

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Added an approved source and updated.	14-02-03	Michael A. Radecki
B	Added missing PINs and 100V parts.	16-05-06	Michael A. Radecki
C	Updated vendor information and updated table III to be consistent with MIL-PRF-55681.	19-07-03	RADECKI.MICHAEL.A.1230152051 EL. A.1230152051

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RADECKI.MICHAEL.A.1230152
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Date: 2019.07.03 08:23:32
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CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
HAS CHANGED NAMES TO:
DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990



Prepared in accordance with [ASME Y14.100](#)

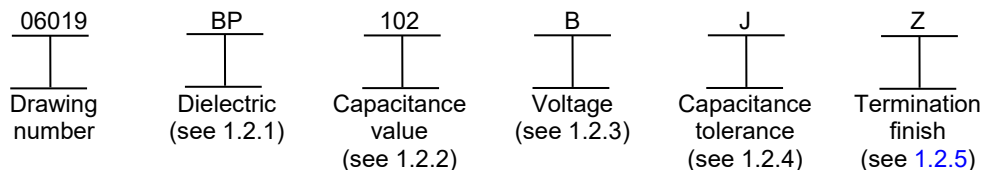
Selected item drawing

REV STATUS OF PAGES	REV	C	C	C	C	C	C	C	C	C								
	PAGES	1	2	3	4	5	6	7	8	9								
PMIC N/A	PREPARED BY Patrick Kyne							DESIGN ACTIVITY DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH										
Original date of drawing 06-07-12	CHECKED BY Kenneth A. Bernier							TITLE CAPACITOR, FIXED, CERAMIC, CHIP, HIGH FREQUENCY										
	APPROVED BY Michael A. Radecki																	
	SIZE A	CAGE CODE 037Z3							DWG NO. 06019									
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1. SCOPE

1.1 Scope. This drawing and [MIL-PRF-123](#) describe the requirements for high frequency ceramic chip capacitors.

1.2 Part or Identifying Number (PIN). The complete PIN is as follows:



1.2.1 Dielectric. The dielectric type is identified by the following 2 letters as defined in [3.3.1](#): BP or BG.

1.2.2 Capacitance value. The nominal capacitance value, expressed in picofarads (pF) is identified by a three digit number; the first two digits represent significant figures and the last digit specifies the number of zeros to follow. When the nominal value is less than 10 pF, the letter "R" is used to indicate the decimal point and the succeeding digit(s) of the group represent significant figure(s). 1R0 indicates 1.0 pF; R75 indicates .75 pF; and 0R5 indicates 0.5 pF. See [table IV](#) for values.

1.2.3 Voltage. The rated voltage for continuous operation at +125°C is identified by a single letter as shown in table I.

TABLE I. Rated voltage.

Symbol	Rated voltage (volts, dc)
A	50
B	100
K	150

1.2.4 Capacitance tolerance. The capacitance tolerance is identified by a single letter in accordance with table II.

TABLE II. Capacitance tolerance.

Symbol	Capacitance tolerance
B	.10 pF
C	.25 pF
D	.50 pF
F	±1 percent
G	±2 percent
J	±5 percent
K	±10 percent
M	±20 percent

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1.2.5 Termination finish. Termination finish is identified by a single letter as shown in table III.

TABLE III. Termination finish.

Symbol	Termination finish
M	Palladium/silver alloy
N	Silver-nickel-gold
U	Base metallization-nickel-solder coated (tin/lead alloy, with a minimum of 3 percent lead). Solder has a melting point of +200°C or less. Solder coat thickness is a minimum of 60 microinches.
Z	Base metallization-nickel-solder plated (tin/lead alloy, with a minimum of 3 percent lead)

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-PRF-123 - Capacitors, Fixed, Ceramic Dielectric, (Temperature Stable and General Purpose), High Reliability, General Specification For
- MIL-PRF-55681 - Capacitor, Chip, Multiple Layer, Fixed, Unencapsulated, Ceramic Dielectric, Established Reliability and Non-Established Reliability, General Specification For
- MIL-PRF-55681/4 - Capacitor, Chip, Multiple Layer, Fixed, Ceramic Dielectric, Established Reliability and Non-Established Reliability, Styles CDR11, CDR12, CDR13, and CDR14 (High Frequency)

DEPARTMENT OF DEFENSE STANDARDS

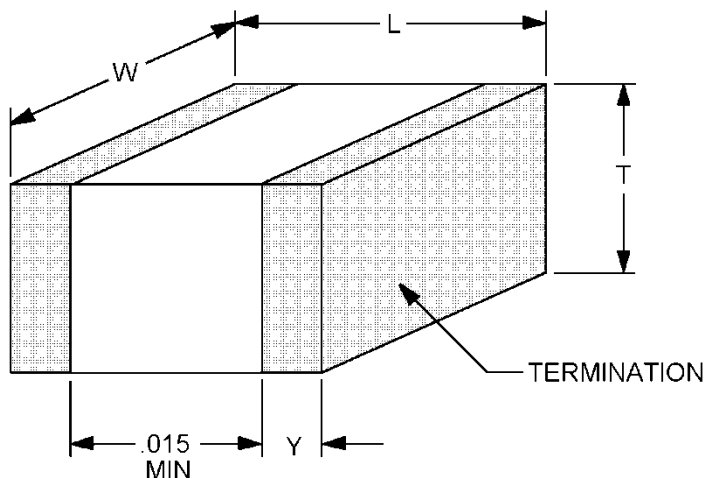
- MIL-STD-202-305 - Method 305, Capacitance

(Copies of these documents are available online at <https://quicksearch.dla.mil/>.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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Inches	mm
.005	0.13
.010	0.25
.015	0.38
.020	0.51
.025	0.64
.030	0.76
.035	0.89
.055	1.40
.057	1.45
.102	2.59
.110	2.79



Dimensions				
L 3/	W	T		Y
		Min	Max	
.055 ±.015	.055 ±.015	.020	.057	.010 -.005 +.010

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Dimension L tolerance shall be ± 0.025 when termination finish U or Z is specified (see 1.2.5).

FIGURE 1. Dimensions and configuration.

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3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with [MIL-PRF-123](#) including those for deliverables, data, production lot definition, traceability, and as specified herein. Unless otherwise stated, these capacitors shall be capable of meeting all design, electrical, environmental, and mechanical requirements of [MIL-PRF-123](#).

3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified in [MIL-PRF-123](#) and herein (see [figure 1](#)).

3.2.1 Tin plated finishes. Tin plating is prohibited as a final finish or as an undercoat. Tin-lead (Sn-Pb) finishes are acceptable provided that the minimum lead content is 3 percent (see [6.3](#)).

3.3 Electrical characteristics.

3.3.1 Dielectric type. The dielectric type shall be BG ($90 \pm 20 \text{ ppm}/^\circ\text{C}$) or BP ($0 \pm 30 \text{ ppm}/^\circ\text{C}$) ceramic in accordance with [MIL-PRF-123](#).

Symbol	Capacitance change with reference to +25°C		
	Step A through step D of MIL-PRF-123 table XVIII	Percent rated voltage	Step E through step G of MIL-PRF-123 table XVIII
BG	$90 \pm 20 \text{ ppm}/^\circ\text{C}$	100	$90 \pm 20 \text{ ppm}/^\circ\text{C}$
BP	$0 \pm 30 \text{ ppm}/^\circ\text{C}$	100	$0 \pm 30 \text{ ppm}/^\circ\text{C}$

3.3.2 Capacitance. Capacitance shall be in accordance with [table IV](#) when measured in accordance with [MIL-STD-202-305](#). The following conditions shall apply:

$\leq 1,000 \text{ pF}$	1 MHz \pm 50 kHz 1 V rms \pm .2 V rms
$> 1,000 \text{ pF}$	1 kHz \pm 50 Hz 1 V rms \pm .2 V rms

3.3.3 Dissipation factor (+25°C). The dissipation factor shall be as follows:

BP	BG
All capacitance values: $\leq 0.15\%$	All capacitance values: $\leq 0.05\%$

3.3.4 Insulation resistance. At +25°C: 10^6 megohms, minimum
At +125°C: 10^5 megohms, minimum

3.3.5 Equivalent series resistance. In accordance with [MIL-PRF-55681](#).

3.3.6 Series Resonance. In accordance with [MIL-PRF-55681](#).

3.4 Marking. Marking shall be as specified in [MIL-PRF-123](#). In addition, these capacitors shall be marked with a contrasting color dot placed on the side of the capacitor to indicate the vertical plate orientation to that side. When laser marked, the marking shall be on the surface which is parallel to the plane of the embedded electrodes (this is the larger area which is normally the imprint area). If the capacitor is so marked, the vertical plane orientation is defined; therefore the contrasting color dot on the capacitor to indicate vertical plate orientation to that side is optional. Packaging shall be marked as specified in [MIL-PRF-123](#) except the PIN shall be as specified in [1.2](#) and the "JAN" brand is not applicable.

3.5 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the [MIL-PRF-55681/4 Qualified Products List](#) for "S" failure rate level.

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3.6 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply.

3.7 Changes to product. Any changes in material or processes that alter the form, fit, or function such that it no longer meets the requirements specified in this drawing will require approval prior to implementation.

3.8 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.9 Workmanship. In accordance with [MIL-PRF-123](#).

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not required.

4.2 In-process inspection. In-process inspection shall be in accordance with [MIL-PRF-123](#).

4.3 Conformance inspection.

4.3.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections of [MIL-PRF-123](#). In addition, the following tests and sampling requirements shall be included in group B inspection as subgroup 4 and subgroup 5:

Subgroup 4

Solderability; 6 samples, accept/reject is 0.

Subgroup 5

ESR (UHF and RF) and resonance frequency; 6 samples, accept/reject is 0.

The remaining group C inspection requirements of [MIL-PRF-123](#) shall be satisfied by the continued qualification of the supplier to the "S" failure rate for the equivalent [MIL-PRF-55681/4](#) capacitors.

4.4 Methods of inspection. Methods of inspection shall be as specified in [MIL-PRF-123](#) and [MIL-PRF-55681](#) for ESR and resonance frequency.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see [6.2](#)). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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TABLE IV. Capacitor characteristics.

DSCC drawing PIN 06019 - <u>1/</u>	Capacitance (pF)	Capacitance tolerance	Rated temperature and voltage- temperature limits	Rated voltage (V dc)
B - 0R1 - B -	0.1	B	BG, BP	50, 150
B - 0R2 - B -	0.2	B	BG, BP	50, 150
B - 0R3 ---	0.3	B, C	BG, BP	50, 150
B - 0R4 ---	0.4	B, C	BG, BP	50, 150
B - 0R5 ---	0.5	B, C, D	BG, BP	50, 150
B - 0R6 ---	0.6	B, C, D	BG, BP	50, 150
B - 0R7 ---	0.7	B, C, D	BG, BP	50, 150
B - 0R8 ---	0.8	B, C, D	BG, BP	50, 150
B - 0R9 ---	0.9	B, C, D	BG, BP	50, 150
B - 1R0 ---	1.0	B, C, D	BG, BP	50, 150
B - 1R1 ---	1.1	B, C, D	BG, BP	50, 150
B - 1R2 ---	1.2	B, C, D	BG, BP	50, 150
B - 1R3 ---	1.3	B, C, D	BG, BP	50, 150
B - 1R4 ---	1.4	B, C, D	BG, BP	50, 150
B - 1R5 ---	1.5	B, C, D	BG, BP	50, 150
B - 1R6 ---	1.6	B, C, D	BG, BP	50, 150
B - 1R7 ---	1.7	B, C, D	BG, BP	50, 150
B - 1R8 ---	1.8	B, C, D	BG, BP	50, 150
B - 1R9 ---	1.9	B, C, D	BG, BP	50, 150
B - 2R0 ---	2.0	B, C, D	BG, BP	50, 150
B - 2R1 ---	2.1	B, C, D	BG, BP	50, 150
B - 2R2 ---	2.2	B, C, D	BG, BP	50, 150
B - 2R4 ---	2.4	B, C, D	BG, BP	50, 150
B - 2R7 ---	2.7	B, C, D	BG, BP	50, 150
B - 3R0 ---	3.0	B, C, D	BG, BP	50, 150
B - 3R3 ---	3.3	B, C, D	BG, BP	50, 150
B - 3R6 ---	3.6	B, C, D	BG, BP	50, 150
B - 3R9 ---	3.9	B, C, D	BG, BP	50, 150
B - 4R3 ---	4.3	B, C, D	BG, BP	50, 150
B - 4R7 ---	4.7	B, C, D	BG, BP	50, 150
B - 5R1 ---	5.1	B, C, D	BG, BP	50, 150
B - 5R6 ---	5.6	B, C, D	BG, BP	50, 150
B - 6R2 ---	6.2	B, C, D	BG, BP	50, 150
B - 6R8 ---	6.8	B, C, J, K, M	BG, BP	50, 150
B - 7R5 ---	7.5	B, C, J, K, M	BG, BP	50, 150
B - 8R2 ---	8.2	B, C, J, K, M	BG, BP	50, 150
B - 9R1 ---	9.1	B, C, J, K, M	BG, BP	50, 150
B - 100 ---	10	F, G, J, K, M	BG, BP	50, 150
B - 110 ---	11	F, G, J, K, M	BG, BP	50, 150
B - 120 ---	12	F, G, J, K, M	BG, BP	50, 150
B - 130 ---	13	F, G, J, K, M	BG, BP	50, 150
B - 150 ---	15	F, G, J, K, M	BG, BP	50, 150
B - 160 ---	16	F, G, J, K, M	BG, BP	50, 150
B - 180 ---	18	F, G, J, K, M	BG, BP	50, 150
B - 200 ---	20	F, G, J, K, M	BG, BP	50, 150
B - 220 ---	22	F, G, J, K, M	BG, BP	50, 150
B - 240 ---	24	F, G, J, K, M	BG, BP	50, 150
B - 270 ---	27	F, G, J, K, M	BG, BP	50, 150
B - 300 ---	30	F, G, J, K, M	BG, BP	50, 150
B - 330 ---	33	F, G, J, K, M	BG, BP	50, 150
B - 360 ---	36	F, G, J, K, M	BG, BP	50, 150

See footnote at end of table.

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TABLE IV. Capacitor characteristics - Continued.

DSCC drawing PIN 06019 - 1/	Capacitance (pF)	Capacitance tolerance	Rated temperature and voltage- temperature limits	Rated voltage (V dc)
B - 390 ---	39	F, G, J, K, M	BG, BP	50, 150
B - 430 ---	43	F, G, J, K, M	BG, BP	50, 150
B - 470 ---	47	F, G, J, K, M	BG, BP	50, 150
B - 510 ---	51	F, G, J, K, M	BG, BP	50, 150
B - 560 ---	56	F, G, J, K, M	BG, BP	50, 150
B - 620 ---	62	F, G, J, K, M	BG, BP	50, 150
B - 680 ---	68	F, G, J, K, M	BG, BP	50, 150
B - 750 ---	75	F, G, J, K, M	BG, BP	50, 150
B - 820 ---	82	F, G, J, K, M	BG, BP	50, 150
B - 910 ---	91	F, G, J, K, M	BG, BP	50, 150
B - 101 ---	100	F, G, J, K, M	BG, BP	50, 150
BP111 ---	110	F, G, J, K, M	BP	50, 100
BP121 ---	120	F, G, J, K, M	BP	50, 100
BP131 ---	130	F, G, J, K, M	BP	50, 100
BP151 ---	150	F, G, J, K, M	BP	50, 100
BP161 ---	160	F, G, J, K, M	BP	50, 100
BP181 ---	180	F, G, J, K, M	BP	50, 100
BP201 ---	200	F, G, J, K, M	BP	50, 100
BP221 ---	220	F, G, J, K, M	BP	50, 100
BP241 ---	240	F, G, J, K, M	BP	50, 100
BP271 ---	270	F, G, J, K, M	BP	50, 100
BP301 ---	300	F, G, J, K, M	BP	50, 100
BP331 ---	330	F, G, J, K, M	BP	50, 100
BP361 ---	360	F, G, J, K, M	BP	50, 100
BP391 ---	390	F, G, J, K, M	BP	50, 100
BP431 ---	430	F, G, J, K, M	BP	50, 100
BP471 ---	470	F, G, J, K, M	BP	50, 100
BP511 ---	510	F, G, J, K, M	BP	50, 100
BP561 ---	560	F, G, J, K, M	BP	50, 100
BP621 ---	620	F, G, J, K, M	BP	50, 100
BP681 ---	680	F, G, J, K, M	BP	50, 100
BP751 ---	750	F, G, J, K, M	BP	50, 100
BP821 ---	820	F, G, J, K, M	BP	50, 100
BP911 ---	910	F, G, J, K, M	BP	50, 100
BP102 ---	1,000	F, G, J, K, M	BP	50, 100

1/ Complete PIN shall include additional symbols to indicate voltage-temperature limits (where applicable), rated voltage, capacitance tolerance (where applicable), and termination finish

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This drawing covers high frequency capacitors that are primarily intended for use in resonant circuits with high Q factor and stability of capacitance with respect to temperature (-55°C to +125°C), frequency, and life. The capacitors covered by this drawing are intended for use in high reliability applications. Capacitors conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing, this drawing becomes obsolete and will not be used for new design.

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6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for notification of change of product to acquiring activity, if applicable.
- c. Requirements for packaging and packing.

6.3 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to [ASTM-B545](#) (Standard Specification for Electrodeposited Coatings of Tin).

6.4 Replaceability. Capacitors covered by this drawing will replace the same commercial device covered by a contractor-prepared specification or drawing.

6.5 Users of record. Coordination of this document for future revisions is coordinated only with the approved sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at capacitorfilter@dla.mil or if in writing to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990, or by telephone (614) 692-4709 or DSN 850-4709.

6.6 Changes from previous issue. The margins of this drawing are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

6.7 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at capacitorfilter@dla.mil, or by contacting DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-4709 or DSN 850-4709.

Vendor CAGE	Vendor name and address	Similar designation <u>1/</u>
29990	American Technical Ceramics One Norden Lane Huntington Station, NY 11746-2142	100A (BG) 700A (BP)
6KUV2	AVX Corporation One AVX Blvd. Fountain Inn, SC 29644-9039	AQ12*A****H*** <u>2/</u>
S9915	Plants: 1. Same address as Manufacturer	
04222	2. AVX-Avio Excelente S de RL de CV Av. San Lorenzo No. 651 Area Rivereno C 1. .P., 32310 Cd. Juarez, Chihuahua, Mexico	
60212	3. AVX Corporation 2200 AVX Dr. Myrtle Beach, SC 29577	
60212	Presidio Components Incorporated 7169 Construction Court San Diego CA 92121-2615	SR0505*****

1/ Parts must be purchased to the DLA Land and Maritime CAGE code and PIN to assure that all performance requirements and tests are met.

2/ Vendor supplies dielectric type BP only.

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