Wire Wound Chip Inductors

SWI0603CS Series

ABC 千如電子集團 ABC ELECTRONICS GROUP.
AOBA Technology (M) Sdn. Bhd.

INTRODUCTION

The SWI series are wire wound chip inductors widely used in the communication applications such as cellular phones, cable modem, ADSL, repeaters, Bluetooth, and other electronic devices. The wire wound inductors advance in higher self resonate frequency, better Q factor, and much more stable performance. Precious tolerance of 2% is available.

FEATURES

- Operating temperature -40 to +125°C for ceramic series.
- Excellent solderability and resistance to soldering heat.
- Suitable for reflow soldering.
- High reliability and easy surface mount assembly.
- Wide range of inductance values are available for flexible needs.

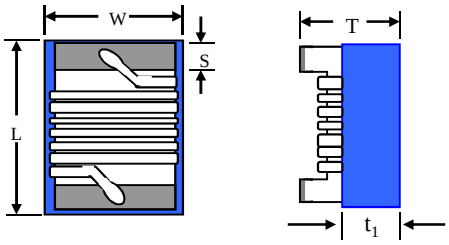
PART NUMBER

SWI 0603 C S 33N J - □□

1 2 3 taping 4 5 6

1 Product Type

2 Chip Dimension



Size (inch) mm	Length (L) (inch) mm	Width (W) (inch) mm	Thickness (T) (inch) mm	Terminal (S) (inch) mm	(t_1) (Ref.) mm
SWI 0603 1608	(0.065 ± 0.008) 1.65 ± 0.20	(0.045 ± 0.008) 1.15 ± 0.20	(0.035 ± 0.008) 0.90 ± 0.20	(0.012 ± 0.004) 0.30 ± 0.10	0.50

3 Material Type C : Ceramic

4 Inductance Value 3N3 = 3.3nH 33N = 33nH R33 = 330nH

5 Tolerance B = ±0.2nH S = ±0.3nH G = ±2% J = ±5% K = ±10%

6 Internal Code

1 Scope

This specification applies to fixed inductors of the following types used in electronic equipment :

*Ceramic Type : For lower inductance with high Q factor at high frequency and stable circuit requirement.

2 Construction

*Configuration & Dimension : Please refer to the attached figures and tables.

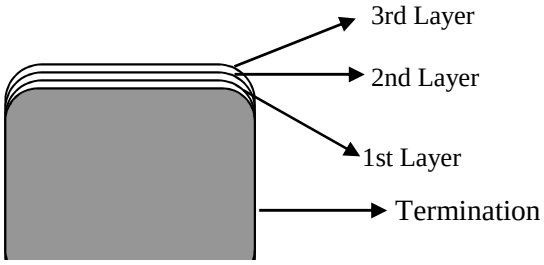
*Terminals : Consist of Ag alloy followed by Nickel, then Au platting for easier soldering.

3 Operating Temperature Range

Operating Temperature Range is the scope of ambient temperature at which the inductor can be operated continuously at rated current.

*Temp. Range : Ceramic material : -40°C ~ +125°C

4 Ingredient of terminals electrode



Ceramic Type :

1st Layer : Ag

2nd Layer : Nickel (Ni)

3rd Layer : Gold (Au)

5 Characteristics

Standard Atmospheric Conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows:

Ambient Temperature : 25°C ± 2°C

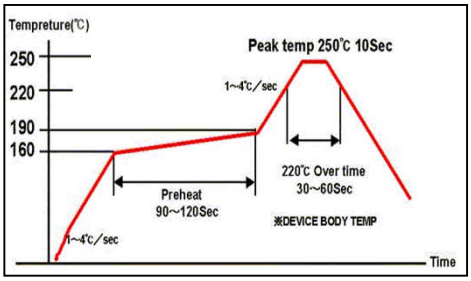
Relative Humidity : 60% to 70%

Air Pressure : 86Kpa to 106Kpa

Temperature Profile

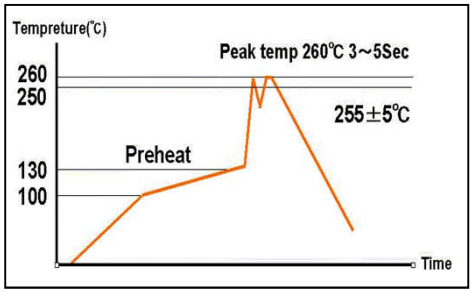
1 Reflow Temperature Profile

(Temperature of the mounted parts surface on the printed circuit board)



Recommended Peak Temperature : 250℃ Max
250℃ up /within 10secs
Max. Reflow temperature : 260°C
Gradient of temperature rise : av 1-4℃/sec
Preheat : 160-190℃/within 90-120secs
220℃ up /within 30-60secs
Composition of solder Sn-3Ag-0.5Cu

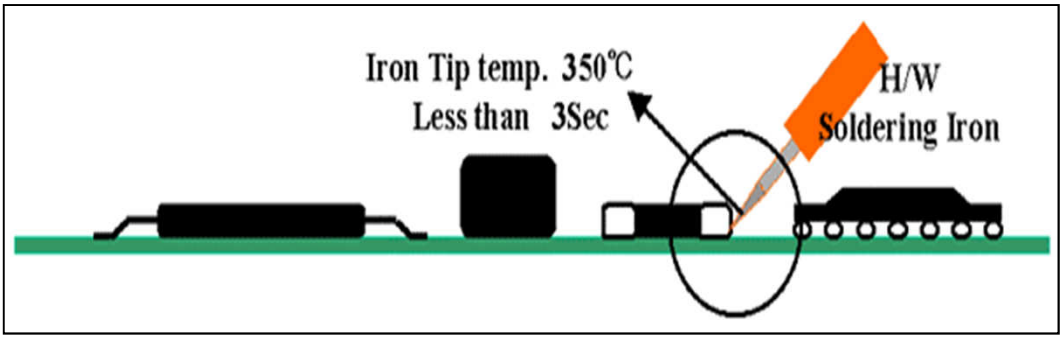
2 Dip Temperature



Solder bathtub temperature : 260℃ max
within 5secs.
Preheating temperature : 100～130℃
deposit solder temperature.
Composition of solder Sn-3Ag-0.5Cu

3 Soldering iron tip temperature : 350°C max / within 3 seconds.

Maximum Temperature : 380°C max / within 3 seconds.



Part No.	Inductance [1] (nH)	Tolerance	Q [2] Min	S.R.F.[3] Min (MHz)	RDC [4] Max (Ω)	IDC [5] Max (mA)	Marking
SWI0603CS 1N6 □-□□	1.6 @ 250MHz	B, S, K	18 @ 250MHz	12500	0.030	700	-
SWI0603CS 1N8 □-□□	1.8 @ 250MHz	B, S, K	16 @ 250MHz	>8500	0.045	700	-
SWI0603CS 2N2□-□□	2.2@ 250MHz	B, S, K	13 @ 250MHz	>8500	0.110	700	-
SWI0603CS 3N3 □-□□	3.3 @ 250MHz	K, J	35 @ 250MHz	6000	0.045	700	-
SWI0603CS 3N6 □-□□	3.6 @ 250MHz	K, J	22 @ 250MHz	6000	0.070	700	-
SWI0603CS 3N9 □-□□	3.9 @ 250MHz	K, J	22 @ 250MHz	6900	0.070	700	-
SWI0603CS 4N3 □-□□	4.3 @ 250MHz	K, J	22 @ 250MHz	5900	0.070	700	-
SWI0603CS 4N7 □-□□	4.7 @ 250MHz	K, J	20 @ 250MHz	5800	0.080	700	-
SWI0603CS 5N1 □-□□	5.1 @ 250MHz	K, J	18 @ 250MHz	5700	0.150	700	-
SWI0603CS 5N6 □ - 0I	5.6 @ 250MHz	K, J	16 @ 250MHz	5500	0.190	700	-
SWI0603CS 6N2 □-□□	6.2 @ 250MHz	K, J	25 @ 250MHz	5800	0.100	700	-
SWI0603CS 6N8 □-□□	6.8 @ 250MHz	K, J, G	27 @ 250MHz	5800	0.100	700	-
SWI0603CS 7N5 □-□□	7.5 @ 250MHz	K, J, G	28 @ 250MHz	4800	0.100	700	-
SWI0603CS 8N2 □-□□	8.2 @ 250MHz	K, J, G	28 @ 250MHz	4700	0.100	700	-
SWI0603CS 8N7 □-□□	8.7 @ 250MHz	K, J, G	28 @ 250MHz	4600	0.100	700	-
SWI0603CS 9N5 □-□□	9.5 @ 250MHz	K, J, G	28 @ 250MHz	5400	0.100	700	-
SWI0603CS 10N □-□□	10 @ 250MHz	K, J, G	31 @ 250MHz	4800	0.100	700	-
SWI0603CS 11N □-□□	11 @ 250MHz	K, J, G	30 @ 250MHz	4000	0.100	700	-
SWI0603CS 12N □-□□	12 @ 250MHz	K, J, G	32 @ 250MHz	4000	0.100	700	-
SWI0603CS 13N □-□□	13 @ 250MHz	K, J, G	38 @ 250MHz	3600	0.100	700	-
SWI0603CS 15N □-□□	15 @ 250MHz	K, J, G	35 @ 250MHz	4000	0.120	700	-
SWI0603CS 16N □-□□	16 @ 250MHz	K, J, G	35 @ 250MHz	3300	0.120	700	-
SWI0603CS 18N □-□□	18 @ 250MHz	K, J, G	35 @ 250MHz	3100	0.120	700	-
SWI0603CS 20N □-□□	20 @ 250MHz	K, J, G	35 @ 250MHz	3100	0.120	700	-
SWI0603CS 22N □-□□	22 @ 250MHz	K, J, G	35 @ 250MHz	3000	0.150	700	-
SWI0603CS 23N □-□□	23 @ 250MHz	K, J, G	38 @ 250MHz	2850	0.140	700	-
SWI0603CS 24N □-□□	24 @ 250MHz	K, J, G	35 @ 250MHz	2650	0.140	700	-
SWI0603CS 27N □-□□	27 @ 250MHz	K, J, G	35 @ 250MHz	2800	0.200	600	-
SWI0603CS 30N □-□□	30 @ 250MHz	K, J, G	37 @ 250MHz	2250	0.144	600	-
SWI0603CS 33N □-□□	33 @ 250MHz	K, J, G	36 @ 250MHz	2300	0.200	600	-
SWI0603CS 36N □-□□	36 @ 250MHz	K, J, G	36 @ 250MHz	2080	0.200	600	-
SWI0603CS 39N □-□□	39 @ 250MHz	K, J, G	36 @ 250MHz	2200	0.210	600	-
SWI0603CS 43N □-□□	43 @ 250MHz	K, J, G	38 @ 250MHz	2000	0.220	600	-
SWI0603CS 47N □-□□	47 @ 200MHz	K, J, G	35 @ 200MHz	2000	0.230	600	-
SWI0603CS 51N □-□□	51 @ 200MHz	K, J, G	32 @ 200MHz	1950	0.240	600	-

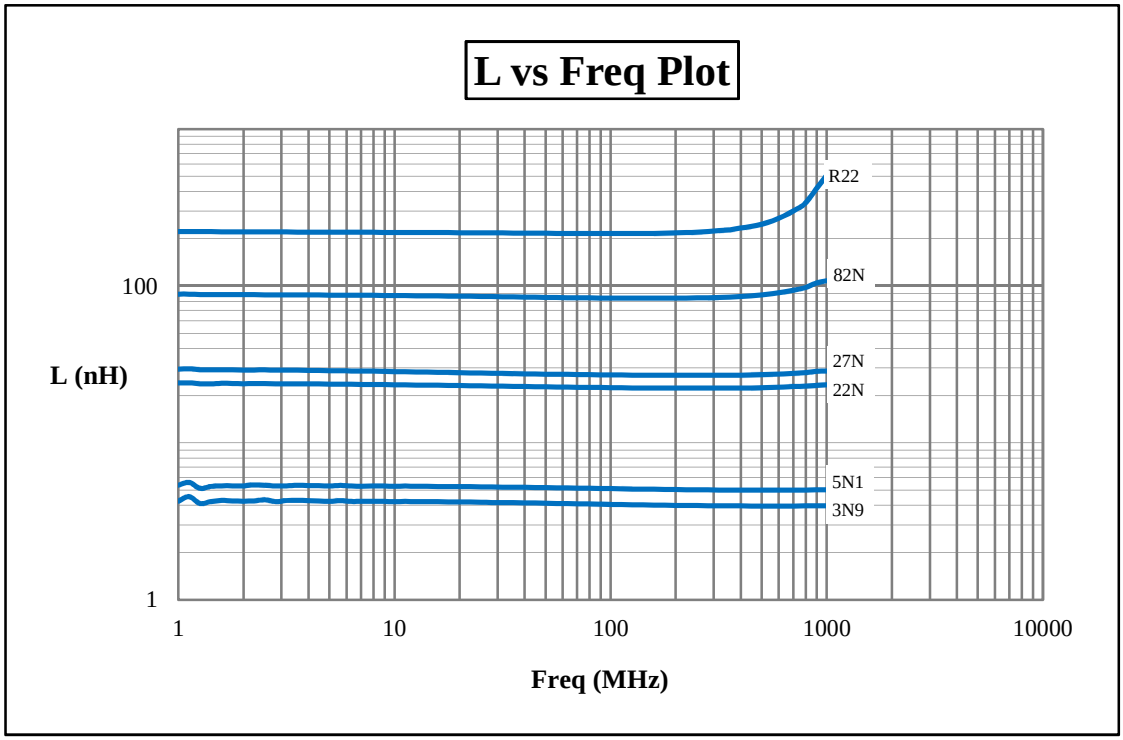
SWI0603CS Series

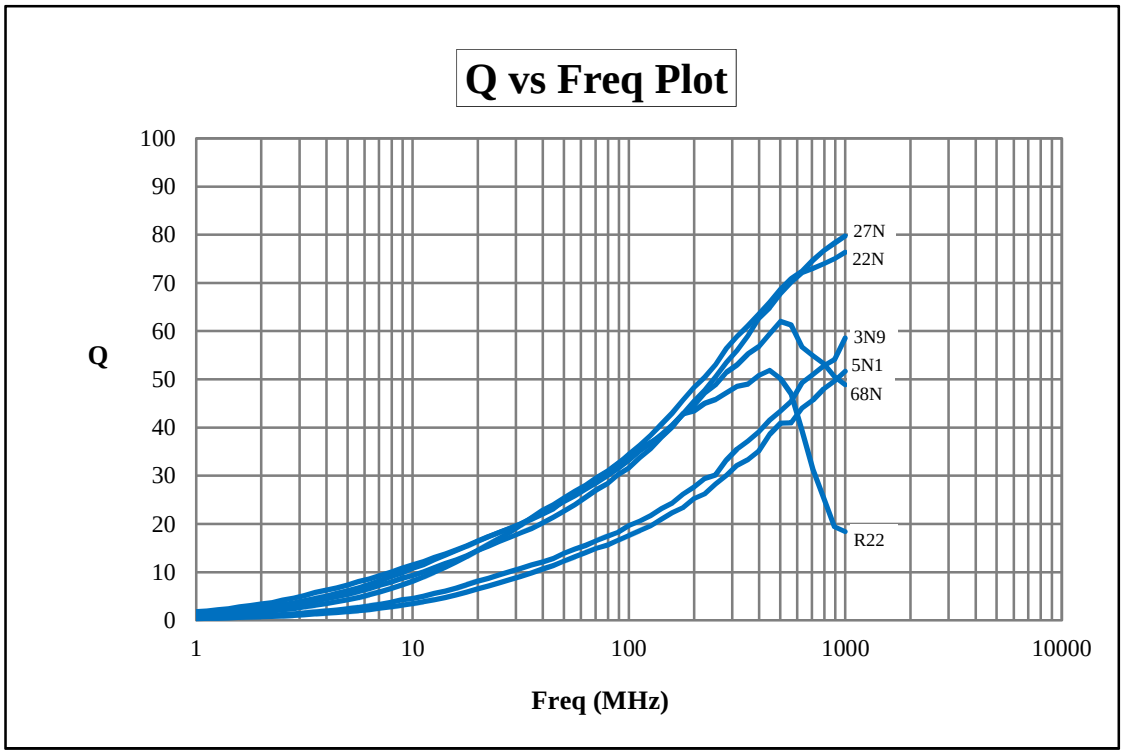
千如電子集團 ABC ELECTRONICS GROUP.
AOBA Technology (M) Sdn. Bhd.

Part No.	Inductance [1] (nH)	Tolerance	Q [2] Min	S.R.F.[3] Min (MHz)	RDC [4] Max (Ω)	IDC [5] Max (mA)	Marking
SWI0603CS 56N □-□□	56 @ 200MHz	K, J, G	32 @ 200 MHz	1900	0.250	600	-
SWI0603CS 68N □-□□	68 @ 200MHz	K, J, G	32 @ 200MHz	1700	0.350	600	-
SWI0603CS 72N □-□□	72 @ 150MHz	K, J, G	34 @ 150MHz	1700	0.490	400	-
SWI0603CS 82N □-□□	82 @ 150MHz	K, J, G	30 @ 150MHz	1700	0.580	400	-
SWI0603CS R10 □-□□	100 @ 150MHz	K, J, G	34 @ 150MHz	1400	0.580	400	-
SWI0603CS R11 □-□□	110 @ 150MHz	K, J, G	33 @ 150MHz	1350	0.610	300	-
SWI0603CS R12 □-□□	120 @ 150MHz	K, J, G	30 @ 150MHz	1300	0.650	300	-
SWI0603CS R15 □-□□	150 @ 100MHz	K, J, G	30 @ 150MHz	990	0.850	280	-
SWI0603CS R18 □-□□	180 @ 100MHz	K, J, G	25 @ 100MHz	990	1.000	250	-
SWI0603CS R22 □-□□	220 @ 100MHz	K, J, G	25 @ 100MHz	900	1.800	250	-
SWI0603CS R27 □-□□	270 @ 100MHz	K, J, G	25 @ 100MHz	822	2.100	200	-
SWI0603CS R33 □-□□	330 @ 100MHz	K, J	25 @ 100MHz	500	2.300	150	-
SWI0603CS R39 □-□□	390 @ 100MHz	K, J	25 @ 100 MHz	350	2.900	130	-

1. Inductance is measured in HP-4287A RF LCR meter with HP-16193 fixture.
2. Q is measured in HP-4287A RF LCR meter with HP-16193 fixture.
3. SRF is measured in ENA E5071B network analyzer or equivalent.
4. RDC is measured in HP-4338B milliohm meter or equivalent.
5. For 15 °C Rise.

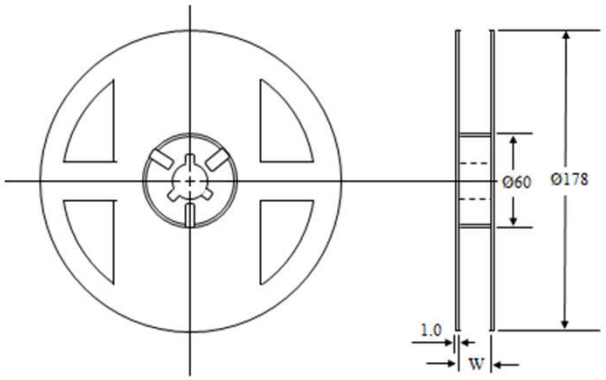
Remarks :
Unit weight = 0.0037g (for ref.)
Unit weight = 0.0049g ref. for 5N6 only


L vs Freq Plot
R22
82N
27N
22N
5N1
3N9
100
1
L (nH)
1
10
100
1000
10000
Freq (MHz)

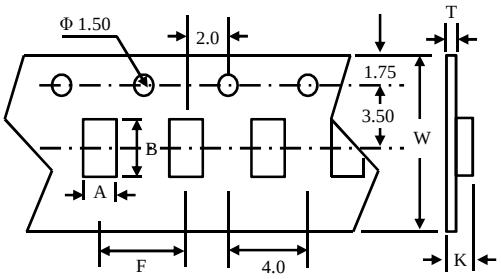

Q vs Freq Plot
100
90
80
70
60
50
40
30
20
10
0
Q
27N
22N
3N9
5N1
68N
R22
1
10
100
1000
10000
Freq (MHz)

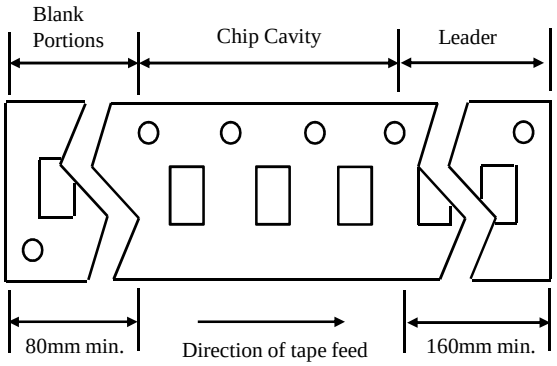
ITEM		CONDITION	SPECIFICATION
Electrical Characteristics	Inductance and Tolerance	Measuring Frequency: As shown in Product Table Measuring Temperature: +25°C	Within specified tolerance
	Quality Factor		
	Insulation Resistance	Measured at 100V DC between inductor terminals and center of case.	1000 mega ohms minimum
	Dielectric Withstanding Voltage	Measured at 500V AC between inductor terminals and center of case for a maximum of 1 minute.	No damage occurs when the test voltage is applied.
	Temperature Coefficient of Inductance (TCL)	Over -40°C to +85°C at frequency specified in Product Table.	+25 to 500 ppm/°C TCL = $\frac{L1 - L2}{L1(T1-T2)} \times 10^6$ (ppm/°C)
Mechanical Characteristics	Component Adhesion (Push Test)	The component shall be reflow soldered onto a PC board (240±5°C for 20 seconds). Then dynometer force gauge shall be applied to any side of the component.	0603 series – 900g minimum
	Drop Test	The inductor shall be dropped two times on the concrete floor or the vinyl tile from 1M naturally.	Change in Inductance: No more than 5% Change in Q: No more than 10% Change in appearance: Without distinct damage
	Terminal Shock Test	Each cycle shall consist of 30 minutes at -40°C followed by 30 minutes at +85°C with a 5 minutes transition time between temperature extremes. Test duration is 10 cycles.	
Endurance Characteristics	Solderability	Dip pads in flux and dip in solder pot containing lead free solder at 240±5°C for 5 seconds.	A minimum of 80% of the metalized area must be covered with solder.
	Resistance to Soldering Heat	Dip the components into flux and dip into solder pot containing lead free solder at 260±5°C for 5±2 seconds.	Change in Inductance: No more than 5% Change in Q: No more than 10% Change in appearance: Without distinct damage
	Vibration (Random)	Inductors shall be randomly vibrated at amplitude of 1.5mm and frequency of 10-55Hz : 0.4G/Hz for a minimum of 15 minutes per axis for each of the three axes.	
	Cold Temperature Storage	Inductors shall be stored at temperature of -40±2°C for 1000hrs (+48 -0hrs). Then inductors shall be subjected to standard atmospheric conditions for 1 hour. After that, measurement shall be made.	
	High Temperature Storage	Inductors shall be stored at temperature of 85±2°C for 1000hrs (+48 -0hrs). Then inductors shall be subjected to standard atmospheric conditions for 1 hour. After that, measurement shall be made.	
	Moisture Resistance	Inductors shall be stored in the chamber at 45°C at 90-95 R.H. for 1000hrs. Then inductors are to be tested after 2 hours at room temperature.	Inductors shall not have a shorted or open winding.
	High Temperature with Loaded	Inductors shall be stored in the chamber at +85°C for 1000hrs with rated current applied. Inductors shall be tested at the beginning of the test at 500hrs and 1000hrs. Then inductors are to be tested after 1 hour at room temperature.	

Type	Pcs/Reel
SWI0603CS	3,000



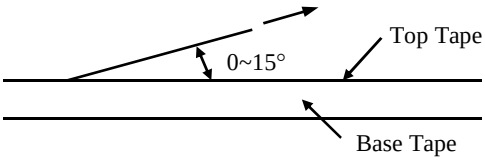
Type	Chip Cavity		Insert Pitch	Tape Thickness		
	A	B	F	K	T	W
SWI0603CS	1.16	1.90	4.00	0.95	0.22	8.00





Top Tape Strength

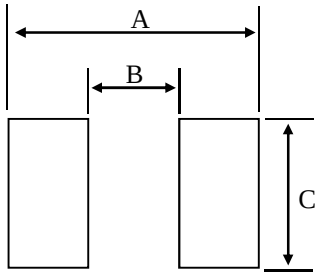
The top tape requires a peel-off force of 0.2 to 0.7N in the direction of the arrow as illustrated below.



Dimensions (unit : m/m)

Type	A	B	C
SWI0603CS	1.92	0.64	1.27

Recommended Pattern



Chip Inductor Storage & Precaution

1. Operating Environment

Do not use this product under the following environmental conditions, on deterioration of performance, such as insulation resistance may result from the use.

a) In corrosive gases (acidic gases, alkaline gases, chlorine, sulfur gases, organic gases and etc.)
b) In the atmosphere where liquid such as organic solvent, may splash on the products.

2. Storage Condition

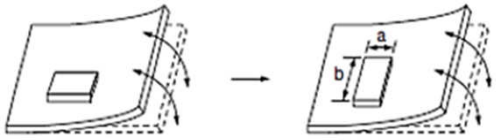
2.1 Storage period
Use the product within 12 months after delivered.
Solderability should be checked if this period is exceeded.

2.2 Storage environment conditions
a) Product should be store in the warehouse on the following conditions.
Temperature : -10 ~ +40°C
Humidity : 30 to 70% relative humidity. No rapid change on temperature and humidity
b) Products should not be stored in corrosive gases, such as sulfurous, acid gases, alkaline gases, to prevent the following deterioration.
Poor solderability due to the oxidized electrode.
c) Products should be stored on the pallet for the prevention of the influence from humidity, dust and so on.
d) Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.
e) Do not unpack the minimum package until immediately before use. After unpacking, re-seal promptly or store in desiccator with desiccant.
f) Do not store parts in bulk to prevent coils and parts being damaged.

3. PCB Warping

PCB should be designed so that products are not subjected to the mechanical stress caused by warping of board as shown below. Bending and twisting of PCB will causing excessive mechanical stress and lead to cracking in the product as well.

Products should be located in the sideways direction
(Length: a<b) to the mechanical stress.



Poor example Good example

4. Brushing & Cleaning

a) Cleaning brush shall not be touched to the winding portion of this product to prevent the breaking of wire.
b) Cleaning could cause failure and degradation of a product.

5. Handling

a) Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.
b) Parts could be damaged by external mechanical pressure, stacked heavy object, as well as strong shaking and dropping.