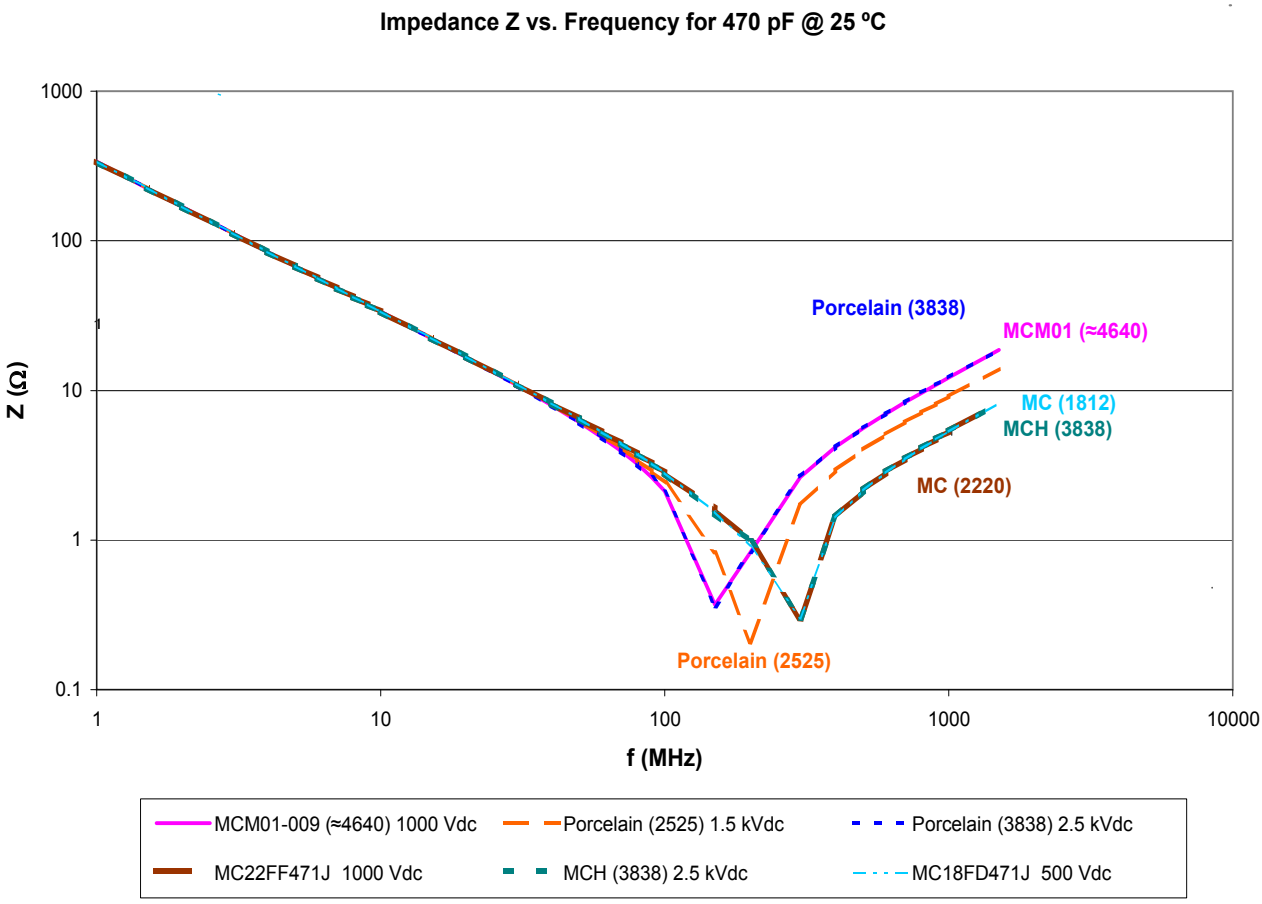
ESR vs. Frequency for 470 pF



Current Rating (IRMS) for 470 pF at 60 ºC Rise

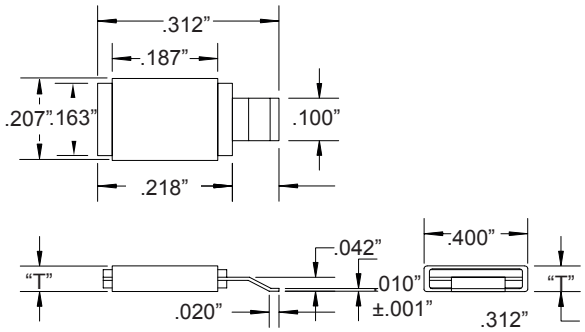



Q vs. Frequency 470 pF @ 25 ºC
Q
f (MHz)
100000
10000
1000
100
10
1
1
10
100
1000
10000
Porcelain (2525)
MC (1812)
MCM01 (≈4640)
MC (2220)
Porcelain (3838)
MCH (3838)
MCM01-009 (≈4640) 1000 Vdc
Porcelain (2525) 1.5 kVdc
Porcelain (3838) 2.5 kVdc
MC22FF471J 1000 Vdc
MCH (3838) 2.5 kVdc
MC18FD471J 500 Vdc


Impedance Z vs. Frequency for 470 pF @ 25 ºC
Z (Ω)
f (MHz)
1000
100
10
1
0.1
1
10
100
1000
10000
Porcelain (3838)
MCM01 (≈4640)
MC (1812)
MCH (3838)
MC (2220)
Porcelain (2525)
MCM01-009 (≈4640) 1000 Vdc
Porcelain (2525) 1.5 kVdc
Porcelain (3838) 2.5 kVdc
MC22FF471J 1000 Vdc
MCH (3838) 2.5 kVdc
MC18FD471J 500 Vdc

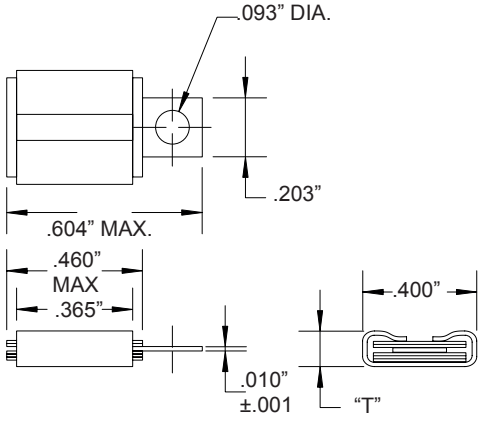
Outline Drawings for Popular Items

MIN02-002



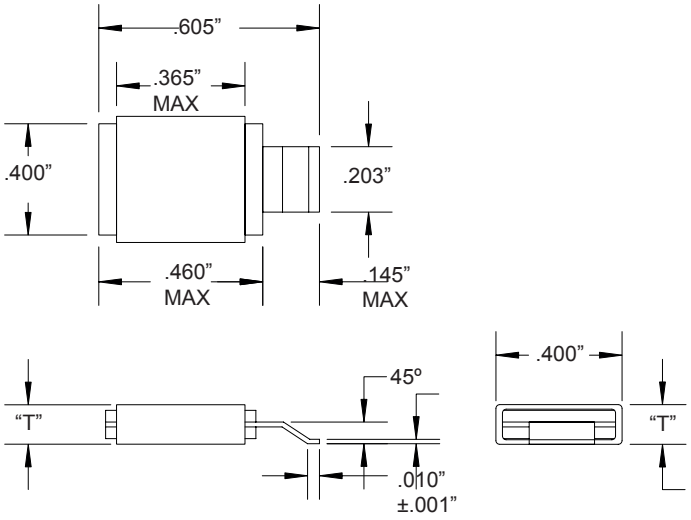
"T" (thickness) depending on capacitance value = .065 to .125±.015

MCM01-001



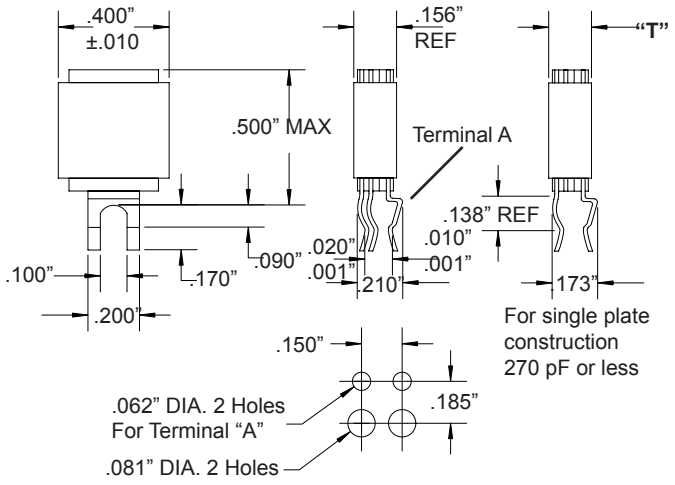
"T" (thickness) depending on capacitance value= .110 to .165±.015

MCM01-009



"T" (thickness) depending on capacitance value= .110 to .165±.015

MCM01-010



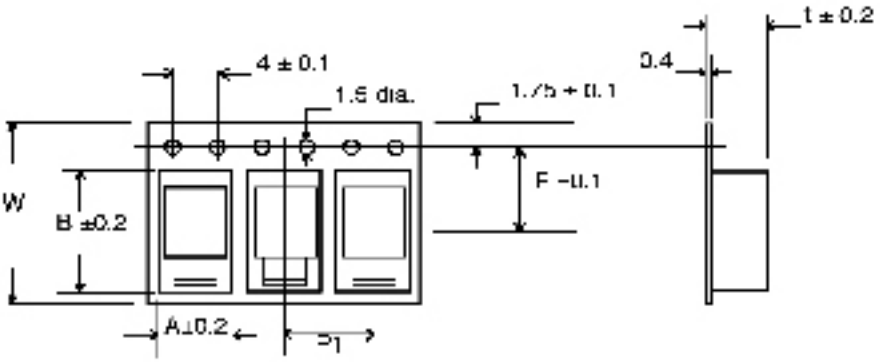
"T" (thickness) depending on capacitance value= .110 to .165±.015

"T" varies with capacitance

Standard Minimum Quantities

Bulk Pack: 100 pieces per bag Reel Pack: 500 pieces per reel

Tape Specifications



Tape Dimensions (mm)						
Case	**W**	**A**	**B**	**P1**	**F**	**t**
MIN02-002 < 150 pF	16	5.56	8.18	8	7.5	2.16
MIN02-002 ≥ 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. **1**

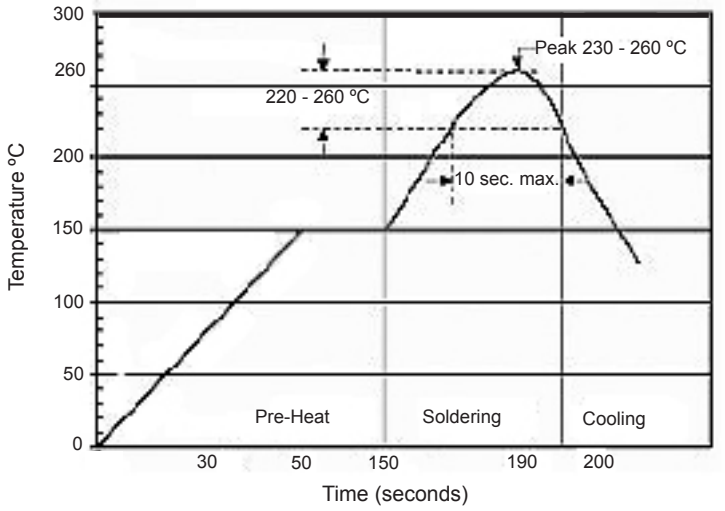
Solder Profile

Specifications:

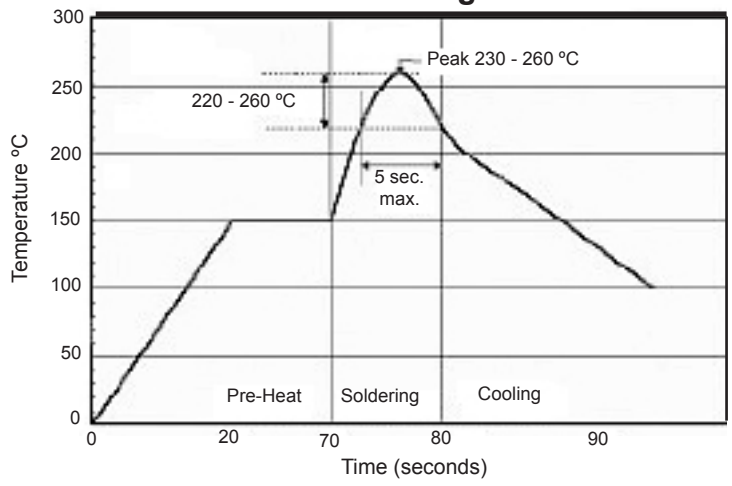
Lead free finish

Case and Terminal Material:
Silver plated, copper flashed, brass

Reflow Soldering Method



Wave Soldering Method



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