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CMCC1608C 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

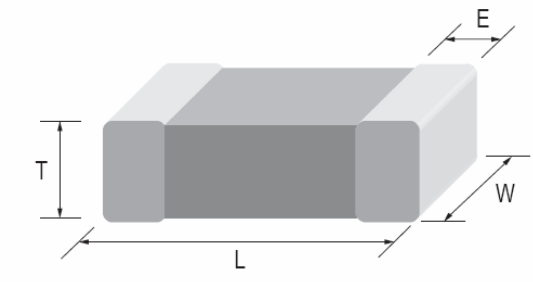
◆ PRODUCT IDENTIFICATION

CMCC	1608	C	2N2	S	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)	L	W	T	E
	1.60±0.150	0.80±0.150	0.80±0.150	0.30±0.200



◆Specifications

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	300	500	800	1000	1800			
				Q								
CMCC1608 Series												
CMCC1608C1N0SSP	1.0±0.3	8	100	12	22	37	38	68	85	6000	0.10	500
CMCC1608C1N2SSP	1.2±0.3	8	100	12	22	37	38	68	85	6000	0.10	500
CMCC1608C1N5SSP	1.5±0.3	8	100	12	22	37	38	68	85	6000	0.10	500
CMCC1608C1N8SSP	1.8±0.3	8	100	12	21	33	35	61	85	6000	0.12	500
CMCC1608C2N2SSP	2.2±0.3	8	100	12	26	40	39	60	85	6000	0.20	500
CMCC1608C2N7SSP	2.7±0.3	8	100	12	23	27	37	47	85	6000	0.20	500
CMCC1608C3N3SSP	3.3±0.3	8	100	12	23	27	36	47	77	6000	0.20	500
CMCC1608C3N9SSP	3.9±0.3	8	100	12	25	28	38	47	73	6000	0.20	500
CMCC1608C4N7SSP	4.7±0.3	8	100	12	26	30	38	49	81	6000	0.20	500
CMCC1608C5N6SSP	5.6±0.3	8	100	12	26	29	35	34	28	5000	0.30	500
CMCC1608C6N2SSP	6.2±0.3	8	100	12	26	29	35	34	28	5000	0.30	500
CMCC1608C6N8JSP	6.8	8	100	12	23	27	35	40	63	4500	0.30	500
CMCC1608C8N2JSP	8.2	8	100	12	22	26	33	39	50	4000	0.30	500
CMCC1608C10NJSP	10	8	100	14	25	31	38	45	64	3500	0.50	300
CMCC1608C12NJSP	12	8	100	14	24	28	35	39	50	2800	0.50	300
CMCC1608C15NJSP	15	8	100	14	22	27	34	40	45	2300	0.60	300
CMCC1608C18NJSP	18	8	100	14	24	28	35	38	37	2200	0.60	300
CMCC1608C22NJSP	22	8	100	15	27	32	38	43	36	2000	0.60	300
CMCC1608C27NJSP	27	8	100	15	26	29	36	44	25	1700	0.80	300
CMCC1608C33NJSP	33	8	100	15	26	30	35	34	6	1500	0.80	300
CMCC1608C39NJSP	39	8	100	15	22	25	28	28	-	1300	0.80	300
CMCC1608C47NJSP	47	8	100	15	25	29	30	25	-	1200	1.00	300
CMCC1608C56NJSP	56	8	100	15	28	31	31	25	-	1100	1.00	300
CMCC1608C68NJSP	68	8	100	15	22	25	22	15	-	900	1.00	300
CMCC1608C82NJSP	82	8	100	15	23	24	22	-	-	800	1.00	300
CMCC1608CR10JSP	100	8	100	15	25	27	16	-	-	700	1.20	300

◆Specifications

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	300	500	800	1000	1800			
				Q								
CMCC1608 Series												
CMCC1608CR12JSP	120	8	50	15	24	23	-	-	-	600	1.40	200
CMCC1608CR15JSP	150	8	50	15	19	16	-	-	-	500	1.60	200
CMCC1608CR18JSP	180	8	50	15	18	12	-	-	-	400	1.90	200
CMCC1608CR22JSP	220	8	50	15	16	-	-	-	-	350	2.40	200
CMCC1608CR27JSP	270	8	50	16	18	-	-	-	-	350	2.60	150
CMCC1608CR33JSP	330	8	50	16	16	-	-	-	-	350	2.80	150
CMCC1608CR39JSP	390	8	50	16	-	-	-	-	-	300	3.20	150
CMCC1608CR43JSP	430	8	50	16	-	-	-	-	-	280	3.40	150
CMCC1608CR47JSP	470	8	50	15	-	-	-	-	-	250	3.60	150
CMCC1608CR56JSP	560	8	50	15						250	4.00	100
CMCC1608CR68JSP	680	8	50	15						250	4.50	100

◆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

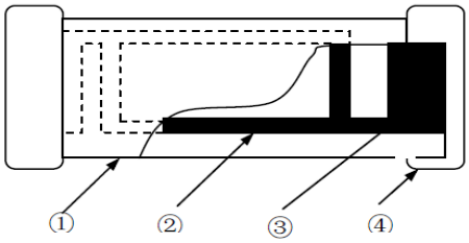


Fig.2 Body Structure

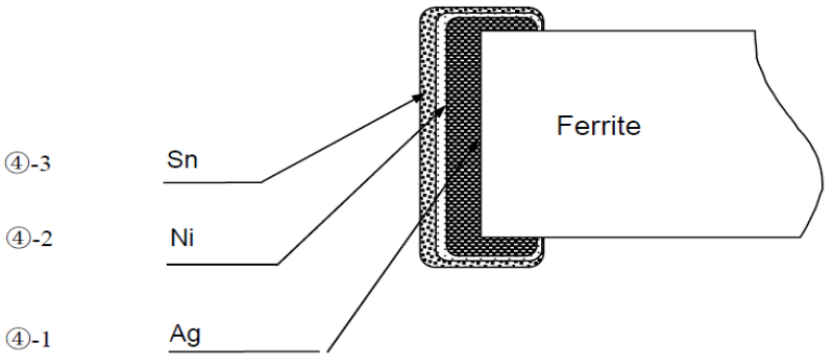


Fig. 3 Structure of Electro-plating

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)

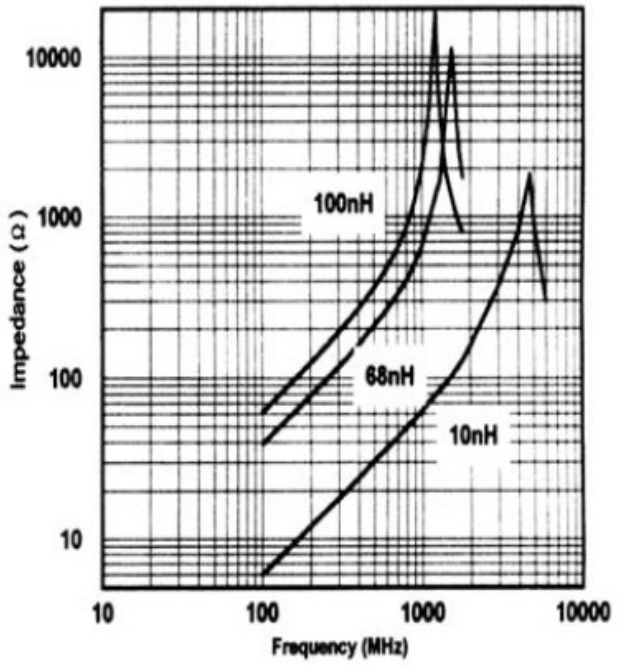
Compositions Wt Rate (Wt%) of Material

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

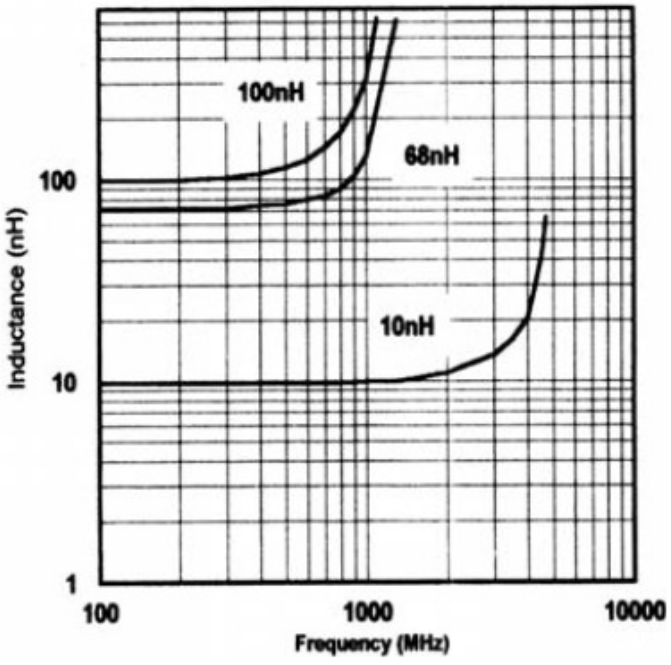
◆ TYPICAL ELECTRICAL CHARACTERISTICS

CMCC1608 Series

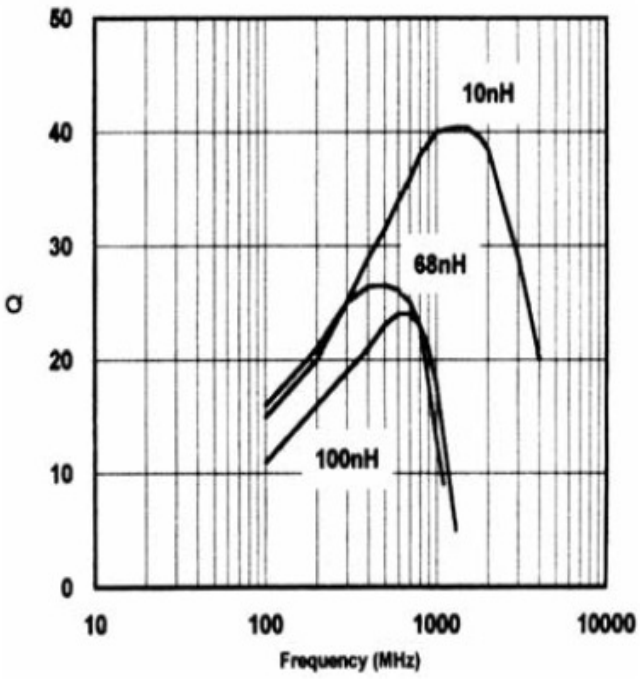
Inductance vs. Frequency Characteristics



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).

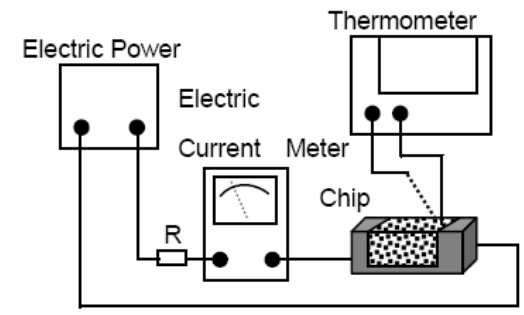


Fig1

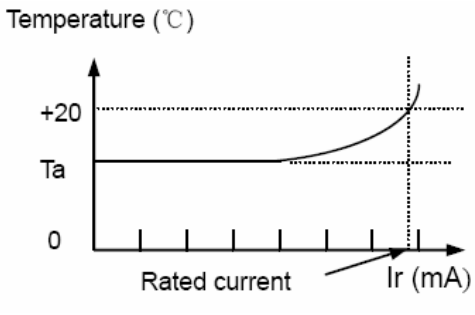
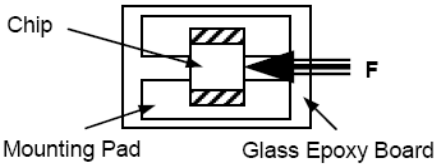
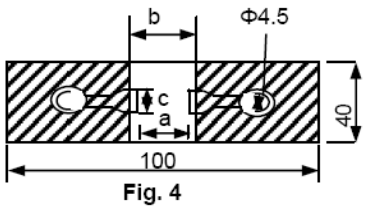
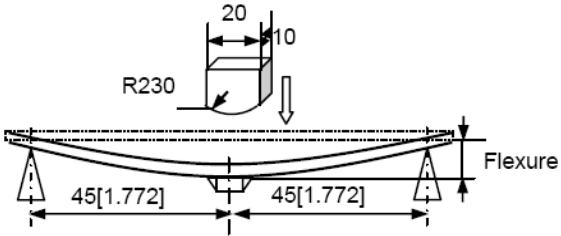
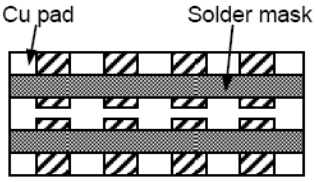
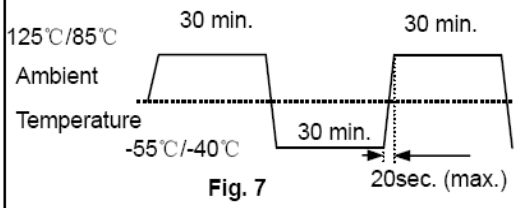


Fig2

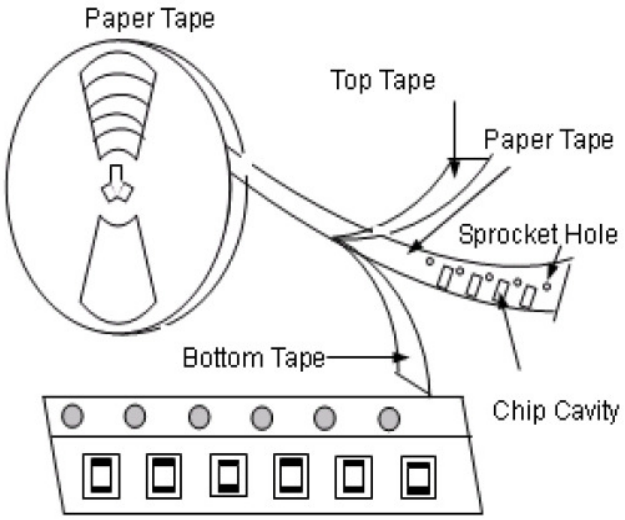
◆ Reliability Test

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 1608 series. ③ Keep time: 10±1s Speed: 1.0mm/s.
2. Resistance to Flexure	No visible mechanical damage. Type / a / b / c 1608[0603] / 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%.  Glass Epoxy Board **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.

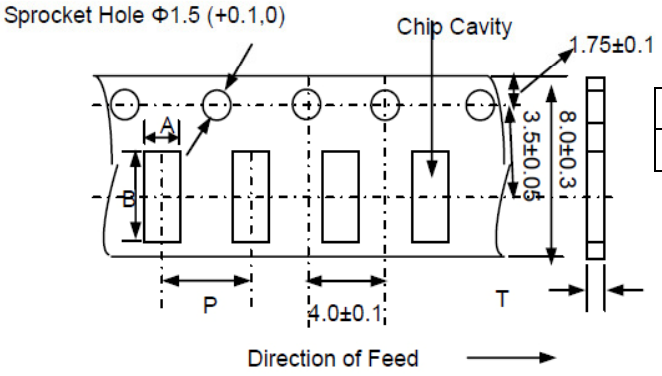
◆ Packaging

(1) Taping Drawings (Unit: mm)



Remark: The sprocket holes are to the right as the tape is pulled toward the user.

(2) Taping Dimensions (Unit: mm)



Type	A	B	P	T max	Quantity
1608(0603)	1.0±0.2	1.8±0.2	4.0±0.1	1.1	4K

(3) Reel Dimensions (Unit: mm)