



**THE DATASHEET OF
LI0402D121R-10**





EMI FILTERING & RF INDUCTORS



About Laird

Laird is a global technology business focused on enabling wireless communication and smart systems, and providing components and systems that protect electronics. Laird operates through two divisions, Wireless Systems and Performance Materials. Wireless Systems solutions include antenna systems, embedded wireless modules, telematics products and wireless automation and control solutions. Performance Materials solutions include electromagnetic interference shielding, thermal management and signal integrity products. As a leader in the design, supply and support of innovative technology, our products allow people, organisations, machines and applications to connect effectively, helping to build a world where smart technology transforms the way of life. Custom products are supplied to major sectors of the electronics industry including the handset, telecommunications, IT, automotive, public safety, consumer, medical, rail, mining and industrial markets. Providing value and differentiation to our customers through innovation, reliable fulfilment and speed, Laird PLC is listed and headquartered in London, and employs over 9,000 people in more than 58 facilities located in 18 countries.

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All parts listed in this catalog are lead free and RoHS compliant.

NOTICE

Laird products or subcomponents are not specifically designed or tested by Laird for use in any medical application, medical device manufacturing, or any similar procedure or process requiring approval, testing, or certification and drug administration or other similar Governmental entity. Applications with unusual environmental medical, life-support or life-sustaining equipment are specifically not recommended without additional

Nomenclature Explanation

PART NUMBERING SYSTEM

| HZ PRODUCT SERIES CODE | 0402 EIA SIZE CODE | A RATED CURRENT CODE | 601 IMPEDANCE (Z) OR INDUCTANCE (L) | R PACKING CODE | -10 ADDITIONAL DESCRIPTION |
|---|--------------------------|----------------------------|---|-----------------------------------|----------------------------------|
| HI = High Current Chip Beads (≥3,000 mA) | 0402 2545 | A < 100 mA | First two numbers are Significant Digits | B: | -10 = |
| | 0504 2722 | B = 200 mA | The last number indicates how many zeros are added to the significant digits. | Bulk Standard Thru-Hole Packaging | Lead Free Standard Catalog Part |
| MI = Mid Current Chip Beads (≥ 1,000 mA to <3,000 mA) | 0603 3032 | C = 300 mA | | R : | -11 to -99 = |
| | 0805 3312 | D = 400 mA | Impedance Examples: | Tape&Reel Standard SMT Package | Non-Standard or Custom Part |
| LI = Low Current Chip Beads (<1,000 mA, <400 Ω Z) | 0806 3322 | E = 500 mA | 100 = 10 OHMS | | -1□ = Tolerance Code |
| | 1008 3421 | F = 600 mA | 101 = 100 OHMS | | |
| | 1206 3822 | G = 700 mA | 102 = 1,000 OHMS | | |
| HZ = High Impedance Chip Beads (<1,000 mA, >400 Ω Z) | 1210 4440 | H = 800 mA | 202 = 2,000 OHMS | | |
| | 1211 4545 | I = 900 mA | 060 = 6 OHMS | | |
| | 1616 4732 | J = 1,000 mA | | | |
| HF = High Frequency Chip Beads | 1612 5022 | K = 1,500 mA | Examples: (For IC Series) | | |
| | 1806 5441 | L = 2,000 mA | 470 = 47 nH | | |
| LF = Low Frequency Chip Beads | 1812 6032 | M = 2,500 mA | 471 = 470 nH | | |
| | 1922 | N = 3,000 mA | 472 = 4,700 nH | | |
| HR = High Bias Retention Chip Beads (>3,000 mA) | 2021 | O = 3,500 mA | 473 = 47,000 nH | | |
| | 2220 | P = 4,000 mA | | | |
| CC = CAN-Bus Common Mode Chokes | 2520 | Q = 4,500 mA | Examples: (For CCI series) | | |
| | | R = 5,000 mA | 0N3 = 0.3 nH | | |
| CM = Common Mode Chokes | | S = 5,500 mA | 1N2 = 1.2 nH | | |
| | | T = 6,000 mA | 12N = 12 nH | | |
| CMX = Wire-Wound Power Common Mode Chokes | | U = 7,000 mA | R12 = 120 nH | | |
| | | V = 8,000 mA | R22 = 220 nH | | |
| CF = Small Size (0805, 0504) Monolithic Common Mode Chokes | | W = 9,000 mA | Examples: (For CPI series) | | |
| | | X = 10,000 mA | R47 = 0.47 uH | | |
| DA = Multilines Array Chip Arrays | | Y = 15,000 mA | 1R0 = 1.0 uH | | |
| | | Z ≥ 20,000 mA | 4R7 = 4.7 uH | | |
| IC = Ferrite Chip Inductors | | | Examples: (For CMX series) | | |
| CCI = Ceramic Chip Inductors | | | 680 = 68 uH | | |
| CPI = Multilayer Power Chip Inductors | | | 181 = 180 uH | | |
| | | | 132 = 1300 uH | | |

PART NUMBERING SYSTEM

| 29 | F | 0818 | -1 | S | R | -10 |
|--|--|--|-------------------------------|-----------------------------------|--|---|
| MATERIAL TYPE | PRODUCT TYPE CODE | PART SIZE CODE | MINOR DIMENSION CODE | BOARD MOUNTING STYLE | PACKAGING CODE | ADDITIONAL DESCRIPTION |
| 28 & 29 = Broad Band Material 35 = Low Freq. Material | C = Choke L = Axial Leaded Bead F = Assembled Part | Unique Part Identifier or Significant Dimension | Height or Length Variation | S = Surface Mount T= Thru-Hole | O = Bulk Standard R = Tape & Reel Standard SMT Package | -10 = Lead Free Standard Catalog Part -11 to -99 = Non Standard or Custom Part |

TEST CONDITIONS

Operation temperature: -40°C ~ +125°C (If no parts are specifically defined)

Visit www.lairdtech.com for additional and the most up-to-date information and for other board level part families not included in this catalog. All data charts are available by contacting your local Laird office.

A revolutionary new SPICE model for EMI ferrite chip beads is now available from Laird. This new design aid includes the de-rating effects of DC bias currents providing much greater accuracy for better designs the first time. This chip bead SPICE model is available by contacting your local Laird office.

Note: Most current ratings (I MAX) are based upon a 40°C temperature rise during continuous operation. Parts have no polarity.



FEATURES



- Up to 10 Amps (I MAX) continuous operating capability
- Monolithic construction with small footprint and high reliability
- Excellent retention under bias
- Economical
- Broad range of sizes (from EIA 0201 up to 3312)
- For power line, low frequency and high frequency signal lines

PART NUMBERING SYSTEM

| | | | | | |
|---------------------|---------------|--------------------|----------------------|--------------|------------------------|
| HZ | 0402 | A | 601 | R | -10 |
| Product Series Code | EIA Size Code | Rated Current Code | Impedance Value Code | Packing Code | Additional Description |

FOR SIGNAL LINE

| EIA Pkg. Size | Metric Pkg. Size | Part Number | Typical Impedance (Ω) | | | | Typical Peak Impedance (Ω) | Peak Impedance Frequency (MHz) | DCR MAX (Ω) | RATED I MAX (continuous) mA |
|---------------|------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-----------------------------|
| | | | Z 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 0402 | 1005 | LI0402E190R-10 | 6 | 19 | 43 | 56 | 59 | 1,519 | 0.10 | 500 |
| 0402 | 1005 | LI0402C220R-10 | 9 | 22 | 30 | 31 | 31 | 830 | 0.20 | 300 |
| 0402 | 1005 | LI0402E300R-10 | 9 | 30 | 50 | 57 | 58 | 1,195 | 0.30 | 500 |
| 0402 | 1005 | LI0402C470R-10 | 15 | 47 | 76 | 90 | 92 | 1,402 | 0.15 | 300 |
| 0402 | 1005 | LI0402E600R-10 | 29 | 60 | 90 | 57 | 97 | 801 | 0.30 | 500 |
| 0402 | 1005 | LI0402B800R-10 | 32 | 80 | 220 | 224 | 243 | 769 | 0.80 | 200 |
| 0402 | 1005 | LI0402E800R-10 | 34 | 80 | 126 | 132 | 132 | 867 | 0.17 | 500 |
| 0402 | 1005 | LI0402D121R-10 | 40 | 120 | 205 | 195 | 213 | 682 | 0.40 | 400 |
| 0402 | 1005 | LI0402C221R-10 | 72 | 220 | 443 | 243 | 453 | 440 | 0.35 | 300 |
| 0402 | 1005 | LI0402B301R-10 | 96 | 300 | 454 | 351 | 549 | 374 | 0.80 | 200 |
| 0402 | 1005 | HZ0402A601R-10 | 182 | 600 | 600 | 300 | 965 | 241 | 1.00 | 100 |
| 0402 | 1005 | HZ0402B102R-10 | 225 | 1,000 | 489 | 222 | 1,116 | 182 | 1.00 | 200 |
| 0402 | 1005 | HZ0402A152R-10 | 400 | 1,500 | 441 | 200 | 1,500 | 143 | 2.00 | 50 |
| 0402 | 1005 | HZ0402A182R-10 | 251 | 1,800 | 520 | 265 | 2,702 | 143 | 1.40 | 100 |
| 0603 | 1608 | LI0603E470R-10 | 17 | 47 | 83 | 91 | 91 | 1,000 | 0.10 | 500 |
| 0603 | 1608 | LI0603G800R-10 | 32 | 80 | 100 | 91 | 100 | 500 | 0.20 | 700 |
| 0603 | 1608 | LI0603G121R-10 | 52 | 120 | 156 | 113 | 177 | 389 | 0.20 | 700 |
| 0603 | 1608 | LI0603E151R-10 | 61 | 150 | 197 | 131 | 209 | 331 | 0.25 | 500 |
| 0603 | 1608 | LI0603B201R-10 | 70 | 200 | 340 | 210 | 362 | 420 | 0.40 | 200 |
| 0603 | 1608 | LI0603G221R-10 | 98 | 220 | 279 | 168 | 283 | 251 | 0.30 | 700 |
| 0603 | 1608 | LI0603D301R-10 | 144 | 300 | 286 | 165 | 389 | 261 | 0.35 | 400 |
| 0603 | 1608 | HZ0603B471R-10 | 94 | 470 | 560 | 253 | 1,060 | 240 | 0.85 | 200 |
| 0603 | 1608 | HZ0603C601R-10 | 232 | 600 | 360 | 171 | 775 | 168 | 0.45 | 300 |
| 0603 | 1608 | HZ0603C651R-10 | 296 | 650 | 954 | 652 | 960 | 400 | 0.60 | 300 |
| 0603 | 1608 | HZ0603B751R-10 | 302 | 750 | 437 | 198 | 863 | 137 | 0.60 | 200 |

FOR SIGNAL LINE

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) mA |
|---------------|------------------|----------------|-----------------------|-------------|-------------|-----------|----------------------------|--------------------------------|-------------|-----------------------------|
| | | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 0603 | 1608 | HZ0603A102R-10 | 288 | 1,000 | 1975 | 1,450 | 2,000 | 480 | 1.00 | 100 |
| 0603 | 1608 | HZ0603B102R-10 | 453 | 1,000 | 380 | 200 | 1,000 | 100 | 0.60 | 200 |
| 0603 | 1608 | HZ0603D102R-10 | 453 | 1,000 | 380 | 193 | 970 | 140 | 0.35 | 400 |
| 0603 | 1608 | HZ0603B112R-10 | 515 | 1,100 | 1,300 | 850 | 1,539 | 288 | 0.80 | 200 |
| 0603 | 1608 | HZ0603A152R-10 | 552 | 1,500 | 1,062 | 503 | 2,306 | 190 | 0.90 | 100 |
| 0603 | 1608 | HZ0603C152R-10 | 319 | 1,500 | 462 | 190 | 1,493 | 135 | 0.60 | 300 |
| 0603 | 1608 | HZ0603A182R-10 | 610 | 1,800 | 1,070 | 500 | 2,420 | 180 | 1.50 | 50 |
| 0603 | 1608 | HZ0603A222R-10 | 195 | 2,200 | 375 | 175 | 3,051 | 122 | 1.50 | 100 |
| 0603 | 1608 | HZ0603A252R-10 | 791 | 2,500 | 1,014 | 501 | 3,065 | 149 | 1.50 | 50 |
| 0805 | 2012 | LI0805G201R-10 | 100 | 200 | 221 | 128 | 272 | 250 | 0.30 | 700 |
| 0805 | 2012 | LI0805G301R-10 | 124 | 300 | 248 | 146 | 350 | 205 | 0.20 | 700 |
| 0805 | 2012 | HZ0805G471R-10 | 221 | 470 | 286 | 150 | 572 | 149 | 0.20 | 700 |
| 0805 | 2012 | HZ0805E601R-10 | 277 | 600 | 304 | 151 | 696 | 155 | 0.30 | 500 |
| 0805 | 2012 | HZ0805D102R-10 | 280 | 1,000 | 328 | 168 | 1,268 | 113 | 0.30 | 400 |
| 0805 | 2012 | MI0805J102R-10 | 195 | 1,000 | 226 | 108 | 1,112 | 120 | 0.15 | 1,000 |
| 0805 | 2012 | HZ0805D152R-10 | 289 | 1,500 | 333 | 166 | 1,525 | 110 | 0.40 | 400 |
| 0805 | 2012 | HZ0805C202R-10 | 350 | 2,000 | 300 | 150 | 2,000 | 100 | 0.50 | 300 |
| 0805 | 2012 | HZ0805B222R-10 | 648 | 2,200 | 419 | 213 | 2,200 | 100 | 0.80 | 200 |
| 0805 | 2012 | HZ0805B252R-10 | 400 | 2,500 | 400 | 180 | 2,900 | 90 | 0.75 | 200 |
| 0805 | 2012 | HZ0805B272R-10 | 400 | 2,700 | 400 | 150 | 2,900 | 88 | 0.80 | 200 |
| 1206 | 3216 | HZ1206E601R-10 | 296 | 600 | 202 | 103 | 674 | 75 | 0.30 | 500 |
| 1206 | 3216 | HZ1206C202R-10 | 1,673 | 915 | 180 | 100 | 2,505 | 41 | 0.50 | 300 |
| 1206 | 3216 | HZ1206E152R-10 | 823 | 950 | 188 | 57 | 1,564 | 57 | 0.30 | 500 |
| 1206 | 3216 | HZ1206D102R-10 | 201 | 1,250 | 250 | 100 | 1,000 | 100 | 0.40 | 400 |

FOR POWER LINE

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) mA |
|---------------|------------------|----------------|-----------------------|-------------|-------------|-----------|----------------------------|--------------------------------|-------------|-----------------------------|
| | | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 0402 | 1005 | MI0402L100R-10 | 3.6 | 10 | 14 | 13.2 | 15 | 510 | 0.10 | 2,000 |
| 0402 | 1005 | LI0402E190R-10 | 6 | 19 | 43 | 56 | 59 | 1,519 | 0.10 | 500 |
| 0402 | 1005 | LI0402C220R-10 | 9 | 22 | 30 | 31 | 31 | 830 | 0.20 | 300 |
| 0402 | 1005 | LI0402E300R-10 | 9 | 30 | 50 | 57 | 58 | 1,195 | 0.30 | 500 |
| 0402 | 1005 | LI0402C470R-10 | 15 | 47 | 76 | 90 | 92 | 1,402 | 0.15 | 300 |
| 0402 | 1005 | LI0402E600R-10 | 29 | 60 | 90 | 57 | 97 | 801 | 0.30 | 500 |
| 0402 | 1005 | LI0402E750R-10 | 30 | 75 | 92 | 92 | 93 | 710 | 0.10 | 500 |
| 0402 | 1005 | LI0402B800R-10 | 32 | 80 | 220 | 224 | 243 | 769 | 0.80 | 200 |
| 0402 | 1005 | LI0402E800R-10 | 34 | 80 | 126 | 132 | 243 | 867 | 0.17 | 500 |
| 0402 | 1005 | LI0402D121R-10 | 40 | 120 | 205 | 195 | 213 | 682 | 0.40 | 400 |
| 0402 | 1005 | MI0402K121R-10 | 52 | 120 | 160 | 132 | 160 | 500 | 0.13 | 1,500 |
| 0402 | 1005 | LI0402C221R-10 | 72 | 220 | 443 | 243 | 453 | 440 | 0.35 | 300 |
| 0402 | 1005 | LI0402B301R-10 | 96 | 300 | 454 | 351 | 549 | 374 | 0.80 | 200 |
| 0402 | 1005 | HZ0402B102R-10 | 225 | 1,000 | 489 | 222 | 1,116 | 182 | 1.00 | 200 |
| 0603 | 1608 | MI0603K300R-10 | 12 | 30 | 43 | 45 | 45 | 1,000 | 0.09 | 1,500 |
| 0603 | 1608 | HI0603N300R-10 | 13 | 30 | 44 | 48 | 54 | 1,000 | 0.04 | 3,000 |
| 0603 | 1608 | HI0603R300R-10 | 13 | 30 | 44 | 45 | 47 | 950 | 0.01 | 5,000 |
| 0603 | 1608 | HI0603N330R-10 | 13 | 33 | 44 | 54 | 54 | 1,000 | 0.025 | 3,000 |
| 0603 | 1608 | LI0603E470R-10 | 17 | 47 | 83 | 91 | 91 | 1,000 | 0.10 | 500 |
| 0603 | 1608 | MI0603J600R-10 | 25 | 60 | 91 | 92 | 95 | 700 | 0.10 | 1,000 |
| 0603 | 1608 | HI0603P600R-10 | 25 | 60 | 85 | 83 | 95 | 738 | 0.03 | 4,000 |
| 0603 | 1608 | MI0603J680R-10 | 35 | 68 | 106 | 99 | 110 | 650 | 0.10 | 1,000 |
| 0603 | 1608 | HI0603O700R-10 | 32 | 70 | 91 | 94 | 98 | 600 | 0.02 | 3,500 |
| 0603 | 1608 | LI0603G800R-10 | 32 | 80 | 100 | 91 | 100 | 500 | 0.20 | 700 |

FOR POWER LINE

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHZ) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) MA |
|---------------------|------------------------|----------------|-----------------------|----------------|----------------|-------------|----------------------------------|--------------------------------------|----------------|-----------------------------------|
| | | | Z @ 25 MHZ | Z @ 100 MHZ | Z @ 500 MHZ | Z@ 1 GHZ | | | | |
| 0603 | 1608 | LI0603G121R-10 | 52 | 120 | 156 | 113 | 177 | 389 | 0.20 | 700 |
| 0603 | 1608 | MI0603M121R-10 | 55 | 120 | 169 | 138 | 170 | 420 | 0.05 | 2,500 |
| 0603 | 1608 | LI0603E151R-10 | 61 | 150 | 197 | 131 | 209 | 331 | 0.25 | 500 |
| 0603 | 1608 | MI0603K181R-10 | 95 | 180 | 238 | 190 | 245 | 380 | 0.09 | 1,500 |
| 0603 | 1608 | LI0603B201R-10 | 70 | 200 | 340 | 210 | 362 | 420 | 0.40 | 200 |
| 0603 | 1608 | LI0603G221R-10 | 98 | 220 | 279 | 168 | 283 | 251 | 0.30 | 700 |
| 0603 | 1608 | MI0603L221R-10 | 107 | 220 | 219 | 121 | 240 | 280 | 0.05 | 2,000 |
| 0603 | 1608 | LI0603D301R-10 | 144 | 300 | 286 | 165 | 389 | 261 | 0.35 | 400 |
| 0603 | 1608 | MI0603L301R-10 | 50 | 300 | 225 | 120 | 410 | 200 | 0.10 | 2,000 |
| 0603 | 1608 | HZ0603B471R-10 | 94 | 470 | 560 | 253 | 1,060 | 240 | 0.85 | 200 |
| 0603 | 1608 | MI0603J471R-10 | 203 | 470 | 398 | 181 | 580 | 210 | 0.20 | 1,000 |
| 0603 | 1608 | MI0603K471R-10 | 237 | 470 | 350 | 193 | 562 | 197 | 0.15 | 1,500 |
| 0603 | 1608 | HZ0603C601R-10 | 232 | 600 | 360 | 171 | 775 | 168 | 0.45 | 300 |
| 0603 | 1608 | MI0603J601R-10 | 225 | 600 | 400 | 200 | 620 | 150 | 0.20 | 1,000 |
| 0603 | 1608 | HZ0603C651R-10 | 296 | 650 | 954 | 652 | 960 | 400 | 0.60 | 300 |
| 0603 | 1608 | HZ0603B751R-10 | 302 | 750 | 437 | 198 | 863 | 137 | 0.60 | 200 |
| 0603 | 1608 | HZ0603B102R-10 | 453 | 1,000 | 380 | 200 | 1,000 | 100 | 0.60 | 200 |
| 0603 | 1608 | MI0603J102R-10 | 432 | 1,000 | 400 | 196 | 1,000 | 120 | 0.20 | 1,000 |
| 0603 | 1608 | HZ0603B112R-10 | 515 | 1,100 | 1,300 | 850 | 1,539 | 288 | 0.80 | 200 |
| 0603 | 1608 | HZ0603C152R-10 | 319 | 1,500 | 462 | 190 | 1,590 | 135 | 0.60 | 300 |
| 0805 | 2012 | MI0805K110R-10 | 5 | 11 | 18 | 19 | 20 | 1,000 | 0.06 | 1,500 |
| 0805 | 2012 | HI0805Q310R-10 | 12 | 31 | 42 | 44 | 45 | 800 | 0.025 | 4,500 |
| 0805 | 2012 | HI0805N310R-10 | 17 | 31 | 41 | 39 | 42 | 510 | 0.03 | 3,000 |
| 0805 | 2012 | HI0805P390R-10 | 17 | 39 | 59 | 65 | 65 | 1,050 | 0.008 | 4,000 |
| 0805 | 2012 | LI0805H400R-10 | 18 | 40 | 70 | 76 | 76 | 1,000 | 0.15 | 800 |
| 0805 | 2012 | MI0805K400R-10 | 19 | 40 | 60 | 63 | 69 | 903 | 0.05 | 1,500 |
| 0805 | 2012 | HI0805T500R-10 | 25 | 50 | 64 | 59 | 65 | 490 | 0.01 | 6,000 |
| 0805 | 2012 | HI0805N600R-10 | 34 | 60 | 80 | 75 | 81 | 500 | 0.04 | 3,000 |
| 0805 | 2012 | LI0805H750R-10 | 31 | 75 | 128 | 130 | 132 | 769 | 0.15 | 800 |
| 0805 | 2012 | HI0805R800R-10 | 38 | 80 | 70 | 38 | 100 | 200 | 0.01 | 5,000 |
| 0805 | 2012 | LI0805H121R-10 | 53 | 120 | 170 | 114 | 170 | 340 | 0.15 | 800 |
| 0805 | 2012 | HI0805O121R-10 | 61 | 120 | 140 | 80 | 167 | 270 | 0.02 | 3,500 |
| 0805 | 2012 | HI0805R121R-10 | 47 | 120 | 98 | 58 | 149 | 205 | 0.03 | 5,000 |
| 0805 | 2012 | HI0805P121R-10 | 45 | 120 | 102 | 64 | 125 | 240 | 0.02 | 4,000 |
| 0805 | 2012 | LI0805H151R-10 | 73 | 150 | 207 | 150 | 210 | 400 | 0.15 | 800 |
| 0805 | 2012 | LI0805G201R-10 | 100 | 200 | 221 | 128 | 272 | 250 | 0.30 | 700 |
| 0805 | 2012 | MI0805M221R-10 | 100 | 220 | 274 | 115 | 287 | 260 | 0.05 | 2,500 |
| 0805 | 2012 | HI0805N221R-10 | 81 | 220 | 113 | 115 | 283 | 220 | 0.04 | 3,000 |
| 0805 | 2012 | LI0805G301R-10 | 124 | 300 | 248 | 146 | 350 | 205 | 0.20 | 700 |
| 0805 | 2012 | MI0805L301R-10 | 135 | 300 | 271 | 147 | 350 | 200 | 0.06 | 2,000 |
| 0805 | 2012 | MI0805L331R-10 | 148 | 330 | 264 | 143 | 197 | 393 | 0.06 | 2,000 |
| 0805 | 2012 | HZ0805G471R-10 | 221 | 470 | 286 | 150 | 572 | 149 | 0.20 | 700 |
| 0805 | 2012 | HZ0805E601R-10 | 277 | 600 | 304 | 151 | 696 | 155 | 0.30 | 500 |
| 0805 | 2012 | MI0805K601R-10 | 280 | 600 | 240 | 120 | 723 | 130 | 0.10 | 1,500 |
| 0805 | 2012 | MI0805L601R-10 | 264 | 600 | 316 | 172 | 663 | 155 | 0.10 | 2,000 |
| 0805 | 2012 | HZ0805D102R-10 | 280 | 1,000 | 328 | 168 | 1,268 | 113 | 0.30 | 400 |
| 0805 | 2012 | MI0805J102R-10 | 195 | 1,000 | 226 | 108 | 1,112 | 120 | 0.15 | 1,000 |
| 0805 | 2012 | HZ0805D152R-10 | 289 | 1,500 | 333 | 166 | 1,525 | 110 | 0.40 | 400 |
| 0805 | 2012 | HZ0805C202R-10 | 350 | 2,000 | 300 | 150 | 2,000 | 100 | 0.50 | 300 |
| 1206 | 3216 | MI1206K260R-10 | 12 | 26 | 44 | 46 | 46 | 1,000 | 0.06 | 1,500 |
| 1206 | 3216 | MI1206K310R-10 | 12 | 31 | 37 | 41 | 41 | 1,000 | 0.045 | 1,500 |
| 1206 | 3216 | HI1206T500R-10 | 19 | 50 | 66 | 70 | 70 | 1,000 | 0.01 | 6,000 |
| 1206 | 3216 | HI1206N680R-10 | 29 | 68 | 93 | 102 | 102 | 1,000 | 0.012 | 3,000 |
| 1206 | 3216 | HI1206N800R-10 | 38 | 80 | 120 | 129 | 130 | 800 | 0.035 | 3,000 |
| 1206 | 3216 | MI1206K900R-10 | 44 | 90 | 142 | 150 | 154 | 867 | 0.08 | 1,500 |
| 1206 | 3216 | HI1206N101R-10 | 41 | 100 | 144 | 145 | 150 | 600 | 0.035 | 3,000 |
| 1206 | 3216 | LI1206H121R-10 | 53 | 120 | 144 | 135 | 145 | 422 | 0.15 | 800 |
| 1206 | 3216 | HI1206P121R-10 | 56 | 120 | 130 | 105 | 142 | 300 | 0.03 | 4,000 |
| 1206 | 3216 | LI1206H151R-10 | 73 | 150 | 173 | 123 | 182 | 241 | 0.15 | 800 |
| 1206 | 3216 | HI1206T161R-10 | 71 | 160 | 220 | 127 | 229 | 251 | 0.018 | 6,000 |
| 1206 | 3216 | MI1206L391R-10 | 100 | 390 | 160 | 90 | 460 | 130 | 0.05 | 2,000 |

FOR POWER LINE

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHZ) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) MA |
|---------------|------------------|----------------|-----------------------|-------------|-------------|-----------|----------------------------|--------------------------------|-------------|-----------------------------|
| | | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 1206 | 3216 | MI1206L501R-10 | 210 | 500 | 150 | 82 | 500 | 100 | 0.06 | 2,000 |
| 1206 | 3216 | HZ1206E601R-10 | 296 | 600 | 202 | 103 | 674 | 75 | 0.30 | 500 |
| 1206 | 3216 | MI1206K601R-10 | 300 | 600 | 250 | 130 | 650 | 80 | 0.08 | 1,500 |
| 1206 | 3216 | MI1206L601R-10 | 296 | 600 | 116 | 59 | 660 | 79 | 0.08 | 2,000 |
| 1206 | 3216 | HZ1206E152R-10 | 823 | 950 | 188 | 57 | 1,564 | 57 | 0.30 | 500 |
| 1206 | 3216 | HZ1206C202R-10 | 1,673 | 915 | 180 | 100 | 2,505 | 41 | 0.50 | 300 |
| 1206 | 3216 | HZ1206D102R-10 | 201 | 1,000 | 185 | 100 | 1,000 | 100 | 0.40 | 400 |
| 1210 | 3225 | MI1210K600R-10 | 30 | 60 | 90 | 95 | 105 | 900 | 0.035 | 1,500 |
| 1612 | 4131 | HI1612X560R-10 | 23 | 56 | 75 | 79 | 79 | 1,000 | 0.004 | 10,000 |
| 1806 | 4516 | HI1806T600R-10 | 28 | 60 | 87 | 92 | 92 | 1,000 | 0.01 | 6,000 |
| 1806 | 4516 | LI1806E800R-10 | 28 | 80 | 117 | 117 | 117 | 1,000 | 0.30 | 500 |
| 1806 | 4516 | MI1806J800R-10 | 34 | 78 | 114 | 118 | 119 | 903 | 0.03 | 1,000 |
| 1806 | 4516 | HI1806N910R-10 | 42 | 91 | 140 | 150 | 150 | 1,000 | 0.03 | 3,000 |
| 1806 | 4516 | LI1806E101R-10 | 45 | 100 | 157 | 164 | 166 | 966 | 0.30 | 500 |
| 1806 | 4516 | LI1806C151R-10 | 60 | 150 | 219 | 222 | 223 | 871 | 0.50 | 300 |
| 1806 | 4516 | HZ1806K102R-10 | 60 | 1,000 | 160 | 80 | 1,390 | 135 | 0.15 | 1,500 |
| 1812 | 4532 | HI1812T800R-10 | 30 | 80 | 97 | 107 | 107 | 1,000 | 0.01 | 6,000 |
| 1812 | 4532 | HI1812V101R-10 | 45 | 100 | 136 | 134 | 139 | 800 | 0.01 | 8,000 |
| 1812 | 4532 | LI1812D121R-10 | 55 | 120 | 182 | 184 | 186 | 738 | 0.40 | 400 |
| 1812 | 4532 | MI1812K121R-10 | 45 | 120 | 162 | 170 | 175 | 900 | 0.055 | 1,500 |
| 2220 | 5620 | HI2220T101R-10 | 50 | 100 | 148 | 152 | 160 | 600 | 0.006 | 6,000 |
| 2220 | 5620 | HI2220R151R-10 | 60 | 150 | 230 | 196 | 230 | 500 | 0.015 | 5,000 |
| 2220 | 5620 | HI2220P171R-10 | 78 | 170 | 256 | 237 | 256 | 500 | 0.03 | 4,000 |
| 2220 | 5620 | HI2220R181R-10 | 80 | 180 | 263 | 234 | 270 | 400 | 0.02 | 5,000 |
| 2220 | 5620 | HI2220P251R-10 | 100 | 250 | 172 | 91 | 390 | 200 | 0.015 | 4,000 |
| 2220 | 5620 | HI2220P271R-10 | 110 | 270 | 360 | 250 | 390 | 300 | 0.035 | 4,000 |
| 2220 | 5620 | HI2220R301R-10 | 100 | 300 | 190 | 100 | 380 | 200 | 0.02 | 5,000 |
| 2220 | 5620 | HI2220Q401R-10 | 100 | 400 | 159 | 99 | 450 | 150 | 0.03 | 4,500 |
| 2220 | 5620 | HI2220P551R-10 | 180 | 550 | 670 | 343 | 850 | 300 | 0.035 | 4,000 |
| 2220 | 5620 | HI2220P601R-10 | 220 | 600 | 184 | 106 | 600 | 100 | 0.025 | 4,000 |
| 2220 | 5620 | HR2220P601R-10 | 200 | 600 | 150 | 75 | 600 | 100 | 0.025 | 4,000 |
| 2220 | 5620 | HI2220P701R-10 | 200 | 700 | 140 | 90 | 700 | 100 | 0.025 | 4,000 |
| 2220 | 5620 | HR2220V701R-10 | 198 | 700 | 120 | 62 | 760 | 91 | 0.01 | 8,000 |
| 2220 | 5620 | HR2220V801R-10 | 150 | 800 | 125 | 75 | 910 | 90 | 0.01 | 8,000 |
| 3312 | 8531 | HI3312X101R-10 | 39 | 100 | 160 | 172 | 172 | 1,000 | 0.004 | 10,000 |

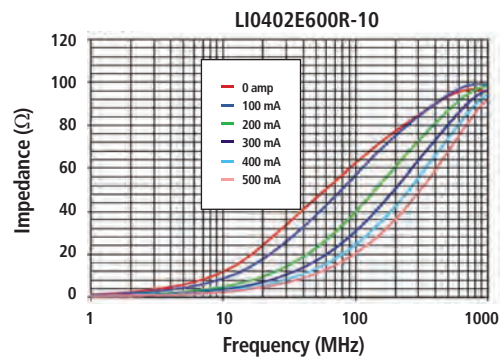
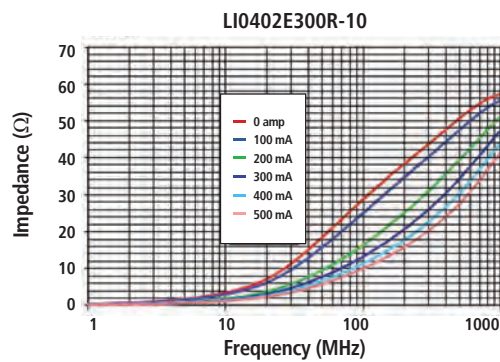
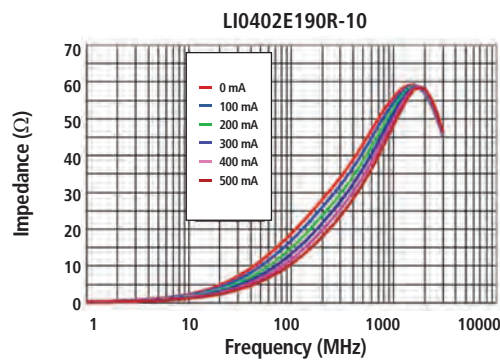
4 LINES CHIP BEAD ARRAY

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHZ) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) MA |
|---------------|------------------|----------------|-----------------------|-------------|-------------|-----------|----------------------------|--------------------------------|-------------|-----------------------------|
| | | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 1206 | 3216 | DA1206E300R-10 | 10 | 30 | 55 | 56 | 56 | 1,000 | 0.30 | 500 |
| 1206 | 3216 | DA1206D600R-10 | 15 | 60 | 115 | 132 | 133 | 1,103 | 0.20 | 400 |
| 1206 | 3216 | DA1206C121R-10 | 39 | 120 | 181 | 151 | 211 | 559 | 0.20 | 300 |
| 1206 | 3216 | DA1206D301R-10 | 94 | 300 | 437 | 245 | 437 | 500 | 0.40 | 400 |
| 1206 | 3216 | DA1206B601R-10 | 180 | 600 | 475 | 230 | 761 | 214 | 0.35 | 200 |
| 1206 | 3216 | DA1206B102R-10 | 275 | 1,000 | 520 | 240 | 1,129 | 175 | 0.80 | 200 |

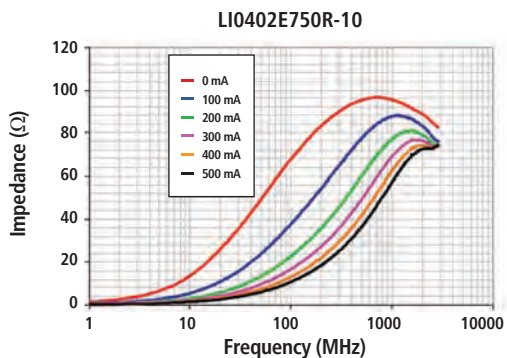
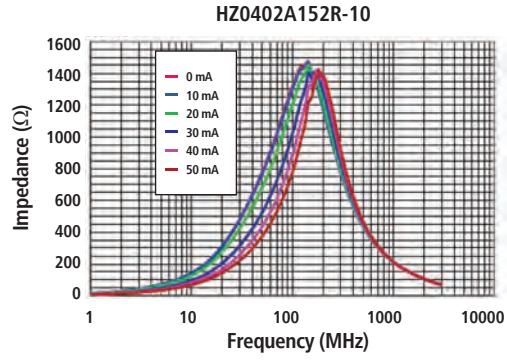
LOW FREQUENCY EMI CHIP BEADS

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHZ) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) mA |
|---------------|------------------|----------------|-----------------------|-------------|-------------|----------------------------|--------------------------------|-------------|-----------------------------|
| | | | Z | Z @ 100 MHz | Z @ 500 MHz | | | | |
| 1206 | 3216 | LF1206A302R-10 | 3,000 @ 10 MHz | 760 | 166 | 5,650 | 19 | 1.05 | 100 |
| 1206 | 3216 | LF1206C202R-10 | 2,000 @ 30 MHz | 915 | 180 | 2,505 | 41 | 0.50 | 300 |
| 1206 | 3216 | LF1206E152R-10 | 1,500 @ 50 MHz | 946 | 169 | 1,564 | 57 | 0.30 | 500 |
| 0805 | 2012 | LF0805A252R-10 | 2,500 @ 10 MHz | 1,248 | 306 | 5,138 | 25 | 1.25 | 100 |

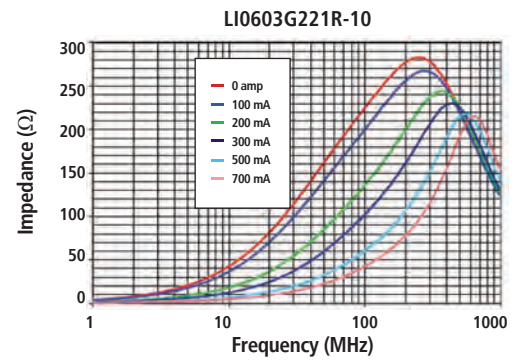
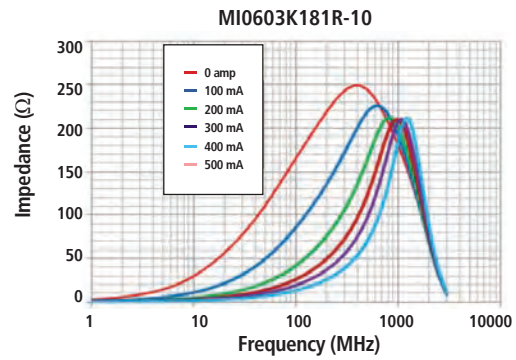
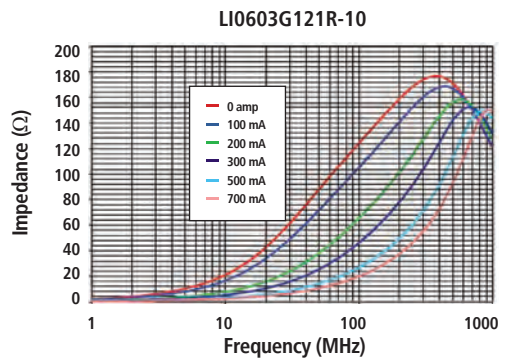
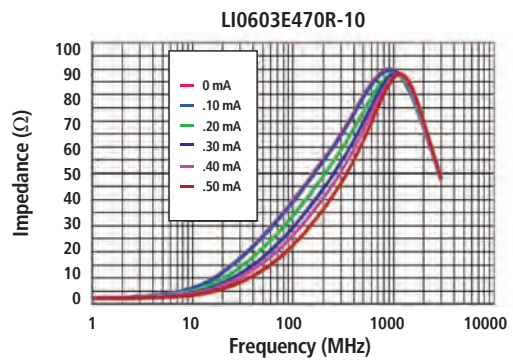
0402 Chip Bead Impedance Under DC Bias



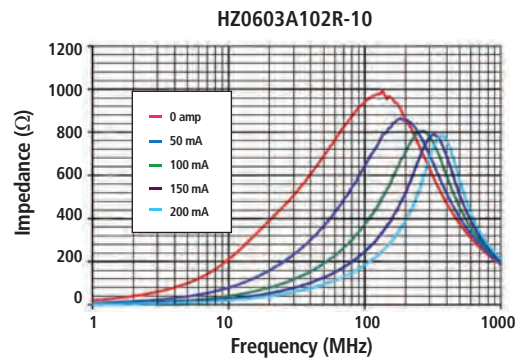
0402 Chip Bead Impedance Under DC Bias



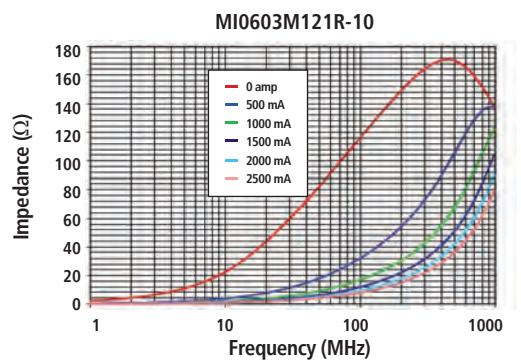
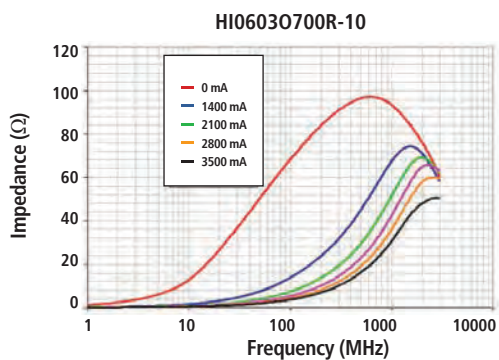
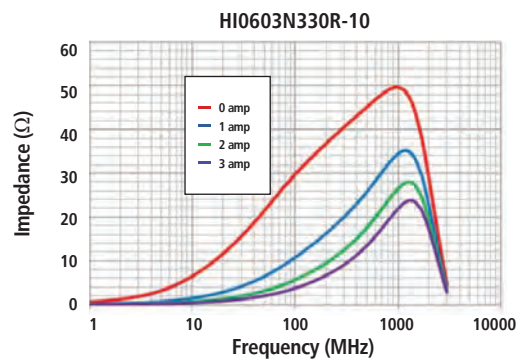
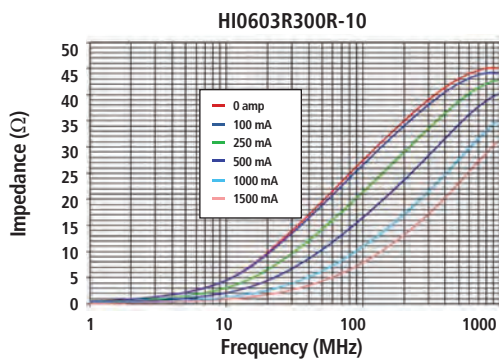
0402/0603 Chip Bead Impedance Under DC Bias



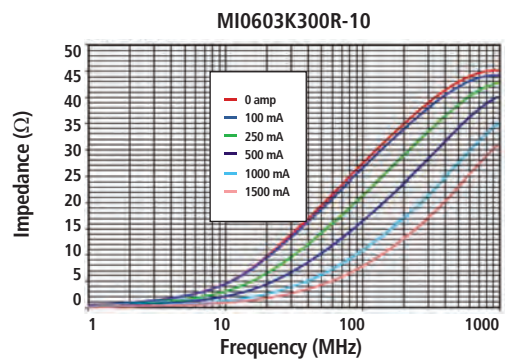
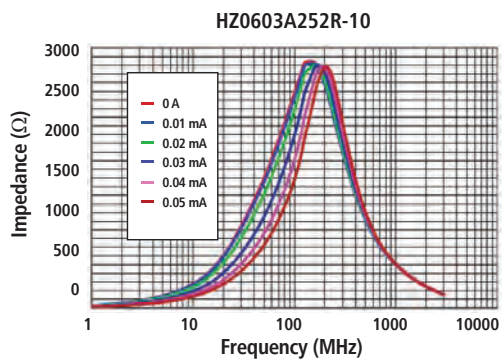
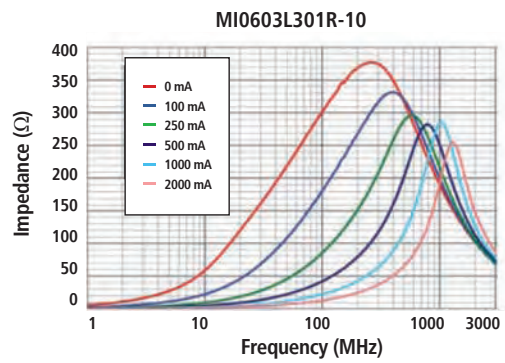
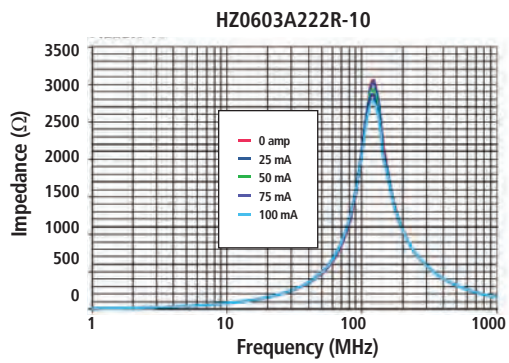
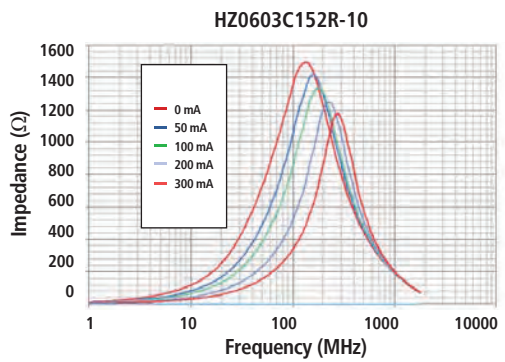
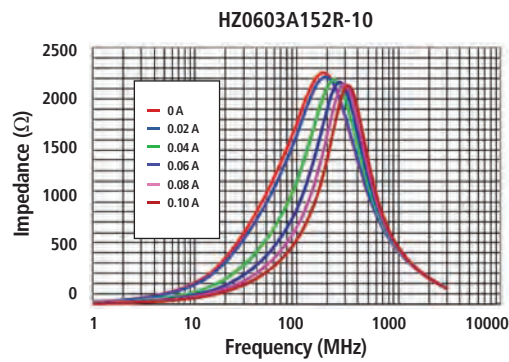
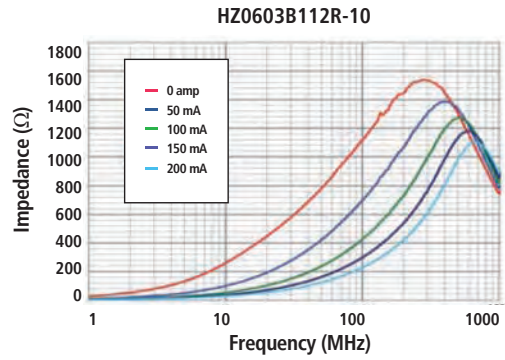
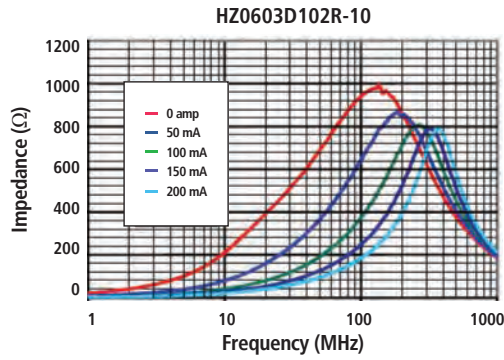
0603 Chip Bead Impedance Under DC Bias



0603 Chip Bead Impedance Under DC Bias



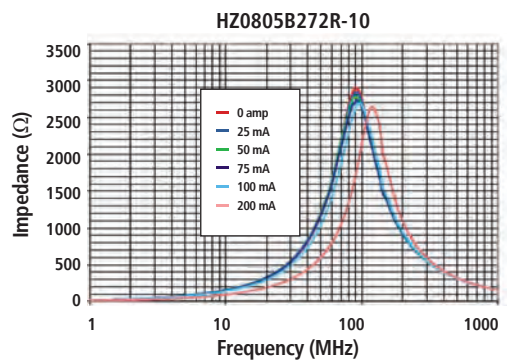
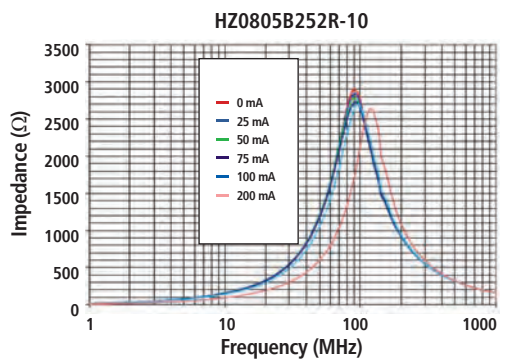
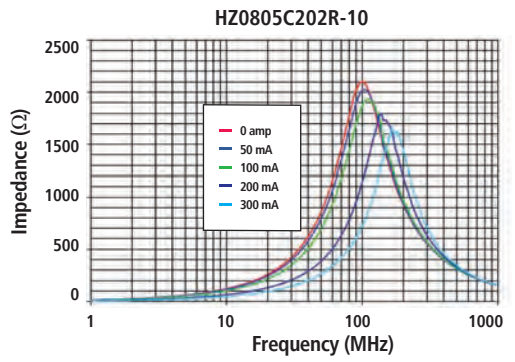
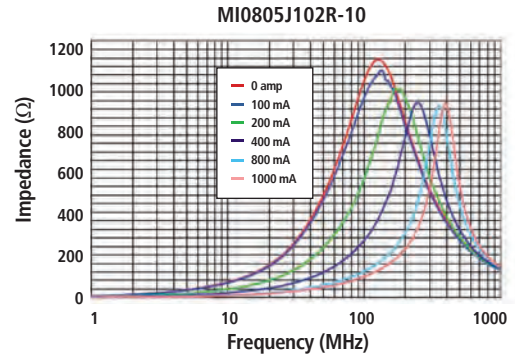
0603 Chip Bead Impedance Under DC Bias



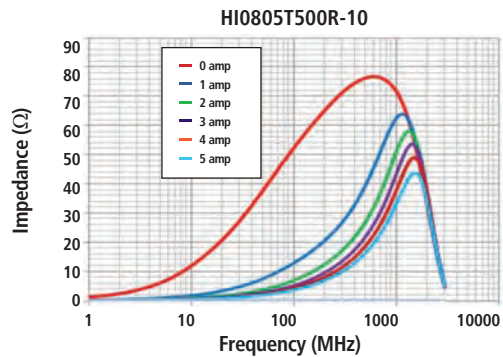
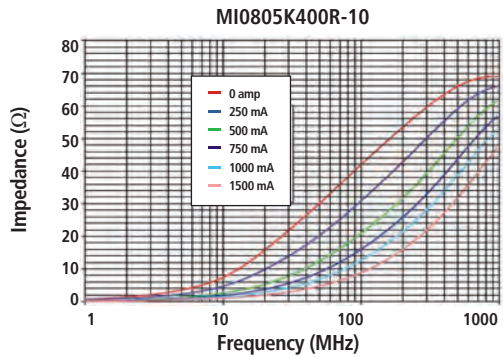
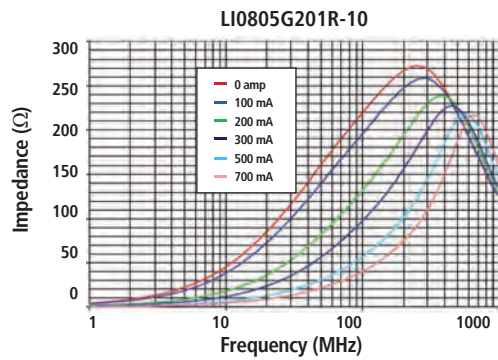
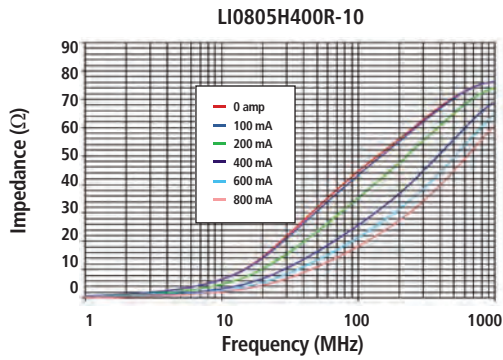
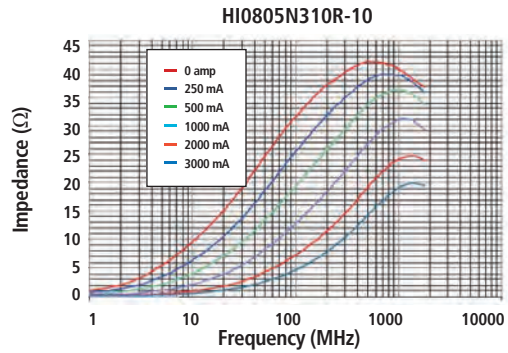
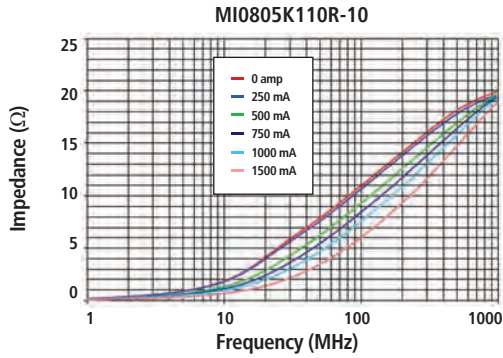
0603/0805 Chip Bead Impedance Under DC Bias



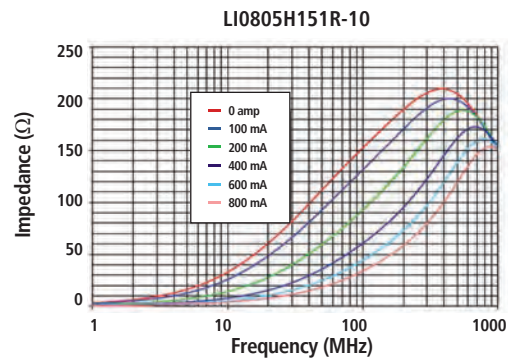
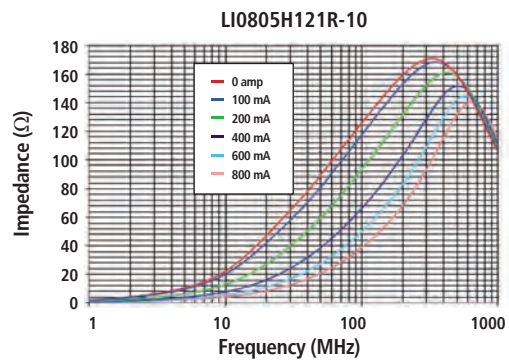
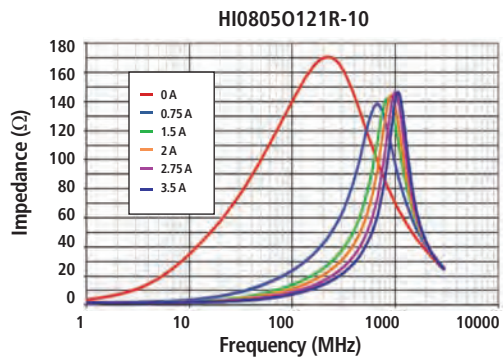
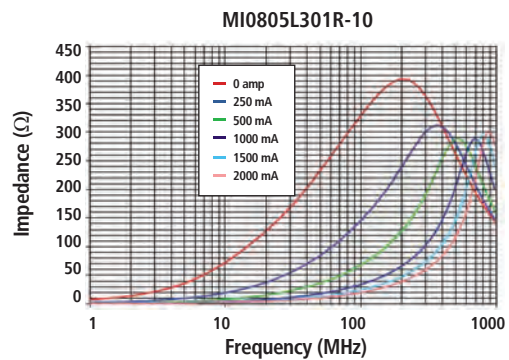
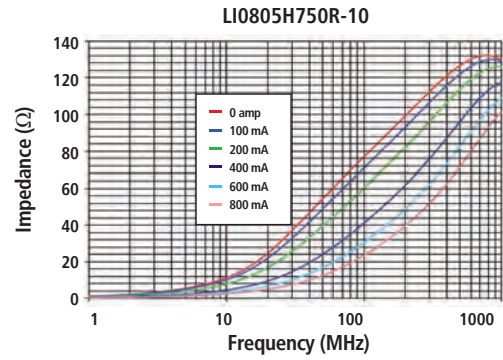
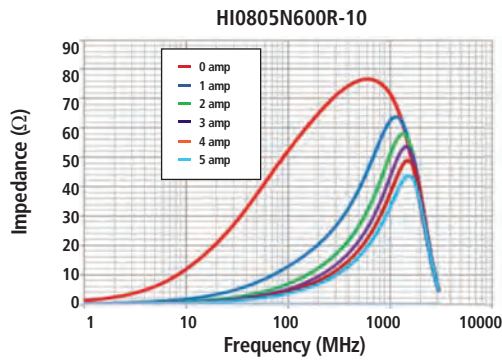
0805 Chip Bead Impedance Under DC Bias



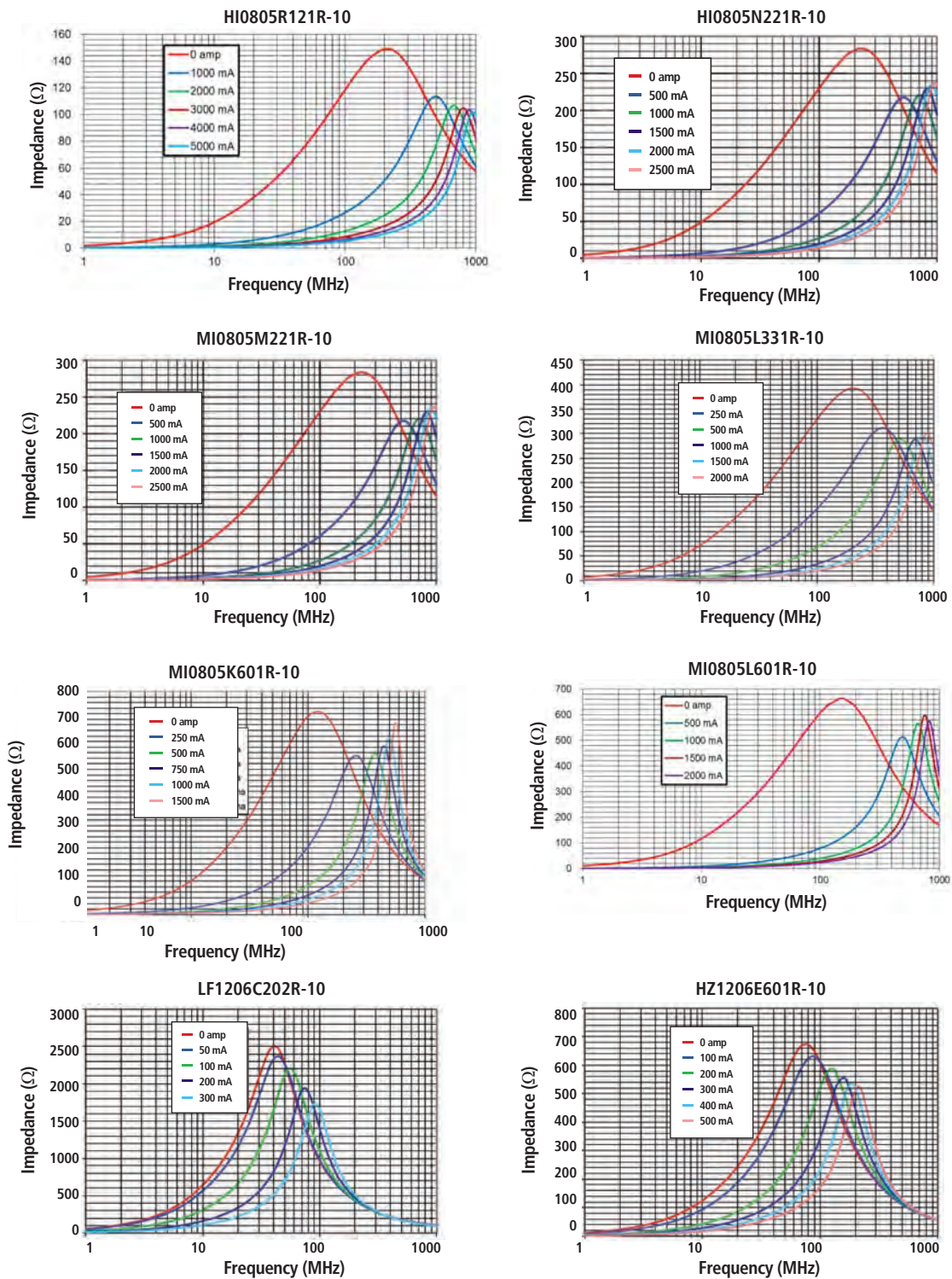
0805 Chip Bead Impedance Under DC Bias



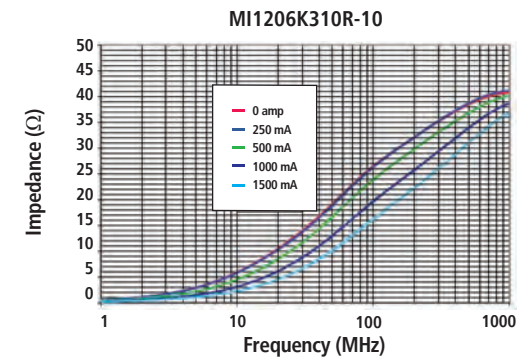
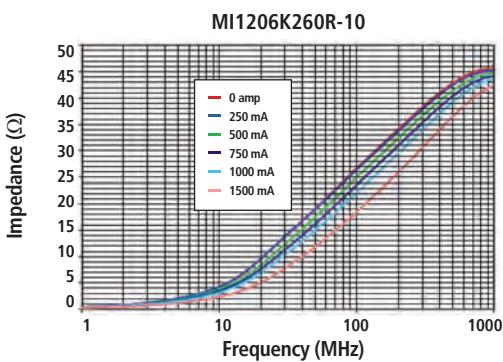
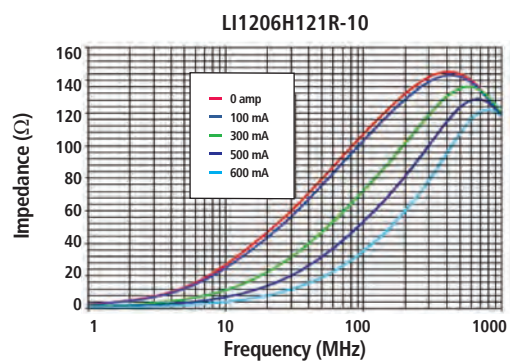
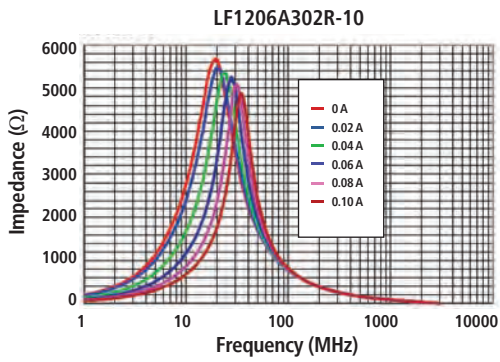
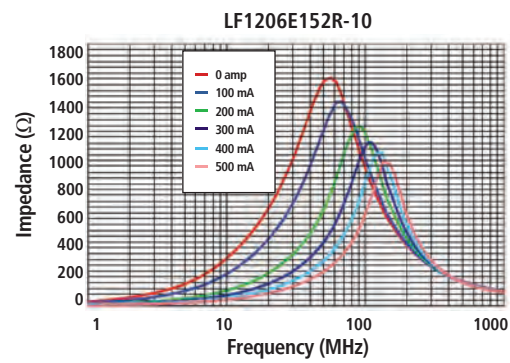
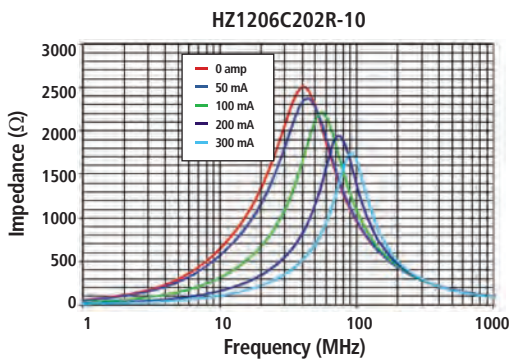
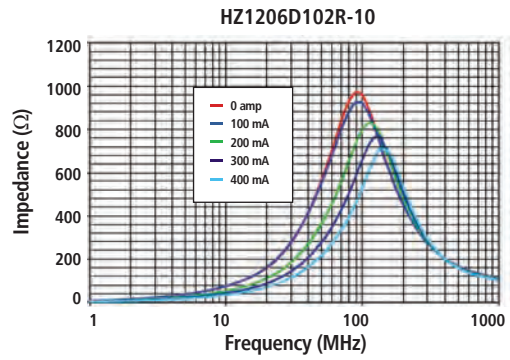
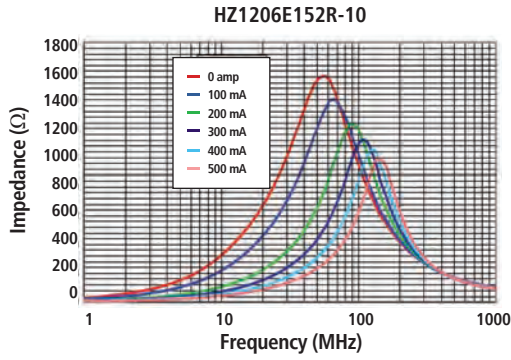
0805 Chip Bead Impedance Under DC Bias



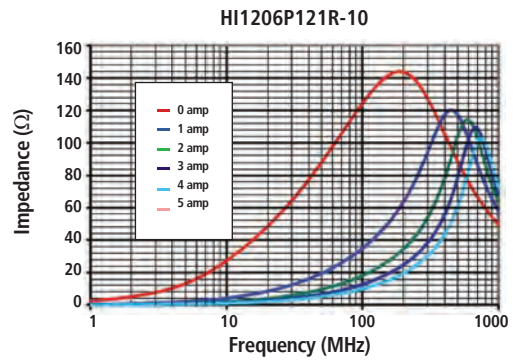
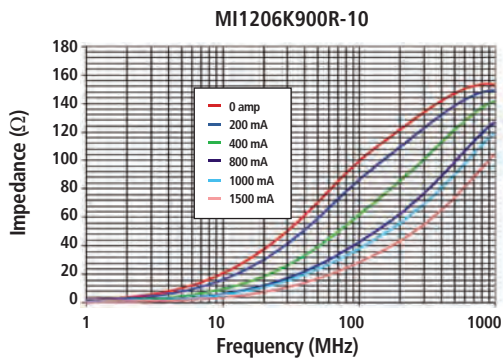
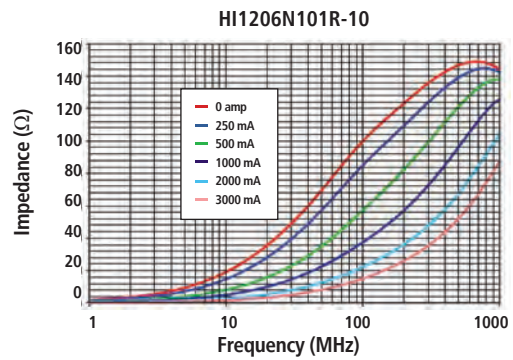
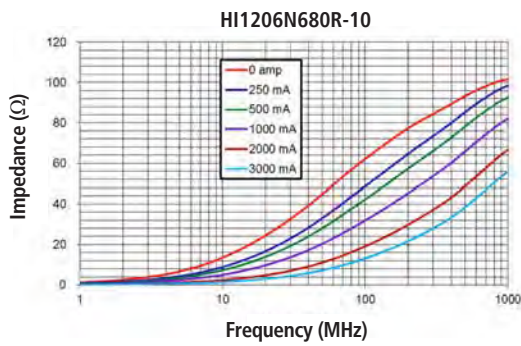
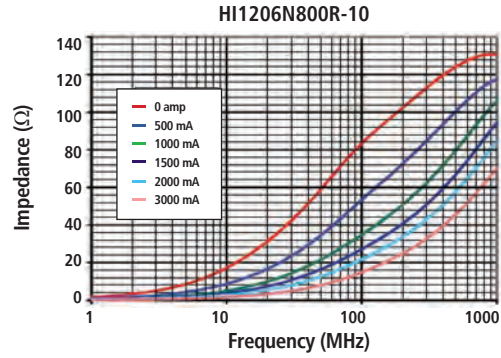
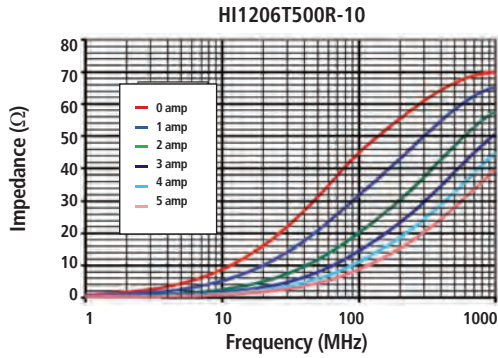
0805/1206 Chip Bead Impedance Under DC Bias



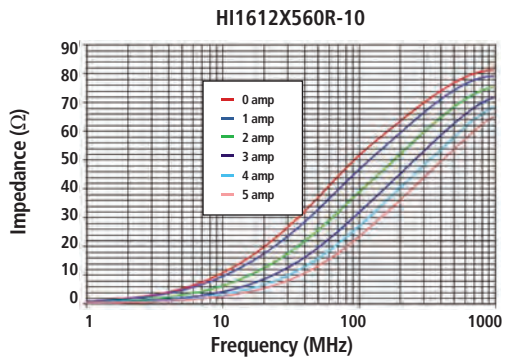
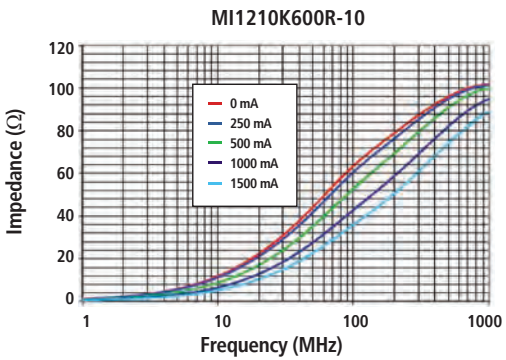
1206 Chip Bead Impedance Under DC Bias



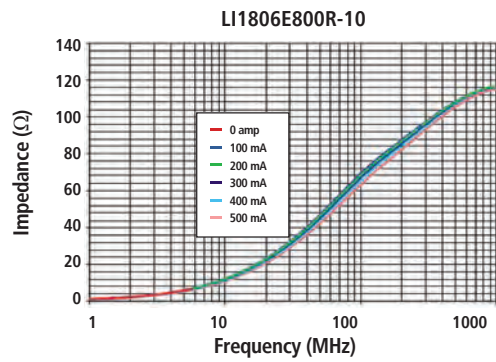
1206 Chip Bead Impedance Under DC Bias



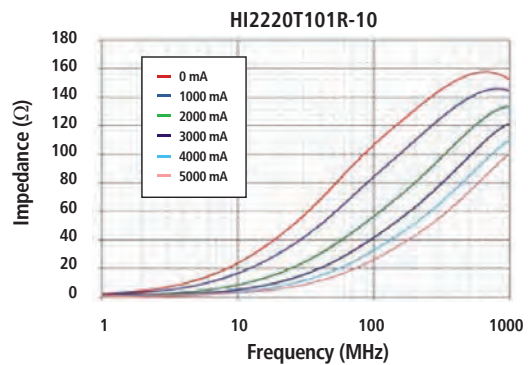
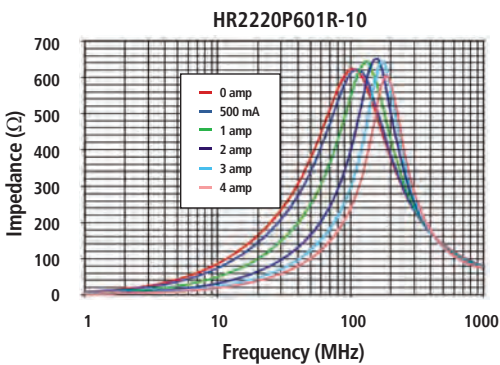
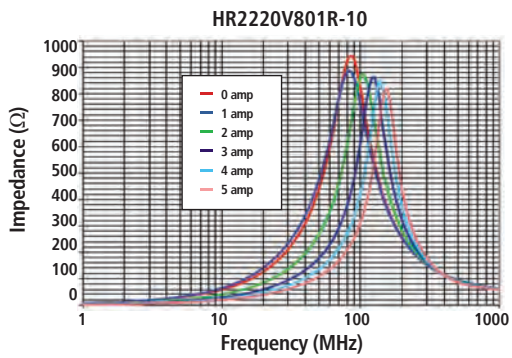
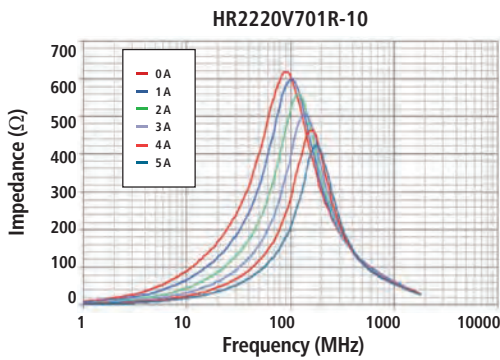
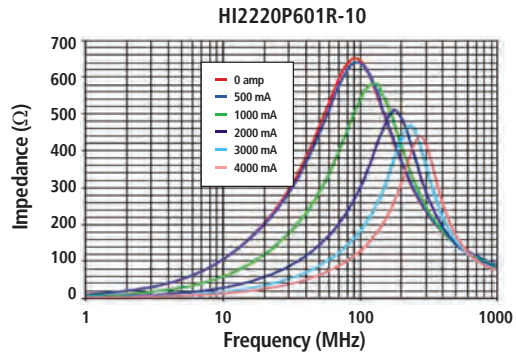
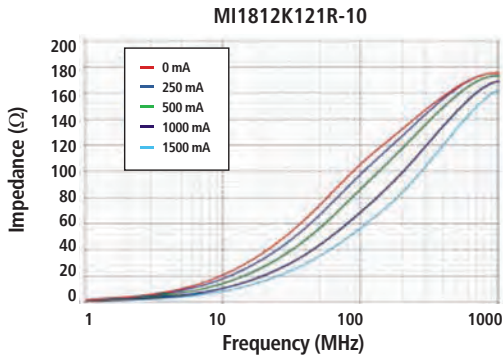
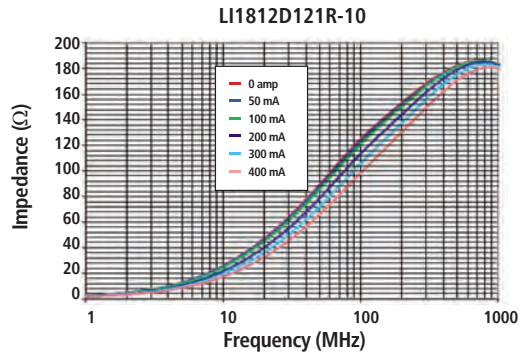
1206/1210/1612 Chip Bead Impedance Under DC Bias



1806/1812 Chip Bead Impedance Under DC Bias



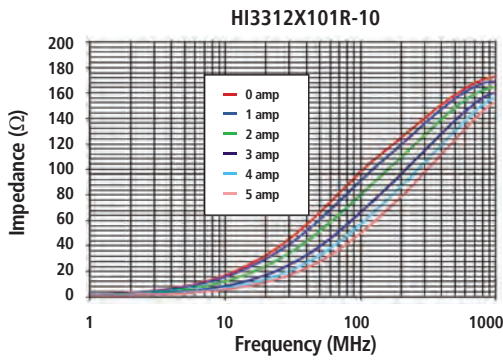
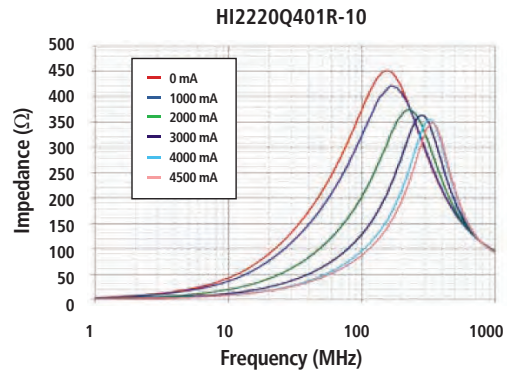
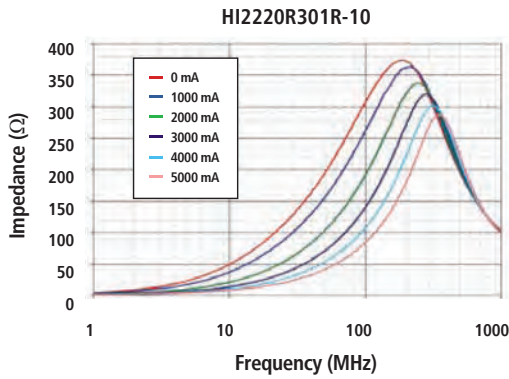
1812/2220 Chip Bead Impedance Under DC Bias



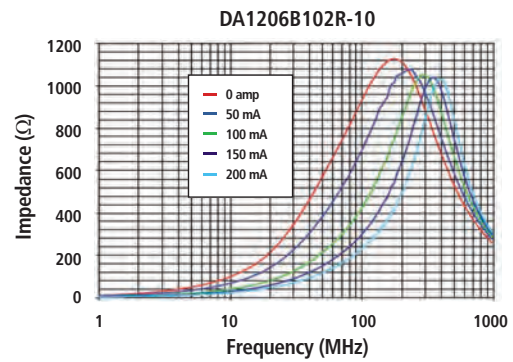
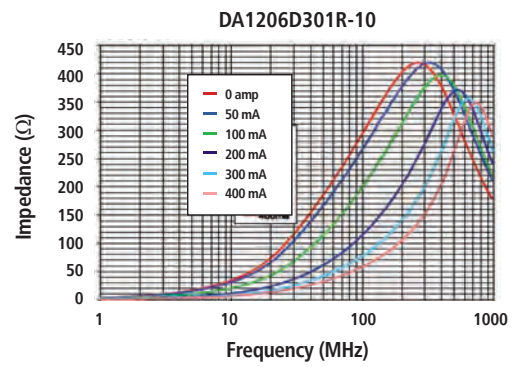
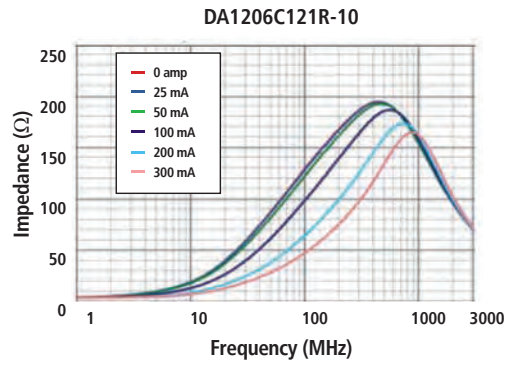
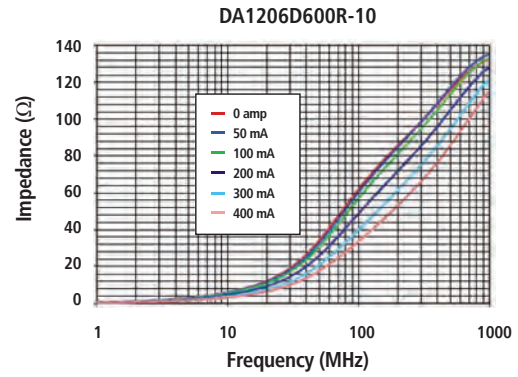
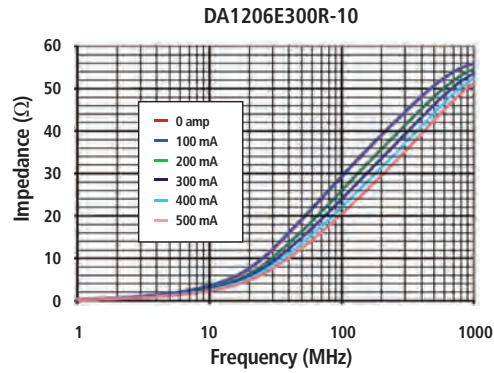
2220 Chip Bead Impedance Under DC Bias



2220/3312 Chip Bead Impedance Under DC Bias



4 Line Array Impedance Under DC Bias



FERRITE EMI SMT BEAD ASSEMBLIES



FEATURES

- 10 Amps continuous operating current capability
- Very low RDC
- Broadband (28F) and (35F) parts available
- Lead free and RoHS compliant

PART NUMBERING SYSTEM

| 28 | F | 0121 | -0 | S | R | -10 |
|---------------|--------------------|---------------|-------------------------|------------------------|--------------|------------------------|
| Material Code | Product Code (EIA) | EIA Size Code | Selected Dimension Code | Additional Description | Packing Code | Additional Description |

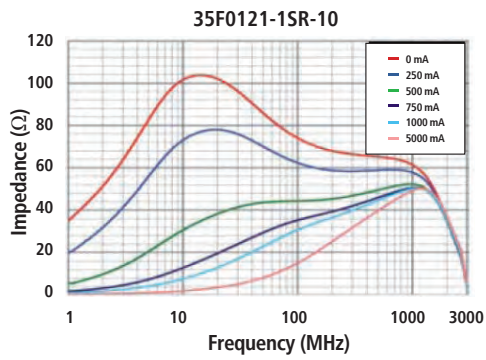
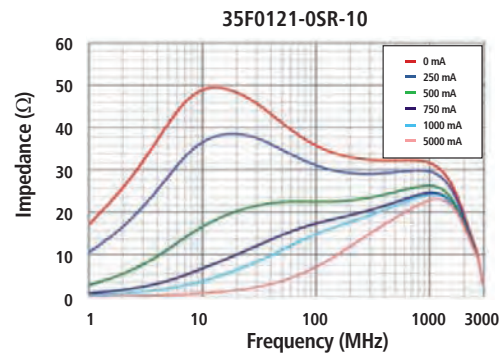
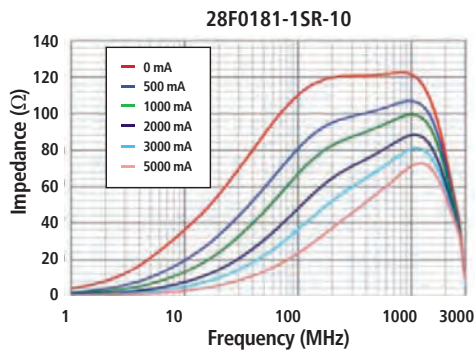
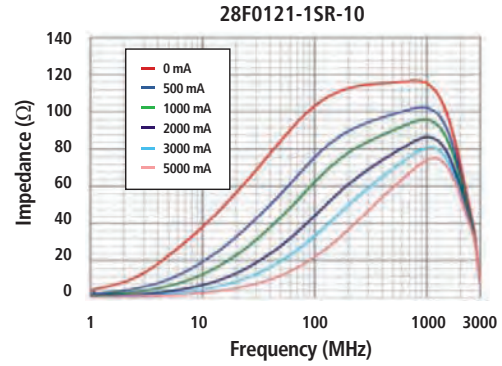
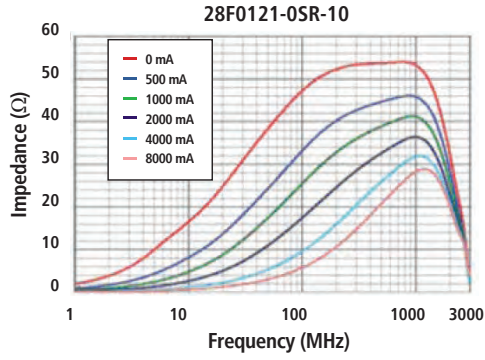
SMT BEAD ASSEMBLIES - POWER LINE

| EIA PKG. SIZE | Metric Pkg. Size | Part Number | Typical Impedance (Ω) | | | | Typical Peak Impedance (Ω) | Peak Impedance Frequency (MHz) | DCR MAX (Ω) | RATED I MAX (continuous) mA |
|---------------|------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-----------------------------|
| | | | Z @ MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 1612 | 4131 | 28F0121-0SR-10 | 30 | 48 | 53 | 53 | 54 | 800 | 0.00075 | 10,000 |
| 3312 | 8531 | 28F0121-1SR-10 | 60 | 96 | 115 | 114 | 117 | 833 | 0.001 | 10,000 |
| 3318 | 8545 | 28F0181-1SR-10 | 72 | 115 | 123 | 123 | 125 | 900 | 0.001 | 10,000 |

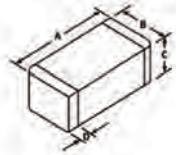
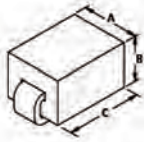
LOW FREQUENCY BEAD ASSEMBLIES - POWER LINE

| EIA PKG. SIZE | Metric Pkg. Size | Part Number | Typical Impedance (Ω) | | | | Typical Peak Impedance (Ω) | Peak Impedance Frequency (MHz) | DCR MAX (Ω) | RATED I MAX (continuous) mA |
|---------------|------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-----------------------------|
| | | | Z @ MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| 1612 | 4131 | 35F0121-0SR-10 | 17 | 41 | 48 | 47 | 49 | 13 | 0.00075 | 10,000 |
| 3312 | 8531 | 35F0121-1SR-10 | 35 | 82 | 102 | 90 | 104 | 17 | 0.001 | 10,000 |

SMT Bead Assemblies Impedance Under DC Bias



DIMENSION

| METRIC (EIA) PKG. SIZE | A mm (INCHES) | B mm (INCHES) | C* mm (INCHES) | D mm (INCHES) | MONOLITHIC CHIP BEAD |
|-----------------------------|------------------|------------------|-------------------|------------------|---|
| 0603 (0201) | 0.60 (0.023) | 0.30 (0.011) | 0.30 (0.011) | 0.15 (0.006) |  |
| 1005 (0402) | 1.01 (0.040) | 0.50 (0.020) | 0.50 (0.020) | 0.30 (0.012) | |
| 1608 (0603) | 1.60 (0.063) | 0.80 (0.031) | 0.80 (0.031) | 0.36 (0.014) | |
| 2010 (0804) | 2.00 (0.079) | 1.00 (0.039) | 0.50 (0.020) | 0.025 (0.010) | |
| 2012 (0805) | 2.00 (0.079) | 1.25 (0.049) | 0.90 (0.035) | 0.51 (0.020) | |
| 3216 (1206) | 3.20 (0.126) | 1.60 (0.063) | 1.10 (0.043) | 0.51 (0.020) | |
| 3225 (1210) | 3.20 (0.126) | 2.50 (0.098) | 1.40 (0.055) | 0.46 (0.018) | |
| 4030 (1612) | 4.06 (0.160) | 3.05 (0.120) | 2.28 (0.090) | 0.46 (0.018) | |
| 4516 (1806) | 4.50 (0.177) | 1.60 (0.063) | 1.60 (0.063) | 0.51 (0.020) | |
| 4532 (1812) | 4.50 (0.177) | 3.20 (0.126) | 1.40 (0.055) | 0.46 (0.018) | |
| 5650 (2220) | 5.59 (0.220) | 5.08 (0.200) | 3.45 (0.136) | 0.76 (0.030) | |
| 8530 (3312) | 8.50 (0.335) | 3.05 (0.120) | 2.28 (0.090) | 0.51 (0.020) | |
| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C* mm (INCHES) | D mm (INCHES) | |
| __ F0121-OSR | 3.05 (0.120) | 2.54 (0.100) | 4.06 (0.160) | -- |  |
| __ F0121-1SR | 3.05 (0.120) | 2.54 (0.100) | 8.51 (0.335) | -- | |
| __ F0181-OSR | 4.57 (0.180) | 2.54 (0.100) | 8.51 (0.335) | -- | |

*C Dimension (height) may vary with current and impedance rating requirements.
Refer to part print for specific dimensions. Parts have no polarity.

COMMON MODE AND DIFFERENTIAL MODE EXPLANATION

Laird common mode chokes are the ideal components for EMI filtering of power and signal lines. These components withstand high DC currents without degradation of filtering performance that can occur with differential mode filters like small chip beads. Stable common mode chokes allow most signals to pass unaffected, yet filter the noise (EMI) from these circuits.

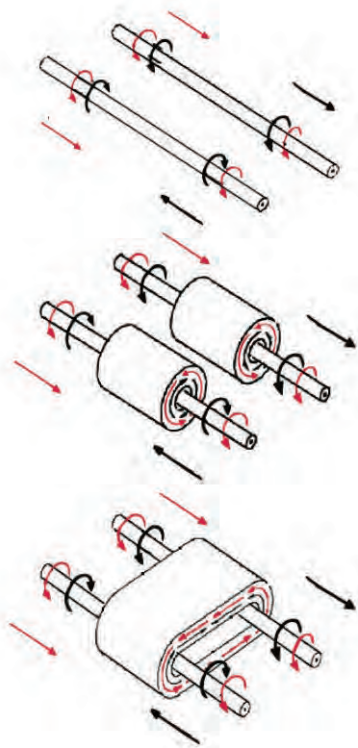
Switch mode power supplies are required for most advanced electronics because harmonics of the switch mode power supply can escape the power supply as EMI. The power delivery circuit often creates opportunities for unintended common mode current loops to form in the end product, even when using a "certified" or "regulation compliant" power supply. Installation of a common mode choke to the supply output can significantly reduce this common mode energy flow and help insure product performance and EMI regulatory compliance.

Small ferrite chip beads or inductors are degraded by the power supply output. However, common mode chokes continue their high performance regardless of the high power currents that might flow or spike in the circuit.

Modern systems are frequently an interconnection of functional blocks and connections made by cables or wiring harnesses. These interconnections often present the opportunity for common mode current loops between devices that can lead to EMI regulatory failure. The addition of a common mode choke before the connector filters these common mode currents while allowing the desired signals to pass unaffected. The result is effective communication between devices, reliable product and system operation and product EMI regulatory compliance.

Most well-designed power and signal circuits present no EMI caused from intended currents. As an example, at 30 MHz a pair of traces or wires 1 m long, separated by 1.3 mm, require over 20 mA differential current imbalance to exceed 100 $\mu\text{V}/\text{m}$ radiation 3 meters away. However, unintended, unforeseen common mode currents can exceed 100 $\mu\text{V}/\text{m}$ radiation with only 8 μA common mode current flow! Suppression of these tiny common mode currents is often crucial to assuring EMI regulatory compliance and reliable product performance. Ferrite common mode chokes operate by acting on the magnetic fields surrounding a pair of conductors.

Black arrows represent differential (normal) mode. Red arrows represent common mode.



Two conductors used in a standard "differential" transmission circuit create magnetic fields surrounding the conductors. These magnetic fields flow around the conductors in the directions depicted by the black arrows.

Likewise, common mode currents generate magnetic fields surrounding the conductors. The red arrows depict the common mode current path and the associated flux paths around the wires.

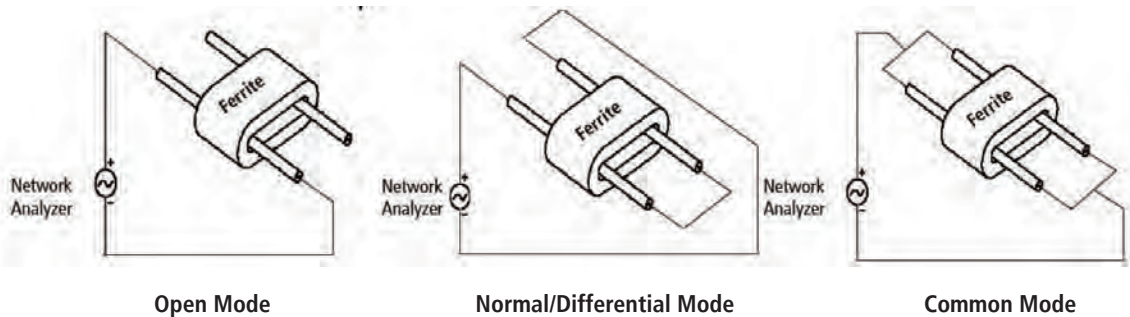
The same two wires shown above have been fitted above with two separate ferrite EMI cores in a differential-mode configuration with one core per line. In this application, each core must contain the total magnetic flux resulting from both the differential mode (intended) current and the common mode (unintended) by the intended current. Differential mode filters (like small chip beads) are not stable under significant load.

The same two wires have now been fitted with a ferrite EMI core in a common mode configuration; a single core with both lines through a common opening in the core. The differential mode (black) fields in the core are now equal and opposite, which yields a net flux seen by the core of approximately zero. Saturation is no longer an issue, and a much smaller ferrite core/choke can be used. The field from the common mode noise (red arrows) is additive and is the only remaining flux to be inflected by the core. The common mode choke configuration applies to both cable cores and board level components. Common mode chokes are stable under load.

COMMON MODE CHOKE FAMILY

| PART SERIES | SPECIAL FEATURES | EIA PACKAGE SIZE | IMPEDANCE (Z) Ω @ 100 MHz | RATED I MAX (CONTINUOUS) mA | PEAK IMPEDANCE (Z) FREQUENCY | # OF SINGLE LINE PAIRS OR CHOKES |
|-------------|---|------------------|----------------------------------|-----------------------------|------------------------------|----------------------------------|
| CM 05 | USB 2.0, Low Normal Mode Z | 0805 | 90-370 | 100-400 | 1 GHz - 1.4 GHz | 1 |
| CH 05 | HDMI High Speed Signal | 0805 | 90 | 400 | 2000 | 1 |
| CF Beads | Normal Signal, Small Package | 0504-0805 | 67-220 | 300-400 | 180-583 | 1 |
| CM 21 | High Current, Low Profile | 2021-3421 | 33-60 | 15,000 | 1GHz | 1 |
| CM 22 Array | Firewire, Gigabit Ethernet | 2722-5022 | 45-200 | 5,000 | 200 MHz - 3 GHz | 2,3,4 |
| CM 32 Array | High Current, High Frequency | 3032- 6032 | 120-300 | 8,000 | 150 MHz - 2 GHz | 2,3,4 |
| CM 40 Array | High Current, Low to High Frequency | 3440-5740 | 170 | 20,000 | 1 GHz | 1,2 |
| CM 41 | Ultra High Current, Low to High Frequency | 5441 | 90-160 | 75,000 | 600 MHz - 700 MHz | 1 |
| CM 44 | 3 Line Power | 4440 | 110 | 20,000 | 500 MHz | 3 |
| CM 45 | 2 & 4 Line Power | 2545-4545 | 130-170 | 10,000 | 500 MHz - 1 GHz | 1,2 |
| LF CM | Low Frequency | 1812-5740 | 100-3500 | 200-20,000 | 3 MHz - 80 MHz | 1 |

IMPEDANCE TEST FOR COMMON MODE CHOKES



Open-Mode Impedance Measurement -

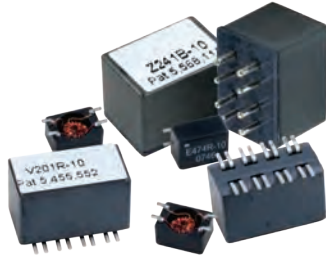
The open-mode impedance characterizes the impedance of only a single conductor in the ferrite common mode choke.

Normal (Differential) Mode Impedance Measurement

The normal mode impedance characterizes the impedance presented by the common mode choke to the normal (differential) signals present in the circuit. The test circuit represents the forward and return paths through the device.

Common Mode Impedance Measurement -

The common mode impedance characterizes the impedance presented by the choke to the unintended common mode currents that might flow in the circuit and cause EMI failures. Since this current flows in both conductors, it is necessary to short the conductors on each side of the choke so that test current flows equally through both conductors.



FEATURES 

- Wire wound SMT and through hole structure rated current up to 75 Amps
- Low DCR with small package
- Stable performance under load bias
- Excellent impedance vs frequency feature
- Small size and high reliability
- For power, low frequency and high frequency signal lines
- For USB, HDMI, 1394, DVI, S-ATA, LVDS signal line applications
- Suitable for power saving especially for portable application

PART NUMBERING SYSTEM

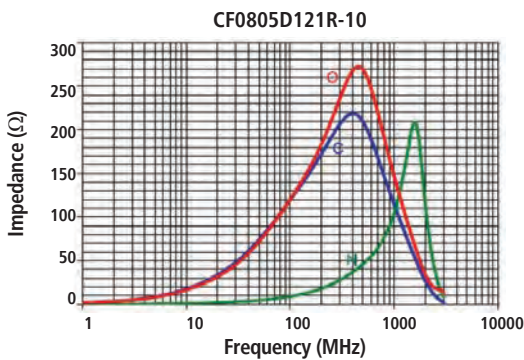
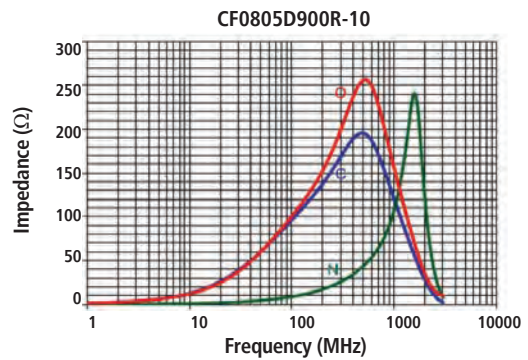
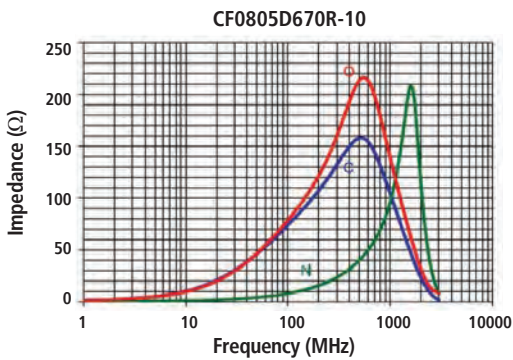
| | | | | | |
|---------------------|---------------|--------------------|-----------------------|--------------|------------------------|
| CM | 0805 | D | 900 | R | -10 |
| Product Series Code | EIA Size Code | Rated Current Code | Inductance Value Code | Packing Code | Additional Description |

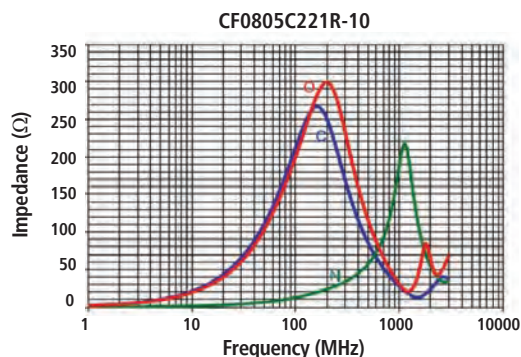
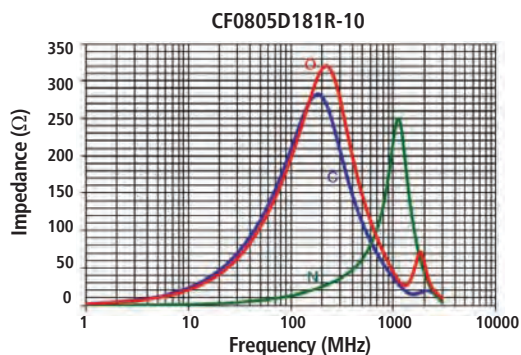
HIGH SPEED SERIAL INTERFACE COMMON MODE CHOKE

| APPLICATION | TYPE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) (mA) |
|-----------------|--------------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-------------------------------|
| | | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| USB2.0/LVDS | Wirewound (For 2 lines) | CM0805D900R-10 | 24 | 90 | 340 | 435 | 445 | 1405 | 0.3 | 400 |
| | | CM0805C161R-10 | 49 | 160 | 540 | 684 | 684 | 1000 | 0.35 | 300 |
| | | CM0805C221R-10 | 57 | 220 | 570 | 720 | 724 | 1147 | 0.4 | 300 |
| | | CM0805B361R-10 | 95 | 360 | 1080 | 1310 | 1343 | 913 | 0.4 | 280 |
| | | CM0805A371R-10 | 186 | 370 | 730 | 878 | 878 | 1000 | 0.5 | 100 |
| | | CM0805B501R-10 | 185 | 500 | 895 | 980 | 1015 | 833 | 0.5 | 250 |
| | | CM0805C601R-10 | 265 | 600 | 1080 | 1227 | 1264 | 782 | 0.375 | 250 |
| HDMI/DVI/SATA | Wirewound (For 2 lines) | CH0805D900R-10 | 48 | 90 | 249 | 339 | 494 | 2000 | 0.3 | 400 |
| | | CM1206A601R-10 | 200 | 600 | 1450 | 980 | 1530 | 580 | 0.8 | 260 |
| | | CM1206C161R-10 | 81 | 160 | 358 | 555 | 718 | 2177 | 0.4 | 340 |
| USB/Signal Line | Multilayer (For 2 lines) | CF0504C900R-10 | 28 | 90 | 210 | 148 | 217 | 583 | 0.6 | 300 |
| | | CF0504C121R-10 | 33 | 120 | 250 | 145 | 250 | 500 | 0.6 | 300 |
| | | CF0805D670R-10 | 24 | 67 | 196 | 98 | 166 | 510 | 0.4 | 400 |
| | | CF0805D900R-10 | 32 | 90 | 210 | 106 | 220 | 435 | 0.4 | 400 |
| | | CF0805D121R-10 | 36 | 120 | 240 | 103 | 260 | 397 | 0.4 | 400 |
| | | CF0805D181R-10 | 48 | 180 | 123 | 42 | 277 | 210 | 0.5 | 400 |
| | | CF0805C221R-10 | 50 | 220 | 109 | 33 | 296 | 180 | 0.5 | 300 |



COMMON MODE CHOKES





32

DIMENSION

| PART NUMBER | EIA PKG SIZE | METRIC PKG SIZE | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | D mm (INCHES) | D1 mm (INCHES) | E mm (INCHES) | |
|---------------|--------------|-----------------|---------------|---------------|---------------|---------------|----------------|---------------|--|
| CM0805 CH0805 | 0805 | 2012 | 2.00 (0.079) | 1.20 (0.047) | 1.20 (0.047) | - | - | - | |
| CF0504 | 0504 | 1210 | 1.25 (0.049) | 1.00 (0.039) | 0.82 (0.032) | 0.30 (0.012) | 0.20 (0.008) | 0.50 (0.020) | |
| CF0805 | 0805 | 2012 | 2.00 (0.079) | 1.25 (0.049) | 1.00 (0.039) | 0.30 (0.012) | - | 0.40 (0.016) | |

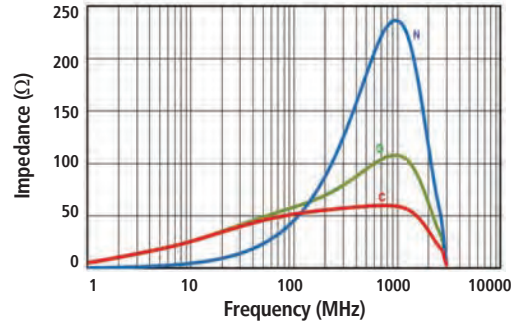
POWER LINES COMMON MODE CHOKE

| APPLICATION | TYPE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) (mA) |
|----------------|------------------------------|----------------|-----------------------|-------------|-------------|-----------|----------------------------|--------------------------------|-------------|---|
| | | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| Power Lines | Surface Mount (For 2 lines) | CM2021Y330R-10 | 18 | 33 | 52 | 61 | 62 | 1100 | 0.0008 | 15,000 |
| | | CM3421Y600R-10 | 39 | 60 | 96 | 110 | 110 | 1000 | 0.0008 | 15,000 |
| | Thru-Hole (For 2 lines) | CM3440Z171B-10 | 116 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 |
| | | CM5740Z171B-10 | 116 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 |
| | Surface Mount (For 2 lines) | CM3440Z171R-10 | 116 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 |
| | | CM5740Z171R-10 | 116 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 |
| | Surface Mount (For 3 lines) | CM4440Z111R-10 | 79 | 110 | 122 | 117 | 122 | 500 | 0.001 | 20,000 |
| | | CM4440Z121R-10 | 82 | 120 | 122 | 117 | 123 | 460 | 0.001 | 20,000 |
| | Thru-Hole (For 2 lines) | CM5441Z101B-10 | 79 | 100 | 188 | 183 | 204 | 682 | 0.0003 | 30,000 mA @ 25°C Temp Rise 70,000 mA @ 30 °C Temp Rise |
| CM5441Z161B-10 | | 112 | 160 | 261 | 146 | 263 | 457 | 0.0003 | | |
| CM5441Z161R-10 | | 110 | 160 | 260 | 140 | 265 | 460 | 0.0003 | | |

CM2021Y330R-10



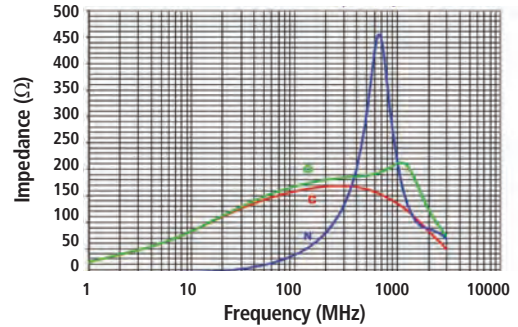
CM3421Y600R-10



CM3440Z171B-10 CM3440Z171R-10



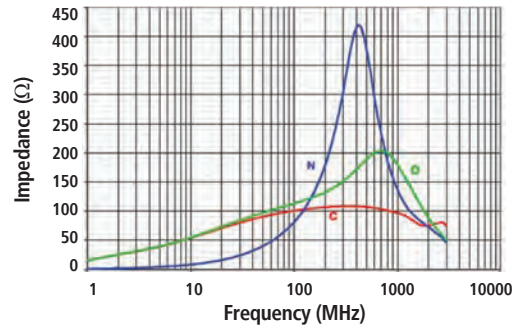
CM5740Z171B-10 CM5740Z171R-10



CM4440Z111R-10



CM5441Z101B-10



CM5441Z161B-10



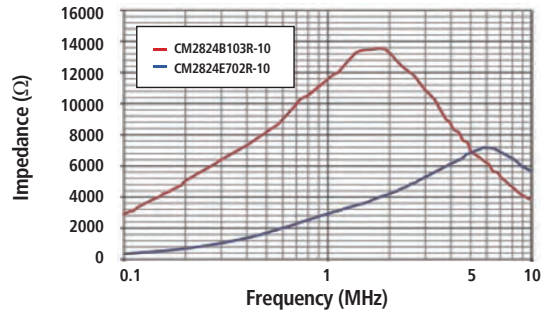
DIMENSION

| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|----------------|---------------|---------------|---------------|---|
| CM2021Y330R-10 | 5.00 (0.197) | 5.60 (0.220) | 2.85 (0.112) |  |
| CM3421Y600R-10 | 8.68 (0.342) | 5.60 (0.220) | 2.85 (0.112) |  |
| CM3440Z171B-10 | 8.51 (0.335) | 10.03 (0.395) | 9.32 (0.367) |  |
| CM3440Z171R-10 | 8.51 (0.335) | 10.03 (0.395) | 9.32 (0.367) | |
| CM5740Z171B-10 | 14.48 (0.570) | 10.03 (0.395) | 9.32 (0.367) |  |
| CM5740Z171R-10 | 14.48 (0.570) | 10.03 (0.395) | 9.32 (0.367) |  |
| CM4440Z111R-10 | 11.05 (0.435) | 10.03 (0.395) | 9.32 (0.367) |  |
| CM5441Z101B-10 | 13.72 (0.540) | 10.41 (0.410) | 10.52 (0.414) |  |
| CM5441Z161B-10 | 13.72 (0.540) | 10.41 (0.410) | 15.24 (0.600) | |

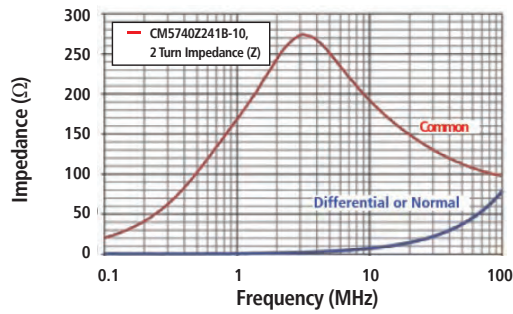
LOW FREQUENCY
COMMON MODE CHOKES

| APPLICATION | TYPE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) (mA) |
|-----------------------|-----------------------------|----------------|--------------------------------|---------------|---------------|---------------|-------------------------------------|--------------------------------|----------------------|-------------------------------|
| | | | Z @ 1 MHz | Z @ 4 MHz | Z @ 10 MHz | Z @ 100 MHz | | | | |
| Signal/ Power Line | Surface Mount (For 2 lines) | CM1812C282R-10 | 370 | 1,100 | 1,900 | 2,800 | 3500 | 50 | 0.5 | 200 |
| | | CM2824B103R-10 | 10,000 | 8,900 | 3,980 | 400 | 13,200 | 2 | 1.3 | 400 |
| | | CM2824E182R-10 | 200 | 570 | 920 | 1,800 | 1,920 | 80 | 0.26 | 800 |
| | | CM2824E352R-10 | 350 | 1400 | 2,100 | 3,500 | 3,950 | 45 | 0.3 | 800 |
| | Thru-Hole (For 4 lines) | CM2824E702R-10 | 3,000 | 7,000 | 5,800 | 800 | 7,200 | 6 | 0.26 | 700 |
| | | CM5740Z241B-10 | 170 (2 Turns) | 240 (2 Turns) | 173 (2 Turns) | 100 (2 Turns) | 276 (2 Turns) | 3 (2 Turns) | 0.0013 | 20,000 |

Impedance (Z) versus Frequency



CM5740Z241B-10, 2 Turn Impedance (Z)



DIMENSION

| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|----------------|---------------|---------------|---------------|--|
| CM1812C282R-10 | 5.00 (0.197) | 3.50 (0.138) | 5.55 (0.140) | |
| CM2824B103R-10 | 7.50 (0.295) | 5.50 (0.217) | 3.80 (0.150) | |
| CM2824E182R-10 | 7.50 (0.295) | 5.50 (0.217) | 3.80 (0.150) | |
| CM2824E352R-10 | 7.50 (0.295) | 5.50 (0.217) | 3.80 (0.150) | |
| CM2824E702R-10 | 7.50 (0.295) | 5.50 (0.217) | 3.80 (0.150) | |
| CM5740Z241B-10 | 14.40 (0.570) | 10.03 (0.395) | 9.32 (0.387) | |

APPLICATION FOR POWER LINES

| TYPE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) (mA) |
|------------------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-------------------------------|
| | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| Surface Mount (For 4 lines) | CM2722R800R-10 | 60 | 80 | 92 | 98 | 140 | 3000 | 0.02 | 5,000 |
| | CM2722R151R-10 | 113 | 150 | 165 | 165 | 168 | 1783 | 0.02 | 5,000 |
| | CM2722R201R-10 | 141 | 200 | 202 | 187 | 206 | 272 | 0.02 | 5,000 |
| Surface Mount (For 6 lines) | CM3822R800R-10 | 63 | 80 | 97 | 105 | 151 | 3000 | 0.02 | 5,000 |
| | CM3822R151R-10 | 108 | 150 | 170 | 169 | 172 | 1646 | 0.02 | 5,000 |
| | CM3822R201R-10 | 140 | 200 | 207 | 187 | 213 | 218 | 0.02 | 5,000 |
| Surface Mount (For 8 lines) | CM5022R800R-10 | 61 | 80 | 95 | 102 | 150 | 3000 | 0.02 | 5,000 |
| | CM5022R151R-10 | 112 | 150 | 165 | 167 | 177 | 2092 | 0.02 | 5,000 |
| | CM5022R201R-10 | 144 | 200 | 206 | 188 | 210 | 306 | 0.02 | 5,000 |
| Surface Mount (For 4 lines) | CM3032V121R-10 | 80 | 120 | 130 | 140 | 169 | 200 | 0.01 | 8,000 |
| | CM3032V201R-10 | 143 | 200 | 210 | 199 | 214 | 319 | 0.01 | 8,000 |
| | CM3032V301R-10 | 211 | 300 | 280 | 224 | 307 | 214 | 0.01 | 8,000 |
| Surface Mount (For 6 lines) | CM4732V201R-10 | 152 | 200 | 218 | 187 | 229 | 241 | 0.01 | 8,000 |
| | CM4732V301R-10 | 217 | 300 | 250 | 172 | 328 | 168 | 0.01 | 8,000 |
| Surface Mount (For 8 lines) | CM6032V201R-10 | 140 | 200 | 219 | 213 | 219 | 500 | 0.01 | 8,000 |
| | CM6032V301R-10 | 240 | 300 | 258 | 170 | 346 | 149 | 0.01 | 8,000 |
| Thru-Hole (For 2 lines) | CM2545X171B-10 | 108 | 170 | 210 | 180 | 210 | 500 | 0.01 | 10,000 |
| Surface Mount (For 2 lines) | CM2545X171R-10 | 108 | 170 | 210 | 180 | 210 | 500 | 0.01 | 10,000 |
| Thru-Hole (For 4 lines) | CM4545Z131B-10 | 65 | 130 | 267 | 256 | 288 | 682 | 0.01 | 10,000 |
| Surface Mount (For 4 lines) | CM4545Z131R-10 | 65 | 130 | 267 | 256 | 288 | 682 | 0.01 | 10,000 |

| PART NUMBER | # OF CHOKES | TYPICAL IMPEDANCE (Ω) FOR MULTIPLE PASS BOARD LAYOUT OPTIONS | | | | | | | | | | | |
|----------------|-------------|---|---------|-------|----------|---------|-------|------------|---------|-------|-----------|---------|-------|
| | | ONE PASS | | | TWO PASS | | | THREE PASS | | | FOUR PASS | | |
| | | 100 MHz | 500 MHz | 1 GHz | 100 MHz | 500 MHz | 1 GHz | 100 MHz | 500 MHz | 1 GHz | 100 MHz | 500 MHz | 1 GHz |
| CM2722R800R-10 | 2 | 80 | 92 | 98 | 174 | 190 | 173 | - | - | - | - | - | - |
| CM2722R151R-10 | 2 | 150 | 165 | 165 | 292 | 311 | 222 | - | - | - | - | - | - |
| CM2722R201R-10 | 2 | 200 | 202 | 187 | 433 | 362 | 187 | - | - | - | - | - | - |
| CM3822R800R-10 | 3 | 80 | 97 | 105 | 174 | 190 | 173 | 304 | 334 | 257 | - | - | - |
| CM3822R151R-10 | 3 | 150 | 170 | 169 | 292 | 311 | 222 | 490 | 448 | 226 | - | - | - |
| CM3822R201R-10 | 3 | 200 | 207 | 187 | 433 | 362 | 187 | 670 | 470 | 208 | - | - | - |
| CM5022R800R-10 | 4 | 80 | 95 | 102 | 174 | 190 | 173 | 304 | 334 | 257 | 389 | 446 | 283 |
| CM5022R151R-10 | 4 | 150 | 165 | 167 | 292 | 311 | 222 | 490 | 448 | 226 | 674 | 535 | 229 |
| CM5022R201R-10 | 4 | 200 | 206 | 188 | 433 | 362 | 187 | 670 | 470 | 208 | 945 | 499 | 212 |
| CM3032V121R-10 | 2 | 120 | 130 | 140 | 266 | 284 | 241 | - | - | - | - | - | - |
| CM3032V201R-10 | 2 | 200 | 210 | 199 | 432 | 300 | 175 | - | - | - | - | - | - |
| CM3032V301R-10 | 2 | 300 | 280 | 224 | 631 | 251 | 156 | - | - | - | - | - | - |
| CM4732V201R-10 | 3 | 200 | 218 | 187 | 491 | 317 | 182 | 771 | 331 | 194 | - | - | - |
| CM4732V301R-10 | 3 | 300 | 250 | 172 | 684 | 258 | 156 | 967 | 278 | 172 | - | - | - |
| CM6032V201R-10 | 4 | 200 | 219 | 213 | 472 | 313 | 179 | 737 | 315 | 193 | 995 | 358 | 250 |
| CM6032V301R-10 | 4 | 300 | 258 | 170 | 681 | 266 | 161 | 926 | 273 | 167 | 1075 | 317 | 300 |

Part Impedance

CM2722R800R-10, CM3822R800R-10,
CM5022R800R-10



CM2722R151R-10M, CM3822R151R-10,
CM5022R151R-10

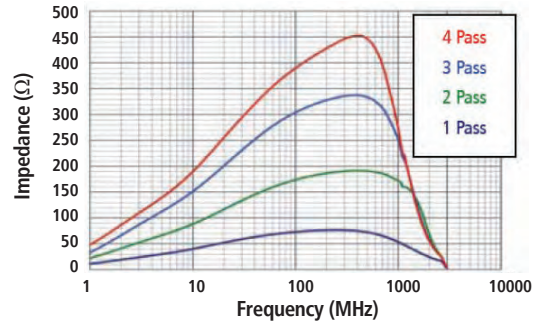


CM2722R201R-10, CM3822R201R-10,
CM5022R201R-10

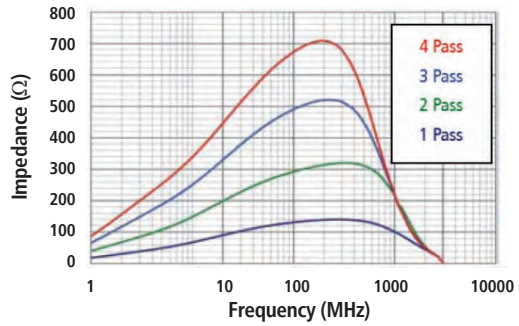


Multi-Pass Impedance
(for multiple pass board layout options)

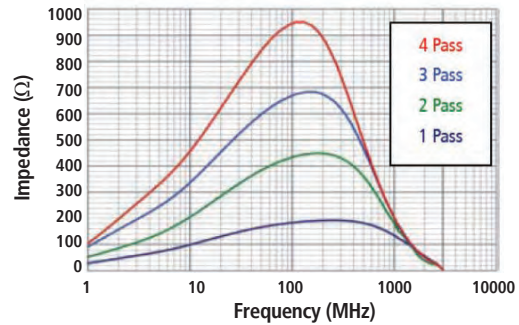
CM2722R800R-10, CM3822R800R-10,
CM5022R800R-10



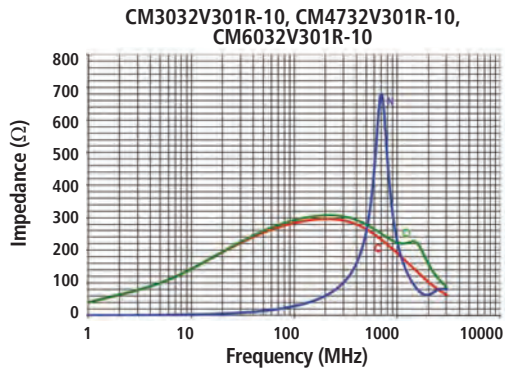
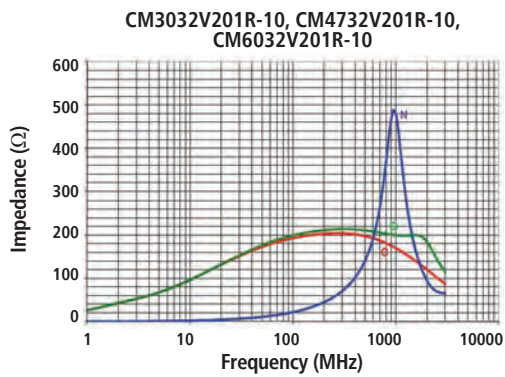
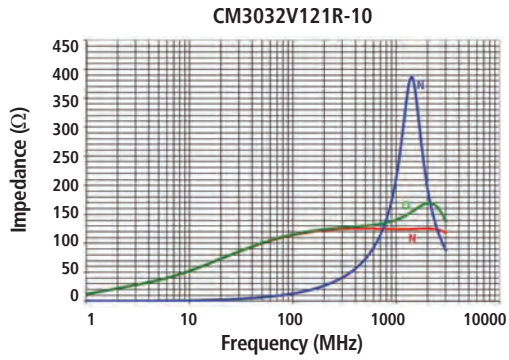
CM2722R151R-10M, CM3822R151R-10,
CM5022R151R-10



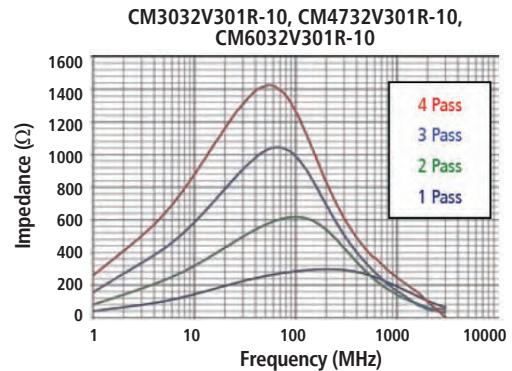
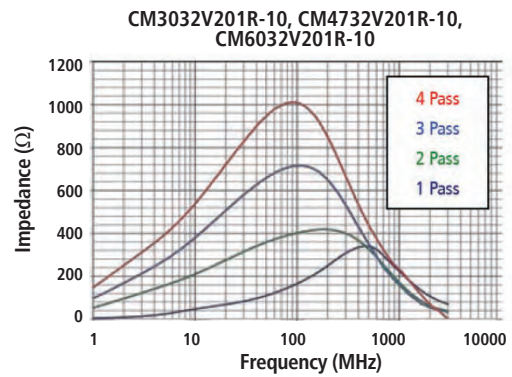
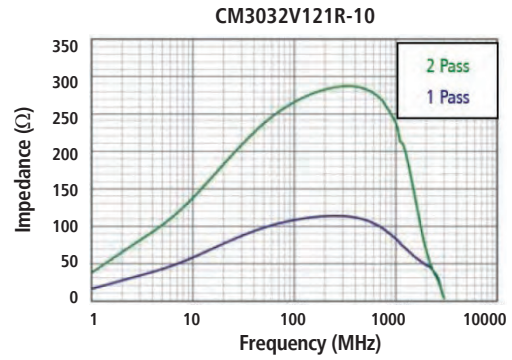
CM2722R201R-10, CM3822R201R-10,
CM5022R201R-10



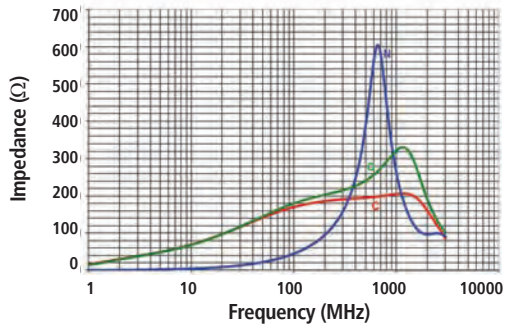
Part Impedance



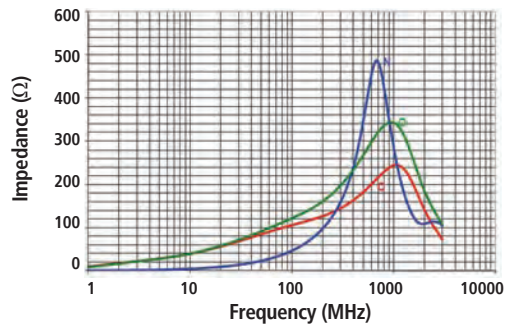
Multi-Pass Impedance
(for multiple pass board layout options)



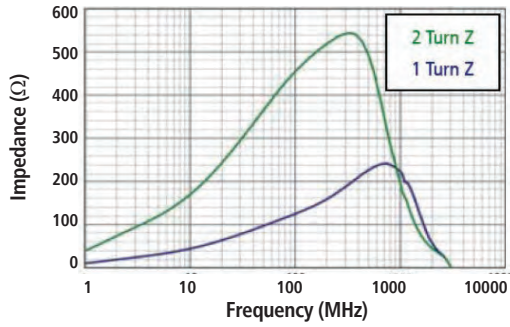
CM2545X171B-10, CM2545X171R-10



CM4545X131B-10, CM4545X131R-10

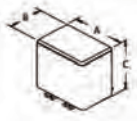

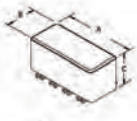



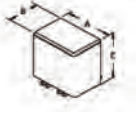


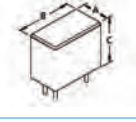
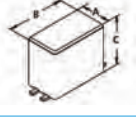
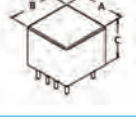

CM4545X131B-10, CM4545X131R-10,
Multi-Turn Impedance



COMMON MODE
ARRAYS

DIMENSION

| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|----------------|---------------|---------------|---------------|---|
| CM2722R800R-10 | 6.99 (0.275) | 5.72 (0.225) | 4.32 (0.170) |  |
| CM2722R151R-10 | 6.99 (0.275) | 5.72 (0.225) | 7.62 (0.300) | |
| CM2722R201R-10 | 6.99 (0.275) | 5.72 (0.225) | 9.53 (0.375) | |
| CM3822R800R-10 | 9.78 (0.385) | 5.72 (0.225) | 4.32 (0.170) |  |
| CM3822R151R-10 | 9.78 (0.385) | 5.72 (0.225) | 7.62 (0.300) | |
| CM3822R201R-10 | 9.78 (0.385) | 5.72 (0.225) | 9.53 (0.375) | |
| CM5022R800R-10 | 12.57 (0.495) | 5.72 (0.225) | 4.32 (0.170) |  |
| CM5022R151R-10 | 12.57 (0.495) | 5.72 (0.225) | 7.62 (0.300) | |
| CM5022R201R-10 | 12.57 (0.495) | 5.72 (0.225) | 9.53 (0.375) | |
| CM3032V121R-10 | 7.62 (0.300) | 8.13 (0.320) | 5.72 (0.225) |  |

| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|----------------|---------------|---------------|---------------|---|
| CM3032V201R-10 | 7.62 (0.300) | 8.13 (0.320) | 9.45 (0.372) |  |
| CM3032V301R-10 | 7.62 (0.300) | 8.13 (0.320) | 14.48 (0.570) | |
| CM4732V201R-10 | 11.94 (0.470) | 8.13 (0.320) | 9.45 (0.372) |  |
| CM4732V301R-10 | 11.94 (0.470) | 8.13 (0.320) | 14.48 (0.570) | |
| CM6032V201R-10 | 15.24 (0.600) | 8.13 (0.320) | 9.45 (0.372) |  |
| CM6032V301R-10 | 15.24 (0.600) | 8.13 (0.320) | 14.48 (0.570) | |
| CM2545X171B-10 | 6.3 (0.248) | 11.38 (0.448) | 9.32 (0.367) |  |
| CM2545X171R-10 | 6.3 (0.248) | 11.38 (0.448) | 9.32 (0.367) |  |
| CM4545Z131B-10 | 11.38 (0.448) | 11.38 (0.448) | 9.32 (0.367) |  |
| CM4545Z131R-11 | 11.38 (0.448) | 11.38 (0.448) | 9.32 (0.367) |  |

CAN-BUS COMMON MODE CHOKE SERIES



FEATURES

- Accurate current matching capability over a broad range of inductance values
- Sector wound coils at 25 & 51 μH to filter differential mode noise from the data signal.
- Low distortion
- Custom designs possible
- Open bottom case construction
- Small (1812) size parts are so available
- Surface Mount

HIGH SPEED SERIAL INTERFACE COMMON MODE CHOKE

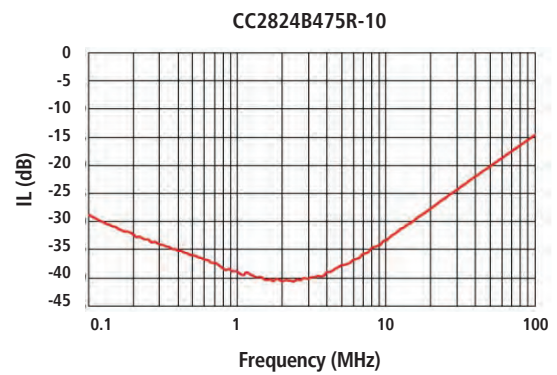
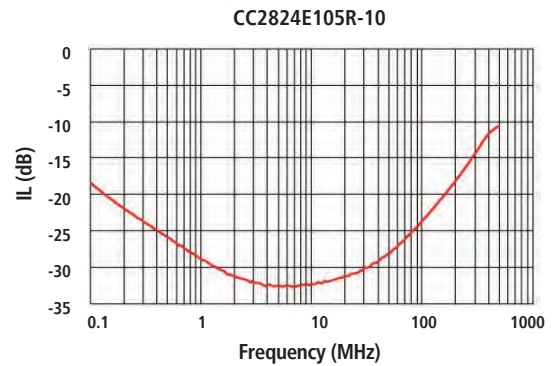
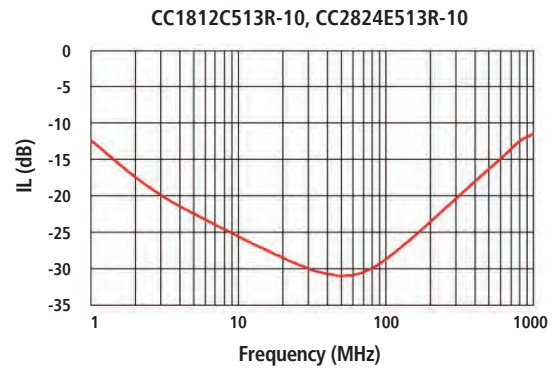
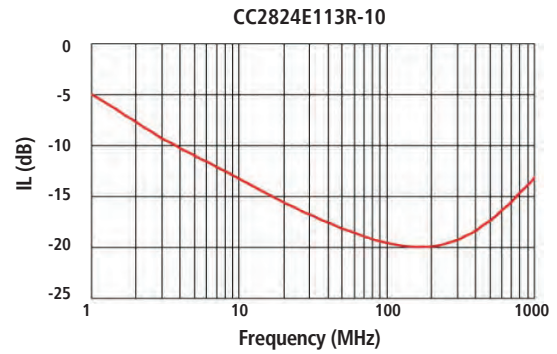
| TYPE | PART NUMBER | Lp IMPEDANCE (μH) | | | PEAK IMPEDANCE (Z) | L LEAKAGE (μH) | HI-POT (VAC) 0.5 mA 2 SEC | DCR TYPICAL (Ω) | Idc (mA) | |
|--------------------------------|-----------------|--------------------------------|------|------|------------------------|-----------------------------|------------------------------|--------------------------|----------|------|
| | | TEST CONDITION | MIN | NOM | | | | | | MAX |
| Surface Mount (For 2 lines) | CC1812C513R-10* | 100 KHz / 50mV | 35.7 | 51 | 66.3 | 3500 @40 MHz | 2.6 | 250 | 0.5 | 200 |
| | CC2824J502R-10 | 100 KHz / 50 mV | 3.5 | 5 | 6.5 | 400 @ 500 MHz | 0.05 | 250 | 0.1 | 1200 |
| | CC2824E113R-10 | 100 KHz / 50mV | 7.7 | 11 | 14.3 | 800 @ 200 MHz | 0.05 | 250 | 0.12 | 800 |
| | CC2824E253R-10 | 100 KHz / 50mV | 17.5 | 25 | 32.5 | 2000 @ 100 MHz | 1.5 | 250 | 0.13 | 800 |
| | CC2824E513R-10* | 100 KHz / 50mV | 35 | 51 | 66.3 | 3800 @ 50 MHz | 2 | 250 | 0.16 | 800 |
| | CC2824E474R-10 | 100 KHz / 50mV | 329 | 470 | 611 | 8600 @ 5 MHz | 0.2 | 750 | 0.2 | 700 |
| | CC2824E105R-10 | 100 KHz / 50mV | 700 | 1000 | 1500 | 4250 @ 7 MHz | 0.2 | 750 | 0.2 | 700 |
| | CC2824D225R-10 | 10 KHz / 50mV | 1540 | 2200 | 3300 | 5300 @ 5 MHz | 0.25 | 750 | 0.4 | 500 |
| | CC2824B475R-10 | 10 KHz / 50mV | 3290 | 4700 | 7050 | 12300 @ 2 MHz | 0.3 | 750 | 0.55 | 400 |

* Sector Wound

DIMENSION

| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|-------------|----------------------|----------------------|----------------------|---|
| CC2824 | 7.50 MAX (0.295 MAX) | 5.50 MAX (0.217 MAX) | 3.80 MAX (0.150 MAX) |  |
| CC1812 | 5.00 MAX (0.197 MAX) | 3.50 MAX (0.138 MAX) | 5.55 MAX (0.140 MAX) |  |

Typical Insertion Loss @ 50 Ω



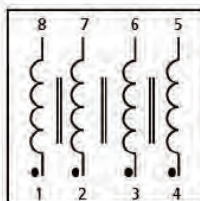
EMI Chip Beads, Chip Inductors



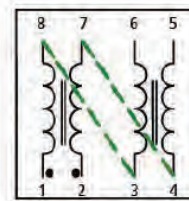
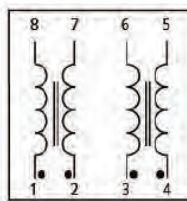
CM Beads, CM 05 / 21 / 40 / 41 / 45, LF CM, Can Bus



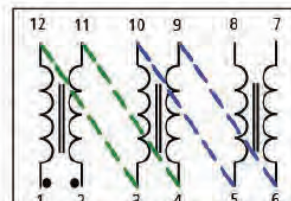
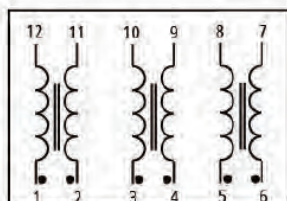
CM5740Z241B-10, CM 45 Array



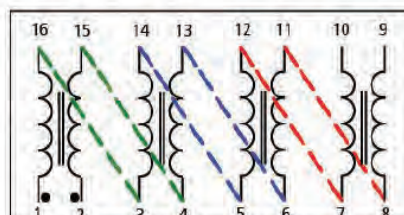
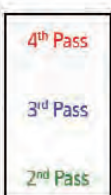
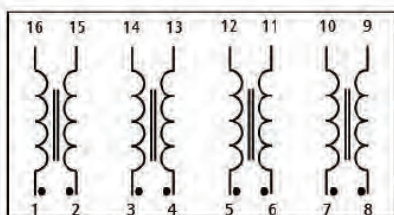
CM22 Array, CM 32 Array, CM 40 Array



CM22 Array, CM 32 Array



CM22 Array, CM 32 Array



EXPLANATION OF PASSES & TURNS

Laird multi-choke arrays can be electrically connected in the PC board to increase effective impedance. When the PCB circuits are configured, as shown above, such that individual side-by-side chokes within one array part are connected in series, the impedance is increased by a factor of the number of passes through the part. Since internal construction of Laird ferrite common mode chokes varies, Laird refers to this special installation configuration using the different terms of "pass" (additive) or "turn" (multiplicative).

When the term "pass" is used to describe series connections through a choke, each additional pass increases the impedance (Z) in proportion to the number of series PCB connections applied. Each additional "pass" adds a choke in series. If needed, it's an optional effective method of increasing impedance with an array.

When the term "turn" is used to describe series connection through a choke, each additional turn increases the impedance in proportion to the square of the number of series PCB connections applied. Each turn multiplies impedance.

Parts have no polarity.

WIRE-WOUND SMT POWER COMMON-MODE
CHOKES



CMX 1211 Series

FEATURES



- Small size with high current
- Stable performance under load bias and high reliability
- High suppression of asymmetric interferences at both low and high frequency
- SMT Type with less height
- Operation temperature: -40°C to 125°C (Including self-heating)
- Custom designs on request

APPLICATIONS

- Interferences suppression of common mode noise
- Power line filter
- Switch-mode power supplies

ELECTRICAL SPECIFICATIONS

| PART NO. | INDUCTANCE @ 100 KHZ / 100 mV (uH) | | | DCR MAX (mΩ) | CURRENT RATING MAX (A) | RATING VOLTAGE MAX (Vrms) | HIPOT COIL – COIL (VAC) |
|-----------------|------------------------------------|------|------|--------------|------------------------|---------------------------|-------------------------|
| | NOM | MIN | MAX | | | | |
| CMX1211Z680B-10 | 68 | 40.8 | 91.8 | 0.56 | 50 | 250 | 1500 |
| CMX1211Z181B-10 | 180 | 108 | 243 | 1.35 | 32 | 250 | 1500 |
| CMX1211Z321B-10 | 320 | 192 | 432 | 2.5 | 28 | 250 | 1500 |
| CMX1211Z601B-10 | 620 | 372 | 837 | 3.5 | 20 | 250 | 1500 |
| CMX1211Y801B-10 | 800 | 480 | 1080 | 5.3 | 16 | 250 | 1500 |
| CMX1211X132B-10 | 1300 | 780 | 1755 | 10 | 11 | 250 | 1500 |
| CMX1211W182B-10 | 1800 | 1080 | 2430 | 14 | 9 | 250 | 1500 |

DIMENSIONS CMX1211

Unit: mm



| A Max | B Max | C Max |
|-------|-------|-------|
| 31.50 | 19.00 | 28.80 |

ORDERING INFORMATION

CMX1211 SERIES PART NUMBER EXAMPLE C M X 1 2 1 1 Z 6 8 0 B - 1 0

| | | | | | |
|---------------------|-----------------------|---|---|--------------------|------------------------|
| Product series code | EIA size code (L x W) | Rated Current Code | Inductance value code (L) | Packing Code | Additional Description |
| | | X = 10,000 mA Y = 15,000 mA Z ≥ = 20,000 mA | 401 = 396 uH 171 = 176 uH 222 = 2156 uH | B = Bulk Packaging | |

TYPICAL CHARACTERISTICS – ZRX VS FREQUENCY



CHOKES



CMX 1616 Series

FEATURES



- Current rating up to 62 Amp
- Stable performance and high reliability
- High suppression of asymmetric interferences at both low and high frequency
- Operation temperature: -40°C to 125°C (Including self-heating)
- Custom designs on request

APPLICATIONS

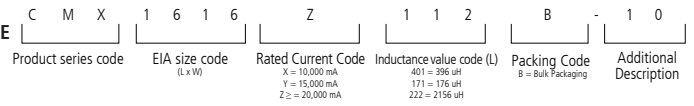
- Interferences suppression of common mode noise
- Power line filter
- Switch-mode power supplies

ELECTRICAL SPECIFICATIONS

| PART NO. | INDUCTANCE @ 100 KHZ / 100 mV (uH) | | | DCR MAX (mΩ) | CURRENT RATING MAX (A) | RATING VOLTAGE MAX (Vrms) | HIPOT COIL – COIL (VAC) |
|-----------------|------------------------------------|------|------|--------------|------------------------|---------------------------|-------------------------|
| | NOM | MIN | MAX | | | | |
| CMX1616X282B-10 | 2816 | 1689 | 3802 | 11.0 | 14 | 250 | 1500 |
| CMX1616Y222B-10 | 2156 | 1293 | 2911 | 6.0 | 19 | 250 | 1500 |
| CMX1616Z112B-10 | 1000 | 600 | 1350 | 2.8 | 30 | 250 | 1500 |
| CMX1616Z162B-10 | 1584 | 950 | 2138 | 4.1 | 24 | 250 | 1500 |
| CMX1616Z171B-10 | 176 | 105 | 238 | 0.65 | 62 | 250 | 1500 |
| CMX1616Z401B-10 | 396 | 237 | 535 | 1.15 | 46 | 250 | 1500 |
| CMX1616Z701B-10 | 704 | 422 | 951 | 2.3 | 33 | 250 | 1500 |

ORDERING INFORMATION

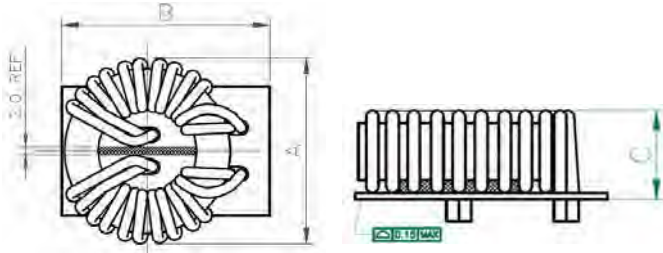
CMX1616 SERIES PART NUMBER EXAMPLE



WIRE-WOUND DIP POWER COMMON-MODE CHOKES

DIMENSIONS

Unit: mm



| Part Number | A Max | B Max | C Max | LAND PATTERN |
|-----------------|-------|-------|-------|--------------|
| CMX1616X282B-10 | 42.00 | 40.00 | 15.50 | |
| CMX1616Y222B-10 | 42.00 | 40.00 | 15.50 | |
| CMX1616Z112B-10 | 40.00 | 40.00 | 16.50 | |
| CMX1616Z162B-10 | 42.00 | 41.00 | 16.50 | |
| CMX1616Z171B-10 | 41.00 | 41.00 | 16.50 | |
| CMX1616Z401B-10 | 41.00 | 41.00 | 16.50 | |
| CMX1616Z701B-10 | 40.00 | 40.00 | 16.50 | |

TYPICAL CHARACTERISTICS – ZRX VS FREQUENCY



COMMON MODE CHOKE
SERIES

SORTED BY IMPEDANCE @ 100 MHz OR 4 MHz

| PART NUMBER | TYPICAL Z Ω @ 25 MHz | NOMINAL Z Ω @ 100 MHz | TYPICAL Z Ω @ 500 MHz | TYPICAL Z Ω @ 1 GHz | TYPICAL PEAK IMPEDANCE (Ω) | TYPICAL PEAK IMPEDANCE FREQ. (MHz) | DCR MAX (Ω) | RATED CONTINUOUS CURRENT (mA) | A (mm) LENGTH | B (mm) WIDTH | C (mm) HEIGHT |
|---------------------|----------------------------|-----------------------------|--------------------------------|---------------------------|----------------------------------|--|----------------|--|------------------|-----------------|------------------|
| CM2021Y330R-10 | 18 | 33 | 52 | 61 | 62 | 1100 | 0.001 | 15,000 | 5.60 | 2.85 | 5.00 |
| CM3421Y600R-10 | 39 | 60 | 96 | 110 | 110 | 1000 | 0.001 | 15,000 | 5.60 | 2.85 | 8.68 |
| CF0805D670R-10 | 24 | 67 | 196 | 98 | 166 | 510 | 0.4 | 400 | 2.00 | 1.25 | 1.00 |
| CM2722R800R-10 | 60 | 80 | 92 | 98 | 140 | 3000 | 0.02 | 5,000 | 6.99 | 5.72 | 4.32 |
| CM3822R800R-10 | 64 | 80 | 97 | 105 | 151 | 3000 | 0.02 | 5,000 | 9.78 | 5.72 | 4.32 |
| CM5022R800R-10 | 61 | 80 | 95 | 102 | 150 | 3000 | 0.02 | 5,000 | 12.57 | 5.72 | 4.32 |
| CF0504C900R-10 | 28 | 90 | 210 | 148 | 217 | 583 | 0.6 | 300 | 1.25 | 1.00 | 0.82 |
| CF0805D900R-10 | 32 | 90 | 210 | 106 | 220 | 435 | 0.4 | 400 | 2.00 | 1.25 | 1.00 |
| CM0805D900R-10 | 24 | 90 | 340 | 435 | 445 | 1405 | 0.3 | 400 | 2.00 | 1.20 | 1.20 |
| CH0805D900R-10 | 48 | 90 | 249 | 339 | 494 | 2000 | 0.3 | 400 | 2.00 | 1.20 | 1.20 |
| CM5441Z101B-10 | 79 | 100 | 188 | 183 | 204 | 682 | 0.0008 | 75,000 | 13.72 | 10.41 | 10.52 |
| CM4440Z111R-10 | 79 | 110 | 122 | 177 | 122 | 500 | 0.001 | 20,000 | 11.05 | 10.03 | 9.32 |
| CM4440Z121R-10 | 82 | 120 | 122 | 117 | 123 | 460 | 0.001 | 20,000 | 11.05 | 10.03 | 9.32 |
| CF0504C121R-10 | 33 | 120 | 250 | 145 | 250 | 500 | 0.6 | 300 | 1.25 | 1.00 | 0.82 |
| CF0805D121R-10 | 36 | 120 | 240 | 103 | 260 | 397 | 0.4 | 400 | 2.00 | 1.25 | 1.00 |
| CM3032V121R-10 | 80 | 120 | 130 | 140 | 169 | 2010 | 0.01 | 8,000 | 7.62 | 8.13 | 5.72 |
| CM4545Z131B-10 | 65 | 130 | 267 | 256 | 288 | 682 | 0.01 | 10,000 | 11.38 | 11.38 | 9.32 |
| CM4545Z131R-10 | 65 | 130 | 267 | 256 | 288 | 682 | 0.01 | 10,000 | 11.38 | 11.38 | 9.32 |
| CM5022R151R-10 | 113 | 150 | 165 | 167 | 177 | 2092 | 0.02 | 5,000 | 12.57 | 5.72 | 7.62 |
| CM2722R151R-10 | 113 | 150 | 165 | 165 | 168 | 1783 | 0.02 | 5,000 | 6.99 | 5.72 | 7.62 |
| CM3822R151R-10 | 107 | 150 | 170 | 169 | 172 | 1646 | 0.02 | 5,000 | 9.78 | 5.72 | 7.62 |
| CM0805C161R-10 | 49 | 160 | 540 | 684 | 684 | 1000 | 0.35 | 300 | 2.00 | 1.20 | 1.20 |
| CM1206C161R-10 | 81 | 160 | 358 | 555 | 718 | 2177 | 0.4 | 340 | 3.20 | 1.60 | 1.80 |
| CM5441Z161B-10 | 112 | 160 | 261 | 146 | 263 | 457 | 0.0008 | 75,000 | 13.72 | 10.41 | 15.24 |
| CM5441Z161R-10 | 110 | 160 | 260 | 140 | 265 | 457 | 0.0003 | 75,000 | 13.72 | 10.41 | 15.24 |
| CM3440Z171B-10 | 116 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 | 8.51 | 10.03 | 9.32 |
| CM3440Z171R-10 | 116 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 | 8.51 | 10.03 | 9.32 |
| CM5740Z171B-10 | 114 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 | 14.48 | 10.03 | 9.32 |
| CM5740Z171R-10 | 114 | 170 | 189 | 202 | 202 | 1000 | 0.001 | 20,000 | 14.48 | 10.03 | 9.32 |
| CM2545X171B-10 | 108 | 170 | 210 | 180 | 210 | 500 | 0.01 | 10,000 | 6.30 | 11.38 | 9.32 |
| CM2545X171R-10 | 108 | 170 | 210 | 180 | 210 | 500 | 0.01 | 10,000 | 6.30 | 11.38 | 9.32 |
| CF0805D181R-10 | 48 | 180 | 123 | 42 | 277 | 210 | 0.5 | 400 | 2.00 | 1.25 | 1.00 |
| CM6032V201R-10 | 140 | 200 | 219 | 213 | 219 | 500 | 0.01 | 8,000 | 15.24 | 8.13 | 9.45 |
| CM3032V201R-10 | 143 | 200 | 210 | 199 | 214 | 319 | 0.01 | 8,000 | 7.62 | 8.13 | 9.45 |
| CM5022R201R-10 | 142 | 200 | 206 | 188 | 210 | 306 | 0.02 | 5,000 | 12.57 | 5.72 | 9.53 |
| CM2722R201R-10 | 142 | 200 | 202 | 187 | 206 | 272 | 0.02 | 5,000 | 6.99 | 5.72 | 9.53 |
| CM4732V201R-10 | 152 | 200 | 218 | 187 | 229 | 241 | 0.01 | 8,000 | 11.94 | 8.13 | 9.45 |
| CM3822R201R-10 | 141 | 200 | 207 | 187 | 213 | 218 | 0.02 | 5,000 | 9.78 | 5.72 | 9.53 |
| CF0805C221R-10 | 50 | 220 | 109 | 33 | 296 | 180 | 0.5 | 300 | 2.00 | 1.25 | 1.00 |
| CM0805C221R-10 | 57 | 220 | 570 | 720 | 724 | 1147 | 0.4 | 300 | 2.00 | 1.20 | 1.20 |
| CM3032V301R-10 | 211 | 300 | 280 | 224 | 307 | 214 | 0.01 | 8,000 | 7.62 | 8.13 | 14.48 |
| CM4732V301R-10 | 217 | 300 | 250 | 172 | 328 | 168 | 0.01 | 8,000 | 11.94 | 8.13 | 14.48 |
| CM6032V301R-10 | 240 | 300 | 258 | 170 | 346 | 149 | 0.01 | 8,000 | 15.24 | 8.13 | 14.48 |
| CM0805A371R-10 | 186 | 370 | 730 | 878 | 878 | 1000 | 0.5 | 100 | 2.00 | 1.20 | 1.20 |
| Low Frequency Parts | @ 1 MHz | @ 4 MHz | @ 10 MHz | @ 25 MHz | (Ohms) | (MHz) | (Ohms) | (mA) | (mm) | (mm) | (mm) |
| CM5740Z241B-10 | 170 (2 Turns) | 240 (2 Turns) | 173 (2 Turns) | 140 (2 Turns) | 276 (2 Turns) | 3 (2 Turns) | 0.001 | 20,000 | 14.48 | 10.03 | 9.32 |
| CM2824E182R-10 | 200 | 570 | 920 | 1400 | 1920 | 80 | 0.26 | 800 | 7.50 | 5.50 | 3.80 |
| CM1812C282R-10 | 370 | 1100 | 1900 | 2700 | 3500 | 50 | 0.5 | 200 | 5.00 | 3.50 | 5.55 |
| CM2824E352R-10 | 350 | 1400 | 2100 | 3200 | 3950 | 45 | 0.3 | 800 | 7.50 | 5.50 | 3.80 |
| CM2824E702R-10 | 3000 | 7000 | 5800 | 4800 | 7200 | 6 | 0.26 | 700 | 7.50 | 5.50 | 3.80 |
| CM2824B103R-10 | 10000 | 8900 | 3980 | 1800 | 13200 | 2 | 1.3 | 400 | 7.50 | 5.50 | 3.80 |

COMMON MODE CHOKE
SERIES

SORTED BY RATED CURRENT (AT CONTINUOUS OPERATION)

| PART NUMBER | TYPICAL Z Ω @ 25 MHz | NOMINAL Z Ω @ 100 MHz | TYPICAL Z Ω @ 500 MHz | TYPICAL Z Ω @ 1 GHz | TYPICAL PEAK IMPEDANCE (Ω) | TYPICAL PEAK IMPEDANCE FREQ. (MHz) | DCR MAX (Ω) | RATED CONTINUOUS CURRENT (mA) | A (mm) LENGTH | B (mm) WIDTH | C (mm) HEIGHT |
|---------------------|----------------------------|-----------------------------|-----------------------------|---------------------------|-------------------------------------|---|----------------|--|------------------|-----------------|------------------|
| CM0805A371R-10 | 186 | 370 | 730 | 878 | 878 | 1,000 | 0.5 | 100 | 2.00 | 1.20 | 1.20 |
| CM0805C161R-10 | 49 | 160 | 540 | 684 | 684 | 1,000 | 0.35 | 300 | 2.00 | 1.20 | 1.20 |
| CM0805C221R-10 | 57 | 220 | 570 | 720 | 724 | 1,147 | 0.4 | 300 | 2.00 | 1.20 | 1.20 |
| CF0504C900R-10 | 28 | 90 | 210 | 148 | 217 | 583 | 0.6 | 300 | 1.25 | 1.00 | 0.82 |
| CF0504C121R-10 | 33 | 120 | 250 | 145 | 250 | 500 | 0.6 | 300 | 1.25 | 1.00 | 0.82 |
| CF0805C221R-10 | 50 | 220 | 109 | 33 | 296 | 180 | 0.5 | 300 | 2.00 | 1.25 | 1.00 |
| CF0805D670R-10 | 24 | 67 | 196 | 98 | 166 | 510 | 0.4 | 400 | 2.00 | 1.25 | 1.00 |
| CF0805D900R-10 | 32 | 90 | 210 | 106 | 220 | 435 | 0.4 | 400 | 2.00 | 1.25 | 1.00 |
| CF0805D121R-10 | 36 | 120 | 240 | 103 | 260 | 397 | 0.4 | 400 | 2.00 | 1.25 | 1.00 |
| CF0805D181R-10 | 48 | 180 | 123 | 42 | 277 | 210 | 0.5 | 400 | 2.00 | 1.25 | 1.00 |
| CH0805D900R-10 | 48 | 90 | 249 | 339 | 494 | 2000 | 0.3 | 400 | 2.00 | 1.20 | 1.20 |
| CM0805D900R-10 | 24 | 90 | 340 | 435 | 445 | 1,405 | 0.3 | 400 | 2.00 | 1.20 | 1.20 |
| CM2722R151R-10 | 113 | 150 | 165 | 165 | 168 | 1,783 | 0.02 | 5,000 | 6.99 | 5.72 | 7.62 |
| CM2722R201R-10 | 142 | 200 | 202 | 187 | 206 | 272 | 0.02 | 5,000 | 6.99 | 5.72 | 9.53 |
| CM2722R800R-10 | 60 | 80 | 92 | 98 | 140 | 3,000 | 0.02 | 5,000 | 6.99 | 5.72 | 4.32 |
| CM3822R151R-10 | 107 | 150 | 170 | 169 | 172 | 1,646 | 0.02 | 5,000 | 9.78 | 5.72 | 7.62 |
| CM3822R201R-10 | 141 | 200 | 207 | 187 | 213 | 218 | 0.02 | 5,000 | 9.78 | 5.72 | 9.53 |
| CM3822R800R-10 | 64 | 80 | 97 | 105 | 151 | 3,000 | 0.02 | 5,000 | 9.78 | 5.72 | 4.32 |
| CM5022R151R-10 | 113 | 150 | 165 | 167 | 177 | 2,092 | 0.02 | 5,000 | 12.57 | 5.72 | 7.62 |
| CM5022R201R-10 | 142 | 200 | 206 | 188 | 210 | 306 | 0.02 | 5,000 | 12.57 | 5.72 | 9.53 |
| CM5022R800R-10 | 61 | 80 | 95 | 102 | 150 | 3,000 | 0.02 | 5,000 | 12.57 | 5.72 | 4.32 |
| CM3032V121R-10 | 80 | 120 | 130 | 140 | 169 | 2,010 | 0.01 | 8,000 | 7.62 | 8.13 | 5.72 |
| CM3032V201R-10 | 143 | 200 | 210 | 199 | 214 | 319 | 0.01 | 8,000 | 7.62 | 8.13 | 9.45 |
| CM3032V301R-10 | 211 | 300 | 280 | 224 | 307 | 214 | 0.01 | 8,000 | 7.62 | 8.13 | 14.48 |
| CM4732V201R-10 | 152 | 200 | 218 | 187 | 229 | 241 | 0.01 | 8,000 | 11.94 | 8.13 | 9.45 |
| CM4732V301R-10 | 217 | 300 | 250 | 172 | 328 | 168 | 0.01 | 8,000 | 11.94 | 8.13 | 14.48 |
| CM6032V201R-10 | 140 | 200 | 219 | 213 | 219 | 500 | 0.01 | 8,000 | 15.24 | 8.13 | 9.45 |
| CM6032V301R-10 | 240 | 300 | 258 | 170 | 346 | 149 | 0.01 | 8,000 | 15.24 | 8.13 | 14.48 |
| CM2545X171B-10 | 108 | 170 | 210 | 180 | 210 | 500 | 0.01 | 10,000 | 6.30 | 11.38 | 9.32 |
| CM2545X171R-10 | 108 | 170 | 210 | 180 | 210 | 500 | 0.01 | 10,000 | 6.30 | 11.38 | 9.32 |
| CM4545Z131B-10 | 65 | 130 | 267 | 256 | 288 | 682 | 0.01 | 10,000 | 11.38 | 11.38 | 9.32 |
| CM4545Z131R-10 | 65 | 130 | 267 | 256 | 288 | 682 | 0.01 | 10,000 | 11.38 | 11.38 | 9.32 |
| CM2021Y330R-10 | 18 | 33 | 52 | 61 | 62 | 1,100 | 0.001 | 15,000 | 5.60 | 2.85 | 5.00 |
| CM3421Y600R-10 | 39 | 60 | 96 | 110 | 110 | 1,000 | 0.001 | 15,000 | 5.60 | 2.85 | 8.68 |
| CM3440Z171B-10 | 116 | 170 | 189 | 202 | 202 | 1,000 | 0.001 | 20,000 | 8.51 | 10.03 | 9.32 |
| CM3440Z171R-10 | 116 | 170 | 189 | 202 | 202 | 1,000 | 0.001 | 20,000 | 8.51 | 10.03 | 9.32 |
| CM4440Z111R-10 | 79 | 110 | 122 | 117 | 122 | 500 | 0.001 | 20,000 | 11.05 | 10.03 | 9.32 |
| CM5740Z171B-10 | 114 | 170 | 189 | 202 | 202 | 1,000 | 0.001 | 20,000 | 14.48 | 10.03 | 9.32 |
| CM5740Z171R-10 | 114 | 170 | 189 | 202 | 202 | 1,000 | 0.001 | 20,000 | 14.48 | 10.03 | 9.32 |
| CM5441Z101B-10 | 79 | 100 | 188 | 183 | 204 | 682 | 0.0008 | 75,000 | 13.72 | 10.41 | 10.52 |
| CM5441Z101B-13 | 79 | 100 | 188 | 183 | 204 | 682 | 0.0008 | 75,000 | 13.72 | 10.41 | 10.52 |
| CM5441Z161B-10 | 112 | 160 | 261 | 146 | 263 | 457 | 0.0008 | 75,000 | 13.72 | 10.41 | 15.24 |
| CM5441Z161B-13 | 112 | 160 | 261 | 146 | 263 | 457 | 0.0008 | 75,000 | 13.72 | 10.41 | 15.24 |
| Low Frequency Parts | @ 1 MHz | @ 4 MHz | @ 10 MHz | @ 25 MHz | (Ohms) | (MHz) | (Ohms) | (mA) | (mm) | (mm) | (mm) |
| CM1812C282R-10 | 370 | 1,100 | 1,900 | 2,700 | 3,500 | 50 | 0.5 | 200 | 5.00 | 3.50 | 5.55 |
| CM2824B103R-10 | 10,000 | 8,900 | 3,980 | 1,800 | 13,200 | 2 | 1.3 | 400 | 7.50 | 5.50 | 3.80 |
| CM2824E702R-10 | 3,000 | 7,000 | 5,800 | 4,800 | 7,200 | 6 | 0.26 | 700 | 7.50 | 5.50 | 3.80 |
| CM2824E182R-10 | 200 | 570 | 920 | 1,400 | 1,920 | 80 | 0.26 | 800 | 7.50 | 5.50 | 3.80 |
| CM2824E352R-10 | 350 | 1,400 | 2,100 | 3,200 | 3,950 | 45 | 0.3 | 800 | 7.50 | 5.50 | 3.80 |
| CM5740Z241B-10 | 170 (2 Turns) | 240 (2 Turns) | 173 (2 Turns) | 140 (2 Turns) | 276 (2 Turns) | 3 (2 Turns) | 0.001 | 20,000 | 14.48 | 10.03 | 9.32 |

DIFFERENTIAL MODE EMI FILTERS



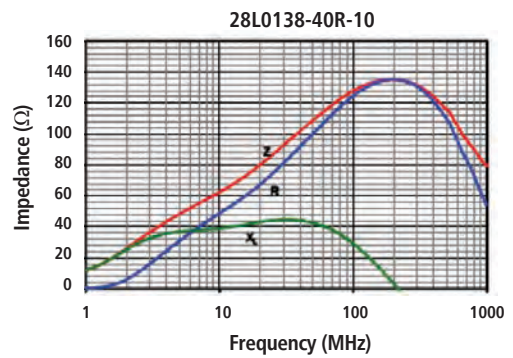
FEATURES

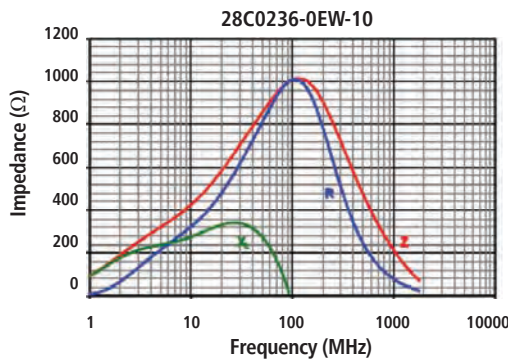
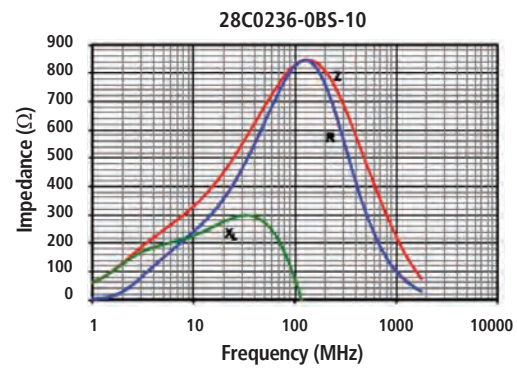
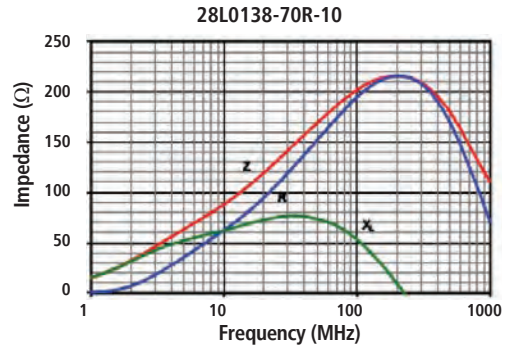
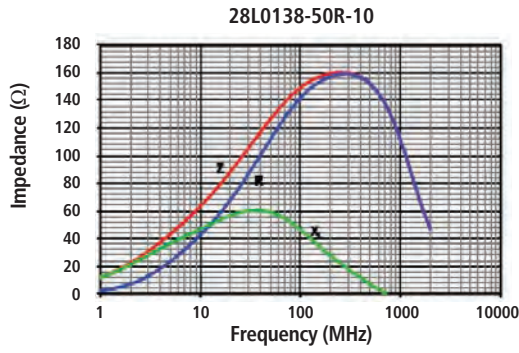
- Differential mode EMI filter, high current, thru-hole type
- Up to 5 Amps continuous operation current
- Low DCR
- For power lines application for LCD-TV, automotive, telecom, test equipment etc.

PART NUMBERING SYSTEM

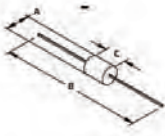
| | | | | | | |
|---------------|--------------|---------------|-----------------------|------------------------|--------------|------------------------|
| 28 | L | 0138 | -1 | 0 | R | -10 |
| Material Code | Product Code | EIA Size Code | Stated Dimension Code | Additional Description | Packing Code | Additional Description |

| TYPE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHZ) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) mA |
|---------------------------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-----------------------------|
| | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| Power Line Thru-Hole (Single Turn) | 28L0138-10R-10 | 45 | 75 | 70 | 55 | 80 | 200 | 0.01 | 5,000 |
| | 28L0138-40R-10 | 99 | 135 | 180 | 80 | 138 | 200 | 0.01 | 5,000 |
| | 28L0138-50R-10 | 92 | 153 | 152 | 111 | 161 | 150 | 0.01 | 5,000 |
| | 28L0138-70R-10 | 123 | 220 | 180 | 110 | 220 | 100 | 0.01 | 5,000 |
| | 28L0138-80R-10 | 48 | 86 | 78 | 57 | 85 | 100 | 0.01 | 5,000 |
| Power Line Thru-Hole (Multiple Turns) | 28C0236-0BS-10 | 500 | 835 | 480 | 220 | 846 | 156 | 0.01 | 5,000 |
| | 28C0236-0BW-10 | 500 | 835 | 480 | 220 | 846 | 156 | 0.01 | 5,000 |
| | 28C0236-0DW-10 | 260 | 460 | 478 | 360 | 498 | 300 | 0.01 | 5,000 |
| | 28C0236-0EW-10 | 620 | 998 | 484 | 205 | 1010 | 140 | 0.01 | 5,000 |
| | 28C0236-0JW-10 | 620 | 998 | 484 | 205 | 1010 | 140 | 0.01 | 5,000 |










DIMENSION

| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|----------------|------------------|------------------|------------------|---|
| 28L0138-10R-10 | 3.51 (0.138) | 59.00 (2.323) | 4.45 (0.175) |  |
| 28L0138-40R-10 | 3.51 (0.138) | 59.00 (2.323) | 8.89 (0.350) | |
| 28L0138-50R-10 | 3.51 (0.138) | 59.00 (2.323) | 9.53 (0.375) | |
| 28L0138-70R-10 | 3.51 (0.138) | 59.00 (2.323) | 13.97 (0.550) | |
| 28L0138-80R-10 | 3.51 (0.138) | 59.00 (2.323) | 5.23 (0.206) | |

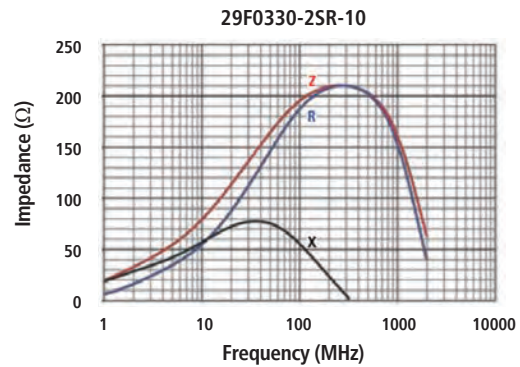
DIMENSION

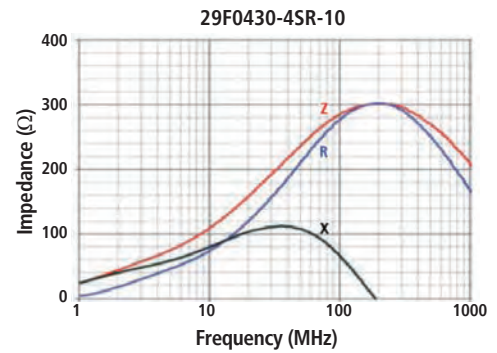
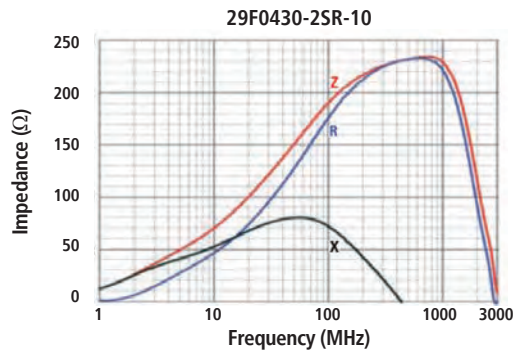
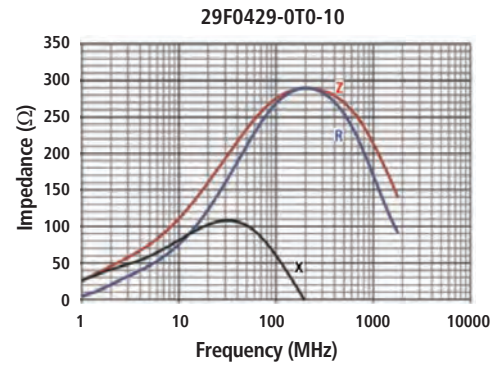
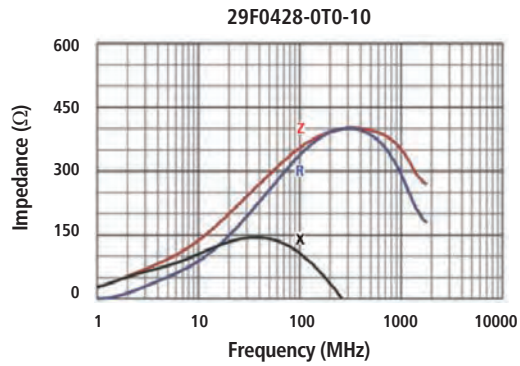
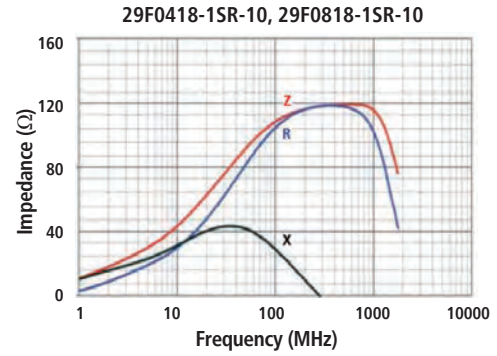
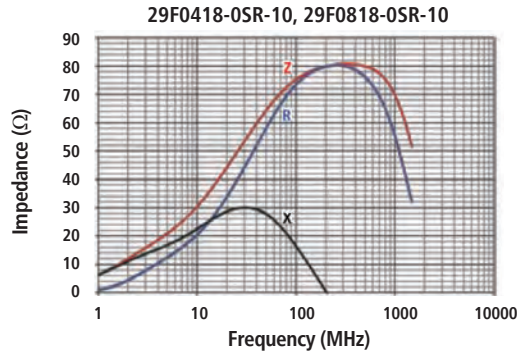
| PART NUMBER | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | D mm (INCHES) | E mm (INCHES) | F mm (INCHES) | L1 mm (INCHES) | |
|----------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|---|
| 28C0236-0BS-10 | 6.00 (0.236) | 14.99 (0.590) | 10.00 (0.394) | 0.51 (0.020) | 14.61 (0.575) | - | 5.99 (0.236) |  |
| 28C0236-0BW-10 | 6.00 (0.236) | 86.46 (3.404) | 10.00 (0.394) | 0.51 (0.020) | 14.61 (0.575) | - | 38.10 (1.500) |  |
| 28C0236-0DW-10 | 6.00 (0.236) | 86.46 (3.404) | 10.00 (0.394) | 0.51 (0.020) | 14.61 (0.575) | - | 38.23 (1.505) |  |
| 28C0236-0EW-10 | 6.00 (0.236) | 50.53 (1.989) | 10.00 (0.394) | 0.51 (0.020) | 14.61 (0.575) | - | 38.10 (1.500) |  |
| 28C0236-0JW-10 | 6.00 (0.236) | 20.96 (0.825) | 10.00 (0.394) | 0.51 (0.020) | 15.90 (0.626) | 5.08 (0.200) | 5.08 (0.200) |  |



POWER LINE

| TYPE | PART NUMBER | TYPICAL IMPEDANCE (Ω) | | | | TYPICAL PEAK IMPEDANCE (Ω) | PEAK IMPEDANCE FREQUENCY (MHz) | DCR MAX (Ω) | RATED I MAX (CONTINUOUS) mA |
|-------------------------|----------------|--------------------------------|-------------|-------------|-----------|-------------------------------------|--------------------------------|----------------------|-----------------------------|
| | | Z @ 25 MHz | Z @ 100 MHz | Z @ 500 MHz | Z @ 1 GHz | | | | |
| Thru-Hole (3 lines) | 29F0303-0T0-10 | 180 | 266 | 278 | 215 | 288 | 200 | 0.01 | 8,000 |
| Surface Mount (3 lines) | 29F0318-1SR-10 | 70 | 119 | 119 | 118 | 119 | 500 | 0.01 | 6,000 |
| Thru-Hole (3 lines) | 29F0328-0T0-10 | 232 | 342 | 418 | 360 | 420 | 350 | 0.01 | 10,000 |
| Surface Mount (3 lines) | 29F0330-2SR-10 | 125 | 200 | 201 | 160 | 210 | 300 | 0.01 | 9,000 |
| Surface Mount (4 lines) | 29F0418-0SR-10 | 48 | 80 | 80 | 70 | 83 | 300 | 0.01 | 6,000 |
| Surface Mount (4 lines) | 29F0418-1SR-10 | 70 | 119 | 119 | 118 | 119 | 500 | 0.01 | 6,000 |
| Thru-Hole (4 lines) | 29F0428-0T0-10 | 225 | 342 | 390 | 350 | 400 | 300 | 0.01 | 10,000 |
| Thru-Hole (4 lines) | 29F0429-0T0-10 | 180 | 245 | 270 | 211 | 280 | 200 | 0.01 | 8,000 |
| Surface Mount (4 lines) | 29F0430-2SR-10 | 120 | 200 | 230 | 225 | 235 | 800 | 0.01 | 8,000 |
| Surface Mount (4 lines) | 29F0430-4SR-10 | 175 | 290 | 268 | 209 | 300 | 200 | 0.01 | 9,000 |
| Thru-Hole (5 lines) | 29F0528-0T0-10 | 232 | 342 | 418 | 360 | 420 | 350 | 0.01 | 10,000 |
| Surface Mount (8 lines) | 29F0818-0SR-10 | 48 | 75 | 80 | 70 | 83 | 370 | 0.01 | 6,000 |
| Surface Mount (8 lines) | 29F0818-1SR-10 | 70 | 119 | 119 | 118 | 119 | 500 | 0.01 | 6,000 |





DIMENSION

| PART NUMBER | | # OF LINES | A mm (INCHES) | B mm (INCHES) | C mm (INCHES) | |
|----------------|---------------|------------|---------------|---------------|---------------|---|
| 29F0303-0T0-10 | Thru-hole | 3 | 7.62 (0.300) | 5.08 (0.200) | 10.44 (0.411) |  |
| 29F0328-0T0-10 | | 3 | 8.34 (0.328) | 10.88 (0.428) | 10.57 (0.416) | |
| 29F0318-1SR-10 | Surface-Mount | 3 | 4.83 (0.190) | 4.50 (0.177) | 4.19 (0.165) |  |
| 29F0330-2SR-10 | | 3 | 8.33 (0.328) | 10.87 (0.428) | 6.35 (0.250) | |
| 29F0428-0T0-10 | Thru-hole | 4 | 10.88 (0.428) | 10.88 (0.428) | 10.57 (0.416) |  |
| 29F0429-0T0-10 | | 4 | 10.88 (0.428) | 5.49 (0.216) | 10.44 (0.411) | |
| 29F0418-0SR-10 | Surface-Mount | 4 | 6.10 (0.240) | 4.50 (0.177) | 2.92 (0.115) |  |
| 29F0418-1SR-10 | | 4 | 6.10 (0.240) | 4.50 (0.177) | 4.19 (0.165) | |
| 29F0430-2SR-10 | | 4 | 10.87 (0.428) | 10.87 (0.428) | 6.35 (0.250) | |
| 29F0430-4SR-10 | | 4 | 10.87 (0.428) | 10.87 (0.428) | 8.89 (0.350) | |
| 29F0528-0T0-10 | Thru-hole | 5 | 13.42 (0.528) | 10.88 (0.428) | 10.57 (0.416) |  |
| 29F0818-0SR-10 | Surface-Mount | 8 | 11.43 (0.450) | 4.50 (0.177) | 2.92 (0.115) |  |
| 29F0818-1SR-10 | | 8 | 11.43 (0.450) | 4.50 (0.177) | 4.19 (0.165) | |

DIFFERENTIAL MODE FILTER
EQUIVALENT CIRCUITS

Diagram #1



Diagram #2

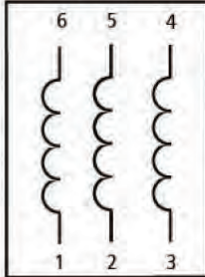


Diagram #3

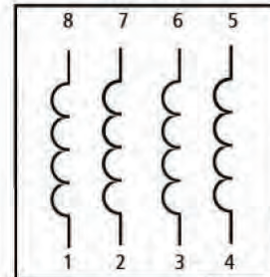
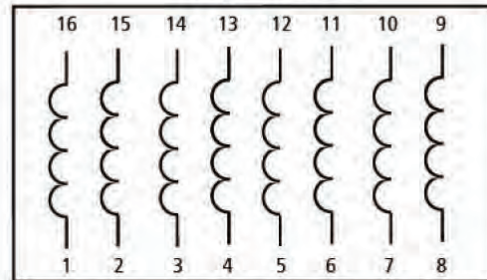


Diagram #4



Diagram #5





FEATURES



- Monolithic construction, small size
- High reliability
- Economical
- Broadband and high frequency available
- For RF and wireless communication, computers, telecommunications, automotive electronics etc.

PART NUMBERING SYSTEM

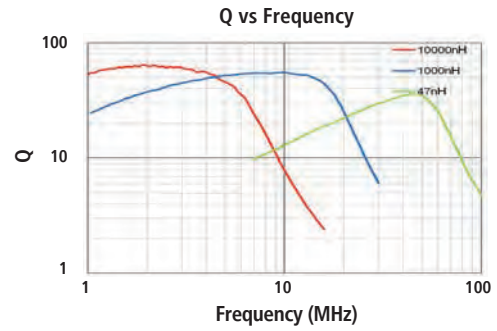
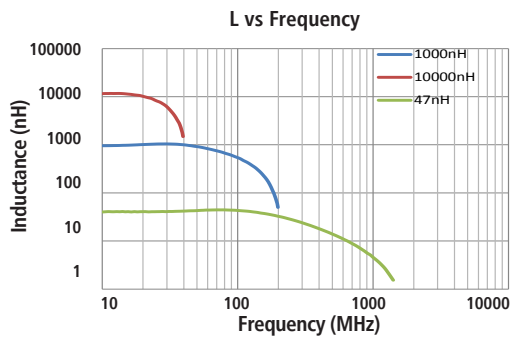
| IC | 0603 | A | 102 | R | -10 |
|---------------------|---------------|--------------------|-----------------------|--------------|------------------------|
| Product Series Code | EIA Size Code | Rated Current Code | Inductance Value Code | Packing Code | Additional Description |

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | L (nH) ± 10% | Q (MIN) | TEST FREQ. L,Q (MHZ) | SELF-RESONANT FREQ. (MHZ) | DCR MAX (Ω) | RATED I MAX (mA) |
|---------------|------------------|----------------|--------------|---------|----------------------|---------------------------|-------------|------------------|
| 0603 | 1608 | IC0603A102R-10 | 1,000 | 30 | 10 | 70 | 0.6 | 25 |
| 0603 | 1608 | IC0603A103R-10 | 10,000 | 30 | 2 | 17 | 2.55 | 15 |
| 0603 | 1608 | IC0603A152R-10 | 1500 | 35 | 10 | 60 | 0.70 | 40 |
| 0603 | 1608 | IC0603A472R-10 | 4700 | 35 | 10 | 33 | 1.60 | 30 |
| 0603 | 1608 | IC0603A182R-10 | 1,800 | 30 | 10 | 50 | 0.95 | 25 |
| 0603 | 1608 | IC0603A681R-10 | 680 | 15 | 25 | 80 | 1.7 | 35 |
| 0603 | 1608 | IC0603B181R-10 | 180 | 15 | 25 | 165 | 0.6 | 50 |
| 0603 | 1608 | IC0603B470R-10 | 47 | 10 | 50 | 260 | 0.3 | 200 |
| 0603 | 1608 | IC0603A821R-10 | 820 | 15 | 25 | 85 | 2.10 | 35 |
| 0603 | 1608 | IC0603B820R-10 | 82 | 10 | 50 | 245 | 0.3 | 200 |

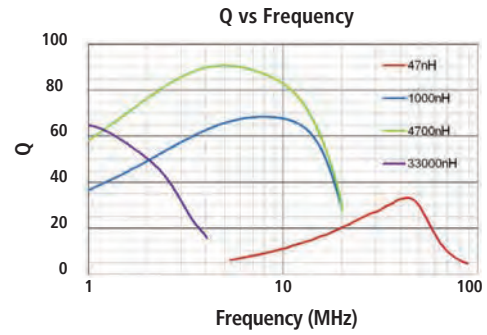
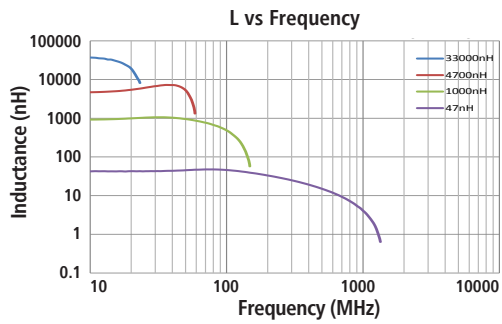
| | | | | | | | | |
|------|------|----------------|--------|----|-----|-----|------|-----|
| 0805 | 2012 | IC0805A103R-10 | 10,000 | 45 | 2 | 24 | 1.15 | 15 |
| 0805 | 2012 | IC0805A153R-10 | 15,000 | 30 | 1 | 19 | 0.8 | 5 |
| 0805 | 2012 | IC0805A183R-10 | 18,000 | 30 | 1 | 18 | 0.9 | 5 |
| 0805 | 2012 | IC0805A223R-10 | 22,000 | 30 | 1 | 16 | 1.1 | 5 |
| 0805 | 2012 | IC0805A272R-10 | 2,700 | 45 | 10 | 45 | 0.75 | 30 |
| 0805 | 2012 | IC0805A333R-10 | 33,000 | 30 | 0.4 | 13 | 1.25 | 5 |
| 0805 | 2012 | IC0805A472R-10 | 4,700 | 45 | 10 | 35 | 1 | 30 |
| 0805 | 2012 | IC0805A681R-10 | 680 | 25 | 25 | 105 | 0.8 | 150 |
| 0805 | 2012 | IC0805A821R-10 | 820 | 25 | 25 | 100 | 1.00 | 150 |
| 0805 | 2012 | IC0805A822R-10 | 8,200 | 45 | 4 | 26 | 1.1 | 15 |
| 0805 | 2012 | IC0805B101R-10 | 100 | 20 | 25 | 235 | 0.3 | 250 |
| 0805 | 2012 | IC0805B102R-10 | 1,000 | 45 | 10 | 75 | 0.4 | 50 |
| 0805 | 2012 | IC0805B122R-10 | 1200 | 45 | 10 | 65 | 0.50 | 250 |
| 0805 | 2012 | IC0805B182R-10 | 1,800 | 45 | 10 | 55 | 0.6 | 50 |
| 0805 | 2012 | IC0805B222R-10 | 2,200 | 45 | 10 | 50 | 0.65 | 30 |
| 0805 | 2012 | IC0805B331R-10 | 330 | 20 | 25 | 145 | 0.55 | 250 |
| 0805 | 2012 | IC0805B332R-10 | 3300 | 45 | 10 | 41 | 0.80 | 200 |
| 0805 | 2012 | IC0805C470R-10 | 47 | 15 | 50 | 320 | 0.2 | 300 |
| 0805 | 2012 | IC0805C680R-10 | 68 | 15 | 50 | 280 | 0.2 | 300 |

| | | | | | | | | |
|------|------|----------------|--------|----|-----|-----|------|-----|
| 1206 | 3216 | IC1206A103R-10 | 10,000 | 50 | 2 | 24 | 1 | 25 |
| 1206 | 3216 | IC1206A332R-10 | 3,330 | 45 | 10 | 41 | 0.7 | 50 |
| 1206 | 3216 | IC1206A333R-10 | 33,000 | 35 | 0.4 | 13 | 1.05 | 5 |
| 1206 | 3216 | IC1206A472R-10 | 4,700 | 45 | 10 | 35 | 0.9 | 50 |
| 1206 | 3216 | IC1206B153R-10 | 15,000 | 35 | 1 | 19 | 0.7 | 5 |
| 1206 | 3216 | IC1206B183R-10 | 18,000 | 35 | 1 | 21 | 0.7 | 5 |
| 1206 | 3216 | IC1206B331R-10 | 330 | 20 | 25 | 145 | 0.5 | 250 |
| 1206 | 3216 | IC1206B821R-10 | 820 | 25 | 25 | 100 | 0.9 | 150 |

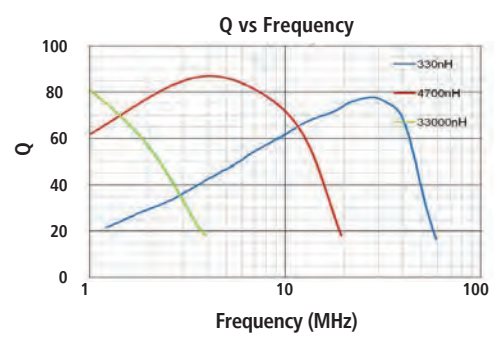
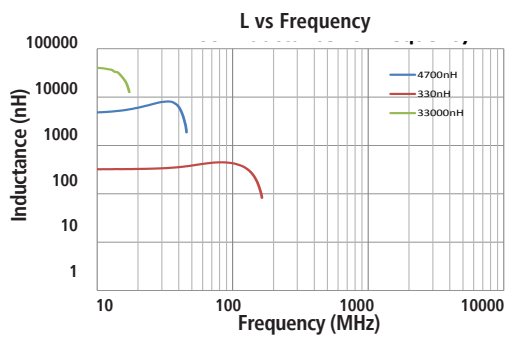
0603 Characteristics



0805 Characteristics



1206 Characteristics



MULTILAYER POWER CHIP INDUCTORS



FEATURES

- Small size (L x W : EIA 0805, 0806 and 1008) with max 1.0 mm in thickness
- Lead-free product and support lead-free soldering
- Applications: mainly for DC-DC converters and power modules. Compact electrical instruments like DSCs, DVCs, PDA, DVD and HDDs, cellular phones
- Operation temperature: -55°C ~ +125°C
- Rated Current Definition: Temperature rise to 40°C max.

PART NUMBERING SYSTEM

| CPI | 0805 | J | R47 | R | -1□ |
|---------------------|---------------|--------------------|-----------------------|--------------|------------------------|
| Product Series Code | EIA Size Code | Rated Current Code | Inductance Value Code | Packing Code | Additional Description |

RATED CURRENT CODE

E = 500 mA F = 600 mA
G = 700 mA H = 800 mA
I = 900 mA J = 1000 mA ≤ IDC < 1500 mA
K = 1500 mA ≤ IDC < 2000 mA

INDUCTANCE VALUE CODE

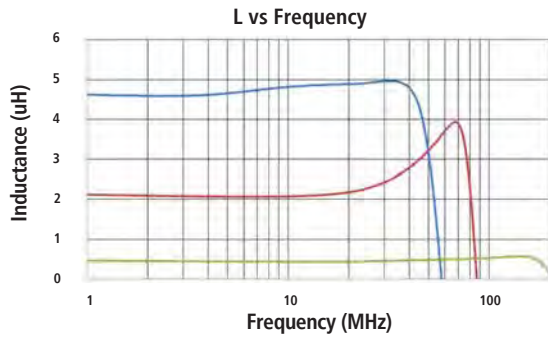
R47 = 0.47 μH 1R0 = 1.0 μH
4R7 = 4.7 μH

| EIA PKG. SIZE | METRIC PKG. SIZE | PART NUMBER | INDUCTANCE (μH) | INDUCTANCE TOLERANCE | TEST FREQ. (MHz) | DCR (Ω) | RATED CURRENT MAX (mA) |
|---------------|------------------|-----------------|-----------------|----------------------|------------------|----------|------------------------|
| 0805 | 2012 | CPI0805JR47R-10 | 0.47 | 20% | 1 | 0.10±25% | 1100 |
| 0805 | 2012 | CPI0805JR68R-10 | 0.68 | 20% | 1 | 0.12±25% | 1000 |
| 0805 | 2012 | CPI0805JR82R-10 | 0.82 | 20% | 1 | 0.14±25% | 900 |
| 0805 | 2012 | CPI0805H1R0R-10 | 1.0 | 20% | 1 | 0.16±25% | 800 |
| 0805 | 2012 | CPI0805H1R2R-10 | 1.2 | 20% | 1 | 0.16±25% | 800 |
| 0805 | 2012 | CPI0805G1R5R-10 | 1.5 | 20% | 1 | 0.22±25% | 700 |
| 0805 | 2012 | CPI0805G1R8R-10 | 1.8 | 20% | 1 | 0.22±25% | 700 |
| 0805 | 2012 | CPI0805F2R2R-10 | 2.2 | 20% | 1 | 0.25±25% | 600 |
| 0805 | 2012 | CPI0805E3R3R-10 | 3.3 | 20% | 1 | 0.22±25% | 500 |
| 0805 | 2012 | CPI0805E4R7R-10 | 4.7 | 20% | 1 | 0.30±25% | 500 |
| 0806 | 2016 | CPI0806KR47R-10 | 0.47 | 20% | 1 | 0.14±30% | 1500 |
| 0806 | 2016 | CPI0806KR68R-10 | 0.68 | 20% | 1 | 0.15±30% | 1500 |
| 0806 | 2016 | CPI0806KR82R-10 | 0.82 | 20% | 1 | 0.16±30% | 1500 |
| 0806 | 2016 | CPI0806J1R0R-10 | 1.0 | 20% | 1 | 0.16±30% | 1400 |
| 0806 | 2016 | CPI0806J1R2R-10 | 1.2 | 20% | 1 | 0.16±30% | 1400 |
| 0806 | 2016 | CPI0806J1R5R-10 | 1.5 | 20% | 1 | 0.20±30% | 1200 |
| 0806 | 2016 | CPI0806J1R8R-10 | 1.8 | 20% | 1 | 0.20±30% | 1200 |
| 0806 | 2016 | CPI0806J2R2R-10 | 2.2 | 20% | 1 | 0.22±30% | 1200 |
| 0806 | 2016 | CPI0806J3R3R-10 | 3.3 | 20% | 1 | 0.24±30% | 1100 |
| 0806 | 2016 | CPI0806J4R7R-10 | 4.7 | 20% | 1 | 0.30±30% | 1100 |
| 1008 | 2520 | CPI1008KR47R-10 | 0.47 | 20% | 1 | 0.07±25% | 1800 |
| 1008 | 2520 | CPI1008KR68R-10 | 0.68 | 20% | 1 | 0.09±25% | 1700 |
| 1008 | 2520 | CPI1008KR82R-10 | 0.82 | 20% | 1 | 0.10±25% | 1700 |
| 1008 | 2520 | CPI1008K1R0R-10 | 1.0 | 20% | 1 | 0.11±25% | 1600 |
| 1008 | 2520 | CPI1008K1R2R-10 | 1.2 | 20% | 1 | 0.11±25% | 1600 |
| 1008 | 2520 | CPI1008K1R5R-10 | 1.5 | 20% | 1 | 0.13±25% | 1500 |
| 1008 | 2520 | CPI1008K1R8R-10 | 1.8 | 20% | 1 | 0.13±25% | 1500 |
| 1008 | 2520 | CPI1008J2R2R-10 | 2.2 | 20% | 1 | 0.17±25% | 1300 |
| 1008 | 2520 | CPI1008J3R3R-10 | 3.3 | 20% | 1 | 0.16±25% | 1200 |
| 1008 | 2520 | CPI1008J4R7R-10 | 4.7 | 20% | 1 | 0.20±25% | 1100 |

DIMENSION

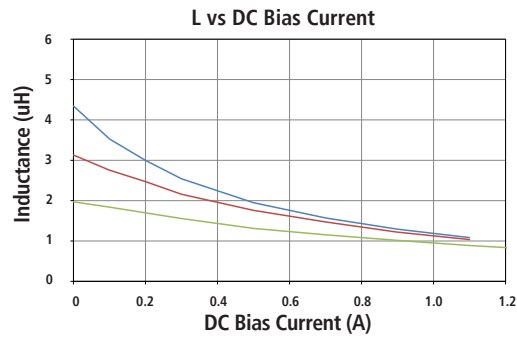
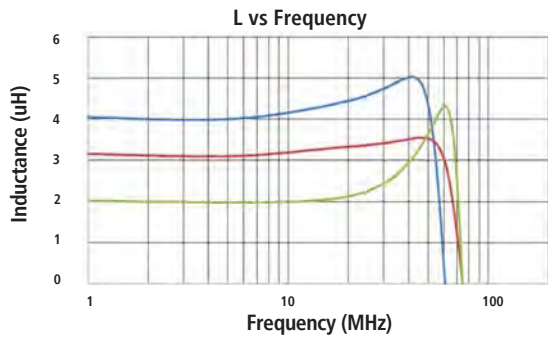
| METRIC (EIA) PKG. SIZE | A mm (INCHES) | B mm (INCHES) | C* mm (INCHES) | D mm (INCHES) | MONOLITHIC POWER CHIP INDUCTOR |
|------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---|
| 2012 (0805) | 2.00±0.20 (0.079±0.008) | 1.25±0.20 (0.049±0.008) | 0.9±0.10 (0.035±0.004) | 0.5±0.20 (0.02±0.008) |  |
| 2016 (0806) | 2.00±0.15 (0.079±0.006) | 1.60±0.15 (0.063±0.006) | 0.9±0.10 (0.035±0.004) | 0.5±0.20 (0.02±0.008) | |
| 2520 (1008) | 2.50±0.20 (0.098±0.008) | 2.00±0.20 (0.079±0.008) | 0.9±0.10 (0.035±0.004) | 0.6±0.20 (0.024±0.008) | |

0805 Characteristics



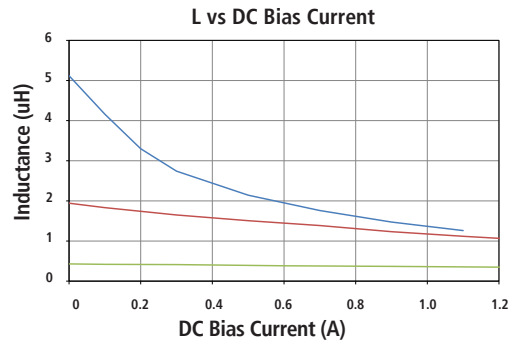
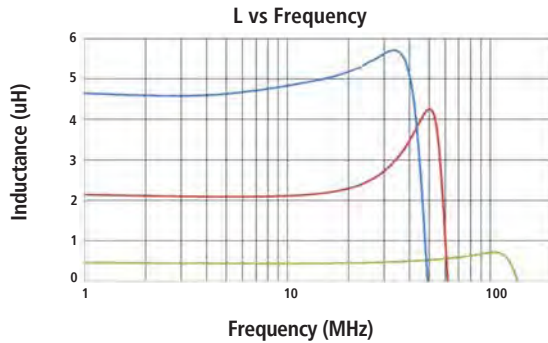
- CPI0805E4R7R-10
- CPI0805F2R2R-10
- CPI0805JR47R-10

0806 Characteristics



- CPI0806J4R7R-10
- CPI0806J3R3R-10
- CPI0806J2R2R-10

1008 Characteristics



- CPI1008J4R7R-10
- CPI1008J2R2R-10
- CPI1008KR47R-10



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