

Product Bulletin

Surface Mount Ceramic Chip Capacitors High Temperature 200°C C0G MLCC



Benefits and Features:

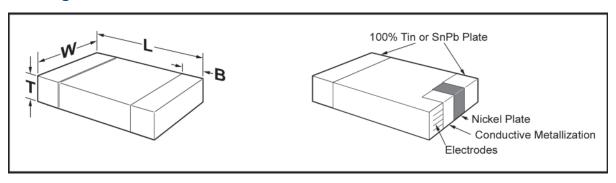
No Piezoelectric Noise. Extremely low ESR and ESL. High Thermal Stability. High Ripple Current Capability. Preferred capacitance solution at line frequencies and into the MHz range. No capacitance change with respect to applied rated DC voltage. Minimal capacitance change with respect to temperature from -55°C to +200°C. No capacitance decay with time. Non-polar device.

Applications:Typical applications include critical timing, tuning, circuits requiring low loss, circuits with pulse, high current, decoupling, by-pass, filtering, transient voltage suppression, blocking and energy storage for use in extreme environments commonly present in applications such as down-hole exploration, aerospace engine compartments and geophysical probes.

KEMET's New High Temperature Surface Mount C0G MLCCs feature a robust and proprietary base metal dielectric system that offers industry-leading performance relative to capacitance and case size combined with capacitance stability at extreme temperatures up to +200°C. This new platform promotes downsizing opportunities of existing High Temperature C0G technology, and offers replacement opportunities of existing X7R/BX/ BR technologies.

Standard capacitance ratings for these devices range from 0.5 pF up to 0.22 µF in capacitance tolerance offerings of ±0.25pF, ±0.5pF, ±1%, ±2%, ±5%, ±10%, or ±20%. The Temperature Coefficient of Capacitance (TCC) is ±30ppm/°C from -55°C to +200°. Devices are available in DC voltage ratings of 10V, 16V, 25V, 50V and 100V, with a maximum dissipation factor of 0.10%. Seven standard EIA case size options are available which include -0603, 0805, 1206, 1210, and 1812- with either nickel barrier/tin or Sn/Pb terminations.

Outline Drawing



Dimensions - Millimeters (Inches)

EIA SIZE CODE	METRIC SIZE CODE	L LENGTH	W WIDTH	B BANDWIDTH	S SEPARATION minimum
0603	1608	1.6 (.063) ± .15 (.006)	0.8 (.032) ± .15 (.006)	0.35 (.014) ± .15 (.006)	0.7 (.028)
0805	2012	2.0 (.079) ± .20 (.008)	1.25 (.049) ± .20 (.008)	0.50 (.020) ± .25 (.010)	0.75 (.030)
1206	3216	3.2 (.126) ± .20 (.008)	1.6 (.063) ± .20 (.008)	0.50 (.020) ± .25 (.010)	N/A
1210	3225	3.2 (.126) ± .20 (.008)	2.5 (.098) ± .20 (.008)	0.50 (.020) ± .25 (.010)	N/A
1812	4532	4.5 (.177) ± .30 (.012)	3.2 (.126) ± .30 (.012)	0.60 (.024) ± .35 (.014)	N/A



Ordering Information

С	1210	Н	124	J	5	G	Α	С	TU
Ceramic	Case Size (L"x W")	Specification/ Series	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Dielectric	Failure Rate/ Design	End Metallization (Plated)	Packaging/Grade (C-Spec)*
	0603	H = High Temp (200°C)	2 Sig. Digits +	C = ±0.25pF	8 = 10V	G = C0G	A = N/A	C = 100% Matte Sn	Blank = Bulk
	0805		Number of	D = ±0.5pF	4 = 16V			L = SnPb (5% min)	TU = 7" Reel Unmarked
	1206		Zeros*	F = ±1%	3 = 25V				TM = 7" Reel Marked
	1210		*Use 9 for 1.0 - 9.9pF	G = ±2%	6 = 35V				
	1812		*Use 8 for 0.599pF	J = ±5%	5 = 50V				
			ex. 2.2pF = 229	K = ±10%	1 = 100V				
			ex. 0.5pF = 508	M = ±20%	2 = 200V				

^{*}Contact KEMET for availability and ordering details if you require additional reeling or packaging options.

Additional termination options may be available, contact KEMET for details.

Electrical Parameters/Characteristics

Operating Temperature Range:	-55°C to +200°C
Temperature Coefficient of Capacitance :	±30PPM/°C (up to 200°C)
Aging Rate (Max % Cap Loss/Decade Hour):	0%
Dielectric Withstanding Voltage:	250%
Dissipation Factor (DF) @ 25°C:	.001 (0.10%) Max
Insulation Resistance (IR) Limit @ 25°C: Insulation Resistance (IR) Limit @ 200°C:	0

Capacitance and Dissipation Factor (DF) measured under the following conditions:

1kHz and 1 Vrms if capacitance >1000pF 1MHz and 1 Vrms if capacitance ≤1000pF

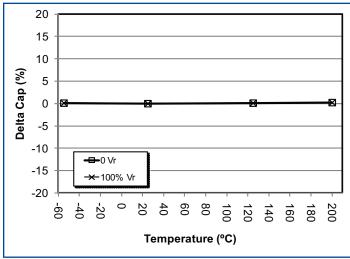
Qualification/Certification

RoHS-PRC (6/6) - 100% matte Sn termination

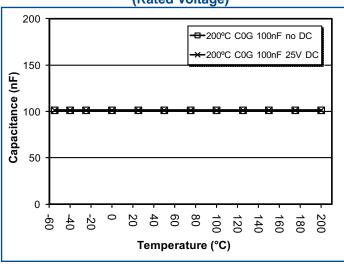
NOTIS-1 NO (0/0) - 100 % matter sit termination										
	Product Qualification Test Plan									
RELIABIL	RELIABILITY/ ENVIRONMENTAL TESTS per MIL-STD-202/JESD22									
High Temperature Life	200°C, Rated Voltage, 2000 Hours.									
Load Humidity 85°C /85%RH, Rated Voltage, 1000 Hours.										
Low Voltage Humidity 85°C /85%RH, 1.5V, 1000 Hours.										
Temperature Cycling -55°C to +200°C, 50 Cycles.										
Thermal Shock	-55°C to +150°C, 20s transfer, 15 min dwell, 300 Cycles.									
Moisture Resistance	Cycled Temp / RH. 0V, 10 cycles @ 24 Hrs each.									
PHYSICAL, ME	ECHANICAL & PROCESS TESTS per MIL-STD 202/JIS-C-6429									
Resistance to Solvents	Include Aqueous wash chemical - OKEM Clean or equivalent.									
Mechanical Shock and Vibration	Method 213: Figure 1, Condition F Method 204: 5 gs for 20 min,12 cycles.									
Restistance to Soldering Heat Condition B, no pre-heat of samples, Single Wave Solder.										
Terminal Strength	Force of 1.8 kg for 60 seconds.									
Board Flex	3mm minimum.									

Electrical Characteristics

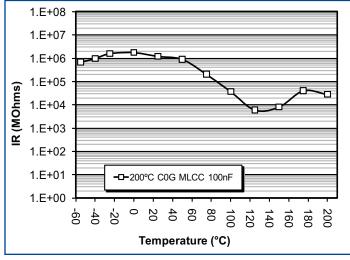
Delta Cap vs. Temperature (Typical)



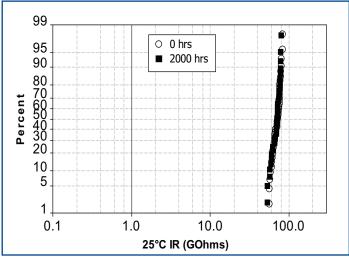
Capacitance vs. Temperature with 25V DC bias (Rated Voltage)



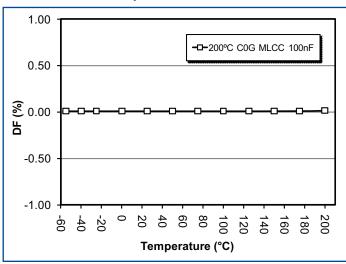
IR vs. Temperature with 25V DC bias (Rated Voltage)



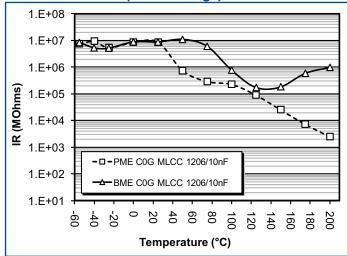
C1210H104J1GAC - Life Test IR Distribution (Lognormal)



DF vs. Temperature without DC bias.



BME vs. PME/IR vs. Temperature with 25V DC bias (Rated Voltage)





High Temperature 200°C (0603 - 1812 Case Sizes) COG DIELECTRIC

		Series		Ten	C0	603					C0	805					C1:	206					C 1:	210			C18	312
Сар	Сар	Voltage	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	50V	100V
pF	Code	Voltage Code	8	4	3	5	1	2	8	4	3	5	1	2	8	4	3	5	1	2	8	4	3	5	1	2	5	1
0.50-0.75	508-759	Cap Tolerance	CB	CB	СВ	CB	Pr CB		DC	DC	y and	Chip	DC.	ness	Codes	s - Se	e Pag	e 78 f	or Ch	ip Thi	icknes	ss Dir	nensi	ons				
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		Voltage Code	8	4	3	5	1	2	8	4	3	5	1	2	8	4	3	5	1	2	8	4	3	5	1	2	5	1
Cap pF	Cap Code	Voltage	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	50V	100V
		Series			C0	603					CO	805					C1:	206					C1:	210			C18	312

Chip Thickness / Packaging Quantities

Thickness Code Reference Chart Packaging Quantity Based on Finished Chip Thickness Specifications

Thickness Code	Chip Size	Thickness ± Range (mm)	Qty per Reel 7" Plastic	Qty per Reel 13" Plastic	Qty per Reel 7" Paper	Qty per Reel 13" Paper	Qty per Bull Cassette
AA	01005	0.20 ± 0.02			15000		
AB	0201	0.30 ± 0.03			15000		
BB CB	0402	0.50 ± 0.05			10000	50000	50000
CC	0603 0603	0.80 ± 0.07 0.80 ± 0.10			4000 4000	10000 10000	15000
CD	0603	0.80 ± 0.10			4000	10000	
DB	0805	0.60 ± 0.10		_	4000	10000	10000
DC	0805	0.78 ± 0.10			4000	10000	
DD	0805	0.90 ± 0.10			4000	10000	
DE	0805	1.00 ± 0.10	2500	10000	-	-	
DF	0805	1.10 ± 0.10	2500	10000			
DG	0805	1.25 ± 0.15	2500	10000			
DH	0805	1.25 ± 0.20	2500	10000			
DL	0805	0.95 ± 0.10	4000	10000			
EB	1206	0.78 ± 0.10	4000	10000	4000	10000	
EC	1206	0.90 ± 0.10	4000	10000	-	-	-
ED	1206	1.00 ± 0.10	2500	10000			
EE EF	1206 1206	1.10 ± 0.10 1.20 ± 0.15	2500 2500	10000 10000	-		
EG	1206	1.60 ± 0.15	2000	8000			
EH	1206	1.60 ± 0.13	2000	8000			
EJ	1206	1.70 ± 0.20	2000	8000	-	-	-
EK	1206	0.80 ± 0.10	2000	8000	-		-
EM	1206	1.25 ± 0.15	2500	10000			
EN	1206	0.95 ± 0.10	4000	10000			
FB	1210	0.78 ± 0.10	4000	10000			
FC	1210	0.90 ± 0.10	4000	10000			
FD	1210	0.95 ± 0.10	4000	10000	-		
FE	1210	1.00 ± 0.10	2500	10000			
FF	1210	1.10 ± 0.10	2500	10000			
FG	1210	1.25 ± 0.15	2500	10000			
FH	1210	1.55 ± 0.15	2000	8000			
FJ	1210	1.85 ± 0.20	2000	8000			
FK FL	1210 1210	2.10 ± 0.20	2000 2000	8000 8000			
FM	1210	1.40 ± 0.15 1.70 ± 0.20	2000	8000			
FN	1210	1.70 ± 0.20	2000	8000			
FO	1210	1.50 ± 0.20	2000	8000			
FP	1210	1.60 ± 0.20	2000	8000			
FR	1210	2.25 ± 0.20	2000	8000			
FS	1210	2.50 ± 0.20	1000	4000	-		
FT	1210	1.90 ± 0.20	1500	4000			
GB	1812	1.00 ± 0.10	1000	4000	-		
GC	1812	1.10 ± 0.10	1000	4000			
GD	1812	1.25 ± 0.15	1000	4000			
GE	1812	1.30 ± 0.10	1000	4000			
GF	1812	1.50 ± 0.10	1000	4000			
GG	1812	1.55 ± 0.10	1000	4000			
GH	1812	1.40 ± 0.15	1000	4000			
GJ	1812	1.70 ± 0.15	1000	4000			
GK	1812	1.60 ± 0.20	1000	4000			
GL	1812	1.90 ± 0.20	1000	4000			
GM GN	1812	2.00 ± 0.20	1000 1000	4000			
GN GO	1812 1812	1.70 ± 0.20 2.50 ± 0.20	500	4000 2000	-		
HB	1825	2.50 ± 0.20 1.10 ± 0.15	1000	4000	-		
HC	1825	1.10 ± 0.15	1000	4000			
HD	1825	1.30 ± 0.15	1000	4000			
HE	1825	1.40 ± 0.15	1000	4000	-	-	-
HF	1825	1.50 ± 0.15	1000	4000			
HG	1825	1.60 ± 0.20	1000	4000			
JB	2220	1.00 ± 0.15	1000	4000	-		-
JC	2220	1.10 ± 0.15	1000	4000			
JD	2220	1.30 ± 0.15	1000	4000			
JE	2220	1.40 ± 0.15	1000	4000	-	-	-
JF	2220	1.50 ± 0.15	1000	4000			
JG	2220	1.70 ± 0.15	1000	4000			
JH	2220	1.80 ± 0.15	1000	4000			
JO	2220	2.40 ± 0.15	500	2000			
JP	2220	1.60 ± 0.20	1000	4000			
KB	2225	1.00 ± 0.15	1000	4000	-	-	-
KC	2225	1.10 ± 0.15	1000	4000	-		-
KD	2225	1.30 ± 0.15	1000	4000			
KE	2225	1.40 ± 0.15	1000	4000			
KF LA	2225 1808	1.60 ± 0.20	1000 1000	4000 4000			
LA LB		1.40 ± 0.15 1.60 ± 0.15		4000			
TC TR	1808 1808	1.60 ± 0.15 2.00 ± 0.15	1000 1000	4000			
LD	1808	0.90 ± 0.10	2500	10000	-		
LD	1632	0.80 ± 0.10	4000	10000			



Soldering Process

All parts incorporate the standard KEMET barrier layer of pure nickel, with an overplate of pure tin to provide excellent solderability as well as resistance to leaching.

HMP solders ,e.g., Pb94, are recommended for high temperature applications.

Marking

These chips will be supplied unmarked. If required, they can be laser-marked as an extra option. Details on the marking format are included in KEMET Surface Mount catalog F3102.

In general, the information in the KEMET Surface Mount catalog F3102 applies to these capacitors. The information in this bulletin supplements that in the catalog.