REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	Added AVX as an approved source of supply. Changed suggested sources to approved sources.	13 December 2005	William E. Sindelar
B	Added approved source of supply. Revised table IV. Added 6.4. Removed table from 3.3.1.	17 April 2008	Michael A. Radecki
C	Changed address of vendor C.	1 July 2010	Michael A. Radecki
D	Removed an approved source of supply.	12 June 2013	Michael A. Radecki
E	Added a new voltage rating and updated vendor offerings.	26 September 2013	Michael A. Radecki

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

REV STATUS OF PAGES	REV	E	E	E	E	E	E	E	E									
	PAGES	1	2	3	4	5	6	7	8									

PMIC N/A	**PREPARED BY** MICHAEL A. RADECKI	**DESIGN ACTIVITY** **DEFENSE SUPPLY CENTER, COLUMBUS** **COLUMBUS, OH**
Original date of drawing 3 January 2005	**CHECKED BY** MICHAEL A. RADECKI	**TITLE** CAPACITORS, FIXED, CERAMIC, CHIP, 0603, HIGH FREQUENCY, BP
	APPROVED BY KENDALL A. COTTONGIM	
	SIZE A / **CODE IDENT. NO.** 037Z3	**DWG NO.** **05002**
	REV E	**PAGE** 1 **OF** 8

1. SCOPE

1.1 Scope. This drawing and MIL-PRF-55681 describe the requirements for ceramic, chip.

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

05002-	2R0	B	C	Z	-
Drawing number	Capacitance value (see 1.2.1)	Voltage (see 1.2.2)	Capacitance tolerance (see 1.2.3)	Termination finish (see 1.2.4)	Group C testing option (see 1.2.5)

1.2.1 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.

1.2.2 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)
Z	25
A	50
B	100
N	150
C	200
K	250

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

TABLE II. Capacitance tolerance.

Symbol	Capacitance tolerance (±)
A	.05 pF
B	.1 pF
C	.25 pF
D	.50 pF
F	1 percent
G	2 percent
J	5 percent
K	10 percent
M	20 percent

1.2.4 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
Z	Base metallization-barrier metal-tinned (tin/lead alloy, with a minimum of 4 percent lead)

1.2.5 Group C testing option. To require MIL-PRF-55681 group C testing, use the appropriate letter from the table below. If group C testing is not desired, leave this location blank. NOTE: Ordering group C options that contain a 2,000 hour life test may extend the processing time by 90 days or more.

Letter	Group C testing option
C	Full group C
L	2,000 hour life test only
M	1,000 hour life test only
H	Low voltage humidity only
N/A	No group C testing.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 and 5 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-55681 - Capacitor, Chip, Multiple Layer, Fixed, Unencapsulated, Ceramic Dielectric, Established Reliability and Non-Established Reliability, General Specification For.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202 - Electronic and Electrical Component Parts, Test Methods for.
MIL-STD-1285 - Marking of Electrical and Electronic Parts.

(Copies of these documents are available online at http://quicksearch.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

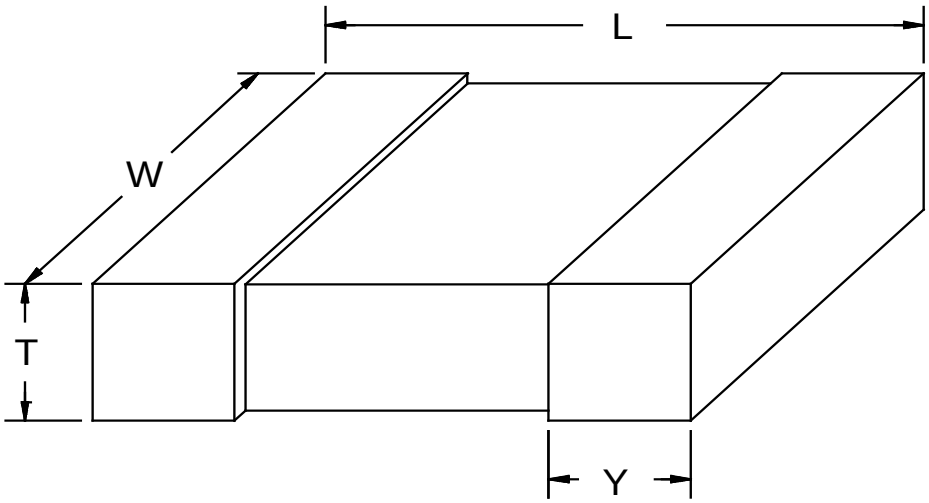
2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific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

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-55681, and as specified herein. These capacitors shall be capable of meeting all electrical, environmental, and mechanical requirements of MIL-PRF-55681, unless otherwise stated.

3.2 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of capacitor components and solder shall not exceed 96 percent. Tin shall be alloyed with a minimum of 4 percent lead (see 6.4).

3.3 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-55681 and herein (see figure 1).



Dimensions			
L ± .006	W ± .006	T Max	Y ± .006
.063	.032	.036	.014

Inches	mm
.006	0.15
.014	0.36
.032	0.81
.036	0.91
.063	1.60

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 1. Case dimensions and configuration.

3.4 Electrical characteristics.

3.4.1 Dielectric type. The dielectric type shall be BP (±30 ppm/°C) ceramic in accordance with MIL-PRF-55681.

3.4.2 Capacitance. Capacitance shall be in accordance with table IV when measured in accordance with method 305 of MIL-STD-202. The following conditions shall apply:

≤ 1,000 pF	1 MHz ± 50 kHz 1 V rms ± .2 V rms
> 1,000 pF	1 kHz ± 50 Hz 1 V rms ± .2 V rms

3.4.3 Dissipation factor (+25°C). When measured at the frequency and voltage specified in 3.4.2, the dissipation factor shall be 0.05 percent.

3.4.4 Insulation resistance. At +25°C: minimum of 100,000 megohms or 1,000 megohm-microfarads, whichever is less.
At +125°C: minimum of 1,000 megohms or 10 megohm-microfarads, whichever is less.

3.5 Solderability. In accordance with MIL-PRF-55681, except the sample size shall be 5 pieces with zero defectives permitted.

3.6 Moisture resistance. In accordance with MIL-PRF-55681, with the following exceptions:

a. Polarizing voltage shall be rated voltage.

b. Testing may be performed on chips with a larger width and/or length as long as they are cut from the same wafer(s) as those used for production.

3.7 Marking. As a minimum, marking shall be on the package due to the small size of the chips. The package marking shall be in accordance with MIL-STD-1285, except the PIN shall be as specified in paragraph 1.2 with manufacturer's name or CAGE code and date code. The manufacturer may, at their option, mark some information on the chips. Suggested marking is the 2 digit EIA capacitance code.

3.8 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the MIL-PRF-55681 Qualified Products List for at least one part, or perform the group A and group C inspections of MIL-PRF-55681 on a sample of parts agreed upon by the manufacturer and DLA Land and Maritime-VA.

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

3.10 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable 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.

3.11 Workmanship. In accordance with MIL-PRF-55681.

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not required.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of all tests specified in group A of MIL-PRF-55681. ESR testing and PPM testing and calculation are not applicable. When optional group C testing is requested, terminal strength and series resonance are not applicable.

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.

6. NOTES

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

6.1 Intended use. 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.

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

a. Complete PIN (see 1.2).

b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.

c. Requirements for notification of change of product to acquiring activity, if applicable.

d. Requirements for packaging and packing.

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

6.4 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).

6.5 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 specification 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.

TABLE IV. Electrical characteristics.

DSCC Drawing 05002- 1/	Capacitance pF	Available tolerances	ATC Vendor A Available voltages						VISHAY 2/ Vendor B Available voltages					
			Z	A	B	N	C	K	Z	A	B	N	C	K
			25	50	100	150	200	250	25	50	100	150	200	250
0R1- - - -	.1	A, B		•	•	•								
0R2- - - -	.2	A, B		•	•	•								
0R3- - - -	.3	A, B, C		•	•	•								
0R4- - - -	.4	A, B, C		•	•	•								
0R5- - - -	.5	A, B, C		•	•	•								
0R6- - - -	.6	A, B, C		•	•	•								
0R7- - - -	.7	A, B, C		•	•	•								
0R8- - - -	.8	A, B, C		•	•	•								
0R9- - - -	.9	A, B, C		•	•	•								
1R0- - - -	1	A, B, C		•	•	•				•	•		•	•
1R1- - - -	1.1	A, B, C, D		•	•	•				•	•		•	•
1R2- - - -	1.2	A, B, C, D		•	•	•				•	•		•	•
1R3- - - -	1.3	A, B, C, D		•	•	•				•	•		•	•
1R4- - - -	1.4	A, B, C, D								•	•		•	•
1R5- - - -	1.5	A, B, C, D		•	•	•				•	•		•	•
1R6- - - -	1.6	A, B, C, D		•	•	•				•	•		•	•
1R7- - - -	1.7	A, B, C, D								•	•		•	•
1R8- - - -	1.8	A, B, C, D		•	•	•				•	•		•	•
1R9- - - -	1.9	A, B, C, D								•	•		•	•
2R0- - - -	2	A, B, C, D		•	•	•				•	•		•	•
2R1- - - -	2.1	A, B, C, D								•	•		•	•
2R2- - - -	2.2	A, B, C, D		•	•	•				•	•		•	•
2R4- - - -	2.4	A, B, C, D		•	•	•				•	•		•	•
2R7- - - -	2.7	A, B, C, D		•	•	•				•	•		•	•
3R0- - - -	3	A, B, C, D		•	•	•				•	•		•	•
3R3- - - -	3.3	A, B, C, D		•	•	•				•	•		•	•
3R6- - - -	3.6	A, B, C, D		•	•	•				•	•		•	•
3R9- - - -	3.9	A, B, C, D		•	•	•				•	•		•	•
4R3- - - -	4.3	A, B, C, D		•	•	•				•	•		•	•
4R7- - - -	4.7	A, B, C, D		•	•	•				•	•		•	•
5R1- - - -	5.1	A, B, C, D		•	•	•				•	•		•	•
5R6- - - -	5.6	A, B, C, D		•	•	•				•	•		•	•
6R2- - - -	6.2	A, B, C, D		•	•	•				•	•		•	•
6R8- - - -	6.8	B, C, J, K, M		•	•	•				•	•		•	•
7R5- - - -	7.5	B, C, J, K, M		•	•	•				•	•		•	•
8R2- - - -	8.2	B, C, J, K, M		•	•	•				•	•		•	•
9R1- - - -	9.1	B, C, J, K, M		•	•	•				•	•		•	•
100- - - -	10	F, G, J, K, M		•	•	•				•	•		•	•
110- - - -	11	F, G, J, K, M		•	•	•				•	•		•	•
120- - - -	12	F, G, J, K, M		•	•	•				•	•		•	•
130- - - -	13	F, G, J, K, M								•	•		•	•
150- - - -	15	F, G, J, K, M		•	•	•				•	•		•	•
180- - - -	18	F, G, J, K, M		•	•	•				•	•		•	•
200- - - -	20	F, G, J, K, M		•	•	•				•	•		•	•
220- - - -	22	F, G, J, K, M		•	•	•				•	•		•	•
240- - - -	24	F, G, J, K, M		•	•	•				•	•		•	•
270- - - -	27	F, G, J, K, M		•	•	•				•	•		•	•
300- - - -	30	F, G, J, K, M		•	•	•				•	•		•	•
330- - - -	33	F, G, J, K, M		•	•	•				•	•		•	•

See footnote at end of table.

TABLE IV. Electrical characteristics. – Continued.

DSCC Drawing 05002- 1/	Capacitance pF	Available tolerances	ATC Vendor A Available voltages						VISHAY 2/ Vendor B Available voltages					
			Z	A	B	N	C	K	Z	A	B	N	C	K
			25	50	100	150	200	250	25	50	100	150	200	250
360- - - -	36	F, G, J, K, M		•	•	•				•	•		•	•
390- - - -	39	F, G, J, K, M		•	•	•				•	•		•	•
430- - - -	43	F, G, J, K, M		•	•	•				•	•		•	•
470- - - -	47	F, G, J, K, M		•	•	•				•	•		•	•
510- - - -	51	F, G, J, K, M		•	•	•				•	•			
560- - - -	56	F, G, J, K, M		•	•	•				•	•			
620- - - -	62	F, G, J, K, M		•	•	•				•	•			
680- - - -	68	F, G, J, K, M		•	•	•				•	•			
750- - - -	75	F, G, J, K, M		•	•	•				•				
820- - - -	82	F, G, J, K, M		•	•	•				•				
910- - - -	91	F, G, J, K, M		•	•	•				•				
101- - - -	100	F, G, J, K, M		•	•	•				•				

1/ Complete PIN shall include symbols to indicate voltage, capacitance tolerance, termination finish, and group C testing option (see 1.2).
2/ Vendor does not supply tolerance "A" (±.05pF).

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	Vendor CAGE	Vendor name and address	Similar designation 1/
A	29990	American Technical Ceramics Corporation One Norden Lane Huntington Station, NY 11746-2141	600S****W150
	3Q6G1	Plant: 2201 Corporate Square Boulevard Jacksonville, FL 32216-1921	
B	SHV71	Vishay Specialty Capacitors Ramat Gabriel P.O. Box 852 Migdal HaEmek 10500 Israel	VJ0603*******A*7Q

1/ Parts must be purchased to the DSCC PIN to assure that all performance requirements and tests are met.