

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Added suggested source of supply.	10 Jan 90	David E. Moore
B	Deleted suggested source of supply.	29 Jun 90	David E. Moore
C	Deleted and added suggested sources of supply. Modified 3.1.2 and figure 1. Added note for standoff. Editorial changes throughout.	24 Feb 92	David E. Moore
D	Changes in accordance with NOR 5910-R018-96	23 May 96	Andrew R. Ernst
E	Altered maximum length. Added and removed suggested sources of supply.	25 August 99	Kendall A. Cottongim
F	Removed suggested source of supply.	10 May 00	Kenneth A. Bernier
G	Editorial changes made throughout.	6 October 2004	Kendall A. Cottongim
H	Changed drawing to source control with approved sources of supply. Added pure tin prohibition paragraph 3.1.3 and manufacturer eligibility paragraph 3.14. Editorial changes.	15 Dec 09	Michael A. Radecki

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
DEFENSE LOGISTICS AGENCY
DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43218-3990

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

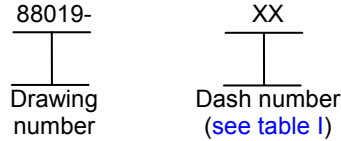
Source control drawing

REV STATUS OF PAGES	REV	H	H	H	H	H	H	H										
	PAGES	1	2	3	4	5	6	7										
PMIC N/A	PREPARED BY ROBERT E. GRILLOT							DESIGN ACTIVITY DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OH 45444-5000										
Original date of drawing: 2 March 1988	CHECKED BY EDWARD H. BACK							TITLE CAPACITORS, CERAMIC, SINGLE IN-LINE PACKAGE, NETWORK, (9 CAPACITOR SECTIONS) BX										
	APPROVED BY DAVID E. MOORE																	
	SIZE A	CODE IDENT. NO. 14933						DWG NO. 88019										
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1. SCOPE

1.1 Scope. This drawing, [MIL-PRF-39014](#), and [MIL-PRF-39014/5](#) describe the complete requirements for single-in-line packaged multilayer ceramic capacitor networks.

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



2. APPLICABLE DOCUMENTS

2.1 Government 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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

[MIL-PRF-39014](#) - Capacitors, Fixed, Ceramic Dielectric (General Purpose) Established Reliability and Nonestablished Reliability, General Specification for.

[MIL-PRF-39014/5](#) - Capacitors, Fixed, Ceramic Dielectric (General Purpose), Established Reliability, Styles CKR11, CKR12, CKR14, CKR15, and CKR16.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-202](#) - Electronics and Electrical Component Parts.
[MIL-STD-1285](#) - Marking of Electrical and Electronic Parts.

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

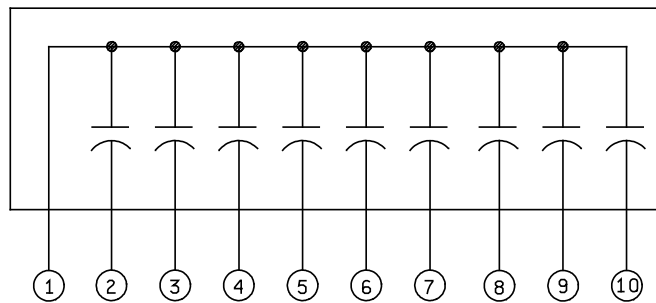
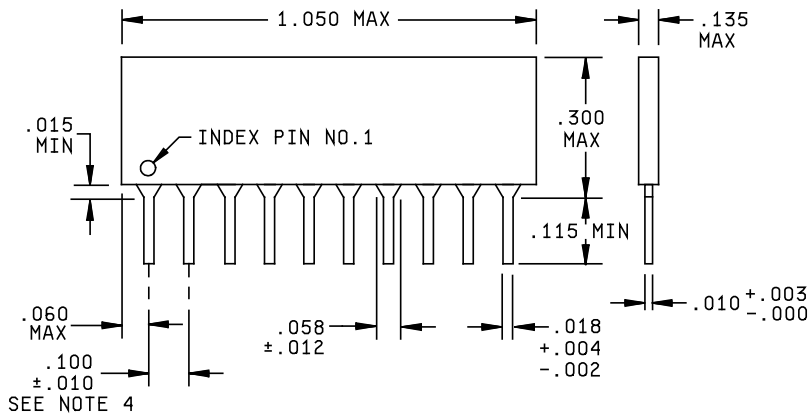
3.1 Interface and physical dimensions. The interface and physical dimensions shall be as specified in [MIL-PRF-39014](#) and herein (see figure 1).

3.1.1 Leads. Leads shall be as specified on figure 1.

3.1.2 Case. Molded or conformally coated.

3.1.3 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 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.3).

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9 CAPACITOR SECTIONS
1 GROUND LEAD

CIRCUIT DIAGRAM

Inches	mm	Inches	mm
.002	0.05	.058	1.47
.003	0.08	.060	1.52
.004	0.10	.100	2.54
.010	0.25	.115	2.92
.012	0.30	.135	3.43
.015	0.38	.300	7.62
.018	0.46	1.000	25.40

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Standoff shape is optional. The minimum height of the standoff shall be .015 (0.38 mm).
4. Lead spacing $.100 \pm .010$ (25.4 ± 0.25) noncumulative.

FIGURE 1. Case dimensions and configuration.

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- 3.1.4 Operating temperature range. The operating temperature range shall be -55°C to +125°C.
- 3.2 Electrical characteristics.
- 3.2.1 Rated voltage. The rated voltage shall be 100 V dc at +85°C, 50 V dc at +125°C.
- 3.2.2 Dielectric type. BX, in accordance with [MIL-PRF-39014/5](#).
- 3.2.3 Voltage temperature limits. In accordance with [MIL-PRF-39014/5](#).
- 3.2.4 Capacitance. See [table I](#). Measured in accordance with [method 305 of MIL-STD-202](#), 1 kHz at 1.0 V rms at +25°C.
- 3.2.5 Dissipation factor (+25°C). 2.5 percent maximum (measured under the same conditions as capacitance).
- 3.2.6 Insulation resistance. Measured in accordance with [method 302 of MIL-STD-202](#). At +25°C, rated voltage: 100,000 megohms or 1,000 megohms microfarad, whichever is less.
- 3.2.7 Dielectric withstanding voltage. Capacitors shall withstand a dc test potential of 250 percent of rated voltage for a period of not less than 1 second nor more than 5 seconds at +25°C. The charging current shall not exceed 50 milliamperes.
- 3.2.8 Capacitance tolerance. K = ±10 percent, M = ±20 percent.
- 3.3 Solderability of terminals. In accordance with [MIL-PRF-39014](#).
- 3.4 Vibration. In accordance with [method 204 of MIL-STD-202](#), test condition B (10 to 20,000 Hz, 15 g's).
- 3.5 Shock. In accordance with [MIL-PRF-39014](#).
- 3.6 Immersion cycling. In accordance with [MIL-PRF-39014](#).
- 3.7 Moisture resistance. In accordance with [MIL-PRF-39014](#).
- 3.8 Life. 200 percent of rated voltage applied at +125°C for 1,000 hours.
- 3.9 Thermal shock. In accordance with [method 107 of MIL-STD-202](#), test condition B except low temperature is -55°C.
- 3.10 Voltage conditioning. In accordance with [MIL-PRF-39014](#), 200 percent of rated voltage.
- 3.11 Terminal strength. Capacitors shall withstand a steady pull of 5 pounds for 5 seconds in a direction parallel to the leads.
- 3.12 Marking. Marking shall be in accordance with [MIL-STD-1285](#) except the capacitors shall be marked with the PIN as specified herein ([see 1.2](#)), the manufacturer's name or Commercial and Government Entity (CAGE) code, and date lot code as a minimum.
- 3.13 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.
- 3.14 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the [MIL-PRF-123](#), [MIL-PRF-39014](#), or [MIL-PRF-49470 Qualified Products Database](#) for at least one part, or perform the group A and group B inspections specified herein on a sample of parts agreed upon by the manufacturer and DSCC-VA.
- 3.15 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply.
- 3.16 Workmanship. Capacitors shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

- 4.1 Sampling and inspection. Qualification sampling and inspection are not required.

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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 and group B inspections of MIL-PRF-39014, provided they are listed in this drawing. PPM testing and calculation is not applicable.

4.2.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group B requirements in lieu of performing group B tests (see 6.2d).

TABLE I. Electrical characteristics.

DSCC drawing 88019-	Capacitance	Capacitance tolerance	DSCC drawing 88019-	Capacitance	Capacitance tolerance	DSCC drawing 88019-	Capacitance	Capacitance tolerance
01	.001 µF	K	14	.0033 µF	M	27	.015 µF	K
02	.001 µF	M	15	.0039 µF	K	28	.015 µF	M
03	.0012 µF	K	16	.0039 µF	M	29	.022 µF	K
04	.0012 µF	M	17	.0047 µF	K	30	.022 µF	M
05	.0015 µF	K	18	.0047 µF	M	31	.033 µF	K
06	.0015 µF	M	19	.0056 µF	K	32	.033 µF	M
07	.0018 µF	K	20	.0056 µF	M	33	.047 µF	K
08	.0018 µF	M	21	.0068 µF	K	34	.047 µF	M
09	.0022 µF	K	22	.0068 µF	M	35	.068 µF	K
10	.0022 µF	M	23	.0082 µF	K	36	.068 µF	M
11	.0027 µF	K	24	.0082 µF	M	37	.1 µF	K
12	.0027 µF	M	25	.01 µF	K	38	.1 µF	M
13	.0033 µF	K	26	.01 µF	M			

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 which 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 original equipment manufacturer 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 packaging and packing.
- d. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements.
- e. Requirements for notification of change of product to acquiring activity, if applicable.

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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 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: Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus OH 43218-3990 or by telephone (614) 692-0561 or DSN 850-0561.

6.6 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 achieved online at capacitorfilter@dla.mil or by contacting Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus OH 43218-3990 or by telephone (614) 692-0561 or DSN 850-0561.

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DSCC drawing PIN 88019-	Vendor similar type <u>1/</u>	Vendor CAGE	Vendor name and address
01	SPA11X102KHA	96095	Olean Advanced Products A Division of AVX Corporation 1695 Seneca Avenue Olean NY 14760-3736
02	SPA11X102MHA		
03	SPA11X122KHA		
04	SPA11X122MHA		
05	SPA11X152KHA		
06	SPA11X152MHA		
07	SPA11X182KHA		
08	SPA11X182MHA		
09	SPA11X222KHA		
10	SPA11X222MHA		
11	SPA11X272KHA		
12	SPA11X272MHA		
13	SPA11X332KHA		
14	SPA11X332MHA		
15	SPA11X392KHA		
16	SPA11X392MHA		
17	SPA11X472KHA		
18	SPA11X472MHA		
19	SPA11X562KHA		
20	SPA11X562MHA		
21	SPA11X682KHA		
22	SPA11X682MHA		
23	SPA11X822KHA		
24	SPA11X822MHA		
25	SPA11X103KHA		
26	SPA11X103MHA		
27	SPA11X153KHA		
28	SPA11X153MHA		
29	SPA11X223KHA		
30	SPA11X223MHA		
31	SPA11X333KHA		
32	SPA11X333MHA		
33	SPA11X473KHA		
34	SPA11X473MHA		
35	SPA11X683KHA		
36	SPA11X683MHA		
37	SPA11X104KHA		
38	SPA11X104MHA		

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

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