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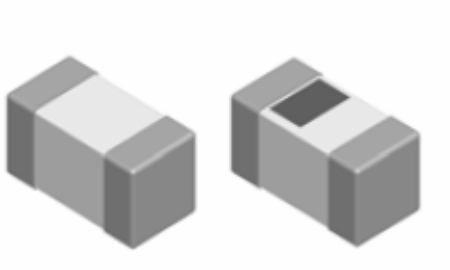
CMCC2012C Series

Multilayer Chip Ceramic Inductor

◆ Features

1、Monolithic Structure for high reliability
2、High self-resonant frequency
3、Excellent solderability and high heat resistance
4、RoHS Compliant.



◆ Application

1、RF Circuit of in telecommunication and other Equipments

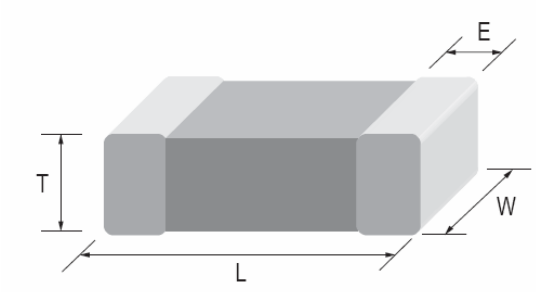
◆ PRODUCT IDENTIFICATION

CMCC	2012	C	10N	J	S	P
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) Series Type
(2) Chip Size（mm）:Length X Width
(3) Material Code
(4) Inductance：1N0=1nH；10N=10nH
R10=100nH
(5) Inductance Tolerance：S=±0.3;
J=±5%; K=±10%
(6) Company Code
(7) Packaging:P–Embossed paper tape, 7" reel
E- Embossed plastic tape, 7" reel

◆ Dimensions Unit: mm

Size(EIA)	2012(0805)
L	2.0 ±0.2
W	1.25±0.2
T	0.85±0.2
E	0.50±0.2



◆Specifications

CMCC2012C Series

Part Number	Inductance (nH)	Min. Quality Factor (Q)	L, Q Test Freq. L/Q(MHz)	Typical Q @ Freq. (MHz)			Min. Self-resonant Frequency (MHz)	Max. DC Resistance (Ω)	Max. Rated Current (mA)
				100	800	1000			
						Q			
CMCC2012 Series									
CMCC2012C1N5SSP	1.5±0.3	10	100	21	61	85	6000	0.10	500
CMCC2012C1N8SSP	1.8±0.3	10	100	20	55	80	6000	0.10	500
CMCC2012C2N2SSP	2.2±0.3	10	100	20	53	75	6000	0.10	500
CMCC2012C2N7SSP	2.7±0.3	12	100	18	56	70	5500	0.10	500
CMCC2012C3N3SSP	3.3±0.3	12	100	18	54	65	5000	0.13	500
CMCC2012C3N9SSP	3.9±0.3	12	100	18	54	60	4500	0.15	500
CMCC2012C4N7SSP	4.7±0.3	12	100	18	55	65	4000	0.20	500
CMCC2012C5N6SSP	5.6±0.3	15	100	18	60	66	3500	0.23	500
CMCC2012C6N8JSP	6.8	15	100	18	63	68	3000	0.25	500
CMCC2012C8N2JSP	8.2	15	100	20	63	70	2500	0.28	500
CMCC2012C10NJSP	10	15	100	21	60	70	2200	0.30	500
CMCC2012C12NJSP	12	15	100	20	60	70	2000	0.35	500
CMCC2012C15NJSP	15	15	100	20	63	65	1800	0.40	500
CMCC2012C18NJSP	18	15	100	22	63	60	1600	0.45	300
CMCC2012C22NJSP	22	15	100	19	60	45	1500	0.50	300
CMCC2012C27NJSP	27	15	100	19	58	38	1400	0.55	300
CMCC2012C33NJSP	33	15	100	19	55	30	1300	0.60	300
CMCC2012C39NJSP	39	15	100	19	47	26	1100	0.65	300
CMCC2012C47NJSP	47	18	100	23	43	20	1000	0.70	300
CMCC2012C56NJSP	56	18	100	22	39	10	900	0.75	300
CMCC2012C68NJSP	68	18	100	22	30	-	850	0.80	300
CMCC2012C82NJSP	82	18	100	22	-	-	800	0.90	300
CMCC2012CR10JSP	100	18	100	22	-	-	700	0.90	300
CMCC2012CR12JSP	120	13	50	19	-	-	600	0.95	300
CMCC2012CR15JSP	150	13	50	19	-	-	550	1.20	300
CMCC2012CR18JSP	180	13	50	19	-	-	500	1.30	300
CMCC2012CR22JSP	220	12	50	20	-	-	400	1.50	300
CMCC2012CR27JSP	270	12	50	20	-	-	350	1.80	300
CMCC2012CR33JSP	330	12	50	18	-	-	300	2.00	300
CMCC2012CR39JSP	390	10	50	17	-	-	250	2.00	300
CMCC2012CR47JSP	470	10	50	17	-	-	200	2.00	300

◆General Technical Data

Operating Temperature Range	-55℃ ~ +125℃
Storage Condition	Less than 40℃ and 70% RH
Soldering Method	Reflow or Wave Soldering

◆ Composition / Information on Ingredients

Product Structure: See Fig.1, Fig. 2 and Fig. 3

Fig.1 Shape

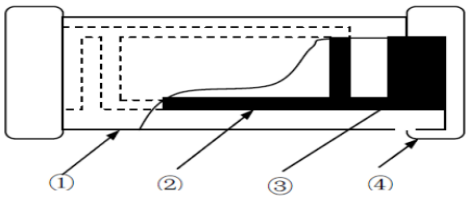


Fig.2 Body Structure

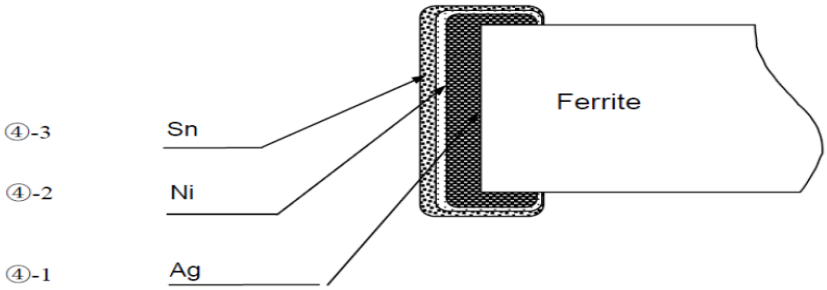


Fig. 3 Structure of Electro-plating

Composition/Information on the Components		
Code	**Material**	**Main Components**
①	Ceramic	Boron Silicate,Al_2O_3, Secret
②	Inner Coil	Silver (Ag)
③	Pull-out Electrode	Silver (Ag)
④-1	Terminal Electrode	Silver (Ag)
④-2	Electrode-plating: Nickel plating	Nickel (Ni)
④-3	Electrode-plating: Sn plating	Tin (Sn)

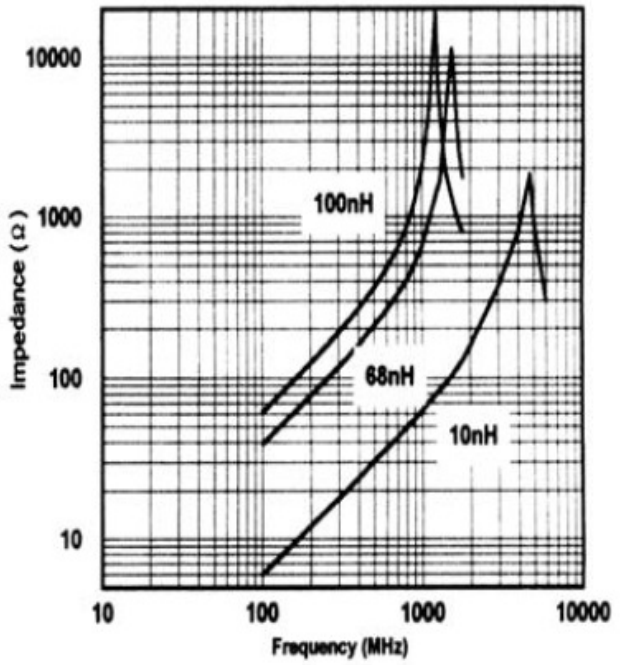
Compositions Wt Rate (Wt%) of Material

Material	Wt Rate (Wt%)	CAS No.
Boron Silicate	51~65	65997-18-4
Al_2O_3	14~17	1344-28-1
Secret	0~5	-
Ag	9~29	7440-22-4
Nickel	1.8~2.3	7440-02-0
Tin	3.6~4.7	7440-31-5

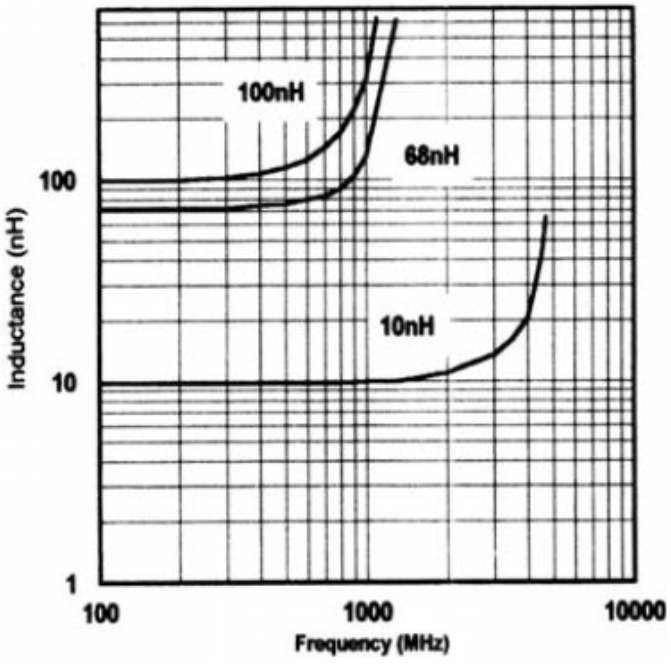
◆ TYPICAL ELECTRICAL CHARACTERISTICS

CMCC2012 Series

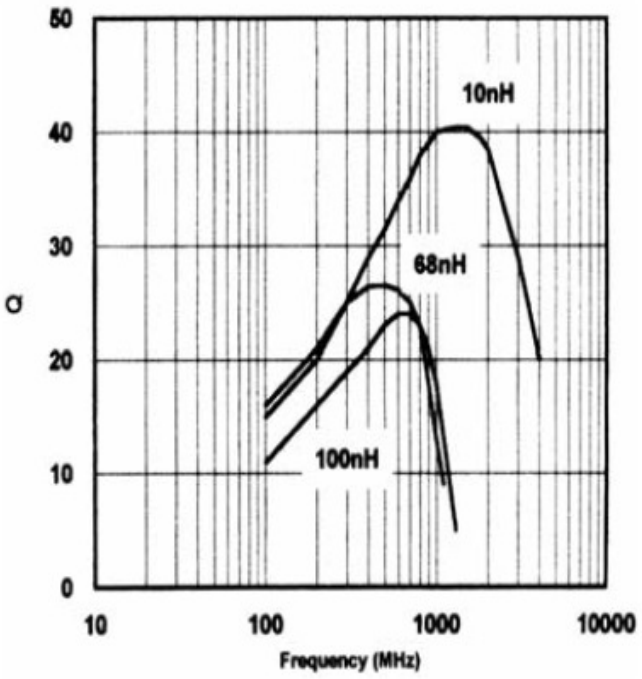
Inductance vs. Frequency Characteristics



Impedance vs. Frequency Characteristics



Q vs. Frequency Characteristics



◆ Test and Measurement Procedures

1、Test Conditions

A、nless otherwise specified, the standard atmospheric conditions for measurement/test as:

a.Ambient Temperature: 20±15℃
b.Relative Humidity: 65±20%
c.Air Pressure: 86kPa to 106kPa

B、If any doubt on the results, measurements/tests should be made within the following limits:

a.Ambient Temperature: 20±2℃
b.Relative Humidity: 65±5%
c.Air Pressure: 86kPa to 106kPa

2、Visual Examination

a .Inspection Equipment: 20× magnifier

3、Electrical Test

A、DC Resistance (DCR)

a.Refer to Appendix A.
b.Test equipment (Analyzer): High Accuracy Milliohmmeter-HP4338B or equivalent.

B、Inductance (L)

a.Refer to Appendix A.
b.Test equipment: High Accuracy RF Impedance /Material Analyzer-E4991A+HP16192A or equivalent.
c.Test signal: -20dBm or 50mV
d.Test frequency refers to Appendix A.

C、Q Factor (Q)

a.Refer to Appendix A.
Test equipment: High Accuracy RF Impedance /Material Analyzer-E4991A+HP16192A or equivalent.
b.Test signal: -20dBm or 50mV
c.Test frequency refers to Appendix A.

4、Self-Resonant Frequency (SRF)

A、Refer to Appendix A.
Test equipment: High Accuracy RF Impedance /Material Analyzer- E4991A+HP16192A or Agilent E5071C Network analyzer(when SRF＞3GHz).

B、Test signal: -20dBm or 50 mV

5、Rated Current

A、Refer to Appendix A.
B、Test equipment (see Fig1): Electric Power, Electric current meter, Thermometer.
C、Measurement method (see Fig1):
a.Set test current to be 0mA.
b.Measure initial temperature of chip surface.
c.Gradually increase voltage and measure chip temperature for corresponding current.
D、Definition of Rated Current(Ir): Ir is direct electric current as chip surface temperature rose just 20℃ against chip initial surface temperature(Ta) (see Fig2).

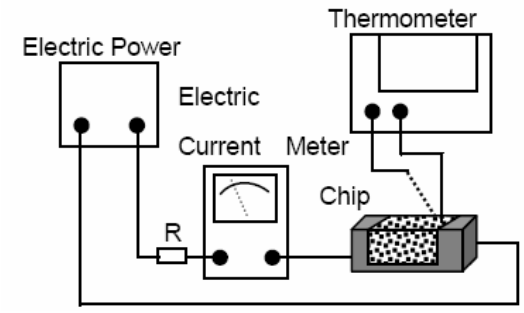


Fig1

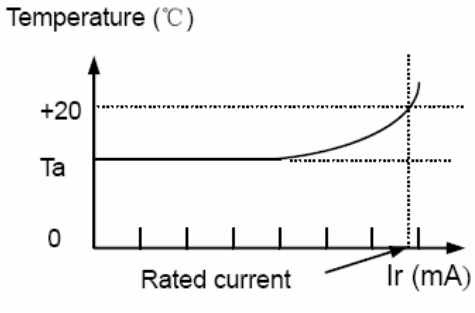
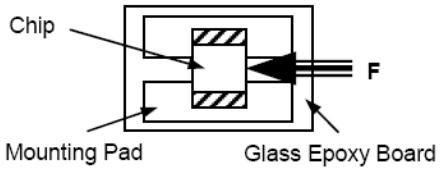
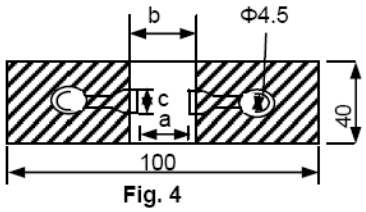
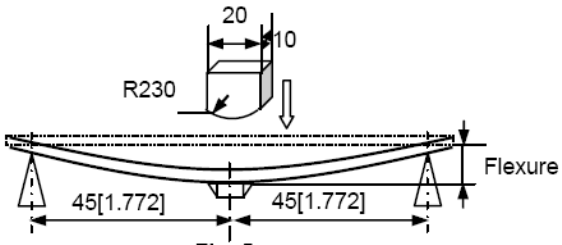
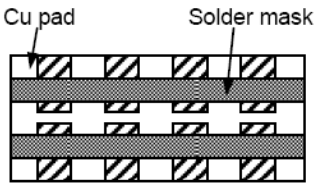
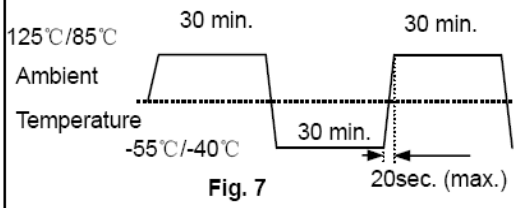


Fig2

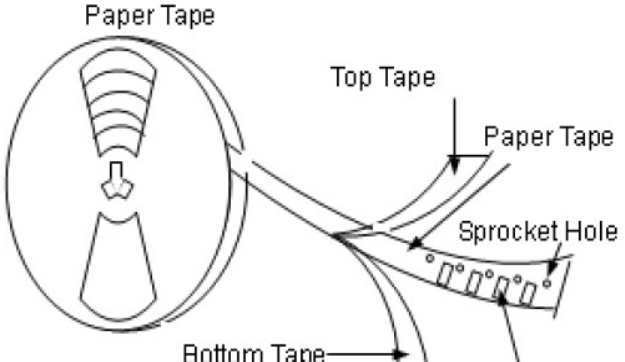
◆ Reliability Test

Items	Requirements	Test Methods and Remarks
1. Terminal Strength	No removal or split of the termination or other defects shall occur.  **Fig.3**	① Solder the inductor to the testing jig (glass epoxy board shown in **Fig. 3**) using leadfree solder. Then apply a force in the direction of the arrow. ② 5N force for 2012 series. ③ Keep time: 10±1s Speed: 1.0mm/s.
2. Resistance to Flexure	No visible mechanical damage. Type / a / b / c 2012[0805] / 1.0 / 3.0 / 1.2 Unit: mm [inch]  **Fig. 4**	① Solder the inductor to the test jig (glass epoxy board shown in **Fig. 4**) Using a leadfree solder. Then apply a force in the direction shown **Fig.5** ② Flexure: 2mm. ③ Pressurizing Speed: 0.5mm/sec. ④ Keep time: 30 sec.  **Fig. 5**
3. Vibration	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.  **Fig. 6**	① Solder the inductor to the testing jig (glass epoxy board shown in **Fig.6**) using leadfree solder. ② The inductor shall be subjected to a simple harmonic motion having total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55 Hz. ③ The frequency range from 10 to 55 Hz and return to 10 Hz shall be traversed in approximately 1 minute. This motion shall be applied for a period of 2 hours in each 3mutually perpendicular directions (total of 6 hours).
4. Dropping	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	Drop chip inductor 10 times on a concrete floor from a height of 100 cm.
5. Temperature	Inductance change should be within ±10% of initial value measuring at 20℃.	Temperature range: -55℃ to +125℃, Reference temperature: 20℃
6. Solderability	① No visible mechanical damage. ② Wetting shall exceed 75% coverage for 0603 series; exceed 95% for others	① Solder temperture:240±2℃ ② Duration: 3 sec. ③ Solder: Sn/3.0Ag/0.5Cu. ④ Flux: 25% Resin and 75% ethanol in weight.
7. Resistance to Soldering Heat	① No visible mechanical damage. ② Wetting shall exceed 75% coverage for 0603 series; exceed 95% coverage for others ③ Inductance change: Within ±10%. ④ Q factor change: Within ±20%.	① Solder temperature: 260±3℃ ② Duration: 5 sec. ③ Solder: Sn/3.0Ag/0.5Cu. ④ Flux: 25% Resin and 75% ethanol in weight. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.

8. Thermal Shock	① No mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.  Fig. 7	① Temperature, Time: (See **Fi.7**) -55℃for 30±3 min→125℃ for 30±3min, ② Transforming interval: Max. 20 sec. ③ Tested cycle: 100 cycles. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
9. Resistance to Low Temperature	① No mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: -55±2℃, ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
10. Resistance to High Temperature	① No mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 125±2℃, ② Duration: 1000^{+24} hours. ③ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
11. Damp Heat (Steady States)	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 60±2℃ ② Humidity: 90% to 95% RH. ③ Duration: 1000^{+24} hours. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
12. Loading Under Damp Heat	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature: 60±2℃ ② Humidity: 90% to 95% RH. ③ Duration: 1000^{+24} hours. ④ Applied current: Rated current. ⑤ The chip shall be stabilized at normal condition for 1~2 hours before measuring.
13. Loading at High Temperature (Life Test)	① No visible mechanical damage. ② Inductance change: Within ±10%. ③ Q factor change: Within ±20%.	① Temperature:125±2℃, ② Duration: 1000^{+24} hours. ③ Applied current: Rated current. ④ The chip shall be stabilized at normal condition for 1~2 hours before measuring.

◆ Packaging

(1) Taping Drawings (Unit: mm)



Type	A	B	P	T max	Quantity
2012(0805)	1.5±0.2	2.3±0.2	4.0±0.1	1.1	4K