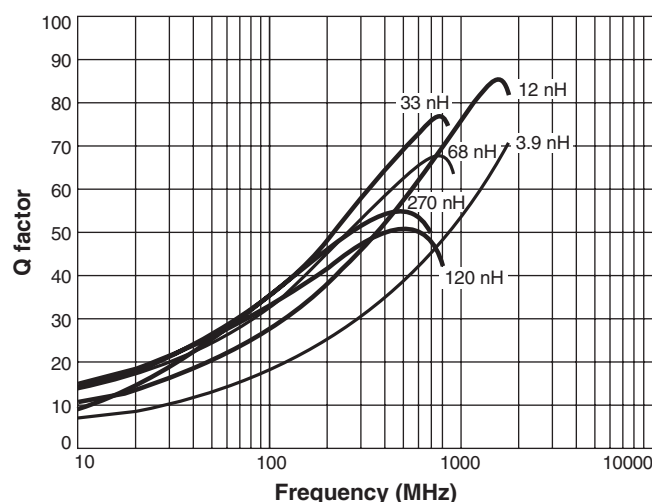




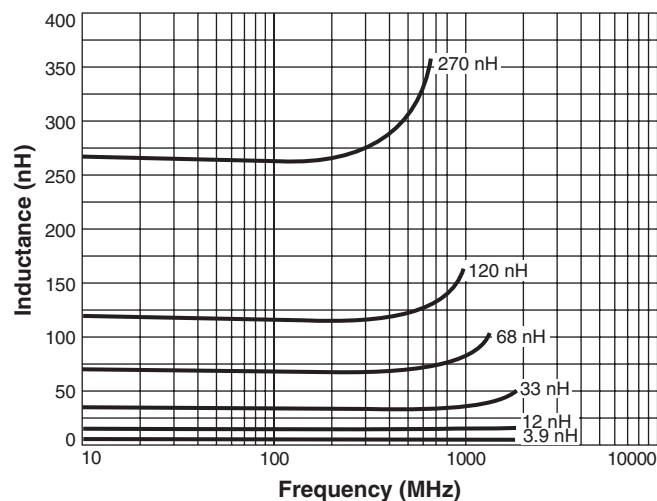
# Chip Inductors – 0603CS (1608)

Ultra-small size, exceptional Q and high SRFs make these inductors ideal for high frequency applications where size is at a premium. They also have excellent DCR and current carrying characteristics.

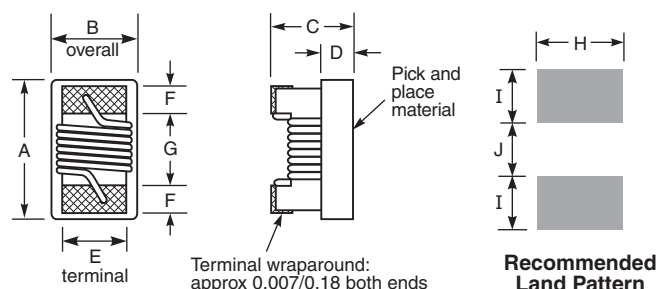
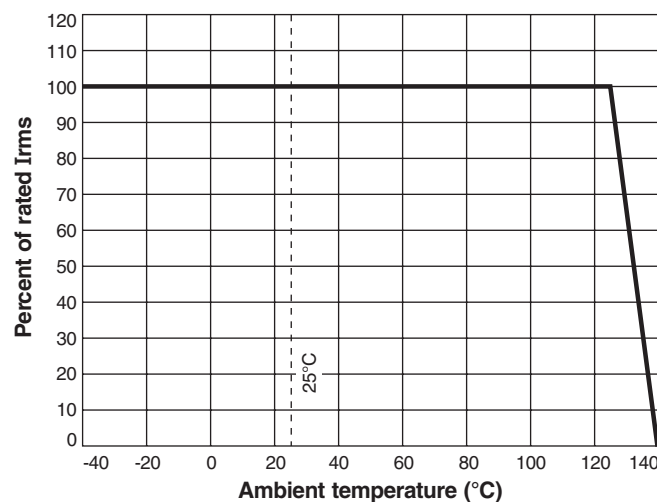
## Typical Q vs Frequency



## Typical L vs Frequency



## Irms Derating



| A     | B     | C     | D     | E     | F     | G     | H     | I     | J     |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| max   | max   | max   | ref   |       |       |       |       |       |       |
| 0.071 | 0.044 | 0.040 | 0.015 | 0.030 | 0.013 | 0.034 | 0.040 | 0.025 | 0.025 |
| 1,80  | 1,12  | 1,02  | 0,38  | 0,76  | 0,33  | 0,86  | 1,02  | 0,64  | 0,64  |

**Note:** Height dimension (C) is before optional solder application. For maximum height dimension including solder, add 0.006 in / 0,152 mm.

**Core material** Ceramic

**Environmental** RoHS compliant, halogen free optional

**Terminations** RoHS compliant silver-palladium-platinum-glass frit. Other terminations available at additional cost.

**Weight** 3.2 – 3.7 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 per 7" reel Paper tape: 8 mm wide, 1.0 mm thick, 4 mm pocket spacing

**PCB washing** Tested with pure water or alcohol only. For other solvents, see Doc787\_PCB\_Washing.pdf



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# 0603CS Series (1608)

Designer's Kits C324A and B contain 10 each of all 5% values  
 Designer's Kits C324A-2 and B-2 contain 10 each of all 2% values



| Part number <sup>1</sup> | Inductance <sup>2</sup><br>(nH) | Percent<br>tolerance <sup>3</sup> | Q<br>min <sup>4</sup> | 900 MHz |       | 1.7 GHz |       | SRF<br>min <sup>5</sup><br>(GHz) | DCR<br>max <sup>6</sup><br>(Ohms) | Irms <sup>7</sup><br>(mA) | Color<br>dot |
|--------------------------|---------------------------------|-----------------------------------|-----------------------|---------|-------|---------|-------|----------------------------------|-----------------------------------|---------------------------|--------------|
|                          |                                 |                                   |                       | L typ   | Q typ | L typ   | Q typ |                                  |                                   |                           |              |
| 0603CS-1N6XJL_           | 1.6 @ 250 MHz                   | <b>5</b>                          | 24                    | 1.67    | 49    | 1.65    | 63    | 12.5                             | 0.030                             | 700                       | Red          |
| 0603CS-1N8XJL_           | 1.8 @ 250 MHz                   | <b>5</b>                          | 16                    | 1.83    | 35    | 1.86    | 50    | 12.5                             | 0.045                             | 700                       | Black        |
| 0603CS-2N2XJL_           | 2.2 @ 250 MHz                   | <b>5</b>                          | 13                    | 2.22    | 31    | 2.24    | 44    | 12.5                             | 0.250                             | 100                       | Yellow       |
| 0603CS-3N3X_L_           | 3.3 @ 250 MHz                   | <b>5,3,2</b>                      | 35                    | 3.31    | 75    | 3.38    | 88    | 5.90                             | 0.045                             | 700                       | Blue         |
| 0603CS-3N6X_L_           | 3.6 @ 250 MHz                   | <b>5,3,2</b>                      | 22                    | 3.72    | 53    | 3.71    | 65    | 5.90                             | 0.063                             | 700                       | Red          |
| 0603CS-3N9X_L_           | 3.9 @ 250 MHz                   | <b>5,3,2</b>                      | 22                    | 3.95    | 49    | 3.96    | 67    | 6.90                             | 0.080                             | 700                       | Brown        |
| 0603CS-4N3X_L_           | 4.3 @ 250 MHz                   | <b>5,3,2</b>                      | 22                    | 4.32    | 50    | 4.33    | 70    | 5.90                             | 0.063                             | 700                       | Orange       |
| 0603CS-4N7X_L_           | 4.7 @ 250 MHz                   | <b>5,3,2</b>                      | 20                    | 4.72    | 47    | 4.75    | 57    | 5.80                             | 0.116                             | 700                       | Violet       |
| 0603CS-5N1X_L_           | 5.1 @ 250 MHz                   | <b>5,3,2</b>                      | 20                    | 4.93    | 47    | 4.95    | 56    | 5.70                             | 0.140                             | 700                       | Green        |
| 0603CS-5N6X_L_           | 5.6 @ 250 MHz                   | <b>5,3,2</b>                      | 26                    | 5.77    | 63    | 6.05    | 80    | 4.76                             | 0.075                             | 700                       | Black        |
| 0603CS-6N8X_L_           | 6.8 @ 250 MHz                   | <b>5,3,2</b>                      | 27                    | 6.75    | 60    | 7.10    | 81    | 5.80                             | 0.110                             | 700                       | Red          |
| 0603CS-7N5X_L_           | 7.5 @ 250 MHz                   | <b>5,3,2</b>                      | 28                    | 7.70    | 60    | 7.82    | 65    | 4.80                             | 0.106                             | 700                       | Brown        |
| 0603CS-8N2X_L_           | 8.2 @ 250 MHz                   | <b>5,3,2</b>                      | 30                    | 8.25    | 82    | 8.37    | 87    | 4.20                             | 0.115                             | 700                       | Orange       |
| 0603CS-8N7X_L_           | 8.7 @ 250 MHz                   | <b>5,3,2</b>                      | 28                    | 8.86    | 62    | 9.32    | 58    | 4.60                             | 0.109                             | 700                       | Yellow       |
| 0603CS-9N5X_L_           | 9.5 @ 250 MHz                   | <b>5,3,2</b>                      | 28                    | 9.7     | 59    | 9.92    | 61    | 5.40                             | 0.135                             | 700                       | Blue         |
| 0603CS-10NX_L_           | 10 @ 250 MHz                    | <b>5,3,2</b>                      | 31                    | 10.0    | 66    | 10.6    | 83    | 4.80                             | 0.130                             | 700                       | Orange       |
| 0603CS-11NX_L_           | 11 @ 250 MHz                    | <b>5,3,2</b>                      | 30                    | 11.0    | 53    | 11.5    | 56    | 4.00                             | 0.130                             | 700                       | Gray         |
| 0603CS-12NX_L_           | 12 @ 250 MHz                    | <b>5,3,2</b>                      | 35                    | 12.3    | 72    | 13.5    | 83    | 4.00                             | 0.130                             | 700                       | Yellow       |
| 0603CS-15NX_L_           | 15 @ 250 MHz                    | <b>5,3,2</b>                      | 35                    | 15.4    | 64    | 16.8    | 89    | 4.00                             | 0.170                             | 700                       | Green        |
| 0603CS-16NX_L_           | 16 @ 250 MHz                    | <b>5,3,2</b>                      | 34                    | 16.2    | 55    | 17.3    | 52    | 3.30                             | 0.170                             | 700                       | White        |
| 0603CS-18NX_L_           | 18 @ 250 MHz                    | <b>5,3,2</b>                      | 35                    | 18.7    | 70    | 21.4    | 69    | 3.10                             | 0.170                             | 700                       | Blue         |
| 0603CS-22NX_L_           | 22 @ 250 MHz                    | <b>5,3,2</b>                      | 38                    | 22.8    | 73    | 26.1    | 71    | 3.00                             | 0.190                             | 700                       | Violet       |
| 0603CS-23NX_L_           | 23 @ 250 MHz                    | <b>5,3,2</b>                      | 38                    | 24.1    | 71    | 28.0    | 67    | 2.85                             | 0.190                             | 700                       | Orange       |
| 0603CS-24NX_L_           | 24 @ 250 MHz                    | <b>5,3,2</b>                      | 36                    | 24.5    | 45    | 28.7    | 39    | 2.65                             | 0.190                             | 700                       | Black        |
| 0603CS-27NX_L_           | 27 @ 250 MHz                    | <b>5,3,2</b>                      | 40                    | 29.2    | 74    | 34.6    | 65    | 2.80                             | 0.220                             | 600                       | Gray         |
| 0603CS-30NX_L_           | 30 @ 250 MHz                    | <b>5,3,2</b>                      | 37                    | 31.4    | 47    | 39.9    | 28    | 2.25                             | 0.220                             | 600                       | Brown        |
| 0603CS-33NX_L_           | 33 @ 250 MHz                    | <b>5,3,2</b>                      | 40                    | 36.0    | 67    | 49.5    | 42    | 2.30                             | 0.220                             | 600                       | White        |
| 0603CS-36NX_L_           | 36 @ 250 MHz                    | <b>5,3,2</b>                      | 37                    | 39.4    | 47    | 52.7    | 24    | 2.08                             | 0.250                             | 600                       | Red          |
| 0603CS-39NX_L_           | 39 @ 250 MHz                    | <b>5,3,2</b>                      | 40                    | 42.7    | 60    | 60.2    | 40    | 2.20                             | 0.250                             | 600                       | Black        |
| 0603CS-43NX_L_           | 43 @ 250 MHz                    | <b>5,3,2</b>                      | 38                    | 47.0    | 44    | 64.9    | 21    | 2.00                             | 0.280                             | 600                       | Orange       |
| 0603CS-47NX_L_           | 47 @ 200 MHz                    | <b>5,3,2</b>                      | 38                    | 52.2    | 62    | 77.2    | 35    | 2.00                             | 0.280                             | 600                       | Brown        |
| 0603CS-51NX_L_           | 51 @ 200 MHz                    | <b>5,3,2</b>                      | 35                    | 55.5    | 69    | 82.2    | 34    | 1.90                             | 0.270                             | 600                       | Blue         |
| 0603CS-56NX_L_           | 56 @ 200 MHz                    | <b>5,3,2</b>                      | 38                    | 62.5    | 56    | 97.0    | 26    | 1.90                             | 0.310                             | 600                       | Red          |
| 0603CS-68NX_L_           | 68 @ 200 MHz                    | <b>5,3,2</b>                      | 37                    | 80.5    | 54    | 168     | 21    | 1.70                             | 0.340                             | 600                       | Orange       |
| 0603CS-72NX_L_           | 72 @ 150 MHz                    | <b>5,3,2</b>                      | 34                    | 82.0    | 53    | 135     | 20    | 1.70                             | 0.490                             | 400                       | Yellow       |
| 0603CS-82NX_L_           | 82 @ 150 MHz                    | <b>5,3,2</b>                      | 34                    | 96.2    | 54    | 177     | 21    | 1.70                             | 0.540                             | 400                       | Green        |
| 0603CS-R10X_L_           | 100 @ 150 MHz                   | <b>5,3,2</b>                      | 34                    | 124     | 49    | —       | —     | 1.40                             | 0.580                             | 400                       | Blue         |
| 0603CS-R11X_L_           | 110 @ 150 MHz                   | <b>5,3,2</b>                      | 32                    | 138     | 43    | —       | —     | 1.35                             | 0.610                             | 300                       | Violet       |
| 0603CS-R12X_L_           | 120 @ 150 MHz                   | <b>5,3,2</b>                      | 32                    | 166     | 39    | —       | —     | 1.30                             | 0.650                             | 300                       | Gray         |
| 0603CS-R15X_L_           | 150 @ 150 MHz                   | <b>5,3,2</b>                      | 28                    | 250     | 25    | —       | —     | 0.990                            | 0.920                             | 280                       | White        |
| 0603CS-R18X_L_           | 180 @ 100 MHz                   | <b>5,3,2</b>                      | 25                    | 305     | 22    | —       | —     | 0.990                            | 1.25                              | 240                       | Black        |
| 0603CS-R20X_L_           | 200 @ 100 MHz                   | <b>5,3,2</b>                      | 25                    | —       | —     | —       | —     | 0.900                            | 1.98                              | 200                       | Green        |
| 0603CS-R21X_L_           | 210 @ 100 MHz                   | <b>5,3,2</b>                      | 27                    | —       | —     | —       | —     | 0.895                            | 2.06                              | 200                       | Gray         |
| 0603CS-R22X_L_           | 220 @ 100 MHz                   | <b>5,3,2</b>                      | 25                    | —       | —     | —       | —     | 0.900                            | 2.10                              | 200                       | Brown        |
| 0603CS-R25X_L_           | 250 @ 100 MHz                   | <b>5,3,2</b>                      | 25                    | —       | —     | —       | —     | 0.822                            | 3.55                              | 120                       | Violet       |
| 0603CS-R27X_L_           | 270 @ 100 MHz                   | <b>5,3,2</b>                      | 26                    | —       | —     | —       | —     | 0.830                            | 2.16                              | 170                       | Red          |
| 0603CS-R33X_L_           | 330 @ 100 MHz                   | <b>5,3,2</b>                      | 25                    | —       | —     | —       | —     | 0.900                            | 3.89                              | 100                       | Blue         |
| 0603CS-R39X_L_           | 390 @ 100 MHz                   | <b>5,3,2</b>                      | 25                    | —       | —     | —       | —     | 0.780                            | 4.35                              | 100                       | Yellow       |

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

**0603CS-R39XJLW**

**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).  
 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.

- Inductance measured using a Coilcraft SMD-A fixture in an Agilent/HP 4286 impedance analyzer with Coilcraft-provided correlation pieces.
- Tolerances in bold are stocked for immediate shipment.
- Q measured at the same frequency as inductance using an Agilent/HP 4291A with an Agilent/HP 16193 test fixture.
- SRF measured using an Agilent/HP 8720D network analyzer and a Coilcraft SMD-D test fixture.
- DCR measured on a Cambridge Technology micro-ohmmeter and a Coilcraft CCF858 test fixture.
- Current that causes a 15°C temperature rise from 25°C ambient.
- Electrical specifications at 25°C.
- Refer to Doc 362 "Soldering Surface Mount Components" before soldering.

**S-Parameter files**  
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**SPICE models**  
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