

REVISIONS			
LT	DESCRIPTION	DATE	APPROVED

Prepared in accordance with ASME Y14.100

Selected item drawing

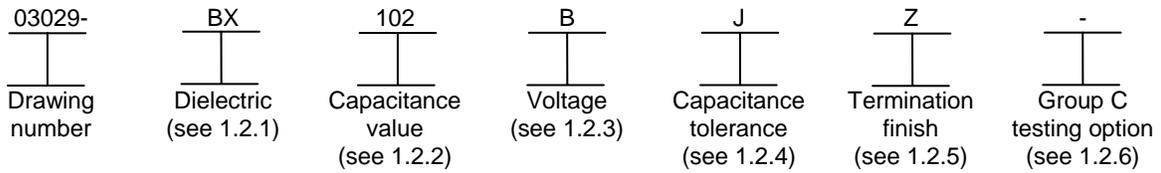
REV STATUS OF PAGES	REV																		
	PAGES	1	2	3	4	5	6	7	8	9									

PMIC N/A Original date of drawing 1 October 2004	PREPARED BY MICHAEL A. RADECKI		DESIGN ACTIVITY DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH															
	CHECKED BY PATRICK G. KYNE		TITLE CAPACITORS, FIXED, CERAMIC, CHIP, 0402															
	APPROVED BY KENDALL A. COTTONGIM																	
	SIZE A	CODE IDENT. NO. 037Z3		DWG NO. 03029														
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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:



1.2.1 Dielectric. The dielectric type is identified by the following 2 letters as defined in 3.3.1: BP, BR, BX.

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 tables IV, V, and VI 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)
W	6.3
X	10
Y	16
Z	25
A	50
B	100
C	200

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	Tolerance applicability
C	.25 pF	BP < 10 pF
D	.50 pF	BP < 10 pF
F	±1 percent	BP ≥ 10 pF
G	±2 percent	BP ≥ 10 pF
J	±5 percent	BP ≥ 10 pF
K	±10 percent	All dielectrics
M	±20 percent	BX, BR

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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
U	Base metallization-barrier metal-solder coated (tin/lead alloy, with a minimum of 4 percent lead). Solder has a melting point of +200°C or less. Solder coat thickness is a minimum of 60 microinches.
Z	Base metallization-barrier metal-tinned (tin/lead alloy, with a minimum of 4 percent lead)

1.2.6 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 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-55681 - Capacitor, Chip, Multiple Layer, Fixed, Unencapsulated, Ceramic Dielectric, Established Reliability and Non-Established Reliability, General Specification For.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1285 - Marking of Electrical and Electronic Parts.

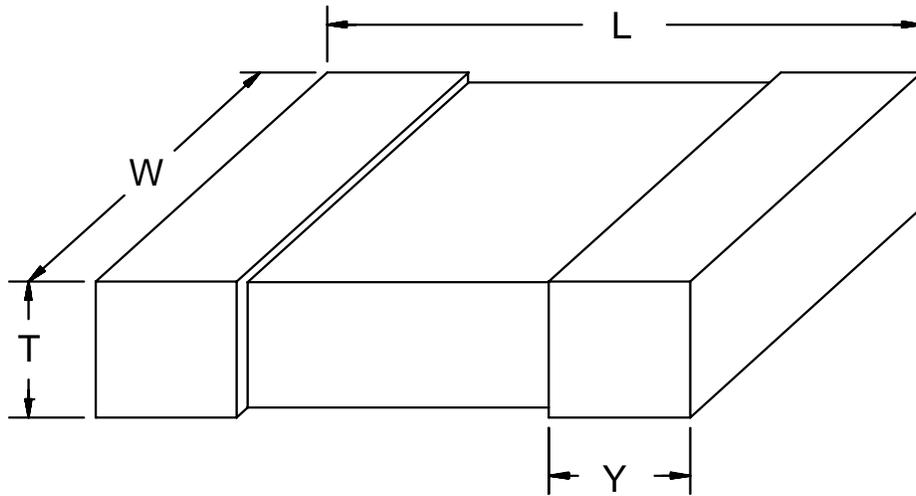
(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or www.dodssp.daps.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. 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.

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Dimensions				Inches	mm
L ± .004	W ± .004	T Max	Y ± .006	.004	0.10
				.006	0.15
				.010	0.25
				.020	0.51
				.024	0.61
				.040	1.02

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Dimensions and tolerances are for bare chips. For solder coated terminations (symbol U), add .020 inch (0.51 mm) to the positive length tolerance and .015 inch (0.38 mm) to the positive width and thickness tolerances.

FIGURE 1. Case dimensions and configuration.

3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-55681 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 4 percent.

3.3 Electrical characteristics.

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3.3.1 Dielectric type. The dielectric type shall be BP (± 30 ppm/ $^{\circ}$ C), BR (+15, -40 percent) or BX (+15, -25 percent) ceramic in accordance with MIL-PRF-55681.

Symbol	Capacitance change with reference to +25 $^{\circ}$ C		
	Step A through step D of MIL-PRF-55681 table XIII	Percent rated voltage	Step E through step G of MIL-PRF-55681 table XIII
BP	0 \pm 30 ppm/ $^{\circ}$ C	100	0 \pm 30 ppm/ $^{\circ}$ C
BR	\pm 15 percent	100	+15, -40 percent
BX	\pm 15 percent	100	+15, -25 percent

3.3.2 Capacitance. Capacitance shall be in accordance with tables IV, V, and VI when measured in accordance with method 305 of MIL-STD-202. The following conditions shall apply:

BP		BR, BX	
\leq 1,000 pF	1 MHz \pm 50 kHz 1 V rms \pm .2 V rms	All values	1 kHz \pm 50 Hz 1 V rms \pm .2 V rms
$>$ 1,000 pF	1 kHz \pm 50 Hz 1 V rms \pm .2 V rms		

3.3.3 Dissipation factor (+25 $^{\circ}$ C). The dissipation factor shall be as follows:

BP	BR, BX	
All values \leq 0.15%	6.3V - 10V	\leq 5.0%
	16V - 25V	\leq 3.5%
	50V - 200V	\leq 2.5%

3.3.4 Insulation resistance. At +25 $^{\circ}$ C: minimum of 100,000 megohms or 1,000 megohm-microfarads, whichever is less.
At +125 $^{\circ}$ C: minimum of 10,000 megohms or 100 megohm-microfarads, whichever is less for BR and BX dielectrics; and minimum of 1,000 megohms or 10 megohm-microfarads, whichever is less for BP dielectric.

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

3.5 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.

3.6 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 of the chips.

3.7 Manufacturer eligibility. To be eligible for listing as a suggested 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 specified herein on a sample of parts agreed upon by the manufacturer and DSCC-VA.

3.8 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be a suggested source of supply.

3.9 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.

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3.10 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 Users of record. Coordination of this document for future revisions is coordinated only with the suggested sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing should be in writing to: Defense Supply Center, Columbus (DSCC), ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990, by e-mail to capacitorfilter@dsc.dla.mil, or by telephone (614) 692-0561 or DSN 850-0561.

6.5 Suggested sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990, by e-mail to capacitorfilter@dsc.dla.mil, or by telephone (614) 692-0561 or DSN 850-0561.

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TABLE IV. BP dielectric electrical characteristics.

Capacitance pF	3 Digit capacitance code	Dielectric	Available tolerances	AVX Vendor A Available voltages	PRESIDIO Vendor B Available voltages	VITRAMON Vendor C Available voltages
.5	0R5	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
.75	R75	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
1	1R0	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
1.2	1R2	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
1.5	1R5	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
1.8	1R8	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
2.2	2R2	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
2.4	2R4	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
2.7	2R7	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
3	3R0	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
3.3	3R3	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
3.6	3R6	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
3.9	3R9	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
4.7	4R7	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
5.1	5R1	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
5.6	5R6	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
6.2	6R2	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
6.8	6R8	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
7.5	7R5	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
8.2	8R2	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
9.1	9R1	BP	C, D	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
10	100	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
11	110	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
12	120	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
13	130	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
15	150	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
16	160	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
18	180	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
20	200	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
22	220	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
24	240	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
27	270	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
30	300	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
33	330	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
36	360	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
39	390	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A, B	Y, Z, A, B
43	430	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
47	470	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
51	510	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
56	560	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
62	620	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
68	680	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
75	750	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
82	820	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
91	910	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
100	101	BP	F, G, J	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A, B
120	121	BP	F, G, J	W, X, Y, Z, A	X, Y, Z	Y, Z, A, B
150	151	BP	F, G, J	W, X, Y, Z, A	X, Y	Y, Z, A, B
180	181	BP	F, G, J	W, X, Y, Z, A	X, Y	Y, Z, A, B

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TABLE IV. BP dielectric electrical characteristics - Continued.

Capacitance pF	3 Digit capacitance code	Dielectric	Available tolerances	AVX Vendor A Available voltages	PRESIDIO Vendor B Available voltages	VITRAMON Vendor C Available voltages
220	221	BP	F, G, J	W, X, Y, Z, A	X	
270	271	BP	F, G, J	W, X, Y	X	
330	331	BP	F, G, J	W, X, Y	X	

TABLE V. BR dielectric electrical characteristics.

Capacitance pF	3 Digit capacitance code	Dielectric	Available tolerances	AVX Vendor A Available voltages	PRESIDIO Vendor B Available voltages	VITRAMON Vendor C Available voltages
100	101	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
120	121	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
150	151	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
180	181	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
220	221	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
270	271	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
330	331	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
390	391	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
470	471	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
560	561	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
680	681	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
820	821	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
1,000	102	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
1,200	122	BR	K, M	W, X, Y, Z, A	X, Y, Z, A	Y, Z, A
1,500	152	BR	K, M	W, X, Y, Z, A	X, Y, Z	Y, Z, A
1,800	182	BR	K, M	W, X, Y, Z, A	X, Y, Z	Y, Z, A
2,200	222	BR	K, M	W, X, Y, Z, A	X, Y, Z	Y, Z, A
2,700	272	BR	K, M	W, X, Y, Z, A	X, Y	Y, Z
3,300	332	BR	K, M	W, X, Y, Z, A	X, Y	Y, Z
3,900	392	BR	K, M	W, X, Y, Z	X, Y	Y, Z
4,700	472	BR	K, M	W, X, Y, Z	X, Y	
5,600	562	BR	K, M		X	
6,800	682	BR	K, M		X	
8,200	822	BR	K, M		X	
10,000	103	BR	K, M		X	
12,000	123	BR	K, M		X	

TABLE VI. BX dielectric electrical characteristics.

Capacitance pF	3 Digit capacitance code	Dielectric	Available tolerances	AVX Vendor A Available voltages	PRESIDIO Vendor B Available voltages	VITRAMON Vendor C Available voltages
100	101	BX	K, M		X, Y, Z, A, B	Y, Z, A
120	121	BX	K, M		X, Y, Z, A, B	Y, Z, A
150	151	BX	K, M		X, Y, Z, A, B	Y, Z, A
180	181	BX	K, M		X, Y, Z, A, B	Y, Z, A

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TABLE VI. BX dielectric electrical characteristics - Continued.

Capacitance pF	3 Digit capacitance code	Dielectric	Available tolerances	AVX Vendor A Available voltages	PRESIDIO Vendor B Available voltages	VITRAMON Vendor C Available voltages
220	221	BX	K, M		X, Y, Z, A, B	Y, Z, A
270	271	BX	K, M		X, Y, Z, A, B	Y, Z, A
330	331	BX	K, M		X, Y, Z, A, B	Y, Z, A
390	391	BX	K, M		X, Y, Z, A, B	Y, Z, A
470	471	BX	K, M		X, Y, Z, A, B	Y, Z, A
560	561	BX	K, M		X, Y, Z, A, B	Y, Z, A
680	681	BX	K, M		X, Y, Z, A, B	Y, Z, A
820	821	BX	K, M		X, Y, Z, A	Y, Z, A
1,000	102	BX	K, M		X, Y, Z, A	Y, Z, A
1,200	122	BX	K, M		X, Y, Z, A	Y, Z, A
1,500	152	BX	K, M		X, Y, Z, A	Y, Z, A
1,800	182	BX	K, M		X, Y, Z, A	Y, Z, A
2,200	222	BX	K, M		X, Y, Z	Y, Z, A
2,700	272	BX	K, M		X, Y	Y, Z
3,300	332	BX	K, M		X, Y	Y, Z
3,900	392	BX	K, M		X	Y, Z
4,700	472	BX	K, M		X	
5,600	562	BX	K, M		X	
6,800	682	BX	K, M		X	

<u>Vendor</u>	<u>Vendor CAGE</u>	<u>Vendor name and address</u>	<u>Similar designation</u> ^{1/}
A	04222	AVX Corporation 801 17th Avenue South Myrtle Beach SC 29577-4245	0402*****HT2A
B	60212	Presidio Components Incorporated 7169 Construction Court San Diego CA 92121-2615	0402*****NT93
C	95275	Vishay Vitramon Incorporated 10 Main Street Monroe CT 06468-1610	VJ0402*****AO

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

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