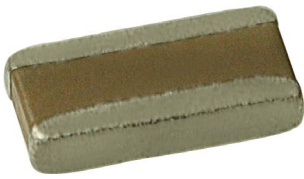


# Low Inductance Ceramic Capacitors (LIC Series)



## Features:

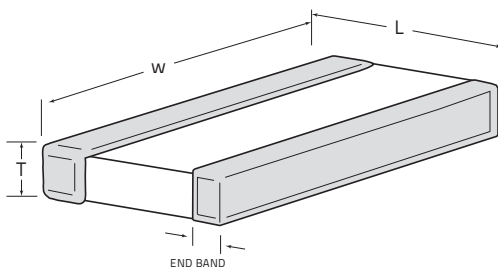
- RoHS Compliant and Halogen Free
- Low parasitic inductance (ESL) and noise reduction for high frequency
- Reversed geometry technology provides low inductance, typically less than 0.40nH
- Dielectrics: X7R, X7S, X6S, X5R
- Voltage range: 4V to 50V
- Capacitance range: 2200pF to 10uF

## Part Number Structure

LIC	0306	X7R	100	-	104	K	N	P
Series	Size	Temperature Characteristic (Dielectric)	Rated Voltage		Capacitance (pico - Farads)	Tolerance	Termination	Packaging
	0204		4R0 = 4V			K = ± 10%	N = 100% matte Tin (Sn) over nickel.	P = Paper Tape
	0306		6R3 = 6.3V		1st two digits are significant,	M = ± 20%		E = Embossed Tape
	0508	X7R	100 = 10V		followed by number of zeroes.			
	0612	X7S	160 = 16V		104 = 0.1uF			
		X6S	250 = 25V					
		X5R	500 = 50V					

Example P/N: LIC0306X7R100-104KNP

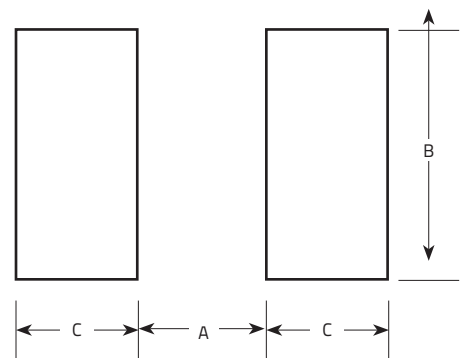
## Dimensions



Unit: inches (mm)				
Size (inches)	L	W	E/B (Max)	T (Max)
0204	0.020 ± 0.002 (0.50 ± 0.05)	0.040 ± 0.0021 (1.00 ± 0.05)	0.006 (0.15)	0.016 ± 0.002 (0.40 ± 0.05)
0306	0.032 ± 0.006 (0.80 ± 0.15)	0.063 ± 0.006 (1.60 ± 0.15)	0.0088 (0.22)	0.04 (0.86)
0508	0.048 ± 0.010 (1.20 ± 0.25)	0.080 ± 0.010 (2.00 ± 0.25)	0.016 (0.40)	0.024 (0.61)
0612	0.063 ± 0.010 (1.60 ± 0.25)	0.126 ± 0.010 (3.20 ± 0.25)	0.016 (0.40)	0.038 (0.97)

## Recommended Land Pattern

Unit: inch (mm)			
Size (inches)	A	B	C
0204	0.006 - 0.008 (0.15 - 0.20)	0.028 - 0.04 (0.7 - 1.0)	0.008 - 0.012 (0.20 - 0.30)
0306	0.012 (0.31)	0.060 (1.52)	0.036 (0.90)
0508	0.020 (0.51)	0.080 (2.03)	0.036 (0.90)
0612	0.030 (0.76)	0.120 (3.05)	0.036 (0.90)

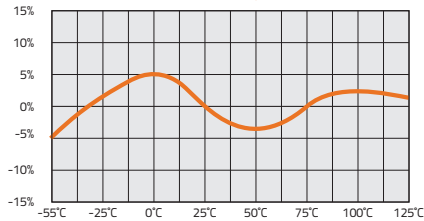


# Low Inductance Ceramic Capacitors (LIC Series)

## Electrical Specifications

### X7R

Typical Capacitance Change vs. Temperature



**Operating Temp. Range:**  
-55°C to +125°C

**Temperature Coefficient:**  
0 ±15% Δ°C max.

**Voltage Ratings:**  
10, 16, 25, 50 VDCW

**Insulation Resistance:**  
100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCW.  
(IR at 125°C is 10% of the value at 25°C)

**Ageing:**  
2.5% per decade hour, Typical

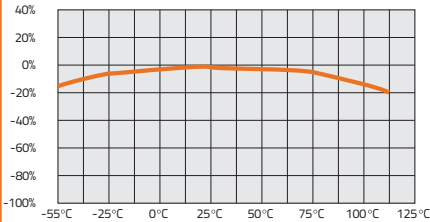
**Withstanding Voltage:**  
See below

**D.F. Specification:**  
≤12.5%

**Capacitance Tolerances:**  
K, M

### X7S

Typical Capacitance Change vs. Temperature



**Operating Temp. Range:**  
-55°C to +125°C

**Temperature Coefficient:**  
0 ±22% Δ°C max.

**Voltage Ratings:**  
4 VDCW

**Insulation Resistance:**  
> 50 Ω-F or 5 GΩ, whichever is less at 25°C, VDCW.  
(IR at 125°C is 10% of the value at 25°C)

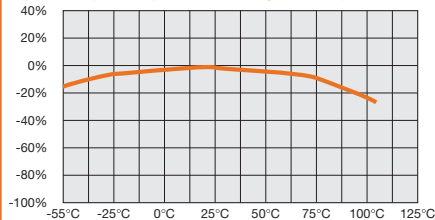
**Ageing:**  
2.5% per decade hour, Typical

**D.F. Specification:**  
≤12.5%

**Capacitance Tolerances:**  
K, M

### X6S

Typical Capacitance Change vs. Temperature



**Operating Temp. Range:**  
-55°C to +105°C

**Temperature Coefficient:**  
0 ±22% Δ°C max.

**Voltage Ratings:**  
6.3 VDCW

**Insulation Resistance:**  
100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCW.  
(IR at 125°C is 10% of the value at 25°C)

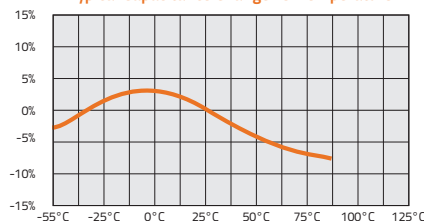
**Ageing:**  
2.5% per decade hour, Typical

**D.F. Specification:**  
≤12.5%

**Capacitance Tolerances:**  
K, M

### X5R

Typical Capacitance Change vs. Temperature



**Operating Temp. Range:**  
-55°C TO +85°C

**Temperature Coefficient:**  
0 ±15%Δ°C MAX.

**Voltage Ratings:**  
4, 6.3, 10, 16, 25, 50, 100 VDCW

**Insulation Resistance:**  
> 100 Ω-F or 10 GΩ, whichever is less at 25°C, VDCW.  
(IR at 125°C is 10% of the value at 25°C)

**Ageing:**  
2.5% per decade hour, Typical

**D.F. Specification:**  
≤12.5%

**Capacitance Tolerance:**  
K, M

# Low Inductance Ceramic Capacitors (LIC Series)

## Test Parameters

Test parameters for Multilayer Ceramic Chip Capacitors - X7R, X7S, X6S:

1KHz  $\pm$  50Hz at 1.0  $\pm$  0.2 Vrms, 25°C

Test parameters for Multilayer Ceramic Chip Capacitors - X5R:

1KHz  $\pm$  100Hz at 1.0  $\pm$  0.2 Vrms, 25°C

**Note:** To ensure proper capacitance readings, the voltage level must be held constant. The HP4284 and Agilent E4980 has a "ALC" (Automatic Level Control) function and should be switched to the "ON" position for accurate capacitance readings.

## Typical Inductance

Size	Measured Inductance (nH)
0204	0.275
0306	0.325
0508	0.400
0612	0.450

## Voltage and Capacitance Range

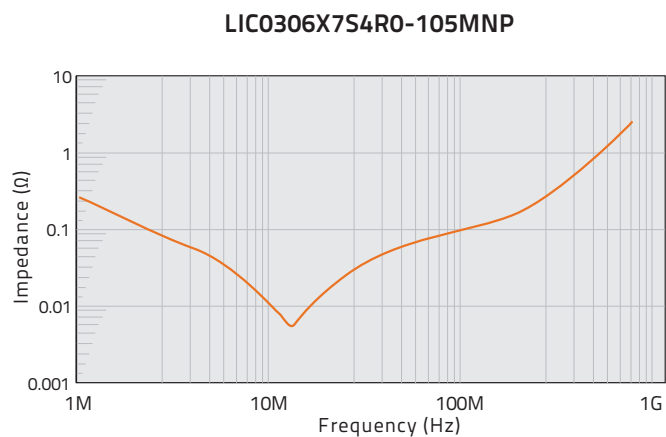
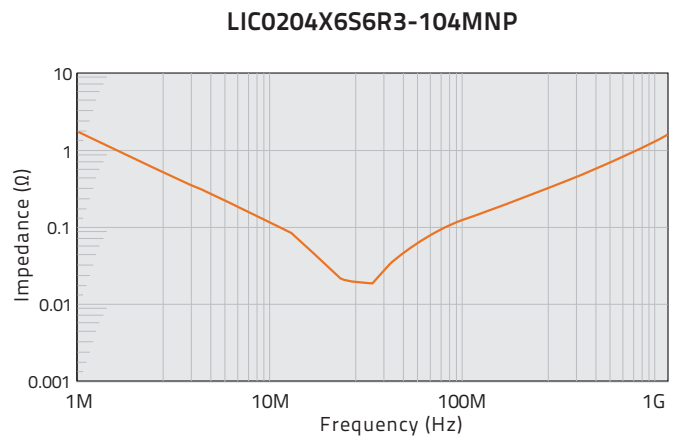
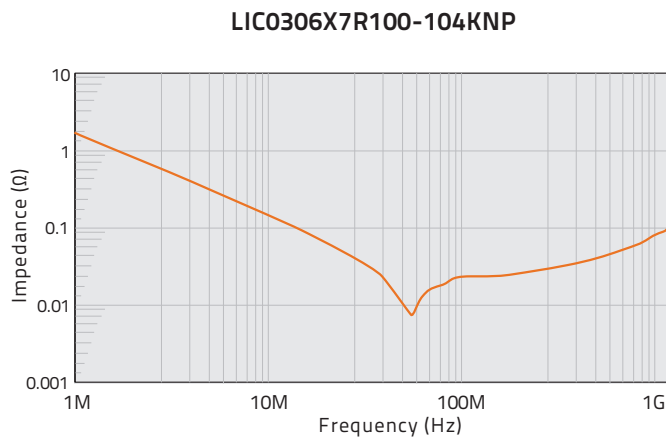
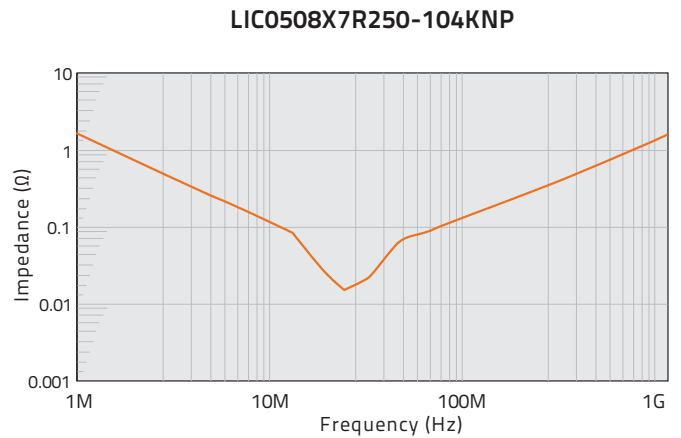
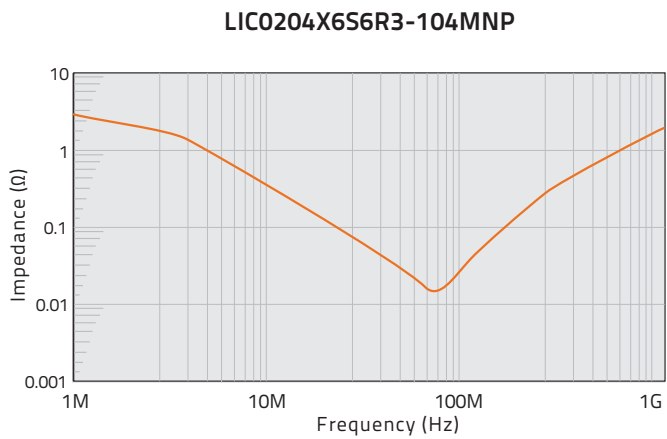
X7R, X7S, X6S, X5R

■ X7R ■ X7S ■ X6S ■ X5R

Size	0204		0306					0508					0612						
	L	W	4V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	4V	6.3V	10V	16V	25V	50V
222	0.02	0.04																	
472	0.02	0.04																	
103	0.02	0.04																	
123	0.02	0.04																	
153	0.02	0.04																	
183	0.02	0.04																	
223	0.02	0.04																	
273	0.02	0.04																	
333	0.02	0.04																	
393	0.02	0.04																	
473	0.02	0.04																	
563	0.02	0.04																	
683	0.02	0.04																	
823	0.02	0.04																	
104	0.02	0.04																	
224	0.02	0.04																	
474	0.02	0.04																	
105	0.02	0.04																	
225	0.02	0.04																	
475	0.02	0.04																	
106	0.02	0.04																	

# Low Inductance Ceramic Capacitors (LIC Series)

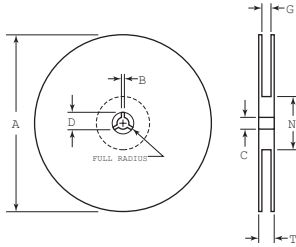
## Impedance vs Frequency



# Low Inductance Ceramic Capacitors (LIC Series)

## Tape and Reel Specifications

All tape and reel specifications must be adhered to per EIA-481-1-A.

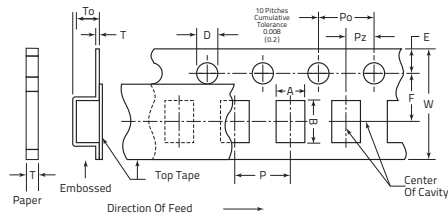


### Reel Dimensions

Unit: mm (inch)

TAPE	B min	C	A (7")	A (13")	D min	N min	G	T max
8mm	$\frac{0.3}{(.012)}$	$\frac{13 \pm .05}{(.512 \pm .02)}$	$\frac{178 \pm 2.0}{(7 \pm .079)}$	$\frac{330 \pm 2.0}{(13 \pm .08)}$	$\frac{20.2}{(.795)}$	$\frac{50}{(1.97)}$	$\frac{10 \pm 1.5}{(.394 \pm .059)}$	$\frac{14.9}{(.587)}$
12mm	$\frac{0.3}{(.012)}$	$\frac{13 \pm .05}{(.512 \pm .02)}$	$\frac{178 \pm 2.0}{(7 \pm .079)}$	$\frac{330 \pm 2.0}{(13 \pm .08)}$	$\frac{20.2}{(.795)}$	$\frac{50}{(1.97)}$	$\frac{10 \pm 1.5}{(.394 \pm .059)}$	$\frac{14.9}{(.587)}$

### Taping Specifications



### 7 in. Reel Quantities

SIZE	0204	0306	0508	0612
Tape Size	8mm	8mm	8mm	8mm
Min. Qty Per Reel	5000	3000	2000	2000
Max Qty Per Reel	10,000	4000	5000	5000

### Paper Tape Carrier Dimensions (8mm)

### Embossed Carrier Dimensions (8mm & 12mm)

Unit: mm (inch)

SIZE (inches)	A	B	W	F	E	P <sub>0</sub>	P <sub>z</sub>	D	t	P
0204	$\frac{0.65 \pm 0.1}{(.026 \pm .004)}$	$\frac{1.10 \pm 0.2}{(.043 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
0306	$\frac{1.10 \pm 0.2}{(.043 \pm .008)}$	$\frac{1.90 \pm 0.2}{(.075 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
0508	$\frac{1.16 \pm 0.2}{(.046 \pm .008)}$	$\frac{2.4 \pm 0.2}{(.095 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$
0612	$\frac{2.0 \pm 0.2}{(.079 \pm .008)}$	$\frac{3.6 \pm 0.2}{(.142 \pm .008)}$	$\frac{8.0 \pm 0.2}{(.315 \pm .008)}$	$\frac{3.5 \pm 0.1}{(.138 \pm .004)}$	$\frac{1.75 \pm 0.1}{(.069 \pm .004)}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$	$\frac{2.0 \pm 0.05}{- 0.0}$ $\frac{- 0.0}{(.039 \pm .002)}$ $- .000$	$\frac{1.5 \pm 0.1}{(.064 \pm .004)}$	$\frac{1.15 \text{ MAX}}{(.045 \text{ MAX})}$	$\frac{4.0 \pm 0.1}{(.157 \pm .004)}$