

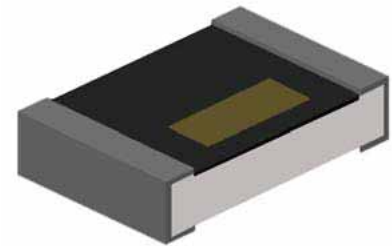


# Chip Inductors

## Thin Film Chip Inductor - AL Series / 薄膜贴片电感器

### Thin Film Chip Inductor Features

- A Photo Lithographic Single Layer Ceramic Chip.
- High SRF, Excellent Q, Superior Temperature Stability.
- Tight Tolerance of  $\pm 1\%$  or  $\pm 0.1\text{nH}$ .
- Self Resonant Frequency Controlled within 10%.
- Stable Inductance in High Frequency Circuit.
- Highly Stable Design for Critical Needs.

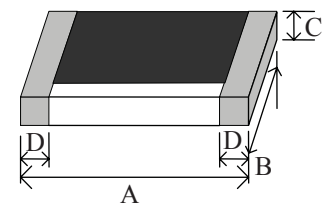
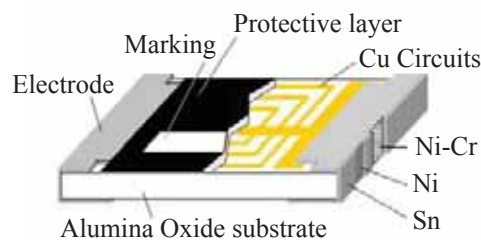
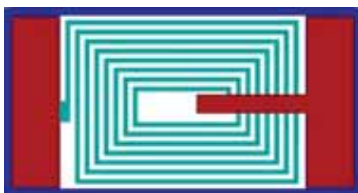


### Applications

- Cellular Telephone, Pagers and GPS Products.
- VCO, TCXO Circuit and RF Transceiver Module.
- Wireless LAN, Bluetooth Module, Communication Appliances.

### Thin Film Chip Inductor Construction & Dimensions (Unit: mm)

Codes	A	B	C	D
TCAL03 (0603)	$1.6 \pm 0.10$	$0.8 \pm 0.10$	$0.45 \pm 0.10$	$0.3 \pm 0.20$
TCAL02 (0402)	$1.0 \pm 0.05$	$0.5 \pm 0.05$	$0.32 \pm 0.05$	$0.2 \pm 0.10$



### Standard Electrical Specifications for 0603 Chip Inductors

Inductance (nH)	Tolerance (% or nH)	Q (min)	DCR ( $\Omega$ )(max)	IDC(mA)(max)	SRF(GHz)(min)
1.0	0.1/0.2/0.3nH	15 / 300MHz	0.35	800	13
1.2	0.1/0.2/0.3nH	15 / 300MHz	0.35	800	13
1.5	0.1/0.2/0.3nH	15 / 300MHz	0.35	800	10
1.8	0.1/0.2/0.3nH	15 / 300MHz	0.35	300	10
2.2	0.1/0.2/0.3nH	15 / 300MHz	0.35	300	8
2.7	0.1/0.2/0.3nH	15 / 300MHz	0.45	300	6
3.3	0.1/0.2/0.3nH	15 / 300MHz	0.45	300	6
3.9	0.1/0.2/0.3nH	15 / 300MHz	0.45	300	6
4.7	0.1/0.2/0.3nH	15 / 300MHz	0.55	300	5
5.6	0.1/0.2/0.3nH	15 / 300MHz	0.65	300	5
6.8	0.1/0.2/0.3nH	15 / 300MHz	0.75	300	5
8.2	0.1/0.2/0.3nH	15 / 300MHz	0.95	300	4
10	1/2/3/5%	15 / 300MHz	0.95	300	4
12	1/2/3/5%	15 / 300MHz	1.05	300	3
15	1/2/3/5%	15 / 300MHz	1.35	300	3
18	1/2/3/5%	15 / 300MHz	1.65	300	2

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# Chip Inductors

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Inductance (nH)	Tolerance (% or nH)	Q (min)	DCR ( $\Omega$ )(max)	IDC (mA)(max)	SRF (GHz)(min)
22	1/2/3/5%	15 / 300MHz	1.95	250	2
27	1/2/3/5%	15 / 300MHz	2.35	250	2
33	1/2/3/5%	15 / 300MHz	2.75	250	1.5
39	1/2/3/5%	15 / 300MHz	3.00	200	1.5
47	1/2/3/5%	15 / 300MHz	3.00	200	1.5
56	1/2/3/5%	15 / 300MHz	5.00	150	1
68	1/2/3/5%	15 / 300MHz	5.00	150	1
100	1/2/3/5%	15 / 300MHz	7.50	100	1

Note: Test Equipment: HP4286A+Agilent 16196A

## ► Standard Electrical Specifications for 0402 Chip Inductors

Inductance (nH)	Tolerance (% or nH)	Q (min)	DCR ( $\Omega$ )(max)	IDC (mA)(max)	SRF (GHz)(min)
0.2	0.1/0.2/0.3nH	13 / 500MHz	0.10	800	14
0.4	0.1/0.2/0.3nH	13 / 500MHz	0.10	800	14
0.8	0.1/0.2/0.3nH	13 / 500MHz	0.15	700	14
1.0	0.1/0.2/0.3nH	13 / 500MHz	0.15	700	12
1.2	0.1/0.2/0.3nH	13 / 500MHz	0.15	700	12
1.5	0.1/0.2/0.3nH	13 / 500MHz	0.25	700	10
1.6	0.1/0.2/0.3nH	13 / 500MHz	0.25	560	10
1.8	0.1/0.2/0.3nH	13 / 500MHz	0.25	560	10
2.0	0.1/0.2/0.3nH	13 / 500MHz	0.35	560	8
2.2	0.1/0.2/0.3nH	13 / 500MHz	0.35	440	8
2.7	0.1/0.2/0.3nH	13 / 500MHz	0.35	440	8
3.1	0.1/0.2/0.3nH	13 / 500MHz	0.45	380	6
3.3	0.1/0.2/0.3nH	13 / 500MHz	0.45	380	6
3.6	0.1/0.2/0.3nH	13 / 500MHz	0.55	380	6
3.9	0.1/0.2/0.3nH	13 / 500MHz	0.55	340	6
4.7	0.1/0.2/0.3nH	13 / 500MHz	0.65	320	6
5.6	0.1/0.2/0.3nH	13 / 500MHz	0.85	280	6
5.9	0.1/0.2/0.3nH	13 / 500MHz	0.85	280	6
6.8	0.1/0.2/0.3nH	13 / 500MHz	1.05	260	6
7.2	0.1/0.2/0.3nH	13 / 500MHz	1.05	260	6
8.0	0.1/0.2/0.3nH	13 / 500MHz	1.25	220	5.5
8.2	0.1/0.2/0.3nH	13 / 500MHz	1.25	220	5.5
9.1	0.1/0.2/0.3nH	13 / 500MHz	1.25	220	5.5
10	1/2/3/5%	13 / 500MHz	1.35	200	4.5
12	1/2/3/5%	13 / 500MHz	1.55	180	3.7
13.8	1/2/3/5%	13 / 500MHz	1.75	180	3.7
15	1/2/3/5%	13 / 500MHz	1.75	130	3.3
17	1/2/3/5%	13 / 500MHz	1.95	100	3.1
18	1/2/3/5%	13 / 500MHz	2.15	100	3.1
20.8	1/2/3/5%	13 / 500MHz	2.55	90	2.8
22	1/2/3/5%	13 / 500MHz	2.65	90	2.8
27	1/2/3/5%	13 / 500MHz	3.25	75	2.5
33	1/2/3/5%	13 / 500MHz	3.75	75	2.5

Note: Test Equipment: HP4286A+Agilent 16196B

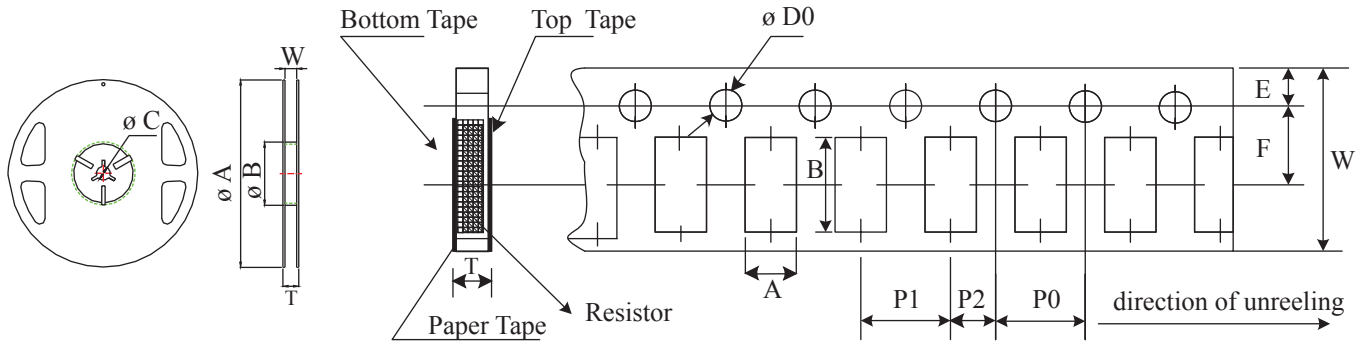
Token is capable of manufacturing the optional spec based on customer's requirement.



# Chip Inductors

## Thin Film Chip Inductor Reel Specifications & Packaging Quantity (Unit: mm)

Codes	$\Phi A$	$\Phi B$	$\Phi C$	W	T	Paper Tape (PCS)
TCAL02	$178 \pm 1$	$60.2 \pm 0.50$	$13.0 \pm 0.50$	$13.2 \pm 1.50$	$16.0 \pm 0.20$	10,000
TCAL03	$178 \pm 1$	$60.0 \pm 0.50$	$13.0 \pm 0.20$	$9.00 \pm 0.50$	$12.0 \pm 0.15$	5,000



## Thin Film Chip Inductor Paper Tape Specifications (Unit: mm)

Codes	A	B	W $\pm 0.10$	E $\pm 0.05$	F $\pm 0.05$	P0 $\pm 0.10$	P1	P2 $\pm 0.05$	$\Phi D0$	T
TCAL02	$0.67 \pm 0.03$	$1.15 \pm 0.03$	8.00	1.75	3.5	4.00	$2.00 \pm 0.05$	2.00	$1.54 \pm 0.03$	$0.40 \pm 0.03$
TCAL03	$1.10 \pm 0.05$	$1.90 \pm 0.05$	8.00	1.75	3.5	4.00	$4.00 \pm 0.10$	2.00	$1.55 \pm 0.05$	$0.60 \pm 0.03$

## Thin Film Chip Inductor Environmental Characteristics

Item	Specification	Test Method
Bending Test	As SPEC.	JIS-C-5202-6.1.4 Bending Amplitude 3mm for 10 seconds
Dielectric Withstand Voltage	>100V	MIL-STD-202F Method 301 Apply 100VA (rms) for 1minute.
Insulation Resistance	>1000MM	MIL-STD-202F Method 302 Apply 100VDC for 1minute.
Resistance to Soldering Heat	$\Delta L \leq 10\%$	MIL-STD-202F Method 210E $260 \pm 5^\circ\text{C}$ , $10 \pm 1$ seconds
High Temperature Exposure	$\Delta L \leq 10\%$	JIS-C-5202-7.2 $85 \pm 2^\circ\text{C}$ , 1000 +48/-0 hours
Moisture Resistance	$\Delta L \leq 10\%$	MIL-STD-202F Method 103B $40 \pm 2^\circ\text{C}$ , 90~95%RH, 1000 +48/-0 hours
Low Temperature Storage	$\Delta L \leq 10\%$	JIS-C-5202-7.1 $-40 \pm 3^\circ\text{C}$ , 1000 +48/-0 hours
Temperature Cycle	$\Delta L \leq 10\%$	JIS-C-5202-7.4 -40/RT/85/RT, 10 cycles
Solderability	95% min coverage	MIL-STD-202F Method 208H $235^\circ\text{C} \pm 5^\circ\text{C}$ , $2 \pm 0.5$ (sec)

Note: Storage Temperature:  $25 \pm 3^\circ\text{C}$ ; Humidity < 80%RH





# Chip Inductors

## ► How to Order



### ① Thin Film Chip Inductor

### ② Dimensions (L×W)(mm)

Code	Dimensions (L×W)	EIA
02	1.00×0.50 mm	0402
03	1.60×0.80 mm	0603

### ③ Inductance Tolerance

Code	Inductance Tolerance
J	±5%
H	±3%
G	±2%
F	±1%
S	±0.3nH
C	±0.2nH
B	±0.1nH

### ④ Packaging: T (Taping Reel)

### ⑤ Inductance

Code	Inductance
1N0	1.0nH
10N	10nH
20N8	20.8nH
R10	100nH

