

SCOPE :

This specification applies to the Pb Free Ceramic Chip Inductors
for MWCS-201212-SERIES

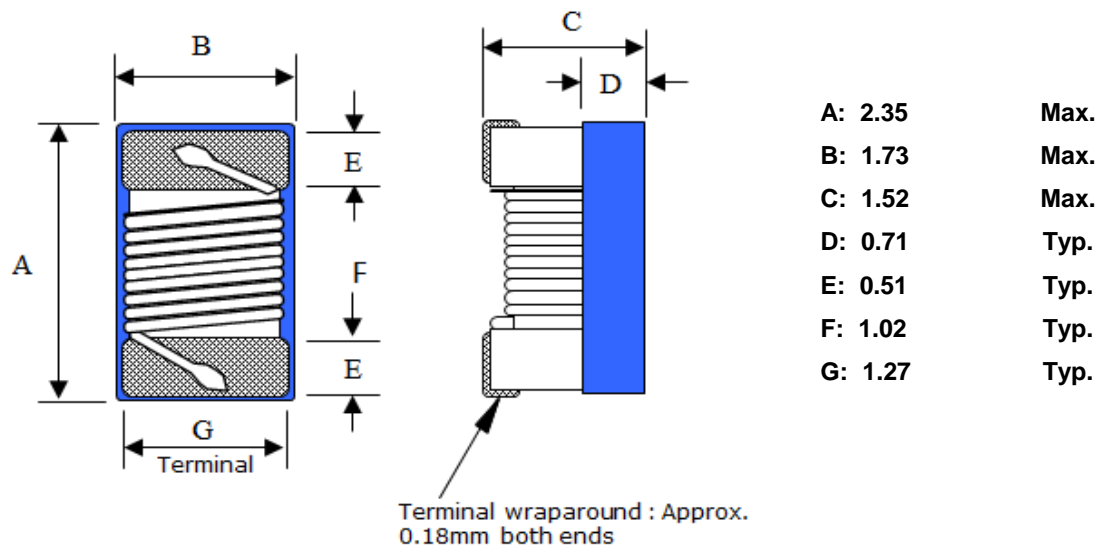
PRODUCT IDENTIFICATION

MWCS - 201212 - 22N J

① ② ③ ④

- ① Product Code
- ② Dimensions Code
- ③ Inductance Code
- ④ Tolerance Code

(1) SHAPES AND DIMENSIONS(mm)



(2) ELECTRICAL SPECIFICATIONS

SEE TABLE 1

TEST INSTRUMENTS

L,Q : HP 4291B IMPEDANCE ANALYZER (or equivalent)
SRF : ENA E5071B NETWORK ANALYZER (or equivalent)
RDC : CHROMA MODEL 16502 MILLIOHMMETER (or equivalent)

(3) CHARACTERISTICS

- (3)-1 Operate temperature range $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$
(Including self temp. rise)
- (3)-2 Storage temperature range $-40^{\circ}\text{C} \sim +125^{\circ}\text{C}$

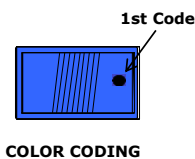


MAG.LAYERS

TABLE 1

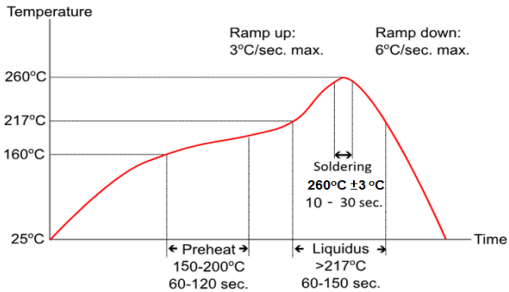
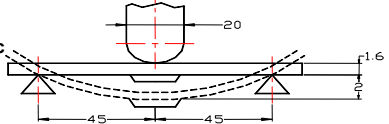
MAGLAYERS PT/NO.	Inductance L(nH)	Percent Tolerance	L/Q Freq. (MHz)	Quality Min.	SRF (MHz)Min.	DCR (Ω) Max.	Irms (mA) Max.	Color Coding
MWCS-201212-2N7□	2.7	G,J,K	250/1500	50	7900	0.060	800	Yellow
MWCS-201212-2N8□	2.8	G,J,K	250/1500	80	7900	0.060	800	Gray
MWCS-201212-3N0□	3.0	G,J,K	250/1500	65	7900	0.060	800	White
MWCS-201212-3N3□	3.3	G,J,K	250/1500	50	7900	0.080	600	Black
MWCS-201212-5N6□	5.6	G,J,K	250/1000	65	5500	0.080	600	Orange
MWCS-201212-6N8□	6.8	G,J,K	250/1000	50	5500	0.110	600	Brown
MWCS-201212-7N5□	7.5	G,J,K	250/1000	50	4500	0.140	600	Green
MWCS-201212-8N2□	8.2	G,J,K	250/1000	50	4700	0.120	600	Red
MWCS-201212-10N□	10	G,J,K	250/500	60	4200	0.100	600	Blue
MWCS-201212-12N□	12	G,J,K	250/500	50	4000	0.150	600	Orange
MWCS-201212-15N□	15	G,J,K	250/500	50	3400	0.170	600	Yellow
MWCS-201212-18N□	18	G,J,K	250/500	50	3300	0.200	600	Green
MWCS-201212-22N□	22	G,J,K	250/500	55	2600	0.220	500	Blue
MWCS-201212-24N□	24	G,J,K	250/500	50	2000	0.220	500	Gray
MWCS-201212-27N□	27	G,J,K	250/500	55	2500	0.250	500	Violet
MWCS-201212-33N□	33	G,J,K	250/500	60	2050	0.270	500	Gray
MWCS-201212-36N□	36	G,J,K	250/500	55	1700	0.270	500	Orange
MWCS-201212-39N□	39	G,J,K	250/500	60	2000	0.290	500	White
MWCS-201212-43N□	43	G,J,K	200/500	60	1650	0.340	500	Yellow
MWCS-201212-47N□	47	G,J,K	200/500	60	1650	0.310	500	Black
MWCS-201212-56N□	56	G,J,K	200/500	60	1550	0.340	500	Brown
MWCS-201212-68N□	68	G,J,K	200/500	60	1450	0.380	500	Red
MWCS-201212-82N□	82	G,J,K	150/500	65	1300	0.420	400	Orange
MWCS-201212-91N□	91	G,J,K	150/500	65	1200	0.480	400	Black
MWCS-201212-R10□	100	G,J,K	150/500	65	1200	0.460	400	Yellow
MWCS-201212-R11□	110	G,J,K	150/250	50	1000	0.480	400	Brown
MWCS-201212-R12□	120	G,J,K	150/250	50	1100	0.510	400	Green
MWCS-201212-R15□	150	G,J,K	100/250	50	920	0.560	400	Blue
MWCS-201212-R18□	180	G,J,K	100/250	50	870	0.640	400	Violet
MWCS-201212-R20□	200	G,J,K	100/250	50	860	0.680	400	Red
MWCS-201212-R22□	220	G,J,K	100/250	50	850	0.700	400	Gray
MWCS-201212-R24□	240	G,J,K	100/250	44	690	1.000	350	Red
MWCS-201212-R24□	250	G,J,K	100/250	45	660	1.200	350	Yellow
MWCS-201212-R27□	270	G,J,K	100/250	48	650	1.000	350	White
MWCS-201212-R30□	300	G,J,K	100/250	25	450	1.400	310	Orange
MWCS-201212-R33□	330	G,J,K	100/250	48	600	1.400	310	Black
MWCS-201212-R39□	390	G,J,K	100/250	48	560	1.500	290	Brown
MWCS-201212-R47□	470	G,J,K	50/100	33	450	1.760	250	Violet
MWCS-201212-R51□	510	G,J,K	25/50	23	340	1.900	230	Gray
MWCS-201212-R56□	560	G,J,K	25/50	23	340	1.900	230	Orange
MWCS-201212-R62□	620	G,J,K	25/50	23	220	2.200	210	Yellow
MWCS-201212-R68□	680	G,J,K	25/50	23	188	2.200	190	Green
MWCS-201212-R82□	820	G,J,K	25/50	23	215	2.350	180	Blue
MWCS-201212-1R0□	1,000	G,J,K	25/50	20	100	2.500	170	Gray
MWCS-201212-1R2□	1,200	J,K	7.9/25	18	100	2.500	170	White
MWCS-201212-1R8□	1,800	G,J,K	7.9/7.9	16	80	2.500	170	Orange
MWCS-201212-3R3□	3,300	G,J,K	7.9/7.9	15	40	4.400	90	Red
MWCS-201212-4R7□	4,700	G,J,K	7.9/7.9	15	40	6.400	90	Yellow

- ※ 1. Please specify the inductance tolerance, G($\pm 2\%$), J($\pm 5\%$), K($\pm 10\%$)
 2. Irms for a 15°C temperature rise from 25°C ambient with current
 3. Color coding is not necessarily same position,
 and Color coding non-directional printing.



(4) RELIABILITY TEST METHOD

MECHANICAL

TEST ITEM	SPECIFICATION	TEST DETAILS
Solder ability	The electrodes shall be at least 90% covered with new solder coating	Refer to J-STD-002 Pre-heating: 150°C, 1min Solder Composition: Sn/Ag3.0/Cu0.5(Pb-Free) Solder Temperature: 245±5°C (Pb-Free) Immersion Time: 4±1sec
Resistance to Soldering heat (reflow soldering)	There shall be no damage or problems. Inductance change shall be within ±10%. Q change: within ±30% of initial value	Refer to MIL-STD-202 Method 210 Temperature profile of reflow soldering  <p>The specimen shall be passed through the reflow oven with the condition shown in the above profile for 1 time. The specimen shall be stored at standard atmospheric conditions for 1 hour, after which the measurement shall be made.</p>
Terminal strength	The terminal electrode and the ferrite must not be damaged.	Refer to AEC-Q200-006 Test device shall be soldered on the substrate Force 0.5lbs for 60±1 seconds for 0201 series Force 1lbs for 60±1 seconds for 0402 series Force 2lbs for 60±1 seconds for 0603 series Force 1.8Kg for 60±1 seconds for the other series.
Board Flex	The terminal electrode and the ferrite must not be damaged.	Refer to AEC-Q200-005 Test device shall be soldered on the substrate Substrate Dimension: 100x40x1.6mm Deflection: 2.0mm Keeping Time: 60sec 
High temperature resistance (Storage)	Appearance: No damage (for microscope of CASTOR MZ-420X) Inductance change shall be within ±10%. Q change: within ±30% of initial value	Refer to MIL-STD-202 Method 108 Temperature: 125±3°C / Relative Humidity: 0% Time: 100hrs Measured after exposure in the room condition for 24hrs
Biased Humidity	Appearance: No damage (for microscope of CASTOR MZ-420X) Inductance change shall be within ±10%. Q change: within ±30% of initial value	Refer to MIL-STD-202 Method 103 Temperature: 85±2°C Relative Humidity: 85% / Time: 100hrs Measured after exposure in the room condition for 24hrs

(4) RELIABILITY TEST METHOD

MECHANICAL

TEST ITEM	SPECIFICATION	TEST DETAILS
Thermal shock	Appearance:No damage (for microscope of CASTOR MZ-420X)Inductance change shall Inductance change shall be within $\pm 10\%$. Q change:within $\pm 30\%$ of initial value	Refer to JESD Method JA-104 Total cycles: 100 cycles Temperature Cycling Test Conditions : -40 to +125 °C -40 °C Soak Mode Condition : 30 minutes 125 °C Soak Mode Condition : 30 minutes Measured after exposure in the room condition for 24hrs
Low temperature storage	There shall be no damage or problems. Inductance change shall be within $\pm 10\%$. Q change:within $\pm 30\%$ of initial value	After the samples shall be soldered onto the test circuit board,the test shall be done. Measurement : After placing for 24 hours min. Temperature : -40 $\pm 2^{\circ}\text{C}$ Testing time : 100 hours
Vibration	There shall be no damage or problems. Inductance change shall be within $\pm 10\%$. Q change:within $\pm 30\%$ of initial value	Refer MIL-STD-202 Method 204 Vibration waveform: Sine waveform Vibration frequency: 10Hz~2000Hz Vibration acceleration: 5g Sweep rate: 0.764386octave/minute Duration of test: 12 cycles each of 3 orientations, 20 minutes for each cycle Vibration axes: X, Y & Z
Resistance to Solvent	There must be no change in appearance or obliteration of marking	Refer to MIL-STD-202 Method 215 Inductors must withstand 6 mimutes of alcohol or water.
Operational Life	No apparent damage Inductance change shall be within $\pm 10\%$.	Refer to MIL-STD-202 Method 108 Temperature: 125 $\pm 3^{\circ}\text{C}$ Applied Current : Rated Current Time: 100hrs Measured after exposure in the room condition for 24hrs

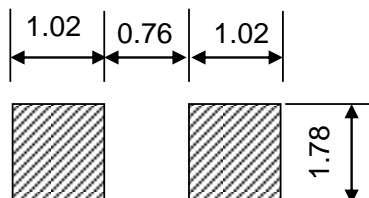


(5) RECOMMENDED SOLDERING CONDITIONS

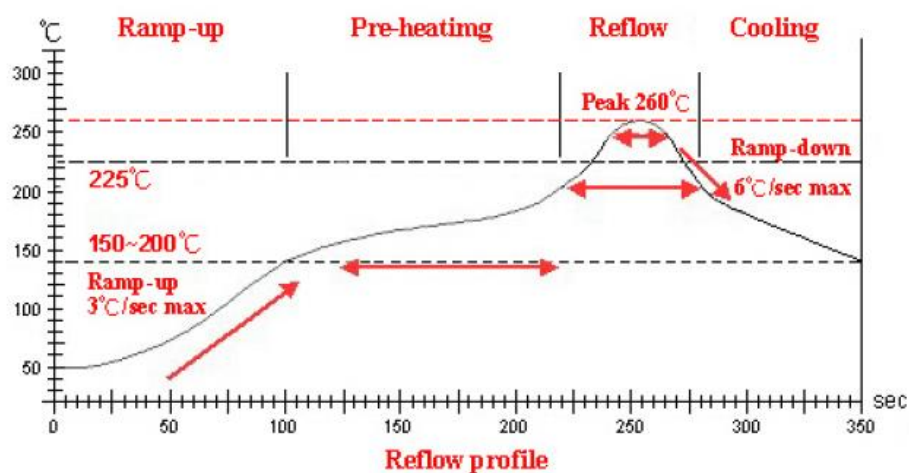
(Please use this product by reflow soldering)

(5)-1 RECOMMENDED FOOTPRINT

Unit: mm



(5)-2 RECOMMENDED REFLOW PATTERN



Lead-Free(LF)

Refer to J-STD-020C

Item	Ramp-up	Pre-heating	Reflow	Peak Temp.	Cooling
Temp. scope	R.T.~150°C	150°C~200°C	225°C	260±5°C	Peak Temp.~150°C
Time result	—	60~180 Sec.	20~60 Sec.	5~10 Sec.	—

NOTE:

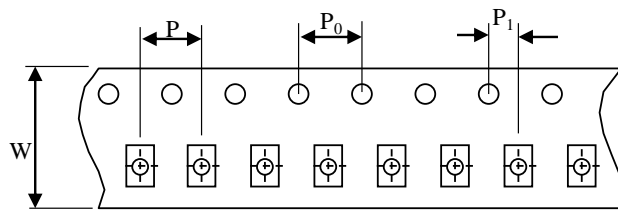
1. Re-flow possible times:with in 2 times
2. Nitrogen adopted is recommended while in re-flow



MAG.LAYERS

(6) PACKAGING

(6)-1 CARRIER TAPE DIMENSIONS (mm)



W : 8.0 mm

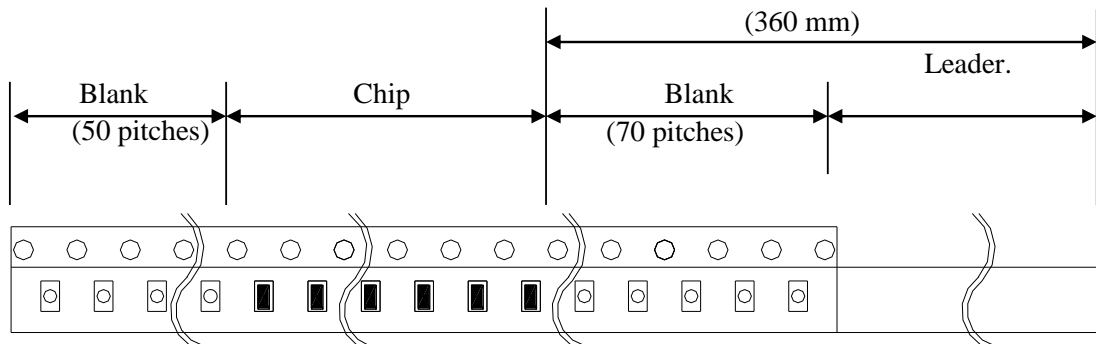
P : 4.0 mm

P0 : 4.0 mm

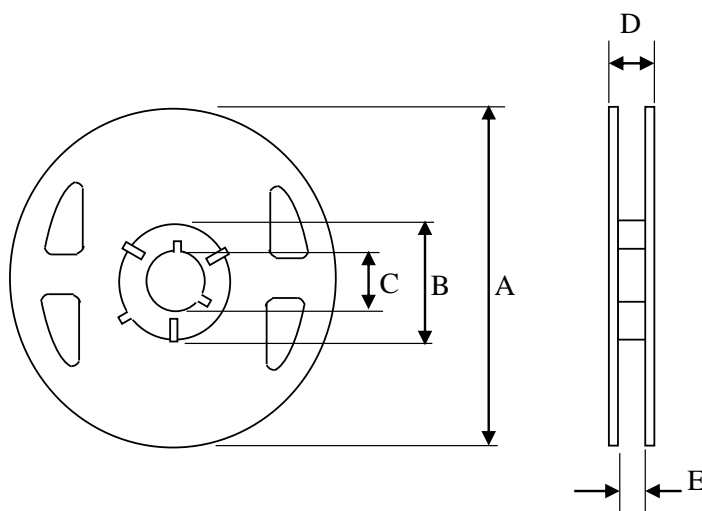
P1 : 2.0 mm

(6)-2 TAPING DIMENSIONS (mm)

There shall not continuation more than two vacancies of the product.



(6)-3 REEL DIMENSIONS



A : 178 mm

B : 60.0 mm

C : 13.0 mm

D : 12.0 mm

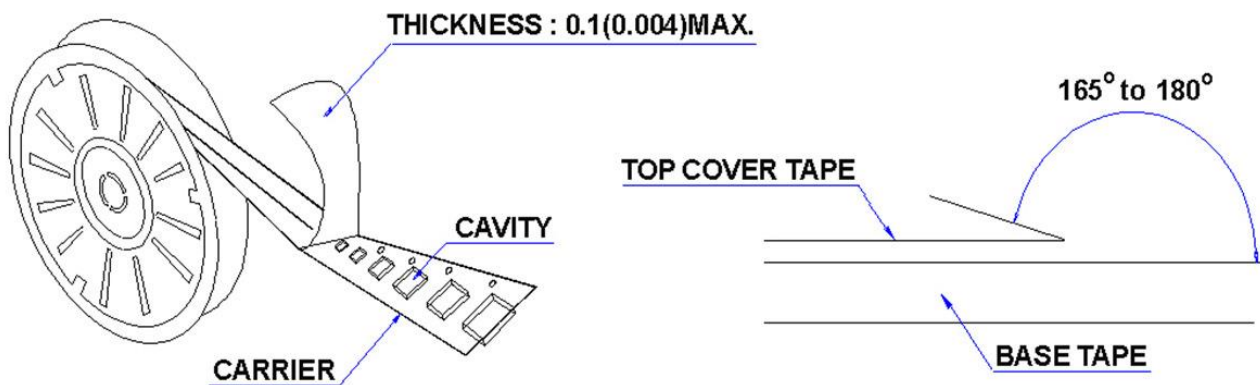
E : 9.0 mm



MAG.LAYERS

(6)-4 COVER TAPE PEEL STRENGTH

The force for tearing off cover tape is 10 to 100 grams in the arrow direction



(6)-5 QUANTITY

2000 pcs/Reel

(6)-6 The products are packaged so that no damage will be sustained.

(7) ATTENTION IN CASE OF USING

In case of using product ,please avoid following matters:

Splashing water or salt water

Dew condenses

Toxic gas (Hydrogen sulfide, Sulfurous acid ,Chlorine, Ammonia)

Vibrations or shocks which exceed the specified condition

Please be careful for the stress to this product by board flexure or something after the mounting.

Please note that the contents may change without any prior notice due to reasons such as upgrading.



MAG.LAYERS