

# Chip Inductors – 0402CS (1005)



Continuing in our long tradition of innovation and leadership, Coilcraft introduced the industry's first 0402 wirewound inductor.

This series shares all of the characteristics of Coilcraft's other ceramic inductors: exceptionally high Q factors, especially at use frequencies; outstanding self-resonant frequency; tight inductance tolerance; and excellent batch-to-batch consistency.

## Typical L vs Frequency



## Typical Q vs Frequency



## Irms Derating



| A     | B     | C     | D     | E     | F     | G     | H     | I     | J     |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| max   | max   | max   | ref   |       |       |       |       |       |       |
| 0.047 | 0.025 | 0.026 | 0.010 | 0.020 | 0.009 | 0.022 | 0.026 | 0.014 | 0.018 |
| 1,19  | 0,64  | 0,66  | 0,25  | 0,51  | 0,23  | 0,56  | 0,66  | 0,36  | 0,46  |

- Core material** Ceramic
- Environmental** RoHS compliant, halogen free optional
- Terminations** RoHS compliant silver-palladium-platinum-glass frit. Other terminations available at additional cost.
- Weight** 0.8 – 1.0 mg
- Ambient temperature** –40°C to +125°C with Irms current, +125°C to +140°C with derated current
- Storage temperature** Component: –40°C to +140°C. Tape and reel packaging: –40°C to +80°C
- Resistance to soldering heat** Max three 40 second reflows at +260°C, parts cooled to room temperature between cycles
- Temperature Coefficient of Inductance (TCL)** +25 to +125 ppm/°C
- Moisture Sensitivity Level (MSL)** 1 (unlimited floor life at <30°C / 85% relative humidity)
- Failures in Time (FIT) / Mean Time Between Failures (MTBF)** One per billion hours / one billion hours, calculated per Telcordia SR-332
- Packaging** 2000 or 5000 per 7" reel Paper tape: 8 mm wide, 1.68 mm thick, 2 mm pocket spacing
- PCB washing** Tested with pure water or alcohol only. For other solvents, see Doc787\_PCB\_Washing.pdf.



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# 0402CS Series (1005)

Designer's Kits C328A and B contain 20 each of all 5% values  
 Designer's Kits C328A-2 and B-2 contain 20 each of all 2% values

| Part number <sup>1</sup> | Inductance <sup>2</sup><br>(nH) | Percent<br>tolerance <sup>3</sup> | 900 MHz |                    | 1.7 GHz |                    | SRF min <sup>5</sup><br>(GHz) | DCR max <sup>6</sup><br>(Ohms) | Irms <sup>7</sup><br>(mA) |
|--------------------------|---------------------------------|-----------------------------------|---------|--------------------|---------|--------------------|-------------------------------|--------------------------------|---------------------------|
|                          |                                 |                                   | L typ   | Q typ <sup>4</sup> | L typ   | Q typ <sup>4</sup> |                               |                                |                           |
| 0402CS-1N0XJL_           | 1.0                             | <b>5</b>                          | 1.02    | 77                 | 1.02    | 69                 | 12.70                         | 0.045                          | 1360                      |
| 0402CS-1N2XJL_           | 1.2                             | <b>5</b>                          | 1.17    | 28                 | 1.17    | 38                 | 12.90                         | 0.090                          | 740                       |
| 0402CS-1N8XJL_           | 1.8                             | <b>5,3,2</b>                      | 1.78    | 54                 | 1.78    | 75                 | 12.00                         | 0.070                          | 1040                      |
| 0402CS-1N9XJL_           | 1.9                             | <b>5,3,2</b>                      | 1.72    | 68                 | 1.74    | 82                 | 11.30                         | 0.070                          | 1040                      |
| 0402CS-2N0X_L_           | 2.0                             | <b>5,3,2</b>                      | 1.93    | 54                 | 1.93    | 75                 | 11.10                         | 0.070                          | 1040                      |
| 0402CS-2N2X_L_           | 2.2                             | <b>5,3,2</b>                      | 2.19    | 59                 | 2.23    | 100                | 10.80                         | 0.070                          | 960                       |
| 0402CS-2N4X_L_           | 2.4                             | <b>5,3,2</b>                      | 2.24    | 51                 | 2.27    | 68                 | 10.50                         | 0.068                          | 790                       |
| 0402CS-2N7X_L_           | 2.7                             | <b>5,3,2</b>                      | 2.58    | 42                 | 2.60    | 61                 | 10.40                         | 0.120                          | 640                       |
| 0402CS-3N3X_L_           | 3.3                             | <b>5,3,2</b>                      | 3.10    | 65                 | 3.12    | 87                 | 7.00                          | 0.066                          | 840                       |
| 0402CS-3N6X_L_           | 3.6                             | <b>5,3,2</b>                      | 3.56    | 45                 | 3.62    | 71                 | 6.80                          | 0.066                          | 840                       |
| 0402CS-3N9X_L_           | 3.9                             | <b>5,3,2</b>                      | 3.89    | 50                 | 4.00    | 75                 | 6.00                          | 0.066                          | 840                       |
| 0402CS-4N3X_L_           | 4.3                             | <b>5,3,2</b>                      | 4.19    | 47                 | 4.30    | 71                 | 6.00                          | 0.091                          | 700                       |
| 0402CS-4N7X_L_           | 4.7                             | <b>5,3,2</b>                      | 4.55    | 48                 | 4.68    | 68                 | 4.77                          | 0.130                          | 640                       |
| 0402CS-5N1X_L_           | 5.1                             | <b>5,3,2</b>                      | 5.15    | 56                 | 5.25    | 82                 | 4.80                          | 0.083                          | 800                       |
| 0402CS-5N6X_L_           | 5.6                             | <b>5,3,2</b>                      | 5.16    | 54                 | 5.28    | 81                 | 4.80                          | 0.083                          | 760                       |
| 0402CS-6N2X_L_           | 6.2                             | <b>5,3,2</b>                      | 6.16    | 52                 | 6.37    | 76                 | 4.80                          | 0.083                          | 760                       |
| 0402CS-6N8X_L_           | 6.8                             | <b>5,3,2</b>                      | 6.56    | 63                 | 6.93    | 78                 | 4.80                          | 0.083                          | 680                       |
| 0402CS-7N5X_L_           | 7.5                             | <b>5,3,2</b>                      | 7.91    | 60                 | 8.22    | 88                 | 4.80                          | 0.10                           | 680                       |
| 0402CS-8N2X_L_           | 8.2                             | <b>5,3,2</b>                      | 8.50    | 57                 | 8.85    | 84                 | 4.40                          | 0.10                           | 680                       |
| 0402CS-8N7X_L_           | 8.7                             | <b>5,3,2</b>                      | 8.78    | 54                 | 9.21    | 73                 | 4.10                          | 0.20                           | 480                       |
| 0402CS-9N0X_L_           | 9.0                             | <b>5,3,2</b>                      | 9.07    | 62                 | 9.53    | 78                 | 4.16                          | 0.10                           | 680                       |
| 0402CS-9N5X_L_           | 9.5                             | <b>5,3,2</b>                      | 9.42    | 54                 | 9.98    | 69                 | 4.00                          | 0.20                           | 480                       |
| 0402CS-10NX_L_           | 10                              | <b>5,3,2</b>                      | 9.8     | 50                 | 10.10   | 67                 | 3.90                          | 0.20                           | 480                       |
| 0402CS-11NX_L_           | 11                              | <b>5,3,2</b>                      | 10.7    | 52                 | 11.20   | 78                 | 3.68                          | 0.12                           | 640                       |
| 0402CS-12NX_L_           | 12                              | <b>5,3,2</b>                      | 11.9    | 53                 | 12.70   | 71                 | 3.60                          | 0.12                           | 640                       |
| 0402CS-13NX_L_           | 13                              | <b>5,3,2</b>                      | 13.4    | 51                 | 14.63   | 57                 | 3.45                          | 0.21                           | 440                       |
| 0402CS-15NX_L_           | 15                              | <b>5,3,2</b>                      | 14.6    | 55                 | 15.50   | 77                 | 3.28                          | 0.17                           | 560                       |
| 0402CS-16NX_L_           | 16                              | <b>5,3,2</b>                      | 16.6    | 46                 | 18.86   | 47                 | 3.10                          | 0.22                           | 560                       |
| 0402CS-18NX_L_           | 18                              | <b>5,3,2</b>                      | 18.3    | 57                 | 20.28   | 62                 | 3.10                          | 0.23                           | 420                       |
| 0402CS-19NX_L_           | 19                              | <b>5,3,2</b>                      | 19.1    | 50                 | 21.10   | 67                 | 3.04                          | 0.20                           | 480                       |
| 0402CS-20NX_L_           | 20                              | <b>5,3,2</b>                      | 20.7    | 52                 | 23.66   | 53                 | 3.00                          | 0.25                           | 420                       |
| 0402CS-22NX_L_           | 22                              | <b>5,3,2</b>                      | 23.2    | 53                 | 26.75   | 53                 | 2.80                          | 0.30                           | 400                       |
| 0402CS-23NX_L_           | 23                              | <b>5,3,2</b>                      | 23.8    | 49                 | 26.90   | 64                 | 2.72                          | 0.30                           | 400                       |
| 0402CS-24NX_L_           | 24                              | <b>5,3,2</b>                      | 25.1    | 51                 | 29.50   | 50                 | 2.70                          | 0.30                           | 400                       |
| 0402CS-27NX_L_           | 27                              | <b>5,3,2</b>                      | 28.7    | 49                 | 33.50   | 63                 | 2.48                          | 0.30                           | 400                       |
| 0402CS-30NX_L_           | 30                              | <b>5,3,2</b>                      | 31.1    | 46                 | 38.50   | 39                 | 2.35                          | 0.30                           | 400                       |
| 0402CS-33NX_L_           | 33                              | <b>5,3,2</b>                      | 34.9    | 31                 | 41.74   | 32                 | 2.35                          | 0.30                           | 400                       |
| 0402CS-36NX_L_           | 36                              | <b>5,3,2</b>                      | 39.5    | 44                 | 48.40   | 53                 | 2.32                          | 0.44                           | 320                       |
| 0402CS-39NX_L_           | 39                              | <b>5,3,2</b>                      | 41.7    | 47                 | 50.23   | 45                 | 2.10                          | 0.55                           | 200                       |
| 0402CS-40NX_L_           | 40                              | <b>5,3,2</b>                      | 39.0    | 44                 | 47.40   | 33                 | 2.24                          | 0.44                           | 320                       |
| 0402CS-43NX_L_           | 43                              | <b>5,3,2</b>                      | 45.8    | 46                 | 61.55   | 34                 | 2.03                          | 0.81                           | 100                       |
| 0402CS-47NX_L_           | 47                              | <b>5,3,2</b>                      | 50.0    | 38                 | –       | –                  | 2.10                          | 0.83                           | 150                       |
| 0402CS-51NX_L_           | 51                              | <b>5,3,2</b>                      | 56.6    | 40                 | –       | –                  | 1.75                          | 0.82                           | 100                       |
| 0402CS-56NX_L_           | 56                              | <b>5,3,2</b>                      | 62.8    | 42                 | –       | –                  | 1.76                          | 0.97                           | 100                       |
| 0402CS-68NX_L_           | 68                              | <b>5,3,2</b>                      | 78.2    | 36                 | –       | –                  | 1.62                          | 1.12                           | 100                       |
| 0402CS-82NX_L_           | 82                              | <b>5,3,2</b>                      | –       | –                  | –       | –                  | 1.26                          | 1.55                           | 50                        |
| 0402CS-R10X_L_           | 100                             | <b>5,3,2</b>                      | –       | –                  | –       | –                  | 1.16                          | 2.00                           | 30                        |
| 0402CS-R12X_L_           | 120                             | <b>5,3,2</b>                      | –       | –                  | –       | –                  | 1.90                          | 2.20                           | 50                        |

1. When ordering, specify **tolerance, termination and packaging** codes:

### 0402CS-68NXJLW

- Tolerance:** G = 2% H = 3% J = 5%  
 (Table shows stock tolerances in bold.)
- Termination:** L = RoHS compliant silver-palladium-platinum-glass frit.  
 E = Halogen free component. RoHS compliant silver-palladium-platinum-glass frit terminations.  
 Special order: T = RoHS tin-silver-copper (95.5/4/0.5) or S = non-RoHS tin-lead (63/37).
- Packaging:** W = 7" machine-ready reel. EIA-481 punched paper tape (2000 parts per full reel).  
 Q = 7" machine-ready reel. EIA-481 punched paper tape (5000 parts per full reel).  
 U = Less than full reel. In tape, but not machine ready. To have a leader and trailer added (\$25 charge), use code letter W instead.

2. Inductance measured at 250 MHz using a Coilcraft SMD-F test fixture and Coilcraft-provided correlation pieces with an Agilent/HP 4286 impedance analyzer.
3. Tolerances in bold are stocked for immediate shipment.
4. Q measured using an Agilent/HP 4291A with an Agilent/HP 16193 test fixture.
5. For SRF >6 GHz, measured using an Agilent/HP 8722ES network analyzer and a Coilcraft SMD-D test fixture. For SRF ≤6 GHz, measured using an Agilent/HP 8753D network analyzer and a Coilcraft SMD-D test fixture.
6. DCR measured on a micro-ohmmeter.
7. Current that causes a 15°C temperature rise from 25°C ambient.
8. Electrical specifications at 25°C.
- Refer to Doc 362 "Soldering Surface Mount Components" before soldering.

**S-Parameter files**  
 ON OUR WEB SITE

**SPICE models**  
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