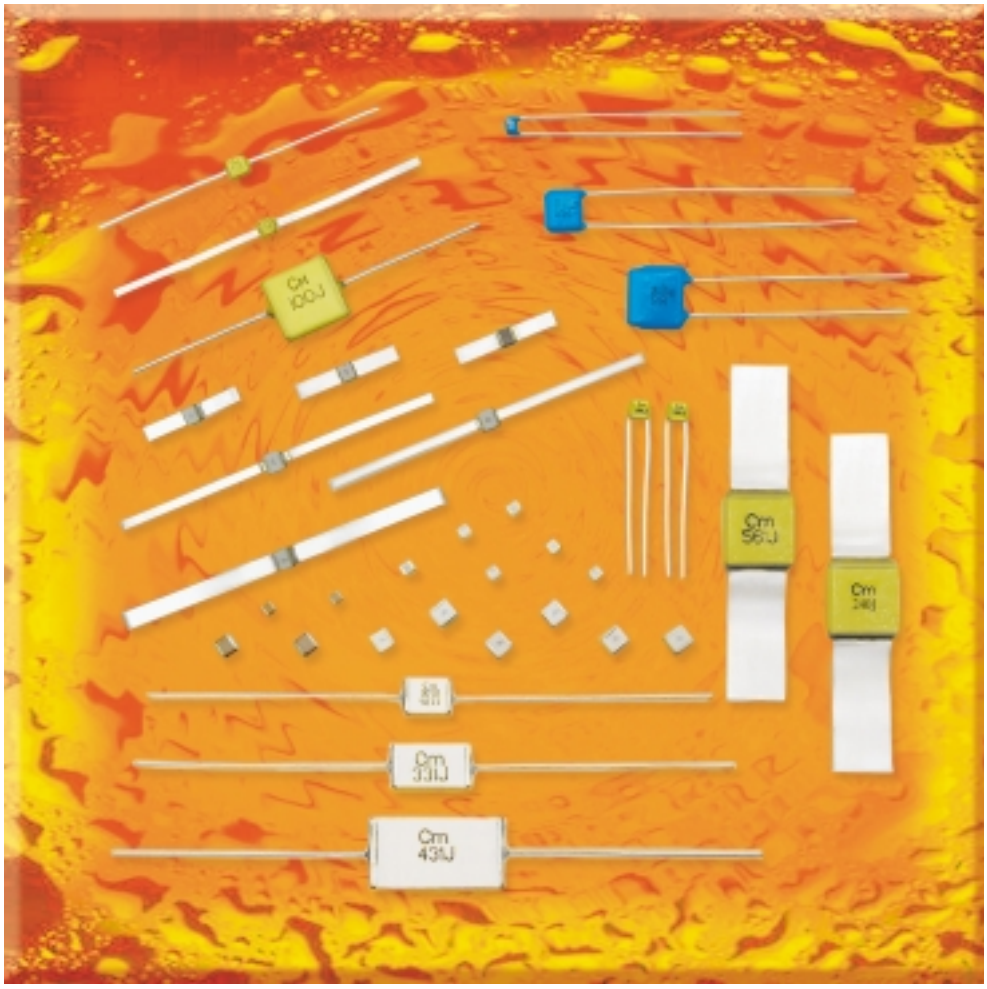
APPLICATION SPECIFIC CAPACITORS CATALOG

C-29-B



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If you have any questions concerning Application Specific Capacitor Products, please contact your local Murata Sales Representative or authorized Murata distributor.

*All the Part Numbers given in the text and specification tables of these product categories are “Global Part Numbers” that were adopted in June 2001. When referring to the contents of this catalog, please carefully review.

For your reference, **“Global Part Numbering”** is described on the first page of each section.

Quality Control

Murata Electronics' Quality Control Department maintains product quality at a level equal to the company's high standards of performance and workmanship, which are certified to ISO-9001 requirements. The department is vested with the authority to exercise control over every phase of the manufacturing process. This control extends from incoming inspection of purchased material to in-process inspection, inspection of final product, packaging and shipping.

Many of today's demanding applications present unique capacitor requirements in order to meet application specific design objectives.

Murata Electronics meets these objectives by offering one of the world's largest varieties and capabilities of specialty capacitors for high reliability, high voltage, high frequency and undersea communication markets.

Whether your application calls for the MA/MB Series, ERB Series, High Voltage Series, special lead configurations, or other unique designs, you can rely on Murata's expertise to supply a reliable, repeatable product for all your needs.

Hi-Reliability Test Methods

Corporate QA Laboratory Test and Method List

This is a listing of the more frequent tests performed in the QA Lab. It is not a comprehensive list and there are many variations of these tests as well as with others that are not listed here.

Barometric Pressure (Reduced): EIA-198 Method 207 or MIL-STD-202 Method 105. Capable of 0 to 600 VDC, usually performed up to100K feet at hot or cold temp.

Bending Strength: Chip Monolithic Ceramic Capacitor GRM Series Tech. Data Manual TD.No. C09E para. 4-3 includes Cap, DF and IR measurement while mounted on an FR4 board w/flex stress applied. Capable of 5mm board deflection.

Break Strength: Chip Monolithic Ceramic Capacitor GRM Series Tech. Data Manual TD.No. C09E para. 4-2 measurement in pounds or kg's of pressure recorded when chip capacitor breaks. 0 to 50 lb. Maximum.

Capacitance: EIA-198 Method 101 or MIL-STD-202 Method 305. Capable of MHz (10KHz to 10MHz) or KHz (100Hz to 100Khz).

DF (Dissipation Factor): EIA-198 Method 101 or MIL-STD-202 Method 305. Capable of MHz (10KHz to 10MHz) or KHz (100Hz to 100Khz).

DWV (Dielectric Withstanding Voltage): EIA-198 Method 103 or MIL-STD-202 Method 301, usually 2.5 X rated voltage. Capable of up to 25,000 VDC.

ESR (Effective Series Resistance): EIA-198 Method 106 and EIA-RS-483.

HALT (Highly Accelerated Life Test): EQA-0003 usually test until 60% fail. Capable of up to +200°C and 1000 VDC max.

HAST (Highly Accelerated Stress Test): EQA-0001 usually 1.5-2.5 VDC applied during pressure. Capable of 0 to 4 kgf/cm of steam pressure.

HUMIDITY: EIA-198 Method 202 Cond. "B" or MIL-STD-202 Method 103, 40°C @ 90 to 95 % R.H. (with no voltage) test duration usually 504 hours.

IR (Insulation Resistance): EIA-198 Method 104 or MIL-STD-202 Method 302. Resistance in ohms, capable of 0 to + 150°C and 0 to 1000 VDC max.

Immersion: EIA-198 Method 203 or MIL-STD-202 Method 104, 15 minute cycles of hot/cold or saltwater w/post IR test.

Life Test: EIA-198 Method 210 Cond."C" or MIL-STD-202 Method 108, usually 1,000 or 2,000 hours @ rated temp. w/2X rated voltage. Capable of 0 to + 150°C and 0 to 1000 VDC. Special Life chambers with capability of 0 to 25,000 VDC.

Load Humidity: MIL-PRF-55681 para. 4.8.15 (except w/1.5 vdc pulsed and post IR test) +85°C @ 85% R.H., usually 240 hours duration. Capable of 0-90°C and 0-98% R.H.

Moisture Resistance: EIA-198 Method 204 or MIL-STD-202 Method 106, cycle heat and humidity w/100 VDC applied or rated voltage, test duration usually 240 hours.

Physical Dimensions: As required by product specification.

Q (Quality Factor): EIA-198 Method 102 or MIL-STD-202 Method 306, a calculated measure of the energy storage factor.

Resistance To Soldering Heat: EIA-198 Method 302 or MIL-STD-202 Method 210, condition of test will vary w/termination type. Capable of up to +399°C.

Resistance To Solvents: EIA-198 Method 210 or MIL-STD-202 Method 215, only on marked parts.

Resonance: MIL-PRF-55681 para. 4.8.18, determines series resonant frequency.

Salt Water Boil: EQI-0054 part of the thermal shock (solder dip), usually one hour duration w/post IR test.

Salt Spray: MIL-STD-202 Method 101, environmental corrosion test.

Shock, Specified Pulse (Half Sine or Sawtooth): EIA-198 Method 305 or MIL-STD-202 Method 213. Capable of 2gs to 3000 g's and 0 to 2000 VDC.

Solderability: EIA-198 Method 301 or MIL-STD-202 Method 208, both methods require 8 hours of steam aging but EIA method allows RMA flux.

Temperature Coefficient (TC): EIA-198 Method 105 Cond. "B". Measurement of cap change over temperature range, usually done @ –55°C to rated temp. or as high as +125°C.

Temperature Cycling: Same as air to air thermal shock but w/ambient (+25°C) between extremes, range can be as much as –100°C to +200°C.

Terminal Strength: EIA-198 Method 303 or MIL-STD-202 Method 211, pull or shear as measured in pounds or kg's.

Hi-Reliability Test Methods

Thermal Shock: EIA-198 Method 202 Cond. "B" or MIL-STD-202 Method 107, usually air to air w/majority done at –55°C and +125°C but we are capable of –70°C to + 185°C with unlimited cycles. The other type of thermal shock is a solder dip w/post IR test, the solder temp. can range from +260°C to +399°C.

Vibration (Sine or Random): EIA-198 Method 304 or MIL-STD-202 Method 204 or 214. Capable of 0 to 2000 VDC, 0-5000 hz and 2g's to 60g's.

Voltage T.C.: MIL-PRF-55681 para. 4.8.11 for T.C. and drift, para. 3.14 for Volt. Temp. limits. Same as Temperature Coefficient (TC) except with rated voltage applied.

Other infrequent or special testing is done on an as needed basis utilizing the individual specifications or test methods.

Glossary of Specialized Terms

1. DIELECTRIC:
Sometimes called "Insulator", a dielectric is a material whose internal charges are bound and can therefore only move over atomic dimensions. It separates the conductive capacitor plates and is important in determining temperature characteristics, voltage rating, capacity/volume and other characteristics of a capacitor.

2. DISSIPATION FACTOR ("DF"):
The dissipation factor of an insulating material is defined as the ratio of energy dissipated to energy stored in the dielectric. The DF is frequency sensitive and must be specified at a given frequency.

3. QUALITY FACTOR ("Q"):
The Q factor is the ratio of energy stored to energy dissipated and is therefore often taken as the inverse of the DF at low frequency. Sometimes called "Figure of Merit," Q factors must be specified at a given frequency.

4. WORKING (OR "RATED") VOLTAGE:
Nominal continuous voltage which may be applied to a component with no derating of any kind.

5. DIELECTRIC WITHSTANDING VOLTAGE:
The peak voltage which the component is designed to withstand without damage for short periods of time. This value must be specified in terms of frequency, waveform, and time.

6. INSULATION RESISTANCE (MEGOHMS):
I.R. is the terminal to terminal DC resistance of a capacitor, and must be specified in terms of voltage, temperature, and relative humidity.

7. TEMPERATURE COEFFICIENT ("TC"):
"TC" is the decimal change in capacity per degree change in environmental temperature. The standard definition for "TC" in parts per million per degree centigrade is ...

$$TC = \frac{(Cx - Co)}{Co} \times \frac{(10^6)}{(Tx - To)} \ / \ °C$$

Where "Tx" is the test temperature, "To" is the reference temperature – usually 25°C. "Co" is the capacity measured at the reference temperature and "Cx" is the capacity measured at the test temperature.

8. DRIFT:
The extent in pF or % to which capacitor changes value as a result of temperature exposure. Sometimes called "Retrace", this measurement is usually made under nominal (i.e. room) conditions and both before and after the conclusion of temperature excursion. (Note: "Drift" may occasionally be used in the test context of the simple passage of time).

9. VOLTAGE COEFFICIENT:
All high K dielectrics tend to reduce their dielectric coefficient (capacity) in the presence of strong unidirectional electric fields. For some materials, and package designs, this effect can become very dramatic. Lower K materials do not exhibit a similar phenomenon. (Usually specified in pF/volt).

10. TERMINATION:
This term refers to the material and/or geometry of the terminals of the capacitor.

11. CHIP, MONOLITHIC OR MULTI-LAYER CAPACITOR:
All of these terms, and any combination of them, refer to a ceramic capacitor style which consists of alternate layers of ceramics and conductive (metallic) surfaces which are compressed and vitrified to form a single "monolithic" structure. Alternate metallic surfaces are then interconnected to form a two terminal capacitor.

12. ESR:
The sum of the equivalent series resistances of the electrode resistance and loss tangent of the dielectric, otherwise known as the real part of the capacitors equivalent circuit impedance (Note: The dielectric loss tangent is frequency dependent as is ESR).

13. AGING:
Aging is the change in the dielectric constant as a function of time. Aging is particularly noticeable in high dielectric materials and is measured as a percentage change per decade of time. Aging decreases logarithmically and becomes less apparent with time.

14. RF POWER:
Typically measured in KVA (applied power) for signals with frequencies greater than 1 MHz. RF Power is limited by the maximum rated voltage or the maximum power the capacitor is able to dissipate.

15. KVAR RATING:
Capacitive reactive power, determined by the rated RF voltage or the rated RF current and the equation $KVAR = IE\sin\theta$ where θ is the phase between current and voltage.

High Frequency Ceramic Capacitors

MA/MB Series

OUTSTANDING CHARACTERISTICS

- Miniature size
- Very high Q at high frequencies
- High RF power capabilities
- Impervious to environmental conditions
- Low dissipation factors
- Excellent retrace capability (not applicable for X7R styles)
- High temperature stability
- Low noise
- Meets Mil-PRF-55681 with respect to: Moisture Resistance, Solderability, Low Voltage Humidity, Life Tests

ADDITIONAL FEATURES

- Packaging options
- Lot processing data available

MA SERIES

For filtering, coupling and impedance matching in most RF circuits, the MA Series chips and leaded devices offer outstanding performance and reliability with the greatest range of values and configurations. MA Series capacitors can be supplied with military equivalent screening. Please consult our factory.

MA Series ceramic fixed capacitors are miniature, high performance precision components having extremely high Q and high power capabilities from low frequencies to gigahertz ranges. These “low loss” multilayer capacitors are extremely stable with respect to variations in temperature, voltage and frequency.

MA Series capacitors are designed for miniature state-of-the-art circuit applications. They are small, easy to apply and have excellent reliability. Units are available in ultra-miniature case size 1 (1.4 x 1.4 x 1.4mm) or miniature case size 2 (2.8 x 2.8 x 2.5mm). Standard case size 1 units are available as chips. Standard case size 2 units are available as chips and also in leaded configurations.

Clean-room manufacturing technology assures product reliability and automated processing reduces costs and cycle time. Key stages of the operation are monitored and controlled with the latest SPC techniques. Flexibility in design allows the production of non-standard values, while maintaining consistent quality objectives.

Please contact the factory for availability of special configurations or high-reliability screening.

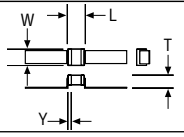
PART NUMBERING SYSTEM – CASE SIZE 1 & CASE SIZE 2

M	A	1	8	101	J	A	N
CUBIC MONOLITHIC	**A-STD SERIES B-ULTRA HIGH Q**	**DIMENSIONAL AND T.C. CODE** 1: P90 Case 1 5: C0G Case 1 7: X7R Case 1 2: P90 Case 2 6: C0G Case 2 8: X7R Case 2	**TERMINATION CODE:** 0: Chip 1: Pellet 2: Microstrip 3: Radial Ribbon 4: Radial Wire 5: Axial Ribbon 6: Narrow Axial Ribbon 7: Axial Wire 8: Nickel Interfaced Pellet 9: Nickel Interfaced Chip	**CAPACITANCE CODE:** Expressed in picofarads and identified by a three-digit number. First two digits represent significant figures. Last digit specifies the number of zeros to follow. For values below 10pF, the letter “R” is used as the decimal point and the last digit becomes significant.	**TOLERANCES:** *B: ±0.1pF *C: ±0.25pF *D: ±0.5pF F: ±1% G: ±2% J: ±5% K: ±10% M: ±20% Z: +80%, –20%	**A: NO MARKING** **B: MARKING** Cap. Code & Tol. Logo if space permits Non XR7 styles only	7″ Reel Plastic Tape

*Available below 10pf only

SPECIAL LEAD CONFIGURATION FOR FLEX BOARDS

NOTE: Targeted for flex circuit boards, the MA22-6 version of the MA22 has an upraised lead configuration. The lead bends when flexing the board after assembly so that minimal stress is placed on the component.

Style	Type				Configuration	Dimensions: mm				Termination
	P90 ± 20	P90 ± 30	C0G	X7R		L ± 0.38*	W ± 0.38*	T ± .038	Band Y	
Raised Micro-Strip	MA22-6	MB22-6	MA62-6	MA82-6		3.4	2.8	2.8	0.38 ± .25	Silver Ribbon: Length: 6.35 typical Width: 2.3 ± .13 Thickness: 0.1 ± .05

High Frequency Ceramic Capacitors

MA/MB Series

1

DIMENSIONS

Fig. 1 Chip

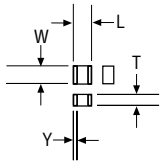


Fig. 2 Pellet

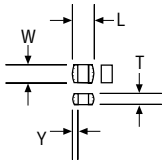


Fig. 3 Micro-Strip

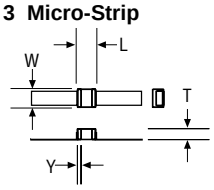


Fig. 4 Radial Ribbon

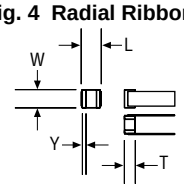


Fig. 5 Radial Wire

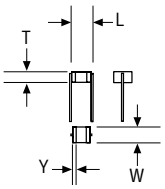


Fig. 6 Axial Ribbon

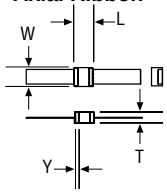


Fig. 7 Narrow Axial Ribbon

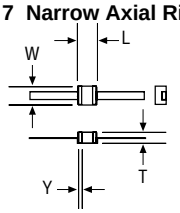
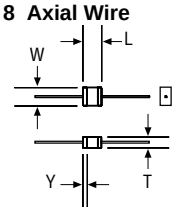
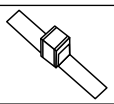
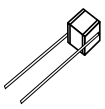
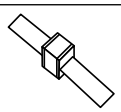
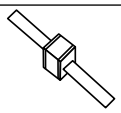
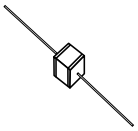


Fig. 8 Axial Wire



CONFIGURATION AND DIMENSIONS – MA & MB

Style	Type				Figure	Case Size	Configuration	Dimensions: mm			Band Y	Termination Non-magnetic
	P90 ± 20	P90 ± 30	C0G	X7R				L ± 0.38*	W ± 0.38*	T max.		
Chip	MA10	—	MA50	MA70	1	1 EIA Style 0505		1.4 ± .25	1.4 ± .25	1.4	0.25 ± .1	Palladium Silver
Pellet	MA11	—	MA51	MA71	2			1.8 max.				Palladium Silver & Sn62 Solder
Nickel Interfaced Pellet	MA18	—	MA58	—	2							Palladium Silver, Nickel Interface** & Sn62 Solder
Nickel Interfaced Chip	MA19	—	MA59	MA79	1			1.4 ± .25				Palladium Silver, Nickel Interface** & Tin Plating
Chip	MA20	MB20	MA60	MA80	1	2 EIA Style 1010		2.8	2.8	2.5	0.38 ± .25	Palladium Silver
Pellet	MA21	MB21	MA61	MA81	2			3.3 max.				Palladium Silver, & Sn62 Solder
Micro Strip	MA22	MB22	MA62	MA82	3			3.4				Silver Ribbon: 6.35 x 2.3 x 0.1mm
Radial Ribbon	MA23	MB23	MA63	MA83	4			3.4				Silver Ribbon: 6.35 x 2.3 x 0.1mm
Radial Wire	MA24	MB24	MA64	MA84	5			3.8				#26AWG Silver Wire: 12.7 x 0.4mm Dia.
Axial Ribbon	MA25	MB25	MA65	MA85	6			3.4				Silver Ribbon: 6.35 x 2.3 x 0.1mm
Narrow Axial Ribbon	MA26	MB26	MA66	MA86	7			3.4				Silver Ribbon: 6.35 x 1.25 x 0.1mm
Axial Wire	MA27	MB27	MA67	MA87	8			3.8				#26AWG Silver Wire: 12.7 x 0.4mm Dia.
Nickel Interfaced Pellet	MA28	MB28	MA68	—	2			3.3 max.				Palladium Silver, Nickel Interface** & Sn62 Solder
Nickel Interfaced Chip	MA29	MB29	MA69	MA89	1			2.8				Palladium Silver, Nickel Interface** & Tin Plating

*Except where Tolerance is shown. Lead lengths are typical widths ±0.1mm, thickness & dia. ±0.05mm. All leaded parts are bonded with high temperature solder 748°F/298°C.
**Magnetic construction due to nickel interface.

Miniature Microwave Ceramic Capacitors

MA Case Size 1 Series

MA10 & 50 SERIES, P90 & C0G – CASE SIZE 1

Cap. Code	Cap. pF	Cap. Tol.	WVDC
0R1	0.1	B	150
0R2	0.2	"	150
0R3	0.3	B,C	150
0R4	0.4	"	150
0R5	0.5	B,C,D	150
0R6	0.6	"	150
0R7	0.7	"	150
0R8	0.8	"	150
0R9	0.9	"	150
1R0	1.0	"	150
1R1	1.1	"	150
1R2	1.2	"	150
1R3	1.3	"	150
1R4	1.4	"	150
1R5	1.5	"	150
1R6	1.6	"	150
1R7	1.7	"	150
1R8	1.8	"	150
1R9	1.9	"	150
2R0	2.0	"	150
2R2	2.2	"	150
2R4	2.4	"	150
2R7	2.7	"	150
3R0	3.0	"	150
3R3	3.3	"	150
3R6	3.6	"	150
3R9	3.9	"	150
4R3	4.3	"	150
4R7	4.7	B,C,D	150
5R1	5.1	"	150
5R6	5.6	"	150
6R2	6.2	"	150
6R8	6.8	B,C,J,K,M	150
7R5	7.5	"	150
8R2	8.2	"	150
9R1	9.1	"	150
100	10	F,G,J,K,M	150
110	11	"	150
120	12	"	150
130	13	"	150
150	15	"	150
160	16	"	150
180	18	"	150
200	20	"	150
220	22	"	150
240	24	"	150
270	27	"	150
300	30	"	150
330	33	"	150
360	36	"	150
390	39	"	150
430	43	"	150
470	47	"	150
510	51	"	150
560	56	"	150
620	62	"	150
680	68	F,G,J,K,M	150
750	75	"	150
820	82	"	150
910	91	"	150
101	100	"	150
111*	110	"	50
121*	120	"	50
131*	130	"	50
151*	150	"	50
161*	160	"	50
181*	180	"	50
201*	200	"	50
221*	220	"	50
241*	240	"	50
271*	270	"	50
301*	300	"	50
331*	330	"	50
361*	360	"	50
391*	390	"	50
431*	430	"	50
471*	470	"	50
511*	510	"	50
561*	560	"	50
621*	620	"	50
681*	680	"	50
751*	750	"	50
821*	820	"	50
911*	910	"	50
102*	1000	"	50

*Extended Cap Range, C0G only

MA70 SERIES, X7R – CASE SIZE 1

Cap. Code	Cap. pF	Cap. Tol.	WVDC
511	510	K,M,Z	50
561	560	"	50
621	620	"	50
681	680	"	50
751	750	"	50
821	820	"	50
911	910	"	50
102	1000	"	50
112	1100	"	50
122	1200	"	50
132	1300	"	50
152	1500	K,M,Z	50
162	1600	"	50
182	1800	"	50
202	2000	"	50
222	2200	"	50
242	2400	"	50
272	2700	"	50
302	3000	"	50
332	3300	"	50
362	3600	"	50
392	3900	"	50
432	4300	K,M,Z	50
472	4700	"	50
512	5100	"	50
562	5600	"	50
622	6200	"	50
682	6800	"	50
752	7500	"	50
822	8200	"	50
912	9100	"	50
103	10000	"	50

Miniature Microwave Ceramic Capacitors

MA Case Size 2 Series

MA20 & 60 SERIES, P90 & C0G – CASE SIZE 2

Cap. Code	Cap. pF	Cap. Tol.	WVDC
0R1	0.1	B	500
0R2	0.2	"	500
0R3	0.3	B,C	500
0R4	0.4	"	500
0R5	0.5	B,C,D	500
0R6	0.6	"	500
0R7	0.7	"	500
0R8	0.8	"	500
0R9	0.9	"	500
1R0	1.0	"	500
1R1	1.1	"	500
1R2	1.2	"	500
1R3	1.3	"	500
1R4	1.4	"	500
1R5	1.5	"	500
1R6	1.6	"	500
1R7	1.7	"	500
1R8	1.8	"	500
1R9	1.9	"	500
2R0	2.0	"	500
2R1	2.1	"	500
2R2	2.2	"	500
2R4	2.4	"	500
2R7	2.7	"	500
3R0	3.0	"	500
3R3	3.3	"	500
3R6	3.6	"	500
3R9	3.9	"	500
4R3	4.3	"	500
4R7	4.7	"	500
5R1	5.1	"	500
5R6	5.6	"	500
6R2	6.2	"	500
6R8	6.8	B,C,J,K,M	500
7R5	7.5	"	500
8R2	8.2	B,C,J,K,M	500
9R1	9.1	"	500
100	10	F,G,J,K,M	500
110	11	"	500
120	12	"	500
130	13	"	500
150	15	"	500
160	16	"	500
180	18	"	500
200	20	"	500
220	22	"	500
240	24	"	500
270	27	"	500
300	30	"	500
330	33	"	500
360	36	"	500
390	39	"	500
430	43	"	500
470	47	"	500
510	51	"	500
560	56	"	500
620	62	"	500
680	68	"	500
750	75	"	500
820	82	"	500
910	91	"	500
101	100	"	500
111	110	"	300
121	120	"	300
131	130	"	300
151	150	"	300
161	160	"	300
181	180	"	300
201	200	"	300
221	220	"	200
241	240	F,G,J,K,M	200
271	270	"	200
301	300	"	200
331	330	"	200
361	360	"	200
391	390	"	200
431	430	"	200
471	470	"	200
511	510	"	100
561	560	"	100
621	620	"	100
681	680	"	50
751	750	"	50
821	820	"	50
911	910	"	50
102	1000	"	50
112*	1100	"	50
122*	1200	"	50
132*	1300	"	50
152*	1500	"	50
162*	1600	"	50
182*	1800	"	50
202*	2000	"	50
222*	2200	"	50
242*	2400	"	50
272*	2700	"	50
302*	3000	"	50
332*	3300	"	50
362*	3600	"	50
392*	3900	"	50
432*	4300	"	50
472*	4700	"	50
512*	5200	"	50

Note: Limited capacitance range available in 1Kv; consult factory.

*Extended Cap Range, C0G only

MA80 SERIES, X7R – CASE SIZE 2

Cap. Code	Cap. pF	Cap. Tol.	WVDC
512	5100	K,M,Z	100
562	5600	"	100
622	6200	"	100
682	6800	"	100
752	7500	"	100
822	8200	"	100
912	9100	"	100
103	10000	"	100
113	11000	"	100
123	12000	"	100
133	13000	"	100
153	15000	K,M,Z	100
163	16000	"	100
183	18000	"	100
203	20000	"	100
223	22000	"	100
243	24000	"	100
273	27000	"	100
303	30000	"	100
333	33000	"	100
363	36000	"	100
393	39000	"	100
433	43000	K,M,Z	100
473	47000	"	100
513	51000	"	100
563	56000	"	100
623	62000	"	100
683	68000	"	100
753	75000	"	100
823	82000	"	100
913	91000	"	100
104	100000	"	100

Miniature Microwave Ceramic Capacitors

MB, P90, Case Size 2

MB20 ~ 29 SERIES, P90 ± 30 – CASE SIZE 2

Cap. Code	Cap. pF	Cap. Tol.	WVDC
0R4	0.4	B,C	1000
0R5	0.5	B,C,D	1000
0R6	0.6	"	1000
0R7	0.7	"	1000
0R8	0.8	"	1000
0R9	0.9	"	1000
1R0	1.0	"	1000
1R1	1.1	"	1000
1R2	1.2	"	1000
1R3	1.3	"	1000
1R4	1.4	"	1000
1R5	1.5	"	1000
1R6	1.6	"	1000
1R7	1.7	"	1000
1R8	1.8	"	1000
1R9	1.9	"	1000
2R0	2.0	"	1000
2R1	2.1	"	1000
2R2	2.2	"	1000
2R4	2.4	"	1000
2R7	2.7	"	1000
3R0	3.0	"	1000
3R3	3.3	"	1000
3R6	3.6	"	1000
3R9	3.9	"	1000
4R3	4.3	B,C,D	1000
4R7	4.7	"	1000
5R1	5.1	"	1000
5R6	5.6	"	1000
6R2	6.2	"	1000
6R8	6.8	B,C,J,K,M	1000
7R5	7.5	"	1000
8R2	8.2	"	1000
9R1	9.1	"	1000
100	10	F,G,J,K,M	500
110	11	"	500
120	12	"	500
130	13	"	500
150	15	"	500
160	16	"	500
180	18	"	500
200	20	"	500
220	22	"	500
240	24	"	500
270	27	"	500
300	30	"	500
330	33	"	500
360	36	"	500
390	39	"	500
430	43	"	500
470	47	F,G,J,K,M	300
510	51	"	300
560	56	"	300
620	62	"	300
680	68	"	100
750	75	"	100
820	82	"	100
910	91	"	100
101	100	"	100

Design Engineering Kits

MA Series

- Miniature sizes
- Very high Q at high frequencies
- High RF power capabilities
- Impervious to adverse environmental conditions
- Low dissipation factors
- Perfect retrace capability
- High temperature stability
- Low noise

CASE 1 SIZE KIT

Kit-MA18-A	QTY
MA180R3B	5
MA180R5B	5
MA180R7B	5
MA181R0B	5
MA181R2C	5
MA181R5C	5
MA181R8C	5
MA182R2C	5
MA182R7C	5
MA183R3C	5
MA183R9C	5
MA184R7C	5
MA185R6D	5
MA186R8D	5
MA188R2D	5
MA18100J	5
MA18120J	5
MA18150J	5
MA18180J	5
MA18220J	5
MA18270J	5
MA18330J	5
MA18390J	5
MA18470J	5
MA18560J	5
MA18680J	5
MA18820J	5
MA18101K	5

CASE 1 SIZE KIT

Kit-MA58-A	QTY
MA581R0B	5
MA581R5C	5
MA582R2C	5
MA583R3C	5
MA584R7C	5
MA586R8D	5
MA58100J	5
MA58150J	5
MA58220J	5
MA58330J	5
MA58470J	5
MA58680J	5
MA58101K	5
MA58221K	5
MA58471K	5
MA58102K	5

CASE 2 SIZE KIT

Kit-MA28-A	QTY
MA280R3B	5
MA2800R5B	5
MA2800R7B	5
MA2801R0B	5
MA2801R2C	5
MA2801R5C	5
MA2801R8C	5
MA2802R2C	5
MA2802R7C	5
MA2803R3C	5
MA2803R9C	5
MA2804R7C	5
MA2805R6D	5
MA2806R8D	5
MA2808R2D	5

CASE 2 SIZE KIT *(continued)*

Kit-MA28-A	QTY
MA280100J	5
MA280120J	5
MA280150J	5
MA280180J	5
MA280220J	5
MA280270J	5
MA280330J	5
MA280390J	5
MA280470J	5
MA280560J	5
MA280680J	5
MA280820J	5
MA280101K	5
MA280151K	5
MA280221K	5
MA280331K	5
MA280471K	5
MA280681K	5
MA280102K	5

CASE 2 SIZE KIT

Kit-MA68-A	QTY
MA681R0B	5
MA681R5C	5
MA682R2C	5
MA683R3C	5
MA684R7C	5
MA686R8D	5
MA68100J	5
MA68150J	5
MA68220J	5
MA68330J	5
MA68470J	5
MA68680J	5
MA68101K	5
MA68221K	5
MA68471K	5
MA68102K	5
MA68222K	5
MA68472K	5
MA68512K	5

ATC Cross Reference

MA/UFP Series

ATC P/N	MURATA P/N
MA SERIES: P90 ± 20 PPM/°C	
ATC100A––––W––	None, Solder Plated Terminations
ATC100A––––C––	MA10
ATC100A––––CN––	MA10
ATC100A––––CA––	None, Gold Terminations
ATC100A––––P––	MA1 8
ATC100B––––W––	None, Solder Plated Terminations
ATC100B––––WN––	None, Copper Barrier Solder Plated
ATC100B––––PN––	None, Copper Barrier Solder Coated
ATC100B––––C––	MA20
ATC100B––––CA––	None, Gold Terminations
ATC100B––––MS––	MA22
ATC100B––––MN––	MA22
ATC100B––––RR––	MA23
ATC100B––––FN––	MA23
ATC100B––––RW––	MA24
ATC100B––––RN––	MA24
ATC100B––––AR––	MA25
ATC100B––––NAR––	MA26
ATC100B––––AN––	MA26
ATC100B––––AW––	MA27
ATC100B––––BN––	MA27
ATC100B––––P––	MA28
MA SERIES: 0 ± 30 PPM/°C	
ATC700A––––W––	None, Solder Plated Terminations
ATC700A––––C––	MA50
ATC700A––––CN––	MA50
ATC700A––––CA––	None, Gold Terminations
ATC700A––––P–––	MA58
ATC700B––––W––	None, Solder Plated Terminations
ATC700B––––WN––	None, Copper Barrier Solder Plated
ATC700B––––PN––	None, Copper Barrier Solder Coated
ATC700B––––C–––	MA60
ATC700B––––CA––	None, Gold Terminations
ATC700B––––MS–––	MA62
ATC700B––––MN––	MA62
ATC700B––––RR––	MA63
ATC700B––––FN––	MA63
ATC700B––––RW––	MA64
ATC700B––––RN––	MA64
ATC700B––––AR––	MA65
ATC700B––––NAIR––	MA66
ATC700B––––AN––	MA66
ATC700B––––AW––	MA67
ATC700B––––BN––	MA67
ATC700B––––P––	MA68

ATC P/N	MURATA P/N
MA SERIES: X7R	
ATC200A––––W––	None, Solder Plated Terminations
ATC200A––––C––	MA70
ATC200A––––CN––	MA70
ATC200A––––CA––	None, Gold Terminations
ATC200A––––P––	MA78
ATC200B––––W––	None, Solder Plated Terminations
ATC200B––––WN––	None, Copper Barrier Solder Plated
ATC200B––––PN––	None, Copper Barrier Solder Coated
ATC200B––––C––	MA80
ATC200B––––CA––	None, Gold Terminations
ATC200B––––MS––	MA82
ATC200B––––MN––	MA82
ATC200B––––RR––	MA83
ATC200B––––FN––	MA83
ATC200B––––RW––	MA84
ATC200B––––RN––	MA84
ATC200B––––AR––	MA85
ATC200B––––NAR––	MA86
ATC200B––––AN––	MA86
ATC200B––––AW––	MA87
ATC200B––––BN––	MA87
ATC200B––––P––	MA88
UFP SERIES: P90 ± 20 PPM/°C	
ATC100E––––W––	None, Chip
ATC100E––––P––	None, Chip
ATC100E––––CA––	None, Chip
ATC100E––––C––	None, Chip
ATC100E––––MS––	UFP12
ATC100E––––AR––	UFP1
ATC100E––––AW––	UFP17
ATC100E––––RW––	None, Radial Leads

Note: Murata Capacitor body size is slightly larger than ATC's

Example:

ATC100A 101JC50 = MA 10 101J

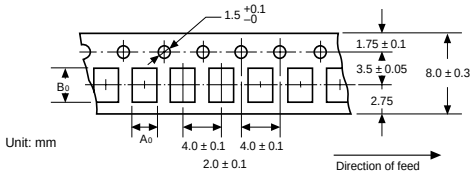
High Frequency Ceramic Capacitors

MA/MB Series

SPECIFICATIONS

Dissipation Factor	MA/MB 1_/2_; 0.05% maximum MA 5_/6_; 0.15% maximum @ 1.0VRMS (f = 1 MHz) MA 7_/8_; 2.5% maximum @ 1.0VRMS maximum (f = 1kHz)
Temperature Coefficient	MB2_ Series P90±30ppm/°C, (–55°C to +175°C) MA 1_/2_ Series P90 ±20ppm/°C, (–55°C to +125°C) MA 5_/6_ Series; C0G (0 ±30ppm/°C, –55°C to +125°C) MA 7_/8_ Series; ±15% maximum (–55°C to +125°C)
Insulation Resistance	MA/MB 1_/2_ 1T Ohms at +25°C, 100G Ohms at +125°C MA 5_/6_ 1T Ohms at +25°C, 100G Ohms at +125°C MA 7_/8_ 10G Ohms or 1000 Megohms μF min., whichever is less (@ 25°C) 10G Ohms or 100 Megohms μF min., whichever is less (@ 125°C)
Dielectric Test Voltage	MA/MB 1_/2_/5_/6_/7_/8_, 250% of WVDC for 5 seconds
Capacitance Drift	Meets or Exceeds MIL-PRF-55681 (Does not apply for MA 7_/8_)
Aging	Negligible for MA/MB 1_/2_/5_/6_, MA 7_/8_; 2.5% per decade maximum
Environmental Tests	MIL-STD-202
Vibration	Method 204, Condition B
Moisture Resistance	Method 106
Solderability	Method 208
Resistance to Soldering Heat	Method 210, Condition B
Thermal Shock	Method 107, Condition A
Life	Method 108, Condition F
Marking	**Standard MA/MB product is unmarked**

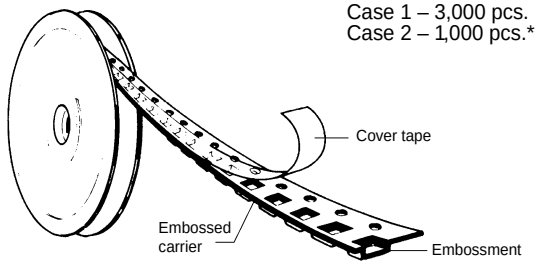
TAPE AND REEL PACKAGING



NOTE: 1 Ao & Bo are determined by maximum specified length and width of components plus 0.016 ± 0.008, plus the additional requirement that components not be allowed to rotate more than 20° within the cavity clearance or whichever condition occurs first.

DIMENSIONS: mm

PACKAGING:
Case 1 – 3,000 pcs.
Case 2 – 1,000 pcs.*



*Custom quantities upon request.

CONDUCTIVE TAPE

Advantages	Benefits
Conductive	Prevents static charge build-up
Flexibility	Insures against crazing, cracking and brittleness
Dimensional strength	Drive loading will not elongate sprocket holes
Dimensional stability	Smooth, reliable running on pick and place machines

Other packaging options available — Consult Factory

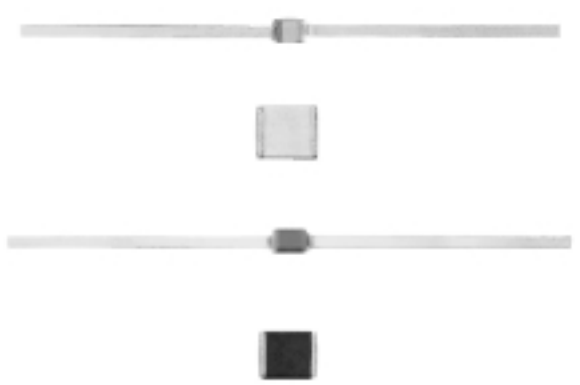
ELECTRICAL PROPERTIES

Property	Value	Test Method
Resistivity	5 x 10^5 ohm/square	ASTM D-257
Electrostatic Decay Time At 50% RH@21°C	0.01 Sec.	ASTM D-257

Typical Values

High Frequency Ceramic Capacitors

HIGH Q, K, UY Series

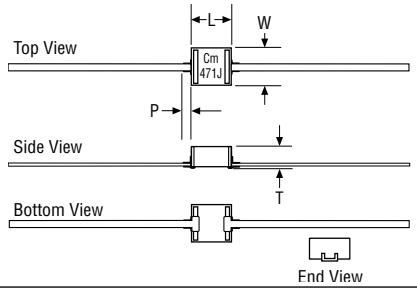
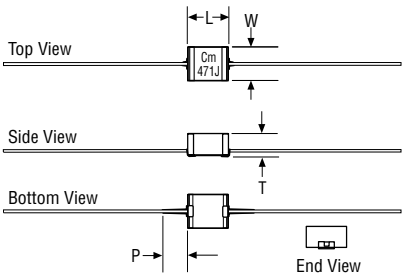
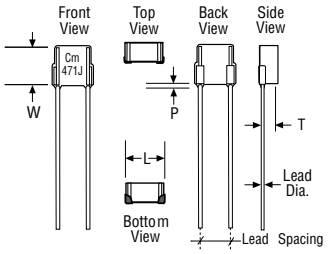


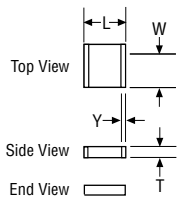
Precise ceramic dielectric layers are sintered into a solid monolithic structure. Silver leads are bonded to the capacitor by a unique solderless process. As a result, Uniceram High Q capacitors maintain stability despite extreme voltage and frequency variations, and severe environmental conditions. Their proprietary ceramic monolithic construction also yields high power handling capabilities per unit volume, as well as the ability to withstand temperatures well in excess of the melting point of solder.

Uniceram High Q capacitors can be provided with radial wire, axial ribbon or axial wire leads. They are also available as unencapsulated chips. These units are ideal for applications where low inductance is essential.

UY High K capacitors employ the same proprietary band metalization process as Murata High Q capacitors to insure peel-proof and leach-resistant termination. High K capacitors also use fine silver leads that are bonded to the capacitor using high temperature solder. Choose from Uniceram High K miniature chips or leaded capacitors with the assurance of performance that will live up to your expectations.

CONFIGURATION & DIMENSIONS – UY Series

Style	Type P90 ± 20	Type X7R	Configuration	Dimensions: mm P90 ± 20 L & W ± 0.78	P90 ± 20 T ± 0.78	X7R L & W ± 0.78	X7R T ± 1.01	Lead Spacing ± 0.78	Pantz "P"	Termination
Axial Ribbon	UY01	—		2.77	1.57	—	—	—	1.19 max.	Silver Ribbon: Length: 22.23 min. Width: 1.27 ± .08 Thickness: 0.25 ± .08
	UY02	UY12		3.56	1.57	3.56	1.52			
	UY03	—		4.75	1.98	—	—			
	UY04	UY14		6.35	1.98	6.35	1.78			
	UY05	UY15		10.31	1.98	10.41	2.03			
Axial Wire	UY21	—		2.77	1.57	—	—	—	1.19 max.	Silver Wire (Diagonal of the rectangle forms the diameter of the wire): Length: 22.23 min. Width: .43 ± .025 Thickness: 0.41 ± .05
	UY22	UY32		3.56	1.57	3.56	1.52			
	UY23	—		4.75	1.98	—	—			
	UY24	UY34		6.35	1.98	6.35	1.78			
	UY25	UY35		10.31	1.98	10.41	2.03			
Radial Wire	UY62	UY72		3.56	1.57	3.56	1.52	3.12	1.19 max.	Silver Wire: Length: 22.23 min. Diameter: .58 ± .08
	UY63	—		4.75	1.98	—	—	4.45		
	UY64	UY74		6.35	1.98	6.35	1.78	5.72		
	UY65	UY75		10.31	1.98	2.8	2.03	9.53		

Type			Configuration	L ± 0.38	W max.	T max.		Band Y	
Chips	WY01	—		2.77	2.92	1.52	0.38 Typ.	0.38 Typ.	Palladium Silver
	WY02	—		3.53	3.56	1.52			
	WY03	—		4.72	4.70	3.56			
	WY04	—		6.10	6.10	2.03			
	WY05	—		10.67	10.67	2.29			

High Frequency Ceramic Capacitors

HIGH Q, K, UY Series

PART NUMBERING SYSTEM – High Q UY Series

UY	0	2	13	1	J
HIGH Q UNICERAM DESIGNATION UY Fixed Capacitor (Glass encapsulated) WY Chip Capacitor (unencapsulated)	**LEADED CONFIGURATIONS** Axial Ribbon = 0 Axial Wire = 2 Radial Wire = 6	**CASE SIZE** 1, 2, 3, 4, 5	**CAPACITANCE CODE** First two digits of Capacitance Value in pF Note: R signifies decimal point	**NO. OF ZEROES** Following the two digits of the capacitance value in pF.	**CAPACITANCE TOLERANCE** B = ±.1pF C = ±.25pF D = ±.50pF F = ±1% G = ±2% J = ±5% K = ±10%

SPECIFICATIONS

Operating Temp. Range	–55 to +125°C
Temp. Coefficient	+90 ± 20ppm/°C
Working Voltage	See Table
Dielectric Test Voltage	200% of rated working voltage
Capacitance Value	Measured at 1MHz and 1Vrms
Capacitance Tolerance	See Table
Quality Factor (Q)	for values 1000pF and smaller 2000 min. @ 1MHz
Dissipation Factor	for values above 1000pF .0002 max.
Insulation Resistance	@ 25°C: 10^6 Megohms min., @ 125°C: 10^5 Megohms min. or 500 ohm farads whichever is less
Marking	All capacitors are stamp marked with Co. I.D., Cap. Code and Tolerance, space permitting

FEATURES

- High capacitance per unit volume
- Available in five sizes covering 0.5pF to 3000pF
- Other ceramic materials, metalizing bands, form factors and voltages available on special order
- Designed for direct connection to microwave substrates, headers, printed circuit boards and hybrid circuits

PART NUMBERING SYSTEM – High K UY Series

UY	1	2	13	1	J
HIGH Q UNICERAM DESIGNATION UY Fixed Capacitor (unencapsulated)	**LEADED CONFIGURATIONS** Axial Ribbon = 1 Axial Wire = 3 Radial Wire = 7	**CASE SIZE** 2, 4, 5	**CAPACITANCE CODE** First two digits of Capacitance Value in pF	**NO. OF ZEROES** Following the two digits of the capacitance value in pF	**CAPACITANCE TOLERANCE** K = ±10% M = ±20% Z = ±80, –20%

SPECIFICATIONS

Dissipation Factor	2.5% max. @ 1kHz
Insulation Resistance	1000 megohm microfarad or 100G Ohms whichever is less @ 25°C
Temp. Coefficient	±15% max., –55°C to +125°C
Working Voltage	50 WVDC, Except as noted
Flash Test	2 x WVDC (5 sec. @ 25°C, 50ma. max.)
Life Test	2 x WVDC @ 125°C, 1000hrs.
Terminations	Palladium Silver: Band-width standard, .015 min.
Test Sequence	Capacitance, Dissipation Factor, Insulation Resistance, Flash Test
Marking	All capacitors are stamp marked with Co. I.D., Cap. Code and Tolerance, space permitting

FEATURES

- High ratio of capacitance to unit volume for equivalent voltage, stability and current ratings

CAPACITANCE RANGE

Case Size	Type	Part #	Capacitance Value						
			Min./Max.	50VDC	100VDC	200VDC	300VDC	500VDC	1000VDC
1	P90 ± 20	UY01, UY21, WY01	Min.	—	—	—	0.5pF	—	—
			Max.	—	—	—	100pF	—	—
2	P90 ± 20	UY02, UY22, UY62, WY02	Min.	—	—	—	5.1pF	—	—
			Max.	—	—	—	130pF	—	—
	X7R	UY12, UY32, UY72	Min.	110000pF	51000pF	—	—	2700pF	1000pF
			Max.	220000pF	100000pF	—	—	47000pF	2600pF
3	P90 ± 20	UY03, UY23, UY63, WY03	Min.	—	—	—	150pF	—	—
			Max.	—	—	—	470pF	—	—
4	P90 ± 20	UY04, UY24, UY64, WY04	Min.	—	—	—	510pF	—	—
			Max.	—	—	—	1000pF	—	—
	X7R	UY14, UY34, UY74	Min.	—	160000pF	130000pF	—	30000pF	8200pF
			Max.	—	1000000pF	150000pF	—	120000pF	27000pF
5	P90 ± 20	UY05, UY25, UY65, WY05	Min.	—	—	—	1100pF	—	—
			Max.	—	—	—	3000pF	—	—
	X7R	UY15, UY35, UY75	Min.	—	2000000pF	510000pF	—	82000pF	—
			Max.	—	2200000pF	1800000pF	—	470000pF	—

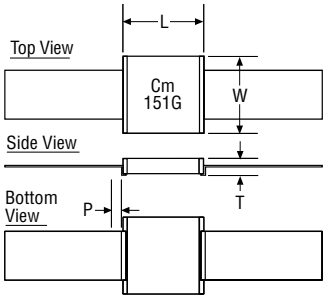
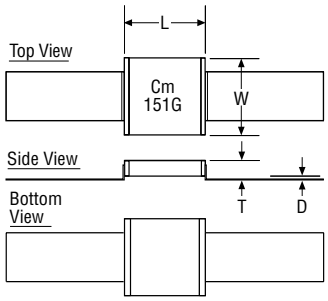
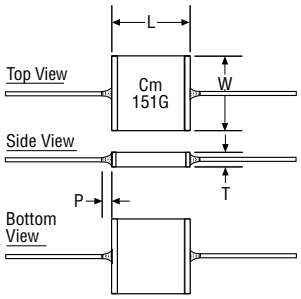
RF Power Capacitors

UFP/UFN Series

UFP fixed ceramic capacitors are specifically designed for high voltage and high RF current high frequency applications. They are ideally suited to the latest aerospace and commercial mobile and fixed communications equipment.

Glass encapsulation protects UFP capacitors against corona, contaminants and other environmental factors. Wide, fine silver lead terminations assure minimum inductance and high RF current capabilities. They can withstand temperatures far in excess of soldered units due to solderless lead attachment.

CONFIGURATION & DIMENSIONS – UFP/UFN Series

Style	Type		Configuration	Dimensions: mm					Leads
	P90 ± 20	C0G		L Max	W Max	T Max P90	T Max NP0	Pantz "P"	
Axial Ribbon	UFP1	UFN15		14.73	13.89	4.37	5.33	1.9 Max	Silver Ribbon: Length: 19.05 Minimum Width: 8.89 Typical Thickness: 0.25 Typical
Raised Axial Ribbon	UFP12	UFN12		14.73	13.89	5.64	6.60	1.19 Max	Silver Ribbon: Length: 19.05 Minimum Width: 8.89 Typical Thickness: 0.25 Typical D = 0.76 ± 0.38
Axial Wire	UFP17	UFN17		14.73	13.89	4.37	5.33	1.19 Max	Silver Wire: Length: 15.24 Minimum Diameter: 0.81 Typical

Notes: For custom lead configuration, see page 15.

RF Power Capacitors

UFP/UFN Series

CAPACITANCE RANGE

Type	Part #	Capacitance Value						
		Min/Max	300VDC	600VDC	1200VDC	2500VDC	3600VDC	5000VDC
P90±20	UFP1, UFP12, UFP17	Min	1500pF	680pF	360pF	160pF	3pF	—
		Max	3000pF	1300pF	620pF	330pF	150pF	—
C0G	UFN12, UFN15, UFN17	Min	—	—	—	—	—	1.5pF
		Max	—	—	—	—	—	360pF

PART NUMBERING SYSTEM

UFP **1** **7** **15** **1** **K**

UFP: P90
UFN: C0G

CASE SIZE

TERMINATION
2 = Raised Axial Ribbon
Blank or
5 = Axial Ribbon
7 = Axial Wire

CAPACITANCE CODE
Capacitance Value in pF
Note: R signifies decimal point

NO. OF ZEROES
Following the first two digits of the capacitance value in pF

CAPACITANCE TOLERANCE
J = ±5% (standard)
K = ±10% (standard)
Other tolerances are available, contact factory.

SPECIFICATIONS

Voltage: See chart below
Q: 5,000 min. at 1MHz and 25°C for values 1,000pF and smaller
Tolerances: ±0.5pF for values below 10pF
±5%, ±10% for higher values
Power: 12 KVAR at 25°C typical
Current: 8 amperes at 25°C (Derated for higher temperatures)

UFP Temperature Coefficient: +90, ±20ppm/°C at 1 MHz (–55°C to +125°C)
UFN Temperature Coefficient: 0 ± 30ppm/°X at 1 MHz (–55°C to +125°C)
Marking: All capacitors stamp marked with company I.D., cap. code and tolerance

Type	Range of Cap. Values (pF)	Rated Voltage (DC)	DWV	RF Current ARMS at +25°C	RF Voltage VRMS at +25°C	RF Power KVAR at +25°C	Voltage Limiting Impedance (ohms)	Current Limiting Impedance (ohms)
UFP1	10 to 150	3,600	7,000	8	3,000	12	750	187.5
	160 to 330	2,500	4,500	8	2,000	12	333.3	187.5
	360 to 620	1,200	2,400	8	1,000	6	166.7	93.75
	680 to 1,300	600	1,200	8	500	3	83.3	46.88
	1,500 to 3,000	300	600	8	250	1.5	41.67	23.44
UFN1	1.5 to 360	5,000	8,000	8	4,000	12	1333	187.5

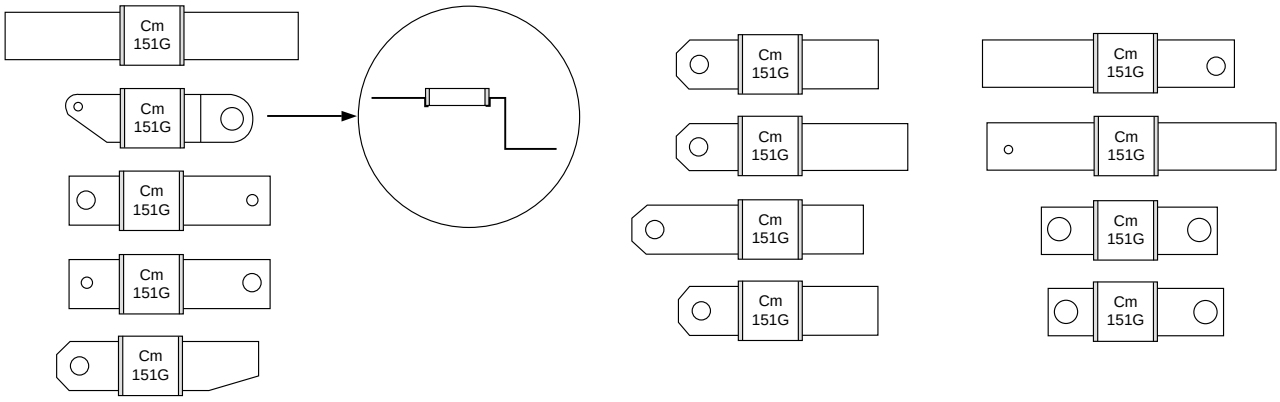
Notes: RF Current, Voltage and KVAR define Operating range using the Voltage Limiting and Current Limiting Impedances.
1. When the Impedance of the capacitor is higher than the Voltage Limiting Impedance, the limiting factor is the RF Voltage.
2. When the Impedance of the capacitor is less than the Current Limiting Impedance, the limiting factor is the RF current.
3. When the Impedance of the capacitor is between these two values, the limiting factor is the RF Power.
4. RF current rating derates 0.4%/°C from +25°C rating to +125°C.
5. RF Power rating derates 0.5%/°C from +25°C rating to +125°C.
6. RF Current rating derates 0.16%/°C from +25°C rating to +125°C.

Formulas for Voltage and Current when the capacitor is Power Limited are:

$$\text{RF Voltage} = (1{,}000 \times \text{KVAR} \times \text{IMPEDANCE})^{1/2} \qquad I = \left(\frac{1{,}000 \times \text{KVAR}}{\text{IMPEDANCE}}\right)^{1/2}$$

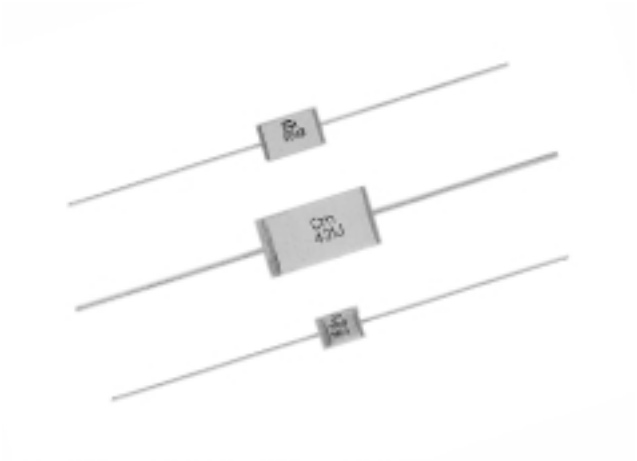
$$\text{RF Current} = (1{,}000 \times \text{KVAR} \times \text{IMPEDANCE})^{1/2} \qquad I = \left(\frac{1{,}000 \times \text{KVAR}}{\text{IMPEDANCE}}\right)^{1/2}$$

EXAMPLES OF AVAILABLE LEAD CONFIGURATIONS



RF Power Capacitors

High Q UV Series

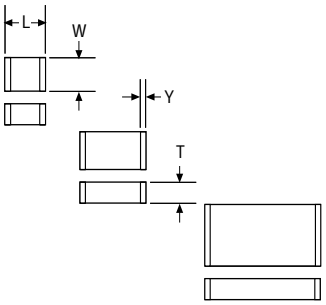
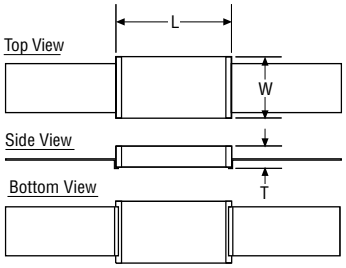
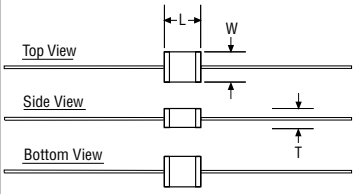


Uniceram high power and high voltage RF Capacitors provide options of chip style, or silver leads. They are suited for power communication equipment, requiring high RF voltage or current.

CAPACITANCE RANGE

Case Size	Part #	2,500VDC
1	UV11, UV17	Min. 1.5pF, Max. 130pF
	UV41, UV47	Min. 3.3pF, Max. 160pF
2	UV21, UV27	Min. 150pF, Max. 330pF
	UV51, UV57	Contact factory
3	UV31, UV35, UV37	Min. 330pF, Max. 910pF
	UV61, UV65, UV67	Contact factory

CONFIGURATION & DIMENSIONS – UV Series

Style	Type		Configuration	Dimensions: mm			Termination
	P90 ± 20	C0G		L ± 0.76	W ± 0.76	T ± 0.76	
Pellet	UV11	UV41		7.62	5.59	3.30	Palladium Silver & Sn62 Solder
	UV21	UV51		12.45	6.86	3.43	
	UV31	UV61		21.84	11.18	3.43	
Axial Ribbon	UV35	UV65		21.84	11.18	3.68	Silver Ribbon: Length: 19.05 Minimum Width: 8.89 Typical Thickness: 0.25 Typical
Axial Wire	UV17	UV47		7.62	5.59	3.30	Tin Plated Copper Axial Wire: Length: 31.75 Minimum Diameter: .64 Typical
	UV27	UV57		12.45	6.86	3.43	Tin Plated Copper Axial Wire: Length: 31.75 Minimum Diameter: .64 Typical
	UV37	UV67		21.84	11.18	3.68	Tin Plated Copper Axial Wire: Length: 31.75 Minimum Diameter: .81 Typical

PART NUMBERING SYSTEM

UV	1	7	15	1	K
STYLE	**CASE SIZE & TYPE**	**TERMINATION** 1 = Pellet 5 = Axial Ribbon 7 = Axial Wire	**CAPACITANCE CODE** Capacitance Value in pF Note: R signifies decimal point	**NO. OF ZEROES** Following the first two digits of the capacitance value in pF	**CAPACITANCE TOLERANCE** J = ±5% (standard) K = ±10% (standard) Other tolerances are available, contact factory.

Global Part Numbering System

RFE Series

Monolithic Ceramic Capacitors Lead Type

(Global Part Number) RFE | 3E | E | X7R | 105 | K | 025 | T1

❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽

❶ Type

Product ID	Series/Terminal	
RF	E	Radial leaded Hi-Reliability

❷ Size Code

Code	Size	Old RPE Code
3E	3.5X3.1mm	RPE110
1**B**	7.75X7.62mm	RPE113
1C	1.27X1.27mm	Custom
1D	1.19X0.875mm	Custom
1E	11.45X10.95mm	Custom
1F	10.2X10.2mm	RPE114
1G	12.7X12.7mm, 10.2mm US	RPE117
1H	5.1X6.4mm, 2.5mm US	RPE121
1J	5.1X6.4mm, 5.1mm US	RPE122
1K	7.6X7.0mm, 5.1mm US	RPE123
1L	5.1X5.1mm, 2.5mm US	RPE131
1M	5.1X5.1mm, 5.1mm US	RPE132

❸ Thickness

Code	Size
E	2.5mm (.098° max)
S	2.8mm (.110° max)
F	3.2mm (.126° max)
G	3.8mm (.150° max)

❹ Temperature Characteristics

Code	Temp. Characteristics
C0G	0 ±30ppm (Note 1)
X7R	±15%
Z5U	+22, –56%
Y5V	+22, –82%
P2H	N150 ± 60ppm
R2H	N220 ± 60ppm
S2H	N330 ± 60ppm
T2H	N470 ± 60ppm
U2J	N750 ± 120ppm
U1G	N080
P2G	N150
R2G	N220

❺ Capacitance Code

Expressed in pico-farads (pF) and identified by a three-digit number. The first two digits represent significant figures. Last digit specifies the number of zeros to follow. For the fractional values below 10pF, the letter "R" is used as the decimal point and the last digit becomes significant.

❻ Capacitance Tolerance

C0G: 5pF or less
- C = ±.25pF
- >5pF ≤ 10pF
- D = ±.5pF>10pF
- J = ±5%

X7R: K = ±10%
Z5U: M = ±20%
Y5V: Z = +80, –20%

❼ Working VDC

Code	Working VDC
025	25VDC
050	50VDC
100	100VDC
200	200VDC
300	300VDC
500	500VDC
750	750VDC
1kV	1000VDC
XXX	Special, i.e. 1500, 125, etc.

❽ RFE Packaging/Leadform

Code	Packaging, Leadform
B1	Bulk, Straight lead
B2	Bulk, Inside kink lead
B3	Bulk, Outside kink lead
T1	Tray, Straight lead
T2	Tray, Inside kink lead
T3	Tray, Outside kink lead
U1	Anti-static Tray, straight lead
U2	Anti-static Tray, inside kink lead
U3	Anti-static Tray, outside kink lead
X1	Anti-static Tape cut into strips, straight lead
X2	Anti-static Tape cut into strips, inside kink lead
X3	Anti-static Tape cut into strips, outside kink lead
X4	Vertipack
Z	Special, not listed above

NOTE: T.C. Tolerance

Capacitance (pF)	T.C. Tolerance (ppm)
10 and over	± 30 (G)
4.0–9.9	± 60 (H)
2.1–3.9	±120 (J)
.4–2.0	±250 (K)

Refer to EIA RS-198 for limitations.

High Reliability Capacitors

RFE Series

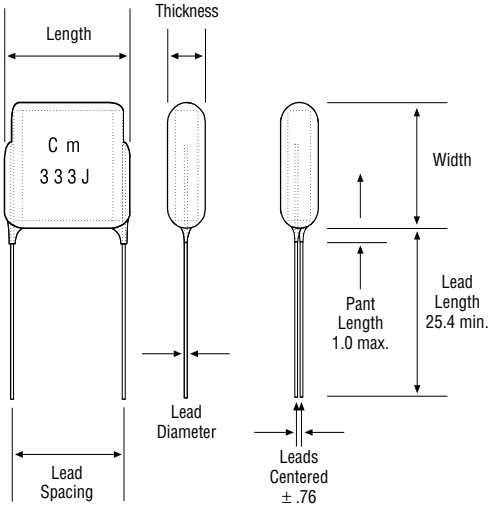
Murata offers High Reliability versions of most of the capacitors manufactured. Whether one wants screening of standard designs (100% Burn-In followed by Elevated Temperature Insulation Resistance, Room Temperature Insulation Resistance, Dielectric Withstanding Voltage, Capacitance, and Dissipation Factor Testing) or special high reliability designs with screening, Murata can supply your needs. Please consult the factory with your request. Murata Electronic's in-house Corporate QA Laboratory can mix and match testing to meet your requirements.

FEATURES

- Wide capacitance, T.C., voltage and tolerance range
- Industry standard sizes
- Various lead spacing available
- Marking standard or to customer specification
- Epoxy coating meets UL94V-0

5

CONFIGURATION & DIMENSIONS – Hi-Rel RPE Series

Style	Configuration	Dimensions: mm				
		L max	W max	T max	Lead Diameter	Lead Spacing ± 0.76
RFE 1		3.5	3.1	2.5	AWG #26 0.4	2.5
RFE 3 Crimped Lead		5.1	6.4	3.2	AWG #24 0.5	2.5
RFE 3 Crimped Lead		5.1	6.4	3.2	AWG #24 0.5	5.1
RFE 2 Crimped Lead		5.1	5.1	3.2	AWG #25 0.45	2.5
RFE 2 Crimped Lead		5.1	5.1	3.2	AWG #25 0.45	5.1
RFE 4 Crimped Lead		7.6	7.0	3.2	AWG #24 0.5	5.1
RFE 5		7.6	7.6	4.0	AWG #24 0.5	5.1
RFE 6		10.2	10.2	4.0	AWG #24 0.5	5.1
RFE 7		12.7	12.7	5.1	AWG #24 0.5	10.2

High Frequency, High Voltage Capacitors Global Part Numbering

ERB, 1kV, HkV Series

Chip Monolithic Ceramic Capacitors

(Global Part Number)

ER	B	18	8	B1	1H	102	K	A01	K
❶	❷	❸	❹	❺	❻	❼	❽	❾	❿

❶Product ID

Product ID	Code	Series
GR	M	for Reflow, Flow/Reflow
	P	Soldering Electrode
ER	B	High-frequency Type (Ni/Sn Termination)
	F	High-frequency and high-power Type
	H	High-frequency and high-power Type (Ribbon Terminal)
	A	High-frequency Type
	D	High-frequency Type (Ribbon Terminal)
GQ	M	High-frequency for Flow/Reflow Soldering
GM	A	Monolithic Microchip
GN	M	Capacitor Array
LL	L	Low ESL Wide-width Type
	A	Low ESL Capacitor Array
GJ	6	Low Dissipation
	2	Smoothing Type
GA	2	for AC250V (r.m.s.)
	3	Safety Standard Recognized Type

❸Dimension (L×W)

Code	Dimension (L×W)	EIA
03	0.6×0.3 mm	0201
05	0.5×0.5 mm	0202
08	0.8×0.8 mm	0303
11	1.25×1.0 mm	0504
15	1.0×0.5 mm	0402
18	1.6×0.8 mm	0603
1X	Depends on individual standards.	
21	2.0×1.25 mm	0805
22	2.8×2.8 mm	1111
31	3.2×1.6 mm	1206
32	3.2×2.5 mm	1210
3X	Depends on individual standards.	
42	4.5×2.0 mm	1808
43	4.5×3.2 mm	1812
52	5.7×2.8 mm	2211
55	5.7×5.0 mm	2220

❹Dimension (T)

Code	Dimension (T)
3	0.3 mm
4	4-elements (Array Type)
5	0.5 mm
6	0.6 mm
7	0.7 mm
8	0.8 mm
9	0.85 mm

❷Series

A	1.0 mm
B	1.25 mm
C	1.6 mm
D	2.0 mm
E	2.5 mm
M	1.15 mm
N	1.35 mm
R	1.8 mm
Q	1.5 mm
X	Depends on individual standards.

With the array type GNM series, "Dimension(T)" indicates the number of elements.

❺Temperature Characteristics

Code	Temperature Characteristics	Temperature Range	Cap. Change or Temp. Coeff.
1X	SL	20 to 85°C	+350 to -1000ppm/°C
2C	CH	-55 to 125°C	0±60ppm/°C
2P	PH	-25 to 85°C	-150±60ppm/°C
2R	RH	-25 to 85°C	-220±60ppm/°C
2S	SH	-25 to 85°C	-330±60ppm/°C
2T	TH	-25 to 85°C	-470±60ppm/°C
3C	CJ	-55 to 125°C	0±120ppm/°C
3P	PJ	-25 to 85°C	-150±120ppm/°C
3R	RJ	-25 to 85°C	-220±120ppm/°C
3S	SJ	-25 to 85°C	-330±120ppm/°C
3T	TJ	-25 to 85°C	-470±120ppm/°C
3U	UJ	-25 to 85°C	-750±120ppm/°C
4C	CK	-55 to 125°C	0±250ppm/°C
5C	C0G	-55 to 125°C	0±30ppm/°C
6C	C0H	-55 to 125°C	0±60ppm/°C
6P	P2H	-55 to 85°C	-150±60ppm/°C
6R	R2H	-55 to 85°C	-220±60ppm/°C
6T	T2H	-55 to 85°C	-470±60ppm/°C
7U	U2J	-55 to 85°C	-750±120ppm/°C
B1	B (1/2Ur)	-25 to 85°C	±10%
B3	B	-25 to 85°C	±10%
E4	Z5U	10 to 85°C	+22, -82%
F1	F (1/2Ur)	-25 to 85°C	+30, -80%
F5	Y5V	-30 to 85°C	+22, -82%
R1	R (1/2Ur)	-55 to 125°C	±15%
R3	R	-55 to 125°C	±15%
R6	X5R	-55 to 85°C	±15%
R7	X7R	-55 to 125°C	±15%

Continued on the following page.

High Frequency, High Voltage Capacitors Global Part Numbering

ERB, 1kV, HkV Series

(Global Part Number)

ER	B	18	8	B1	1H	102	K	A01	K
❶	❷	❸	❹	❺	❻	❼	❽	❾	❿

❻Rated Voltage

Code	Rated Voltage
0J	DC6.3V
1A	DC10V
1C	DC16V
1E	DC25V
1H	DC50V
2A	DC100V
2D	DC200V
2E	DC250V
YD	DC300V
YJ	HKV
2H	DC500V
2J	DC630V
3A	DC1kV
3D	DC2kV
3F	DC3.15kV
E2	AC250V
GB	X2; AC250V (Safety Standard Recognized Type GB)
GC	X1, Y2; AC250V (Safety Standard Recognized Type GC)

❼Capacitance

Expressed by three figures. The unit is pico-farad(pF). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two numbers.
If there is a decimal point, it is expressed by the capital letter "**R**". In this case, all figures are significant digits.

Ex.)

Code	Capacitance
R50	0.5pF
1R0	1.0pF
100	10pF
103	10000pF

❽Capacitance Tolerance

Code	Capacitance Tolerance
B	±0.1pF
C	±0.25pF
D	±0.5pF
G	±2%
J	±5%
K	±10%
M	±20%
Z	+80%, -20%
R	Depends on individual standards.

***** E24 series is also available.

❾Individual Specification Code

Code	Individual Specification
A/B**/C**/W****	Base Metal Inner Electrode
Other than above	Precious Metal Inner Electrode

***** indicates an alphabet or figure.

❿Packaging

Code	Packaging
L	ø178mm Plastic Taping
D	ø178mm Paper Taping
K	ø330mm Plastic Taping
J	ø330mm Paper Taping
B	Bulk
C	Bulk Case
T	Bulk Tray

High Frequency Ceramic Capacitors

ERB Series

The ERB Series was designed specifically as an alternative to “cubic” chip capacitors in high-volume applications where low cost is a primary design objective. This product is manufactured with the same “low loss” C0G ceramic formulation and electrode material as are used in our MA Series. The rectangular shapes of this ERB Series allow for greater manufacturing automation resulting in lower cost. ERB capacitors bridge the gap between standard C0G chips and the high performance MA Series, offering a low cost, high Q capacitor. Applications include cellular phone, GPS, and RF LAN.

FEATURES

- Miniature sizes
- Stable C0G temperature coefficient
- Very high Q at high frequencies
- High RF power handling capabilities

SPECIFICATIONS

Operating Temperature Range	–55 to + 125°C
Temperature Coefficient	0 ± 30 ppm/°C
Working Voltage	See table below.
Dielectric Test Voltage (D.C.)	250% of rated working voltage (except 500 Volt rated @ 200%)
Capacitance Tolerance	B, C, D, G, J, K Available: Specials on request
Quality Factor (Q)/ESR	Consult Factory
Insulation Resistance	@ 25°C: 0.1 to 470 pF: 1 Tohm Min. over 470 pF: 100 Gohm Min. @ 125°C: 0.1 to 470 pF: 100 Gohm Min. over 470 pF: 10 Gohm Min.
Marking	Standard product is unmarked

CAPACITANCE RANGE

Part Number	EIA Code	Capacitance Value					
		Min./Max.	**50VDC**	**100VDC**	**200VDC**	**300VDC**	**500VDC**
ERB18	0603	Min.	—	—	1pF*	—	—
		Max.	—	—	100pF	—	—
ERB21	0805	Min.	150pF	110pF	1pF*	—	—
		Max.	160pF	140pF	100pF	—	—
ERB32	1210	Min.	510pF	240pF	160pF	130pF	3.3pF
		Max.	1000pF	470pF	220pF	150pF	120pF

***Note:** For <1pf capacitance, please call factory.

Design Engineering Kits

ERB Series

- Miniature sizes
- Very high Q at high frequencies
- High RF power capabilities
- Impervious to adverse environmental conditions
- Low dissipation factors
- Perfect retrace capability
- High temperature stability
- Low noise

GPN KIT	PREVIOUS KIT
New GPN	**Previous SPN**
ERB18-KIT-X––––––	**Kit-GRM706**
ERB21-KIT-X––––––	**Kit-GRM708**
ERB32-KIT-X––––––	**Kit-GRM710**

See next page for kit contents.

Design Kits *(continued)*

ERB Series

New GPN ERB18-KIT-X------ Previous P/N KIT-GRM706

No.	Previous SPN	New GPN	Qty
1	GRM706C0G1R0B200	ERB1885C2D1R0BDX1B	10
2	GRM706C0G1R1B200	ERB1885C2D1R1BDX1B	10
3	GRM706C0G1R2B200	ERB1885C2D1R2BDX1B	10
4	GRM706C0G1R3B200	ERB1885C2D1R3BDX1B	10
5	GRM706C0G1R5B200	ERB1885C2D1R5BDX1B	10
6	GRM706C0G1R6B200	ERB1885C2D1R6BDX1B	10
7	GRM706C0G1R8B200	ERB1885C2D1R8BDX1B	10
8	GRM706C0G2R0B200	ERB1885C2D2R0BDX1B	10
9	GRM706C0G2R4B200	ERB1885C2D2R4BDX1B	10
10	GRM706C0G2R7B200	ERB1885C2D2R7BDX1B	10
11	GRM706C0G3R0C200	ERB1885C2D3R0CDX1B	10
12	GRM706C0G3R3C200	ERB1885C2D3R3CDX1B	10
13	GRM706C0G3R6C200	ERB1885C2D3R6CDX1B	10
14	GRM706C0G3R9C200	ERB1885C2D3R9CDX1B	10
15	GRM706C0G4R3C200	ERB1885C2D4R3CDX1B	10
16	GRM706C0G4R7C200	ERB1885C2D4R7CDX1B	10
17	GRM706C0G5R1C200	ERB1885C2D5R1CDX1B	10
18	GRM706C0G5R6C200	ERB1885C2D5R6CDX1B	10
19	GRM706C0G6R2C200	ERB1885C2D6R2CDX1B	10
20	GRM706C0G6R8C200	ERB1885C2D6R8CDX1B	10
21	GRM706C0G7R5C200	ERB1885C2D7R5CDX5B	10
22	GRM706C0G8R2C200	ERB1885C2D8R2CDX5B	10
23	GRM706C0G9R1C200	ERB1885C2D9R1CDX5B	10
24	GRM706C0G100J200	ERB1885C2D100JDX5B	10
25	GRM706C0G120J200	ERB1885C2D120JDX5B	10
26	GRM706C0G150J200	ERB1885C2D150JDX5B	10
27	GRM706C0G180J200	ERB1885C2D180JDX5B	10
28	GRM706C0G220J200	ERB1885C2D220JDX5B	10
29	GRM706C0G270J200	ERB1885C2D270JDX5B	10
30	GRM706C0G330J200	ERB1885C2D330JDX5B	10
31	GRM706C0G390J200	ERB1885C2D390JDX5B	10
32	GRM706C0G470J200	ERB1885C2D470JDX5B	10
33	GRM706C0G560J200	ERB1885C2D560JDX5B	10
34	GRM706C0G680J200	ERB1885C2D680JDX5B	10
35	GRM706C0G820J200	ERB1885C2D820JDX5B	10
36	GRM706C0G101J200	ERB1885C2D101JDX5B	10

New GPN ERB21-KIT-X------ Previous P/N KIT-GRM708

No.	Previous SPN	New GPN	Qty
1	GRM708C0G1R2C200	ERB21B5C2D1R2CDX1B	10
2	GRM708C0G1R5C200	ERB21B5C2D1R5CDX1B	10
3	GRM708C0G1R8C200	ERB21B5C2D1R8CDX1B	10
4	GRM708C0G2R2C200	ERB21B5C2D2R2CDX1B	10
5	GRM708C0G2R7D200	ERB21B5C2D2R7DDX1B	10
6	GRM708C0G3R3D200	ERB21B5C2D3R3DDX1B	10
7	GRM708C0G3R9D200	ERB21B5C2D3R9DDX1B	10
8	GRM708C0G4R7D200	ERB21B5C2D4R7DDX1B	10
9	GRM708C0G5R6D200	ERB21B5C2D5R6DDX1B	10
10	GRM708C0G6R8D200	ERB21B5C2D6R8DDX1B	10
11	GRM708C0G8R2D200	ERB21B5C2D8R2DDX1B	10
12	GRM708C0G100K200	ERB21B5C2D101KDX1B	10
13	GRM708C0G120K200	ERB21B5C2D120KDX1B	10
14	GRM708C0G150K200	ERB21B5C2D150KDX1B	10
15	GRM708C0G180K200	ERB21B5C2D180KDX1B	10
16	GRM708C0G220K200	ERB21B5C2D220KDX1B	10
17	GRM708C0G270K200	ERB21B5C2D270KDX1B	10
18	GRM708C0G330K200	ERB21B5C2D330KDX1B	10
19	GRM708C0G390K200	ERB21B5C2D390KDX1B	10
20	GRM708C0G470K200	ERB21B5C2D470KDX1B	10
21	GRM708C0G560K200	ERB21B5C2D560KDX1B	10
22	GRM708C0G680K200	ERB21B5C2D680KDX1B	10
23	GRM708C0G820K200	ERB21B5C2D820KDX1B	10
24	GRM708C0G101K200	ERB21B5C2D101KDX1B	10

New GPN ERB32-KIT-X------ Previous P/N KIT-GRM710

No.	Previous SPN	New GPN	Qty
1	GRM710C0G3R3D200	ERB32Q5C2D3R3DDX1B	10
2	GRM710C0G3R9D200	ERB32Q5C2D3R9DDX1B	10
3	GRM710C0G4R7D200	ERB32Q5C2D4R7DDX1B	10
4	GRM710C0G5R6D200	ERB32Q5C2D5R6DDX1B	10
5	GRM710C0G6R8D200	ERB32Q5C2D6R8DDX1B	10
6	GRM710C0G8R2D200	ERB32Q5C2D8R2DDX1B	10
7	GRM710C0G100K200	ERB32Q5C2D100KDX1B	10
8	GRM710C0G120K200	ERB32Q5C2D120KDX1B	10
9	GRM710C0G150K200	ERB32Q5C2D150KDX1B	10
10	GRM710C0G180K200	ERB32Q5C2D180KDX1B	10
11	GRM710C0G220K200	ERB32Q5C2D220KDX1B	10
12	GRM710C0G270K200	ERB32Q5C2D270KDX1B	10
13	GRM710C0G330K200	ERB32Q5C2D330KDX1B	10
14	GRM710C0G390K200	ERB32Q5C2D390KDX1B	10
15	GRM710C0G470K200	ERB32Q5C2D470KDX1B	10
16	GRM710C0G560K200	ERB32Q5C2D560KDX1B	10
17	GRM710C0G680K200	ERB32Q5C2D680KDX1B	10
18	GRM710C0G820K200	ERB32Q5C2D820KDX1B	10
19	GRM710C0G101K200	ERB32Q5C2D101KDX1B	10

High Frequency Ceramic Capacitors

ERB Series

ENVIRONMENTAL

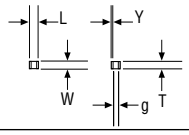
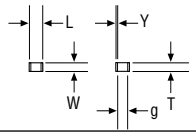
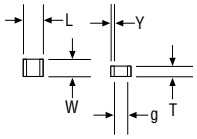
Aging	Negligible
Environmental Tests	MIL-STD-202
Moisture Resistance	Method 106
Solderability	Method 208
Resistance to Soldering Heat	Method 210, Condition B
Thermal Shock	Method 107, Condition A
Life	Method 108, Condition F

STANDARD PACKAGING – TAPE & REEL

	QUANTITY PER 7″ REEL	QUANTITY PER 13″ REEL
ERB18	4000	10000
ERB21	3000	10000
ERB32	2000	8000

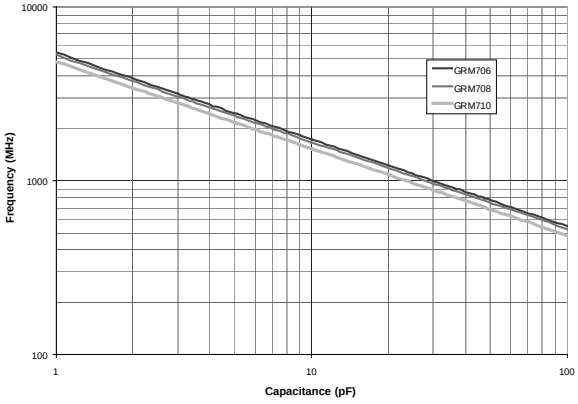
For sample kit contact factory.

CONFIGURATION & DIMENSIONS – GR700 Series

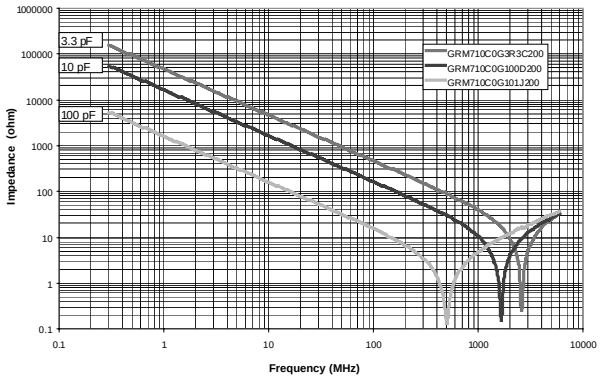
Style	Type	EIA Style	Configuration	Dimensions: mm					Termination
	NPO			L	W	T Max	g min	Band Y min	
ERB18	C0G	0603		1.6 ± .1	0.8 ± .1	0.9	0.5	0.2	Palladium Silver, Nickel Interface & Tin Plating
ERB21		0805		2.0 ± 0.3	1.25 ± 0.3	1.25	0.7	0.25	Palladium Silver, Nickel Interface & Tin Plating
ERB32		1210		3.2 ± 0.3	2.5 ± 0.3	1.52	1.0	0.3	Palladium Silver, Nickel Interface & Tin Plating

TYPICAL HIGH FREQUENCY PERFORMANCE CHARTS

Series Resonance Frequency ERB Series



Typical Impedance of ERB32



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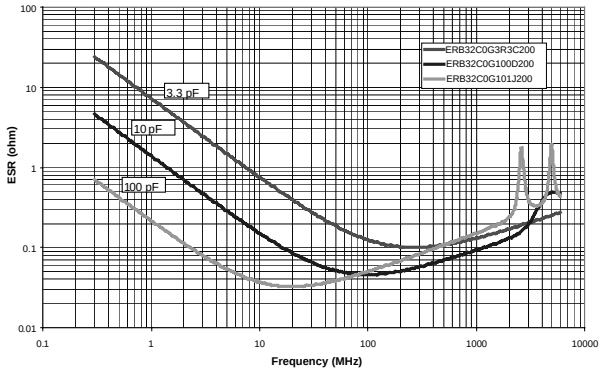
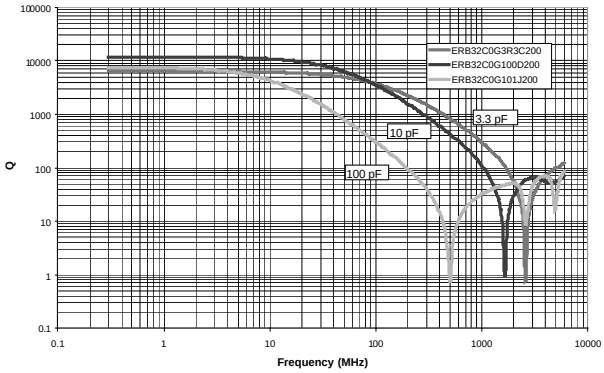
High Frequency Ceramic Capacitors

ERB Series

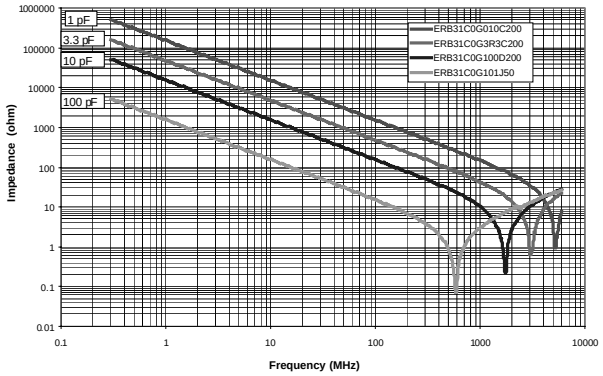
Typical ESR Curve of ERB32



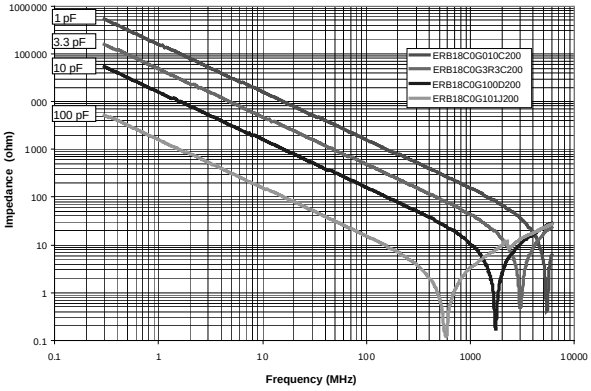
Typical Q of ERB32



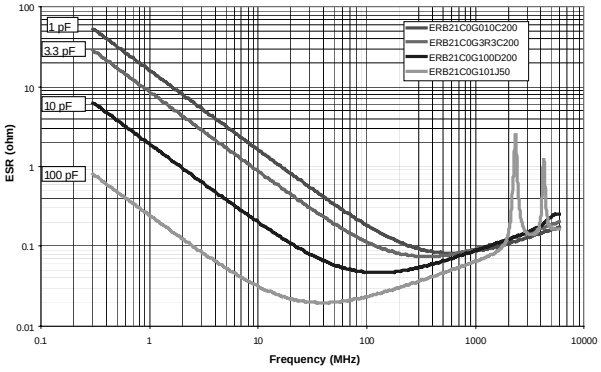
Typical Impedance of ERB31



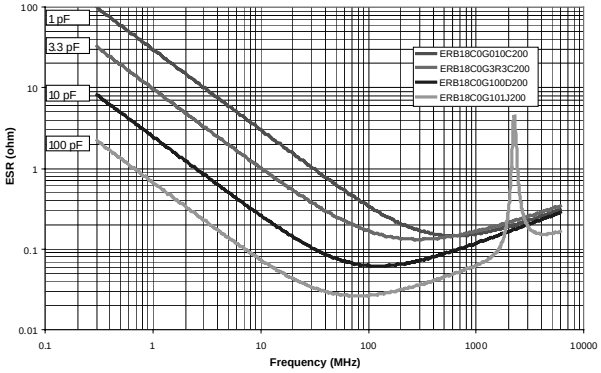
Typical Impedance of ERB18



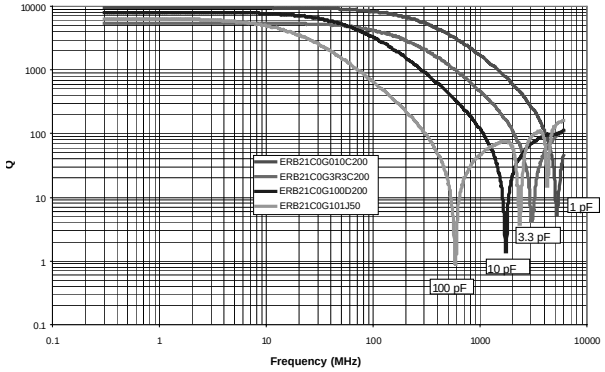
Typical ESR of ERB21



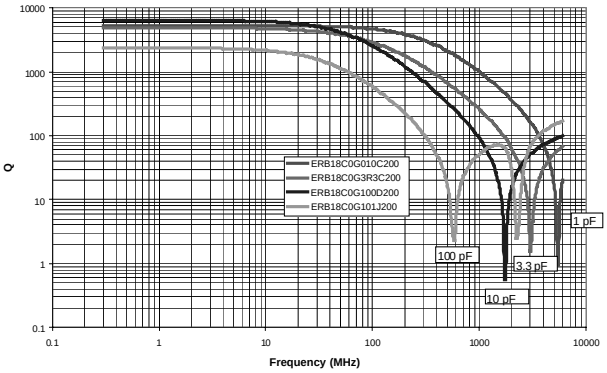
Typical ESR of ERB18



Typical Q of ERB21



Typical Q of ERB18



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All information contained in this catalog is available in PDF downloadable format at www. murata.com.

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12/01

"Preliminary Specification"

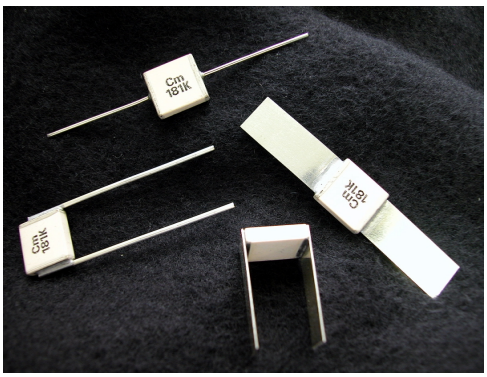
HPP – High Performance Power Capacitor!

Designed Especially for
High RF Power.

Applications:

Semiconductor Plasma Chamber and other Thin Film Process Equipment.
High Power RF/HF Amplifiers, Transmitters and Antenna Tuning.
Medical Scanning (MRI Coils)
High Power RF/HF Filters

This new ceramic capacitor series from MuRata Electronics has been developed for use in High Power RF applications where low dielectric loss and low ESR are essential to the performance of the equipment. The product is available in leaded form for assembly in coil assemblies or can be made in chip form for mounting in special configurations. The product is available with two lead attachment options – High Temperature Solder (<150°C operation) or Brazed Leads (>150°C operation). The HPP product can be made available with non-magnetic terminations for MRI applications. The newly developed HPP series is available in a wide range of cap values and voltages. It is capable of 12 kVAR reactive power in open mounting applications. Heat Sinking allows more power to be dissipated so that higher currents and power can be applied. The Dielectric features ultra low loss (High Q) and the ESR is tightly controlled by the process and capacitor design improvements. Special configurations and capacitance for specific application are available. For specific information, please consult the factory.



PRODUCT FEATURES

Dielectric: P90 or C0G (NP0)

Q is greater than 10,000 at 1MHz (25°C)

Voltage Ratings from 300 to 7200Vdc

Capacitance

Values up to 1200 pF at **2500Vdc**

Values up to 680 pF at **3600Vdc**

Values up to 360 pF at **5000Vdc**

Options

High Reliability Screening

Special Assemblies and Leads

Specific Application Designs

Part Description:

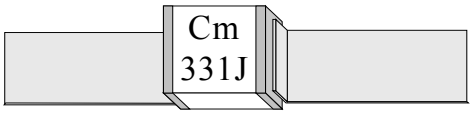
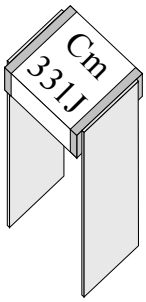
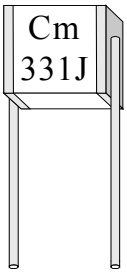
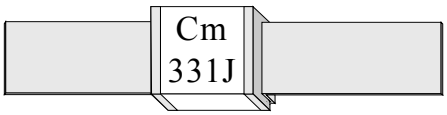
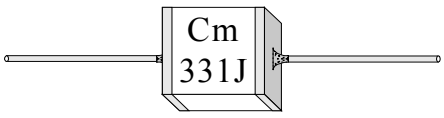
Electrical Specifications:

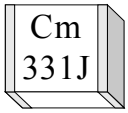
Q: 10,000 minimum At 1 MHz, 25°C
TCC: P90: 90 ± 30 ppm / °C
C0G: 0 ± 30 ppm / °C
(-55 °C to 125 °C)
Power: 12kVAR at 25 °C typical
Current: 10 Arms typical

Chip Dimensions:

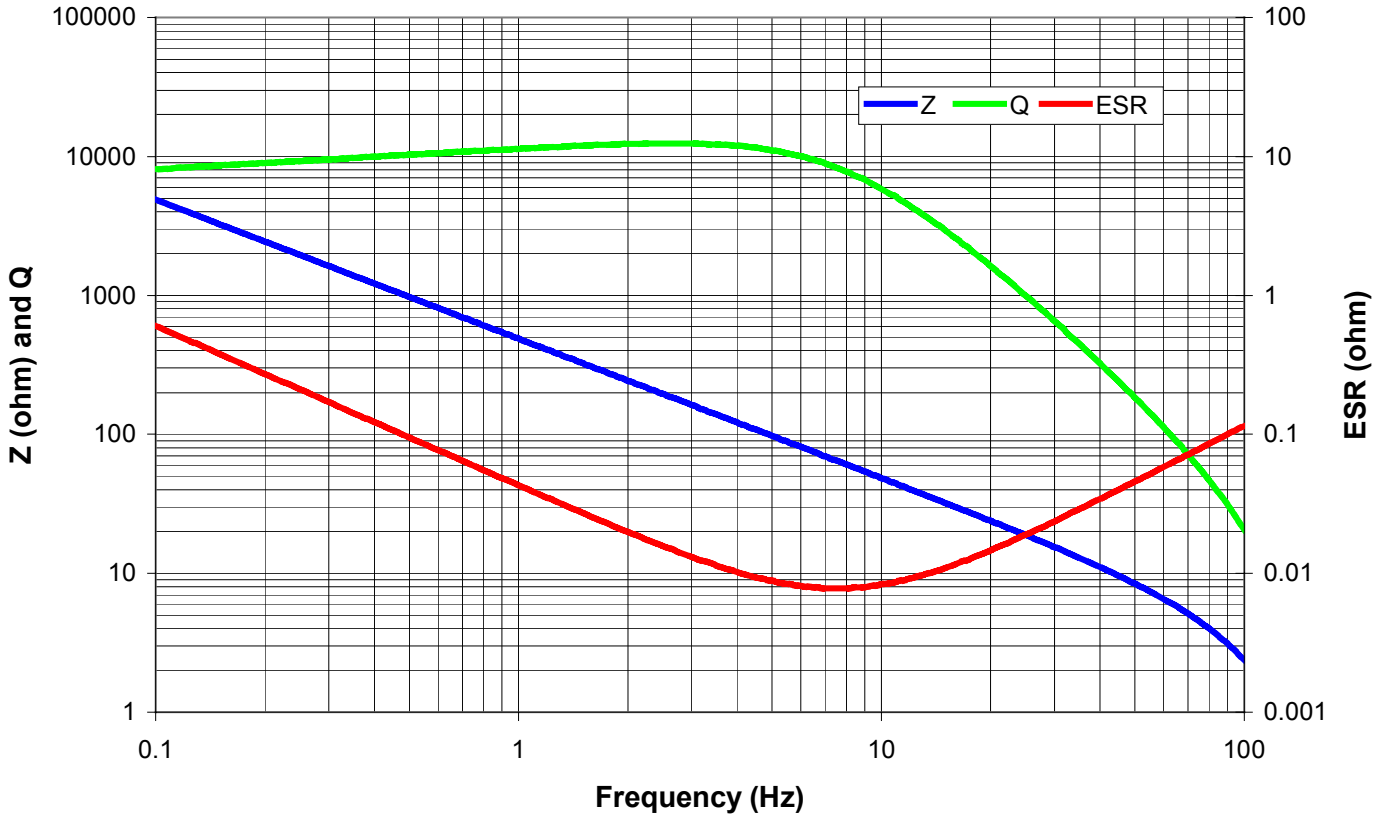
Length: 0.465 in (11.8 mm) nominal
Width: 0.420 in (10.7 mm) nominal
Thickness: 0.135 in (3.5 mm)

HIGH PERFORMANCE POWER (HPP) CAPACITORS

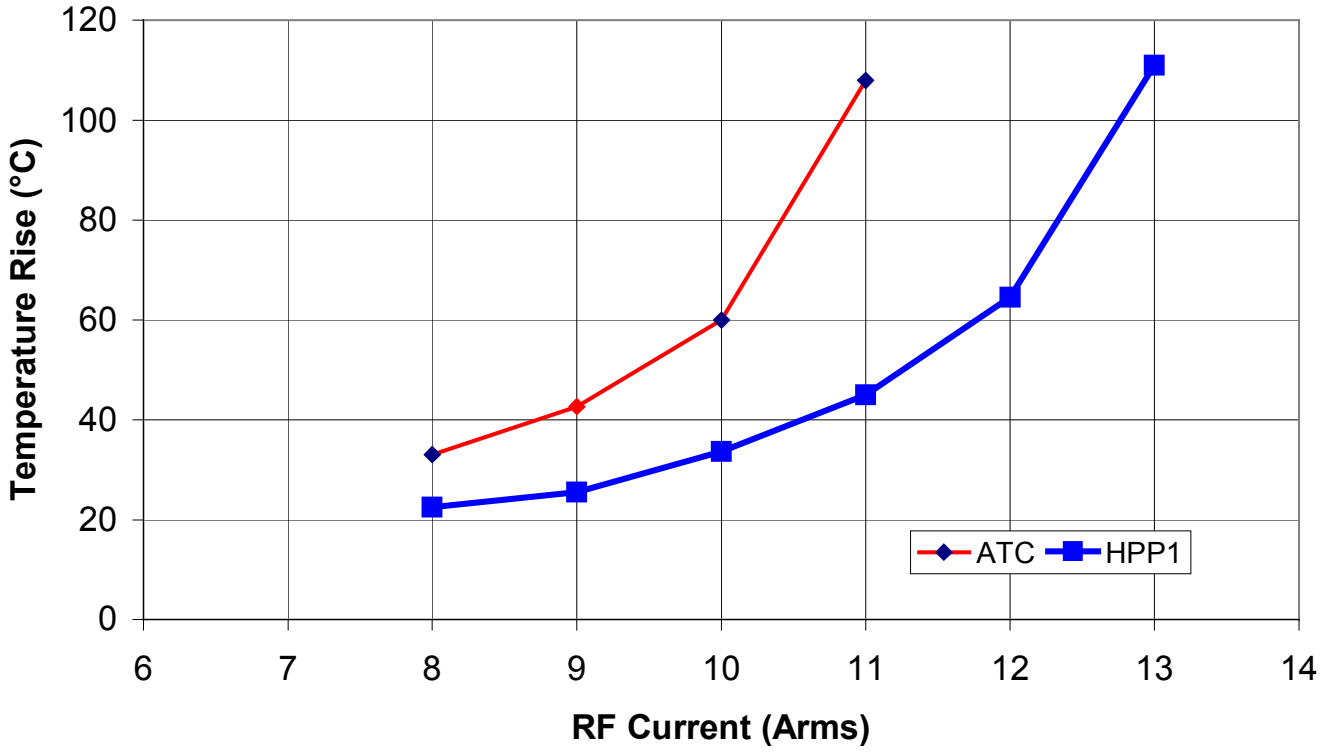
LEAD STYLE (Termination Code)	ILLUSTRATION	LEAD ATTACHMENT		Notes Dimensions in inches (mm) Typ = Typical
		BRAZED	SOLDERED	
Axial Standoff (2)		HPP112	HPP132	Silver Ribbon: Length: 0.75 (19.0) min. Width: 0.35 (8.9) Typ Thick: 0.01 (0.25) Typ Sandoff: 0.03 (0.75) Typ
Radial Ribbon (3)		HPP113	HPP133	Silver Ribbon: Length: 0.75 (19.0) min. Width: 0.35 (8.9) Typ Thick: 0.01 (0.25) Typ
Radial Wire (4)		HPP114	HPP134	Silver Wire: Length: 0.60 (15.2) Min Diameter: 0.04 (1.0) Typ
Axial Ribbon (5)		HPP115	HPP135	Silver Ribbon: Length: 0.75 (19.0) min. Width: 0.35 (8.9) Typ Thick: 0.01 (0.25) Typ
Axial Wire (7)		HPP117	HPP137	Silver Wire: Length: 0.600 (15.24) Min Diameter: 0.032 (.81) Typ

Termination Code	ILLUSTRATION	Termination
Chip (0) (Under Development)		HPP100: Pd/Ag, Cu Barrier, Sn Plating HPP101: Pd/Ag, Cu Barrier, Sn62 Solder Coating HPP108: Pd/Ag, Ni Barrier, Sn62 Solder Coating HPP109: Pd/Ag, Ni Barrier, Sn Plating

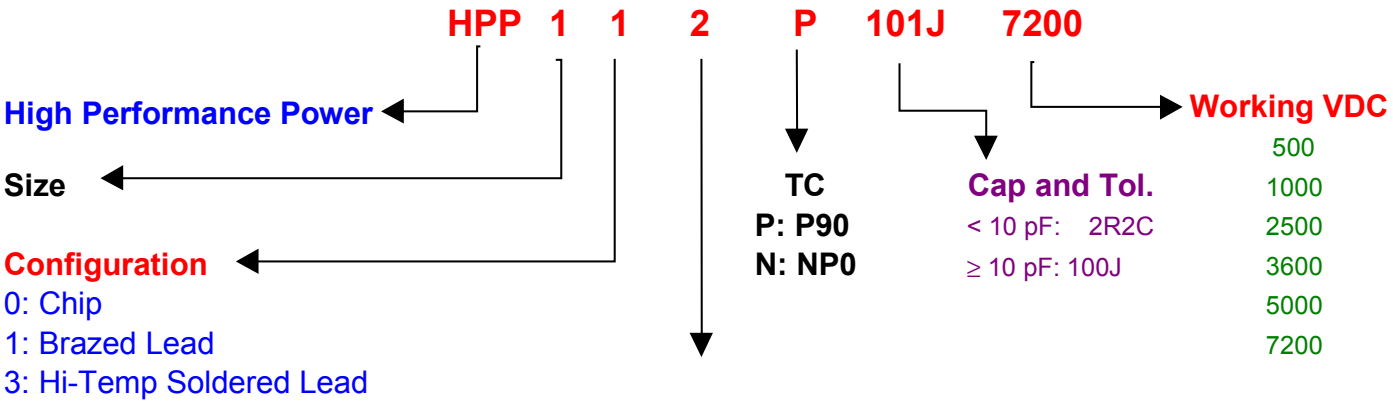
HPP1 P90 331J 3600V
330 pF



Power Handling at 2 MHz
HPP113P331J3600 vs ATC 100E331JAR3600



Part Numbering System:



Terminations

Chip	*Leaded*
0: Pd/Ag, Cu barrier, Sn Plating (Chip)	2: Silver Axial standoff Ribbon
1: Pd/Ag, Cu barrier, Sn 62 Solder coating (Chip)	3: Silver Radial Ribbon
	4: Silver Radial Wire
	5: Silver Axial Ribbon
8: Pd/Ag, Ni barrier, SN 62 Solder (Chip)	6: Not used
9: Pd/Ag, Ni barrier, Sn Plating (Chip)	7: Silver Axial Wire

Environmental Tests:

Murata HPP capacitors are designed and manufactured to pass the following tests.

Thermal Shock: Mil Std 202, Method 107, condition A

Moisture Resistance: Mil Std 202, Method 106

Low Voltage Humidity: Mil Std 202, Method 103, Condition A, with 1.5 Volts D.C. applied while subjected to an environment at 85°C with 85% relative humidity for 240 hours minimum.

Life Test: Mil Std 202, Method 108 for 2000 hours at 125°C. With1.2 times rated working voltage VDC.

Contacts:

Application Specific Capacitors

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Shoji Tsubota, Product Manager – stsubota@murata.com

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