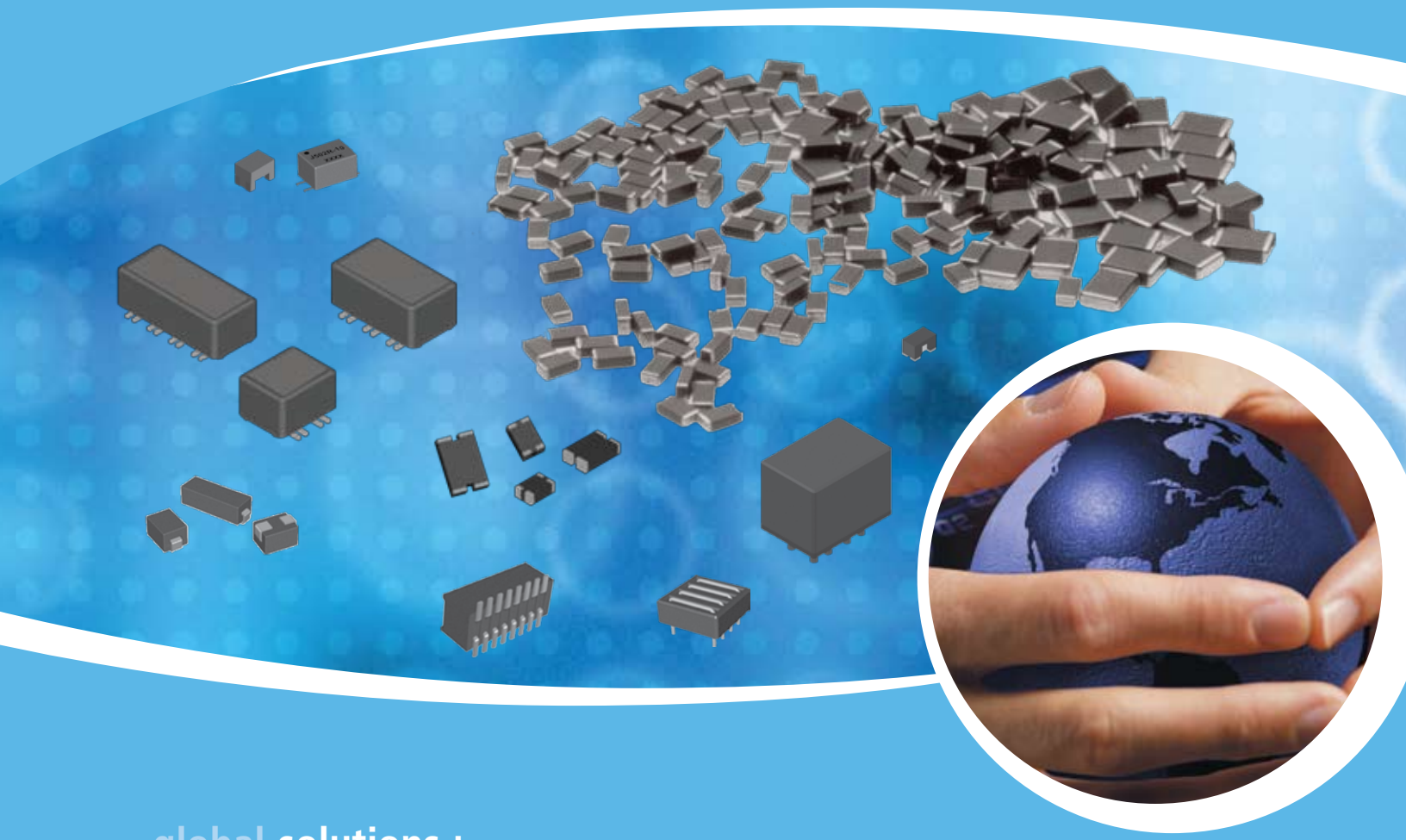
Laird TECHNOLOGIES®



global solutions :
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Board Level EMI Filtering Solutions

Ferrite Chip Beads, Common Mode Chokes, Differential Mode Filters, Chip Inductors, Ferrite Disks & Plates

Laird Technologies is the world leader in the design and supply of customized performance critical products for wireless and other advanced electronic applications. Laird Technologies partners with it's customers to help find solutions for applications in various industries such as:

Aerospace

Automotive Electronics

Computers

Consumer Electronics

Data Communications

Medical Equipment

Military

Network Equipment

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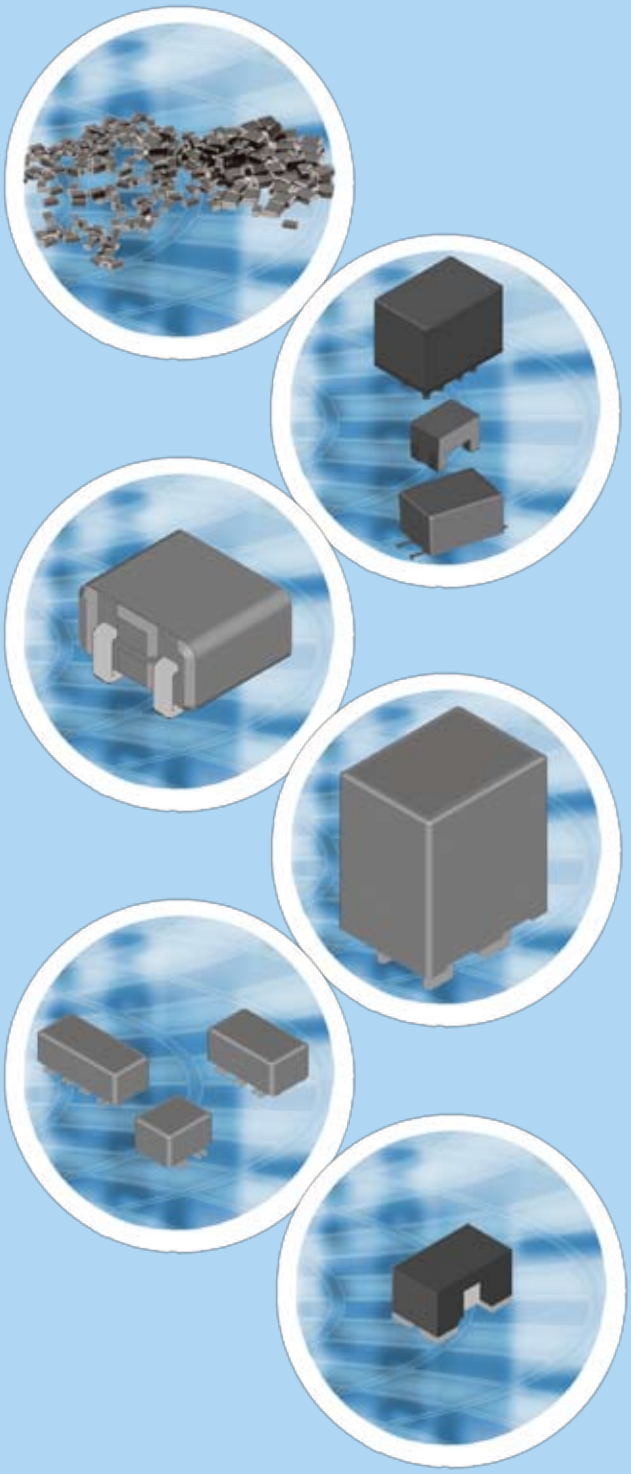


Board Level EMI Solutions
Contents

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

This brochure contains a limited selection of products from Laird Technologies.
Refer to www.lairdtech.com for other board level ferrite part families not included in this brochure.

Laird Technologies, produces an extensive line of ferrite products for inductive and EMI filtering applications. Products include ferrite EMI cable cores, connector plates, unique common mode chokes, can-bus chokes, high current thru hole and surface mount components, impedance chip beads, surface mount inductors and toroid inductor cores.

Board Level Part Number Nomenclature Explanation

HZ0402A601R-10 (Part number example in **BOLD**)

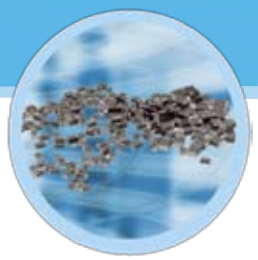
HZ	0402	A	601	R	-10
Product Series Code	Part Size Code	Rated Continuous Current Code	Impedance (Z) or Inductance (L) Value Code	Packaging Code	Addtional Description
HI = High Current Chip Beads (≥3,000 mA) MI = Mid Current Chip Beads (≥1,000 mA to <3,000 mA) LI = Low Current Chip Beads (<1,000 mA, <400 W Z) **HZ = High Impedance Chip Beads (<1,000 mA, ≥400 W Z)** HF = High Frequency Chip Beads LF = Low Frequency Chip Beads HR = High Bias Retention Chip Beads (>3,000 mA) CC = CAN-Bus Common Mode CM = Common Mode DI = Power Inductor DA = Multiline Array Chip IC = Chip Inductor	**0402** 0603 0805 1206 1210 1612 1806 1812 1922 2021 2220 2520 2545 2722 3032 3312 3322 3421 3822 4545 4732 5022 5441 6032	**A ≤ 100 mA** B = 200 mA C = 300 mA D = 400 mA E = 500 mA F = 600 mA G = 700 mA H = 800 mA I = 900 mA J = 1,000 mA K = 1,500 mA L = 2,000 mA M = 2,500 mA N = 3,000 mA O = 3,500 mA P = 4,000 mA Q = 4,500 mA R = 5,000 mA S = 5,500 mA T = 6,000 mA U = 7,000 mA V = 8,000 mA W = 9,000 mA X = 10,000 mA Y = 15,000 mA Z ≥ 20,000 mA	First two numbers are Significant Digits. The last number indicates how many zeros are added to the significant digits for impedance. Impedance Examples 100 = 10 OHMS 101 = 100 OHMS 102 = 1,000 OHMS 202 = 2,000 OHMS 060 = 6 OHMS 600 = 60 OHMS **601 = 600 OHMS** Inductance Examples 470 = 47 nH 471 = 470 nH 472 = 4,700 nH 473 = 47,000 nH 474 = 470,000 nH 475 = 4,700,000 nH	B = Bulk Standard Thru-Hole Packaging **R = Tape & Reel Standard SMT Package**	00 = Legacy Part Contains Lead **-10 = Lead Free Standard Catalog Part** -11 to -99 = Non Standard or Custom Part

29F0818-1SR-10 (Part number example in **BOLD**)

29	F	0818	-1	S	R	-10
Material Type	Product Type Code	Part Size Code	Minor Dimension Code	Board Mounting Style	Packaging Code	Additional Part Description
28 & 29 = Broad Band Material 35 = Low Frequency Material	C = Choke L = Axial Leaded Bead **F = Assembled Part** J = Radial Leaded Bead	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

Electrical specifications and tolerances are based on room temperature operation (23°C ± 2°C). Parts have an operating temperature range of -40°C to +125°C. While the parts will continue to operate without damage over this range, they may not stay within the specified electrical tolerances during exposure to extreme temperatures.

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



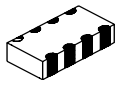
Features:

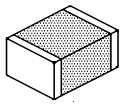
• Up to 10 Amps (I MAX) continuous operating capability • Low DCR • Vibration resistant • Rugged monolithic construction • Small footprint • Excellent retention under bias • Superior impedance vs. frequency characteristics • Economical • Broad range of sizes (from EIA 0402 up to 3312) • Broad range of impedance values and current ratings • Lead free & RoHS compliant • High bias current resistant versions (HR) available. • Broadband, low frequency and high frequency chip beads available • SPICE models incorporating DC bias effects available at www.lairdtech.com.

PART NUMBERING SYSTEM EXAMPLE

HZ	0402	A	601	R	-10
Product Series Code	Part Size Code (EIA)	Rated Continuous Current Code	Impedance Value Code	Packaging Code	Additional Description

HI High Current Chips (≥ 3 Amps)
MI Mid Current Chips (1 Amp to < 3 Amps)
HR High Retention Under Bias
DA 4 Line Chip Array (Page 8)
LI Low Current Chips (< 1 Amp and < 400 Ohms)
HZ High Impedance Chips (< 1 Amp and > 400 Ohms)
HF High Frequency (>5 GHz Peak / Page 8)
LF Low Frequency (Page 8)


Chip Array


Chip Bead

CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	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 CHIP BEADS										
HZ0402A152R-10	High Impedance	1005	400	1,500	441	200	1,500	143	2.00	50
HZ0402A601R-10	High Impedance	1005	182	600	600	300	965	241	1.000	100
HZ0402B102R-10	High Impedance	1005	225	1,000	489	222	1,116	182	1.000	200
LI0402B301R-10	Low Current	1005	96	300	454	351	549	374	0.800	200
LI0402B800R-10	Low Current	1005	32	80	220	224	243	769	0.800	200
LI0402C221R-10	Low Current	1005	72	220	443	243	453	440	0.350	300
LI0402C470R-10	Low Current	1005	15	47	76	90	92	1,402	0.150	300
LI0402D121R-10	Low Current	1005	40	120	205	195	213	682	0.400	400
LI0402E190R-10	Low Current	1005	6	19	43	56	59	1,519	0.100	500
LI0402E300R-10	Low Current	1005	9	30	50	57	58	1,195	0.300	500
LI0402E600R-10	Low Current	1005	29	60	90	57	97	801	0.300	500
0603 CHIP BEADS										
HI0603P600R-10	High Current	1608	25	60	85	85	100	750	0.030	4,000
HZ0603A152R-10	High Impedance	1608	552	1,500	1,062	503	2,306	190	0.900	100
HZ0603A182R-10	High Impedance	1608	610	1,800	1,070	500	2,420	180	1.500	50
HZ0603A222R-10	High Impedance	1608	195	2,200	375	175	3,051	122	1.500	100
HZ0603A252R-10	High Impedance	1608	791	2,500	1,014	501	3,065	149	1.500	50
HZ0603B102R-10	High Impedance	1608	453	1,000	380	200	1,000	100	0.600	200
HZ0603B112R-10	High Impedance	1608	515	1,100	1,300	850	1,539	288	0.800	200
HZ0603B751R-10	High Impedance	1608	302	750	437	198	863	137	0.600	200
HZ0603C601R-10	High Impedance	1608	232	600	360	171	775	168	0.450	300
HZ0603C651R-10	High Impedance	1608	296	650	954	652	960	400	0.600	300
LI0603B201R-10	Low Current	1608	70	200	340	210	362	420	0.400	200

Impedance (Z) curves under bias on following pages.

Chip bead list continued on the next page.

See page 8 for low frequency, high frequency and array chips.
See pages 54 thru 63 for quick reference comparison curves for groups of chip beads and common mode chokes.

Ferrite EMI Chip Beads

CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	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 CHIP BEADS (continued)										
LI0603D301R-10	Low Current	1608	144	300	286	165	389	261	0.350	400
LI0603E151R-10	Low Current	1608	61	150	197	131	209	331	0.250	500
LI0603E470R-10	Low Current	1608	17	47	83	91	91	1,000	0.100	500
LI0603G121R-10	Low Current	1608	52	120	156	113	177	389	0.200	700
LI0603G221R-10	Low Current	1608	98	220	279	168	283	251	0.300	700
LI0603G800R-10	Low Current	1608	32	80	100	91	100	500	0.200	700
MI0603J600R-10	Mid Current	1608	25	60	91	92	95	700	0.100	1,000
MI0603J680R-10	Mid Current	1608	35	68	106	99	110	650	0.100	1,000
MI0603J601R-10	Mid Current	1608	225	600	400	200	620	150	0.200	1,000
MI0603K300R-10	Mid Current	1608	12	30	43	45	45	1,000	0.090	1,500
MI0603L221R-10	Mid Current	1608	107	220	219	121	240	280	0.050	2,000
MI0603L301R-10	Mid Current	1608	50	300	225	120	410	200	0.100	2,000
MI0603M121R-10	Mid Current	1608	55	120	169	138	170	420	0.050	2,500
0805 CHIP BEADS										
HI0805O121R-10	High Current	2012	61	120	140	80	167	270	0.020	3,500
HI0805Q310R-10	High Current	2012	12	31	42	44	45	800	0.025	4,500
HI0805R800R-10	High Current	2012	38	80	70	38	100	200	0.010	5,000
HZ0805B222R-10	High Impedance	2012	648	2,200	419	213	2,200	100	0.800	200
HZ0805B272R-10	High Impedance	2012	400	2,700	400	150	2,900	88	0.800	200
HZ0805C202R-10	High Impedance	2012	350	2,000	300	150	2,000	100	0.500	300
HZ0805D102R-10	High Impedance	2012	280	1,000	328	168	1,268	113	0.300	400
HZ0805D152R-10	High Impedance	2012	289	1,500	333	166	1,525	110	0.400	400
HZ0805E601R-10	High Impedance	2012	277	600	304	151	696	155	0.300	500
LI0805G201R-10	Low Current	2012	100	200	221	128	272	250	0.300	700
LI0805G301R-10	Low Current	2012	124	300	248	146	350	205	0.200	700
HZ0805G471R-10	High Impedance	2012	221	470	286	150	572	149	0.200	700
LI0805H121R-10	Low Current	2012	53	120	170	114	170	340	0.150	800
LI0805H151R-10	Low Current	2012	73	150	207	150	210	400	0.150	800
LI0805H750R-10	Low Current	2012	31	75	128	130	132	769	0.150	800
MI0805J102R-10	Mid Current	2012	195	1,000	226	108	1,112	120	0.150	1,000
MI0805K110R-10	Mid Current	2012	5	11	18	19	20	1,000	0.060	1,500
MI0805K400R-10	Mid Current	2012	19	40	60	63	69	903	0.050	1,500
MI0805K601R-10	Mid Current	2012	280	600	240	120	723	130	0.100	1,500
MI0805L301R-10	Mid Current	2012	135	300	271	147	350	200	0.060	2,000
MI0805M221R-10	Mid Current	2012	100	220	274	115	287	260	0.050	2,500
1206 CHIP BEADS										
HF1206J150R-10	High Frequency	3216	0.25	2	7	15	111	5,450	0.060	1,000
HI1206N101R-10	High Current	3216	41	100	144	145	150	600	0.035	3,000
HI1206N800R-10	High Current	3216	38	80	120	129	130	800	0.035	3,000
HI1206P121R-10	High Current	3216	56	120	130	105	142	300	0.030	4,000
HI1206T161R-10	High Current	3216	71	160	220	127	229	251	0.018	6,000

See page 8 for low frequency, high frequency and array chips.

Chip bead list continued on the next page.

CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	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 CHIP BEADS (continued)										
HI1206T500R-10	High Current	3216	19	50	66	70	70	1,000	0.010	6,000
HZ1206C202R-10	High Impedance	3216	1,673	915	180	100	2,505	41	0.500	300
HZ1206D102R-10	High Impedance	3216	201	1,000	185	100	1,000	100	0.400	400
HZ1206E152R-10	High Impedance	3216	823	950	188	57	1,564	57	0.300	500
HZ1206E601R-10	High Impedance	3216	296	600	202	103	674	75	0.300	500
LI1206H121R-10	Low Current	3216	53	120	144	135	145	422	0.150	800
LI1206H151R-10	Low Current	3216	73	150	173	123	182	241	0.150	800
MI1206K260R-10	Mid Current	3216	12	26	44	46	46	1,000	0.060	1,500
MI1206K310R-10	Mid Current	3216	12	31	37	41	41	1,000	0.045	1,500
MI1206K601R-10	Mid Current	3216	300	600	250	130	650	80	0.080	1,500
MI1206K900R-10	Mid Current	3216	44	90	142	150	154	867	0.080	1,500
MI1206L391R-10	Mid Current	3216	100	390	160	90	460	130	0.050	2,000
MI1206L501R-10	Mid Current	3216	210	500	150	82	500	100	0.060	2,000
1210 CHIP BEAD										
MI1210K600R-10	Mid Current	3225	30	60	90	95	105	900	0.035	1,500
1612 HIGH CURRENT CHIP BEAD										
HI1612X560R-10	High Current	4131	23	56	75	79	79	1,000	0.004	10,000
1806 CHIP BEADS										
HI1806N910R-10	High Current	4516	42	91	140	150	150	1,000	0.030	3,000
HI1806T600R-10	High Current	4516	28	60	87	92	92	1,000	0.010	6,000
HZ1806K102R-10	High Impedance	4516	60	1,000	160	80	1,390	135	0.150	1500
LI1806C151R-10	Low Current	4516	60	150	219	222	223	871	0.500	300
LI1806E101R-10	Low Current	4516	45	100	157	164	166	966	0.300	500
LI1806E800R-10	Low Current	4516	28	80	117	117	117	1,000	0.300	500
MI1806J800R-10	Mid Current	4516	34	78	114	118	119	903	0.030	1,000
1812 CHIP BEADS										
HI1812T800R-10	High Current	4532	30	80	97	107	107	1,000	0.010	6,000
HI1812V101R-10	High Current	4532	45	100	136	134	139	800	0.010	8,000
LI1812D121R-10	Low Current	4532	55	120	182	184	186	738	0.400	400
MI1812K121R-10	Mid Current	4532	45	120	162	170	175	900	0.055	1,500
2220 CHIP BEADS										
HI2220P171R-10	High Current	5620	78	170	256	237	256	500	0.030	4,000
HI2220P251R-10	High Current	5620	100	250	172	91	390	200	0.015	4,000
HI2220P271R-10	High Current	5620	110	270	360	250	390	300	0.035	4,000
HI2220P551R-10	High Current	5620	180	550	670	343	850	300	0.035	4,000
HI2220P601R-10	High Current	5620	220	600	184	106	600	100	0.025	4,000
HI2220P701R-10	High Current	5620	200	700	140	90	700	100	0.025	4,000
HI2220Q401R-10	High Current	5620	100	400	159	99	450	150	0.030	4,500
HI2220R151R-10	High Current	5620	60	150	230	196	230	500	0.015	5,000
HI2220R181R-10	High Current	5620	80	180	263	234	270	400	0.020	5,000

Ferrite EMI Chip Beads

CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	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				
2220 CHIP BEADS (continued)										
HI2220R301R-10	High Current	5620	100	300	190	100	380	200	0.020	5,000
HI2220T101R-10	High Current	5620	50	100	148	152	160	600	0.006	6,000
HR2220P601R-10	High Retention	5620	200	600	150	75	600	100	0.025	4,000
HR2220V801R-10	High Retention	5620	150	800	125	75	910	90	0.010	8,000
3312 HIGH CURRENT CHIP BEAD										
HI3312X101R-10	High Current	8531	39	100	160	172	172	1,000	0.004	10,000

4 LINE 1206 CHIP ARRAYS

CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	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				
DA1206B102R-10	Array	3216	275	1,000	520	240	1,129	175	0.800	200
DA1206B601R-10	Array	3216	180	600	475	230	761	214	0.350	200
DA1206C121R-10	Array	3216	39	120	181	151	211	559	0.200	300
DA1206D301R-10	Array	3216	94	300	437	245	437	500	0.400	400
DA1206D600R-10	Array	3216	15	60	115	132	133	1,103	0.200	400
DA1206E300R-10	Array	3216	10	30	55	56	56	1,000	0.300	500

1206 HIGH FREQUENCY EMI CHIP BEAD

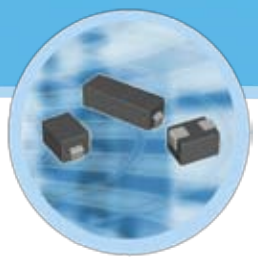
CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Peak Impedance Frequency (MHz)	DCR MAX (Ω)	RATED I MAX (continuous) mA
			Z @ 100 MHz	Z @ 1 GHz	Z @ 2 GHz	Z @ 4 GHz				
HF1206J150R-10	High Frequency	3216	2	15	21	42	111	5,450*	0.060	1,000

*** Insertion loss peaks at beyond 10 GHz**

0805 & 1206 LOW FREQUENCY EMI CHIP BEADS

CHIP BEAD PART NUMBER	DESCRIPTION / SPECIAL FEATURES	METRIC PKG. SIZE	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Peak Impedance Frequency (MHz)	DCR MAX (Ω)	RATED I MAX (continuous) mA
			Z @ 5 MHz	Z @ 10 MHz	Z @ 25 MHz	Z @ 100 MHz				
LF0805A252R-10	Low Frequency	2012	1,162	2,553	5,138	1,267	5,138	25	1.25	100
LF1206A302R-10	Low Frequency	3216	1,143	2,743	4,434	740	5,650	19	1.05	100
LF1206C202R-10	Low Frequency	3216	70	300	1,673	915	2,505	41	0.50	300
LF1206E152R-10	Low Frequency	3216	38	150	823	950	1,564	57	0.30	500

Ferrite EMI SMT Bead Assemblies

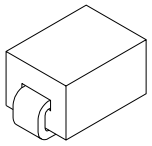


- **10 amps continuous operating current capability**
- **Broadband (28F) & low frequency (35F) parts available**
- **Lead free & RoHS compliant**
- **Very low DCR**

SMT Bead Assemblies provide EMI filtering in circuits carrying up to 10 amps continuous current. Products are offered for low frequency and high frequency EMI filtering. The robust construction and low DCR are well suited for applications operating in extreme conditions or applications that are sensitive to added circuit DCR. Better PC board flex tolerance.

PART NUMBER SYSTEM EXAMPLE

28	F	0121	-0	S	R	-10
Material Type	Product Code	Part Size Code	Selected Dimension Code	Additional Description	Packaging Code	Additional Description



PART NUMBER	EIA PKG. SIZE	METRIC PKG. SIZE	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				
28F0121-0SR-10	**1612**	**4131**	30	48	53	53	54	800	0.00075	10,000
28F0121-1SR-10	**3312**	**8531**	60	96	115	114	117	833	0.001	10,000
28F0181-1SR-10	**3318**	**8545**	72	115	123	123	125	900	0.001	10,000
Low Frequency Parts			@ 1 MHz	@ 5 MHz	@ 10 MHz	@ 25 MHz				
35F0121-0SR-10	**1612**	**4131**	17	41	48	47	49	13	0.00075	10,000
35F0121-1SR-10	**3312**	**8531**	35	82	102	90	104	17	0.001	10,000

All current ratings (I MAX) are based upon continuous operation.

Parts have no polarity.

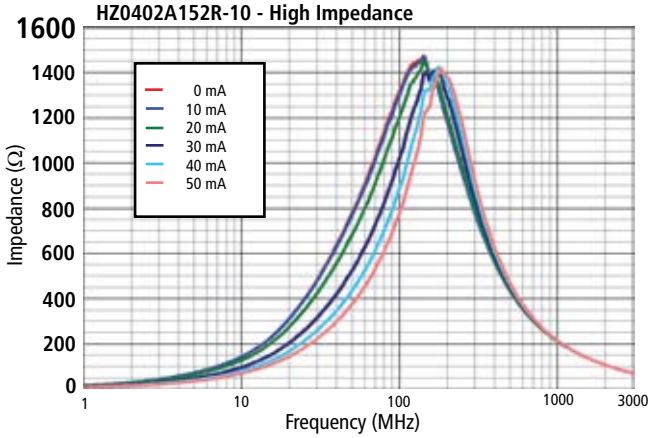
Impedance curves under bias on pages 10 to 24.

All data on charts can be sorted on www.lairdtech.com

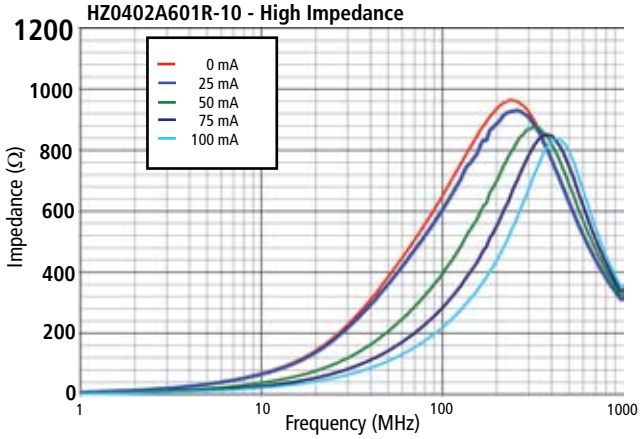
Quick reference comparison curves for groups of chip beads and common mode chokes on pages 54 to 63.

0402 Chip Bead Impedance Under DC Bias

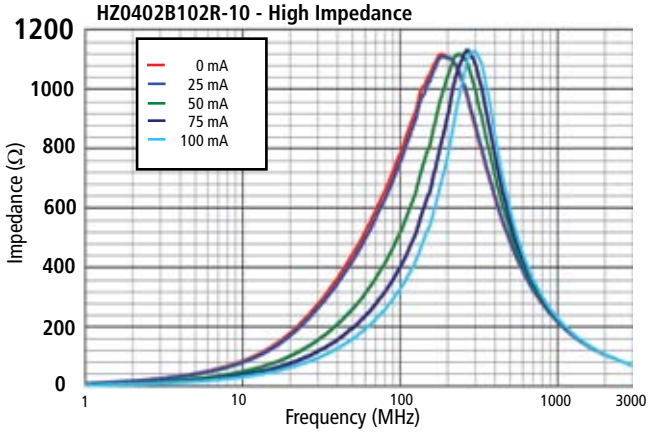
HZ0402A152R-10 - High Impedance



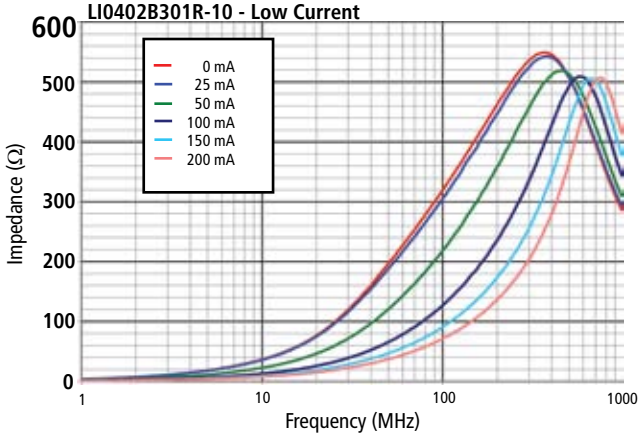
HZ0402A601R-10 - High Impedance



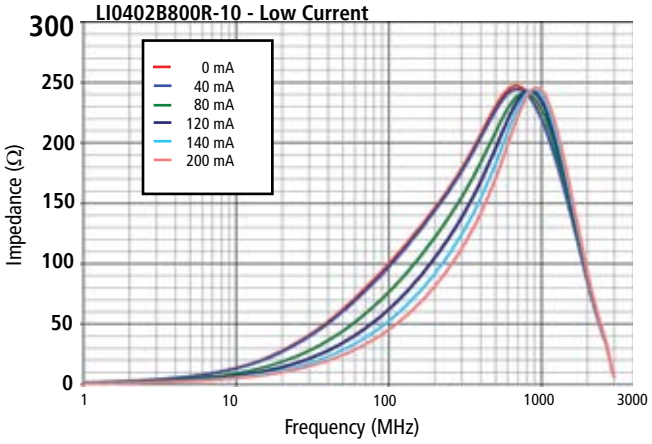
HZ0402B102R-10 - High Impedance



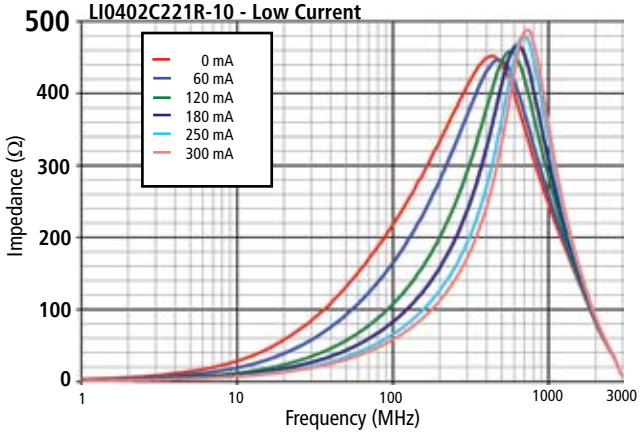
LI0402B301R-10 - Low Current



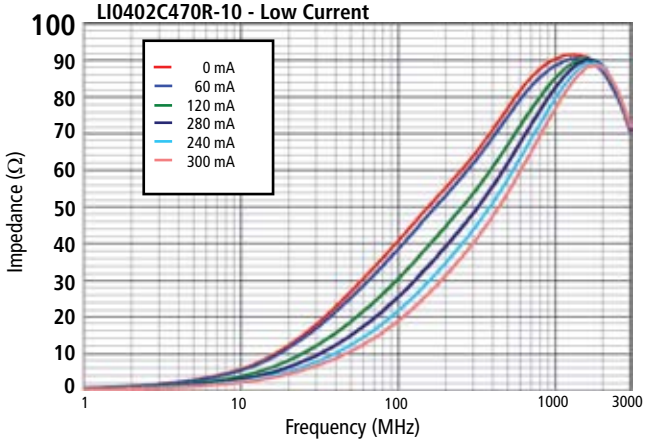
LI0402B800R-10 - Low Current



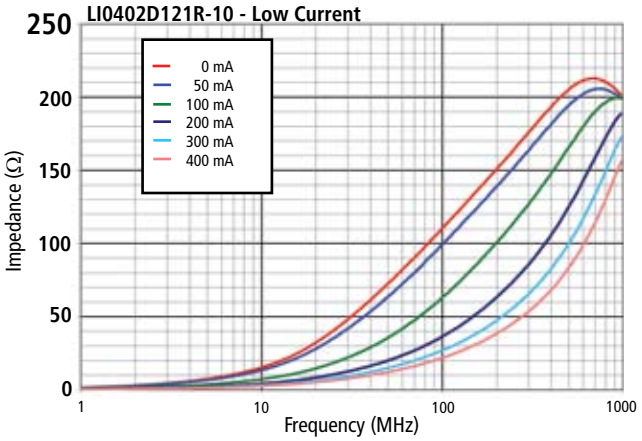
LI0402C221R-10 - Low Current



LI0402C470R-10 - Low Current

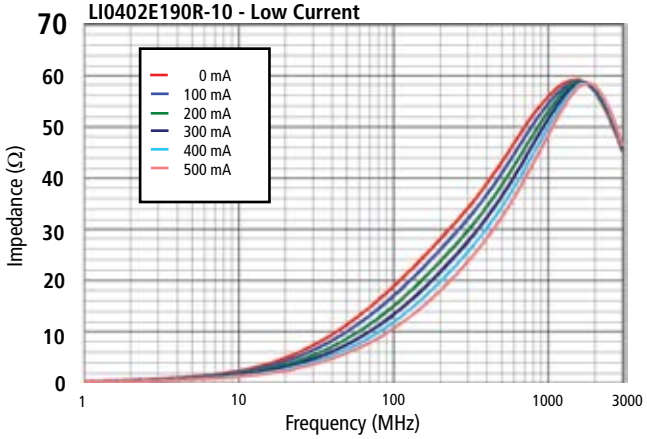


LI0402D121R-10 - Low Current

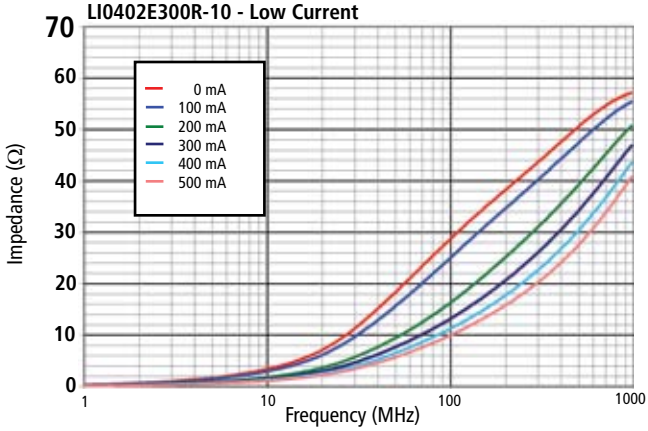


0402 / 0603 Chip Bead Impedance Under DC Bias

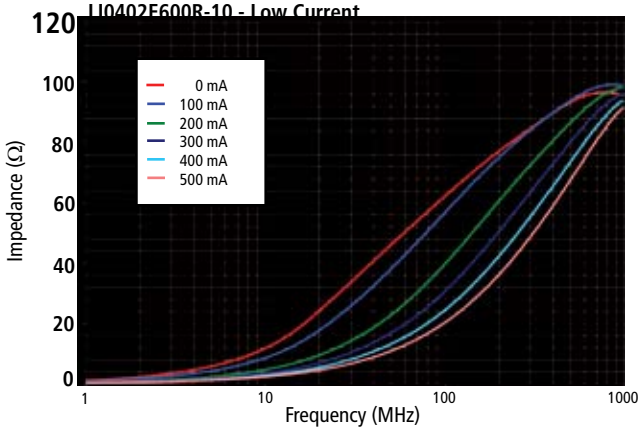
LI0402E190R-10 - Low Current



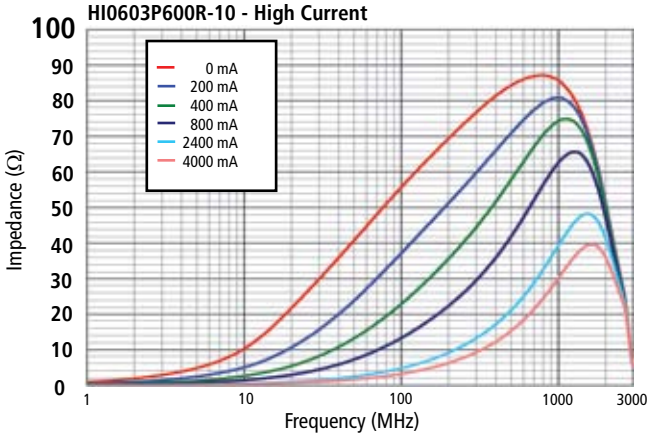
LI0402E300R-10 - Low Current



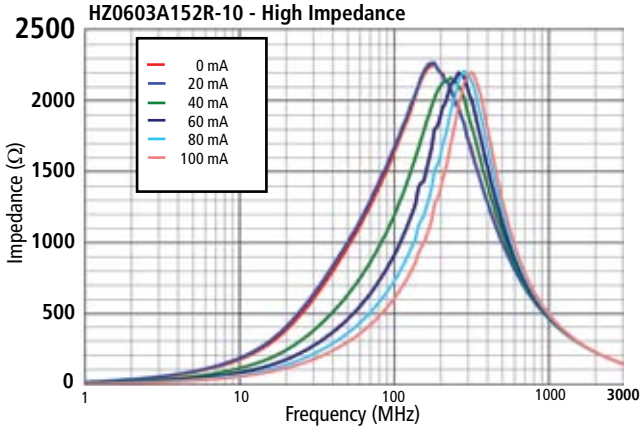
LI0402E600R-10 - Low Current



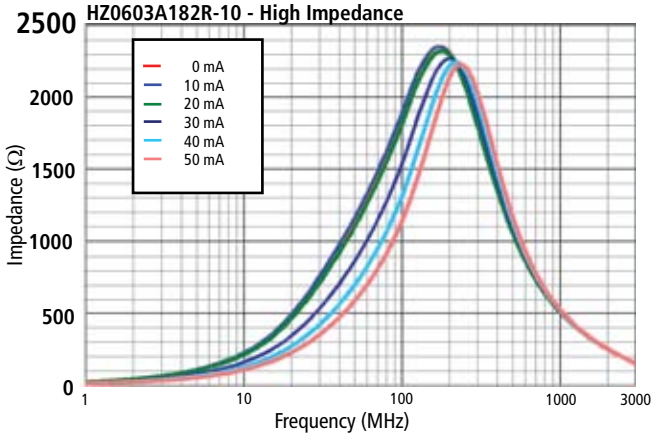
HI0603P600R-10 - High Current



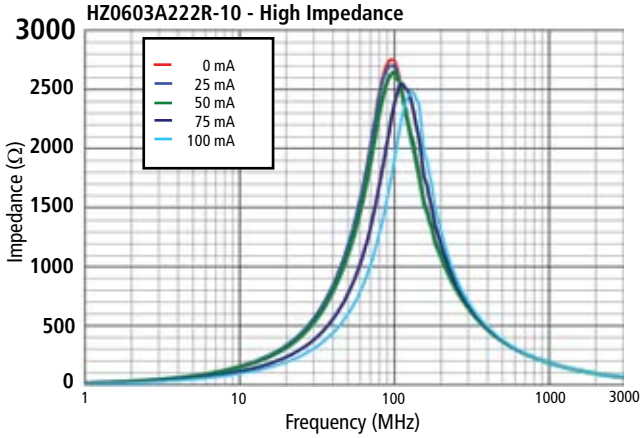
HZ0603A152R-10 - High Impedance



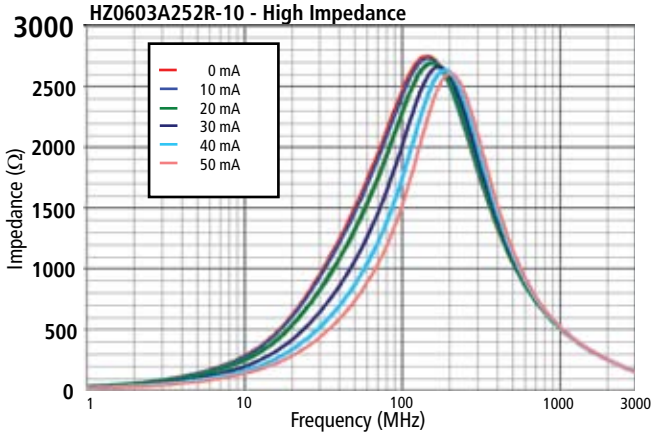
HZ0603A182R-10 - High Impedance



HZ0603A222R-10 - High Impedance

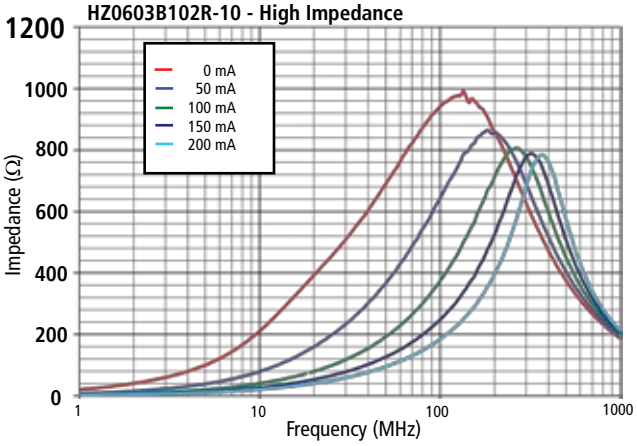


HZ0603A252R-10 - High Impedance

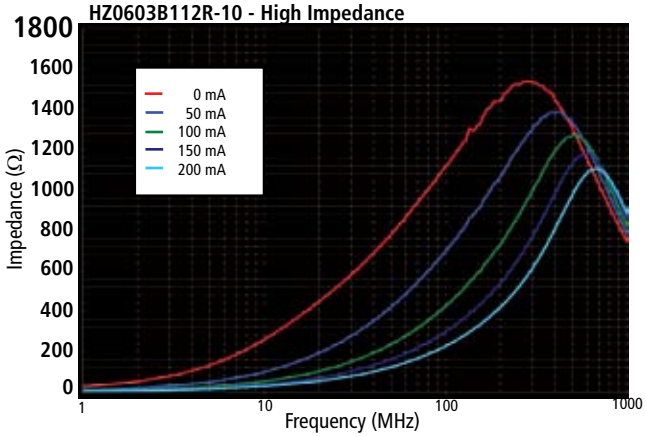


0603 Chip Bead Impedance Under DC Bias

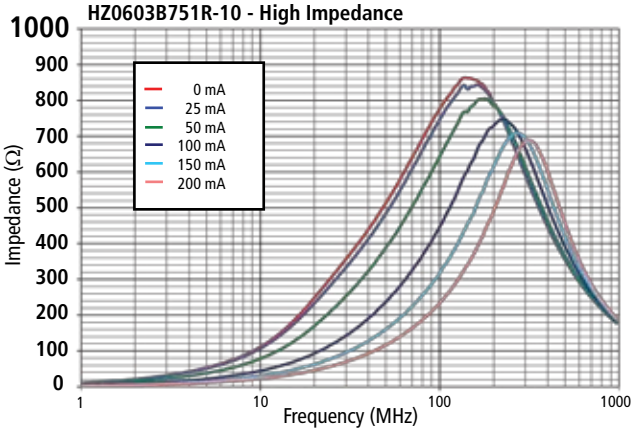
HZ0603B102R-10 - High Impedance



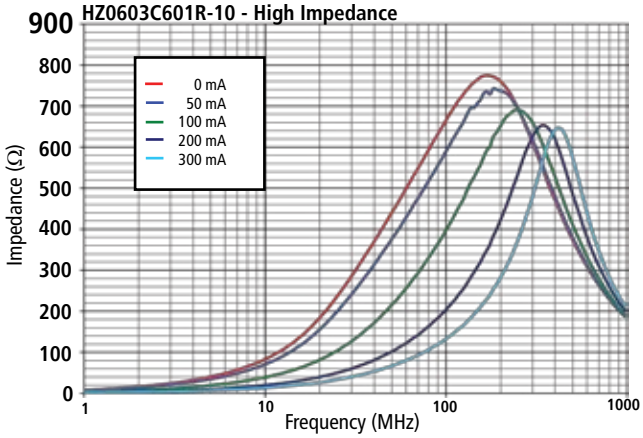
HZ0603B112R-10 - High Impedance



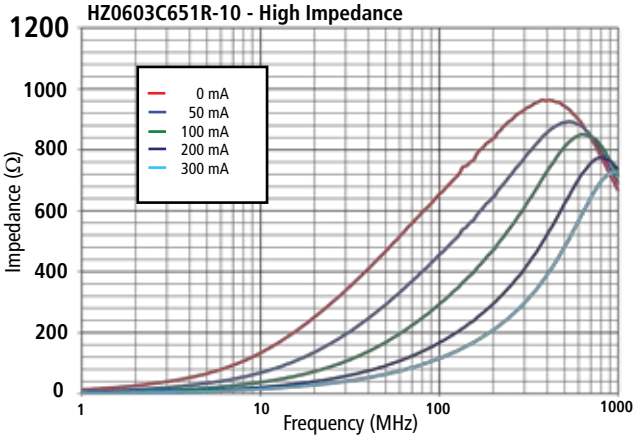
HZ0603B751R-10 - High Impedance



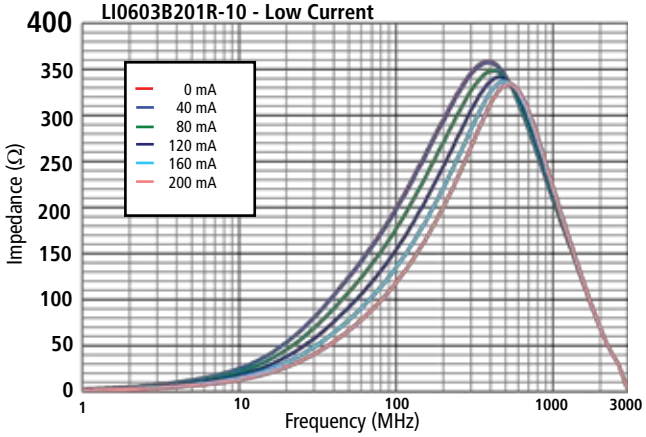
HZ0603C601R-10 - High Impedance



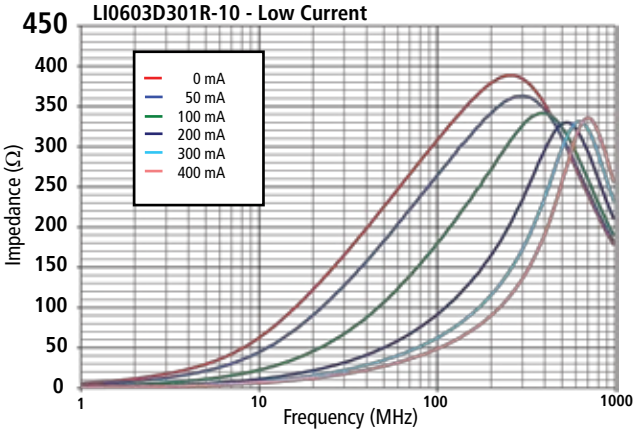
HZ0603C651R-10 - High Impedance



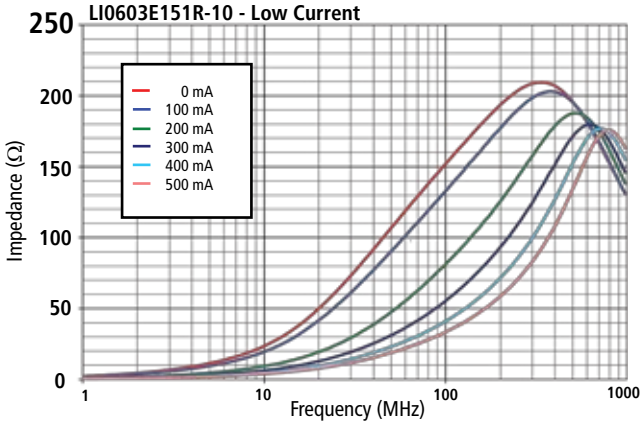
LI0603B201R-10 - Low Current



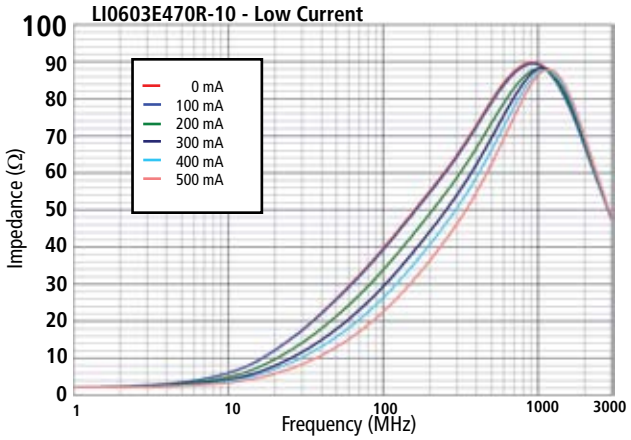
LI0603D301R-10 - Low Current

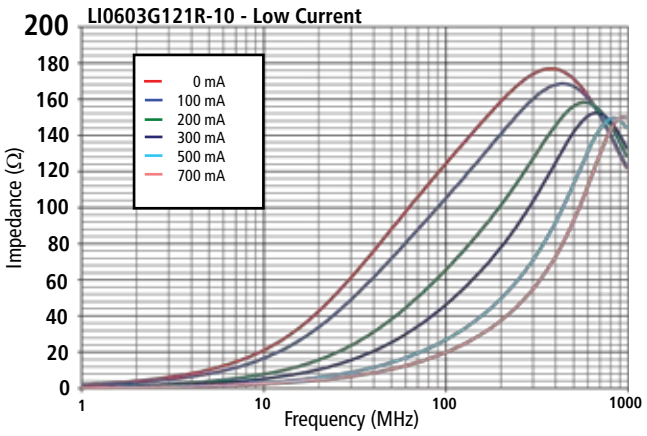


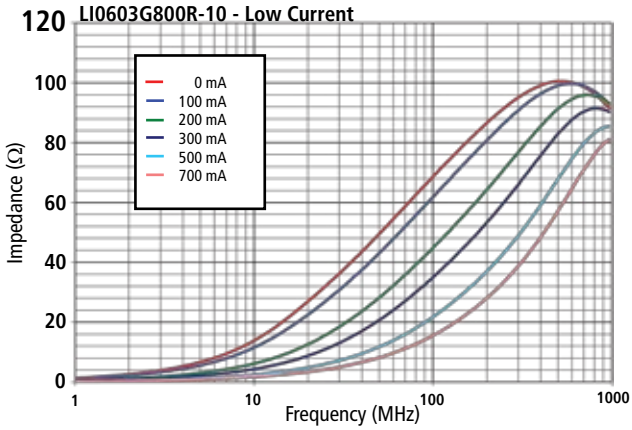
LI0603E151R-10 - Low Current

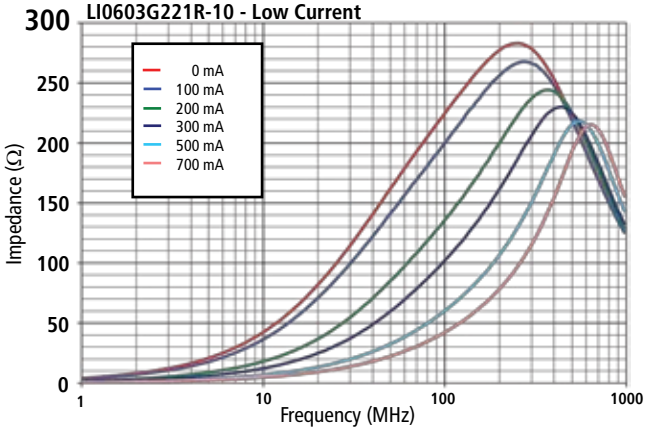


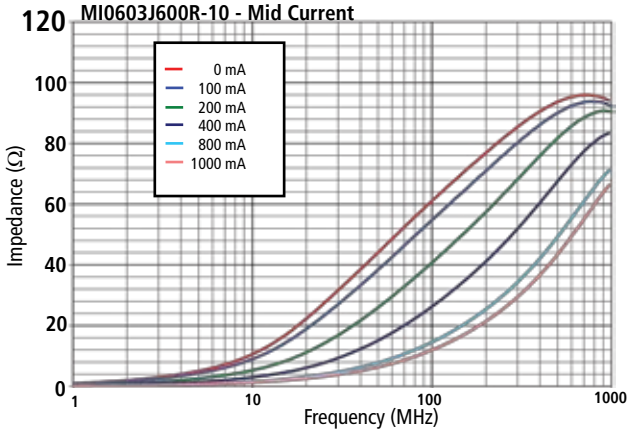
0603 Chip Bead Impedance Under DC Bias

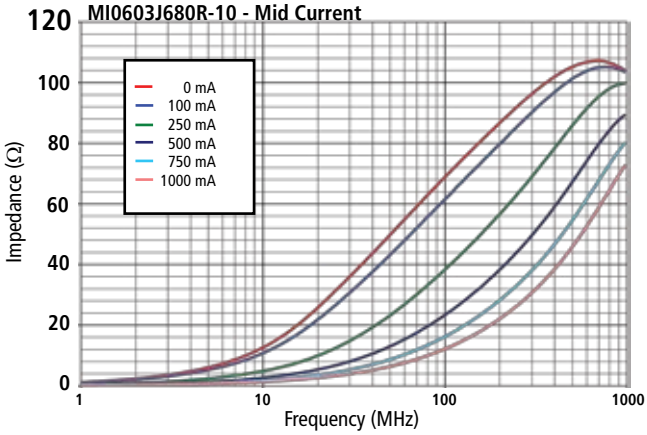


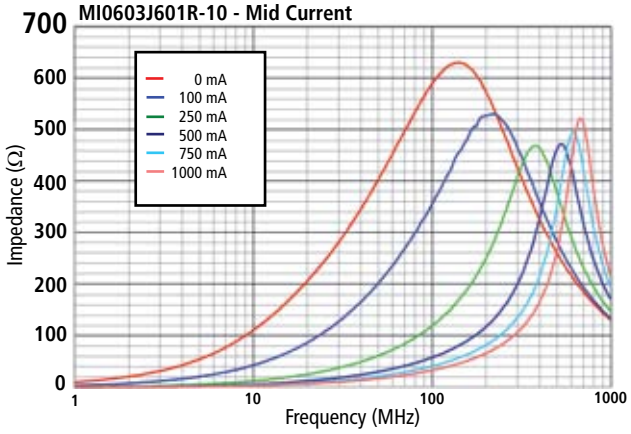


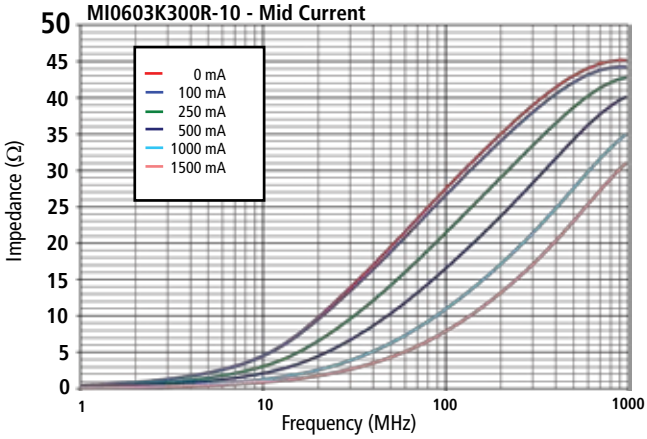




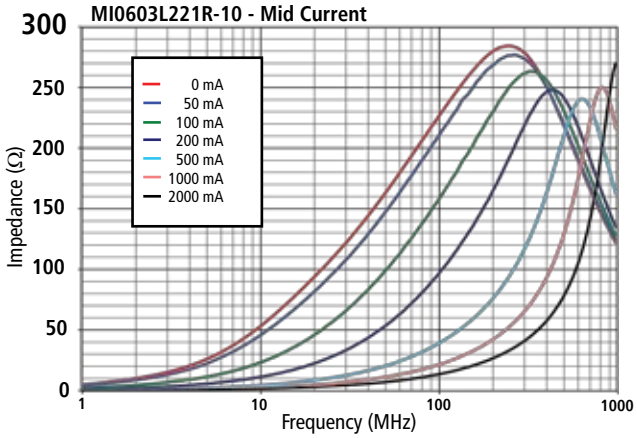


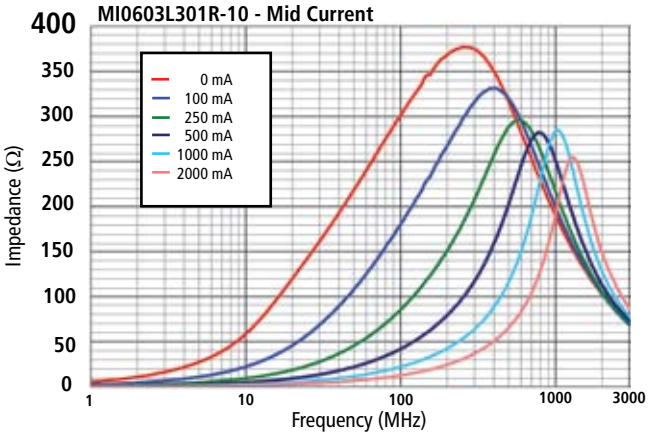


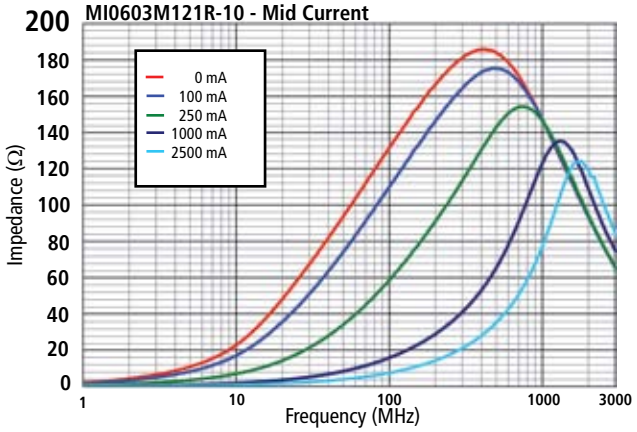


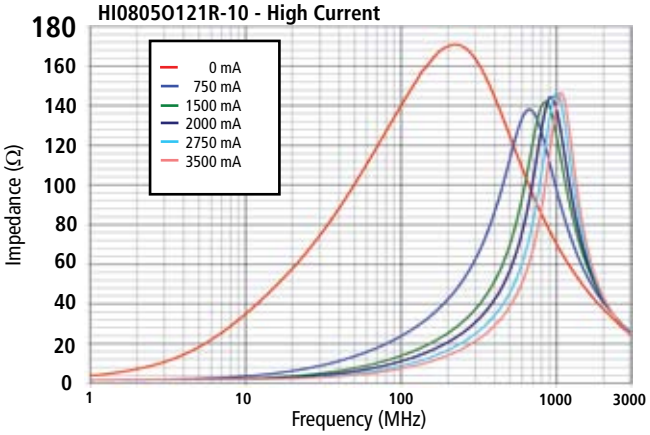


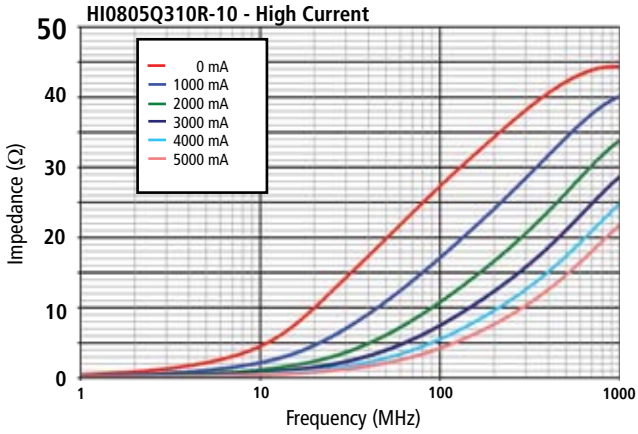
0603 / 0805 Chip Bead Impedance Under DC Bias

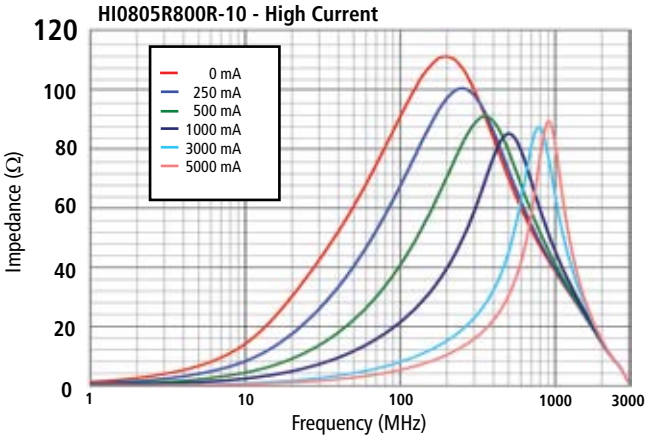


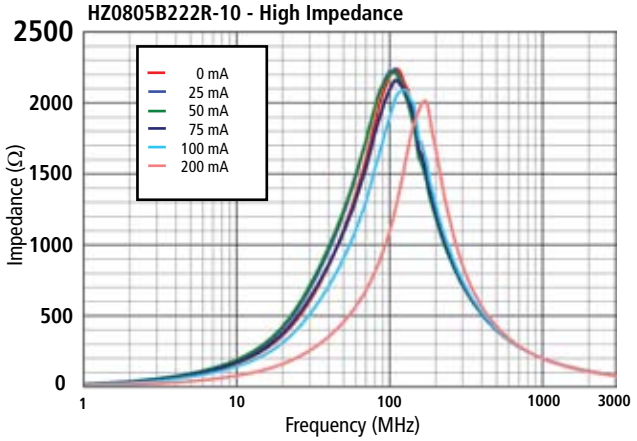


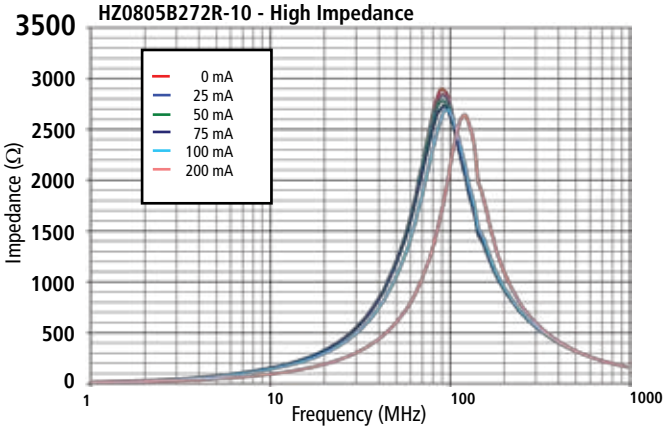






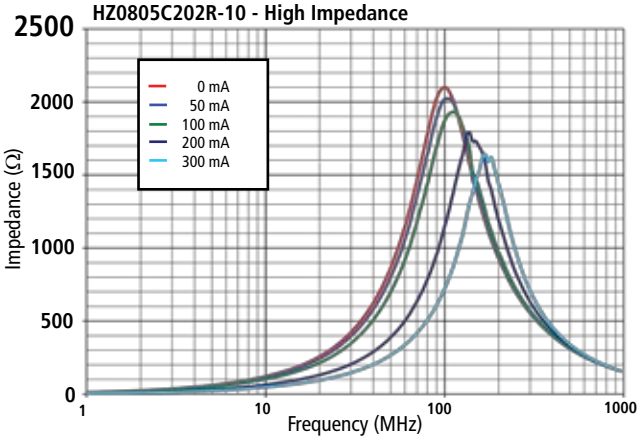




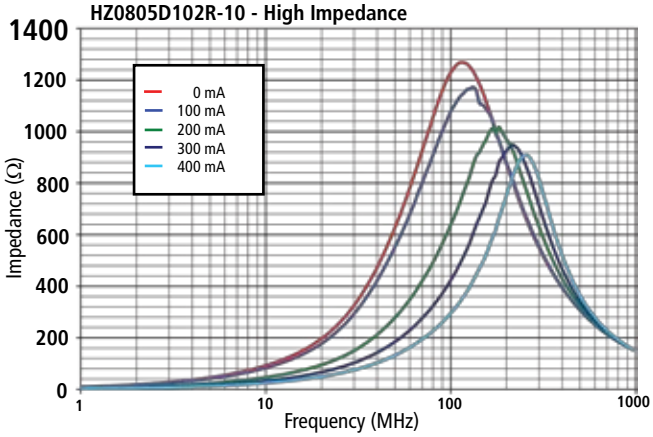


0805 Chip Bead Impedance Under DC Bias

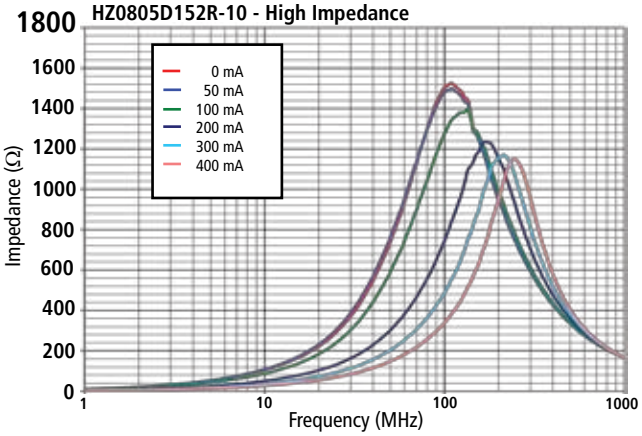
HZ0805C202R-10 - High Impedance



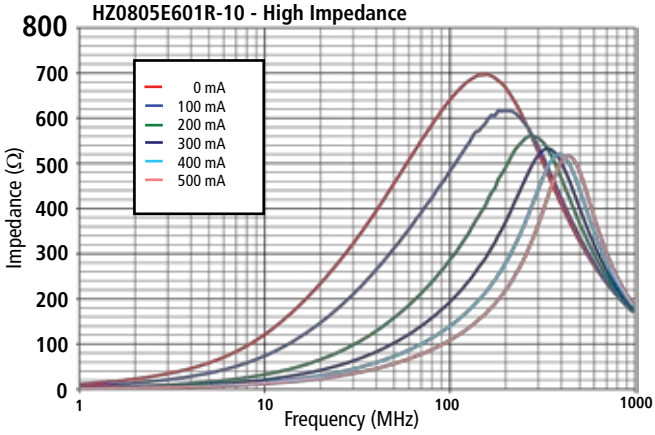
HZ0805D102R-10 - High Impedance



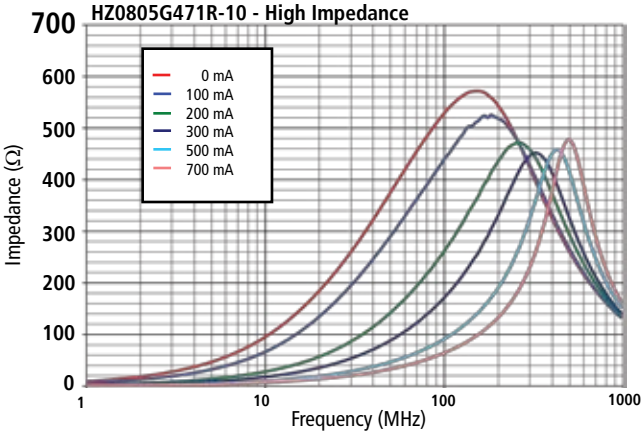
HZ0805D152R-10 - High Impedance



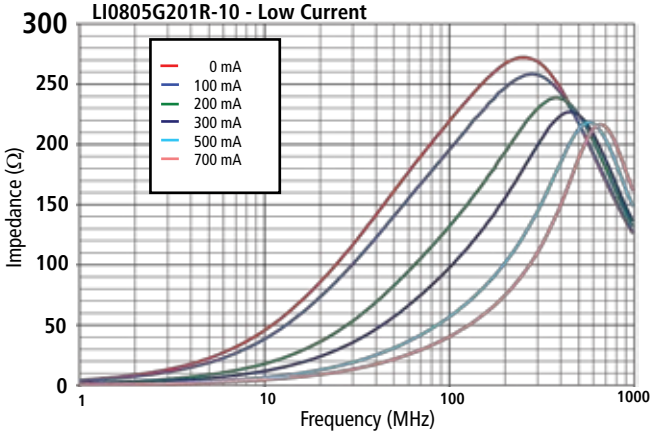
HZ0805E601R-10 - High Impedance



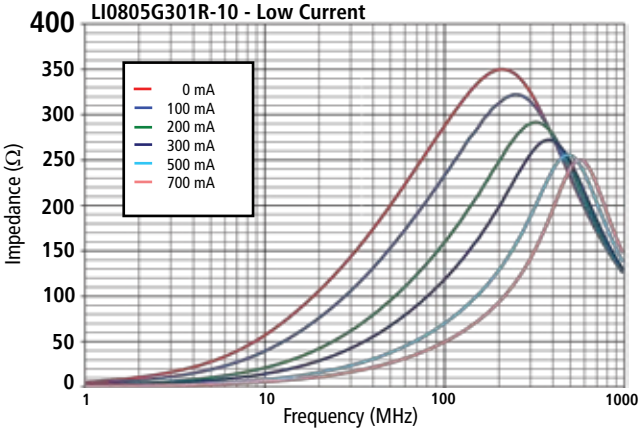
HZ0805G471R-10 - High Impedance



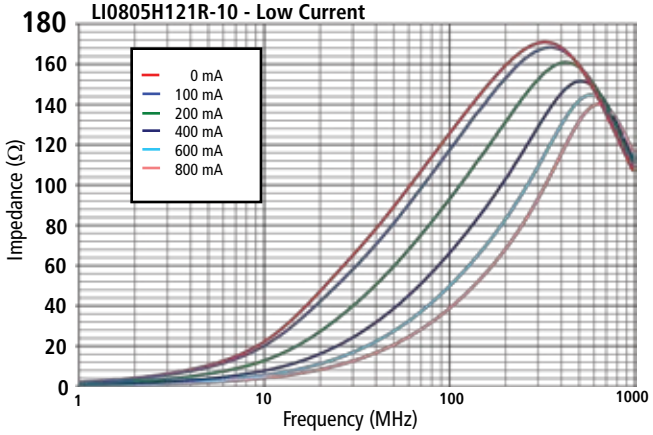
LI0805G201R-10 - Low Current



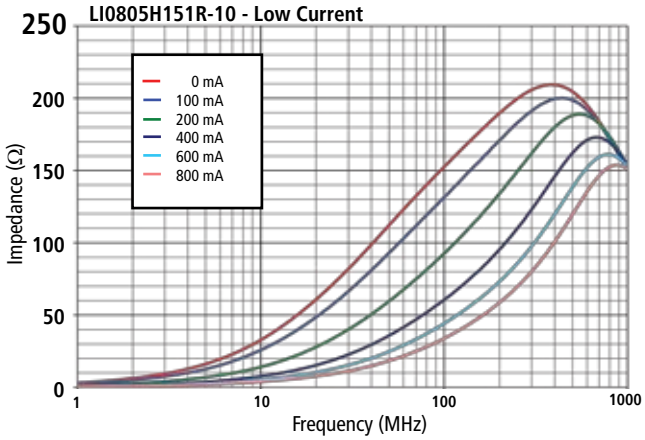
LI0805G301R-10 - Low Current

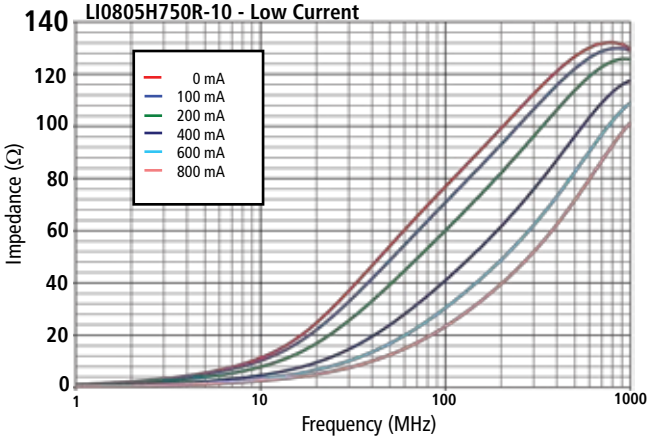


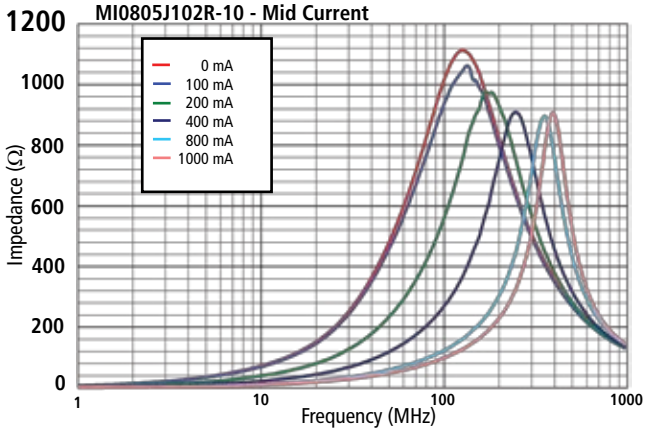
LI0805H121R-10 - Low Current

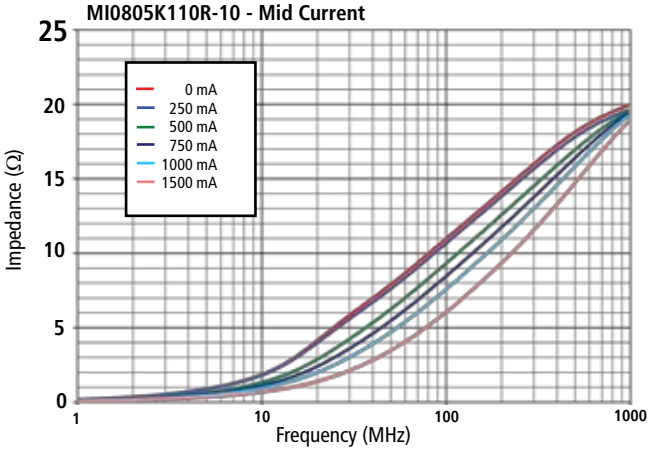


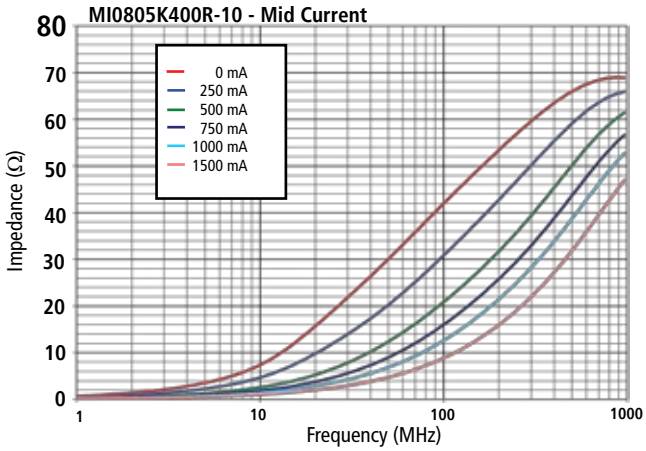
0805 Chip Bead Impedance Under DC Bias

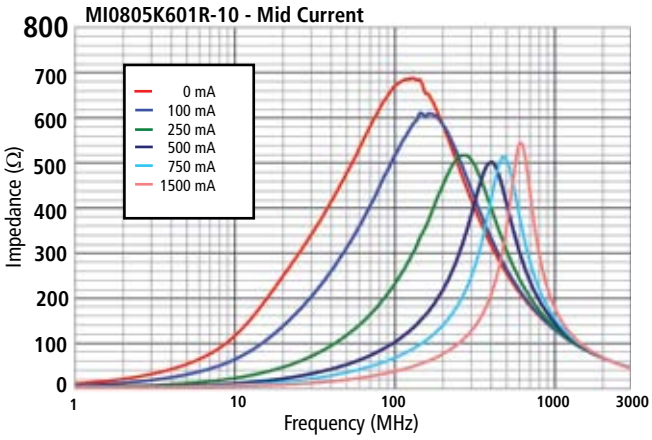


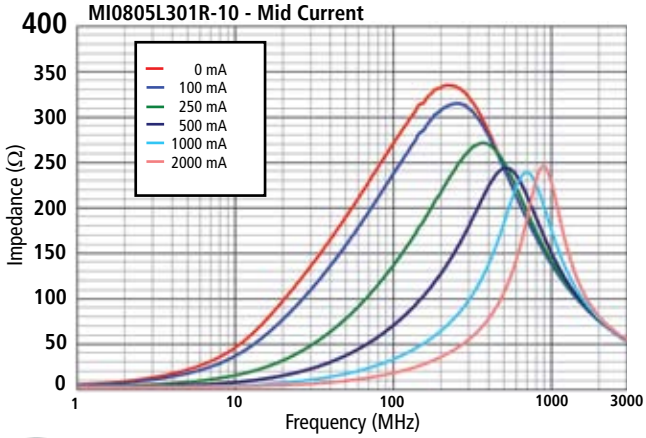


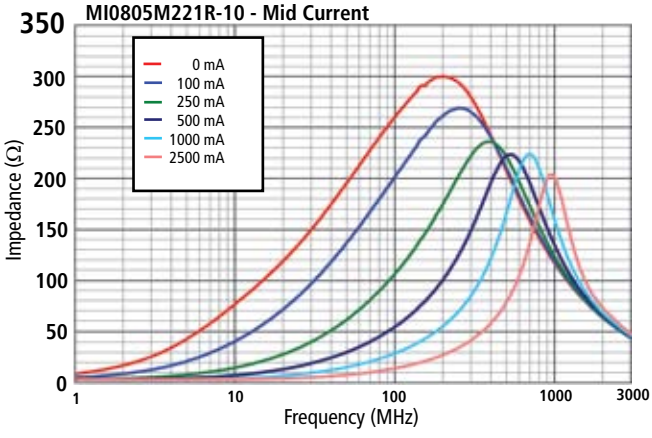






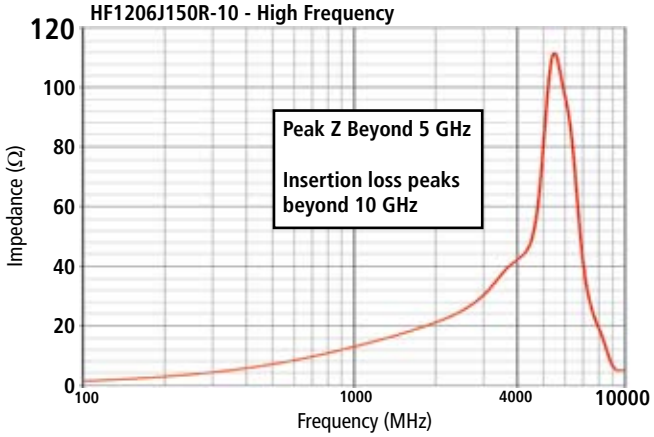




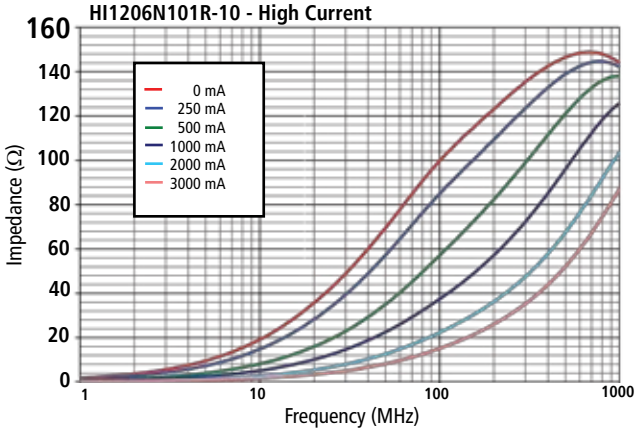


1206 Chip Bead Impedance Under DC Bias

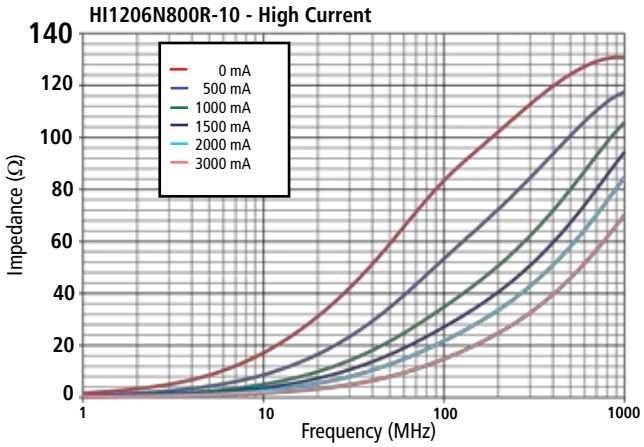
HF1206J150R-10 - High Frequency



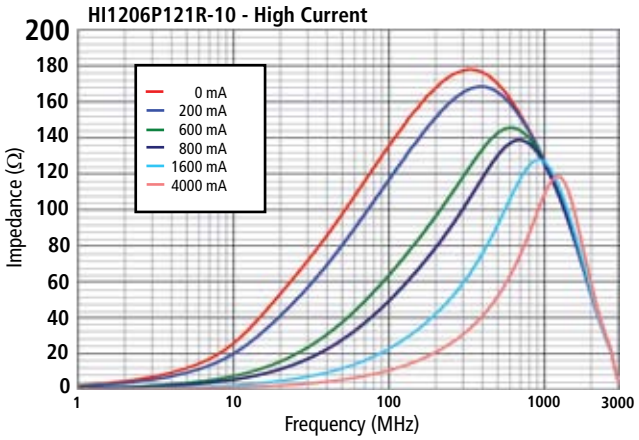
HI1206N101R-10 - High Current



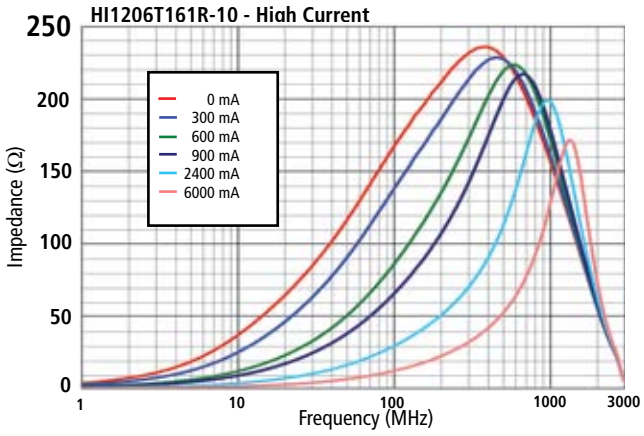
HI1206N800R-10 - High Current



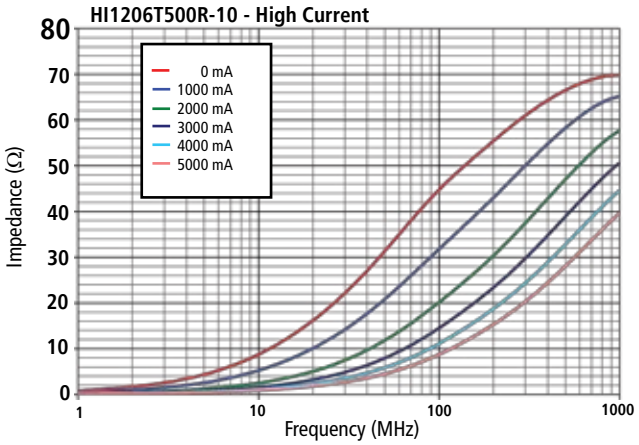
HI1206P121R-10 - High Current



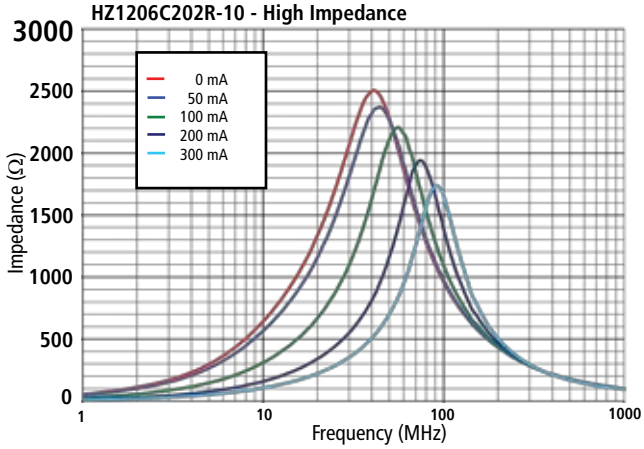
HI1206T161R-10 - High Current



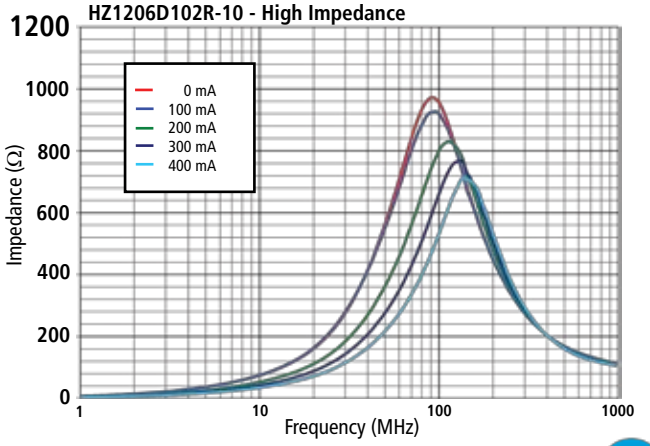
HI1206T500R-10 - High Current



HZ1206C202R-10 - High Impedance

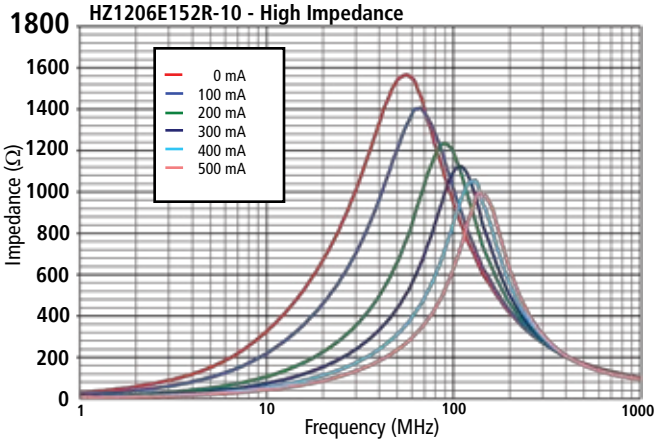


HZ1206D102R-10 - High Impedance

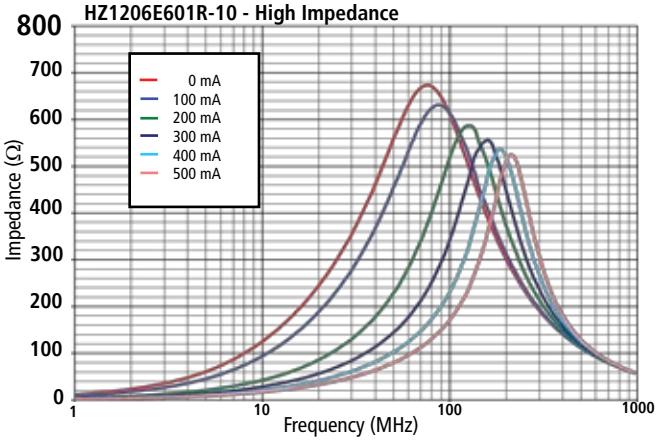


1206 Chip Bead Impedance Under DC Bias

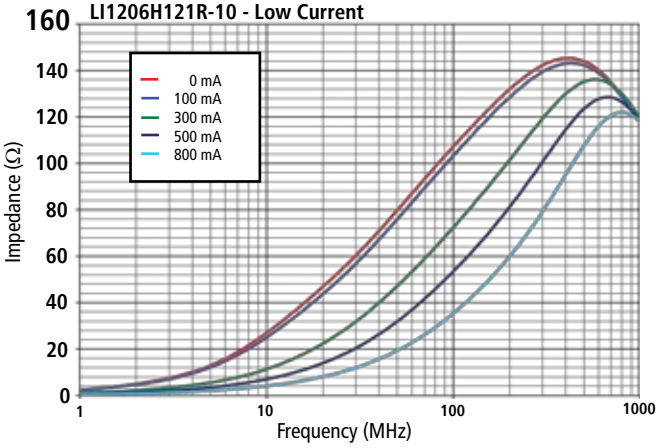
HZ1206E152R-10 - High Impedance



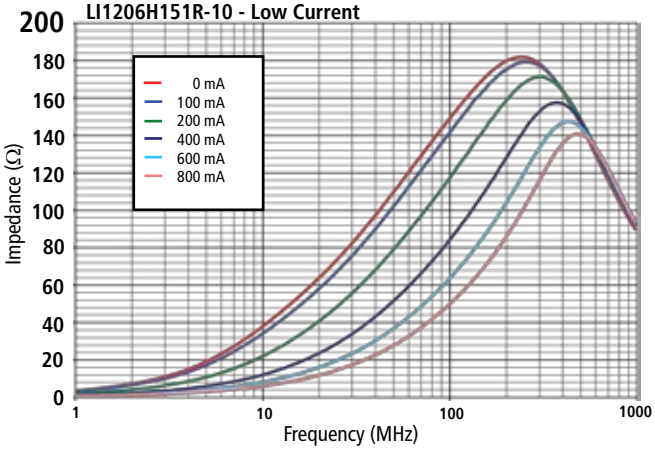
HZ1206E601R-10 - High Impedance



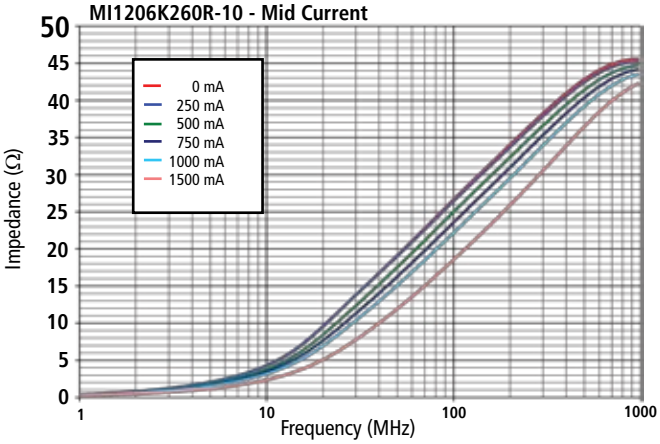
LI1206H121R-10 - Low Current



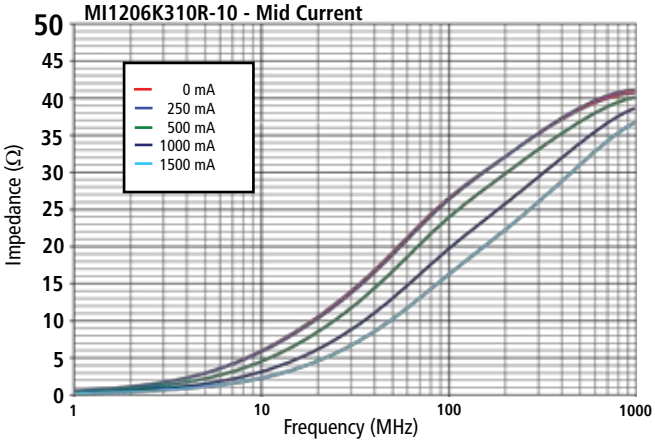
LI1206H151R-10 - Low Current



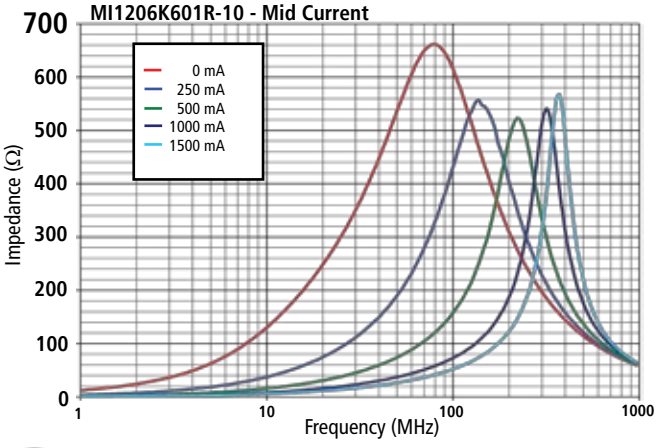
MI1206K260R-10 - Mid Current



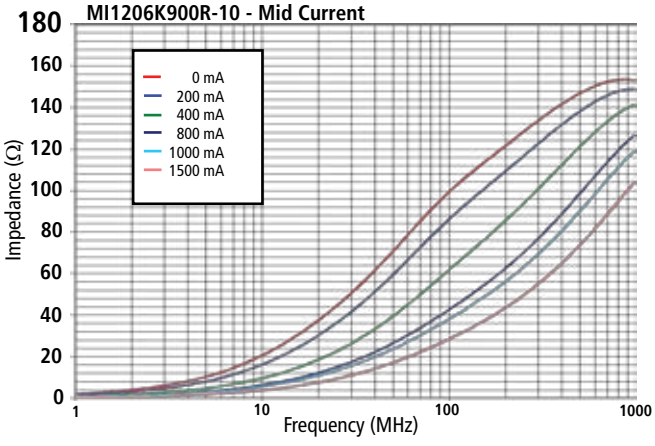
MI1206K310R-10 - Mid Current



MI1206K601R-10 - Mid Current

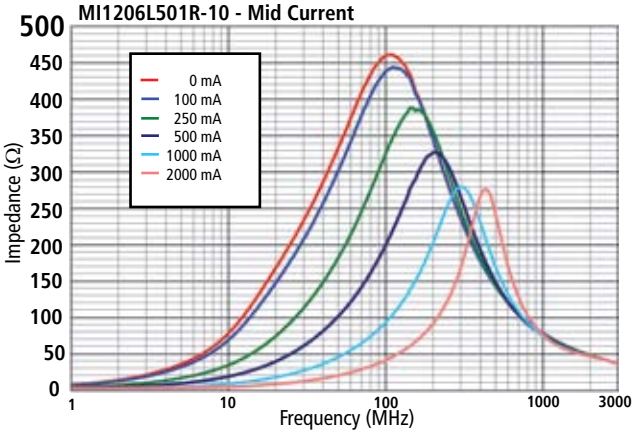


MI1206K900R-10 - Mid Current

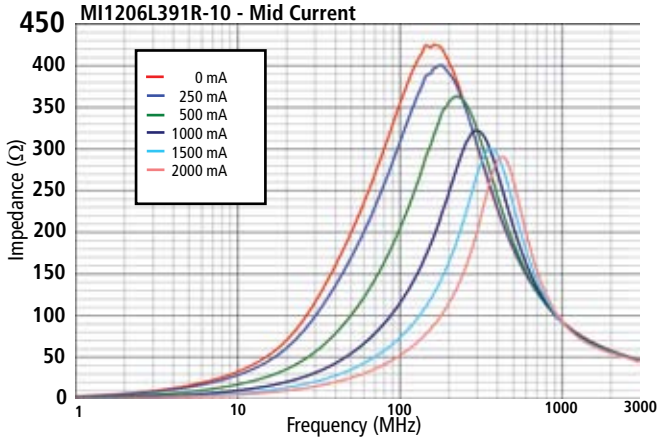


1210 / 1612 / 1806 Chip Bead Impedance Under DC Bias

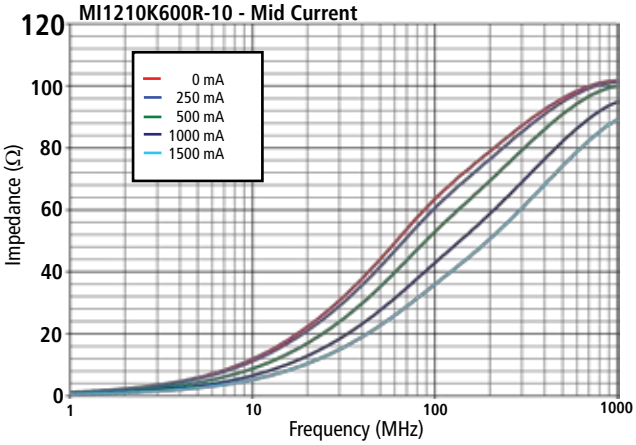
MI1206L501R-10 - Mid Current



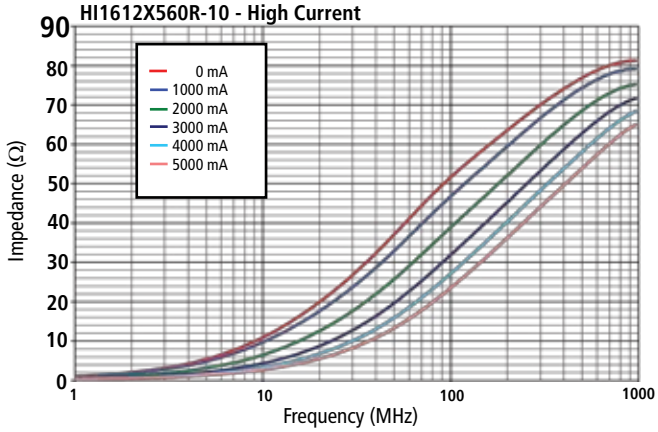
MI1206L391R-10 - Mid Current



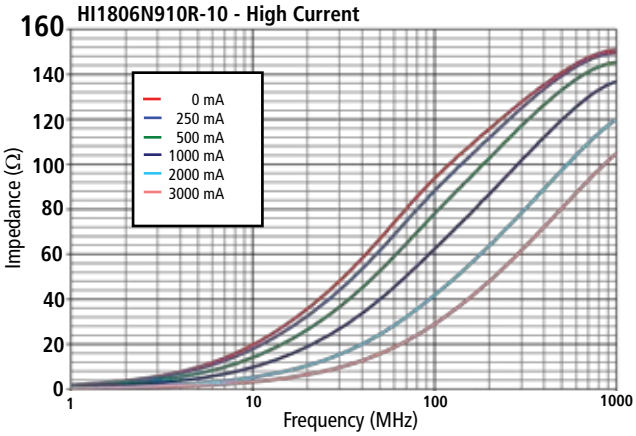
MI1210K600R-10 - Mid Current



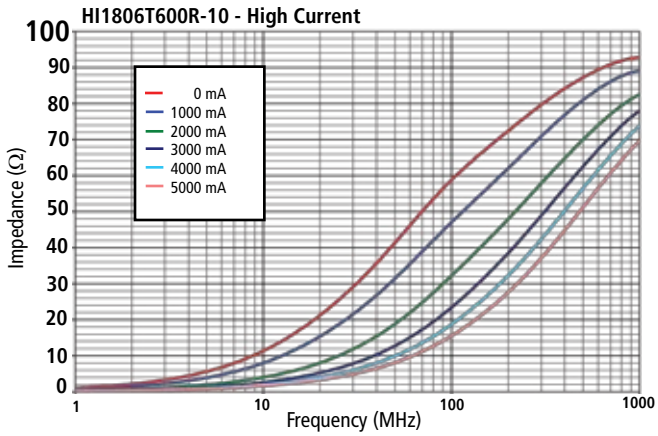
HI1612X560R-10 - High Current



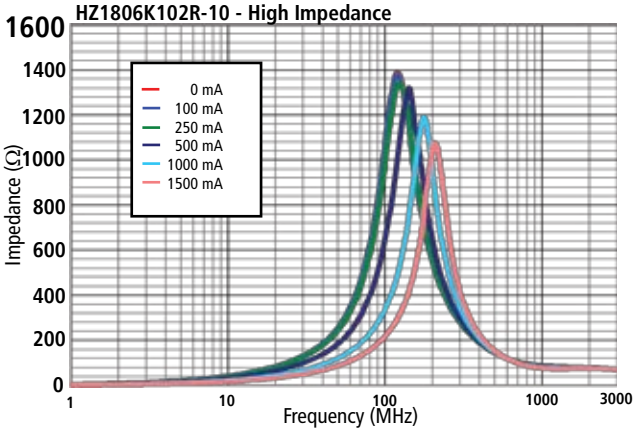
HI1806N910R-10 - High Current



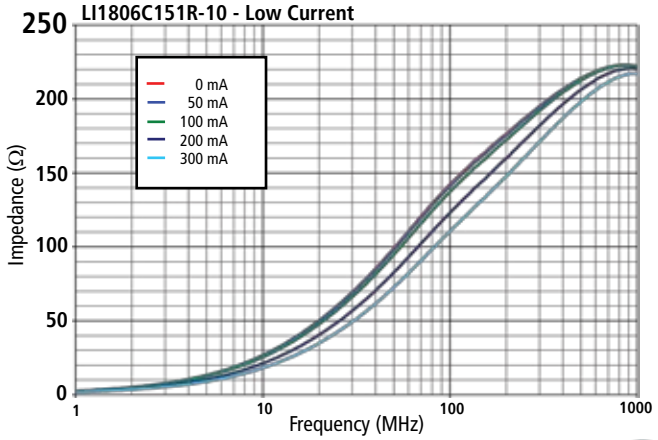
HI1806T600R-10 - High Current



HZ1806K102R-10 - High Impedance

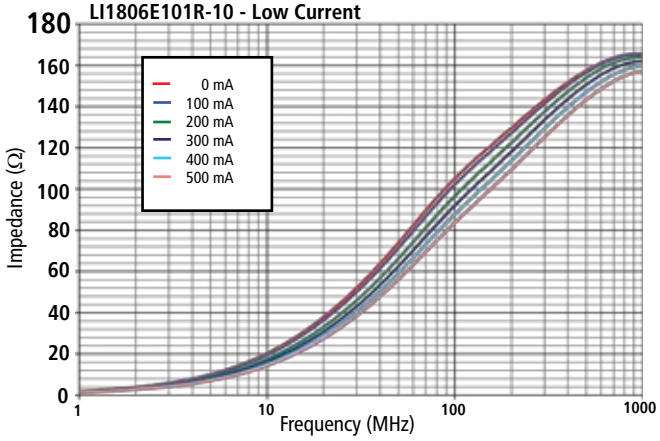


LI1806C151R-10 - Low Current

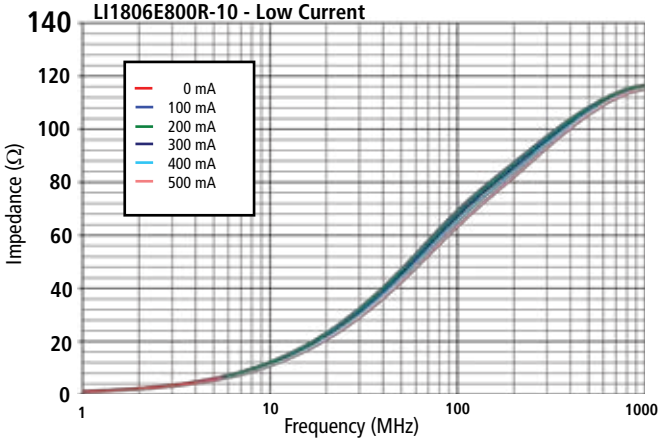


1806 / 1812 / 2220 Chip Bead Impedance Under DC Bias

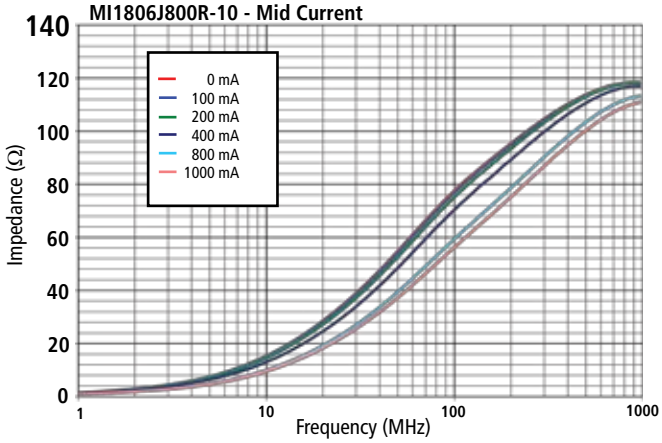
LI1806E101R-10 - Low Current



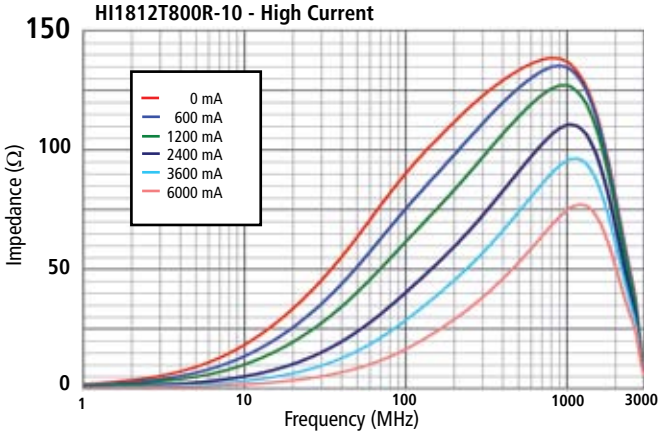
LI1806E800R-10 - Low Current



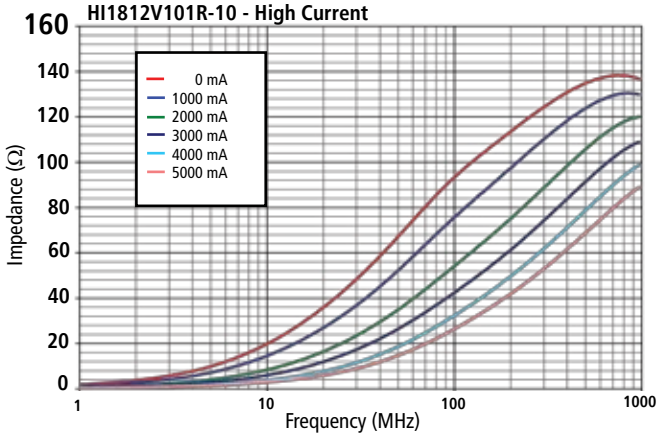
MI1806J800R-10 - Mid Current



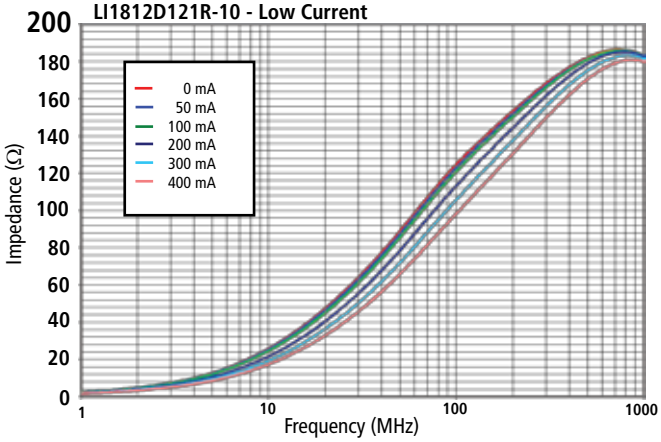
HI1812T800R-10 - High Current



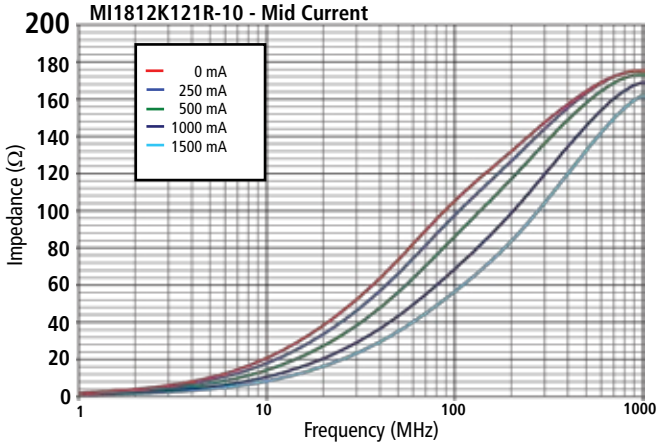
HI1812V101R-10 - High Current



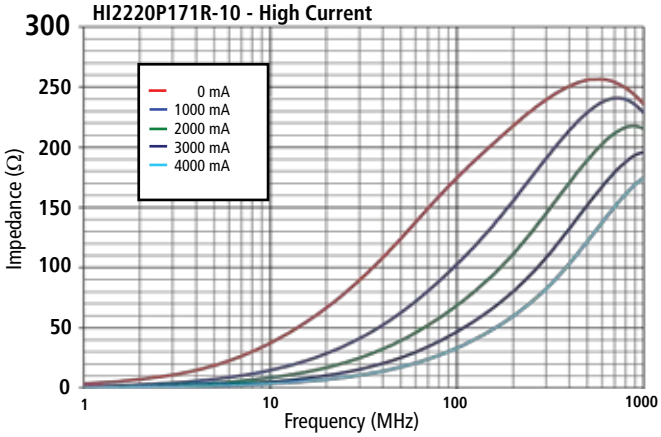
LI1812D121R-10 - Low Current



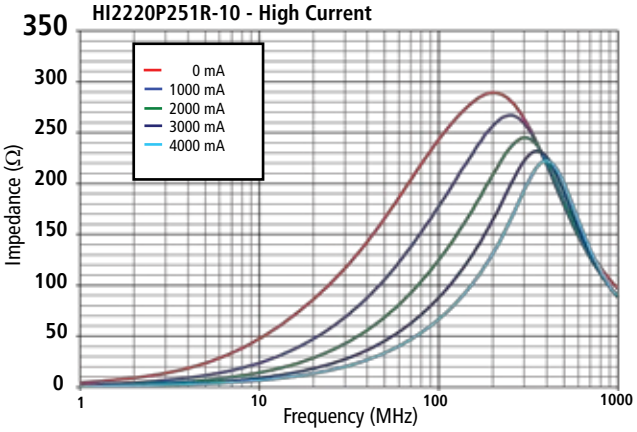
MI1812K121R-10 - Mid Current

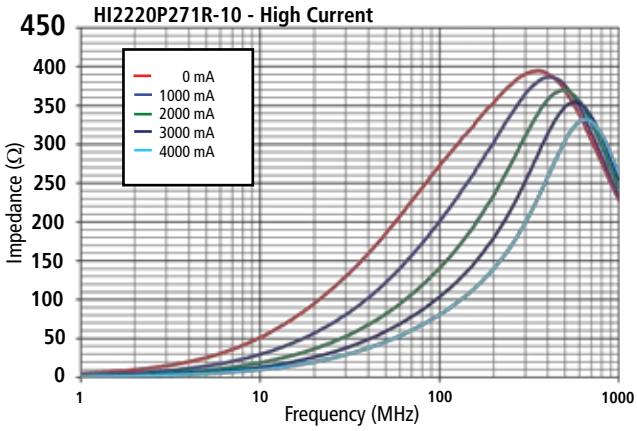


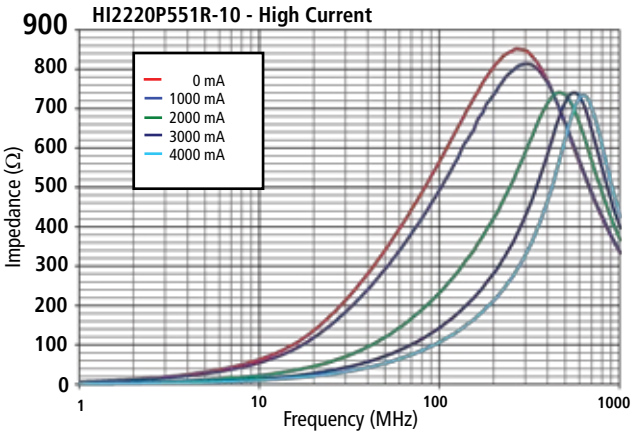
HI2220P171R-10 - High Current

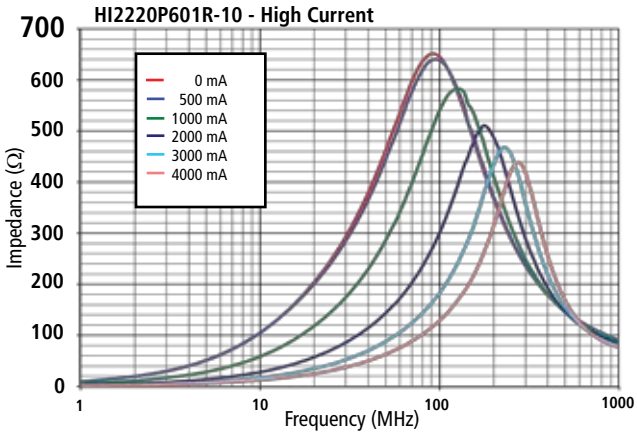


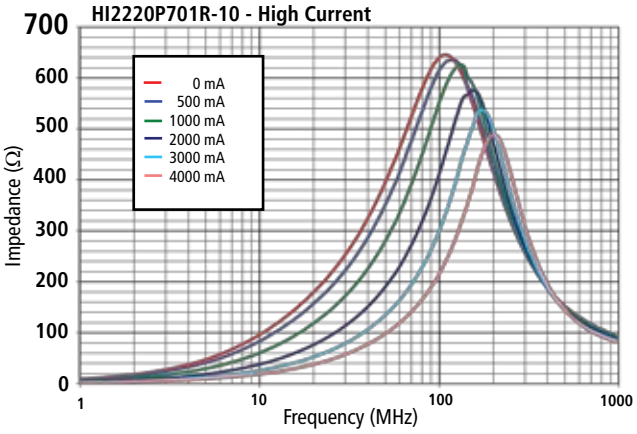
2220 Chip Bead Impedance Under DC Bias

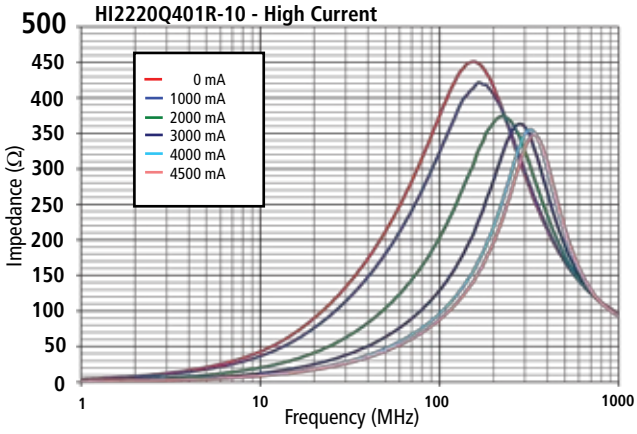


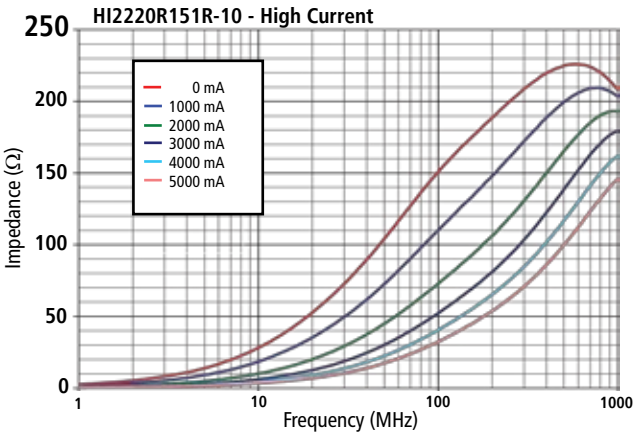


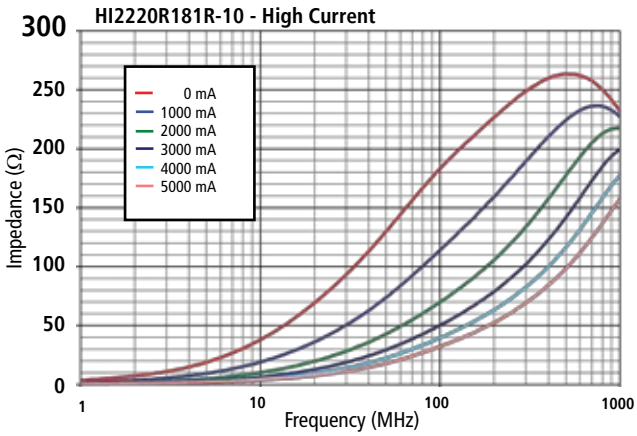






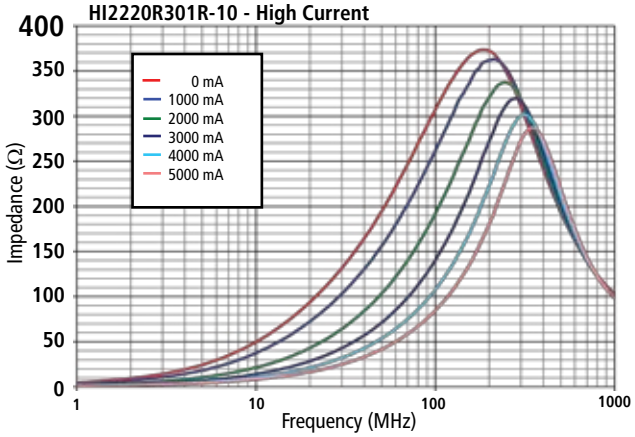




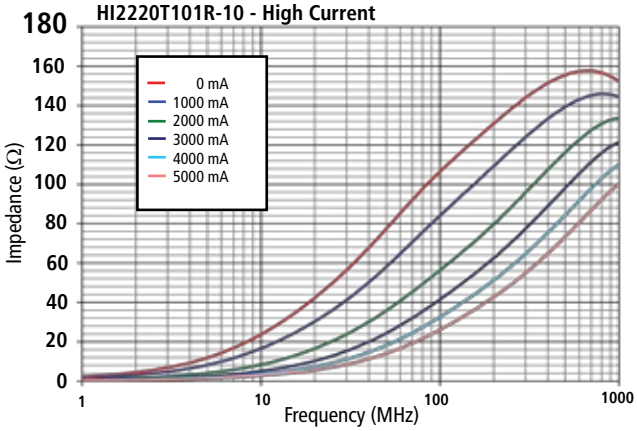


2220 / 3312 and 4 Line Array Impedance Under DC Bias

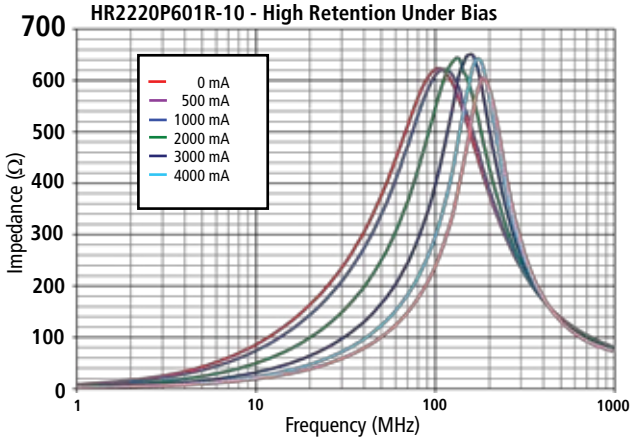
HI2220R301R-10 - High Current



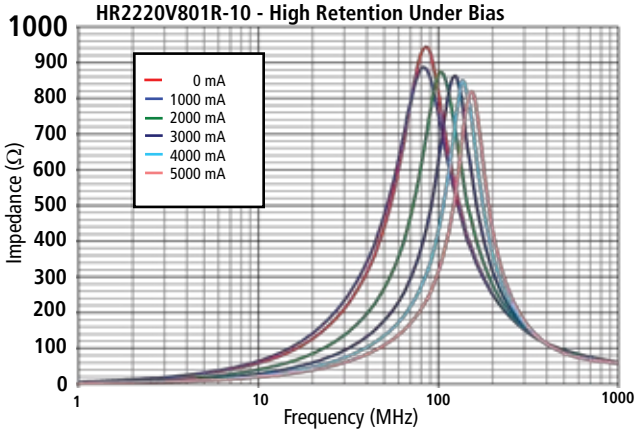
HI2220T101R-10 - High Current



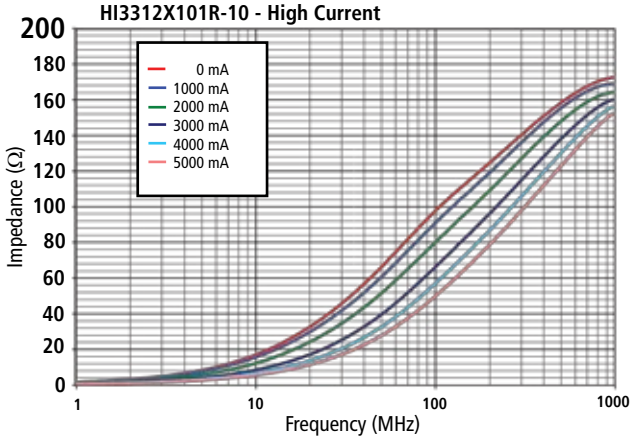
HR2220P601R-10 - High Retention Under Bias



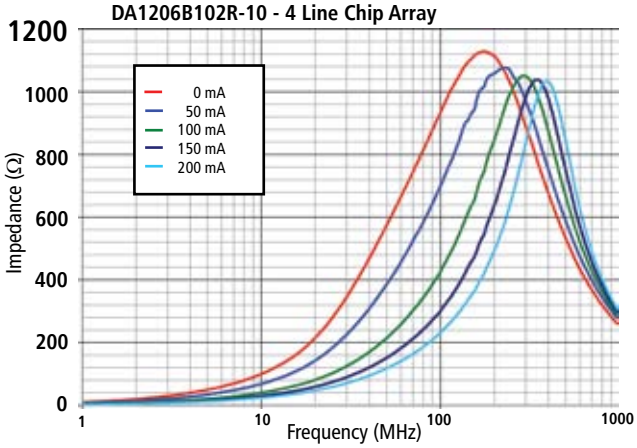
HR2220V801R-10 - High Retention Under Bias



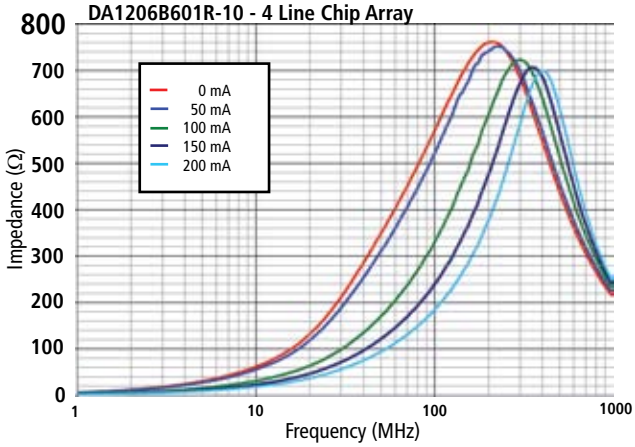
HI3312X101R-10 - High Current



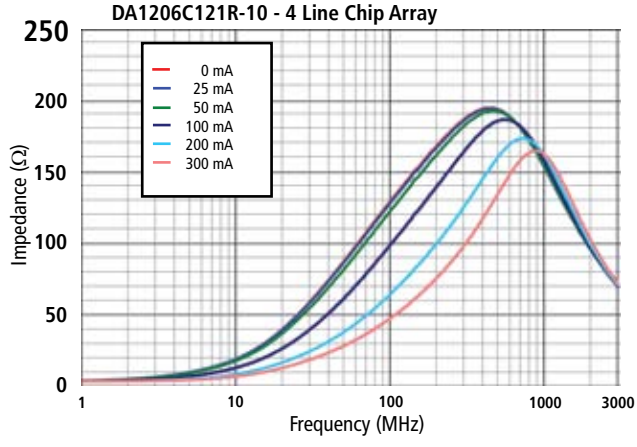
DA1206B102R-10 - 4 Line Chip Array



DA1206B601R-10 - 4 Line Chip Array

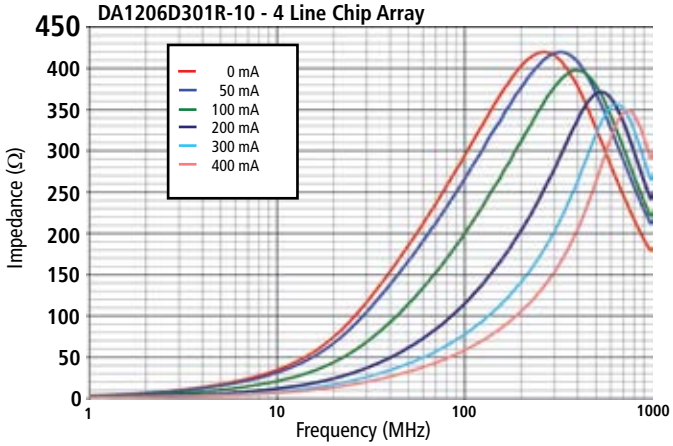


DA1206C121R-10 - 4 Line Chip Array

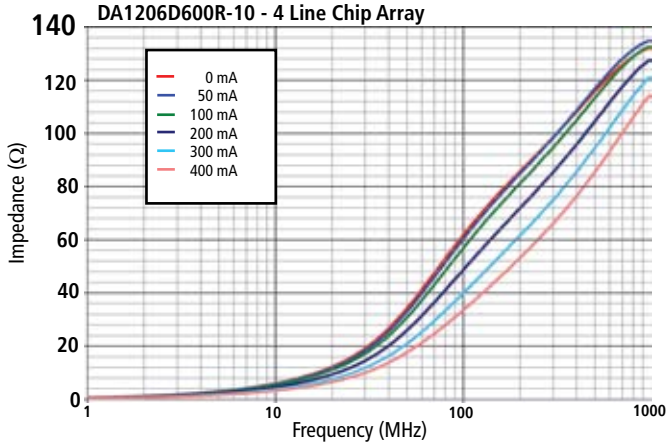


4 Line Array and LF Chip Bead Impedance Under DC Bias

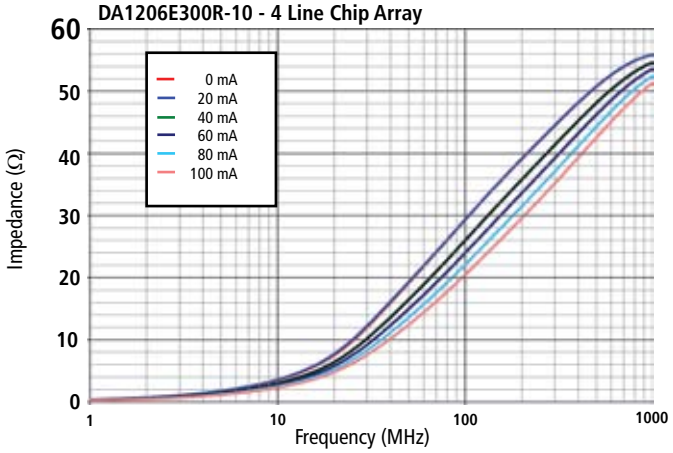
DA1206D301R-10 - 4 Line Chip Array



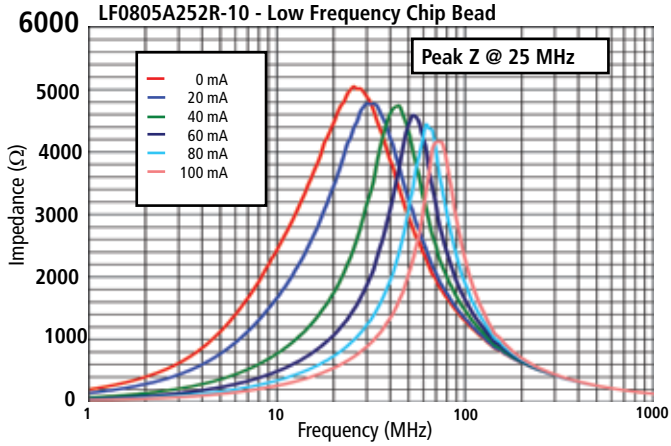
DA1206D600R-10 - 4 Line Chip Array



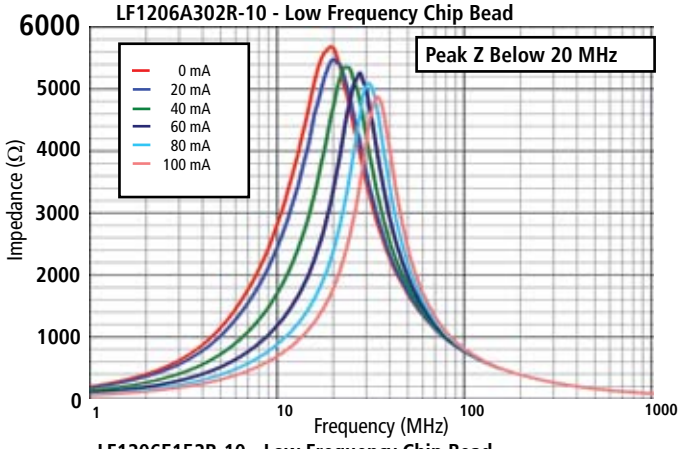
DA1206E300R-10 - 4 Line Chip Array



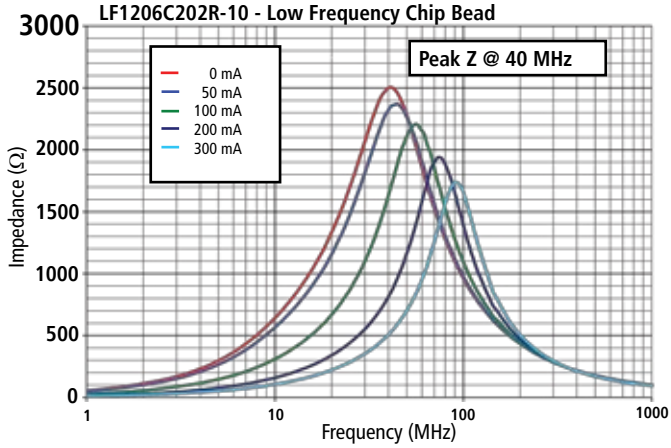
LF0805A252R-10 - Low Frequency Chip Bead



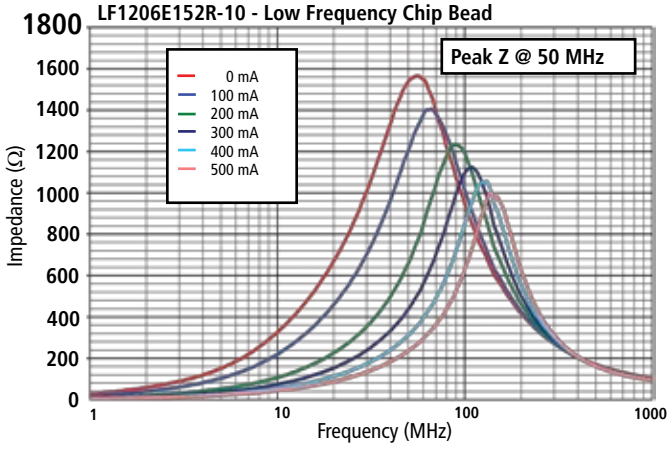
LF1206A302R-10 - Low Frequency Chip Bead



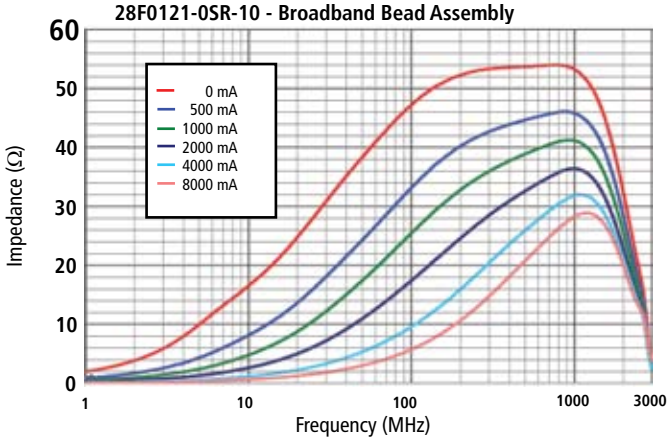
LF1206C202R-10 - Low Frequency Chip Bead



LF1206E152R-10 - Low Frequency Chip Bead

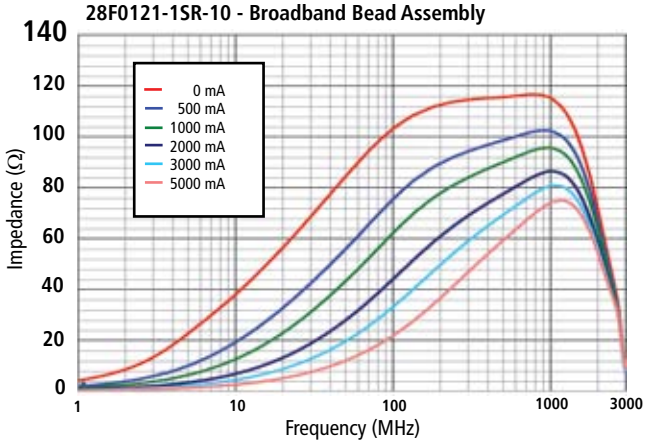


28F0121-0SR-10 - Broadband Bead Assembly

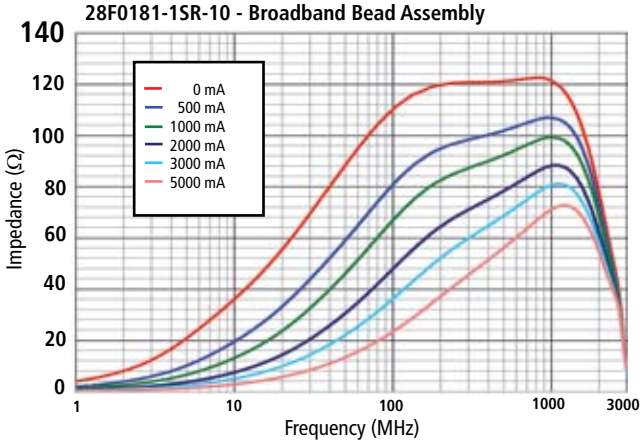


Ferrite SMT Bead Assemblies Impedance Under DC Bias

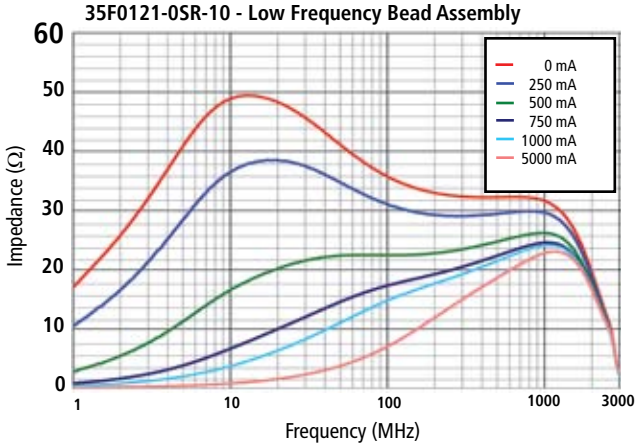
28F0121-1SR-10 - Broadband Bead Assembly



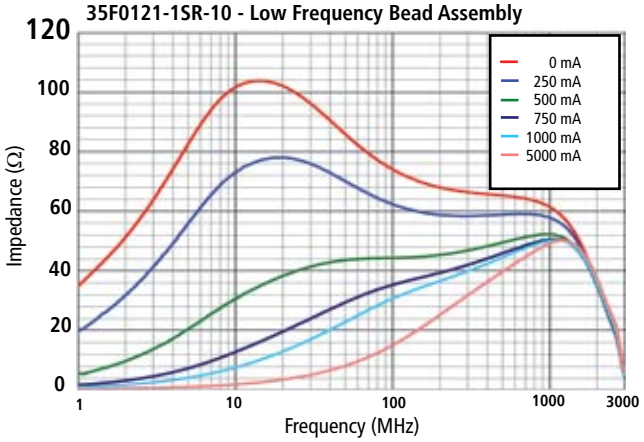
28F0181-1SR-10 - Broadband Bead Assembly



35F0121-0SR-10 - Low Frequency Bead Assembly

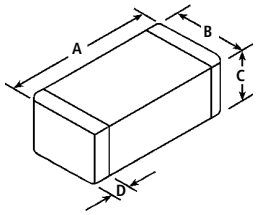
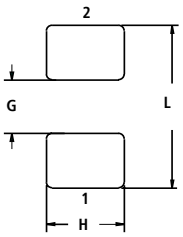
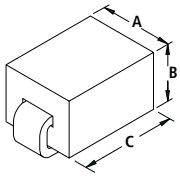


35F0121-1SR-10 - Low Frequency Bead Assembly



Quick reference comparison impedance curves for groups of chip beads and common mode chokes are on pages 54 to 63.

Ferrite EMI Chip Bead Dimensions

CHIP SIZE						LAND PATTERN FOR REFLOW SOLDERING			
Monolithic Chip Bead  See Page 41 for Equivalent Circuit Diagrams	Metric (EIA) Pkg. Size	A mm (inches)	B mm (inches)	C* mm (inches)	D mm (inches)	Parts have no polarity	L mm (inches)	G mm (inches)	H mm (inches)
	1005 (0402)	1.01 (0.040)	0.50 (0.020)	0.50 (0.020)	0.30 (0.012)		2.10 (0.083)	0.50 (0.020)	0.55 (0.022)
	1608 (0603)	1.60 (0.063)	0.80 (0.031)	0.80 (0.031)	0.36 (0.014)		2.60 (0.102)	0.60 (0.023)	0.80 (0.031)
	2010 (0804)	2.00 (0.079)	1.00 (0.039)	0.50 (0.020)	0.025 (0.010)	Land Pattern 	1.50 (0.059)	0.50 (0.020)	0.25 (0.010)
	2012 (0805)	2.00 (0.079)	1.25 (0.049)	0.90 (0.035)	0.51 (0.020)		3.23 (0.127)	0.66 (0.026)	1.47 (0.058)
	3216 (1206)	3.20 (0.126)	1.60 (0.063)	1.10 (0.043)	0.51 (0.020)		4.40 (0.173)	2.20 (0.087)	2.06 (0.081)
	3225 (1210)	3.20 (0.126)	2.50 (0.098)	1.40 (0.055)	0.46 (0.018)		4.06 (0.160)	2.13 (0.084)	2.74 (0.108)
	4030 (1612)	4.06 (0.160)	3.05 (0.120)	2.28 (0.090)	0.46 (0.018		8.64 (0.340)	2.13 (0.084)	4.06 (0.160)
	4516 (1806)	4.50 (0.177)	1.60 (0.063)	1.60 (0.063)	0.51 (0.020)		5.70 (0.224)	2.70 (0.106)	2.24 (0.088)
	4532 (1812)	4.50 (0.177)	3.20 (0.126)	1.40 (0.055)	0.46 (0.018)		5.90 (0.232)	2.57 (0.101)	4.22 (0.166)
	5650 (2220)	5.59 (0.220)	5.08 (0.200)	3.45 (0.136)	0.76 (0.030)		9.19 (0.362)	3.05 (0.120)	6.10 (0.240)
	8530 (3312)	8.50 (0.335)	3.05 (0.120)	2.28 (0.090)	0.51 (0.020)		13.08 (0.515)	6.48 (0.255)	4.06 (0.160)
Ferrite SMT Bead & Wire Assembly 	Part Number	A mm (inches)	B mm (inches)	C mm (inches)	D mm (inches)		L mm (inches)	G mm (inches)	H mm (inches)
	__F0121-0SR	3.05 (0.120)	2.54 (0.100)	4.06 (0.160)	- -		7.29 (0.287)	1.02 (0.040)	3.45 (0.136)
	__F0121-1SR	3.05 (0.120)	2.54 (0.100)	8.51 (0.335)	- -		10.74 (0.423)	4.14 (0.163)	4.60 (0.160)
	__F0181-0SR	4.57 (0.180)	2.54 (0.100)	8.51 (0.335)	- -		10.74 (0.423)	4.14 (0.163)	4.60 (0.160)

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

Electrical specifications and tolerances are based on room temperature operation (23°C ± 2°C). Parts have an operating temperature range of -45°C to +125°C. While the parts will continue to operate without damage over this range, they may not stay within the specified electrical tolerances during exposure to extreme temperatures.

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 sortable at www.lairdtech.com.

A revolutionary new SPICE model for EMI ferrite chip beads is now available from Laird Technologies. 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 on www.lairdtech.com or by contacting your local Laird Technologies office.

Common Mode and Differential Mode Explanation

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.

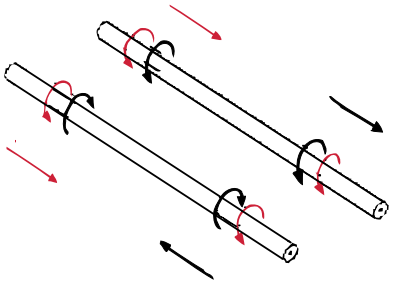
Switch mode power supplies are required for most advanced electronics and harmonics of the switch mode power supply can escape the power supply as EMI. Also, the power delivery circuit often creates opportunities for unintended common mode current loops to form in the end product even when using a "certified" 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 that is caused from intended currents. As an example, at 30 MHz, a pair of traces or wires 1m long, separated by 1.3 mm, requires over 20mA differential current imbalance to exceed 100μV/m radiation 3 meters away. However, unintended, unforeseen common mode currents can exceed 100μV/m radiation with only 8μA common mode current flow! Suppression of these tiny common mode currents is often crucial to assuring EMI regulatory compliance and reliable product performance.

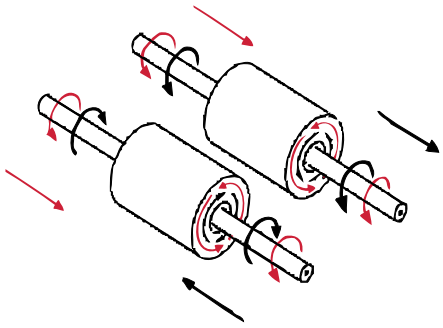
Ferrite common mode chokes operate by acting on the magnetic fields surrounding a pair of conductors.

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

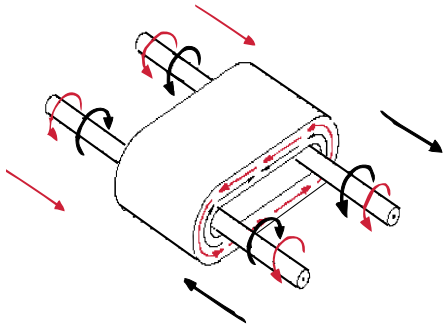


Two conductors used in a standard "differential" transmission circuit create magnetic fields surrounding the conductors. These magnetic fields flow around the conductors in the directions depicted by the black arrows.

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 with two seperate 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) current. In this case, the performance of the ferrite core is significantly altered by the intended current. Differential mode filters (like small chip beads) are not stable under significant load.

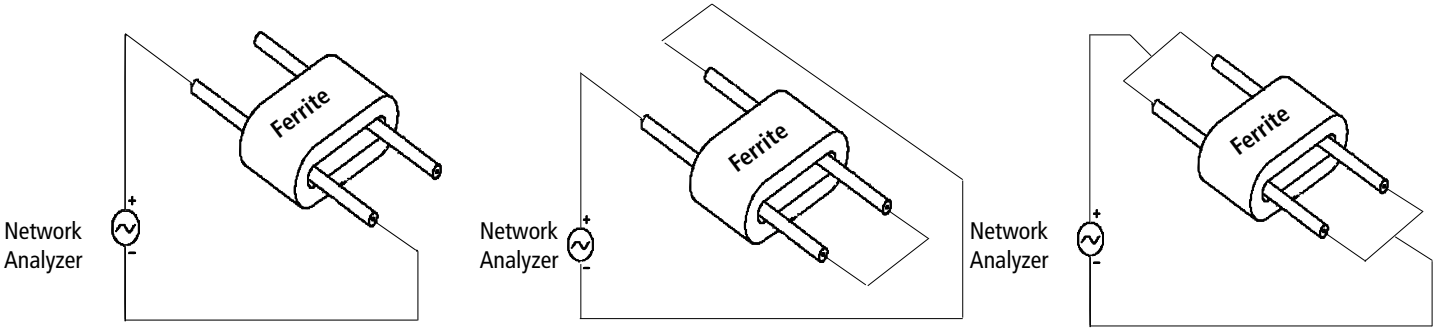


The same two wires have now been fitted with a ferrite EMI core in a **common-mode** configuration; a single core with both lines through a common opening in the core. The differential mode (black) fields in the core are now equal and opposite, which yields a net flux seen by the core of approximately 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 influenced 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 Families

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 Beads	"High Current, Small Package, High Frequency"	1812 - 3322	33 - 110	**4,000 - 10,000**	800 MHz to 2.3 GHz	1
CM 05	"USB 2.0, Low Normal Mode Z"	0805	90 - 370	**100 - 400**	1 GHz - 1.4 GHz	1
CM 21	"High Current, Low Profile"	2021 - 3421	33 - 60	**15,000**	1 GHz	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 Testing For Common Mode Chokes



Open Mode **Normal / Differential Mode** **Common Mode**

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.

Common Mode Choke - Series 05

- **USB 2.0** • **Broadband** • **Video Applications** • **Imaging** • **Surface Mount**
- **High Density Storage Devices** • **Low Normal (Differential) Mode Impedance**

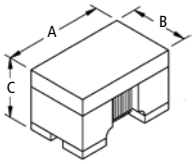
The Series 05 Common Mode Chokes provide excellent filtering capabilities for workload speeds of 25 to 480 Mb/s. Series 05 Common Mode Chokes handle filtering for bandwidth-hungry data lines in USB 2.0 designs. By using these parts on data lines (D+ and D-), they will suppress common mode noise without affecting the integrity of the differential signal. Low normal (differential) mode impedance allows signals to pass. Available in EIA package size 0805.

PART NUMBER SYSTEM EXAMPLE

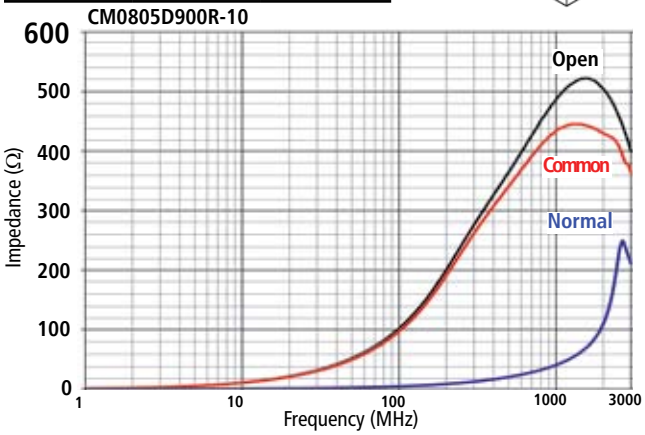
CM	0805	D	900	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

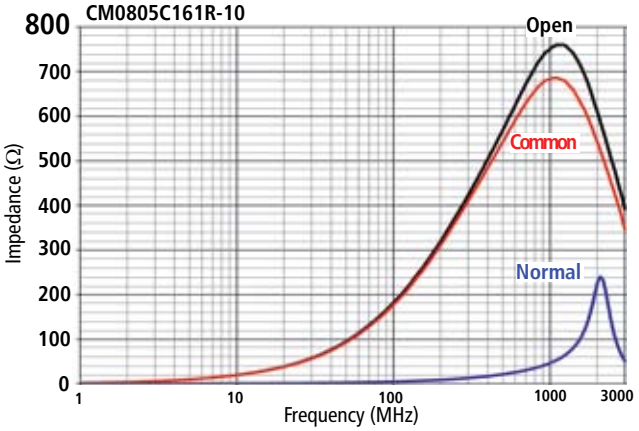
Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
CM0805D900R-10	24	90	340	435	445	1405	0.30	400
CM0805C161R-10	49	160	540	684	684	1000	0.35	300
CM0805C221R-10	57	220	570	720	724	1147	0.40	300
CM0805A371R-10	186	370	730	878	878	1000	0.50	100

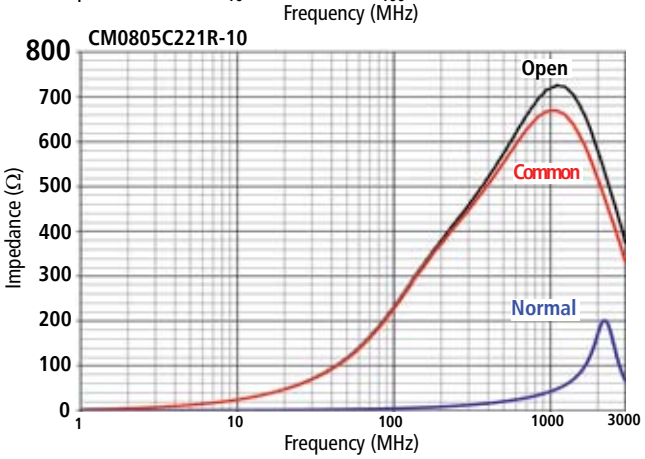
A mm (inches)	B mm (inches)	C mm (inches)
2.00 (0.079)	1.20 (0.047)	1.20 (0.047)

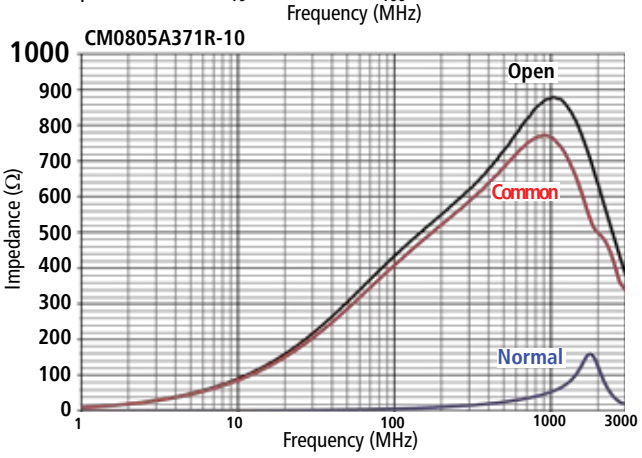


Surface Mount. Refer to part print for additional dimensions

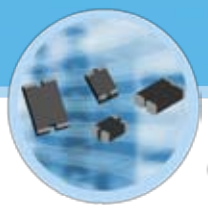








Common Mode Monolithic Chip Beads



- **Up To 10 Amps Continuous Operation**
- **Stable Under Load**
- **Low Profile**
- **Monolithic**
- **Small Footprint**
- **Vibration Resistant**

Surface Mount Common Mode Chip Beads offer low profile, compact filtering of common mode noise (EMI) for applications carrying up to 10 amps of continuous current. The advanced monolithic construction provides low profiles with a package size as small as EIA 1812, perfect for filtering power supply circuits in notebook computers, power adapters, and other mobile products. Servers, workstations, and consumer products benefit as the compact packages allow increased component density in high current circuits. All versions are lead-free and RoHS compliant. Stable performance under load.

PART NUMBER SYSTEM EXAMPLE

CM	1812	R	600	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
CM1812R600R-10	22	60	112	138	146	1519	0.0005	5,000
CM1812X330R-10	18	33	62	74	88	2359	0.0030	10,000
CM1922X330R-10	14	33	64	86	93	1783	0.0030	10,000
CM3312R111R-10	44	110	168	165	170	800	0.0050	5,000
CM3322P400R-10	13	40	121	185	251	1931	0.0300	4,000
CM3322U610R-10	26	61	123	170	191	1581	0.0090	7,000
CM3322X630R-10	26	63	114	152	165	1459	0.0080	10,000

Part Number	Fig #	EIA PKG. SIZE	METRIC PKG. SIZE	A mm (inches)	B mm (inches)	C mm (inches)
CM1812R600R-10	2	1812	4532	4.57 (0.180)	3.05 (0.120)	2.36 (0.093)
CM1812X330R-10	2	1812	4532	4.57 (0.180)	3.05 (0.120)	1.60 (0.063)
CM1922X330R-10	1	1922	4756	4.70 (0.185)	5.60 (0.220)	2.85 (0.112)
CM3312R111R-10	2	3312	8531	8.50 (0.335)	3.05 (0.120)	2.36 (0.093)
CM3322P400R-10	1	3322	8556	8.50 (0.335)	5.60 (0.220)	2.10 (0.083)
CM3322U610R-10	1	3322	8556	8.50 (0.335)	5.60 (0.220)	2.10 (0.083)
CM3322X630R-10	1	3322	8556	8.50 (0.335	5.60 (0.220)	2.85 (0.112)

Figure 1

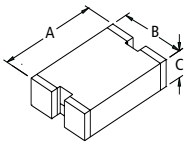
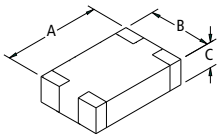


Figure 2

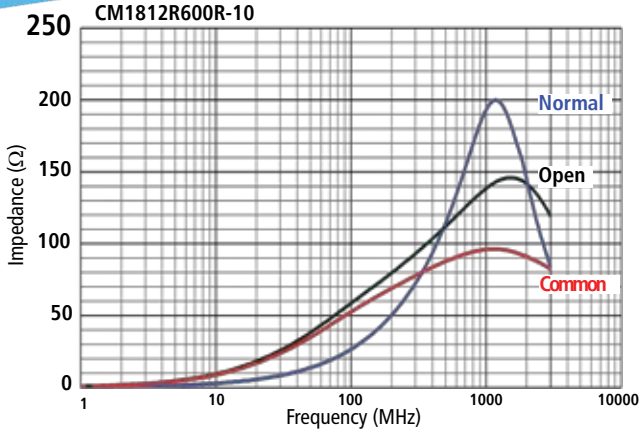


Parts have no polarity.

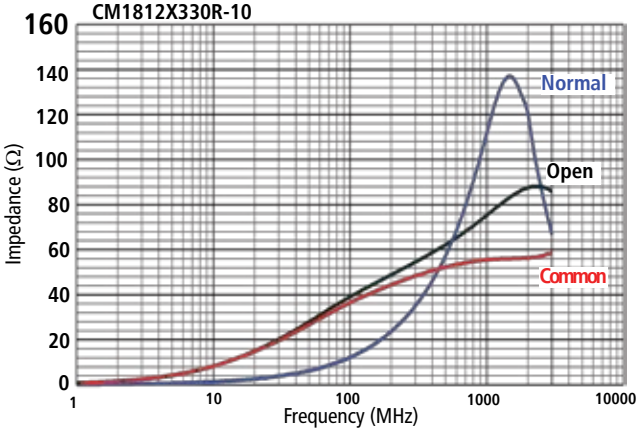
See Page 41 for Equivalent Circuit Examples. Common Mode Choke Master List on Pages 42 & 43.

Normal (differential), Open & Common Mode Impedance

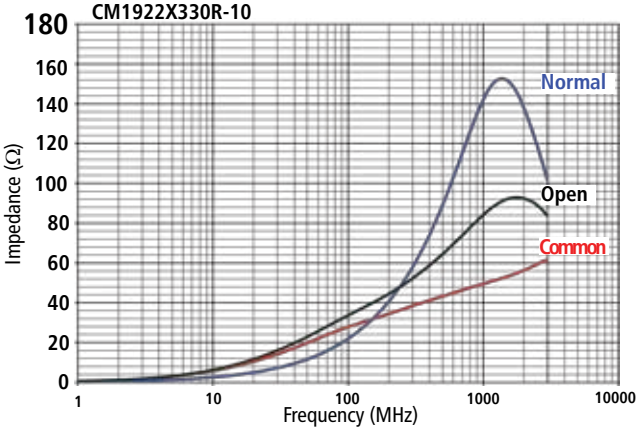
CM1812R600R-10



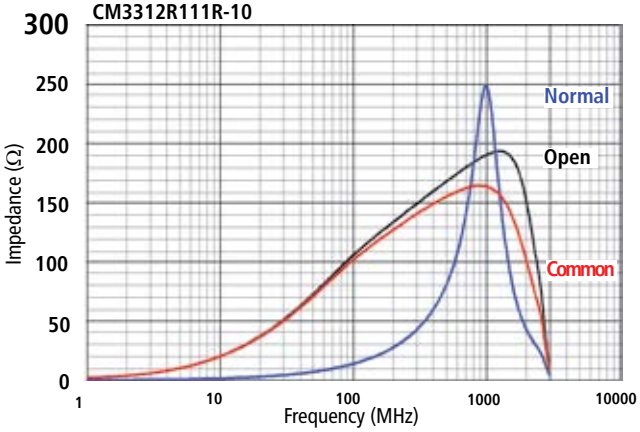
CM1812X330R-10



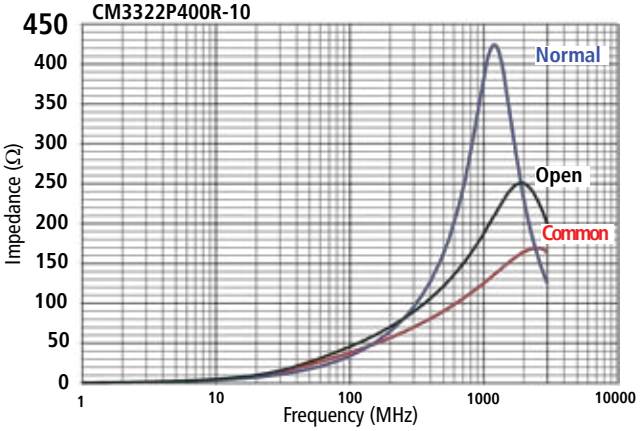
CM1922X330R-10



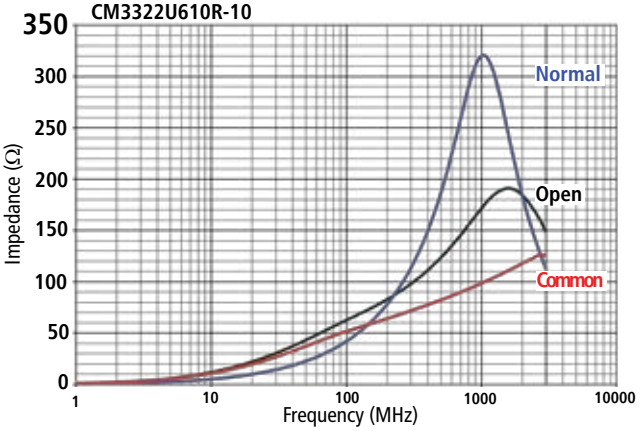
CM3312R111R-10



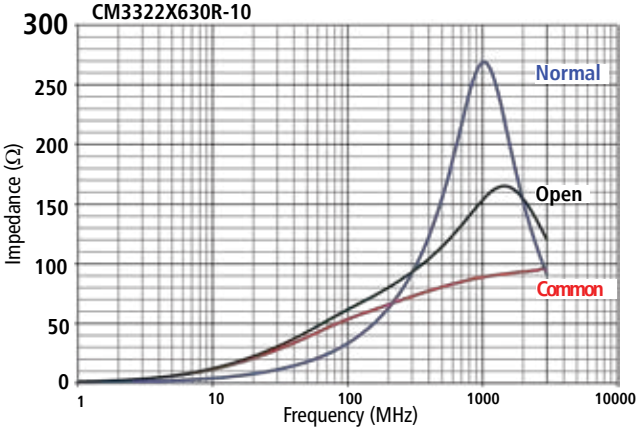
CM3322P400R-10



CM3322U610R-10

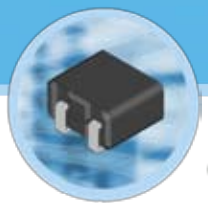


CM3322X630R-10



Quick reference comparison impedance curves for groups of chip beads and common mode chokes are on pages 54 to 63.

All data charts can be sorted at www.lairdtech.com.



- 15 Amps Continuous Operation Capability
- Broadband Performance
- Surface Mount
- Robust Construction
- More Board Flex Tolerance Than Monolithic Components
- Stable Performance Under Load

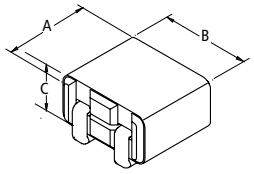
The Series 21 Common Mode Chokes offer compact common mode EMI filtering in applications carrying up to 15 amps continuous current. The robust construction, large conductors, and broad impedance vs frequency characteristics provide secure mounting and wide-ranging performance in applications that operate in extreme conditions. Stable performance under load.

PART NUMBER SYSTEM EXAMPLE

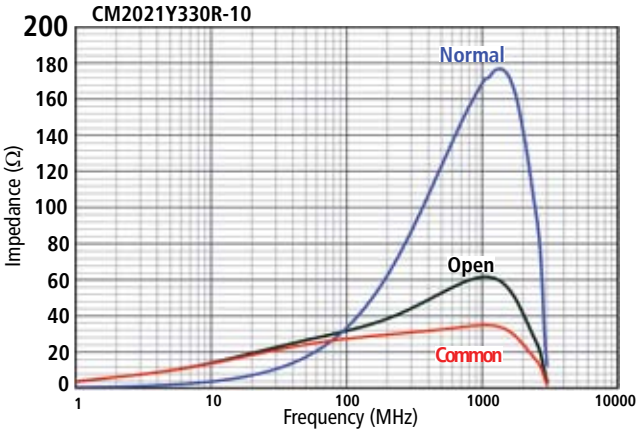
CM	2021	Y	330	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

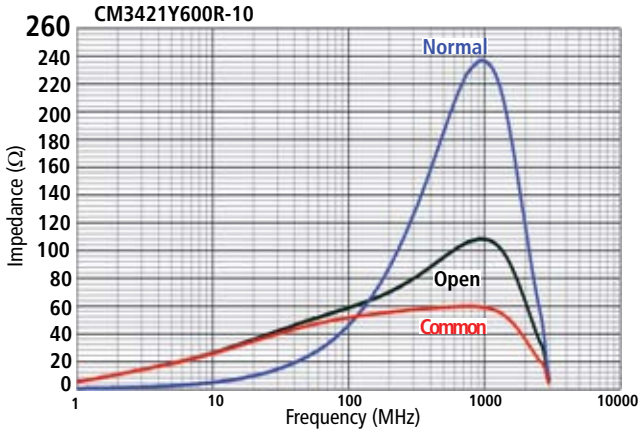
Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
CM2021Y330R-10	18	33	52	61	62	1100	0.0008	15,000
CM3421Y600R-10	39	60	96	110	110	1000	0.0008	15,000

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)



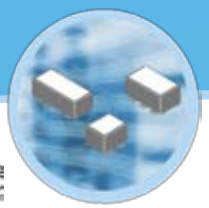
Normal (differential), Open, Common Mode Impedance





See Page 41 for Equivalent Circuit Examples

Common Mode Array - Series 22



- Up to 5 Amps Continuous Operating Capability
- 2, 3 & 4 Choke Array Versions
- Surface Mount
- Stable Performance Under Load
- Low Normal (Differential) Mode Impedance at 100 MHz

PART NUMBER SYSTEM EXAMPLE

CM	2722	R	800	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

Part Number	ONE PASS TYPICAL IMPEDANCE (Ω)				ONE PASS TYPICAL PEAK		DCR MAX (Ω)	Rated I MAX (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz	Impedance (Ω)	Impedance Frequency (MHz)		
CM2722R800R-10	60	80	92	98	140	3000	0.0200	5,000
CM2722R151R-10	113	150	165	165	168	1783	0.0200	5,000
CM2722R201R-10	141	200	202	187	206	272	0.0200	5,000
CM3822R800R-10	63	80	97	105	151	3000	0.0200	5,000
CM3822R151R-10	108	150	170	169	172	1646	0.0200	5,000
CM3822R201R-10	140	200	207	187	213	218	0.0200	5,000
CM5022R800R-10	61	80	95	102	150	3000	0.0200	5,000
CM5022R151R-10	112	150	165	167	177	2092	0.0200	5,000
CM5022R201R-10	144	200	206	188	210	306	0.0200	5,000

Part Number	Fig #	# of Chokes	A mm (inches)	B mm (inches)	C mm (inches)
CM2722R800R-10	1	2	6.99 (0.275)	5.72 (0.225)	4.32 (0.170)
CM2722R151R-10	1	2	6.99 (0.275)	5.72 (0.225)	7.62 (0.300)
CM2722R201R-10	1	2	6.99 (0.275)	5.72 (0.225)	9.53 (0.375)
CM3822R800R-10	2	3	9.78 (0.385)	5.72 (0.225)	4.32 (0.170)
CM3822R151R-10	2	3	9.78 (0.385)	5.72 (0.225)	7.62 (0.300)
CM3822R201R-10	2	3	9.78 (0.385)	5.72 (0.225)	9.53 (0.375)
CM5022R800R-10	3	4	12.57 (0.495)	5.72 (0.225)	4.32 (0.170)
CM5022R151R-10	3	4	12.57 (0.495)	5.72 (0.225)	7.62 (0.300)
CM5022R201R-10	3	4	12.57 (0.495)	5.72 (0.225)	9.53 (0.375)

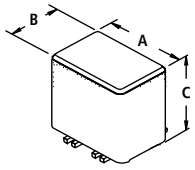


Figure 1
Two Chokes

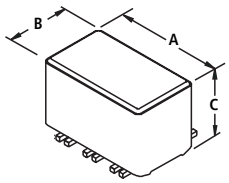


Figure 2
Three Chokes

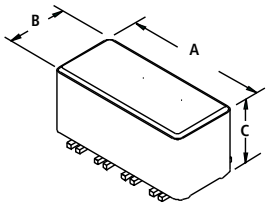


Figure 3
Four Chokes

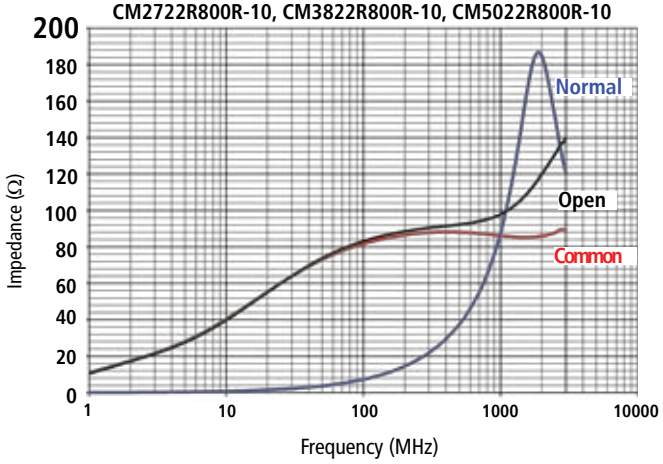
Side by side arrays can be installed in series to multiply impedance

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

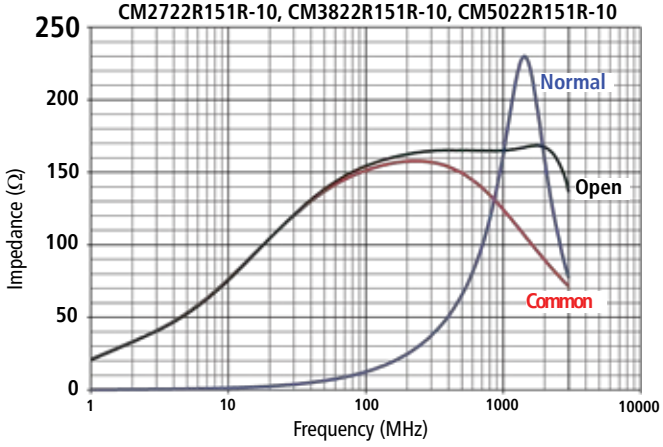
Part Impedance

Normal (Differential) / Open / Common

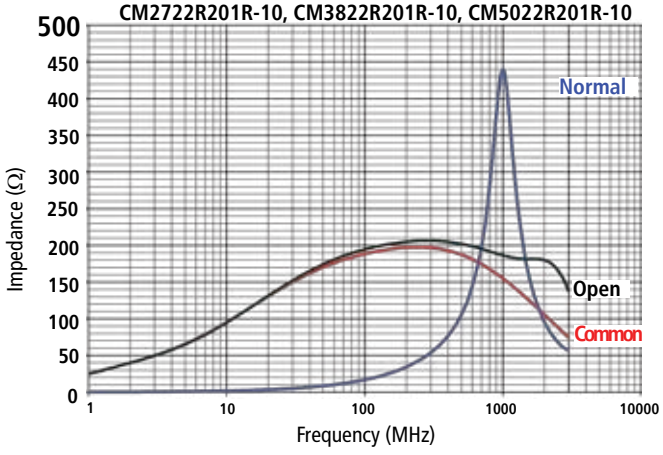
CM2722R800R-10, CM3822R800R-10, CM5022R800R-10



CM2722R151R-10, CM3822R151R-10, CM5022R151R-10



CM2722R201R-10, CM3822R201R-10, CM5022R201R-10

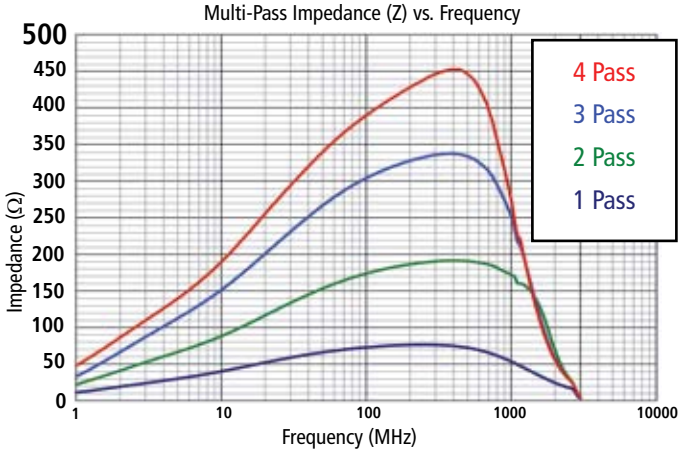


Multi-Pass Impedance

(for multiple pass board layout options)

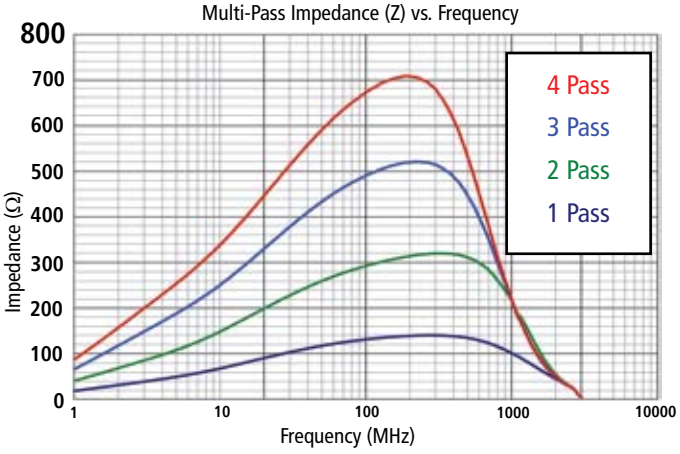
CM2722R800R-10, CM3822R800R-10, CM5022R800R-10

Multi-Pass Impedance (Z) vs. Frequency



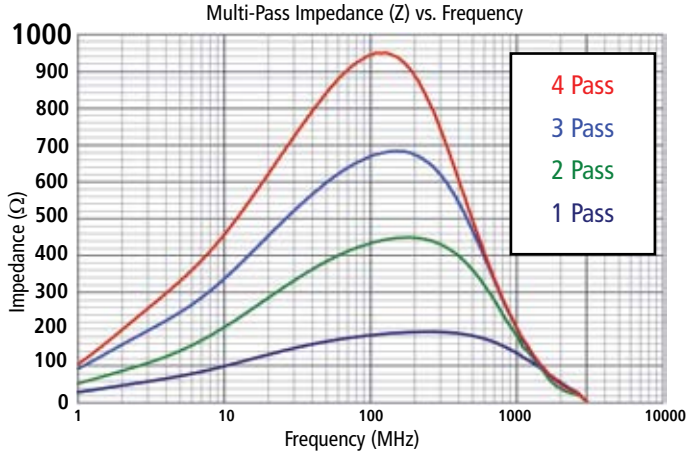
CM2722R151R-10, CM3822R151R-10, CM5022R151R-10

Multi-Pass Impedance (Z) vs. Frequency



CM2722R201R-10, CM3822R201R-10, CM5022R201R-10

Multi-Pass Impedance (Z) vs. Frequency



See Page 41 for Multiple Pass Equivalent Circuit Examples And Explanation

Common Mode Array - Series 32

- Up to 8 Amps Continuous Operating Capability
- 2, 3 & 4 Choke Array Versions
- Low Normal Mode Impedance at 100 MHz
- Surface Mount
- Stable Performance Under Load

PART NUMBER SYSTEM EXAMPLE

CM	3032	V	121	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

Part Number	ONE PASS TYPICAL IMPEDANCE (Ω)				ONE PASS TYPICAL PEAK		DCR MAX (Ω)	Rated I MAX (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz	Impedance (Ω)	Impedance Frequency (MHz)		
CM3032V121R-10	80	120	130	140	169	200	0.0100	8,000
CM3032V201R-10	143	200	210	199	214	319	0.0100	8,000
CM3032V301R-10	211	300	280	224	307	214	0.0100	8,000
CM4732V201R-10	152	200	218	187	229	241	0.0100	8,000
CM4732V301R-10	217	300	250	172	328	168	0.0100	8,000
CM6032V201R-10	140	200	219	213	219	500	0.0100	8,000
CM6032V301R-10	240	300	258	170	346	149	0.0100	8,000

Part Number	Fig #	# of Chokes	A mm (inches)	B mm (inches)	C mm (inches)
CM3032V121R-10	1	2	7.62 (0.300)	8.13 (0.320)	5.72 (0.225)
CM3032V201R-10	1	2	7.62 (0.300)	8.13 (0.320)	9.45 (0.372)
CM3032V301R-10	1	2	7.62 (0.300)	8.13 (0.320)	14.48 (0.570)
CM4732V201R-10	2	3	11.94 (0.470)	8.13 (0.320)	9.45 (0.372)
CM4732V301R-10	2	3	11.94 (0.470)	8.13 (0.320)	14.48 (0.570)
CM6032V201R-10	3	4	15.24 (0.600)	8.13 (0.320)	9.45 (0.372)
CM6032V301R-10	3	4	15.24 (0.600)	8.13 (0.320)	14.48 (0.570)

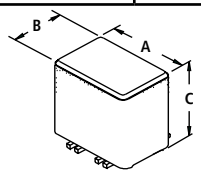


Figure 1
Two Chokes

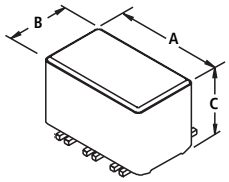


Figure 2
Three Chokes

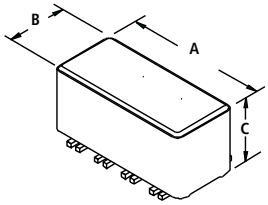


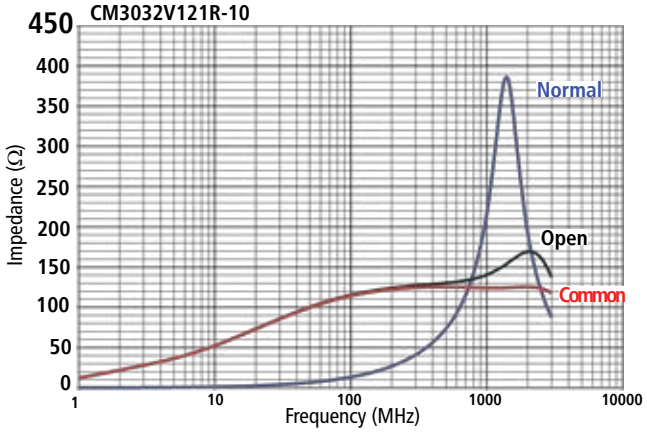
Figure 3
Four Chokes

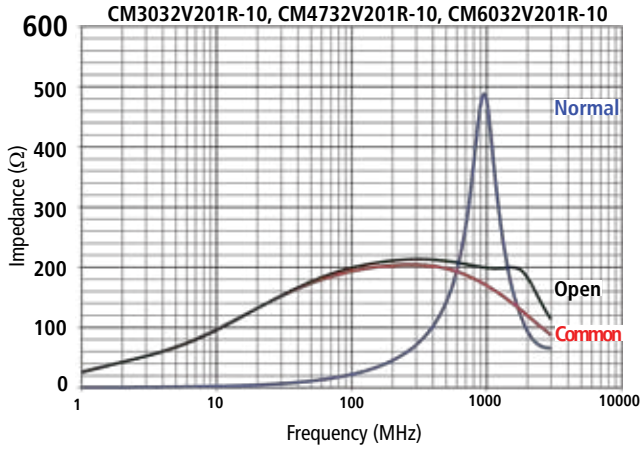
Side by side arrays can be installed in series to multiply impedance

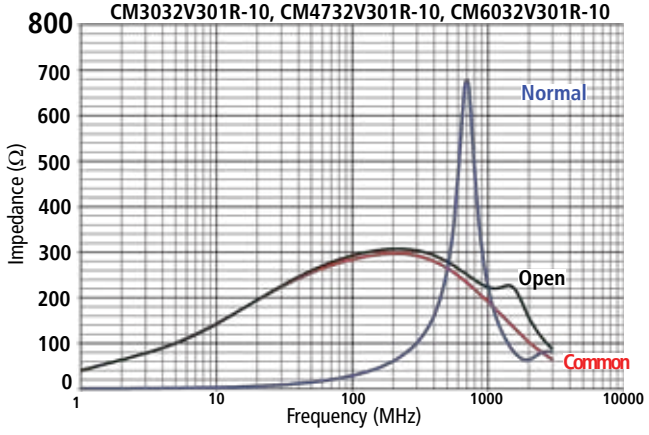
Part Number	# of Chokes	TYPICAL IMPEDANCE (Ω) FOR MULTIPLE PASS BOARD LAYOUT OPTIONS											
		One Pass			Two Pass			Three Pass			Four Pass		
		100 MHz	500 MHz	1 GHz	100 MHz	500 MHz	1 GHz	100 MHz	500 MHz	1 GHz	100 MHz	500 MHz	1 GHz
CM3032V121R-10	2	120	130	140	266	284	241	-	-	-	-	-	-
CM3032V201R-10	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

Normal (Differential) / Open / Common

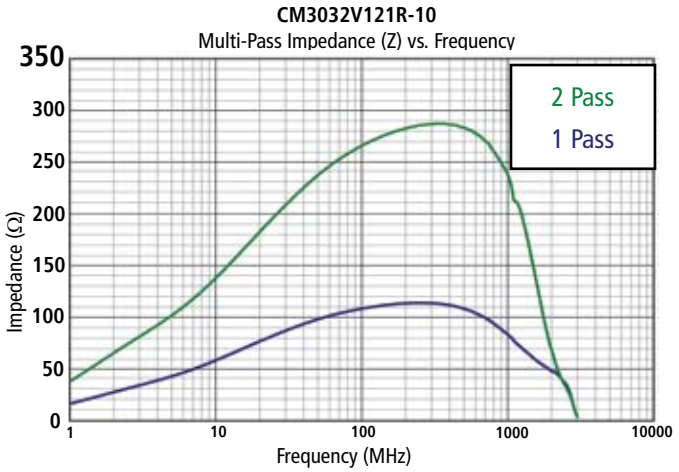


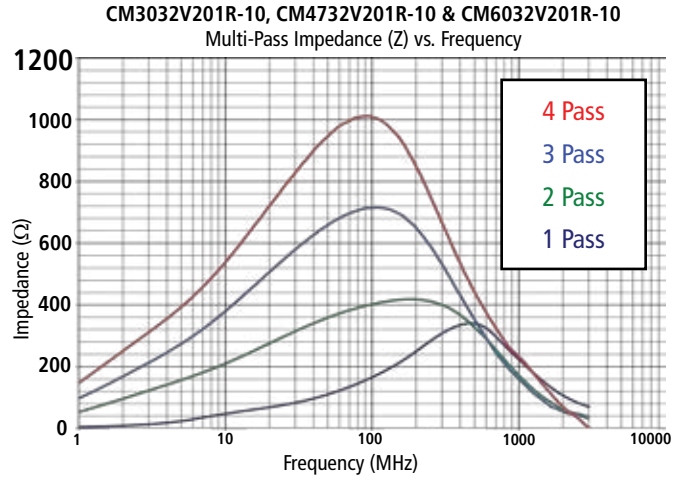


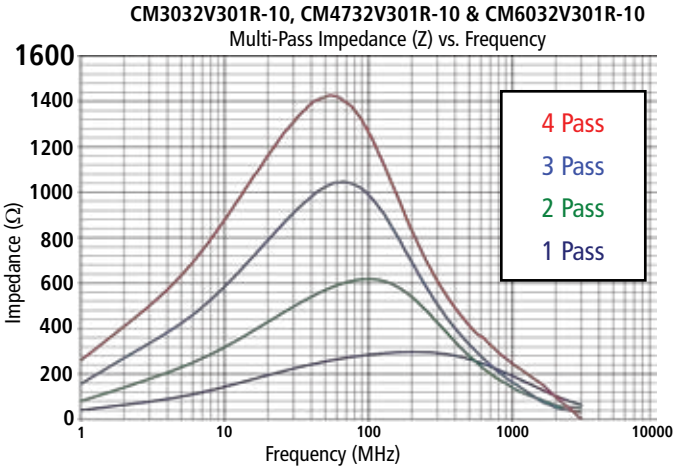


Multi-Pass Impedance

(for multiple pass board layout options)







See Page 41 for Multiple Pass Equivalent Circuit Examples and Explanation

Common Mode Chokes - Series 40

- Both Thru-Hole (B) & Surface Mount (R) Versions Available
- Broadband Filtering At High Currents
- Up to 20 Amps Operating Capability
- Low DCR

Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
CM3440Z171B-10	116	170	189	202	202	1000	0.0010	20,000
CM3440Z171R-10	116	170	189	202	202	1000	0.0010	20,000
CM5740Z171B-10	116	170	189	202	202	1000	0.0010	20,000
CM5740Z171R-10	116	170	189	202	202	1000	0.0010	20,000

Part Number	Fig #	Installation Orientation	# of Chokes	A mm (inches)	B mm (inches)	C mm (inches)
CM3440Z171B-10	1	Thru-Hole	1	8.51 (0.335)	10.03 (0.395)	9.32 (0.367)
CM3440Z171R-10	2	Surface Mount	1	8.51 (0.335)	10.03 (0.395)	9.32 (0.367)
CM5740Z171B-10	3	Thru-Hole	2	14.48 (0.570)	10.03 (0.395)	9.32 (0.367)
CM5740Z171R-10	4	Surface Mount	2	14.48 (0.570)	10.03 (0.395)	9.32 (0.367)

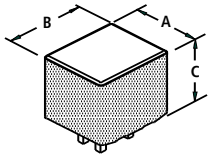


Figure #1
Thru-Hole

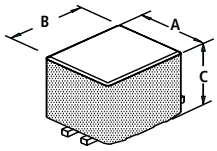


Figure #2
Surface Mount

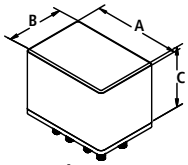


Figure #3
Two Chokes / Thru-Hole

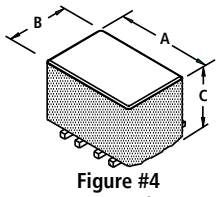
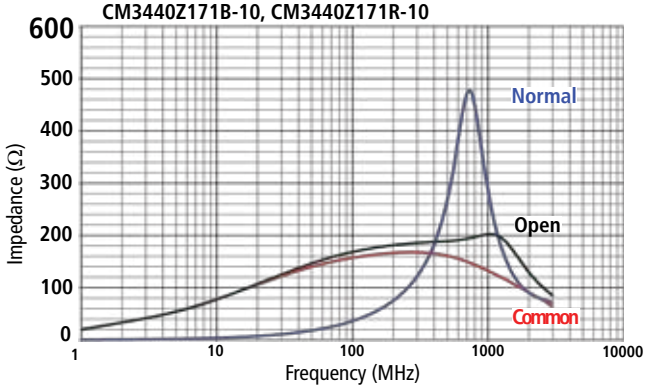
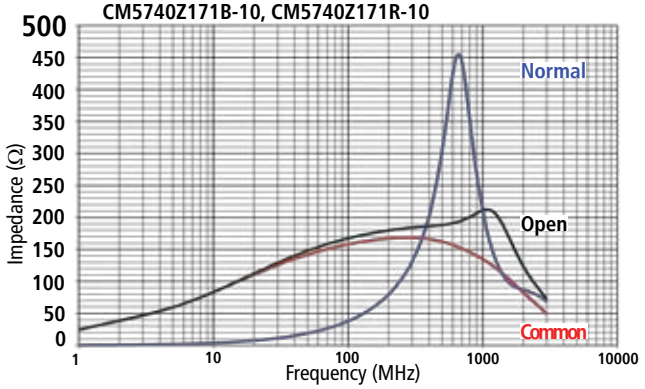


Figure #4
Two Chokes / Surface Mount

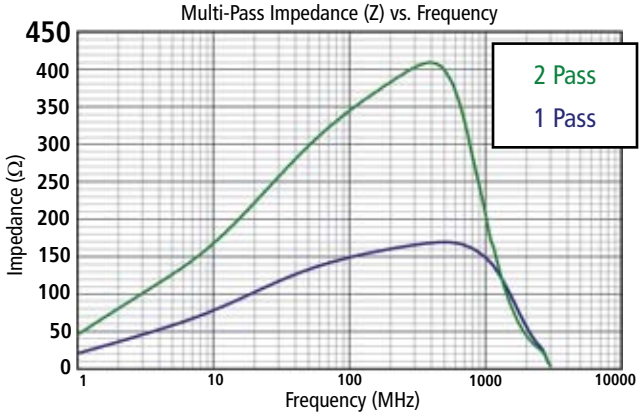
CM3440Z171B-10, CM3440Z171R-10



CM5740Z171B-10, CM5740Z171R-10



CM5740Z171B-10, CM5740Z171R-10
Multi-Pass Impedance (Z) vs. Frequency



3 Line Common Mode Choke - Series 44

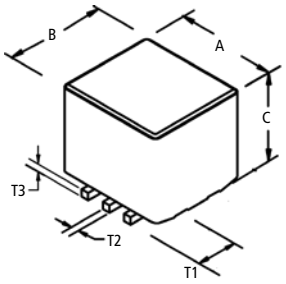
- 3-Line Common Mode Choke
- 20 Amps Continuous Current
- Broadband Performance 50MHz to 3GHz+
- Surface Mount Design
- Tape and Reel Packaging
- Stable Performance Under Load

As devices become more complex, flexibility in delivering power supply becomes more challenging. Multiple voltages must be supplied to power the variety of components present in modern devices. The new Laird Technologies CM4440V111R-10 filters multiple supply conductors carrying up to 20A continuous current.

PART NUMBER SYSTEM EXAMPLE

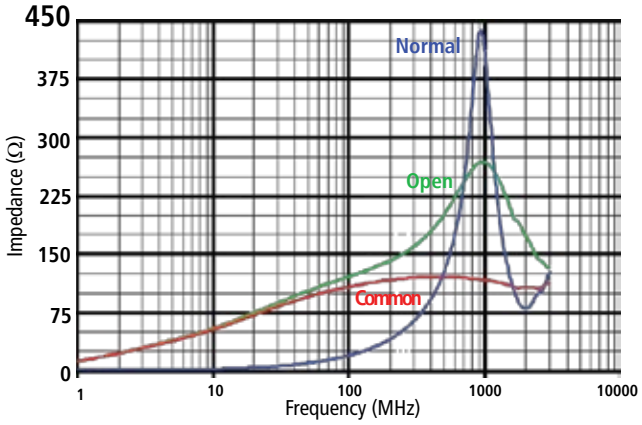
CM	2021	Y	330	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA
Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
79	110	122	117	122	500	0.0010	20,000

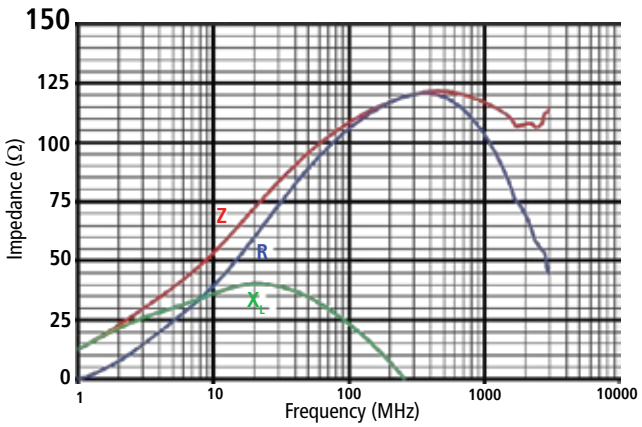


A mm (inches)	B mm (inches)	C mm (inches)	T1 mm (inches)	T2 mm (inches)	T3 mm (inches)
11.05 (0.435)	10.03 (0.395)	9.32 (0.367)	3.56 (0.14)	0.76 (0.030)	0.76 (0.030)

Normal (differential), Open, Common Mode Impedance



Z, R, X_L VS Frequency



See Page 41 for Equivalent Circuit Examples

High Current Common Mode Chokes - Series 41

- **Up To 75 Amps Continuous Operation Capability**
- **Robust Construction**
- **Compact Design**
- **Thru-Hole Installation**
- **Very Low DCR**

The Series 41 Common Mode Arrays filter common mode EMI in applications of up to 75 amps continuous operating current. The combination of very low DCR and small package size allows this choke to be used when high current and high temperature limits other common mode chokes. Additionally, the high resistivity of this ferrite material and robust product design, limits concerns about product placement experienced with conventional wire wound toroidal chokes. All versions are lead-free and RoHS compliant. Stable performance under load.

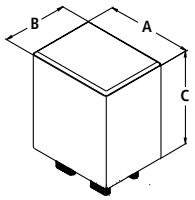
PART NUMBER SYSTEM EXAMPLE

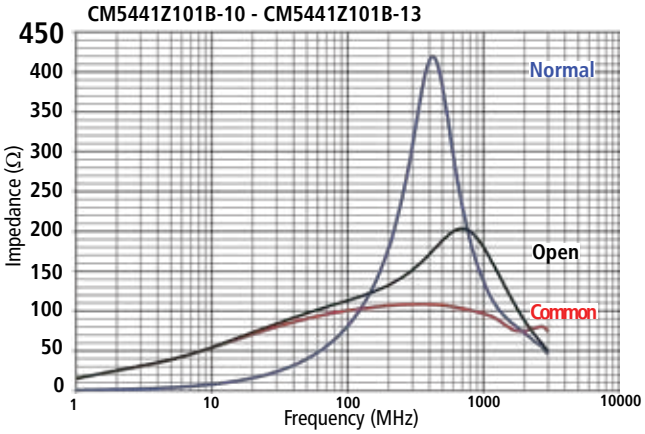
CM	5441	Z	101	B	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

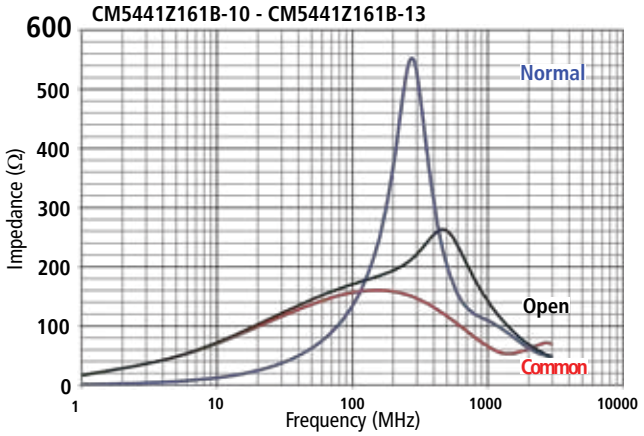
Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA @ 25 C Temp Rise	Rated I MAX (continuous) mA @ 30 C Temp Rise
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz					
CM5441Z101B-10 CM5441Z101B-13*	79	100	188	183	204	682	0.0003	30000	75,000
CM5441Z161B-10 CM5441Z161B-13*	112	160	261	146	263	457	0.0003	30000	75,000

Part Number	A mm (inches)	B mm (inches)	C mm (inches)
CM5441Z101B-10 CM5441Z101B-13*	13.72 (0.540)	10.41 (0.410)	10.52 (0.414)
CM5441Z161B-10 CM5441Z161B-13*	13.72 (0.540)	10.41 (0.410)	15.24 (0.600)

* -13 Part # suffix represents extended thru hole lead length. See www.lairdtech.com for print details.







Normal / Differential Mode Impedance: The total impedance to the differential circuit.
Open Mode Impedance: The impedance measured through a single conductor of the common mode choke.
Common Mode Impedance: The impedance to EMI noise conducted in the same direction through two conductors.

See page 27 for testing methods diagrams

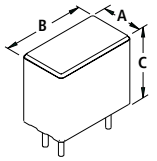
See Page 41 for Equivalent Circuit Examples and Explanations

- **Can Be Installed In A Two Turn Configuration To Mulitply Impedance**
- **Can Be Used In 3 Phase Applications**
- **10 Amps Continuous Operating Capability**

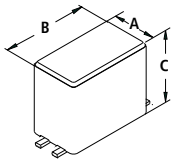
The Series 45 Common Mode Arrays offer compact filtering of common mode noise in applications carrying up to 10 amps continuous current. This product series provides the flexibility of filtering 3-phase power supply without impact on common mode filtering performance, as all conductors share a common magnetic circuit. Additionally, the 4-line array can be configured to offer over 500 Ω peak impedance for a normal 2-line circuit. Both Thru-Hole (B) & Surface Mount (R) versions available.

PART NUMBER SYSTEM EXAMPLE

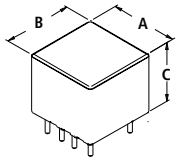
CM	2545	X	171	B	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description



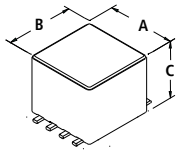
Thru Hole
CM2545X171B-10



Surface Mount
CM2545X171R-10



Thru Hole
CM4545Z131B-10

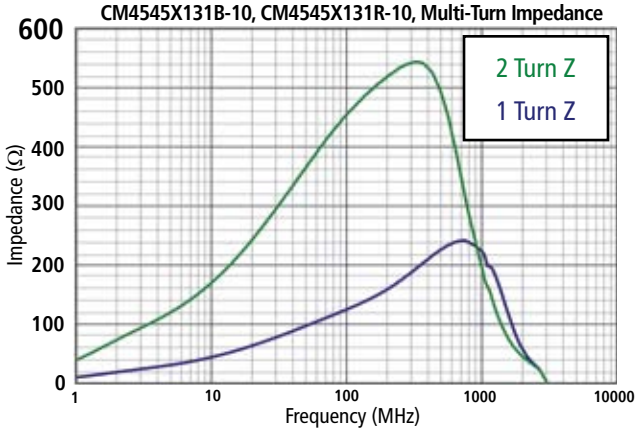


Surface Mount
CM4545Z131R-10

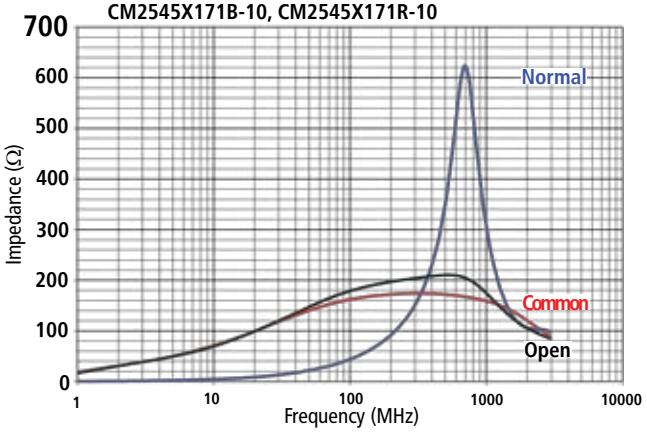
Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I Max (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
CM2545X171B-10	108	170	210	180	210	500	0.0100	10,000
CM2545X171R-10	108	170	210	180	210	500	0.0100	10,000
CM4545Z131B-10	65	130	267	256	288	682	0.0100	10,000
CM4545Z131R-10	65	130	267	256	288	682	0.0100	10,000

Part Number	# of Chokes	A mm (inches)	B mm (inches)	C mm (inches)
CM2545X171B-10	1	6.30 (0.248)	11.38 (0.448)	9.32 (0.367)
CM2545X171R-10	1	6.30 (0.248)	11.38 (0.448)	9.32 (0.367)
CM4545Z131B-10	2	11.38 (0.448)	11.38 (0.448)	9.32 (0.367)
CM4545Z131R-10	2	11.38 (0.448)	11.38 (0.448)	9.32 (0.367)

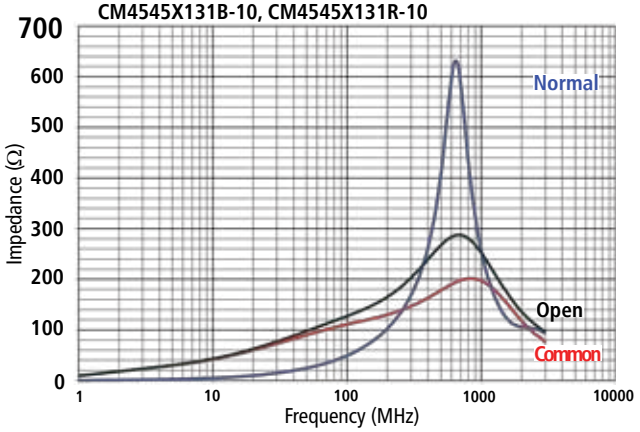
CM4545X131B-10, CM4545X131R-10, Multi-Turn Impedance



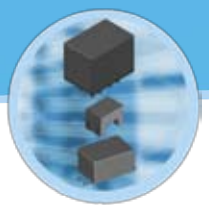
CM2545X171B-10, CM2545X171R-10



CM4545X131B-10, CM4545X131R-10



Common Mode Chokes -Low Frequency Series LF



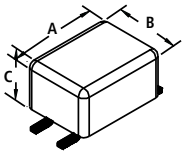
- Medical Equipment
- Telecom Applications
- Low Frequency Peak Impedance
- CM5740 Is High Current And Low DCR
- Stable Performance Under Load

PART NUMBER SYSTEM EXAMPLE

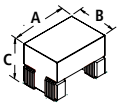
CM	1812	C	282	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

Part Number	PHYSICAL DIMENSIONS			TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I MAX (continuous) mA
	A mm (inches)	B mm (inches)	C mm (inches)	Z @ 1 MHz	Z @ 4 MHz	Z @ 10 MHz	Z @ 100 MHz				
CM1812C282R-10	5.00 (0.197)	3.50 (0.138)	5.55 (0.140)	370	1100	1900	2800	3500	50	0.5000	200
CM2824B103R-10	7.50 (0.295)	5.50 (0.217)	3.80 (0.150)	10000	8900	3980	400	13200	2	1.3000	400
CM2824E182R-10	7.50 (0.295)	5.50 (0.217)	3.80 (0.150)	200	570	920	1800	1920	80	0.2600	800
CM2824E352R-10	7.50 (0.295)	5.50 (0.217)	3.80 (0.150)	350	1400	2100	3500	3950	45	0.3000	800
CM2824E702R-10	7.50 (0.295)	5.50 (0.217)	3.80 (0.150)	3000	7000	5800	800	7200	6	0.2600	700
CM5740Z241B-10	14.40 (0.570)	10.03 (0.395)	9.32 (0.387)	170 (2 Turns)	240 (2 Turns)	173 (2 Turns)	100 (2 Turns)	276 (2 Turns)	3 (2 Turns)	0.0013	20,000

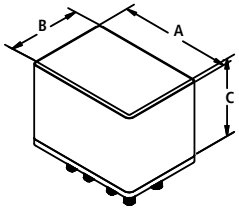
Refer to part print for additional dimensions.



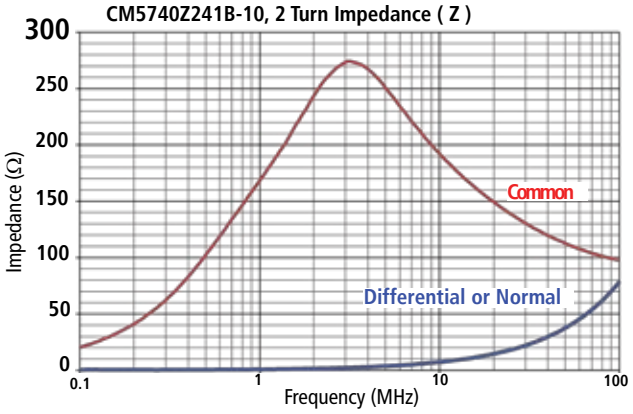
CM2824
Surface Mount

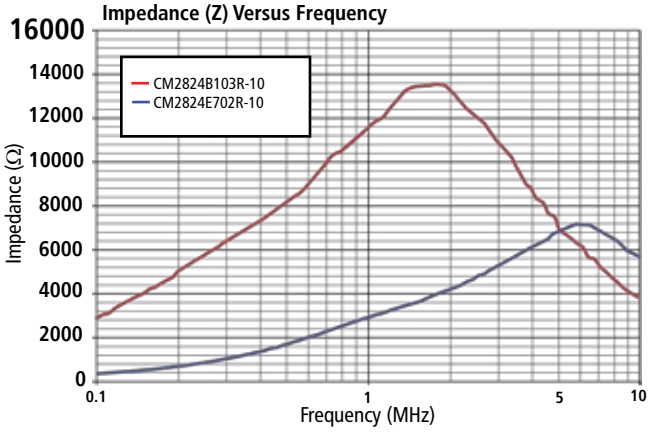


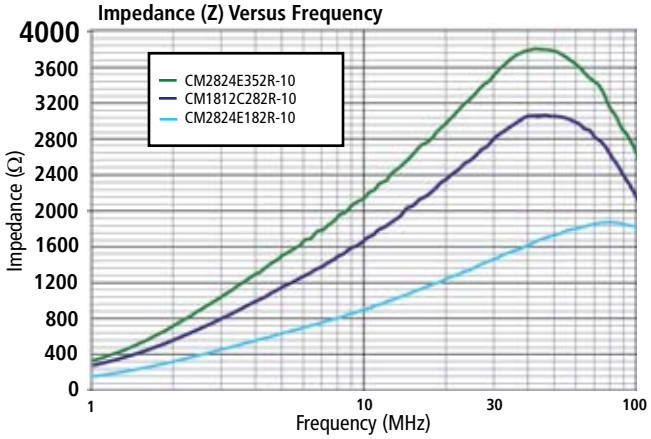
CM1812
Surface Mount



CM5740Z241B-10
Thru-Hole

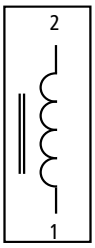




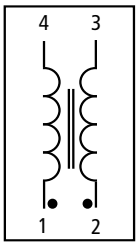


Dashed lines represent optional conductive traces in PC board.

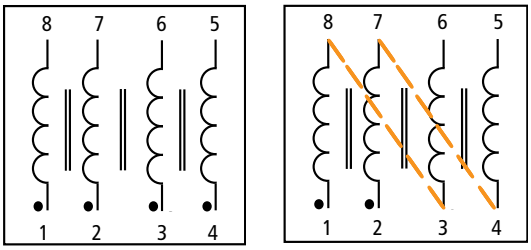
EMI Chip Beads, Chip Inductors



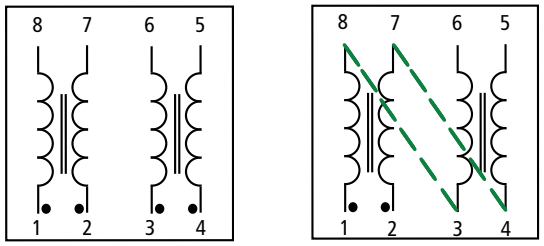
CM Beads, CM 05 / 21 / 40 41 / 45, LF CM, Can Bus



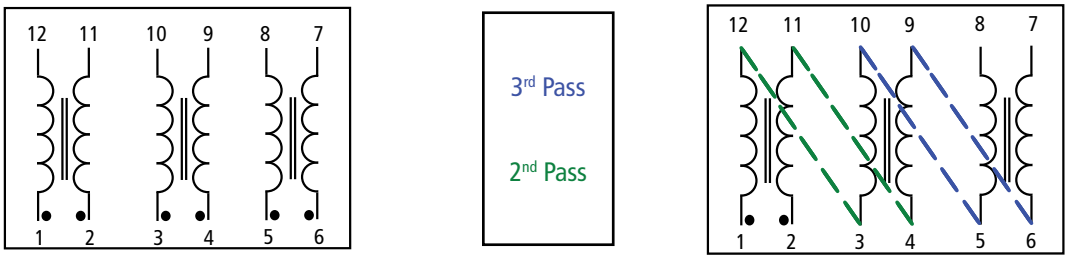
CM5740Z241B-10, CM 45 Array



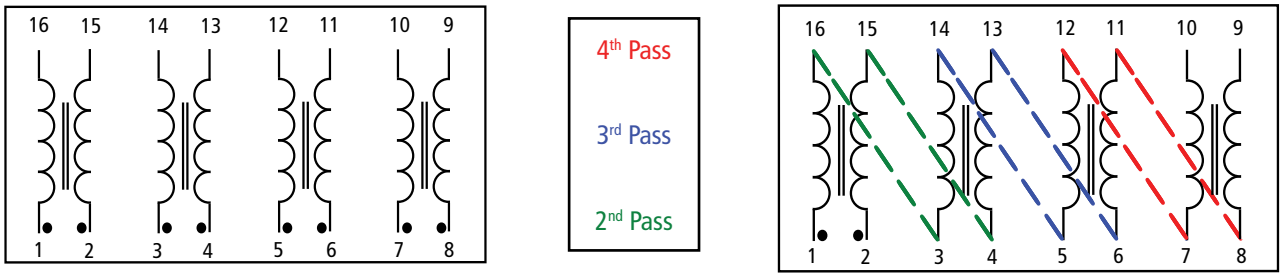
CM22 Array, CM 32 Array, CM 40 Array



CM 22 Array, CM 32 Array



CM 22 Array, CM 32 Array



Explanation of Passes & Turns

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 Technologies ferrite common mode chokes varies, Laird Technologies 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

Sorted By Impedance @ 100 MHz or 4 MHz

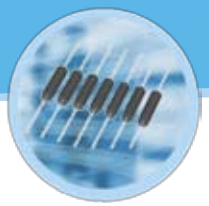
Part Number	Typical Z Ohms @ 25 MHz	Nominal Z Ohms @ 100 MHz	Typical Z Ohms @ 500 MHz	Typical Z Ohms @ 1 GHz	Typical Peak Impedance (Ohms)	Typical Peak Impedance Frequency (MHz)	DCR Max (Ohms)	Rated Continuous Current (mA)	A (mm) Length	B (mm) Width	C (mm) Height
CM1812X330R-10	18	33	62	74	88	2359	0.0030	10,000	4.57	3.05	1.60
CM1922X330R-10	14	33	64	86	93	1783	0.0030	10,000	4.70	5.60	2.85
CM2021Y330R-10	18	33	52	61	62	1100	0.0010	15,000	5.60	2.85	5.00
CM3322P400R-10	13	40	121	185	251	1931	0.0300	4,000	8.50	5.60	2.10
CM1812R600R-10	22	60	112	138	146	1519	0.0010	5,000	4.75	3.05	2.36
CM3421Y600R-10	39	60	96	110	110	1000	0.0010	15,000	5.60	2.85	8.68
CM3322U610R-10	26	61	123	170	191	1581	0.0090	7,000	8.50	5.60	2.10
CM3322X630R-10	26	63	114	152	165	1459	0.0080	10,000	8.50	5.60	2.85
CM2722R800R-10	60	80	92	98	140	3000	0.0200	5,000	6.99	5.72	4.32
CM3822R800R-10	64	80	97	105	151	3000	0.0200	5,000	9.78	5.72	4.32
CM5022R800R-10	61	80	95	102	150	3000	0.0200	5,000	12.57	5.72	4.32
CM0805D900R-10	24	90	340	435	445	1405	0.3000	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
CM5441Z101B-13	79	100	188	183	204	682	0.0008	75,000	13.72	10.41	10.52
CM4440Z111R-10	79	110	122	177	122	500	0.0010	20,000	11.05	10.03	9.32
CM3312R111R-10	44	110	168	165	170	800	0.0050	5,000	8.50	3.05	2.36
CM3032V121R-10	80	120	130	140	169	2010	0.0100	8,000	7.62	8.13	5.72
CM4545Z131B-10	65	130	267	256	288	682	0.0100	10,000	11.38	11.38	9.32
CM4545Z131R-10	65	130	267	256	288	682	0.0100	10,000	11.38	11.38	9.32
CM5022R151R-10	113	150	165	167	177	2092	0.0200	5,000	12.57	5.72	7.62
CM2722R151R-10	113	150	165	165	168	1783	0.0200	5,000	6.99	5.72	7.62
CM3822R151R-10	107	150	170	169	172	1646	0.0200	5,000	9.78	5.72	7.62
CM0805C161R-10	49	160	540	684	684	1000	0.3500	300	2.00	1.20	1.20
CM5441Z161B-10	112	160	261	146	263	457	0.0008	75,000	13.72	10.41	15.24
CM5441Z161R-13	112	160	261	146	263	457	0.0008	75,000	13.72	10.41	15.24
CM3440Z171B-10	116	170	189	202	202	1000	0.0010	20,000	8.51	10.03	9.32
CM3440Z171R-10	116	170	189	202	202	1000	0.0010	20,000	8.51	10.03	9.32
CM5740Z171B-10	114	170	189	202	202	1000	0.0010	20,000	14.48	10.03	9.32
CM5740Z171R-10	114	170	189	202	202	1000	0.0010	20,000	14.48	10.03	9.32
CM2545X171B-10	108	170	210	180	210	500	0.0100	10,000	6.30	11.38	9.32
CM2545X171R-10	108	170	210	180	210	500	0.0100	10,000	6.30	11.38	9.32
CM6032V201R-10	140	200	219	213	219	500	0.0100	8,000	15.24	8.13	9.45
CM3032V201R-10	143	200	210	199	214	319	0.0100	8,000	7.62	8.13	9.45
CM5022R201R-10	142	200	206	188	210	306	0.0200	5,000	12.57	5.72	9.53
CM2722R201R-10	142	200	202	187	206	272	0.0200	5,000	6.99	5.72	9.53
CM4732V201R-10	152	200	218	187	229	241	0.0100	8,000	11.94	8.13	9.45
CM3822R201R-10	141	200	207	187	213	218	0.0200	5,000	9.78	5.72	9.53
CM0805C221R-10	57	220	570	720	724	1147	0.4000	300	2.00	1.20	1.20
CM3032V301R-10	211	300	280	224	307	214	0.0100	8,000	7.62	8.13	14.48
CM4732V301R-10	217	300	250	172	328	168	0.0100	8,000	11.94	8.13	14.48
CM6032V301R-10	240	300	258	170	346	149	0.0100	8,000	15.24	8.13	14.48
CM0805A371R-10	186	370	730	878	878	1000	0.5000	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)	0.0010	20,000	14.48	10.03	9.32
CM2824E182R-10	200	570	920	1400	1920	80	0.2600	800	7.50	5.50	3.80
CM1812C282R-10	370	1100	1900	2700	3500	50	0.5000	200	5.00	3.50	5.55
CM2824E352R-10	350	1400	2100	3200	3950	45	0.3000	800	7.50	5.50	3.80
CM2824E702R-10	3000	7000	5800	4800	7200	6	0.2600	700	7.50	5.50	3.80
CM2824B103R-10	10000	8900	3980	1800	13200	2	1.3000	400	7.50	5.50	3.80

Stable performance under load. **All part lists and data charts are sortable on www.LAIRDTECH.com.** **Custom Parts Available.**

Sorted By Rated Current (at continuous operation)

Part Number	Typical Z Ohms @ 25 MHz	Nominal Z Ohms @ 100 MHz	Typical Z Ohms @ 500 MHz	Typical Z Ohms @ 1 GHz	Typical Peak Impedance (Ohms)	Typical Peak Impedance Frequency (MHz)	DCR Max (Ohms)	Rated Continuous Current (mA)	A Length (mm)	B Width (mm)	C Height (mm)
CM0805A371R-10	186	370	730	878	878	1,000	0.5000	100	2.00	1.20	1.20
CM0805C161R-10	49	160	540	684	684	1,000	0.3500	300	2.00	1.20	1.20
CM0805C221R-10	57	220	570	720	724	1,147	0.4000	300	2.00	1.20	1.20
CM0805D900R-10	24	90	340	435	445	1,405	0.3000	400	2.00	1.20	1.20
CM3322P400R-10	13	40	121	185	251	1,931	0.0300	4,000	8.50	5.60	2.10
CM1812R600R-10	22	60	112	138	146	1,519	0.0010	5,000	4.75	3.05	2.36
CM2722R151R-10	113	150	165	165	168	1,783	0.0200	5,000	6.99	5.72	7.62
CM2722R201R-10	142	200	202	187	206	272	0.0200	5,000	6.99	5.72	9.53
CM2722R800R-10	60	80	92	98	140	3,000	0.0200	5,000	6.99	5.72	4.32
CM3312R111R-10	44	110	168	165	170	800	0.0050	5,000	8.50	3.05	2.36
CM3822R151R-10	107	150	170	169	172	1,646	0.0200	5,000	9.78	5.72	7.62
CM3822R201R-10	141	200	207	187	213	218	0.0200	5,000	9.78	5.72	9.53
CM3822R800R-10	64	80	97	105	151	3,000	0.0200	5,000	9.78	5.72	4.32
CM5022R151R-10	113	150	165	167	177	2,092	0.0200	5,000	12.57	5.72	7.62
CM5022R201R-10	142	200	206	188	210	306	0.0200	5,000	12.57	5.72	9.53
CM5022R800R-10	61	80	95	102	150	3,000	0.0200	5,000	12.57	5.72	4.32
CM3322U610R-10	26	61	123	170	191	1,581	0.0090	7,000	8.50	5.60	2.10
CM3032V121R-10	80	120	130	140	169	2,010	0.0100	8,000	7.62	8.13	5.72
CM3032V201R-10	143	200	210	199	214	319	0.0100	8,000	7.62	8.13	9.45
CM3032V301R-10	211	300	280	224	307	214	0.0100	8,000	7.62	8.13	14.48
CM4732V201R-10	152	200	218	187	229	241	0.0100	8,000	11.94	8.13	9.45
CM4732V301R-10	217	300	250	172	328	168	0.0100	8,000	11.94	8.13	14.48
CM6032V201R-10	140	200	219	213	219	500	0.0100	8,000	15.24	8.13	9.45
CM6032V301R-10	240	300	258	170	346	149	0.0100	8,000	15.24	8.13	14.48
CM1812X330R-10	18	33	62	74	88	2,359	0.0030	10,000	4.57	3.05	1.60
CM1922X330R-10	14	33	64	86	93	1,783	0.0030	10,000	4.70	5.60	2.85
CM2545X171B-10	108	170	210	180	210	500	0.0100	10,000	6.30	11.38	9.32
CM2545X171R-10	108	170	210	180	210	500	0.0100	10,000	6.30	11.38	9.32
CM3322X630R-10	26	63	114	152	165	1,459	0.0080	10,000	8.50	5.60	2.85
CM4545Z131B-10	65	130	267	256	288	682	0.0100	10,000	11.38	11.38	9.32
CM4545Z131R-10	65	130	267	256	288	682	0.0100	10,000	11.38	11.38	9.32
CM2021Y330R-10	18	33	52	61	62	1,100	0.0010	15,000	5.60	2.85	5.00
CM3421Y600R-10	39	60	96	110	110	1,000	0.0010	15,000	5.60	2.85	8.68
CM3440Z171B-10	116	170	189	202	202	1,000	0.0010	20,000	8.51	10.03	9.32
CM3440Z171R-10	116	170	189	202	202	1,000	0.0010	20,000	8.51	10.03	9.32
CM4440Z111R-10	79	110	122	117	122	500	0.0010	20,000	11.05	10.03	9.32
CM5740Z171B-10	114	170	189	202	202	1,000	0.0010	20,000	14.48	10.03	9.32
CM5740Z171R-10	114	170	189	202	202	1,000	0.0010	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	0.5000	200	5.00	3.50	5.55
CM2824B103R-10	10,000	8,900	3,980	1,800	13,200	2	1.3000	400	7.50	5.50	3.80
CM2824E702R-10	3,000	7,000	5,800	4,800	7,200	6	0.2600	700	7.50	5.50	3.80
CM2824E182R-10	200	570	920	1,400	1,920	80	0.2600	800	7.50	5.50	3.80
CM2824E352R-10	350	1,400	2,100	3,200	3,950	45	0.3000	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	0.0010	20,000	14.48	10.03	9.32

Ferrite EMI Beads with Axial Wire



- Differential Mode EMI Filters
- Lead Free & RoHS Compliant
- High Current
- Thru-Hole application
- Wire Leads Thru Ferrite
- Low DCR

PART NUMBER SYSTEM EXAMPLE

28	J	0138	-1	1	R	-10
Material Type	Product Code	Part Size Code	Selected Dimension Code	Additional Description	Packaging Code	Additional Description

Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I Max (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
28J0138-11R-10	95	143	160	140	165	300	0.01	5,000
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

See diagram 1 on page 48 for equivalent circuit

Part Number	Fig #	A mm (inches)	B mm (inches)	C mm (inches)
28J0138-11R-10	1	3.51 (0.138)	25.40 (1.000)	4.45 (0.175)
28L0138-10R-10	2	3.51 (0.138)	59.00 (2.323)	4.45 (0.175)
28L0138-40R-10	2	3.51 (0.138)	59.00 (2.323)	8.89 (0.350)
28L0138-50R-10	2	3.51 (0.138)	59.00 (2.323)	9.53 (0.375)
28L0138-70R-10	2	3.51 (0.138)	59.00 (2.323)	13.97 (0.550)
28L0138-80R-10	2	3.51 (0.138)	59.00 (2.323)	5.23 (0.206)

Refer to part print for additional dimensions

Figure #1

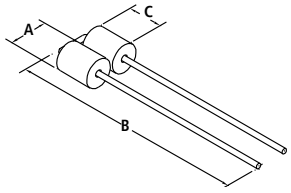
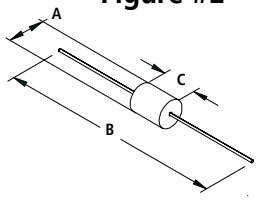
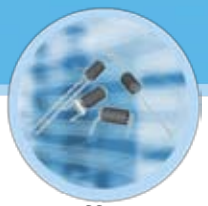


Figure #2



All current ratings (I MAX) are based on continuous operation.
Chart data can be sorted at www.lairdtech.com.

Multiple Turn Axial Wire Ferrite Beads / Cores



- Differential Mode EMI Filters
- Lead free & RoHS Compliant
- Thru-Hole Application
- Wire Wound Thru Ferrite
- Low DCR

PART NUMBER SYSTEM EXAMPLE

28	C	0236	-0	B	S	-10
Material Type	Product Code	Part Size Code	Selected Dimension Code	Additional Description	Packaging Code	Additional Description

Part Number	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I Max (continuous) mA
	Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
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

Part Number	Fig #	A mm (inches)	B mm (inches)	C mm (inches)	D mm (inches)	E mm (inches)	F mm (inches)	L1 mm (inches)
28C0236-0BS-10	1	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	2	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	3	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	4	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	5	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)

See diagram 1 on page 48 for equivalent circuit

Figure #1

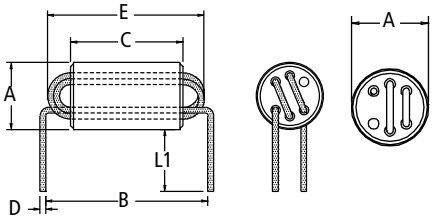


Figure #2

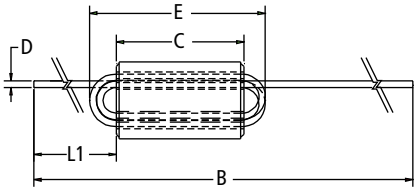


Figure #3

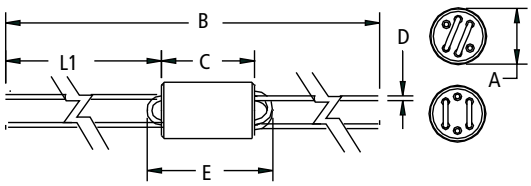


Figure #4

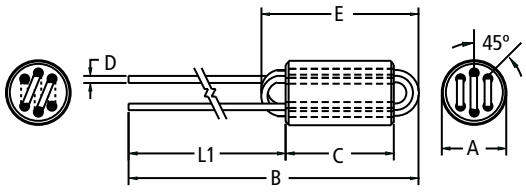
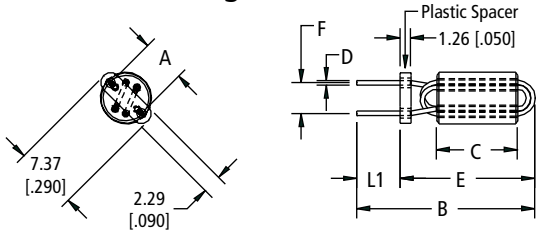


Figure #5



Differential Mode EMI Filter Arrays

- Capable Of Up To 10 Amps Continuous Operation
- 3, 4, 5 & 8 Line Configurations For Installation Flexibility
- Thru-Hole (T) and Surface Mount (R) available
- Low DCR

PART NUMBER SYSTEM EXAMPLE

29	F	0303	0	T	0	-10
Material Type	Product Code	Part Size Code	Selected Dimension Code	Additional Description	Packaging Code	Additional Description

Part Number	Equivalent Circuit Diagram (Page 47)	TYPICAL IMPEDANCE (Ω)				Typical Peak Impedance (Ω)	Typical Peak Impedance Frequency (MHz)	DCR MAX (Ω)	Rated I Max (continuous) mA
		Z @ 25 MHz	Z @ 100 MHz	Z @ 500 MHz	Z @ 1 GHz				
29F0303-0T0-10	2	180	266	278	215	288	200	0.01	8,000
29F0318-1SR-10	2	70	119	119	118	119	500	0.01	6,000
29F0328-0T0-10	2	232	342	418	360	420	350	0.01	10,000
29F0330-2SR-10	2	125	200	201	160	210	300	0.01	9,000
29F0418-0SR-10	3	48	80	80	70	83	300	0.01	6,000
29F0418-1SR-10	3	70	119	119	118	119	500	0.01	6,000
29F0428-0T0-10	3	225	342	390	350	400	300	0.01	10,000
29F0429-0T0-10	3	180	245	270	211	280	200	0.01	8,000
29F0430-2SR-10	3	120	200	230	225	235	800	0.01	8,000
29F0430-4SR-10	3	175	290	268	209	300	200	0.01	9,000
29F0528-0T0-10	4	232	342	418	360	420	350	0.01	10,000
29F0818-0SR-10	5	48	75	80	70	83	370	0.01	6,000
29F0818-1SR-10	5	70	119	119	118	119	500	0.01	6,000

Part Number	Fig #	# of Lines	A mm (inches)	B mm (inches)	C mm (inches)
29F0303-0T0-10	1	3	7.62 (0.300)	5.08 (0.200)	10.44 (0.411)
29F0318-1SR-10	2	3	4.83 (0.190)	4.50 (0.177)	4.19 (0.165)
29F0328-0T0-10	1	3	8.34 (0.328)	10.88 (0.428)	10.57 (0.416)
29F0330-2SR-10	2	3	8.33 (0.328)	10.87 (0.428)	6.35 (0.250)
29F0418-0SR-10	4	4	6.10 (0.240)	4.50 (0.177)	2.92 (0.115)
29F0418-1SR-10	4	4	6.10 (0.240)	4.50 (0.177)	4.19 (0.165)
29F0428-0T0-10	3	4	10.88 (0.428)	10.88 (0.428)	10.57 (0.416)
29F0429-0T0-10	3	4	10.88 (0.428)	5.49 (0.216)	10.44 (0.411)
29F0430-2SR-10	4	4	10.87 (0.428	10.87 (0.428)	6.35 (0.250)
29F0430-4SR-10	4	4	10.87 (0.428)	10.87 (0.428)	8.89 (0.350)
29F0528-0T0-10	5	5	13.42 (0.528)	10.88 (0.428)	10.57 (0.416)
29F0818-0SR-10	6	8	11.43 (0.450)	4.50 (0.177)	2.92 (0.115)
29F0818-1SR-10	6	8	11.43 (0.450)	4.50 (0.177)	4.19 (0.165)

Thru-Hole

Figure #1

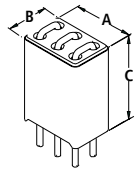


Figure #3

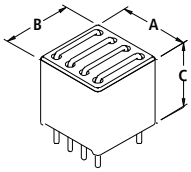
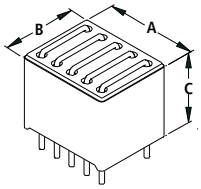


Figure #5



Surface Mount

Figure #2

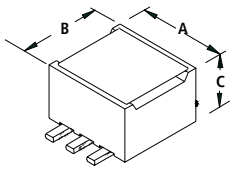


Figure #4

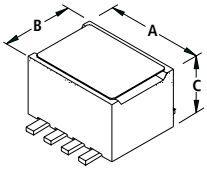
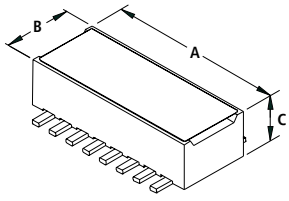


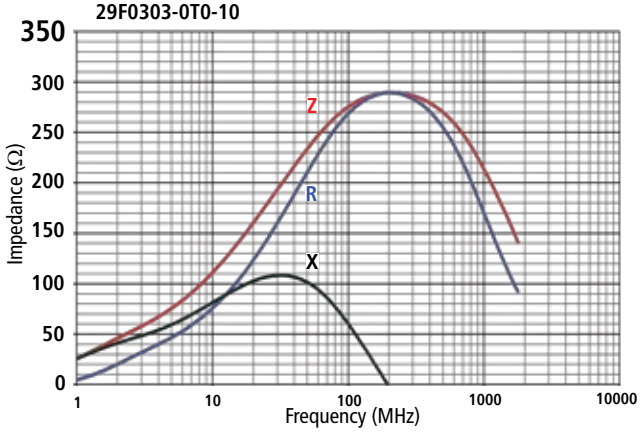
Figure #6



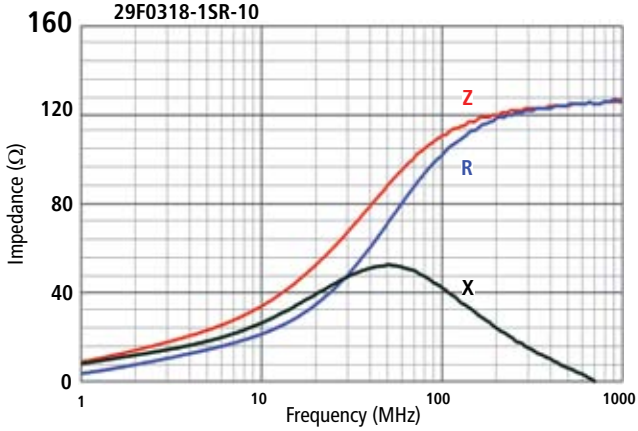
Refer to part print for additional dimensions.

Differential Mode EMI Filter Array Impedance Curves

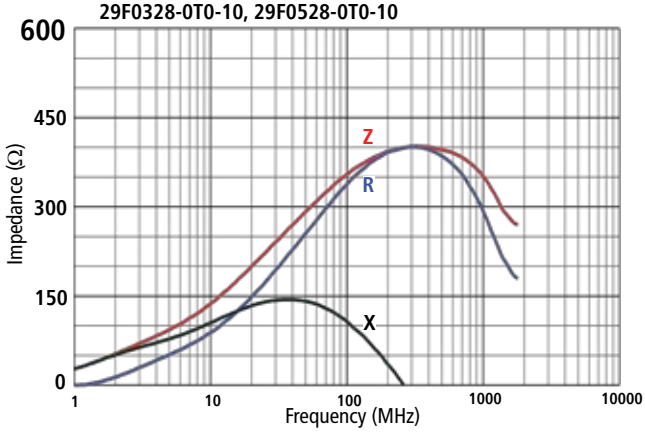
29F0303-0T0-10



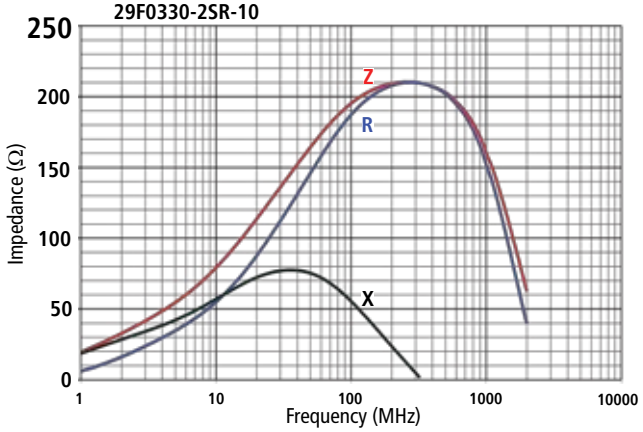
29F0318-1SR-10



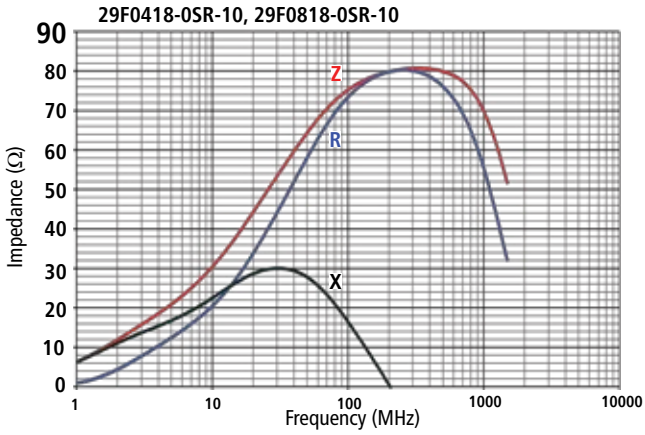
29F0328-0T0-10, 29F0528-0T0-10



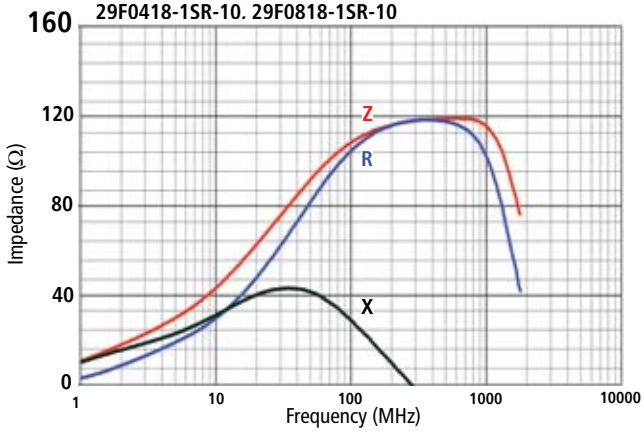
29F0330-2SR-10



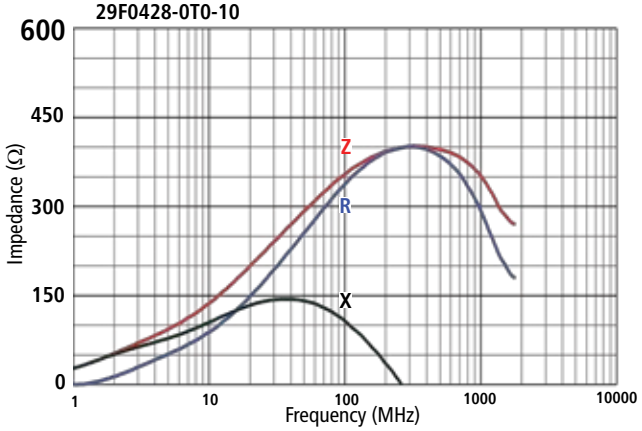
29F0418-0SR-10, 29F0818-0SR-10



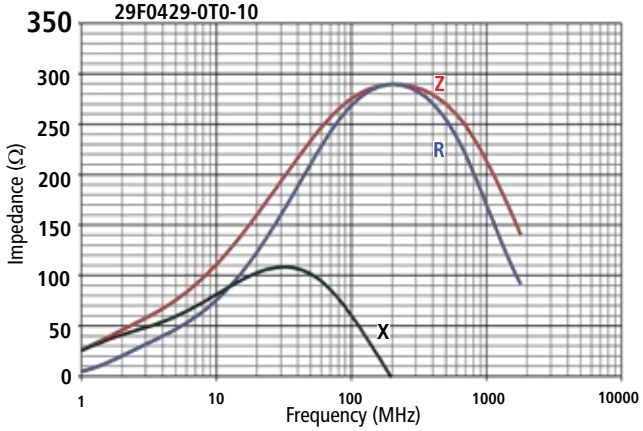
29F0418-1SR-10. 29F0818-1SR-10



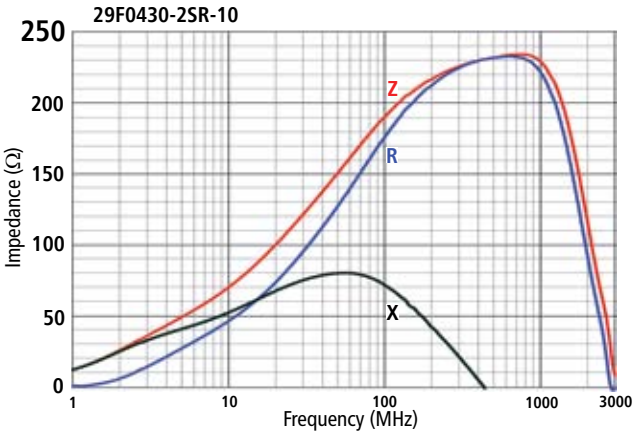
29F0428-0T0-10

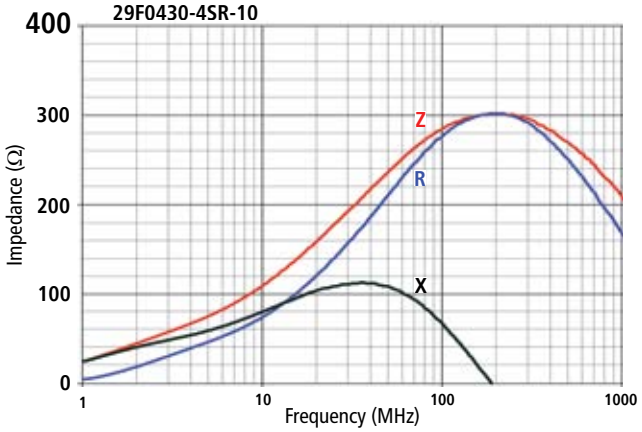


29F0429-0T0-10



Differential Mode EMI Filter Array Impedance Curves





Differential Mode Filter Equivalent Circuits

For parts shown on pages 44, 45, and 46

Diagram #1

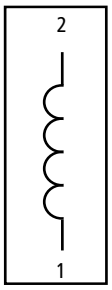


Diagram #2

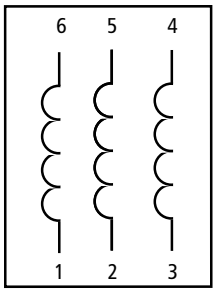


Diagram #3

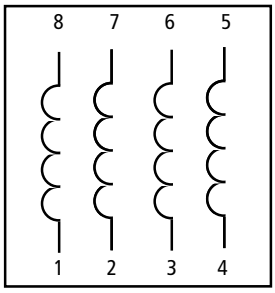


Diagram #4

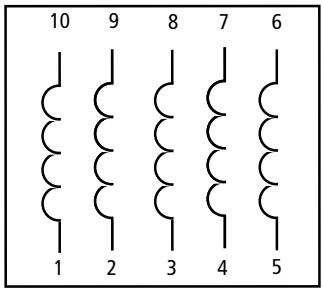
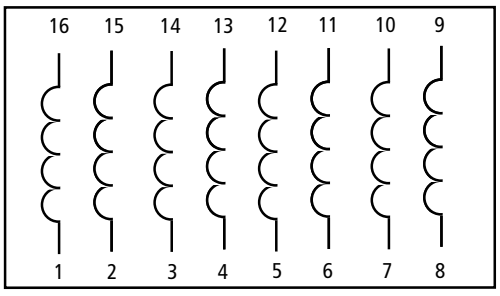


Diagram #5



Parts have no polarity

CAN-Bus Common Mode Chokes

These current compensating surface mount common mode chokes can be used in controller area networks (CAN-Bus) in automotive, industrial and medical applications.

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 also available. • Surface Mount

Applications:

• Automotive controller area network systems • Industrial controls controller area network systems • Medical monitoring systems • Filtering common mode EMI on high speed differential lines such as network and telecom applications

PART NUMBER SYSTEM EXAMPLE

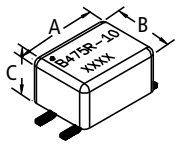
CC	1812	C	513	R	-10
Product Series Code	Part Size Code	Rated Current Code	Impedance Value Code	Packaging Code	Additional Description

Operating Temperature Range: -40°C to +125°C (0°C to 125°C for Lp ≥ 1000 µm)

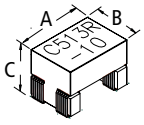
PART NUMBER	Lp Inductance (µH)				Peak Impedance (Z)	L leakage (µh)	Hi-Pot (VAC) 0.5 mA 2 sec.	DCR Typical (Ω)	Idc (mA)
	Test Conditions	MIN	NOM	MAX					
CC1812C513R-10*	100 KHz / 50 mV	35.7	51.0	66.3	3500 Ω @40 MHz	2.60	250	0.50	200
CC2824J502R-10	100 KHz / 50 mV	3.5	5.0	6.5	400 Ω @500 MHz	0.05	250	0.10	1200
CC2824E113R-10	100 KHz / 50 mV	7.7	11.0	14.3	800 Ω @200 MHz	0.05	250	0.12	800
CC2824E253R-10	100 KHz / 50 mV	17.5	25.0	32.5	2000 Ω @100 MHz	1.50	250	0.13	800
CC2824E513R-10*	100 KHz / 50 mV	35.0	51.0	66.3	3800 Ω @50 MHz	2.00	250	0.16	800
CC2824E474R-10	100 KHz / 50 mV	329.0	470.0	611.0	8600 Ω @5 MHz	0.20	750	0.20	700
CC2824E105R-10	100 KHz / 50 mV	700.0	1000.0	1500.0	4250 Ω @7 MHz	0.20	750	0.20	700
CC2824D225R-10	10 KHz / 50 mV	1540.0	2200.0	3300.0	5300 Ω @5 MHz	0.25	750	0.40	500
CC2824B475R-10	10 KHz / 50 mV	3290.0	4700.0	7050.0	12300 Ω @2 MHz	0.30	750	0.55	400

* Sector Wound

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)



CC2824
Surface Mount

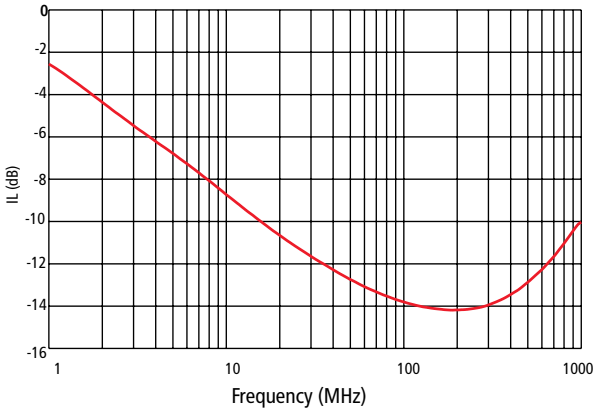


CC1812
Surface Mount

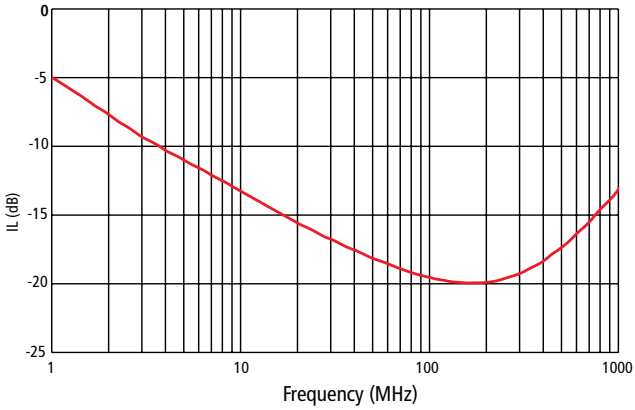
Refer to part print for specific dimensions

Typical Insertion Loss @ 50 Ω

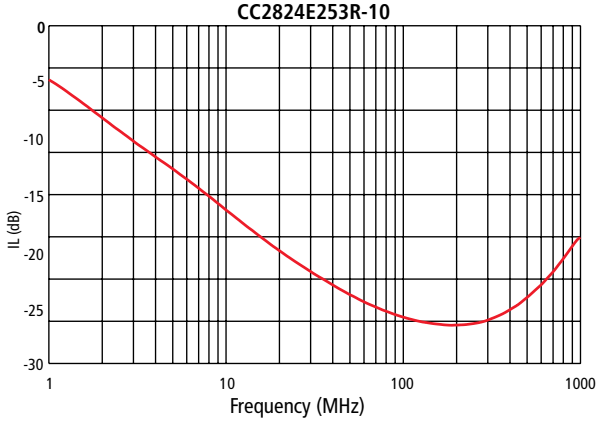
CC2824J502R-10



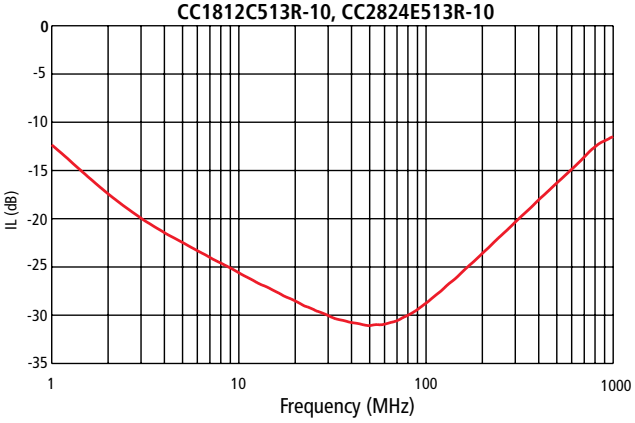
CC2824E113R-10



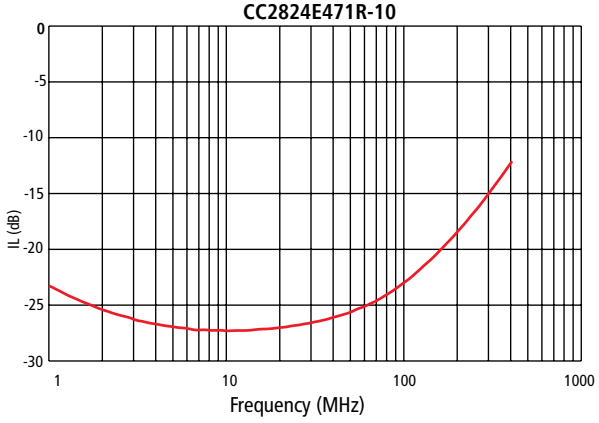
CC2824E253R-10



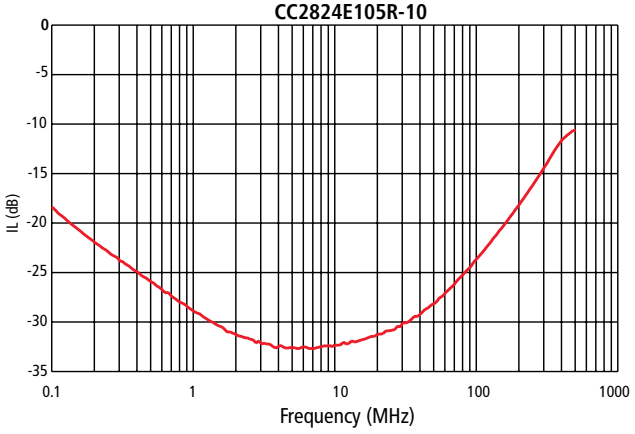
CC1812C513R-10, CC2824E513R-10



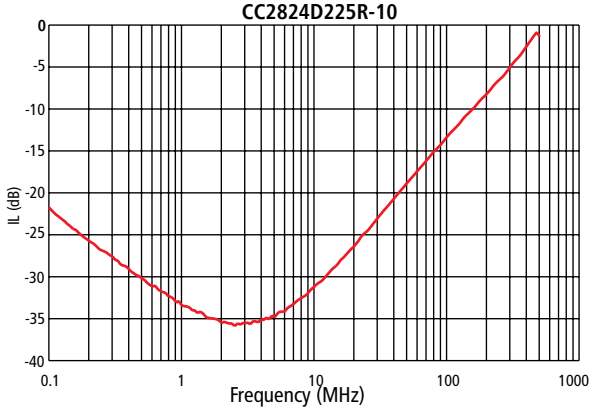
CC2824E471R-10



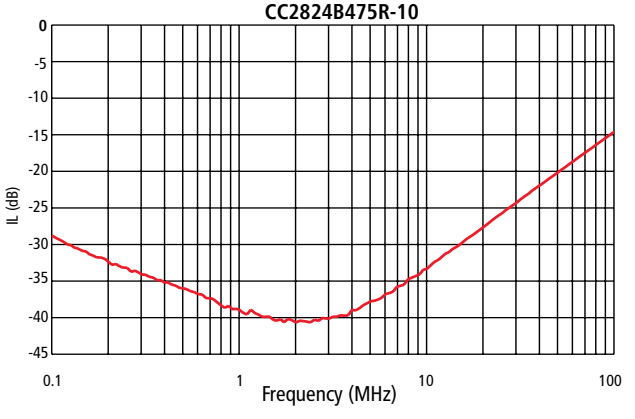
CC2824E105R-10



CC2824D225R-10



CC2824B475R-10



Features:

• Small footprint • Economical • Rugged construction • Lead Free • Monolithic

Applications:

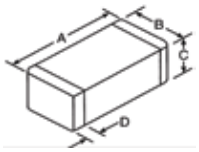
• RF and wireless communication • Information technology equipment including; computers, telecommunications, radar detectors, automotive electronics, cellular phones, pagers, audio equipment, PDAs, keyless remote systems and low-voltage power supply modules • EMI Filters

Specifications:

• Inductance tolerance is rated at ± 10% of the specified frequency • Rated operating current is based on the maximum sustained current applied while maintaining the specified minimum inductance (L).

STEWARD PART NUMBERING SYSTEM EXAMPLE

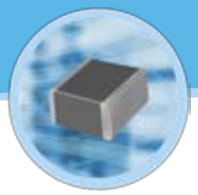
IC	0603	A	102	R	-10
Product Series Code	Part Size Code	Rated Current Code	Inductance Value Code	Packaging Code	Additional Description



FERRITE CHIP INDUCTORS						
Part Number	L (nH) ± 10%	Q (min)	Test Freq. (MHz)	Self-Resonant Frequency (MHz)	DCR MAX (Ω)	Rated Operating Current (mA)
IC0603A102R-10	1,000	30	10	70	0.6	25
IC0603A103R-10	10,000	30	2	17	2.55	15
IC0603A182R-10	1,800	30	10	50	0.95	25
IC0603A681R-10	680	15	25	80	1.70	35
IC0603B181R-10	180	15	25	165	0.60	50
IC0603B470R-10	47	10	50	260	0.30	200
IC0603B820R-10	82	10	50	245	0.3	200
IC0805A103R-10	10,000	45	2	24	1.15	15
IC0805A153R-10	15,000	30	1	19	0.80	5
IC0805A183R-10	18,000	30	1	18	0.90	5
IC0805A223R-10	22,000	30	1	16	1.10	5
IC0805A272R-10	2,700	45	10	45	0.75	30
IC0805A333R-10	33,000	30	0.4	13	1.25	5
IC0805A472R-10	4,700	45	10	35	1.00	30
IC0805A681R-10	680	25	25	105	0.80	150

FERRITE CHIP INDUCTORS						
Part Number	L (nH) ± 10%	Q (min)	Test Freq. (MHz)	Self-Resonant Frequency (MHz)	DCR MAX (Ω)	Rated Operating Current (mA)
IC0805A822R-10	8,200	45	4	26	1.10	15
IC0805B101R-10	100	20	25	235	0.30	250
IC0805B102R-10	1,000	45	10	75	0.40	50
IC0805B182R-10	1,800	45	10	55	0.60	50
IC0805B222R-10	2,200	45	10	50	0.65	30
IC0805C470R-10	47	15	50	320	0.20	300
IC0805C680R-10	68	15	50	280	0.2	300
IC1206A103R-10	10,000	50	2	24	1.00	25
IC1206A332R-10	3,330	45	10	41	0.70	50
IC1206A333R-10	33,000	35	0.4	13	1.05	5
IC1206A472R-10	4,700	45	10	35	0.90	50
IC1206B153R-10	15,000	35	1	19	0.70	5
IC1206B183R-10	18,000	35	1	21	0.70	5
IC1206B331R-10	330	20	25	145	0.50	250
IC1206B821R-10	820	25	25	100	0.90	150

Surface Mount Power Inductor



The DI2220V301R-10 is a surface mount, high current power inductor (in the industry's smallest package) with exceptional performance under DC Bias. Very low DCR provides superior thermal performance under DC bias. This compact, monolithic component produces flat inductance over the driven current range (from 3 to 8 amps) comparable to a larger, heavier, wire-wound toroidal inductor. Stable performance.

Features:

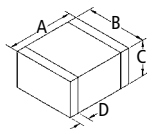
Low Profile (height is 3.61mm / 0.142") • EMI resistant, fully shielded printed coil • Small footprint (one fourth the footprint of an equivalent performance, old style, wire wound inductor assembly) • Superior performance under DC Bias • Rugged, vibration resistant monolithic construction • Maximum performance at 8 amps will yield > 250nH • Distributed power multiphase DC-DC converters that use this new power inductor can operate faster, cooler and cleaner • New high performance, multiphase designs (with the new power inductor) require significantly less total pc board space and usually have lower system cost

Applications:

• Power inductor for DC-DC Converter • Specifically tuned to work with the new generation of high frequency multiphase DC-DC converters • Mounting can be on back side of pc boards • Applications with Voltage Regulator Modules • Power supply bricks

PART NUMBERING SYSTEM EXAMPLE

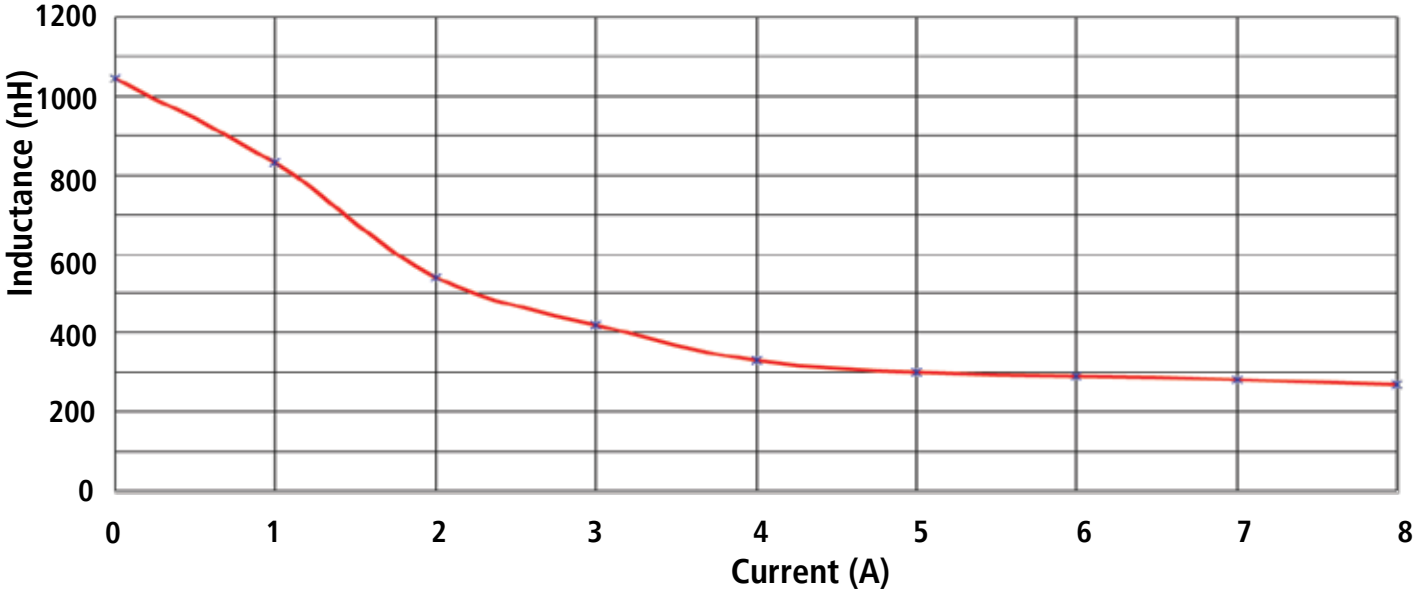
DI	2220	V	301	R	-10
Product Series Code	Part Size Code	Rated Continuous Current Code	Inductance Value Code	Packaging Code	Additional Description



PART NUMBER	A mm (inches)	B mm (inches)	C mm (inches)	D mm (inches)	L @ 2 MHz TYPICAL nH (± 10%)		DCR MAX (Ohms)	RATED I MAX (continuous) mA
					5 AMPS	8 AMPS		
DI2220V301R-10	5.59 (0.220)	5.08 (0.200)	3.61 (0.142)	0.76 (0.030)	300	270	0.010	8000

DI2220V301R-10 Monolithic Power Chip Inductor

INDUCTANCE UNDER BIAS



Ferrite EMI Disks and Plates

These Ferrite Disks and Plates provide a simple, cost-effective solution for radiated and inductively-coupled electromagnetic interference. After the PC board soldering process, a ferrite disk or plate can be installed directly on the source of EMI (such as active devices or unwanted antennas).

Features:

• Easy installation • Each part for volume production is provided with permanent, double sided 3,5 mil acrylic adhesive with 218 oz./inch^2 adhesion. • Samples and sample kits are available with removable and reusable adhesive for "trial and error" testing • Variety of sizes offered • Custom parts also available.

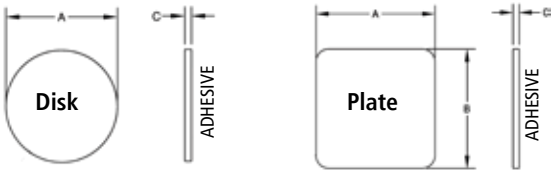
Applications:

• Ferrite disks and plates can be utilized either as inductively-coupled components or EMI shields on PC board components and traces. (Inductive coupling occurs when the ferrite affects the conducted wave form leaving the active component. The rise time of the wave form is effectively slowed by the ferrite, and the overshoot and associated ringing are attenuated. EMI shielding occurs when the ferrite absorbs the radiated emissions from active components, effectively protecting other boards or components in the vicinity from radiated contamination). • Can be used to locate unwanted EMI antennas. • Flat Flex & Ribbon cables. • Can also provide retrofit, auxiliary EMI attenuation.

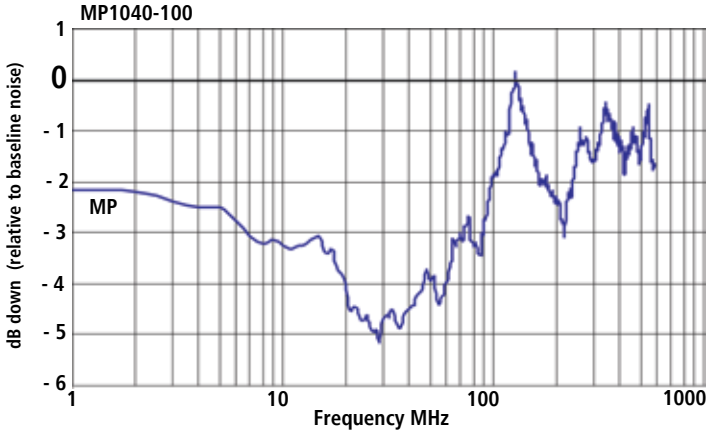
PART NUMBER	A mm (inches)	B mm (inches)	C mm (inches)
MM0650-100	16,51 (0.650)		1,27 (0,050)
MM0787-100	20,00 (0,787)		1,27 (0,050)
MM0787-200	20,00 (0,787)		1,91 (0,075)
MM1400-200	35,56 (1,400)		1,91 (0,075)
MM1400-300	35,56 (1,400)		2,54 (0,100)
MP0315-200	8,00 (0,315)	8,00 (0,315)	2,00 (0,079)
MP0350-000	26,42 (1,040)	8,89 (0,350)	1,27 (0,050)
MP0433-000	11,00 (0,433)	11,00 (0,433)	1,96 (0,077)
MP0512-200	13,00 (0,512)	13,00 (0,512)	2,00 (0,079)
MP0590-200	21,00 (0,827)	15,00 (0,591)	2,00 (0,079)
MP0591-200	15,00 (0,591)	15,00 (0,591)	2,00 (0,079)
MP0760-100	19,30 (0,760)	19,30 (0,760)	1,27 (0,050)
MP1040-100	26,42 (1,040)	26,42 (1,040)	1,27 (0,050)
MP1040-200	26,42 (1,040)	26,42 (1,040)	1,91 (0,075)
MP1040-300	26,42 (1,040)	26,42 (1,040)	2,25 (0,089)
MP1496-000	38,00 (1,496)	38,00 (1,496)	2,00 (0,079)

PART NUMBER SYSTEM EXAMPLE

M	M	0650	-100
Material	M - Disk P - Plate	Part Size Indentification	Thickness Code



EXAMPLE APPLICATION

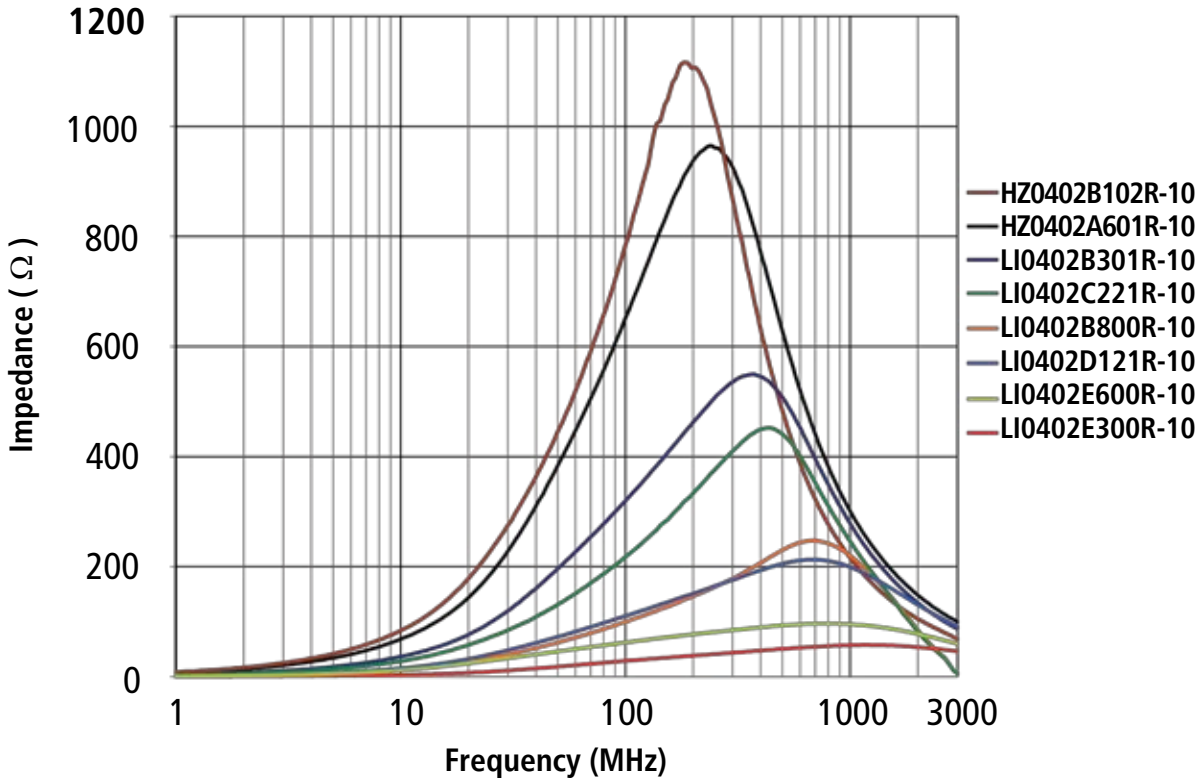


Example Application Graph Explanation:

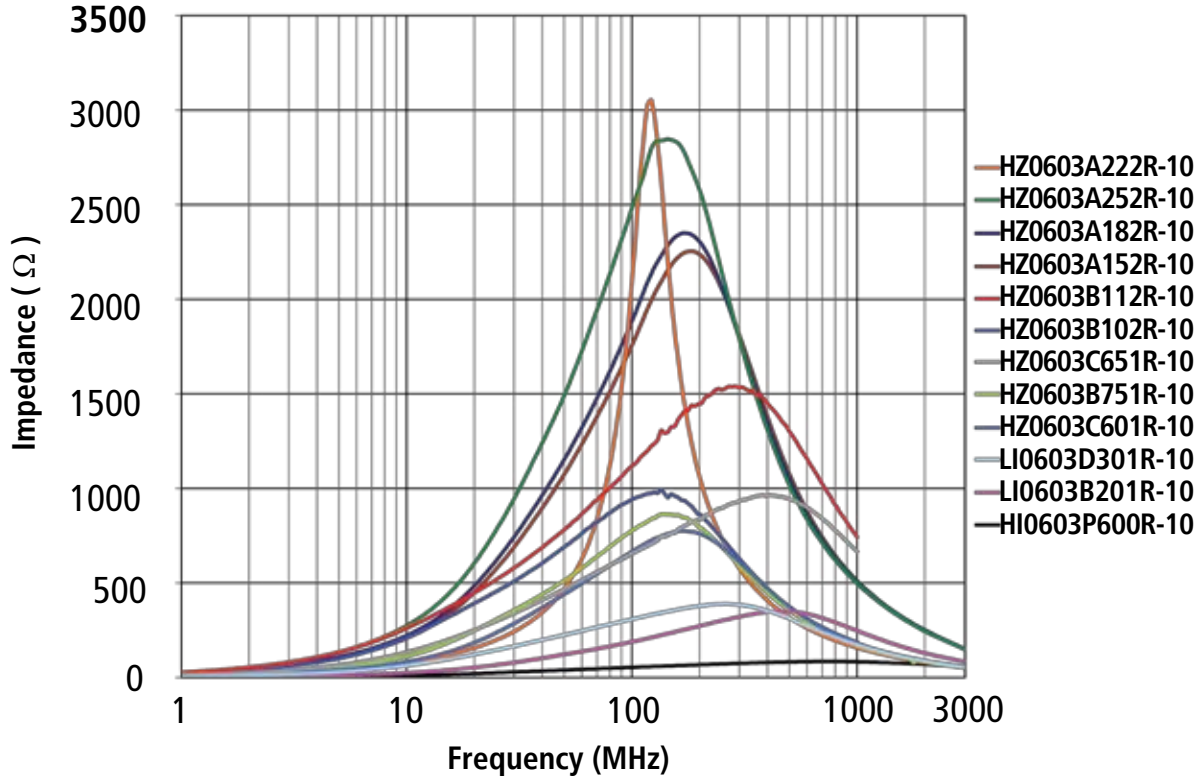
The zero line on the graph represents the base line noise recorded for an unprotected microprocessor. The curve (dB down) represent the performance of the Steward ferrite plate relative to the baseline. The addition of the ferrite plates to the top of the processor in this specific application exhibits up to a 5 dB EMI reduction relative to the unprotected part. Performance can vary with different sizes, materials, processors and applications.

Comparison Impedance Curves for Grouped Chip Beads

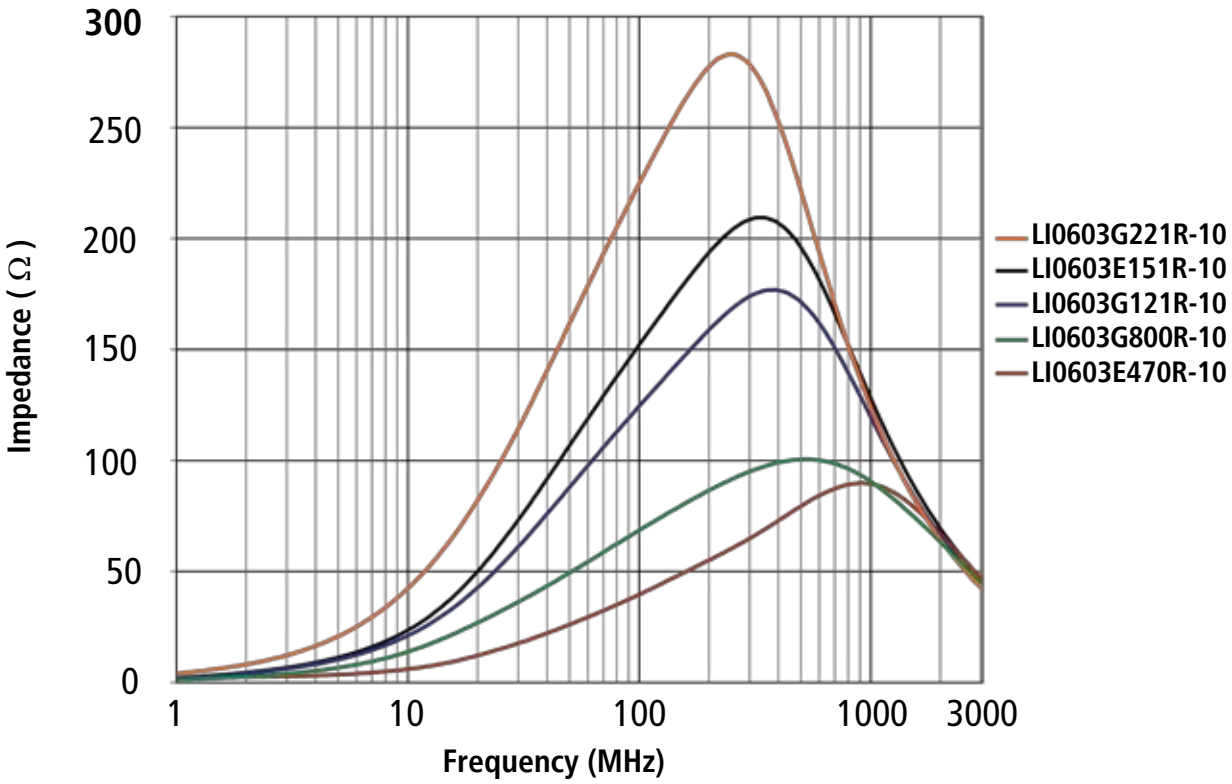
0402 Chip Beads



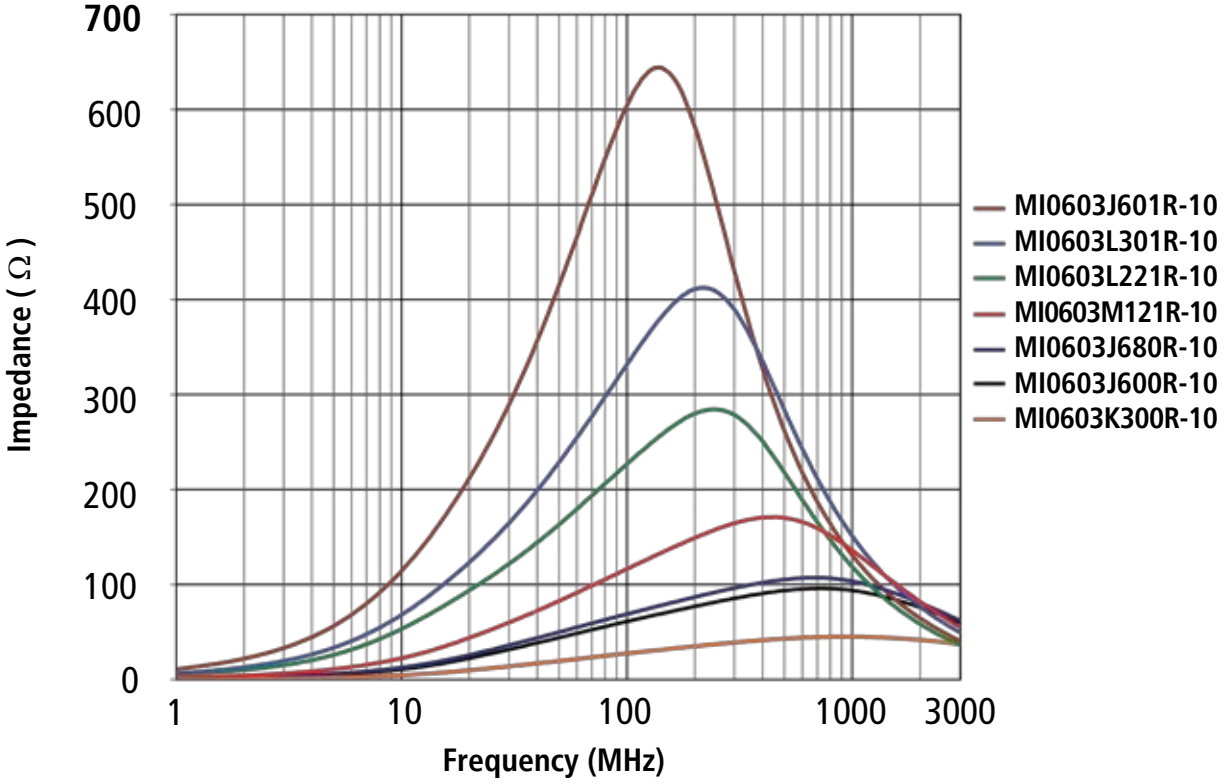
0603 Chip Beads - Up To 500 mA Current Rating



0603 Chip Beads - 500-800 mA Current Rating

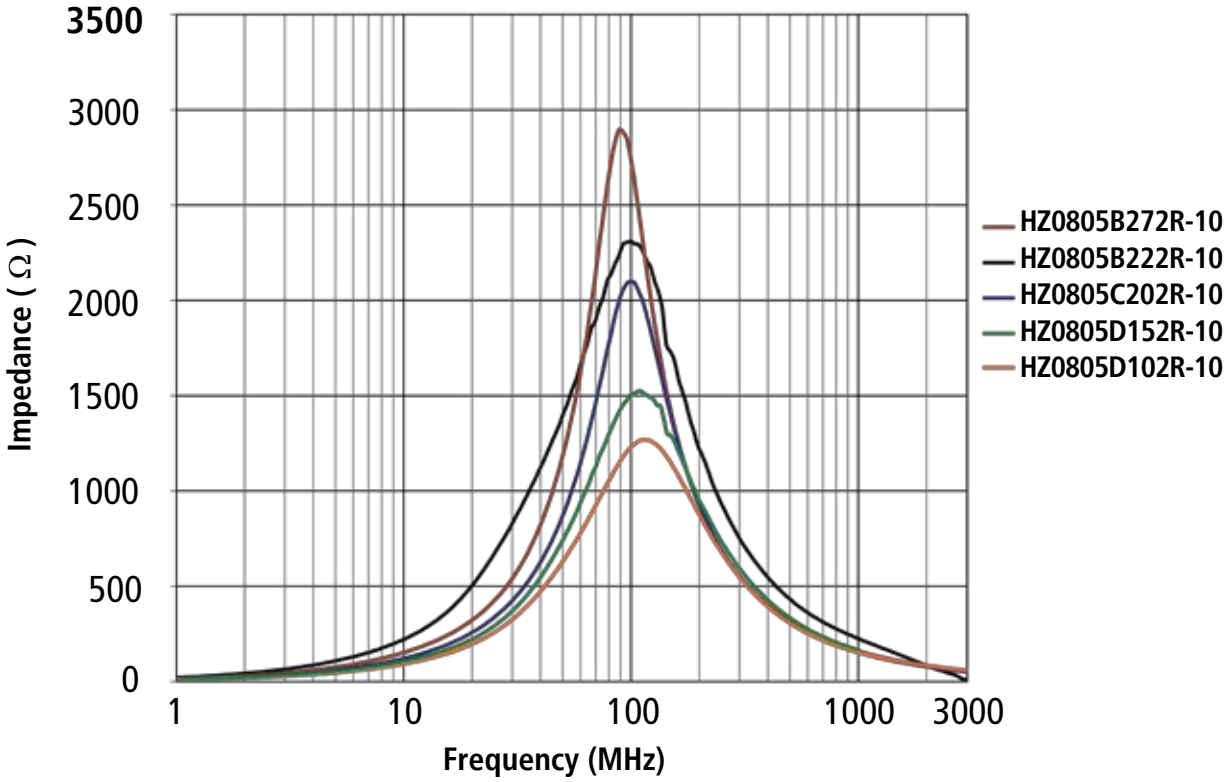


0603 Chip Beads - 1000+ mA Current Rating

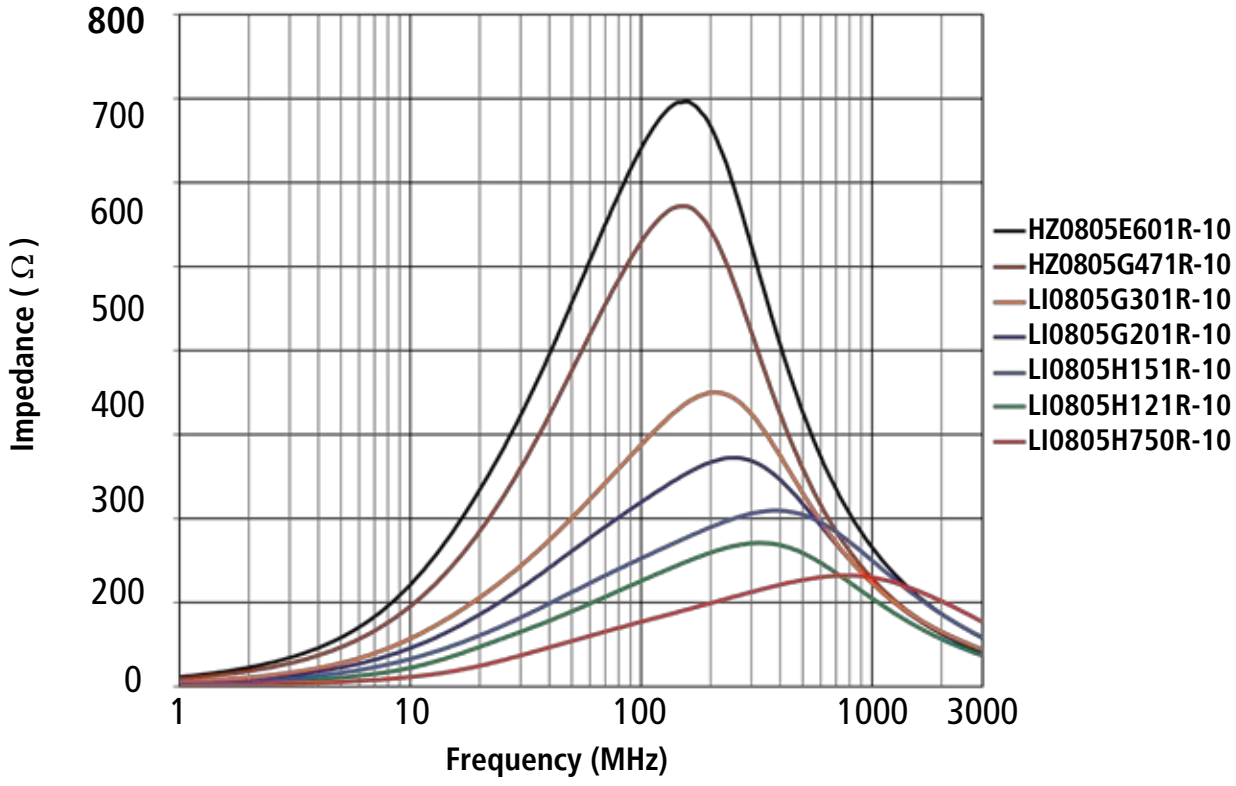


Comparison Impedance Curves for Grouped Chip Beads

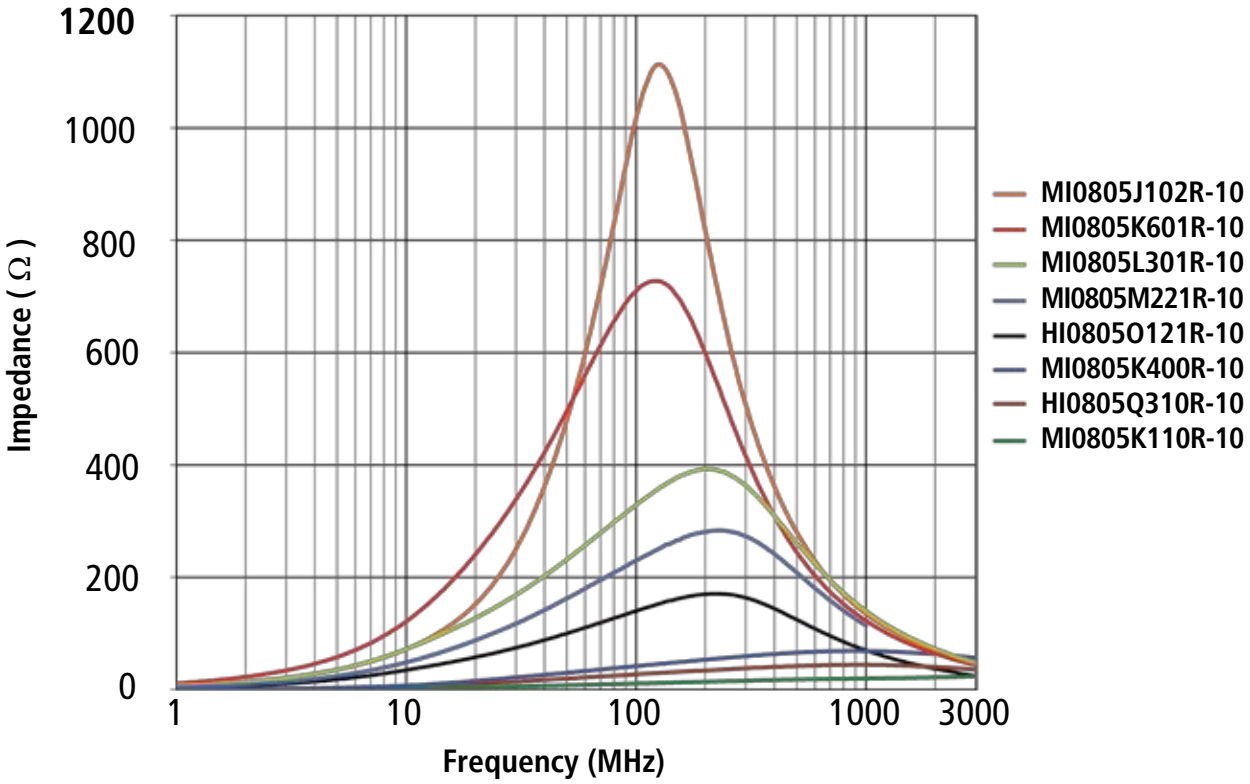
0805 Chip Beads - Up To 500 mA Current Rating



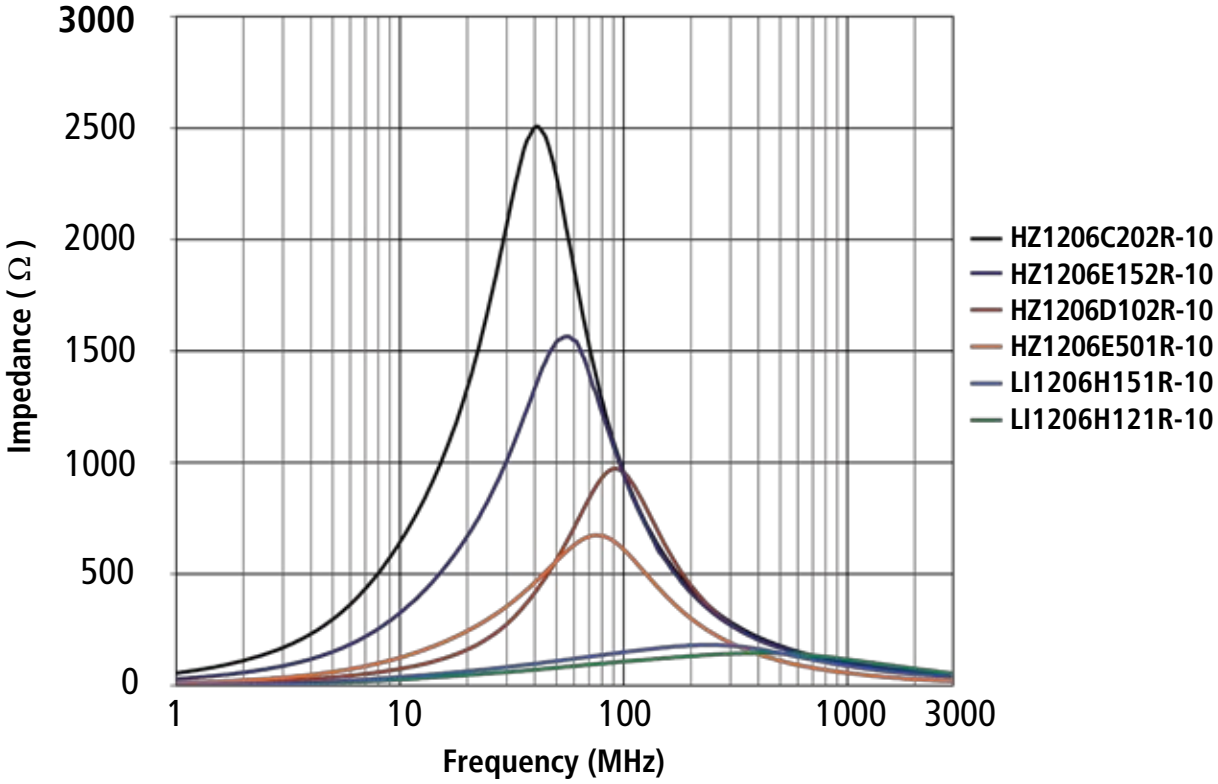
0805 Chip Beads - 500-800 mA Current Rating



0805 Chip Beads - 1000+ mA Current Rating

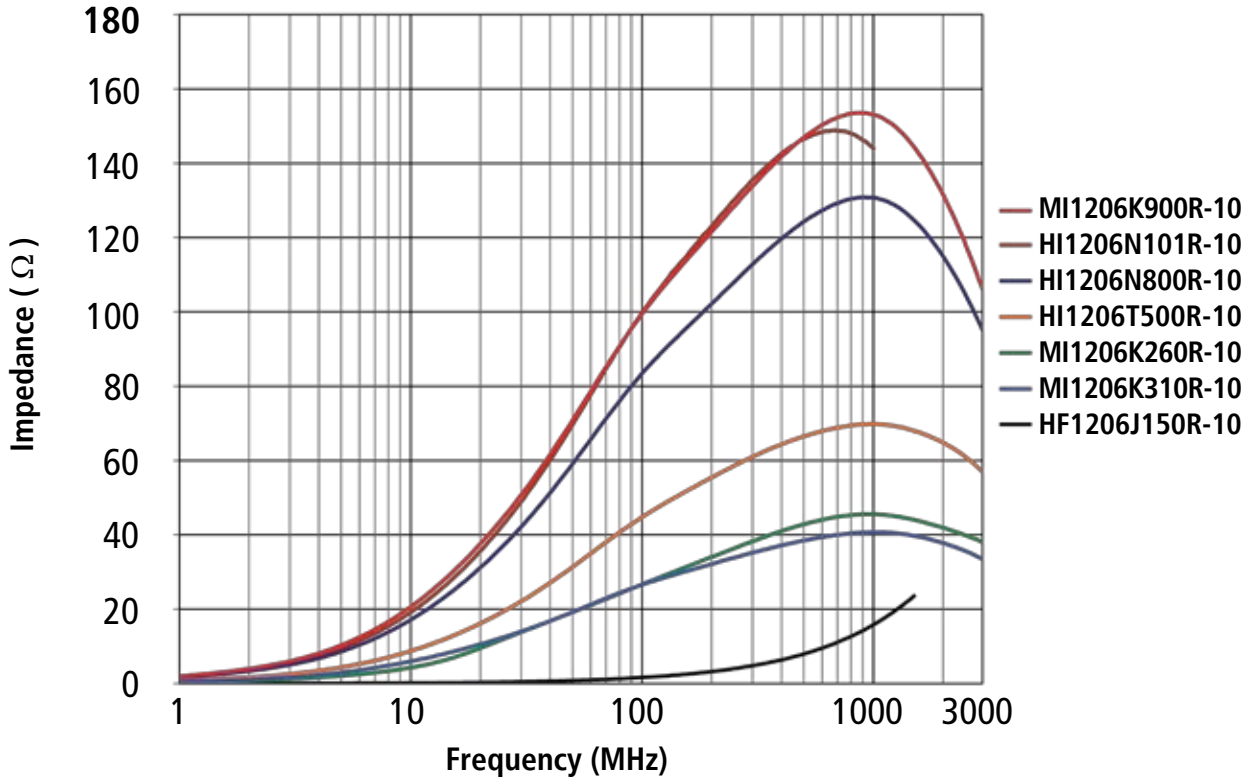


1206 Chip Beads - Up to 1000 mA Current Rating

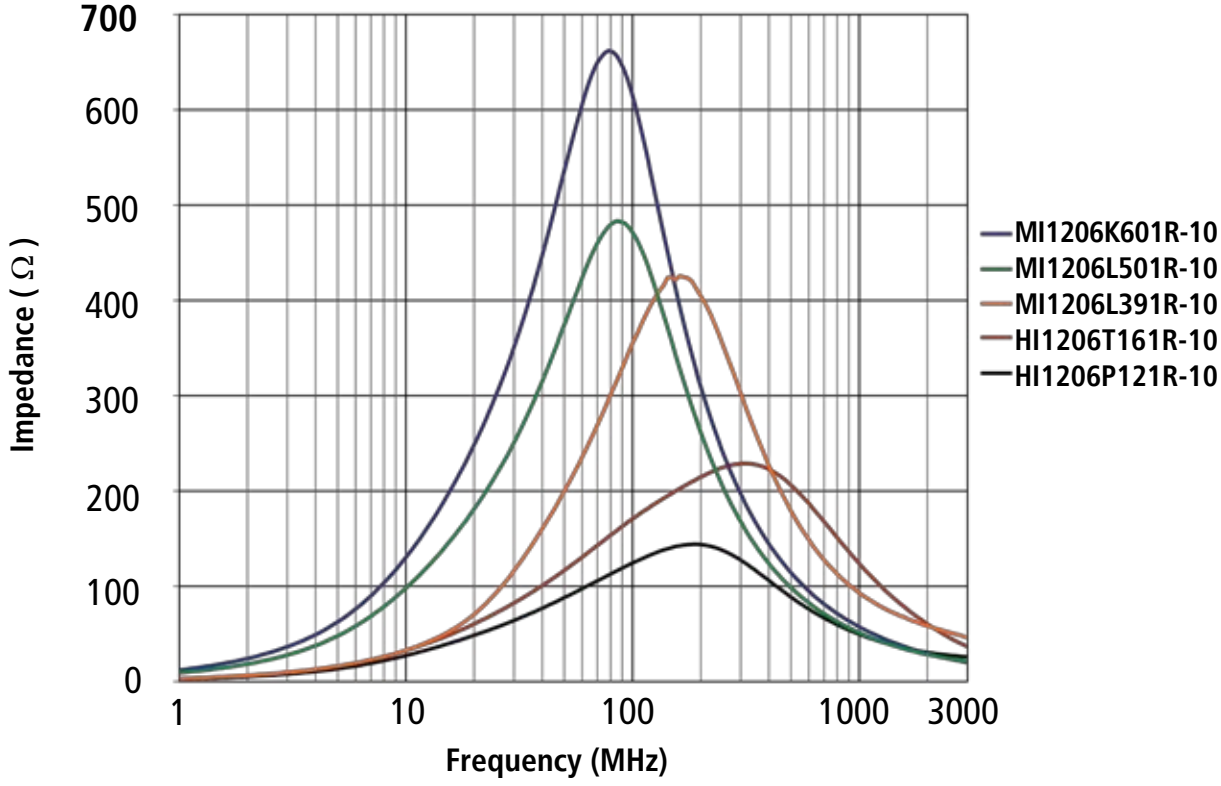


Comparison Impedance Curves for Grouped Chip Beads

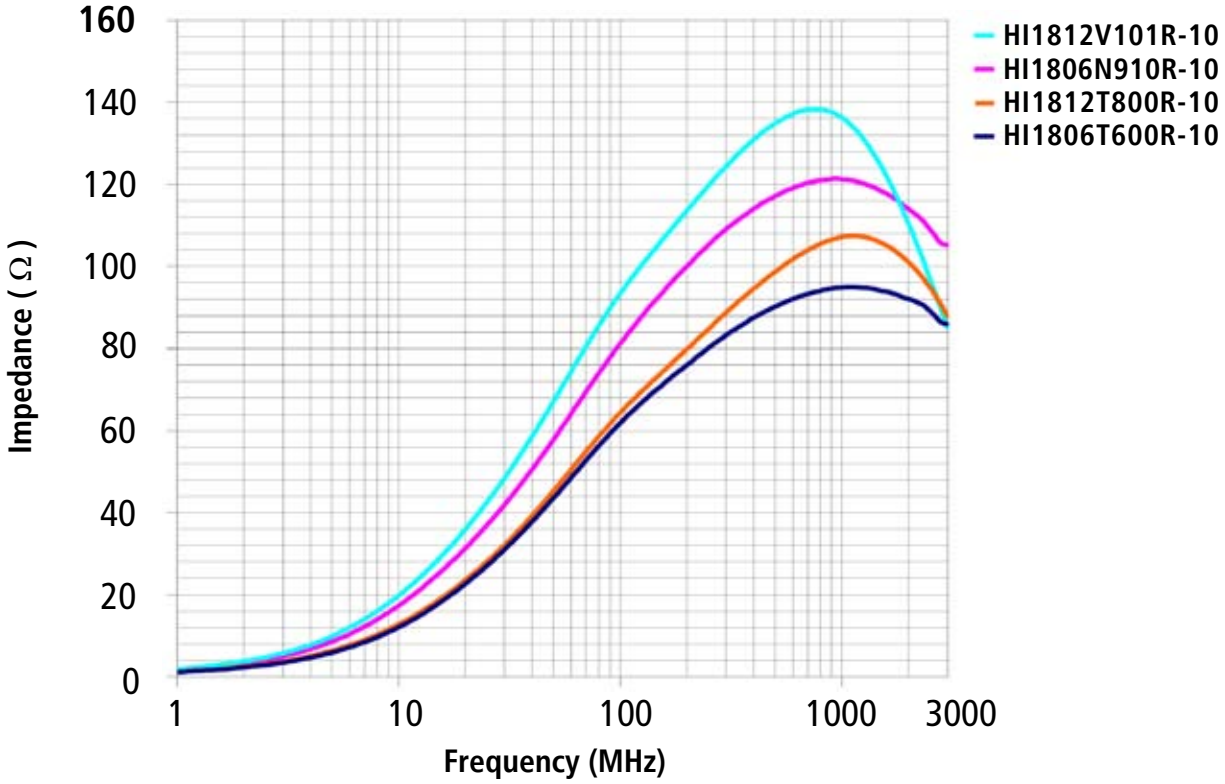
1206 Chip Beads - 1000+ mA Current Rating, Ω <= 100



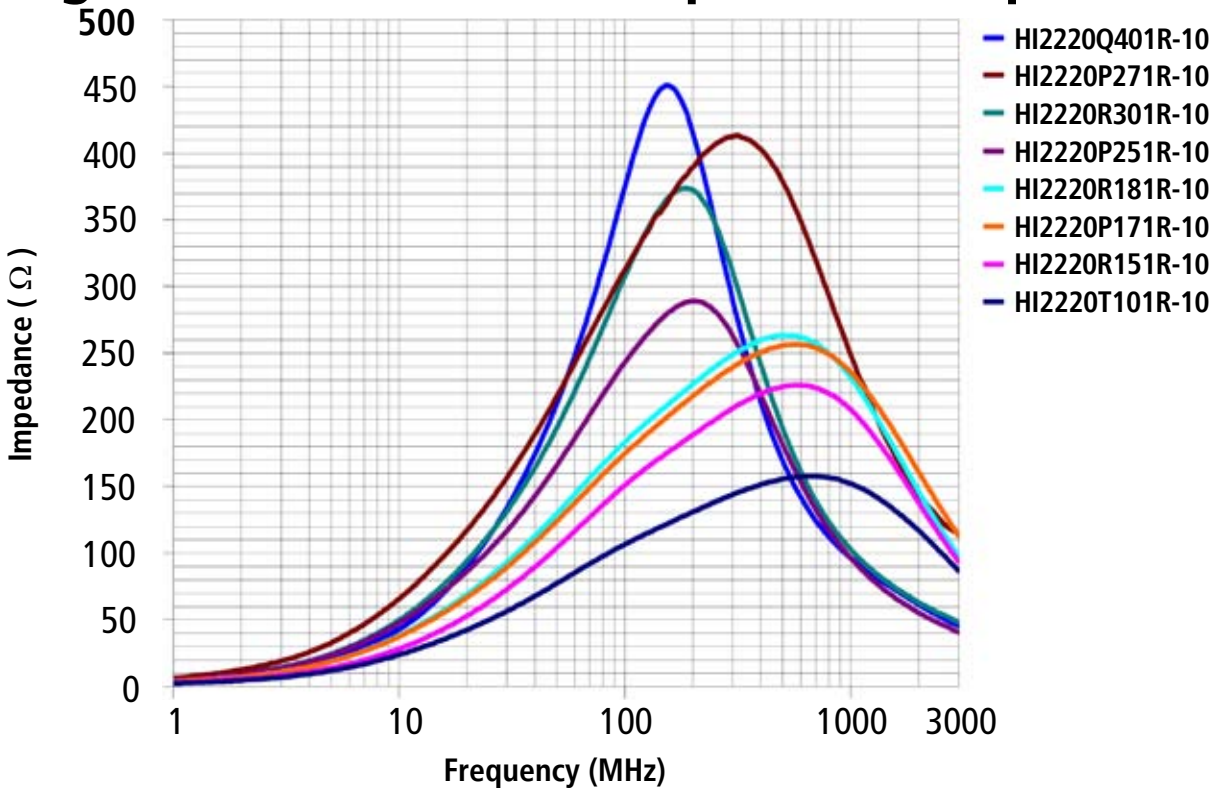
1206 Chip Beads - 1000+ mA Current Rating, Ω > 100



1806 & 1812 High Current Chip Beads

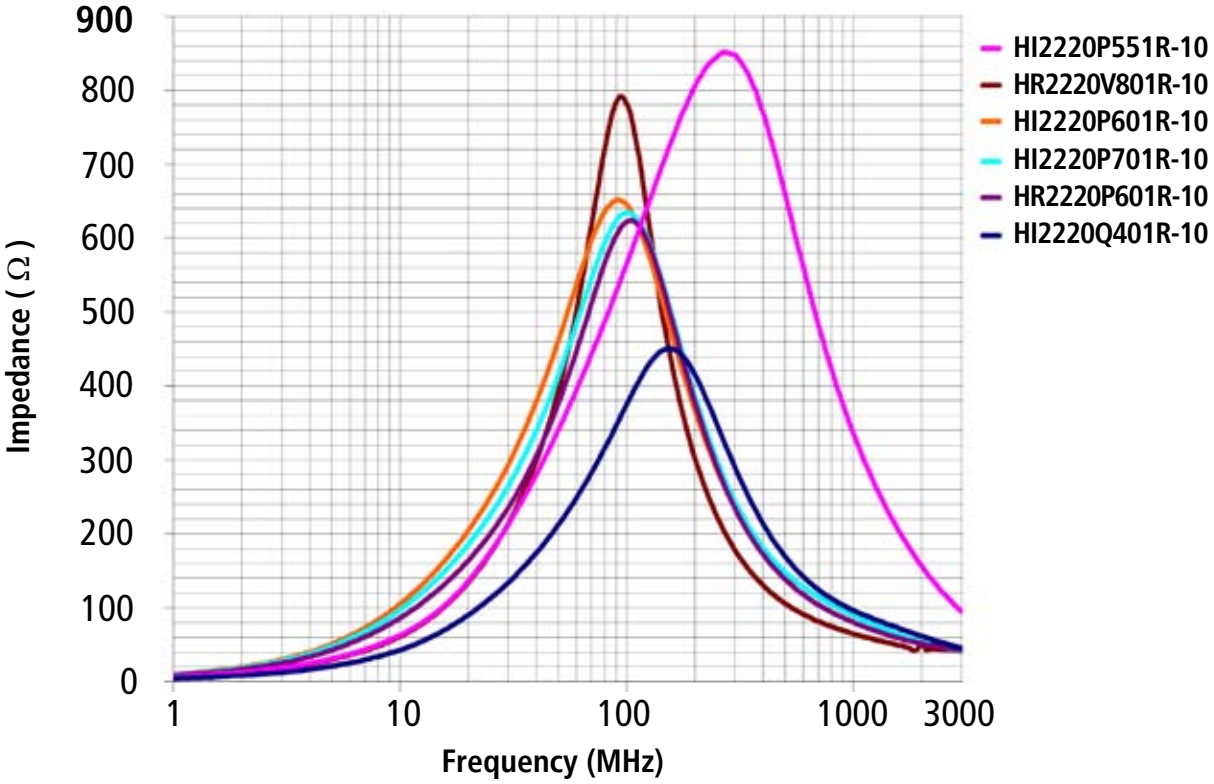


2220 High Current / Medium Impedance Chip Beads

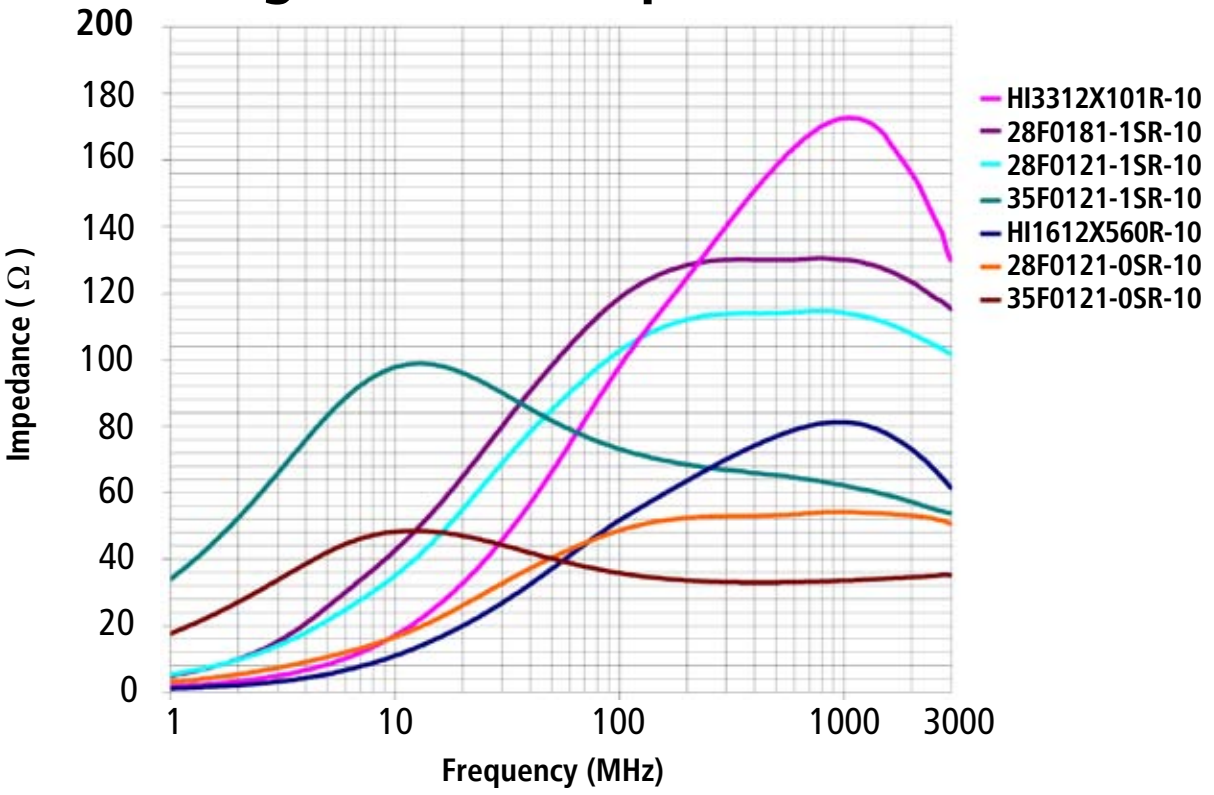


Comparison Impedance Curves for Grouped Chip Beads

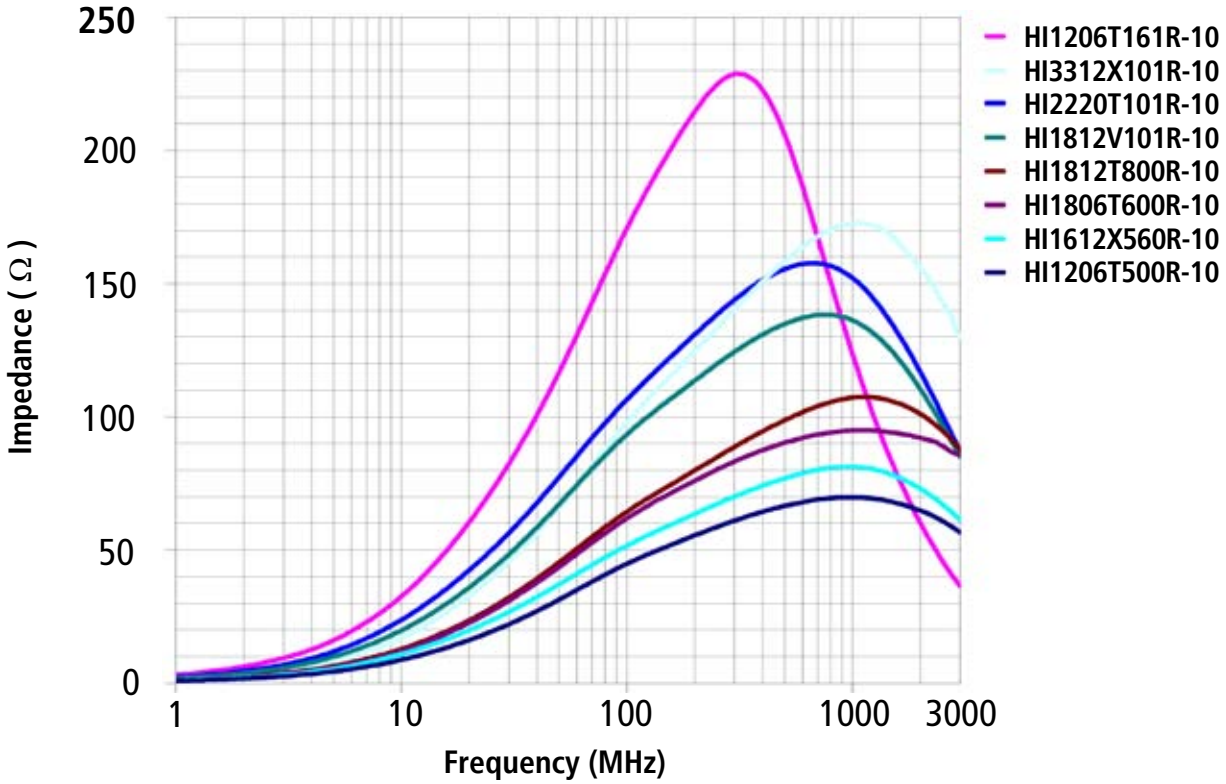
2220 High Current / High Impedance Chip Beads



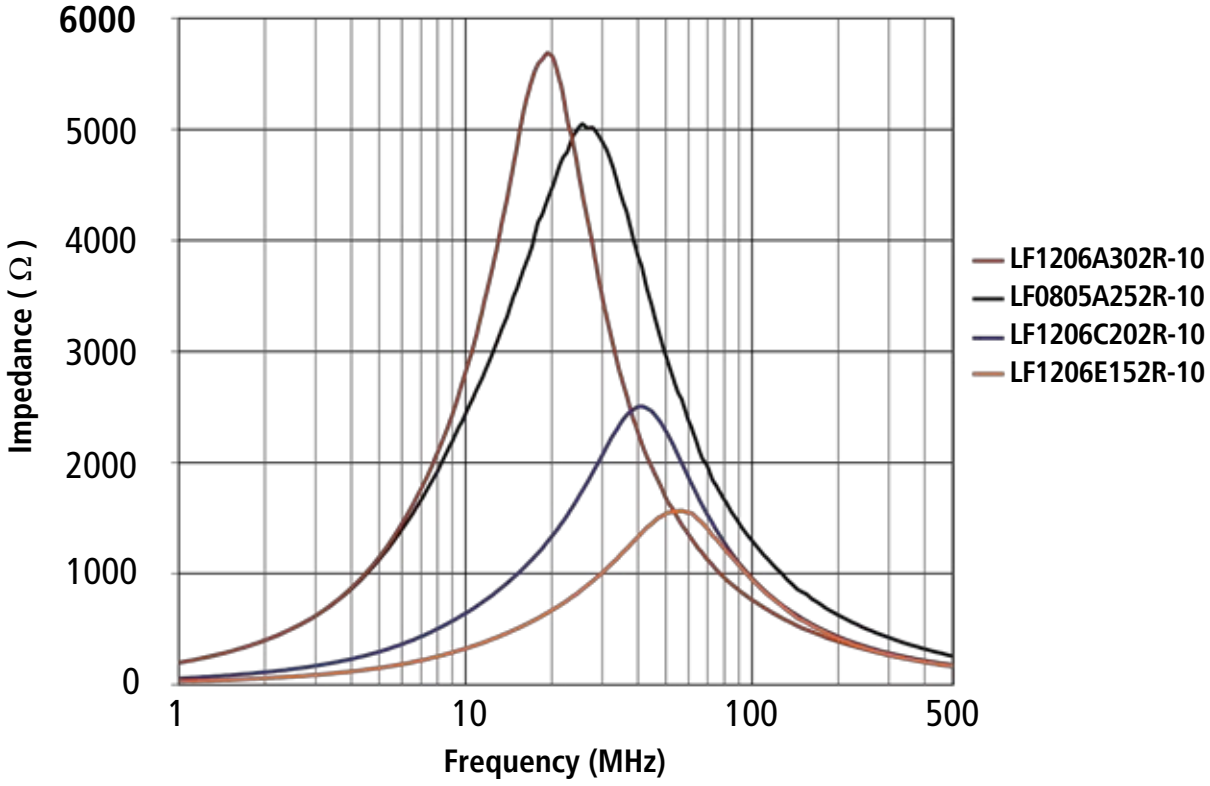
1612 & 3312 High Current Chip Beads & Assemblies



Surface Mount Chip Beads - 6 to 10 Amps Capability

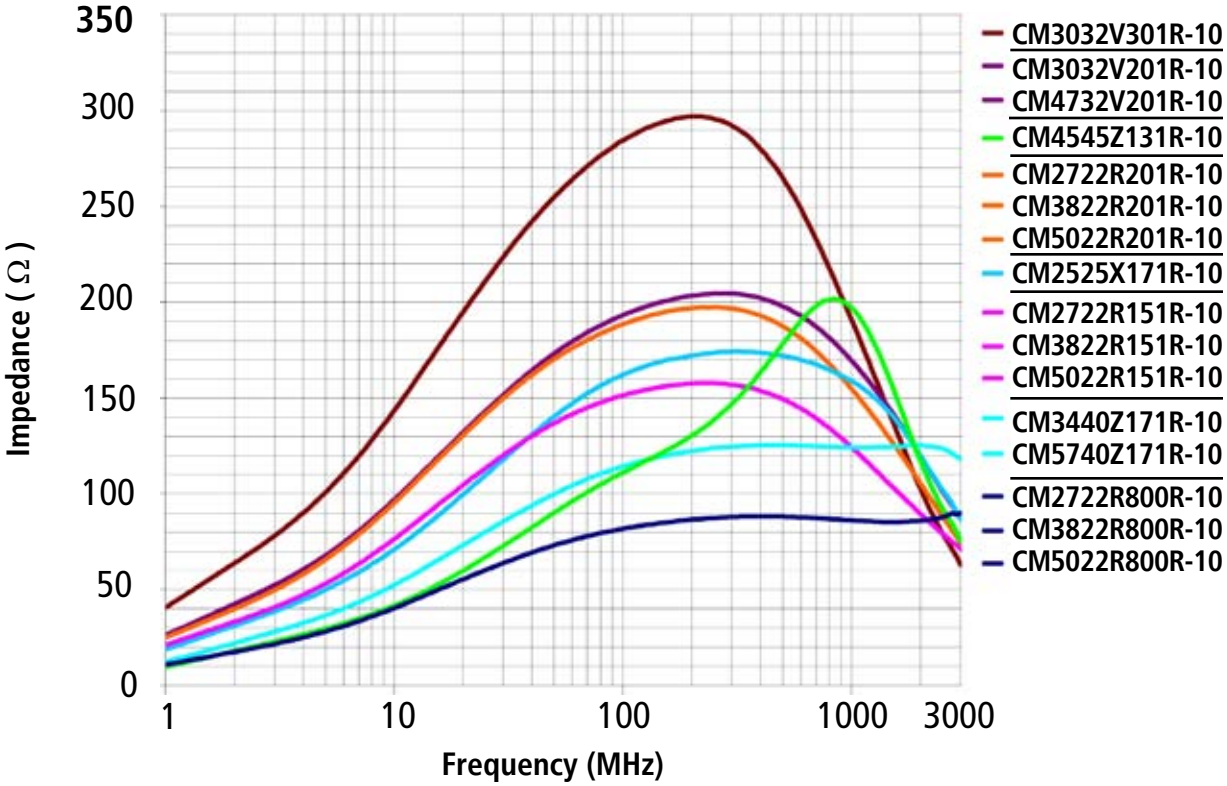


Low Frequency Chip Beads

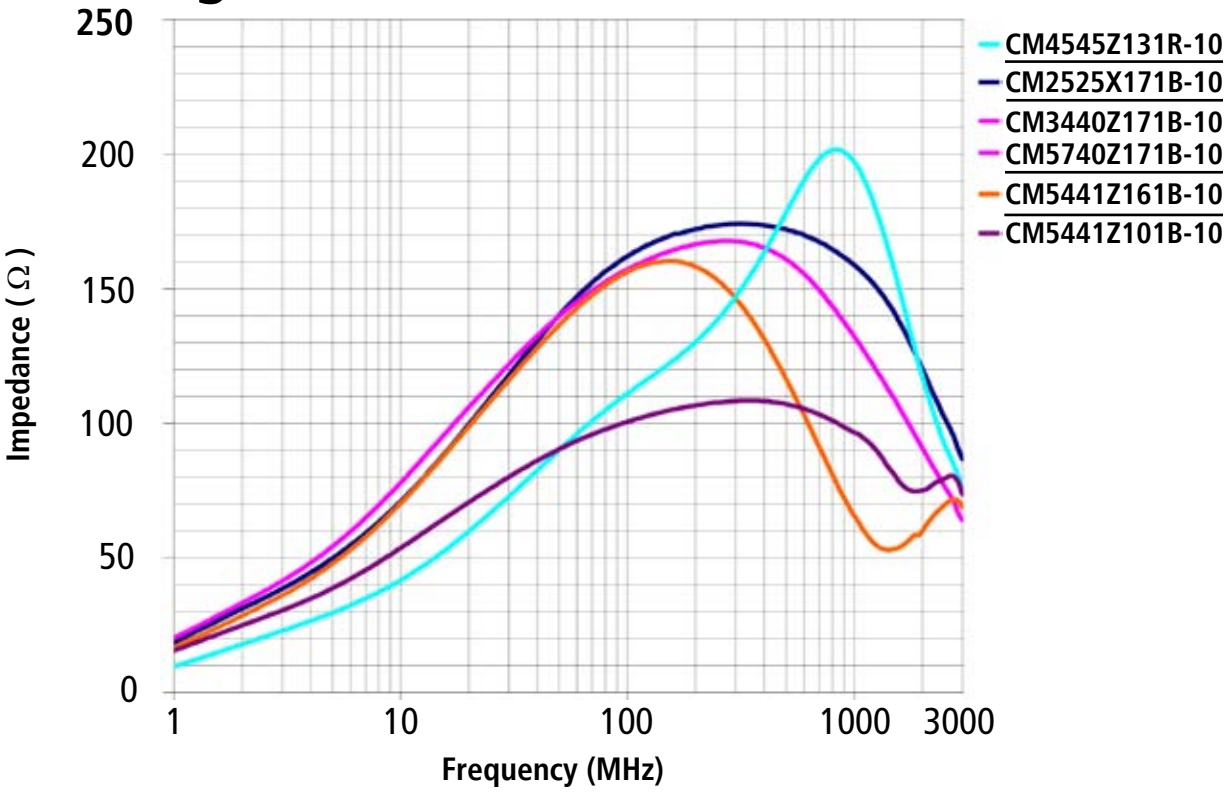


Comparison Impedance Curves of Grouped Chokes

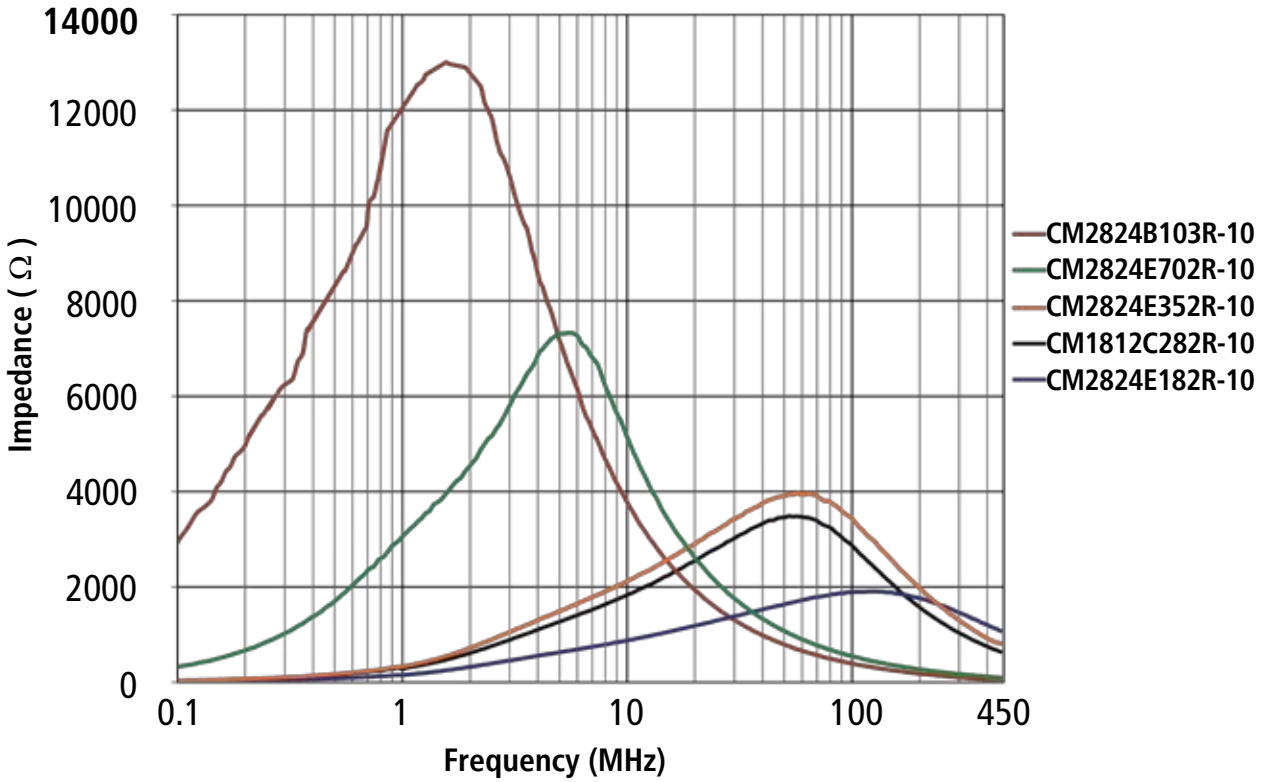
Surface Mount Array Common Mode Chokes



Through-Hole Common Mode Chokes



Low Frequency Surface Mount Common Mode Chokes



Low Profile Surface Mount Common Mode Chokes