KOA SPEER ELECTRONICS, INC.

RoHS COMPLIANT

spec sheet

SS-210 R5
AHA 06/28/06

Thin Film Chip Inductors
Type KL73 0805

ISO 9001:2000 CERTIFIED
TS-16949 CERTIFIED

1. Scope

This specification applies to Thin Film Chip Inductors (KL73) 2A size produced by KOA Corporation.

2. Type Designation

The type designation shall be the following form:

New Type

KL73	2A	T	TE	4N7	G
Type	Size	Termination Material	Packaging	Nominal Inductance	Tolerance
	2A: 0805	T: Sn (Other termination styles available, contact factory for options)	TE: 7" embossed plastic 4mm pitch (2B - 4,000 pieces/reel)	4N7: 4.7nH 47N: 47nH	B: ±0.1nH C: ±0.2nH G: ±2% J: ±5%

3. Rating

Item	Ratings
Nominal Inductance Range (nH)	1.0 ~ 82 (E-12 series)
Inductance Tolerance	± 2%, ± 5% (± 0.2nH: Under 4.7nH)
Quality Factor (typ.)	10 ~ 25
Self Resonant Frequency (typ.) (MHz)	600 ~ 13,000
DC Resistance (typ.) (Ω)	0.25 ~ 5.00
Allowable Current (max.) (mA)	150 ~ 900
Operating Temperature Range (°C)	-40°C ~ +85°C
Storage Temperature Range (°C)	-40°C ~ +125°C

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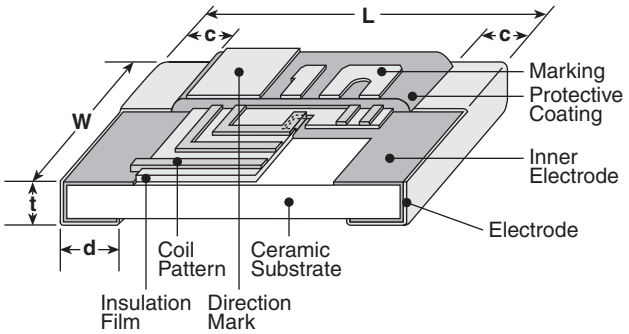
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Rating Table

Part Designation	Inductance (nH)	Inductance Tolerance	Quality Factor Minimum	Self Resonant Frequency Minimum (MHz)	DC Resistance Maximum (Ω)	Allowable DC Current Maximum (mA)	Measured Frequency (MHz)
KL732ATTE1N0*	1.0	C: ±0.2nH	20	13000	0.25	900	500
KL732ATTE1N2*	1.2						
KL732ATTE1N5*	1.5			10000			
KL732ATTE1N8*	1.8		25	9000			
KL732ATTE2N2*	2.2			8000		800	
KL732ATTE2N7*	2.7						
KL732ATTE3N3*	3.3			6000			
KL732ATTE3N9*	3.9						
KL732ATTE4N7*	4.7			5000	0.50	700	
KL732ATTE5N6*	5.6	G: ±2% J: ±5%		4500			
KL732ATTE6N8*	6.8			4000		500	
KL732ATTE8N2*	8.2			3000			
KL732ATTE10N*	10			2500	1.00	400	
KL732ATTE12N*	12						
KL732ATTE15N*	15			2000		300	
KL732ATTE18N*	18		20	1500			
KL732ATTE22N*	22			1000	1.50	250	200
KL732ATTE27N*	27		15				
KL732ATTE33N*	33					200	
KL732ATTE39N*	39			800			
KL732ATTE47N*	47						
KL732ATTE56N*	56		10	700	4.00	150	
KL732ATTE68N*	68				5.00		
KL732ATTE82N*	82			600			

* Add tolerance character (B, C, G, J)

4. Dimensions



Type (Inch Size Code)	Dimensions inches (mm) L	W	c	d	t
2A (0805)	.079±.008 (2.0±0.2)	.049±.008 (1.25±0.2)	.016±.008 (0.4±0.2)	.012±.004 (0.3±0.2)	.02±.004 (0.5±0.1)

5. Marking

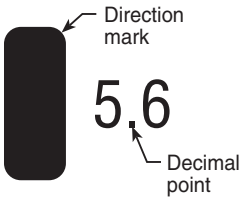
5-1 Coating and Marking Color

Coating color: Dark blue
Direction mark color: Yellow

5-2 Marking Method

Inductance value shall be indicated to two letters marking, including decimal point.

(Example of marking)
2.2 → 2.2nH
5.6 → 5.6nH
10 → 10nH
47 → 47nH



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6. Characteristics

6-1 Test Condition

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

Ambient temperature: 20 ± 15°C
Relative humidity: 65 ± 20%

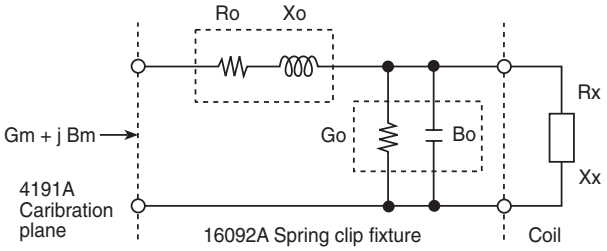
If there may be any doubt on results, measurements shall be made within the following limits:

Ambient temperature: 20 ± 2°C
Relative humidity: 65 ± 5%

6-2 Measurement Method of L and Q

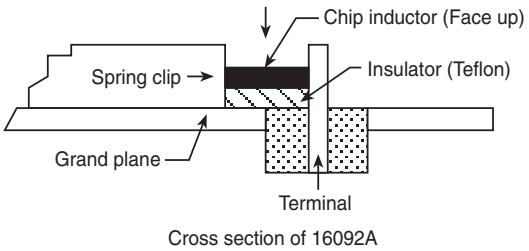
Test equipment:	Hewlett Packard RF Impedance analyzer 4191A
Fixture:	Hewlett Packard Test fixture 16092A
Measuring frequency:	500 MHz/1.0nH ~ 22nH (1.0nH ~ 15nH)
	200 MHz/27nH ~ 100nH (18nH ~ 27nH)

1. Perform auto-calibration to the HP4191A .275" (7mm) unknown connector connected to 0Ω/0S/50Ω standard terminations.
2. Connected the test fixture 16092A.
   Measure the open circuit admittance (Go, Bo), and the short circuit impedance (Ro, Xo).



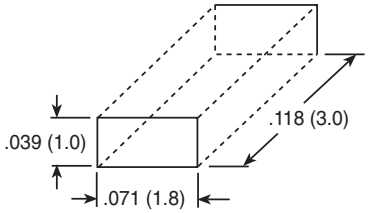
Gm + jBm: Measured admittance [S]
Ro + jXo: Residual impedance [Ω]
Go + jBo: Stray admittance [S]
Rx + jXx: Unknown impedance [Q]

3. Set pattern up and ground side to direction mark on insulator.
   Measure admittance (Gm, Bm).



Cross section of 16092A

Dimensions of insulator (Teflon) in inches (mm)



4. The L and Q value shall be given the following equation. (Compensated calculation)

$$Rx = \frac{Gm - Go}{(Gm - Go)^2 + (Bm - Bo)^2} - Ro$$

$$Xx = \frac{Bo - Bm}{(Gm - Go)^2 - (Bm - Bo)^2} - Xo$$

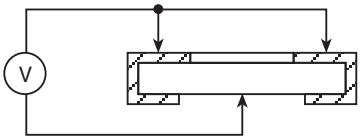
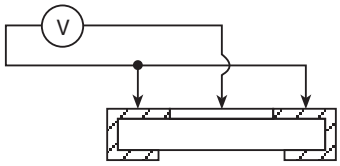
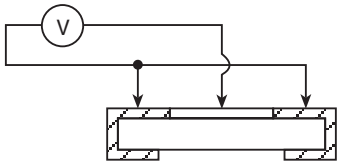
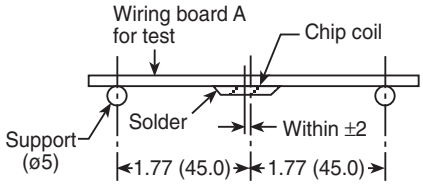
$$L = \frac{Xx}{2\pi f} \quad , \quad Q = \frac{Xx}{Rx}$$

L: Inductance of coil
Q: Quality factor of coil
f: Measuring frequency

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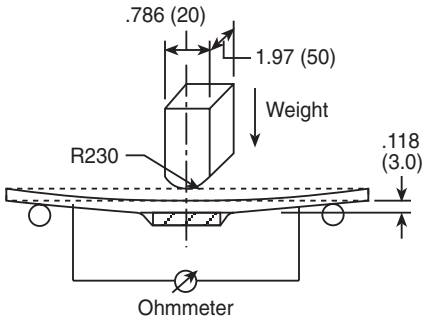
7-3 Characteristics

Item	Requirement	Test Method
Insulation resistance	More than 10^4 MΩ	DC 500V, 1 minute between both terminals and center of reverse side. 
	More than 10^3 MΩ	DC 500V, 1 minute Between both terminals and center of protection coating. 
Dielectric withstanding voltage	Without distinct damage	DC 500V, 1 minute Between both terminals and center of protection coating. 
Terminal strength	Δ R/R: Within ± 1% Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% No mechanical damage by cracks or stripping, etc.	Soldered chip on wiring board A for test is to be bent down to .118" (3 mm) as below drawing. (Set condition) Dimensions in inches (mm) 

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7-3 Characteristics (continued)

Item	Requirement	Test Method
		 Dimensions in inches (mm)
Vibration	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction	Inflict 2 hours in each direction of X, Y, Z at vibration of 10 ~ 55Hz, amplitude .059 (1.5)
Resistance to solder heat	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction	260 ± 5°C, 10 ± 1 second
Solderability	95% of the terminal should be covered with new solder	230 ± 5°C, 3 ± 0.5 second
Shock resistance	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction	Inflict the impulse 3 times to both directions (total 18 times) along perpendicular axis that test condition 100G, 6 months
Low temperature operation	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction	-40°C ± 3°C, 1,000 ± 4 hours
Heat resisting property	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction	125°C ± 2°C, 1,000 ± 4 hours
Temperature cycling	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction	-40 ± 3°C, 30 minutes/125 ± 2°C, 30 minutes 100 cycles

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7-3 Characteristics (continued)

Item	Requirement	Test Method
Humidity	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance and construction. Insulation resistance: more than 50MΩ	40 ± 2°C, 90 ~ 95% RH 1,000 ± 4 hours
Resistance to solvent	Δ L/L: Within ± 2% Δ Q/Q: Within ± 20% Without distinct damage in appearance, construction and marking	Immerse 30 ± 5 seconds in the regent (20 ~ 25°C) of JIS K 8839 (1995)

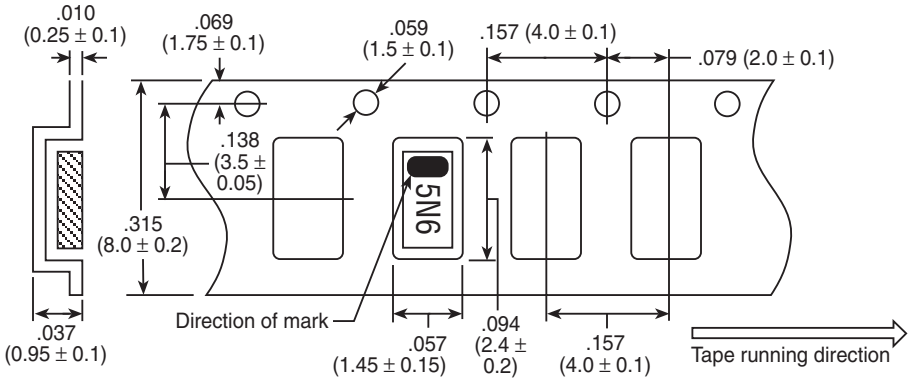
8. Packaging

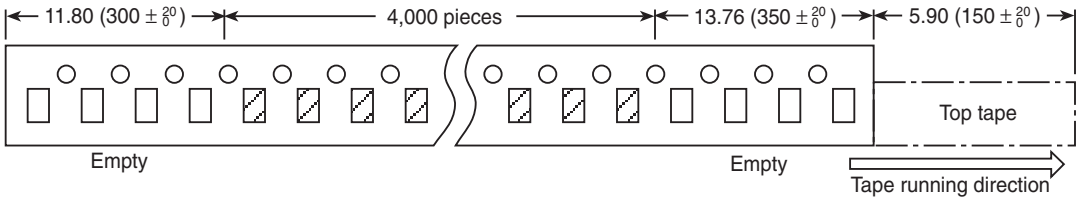
8-1 Taping

The tapes for taping shall be embossed carrier tapes of .315" (8 mm) width and .157" (4 mm) pitches. The standard quantity per reel shall be 4,000 pieces.

(1) Dimensions of carrier tape

Dimensions in inches (mm)

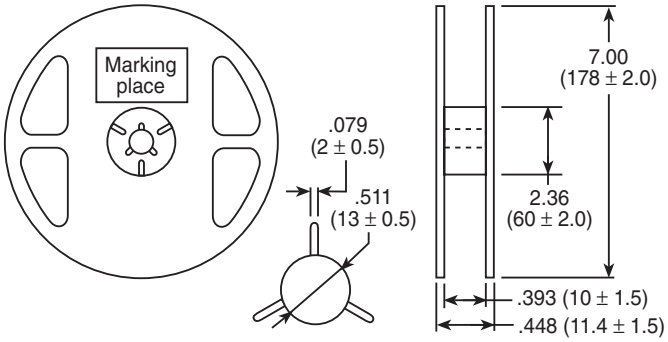




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(2) Reel dimensions



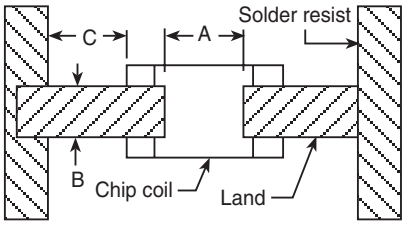
Dimensions in inches (mm)

(Marking item)

(1) Type designation
(2) Nominal inductance
(3) Quantity
(4) Production lot number
(5) Manufacturer's name

9. Recommended Soldering Condition

9-1 Dimensions of Standard Land

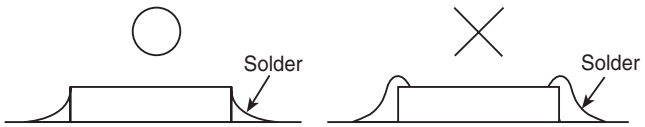


Dimensions in inches (mm)

Size	A	B	C
2A	.047 ~ .055 (1.2 ~ 1.4)	.035 ~ .051 (0.9 ~ 1.3)	.016 ~ .031 (0.4 ~ 0.8)

9-2 Soldering Condition

Reflow soldering should be done at 240°C within 20 seconds. Flow soldering should be done at 260°C within 10 seconds. Please use suitable solder quantity, too much solder may affect performance of product.



10. Recommended Washing Condition

Isopropyl alcohol and methyl alcohol used for the washing process will not affect the part performance.

Ultrasonic cleaning should be changed to condition for size of printed wiring board and type of oscillator. Overpowering of ultrasonic cleaning will cause problems according to resonant phenomenon. Condition of ultrasonic cleaner should be confirmed prior to use.
We recommend the following conditions:

Ultrasonic power: Within 20W/1
Cleaning times: Within 5 minutes

11. Storage

Chip inductors should not be stored under high temperature and high humidity conditions. In particular, do not store ***taping*** where it is exposed to heat or direct sunlight. Otherwise, the packing material may be deformed, causing problems during mounting.

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