

| REVISIONS | | | |
|-----------|--|--------------|-------------------|
| LTR | DESCRIPTION | DATE | APPROVED |
| A | Correct vendor table, cage code and vendor address. | 10 July 2000 | Kendall Cottongim |
| B | Correct vendor part, table title and vendor address. | 14 July 2003 | Kendall Cottongim |
| C | Update for 5 year review, editorial corrections. | 21 Dec 2009 | Michael 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

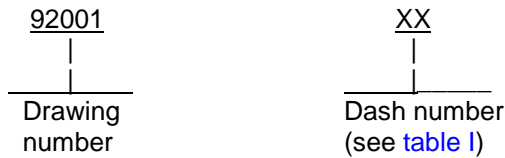
| REV STATUS OF PAGES | REV | C | C | C | C | C | C | C | C | | | | | | | | |
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| | PAGES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | | | | |

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| PMIC N/A | PREPARED BY Robert Grillot | DESIGN ACTIVITY DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OH 45444-5000 | |
| Original date of drawing 6 January 1992 | CHECKED BY Edward W. Back | TITLE CAPACITORS, FIXED, ELECTROLYTIC, DOUBLE LAYER, SEALED | |
| | APPROVED BY David E. Moore | | |
| | SIZE A | CODE IDENT. NO. 14933 | DWG NO. 92001 |
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1. SCOPE

1.1 Scope. This drawing describes the requirements for fixed, electrolytic, double layer, sealed, high-reliability capacitors.

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



2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

- [MIL-PRF-39006](#) - Capacitors, Fixed, Electrolytic, (Nonsolid Electrolyte), Tantalum, Established Reliability, General Specification for.
- [MIL-STD-202](#) - Test Methods for Electronic and Electrical Components Parts.
- [MIL-STD-1285](#) - Marking of Electrical and Electronic Parts.

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

2.2 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.

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3. REQUIREMENTS

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

3.1.1 Case. The case shall be tantalum.

3.1.2 Leads. The leads shall be solder plated nickel (see [figure 1](#)).

3.1.3 Storage temperature. The storage temperature shall be -62°C to +95°C. Capacitors can be stored uncharged for brief periods at temperatures up to +125°C without permanent damage.

3.1.4 Operating temperature range. The operating temperature range shall be -55°C to +85°C.

3.2 Electrical characteristics.

3.2.1 Rated voltage. The rated voltage shall be in accordance with [table I](#) at -55°C to +85°C.

3.2.2 Surge voltage. The test shall be 1000 cycles at 110% of rated voltage at 85°C ±3°C. Each cycle shall consist of a 30 ±2 second surge voltage application followed by a 330 ±2 second discharge period. The part shall be charged and discharged through a 1000 ohm resistor. The capacitor must not be visibly damaged and the electrical characteristics must remain within specification.

3.2.3 Dielectric. The dielectric shall be activated carbon and an aqueous electrolyte.

3.2.4 DC leakage current. The maximum DC leakage current shall be as specified in [Table I](#) following 5 minutes at the working voltage and 25°C.

3.2.5 Capacitance. The capacitance shall be as specified in [Table I](#) at 120Hz and 25°C.

3.2.6 Capacitance tolerance. The capacitance tolerance shall be -20 percent, +80 percent at +25°C.

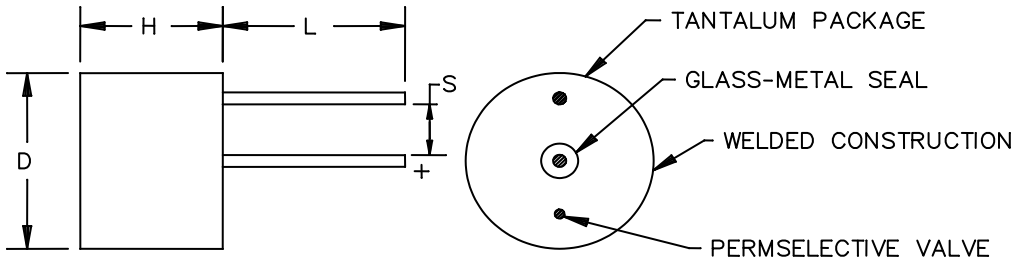
3.2.7 Equivalent series resistance (ESR). The maximum Equivalent Series Resistance shall be as specified in [Table I](#) at 1KHz and 25°C.

3.2.8 Stability at low and high temperatures. Stability at low and high temperatures shall be in accordance with [MIL-PRF-39006](#) with the following exceptions:

- a. Low test temperature -55°C.
- b. High test temperature +85°C.
- c. Thermal stability has been reached when no further change in ESR is observed between two successive measurements taken at intervals of 15 +2, -0 minutes.
- d. Step 2 - ESR shall not exceed 600 percent of the step 1 measured value.
- e. Steps 2 and 4 - Capacitance shall change not more than ±50 percent from the initial measured value.
- f. Step 5 - Capacitance shall change not more than ±20 percent from the initial measured value.

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CASE CODE A



LEADS: .025 ±.002 DIA

L MIN = 1.5
S = .4 ±.02

| Inches | mm |
|--------|-------|
| .002 | 0.05 |
| .020 | 0.51 |
| .025 | 0.64 |
| .060 | 1.52 |
| .400 | 10.16 |
| .580 | 14.73 |
| .620 | 15.75 |
| .645 | 16.38 |
| .650 | 16.51 |
| .675 | 17.15 |
| .680 | 17.27 |
| .795 | 20.19 |
| .950 | 24.13 |
| .975 | 24.77 |
| 1.030 | 26.16 |
| 1.035 | 26.29 |
| 1.050 | 26.67 |
| 1.070 | 27.18 |
| 1.100 | 27.94 |
| 1.280 | 32.51 |
| 1.500 | 38.10 |
| 1.600 | 40.64 |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. For D and H dimensions, see [table I](#).

FIGURE 1. Case dimensions and configuration.

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TABLE I. Electrical characteristics.

| DSCC drawing 92001- | Capacitance in farads <u>1/</u> | Rated voltage dc | Surge voltage dc | ESR max (ohms) <u>1/</u> | Leakage current max (µA) <u>1/</u> | CASE code | Dimensions | |
|---------------------|---------------------------------|------------------|------------------|--------------------------|------------------------------------|-----------|------------|---------|
| | | | | | | | D ±.020 | H ±.060 |
| 02 | 1.0 | 5.5 | 6.3 | 0.7 | 35 | A | 1.280 | 0.675 |
| 05 | 0.10 | 5.5 | 6.3 | 6.0 | 6 | A | 0.620 | 0.620 |
| 07 | 1.0 | 5.5 | 6.3 | 2.0 | 25 | A | 1.100 | 0.580 |
| 09 | 0.47 | 11.0 | 12.6 | 1.5 | 35 | A | 1.280 | 1.050 |
| 14 | 0.56 | 11.0 | 12.6 | 4.0 | 25 | A | 1.100 | 0.950 |

1/ Test temperature +25°C ±2°C.

3.3 Environmental testing.

TABLE II Environmental Testing

| | TEST | TEST METHOD | CONDITION | REMARKS |
|---|---------------------|------------------------|-------------|--------------------------|
| 1 | SHOCK | MIL-STD-202 METHOD 213 | G | 11mS, 50g |
| 2 | VIBRATION | MIL-STD-202 METHOD 204 | D | 12 Sweeps/Axis, 12g peak |
| 3 | VIBRATION | MIL-STD-202 METHOD 214 | I, Letter D | 1.5 Hours/Axis, 12g rms |
| 4 | MOISTURE RESISTANCE | MIL-STD-202 METHOD 106 | | 6 V Polarity |
| 5 | THERMAL SHOCK | MIL-STD-202 METHOD 107 | A | |
| 6 | ALTITUDE | MIL-STD-202 METHOD 105 | D | 100,000 ft test |

3.3.1 Thermal shock. Thermal shock shall be in accordance with [Table II](#).

3.3.2 Moisture resistance. Moisture resistance shall be in accordance with [Table II](#).

3.3.3 Seal test. Capacitors shall be tested in accordance with [method 112 of MIL-STD-202](#), condition D. The following details and exception apply:

- a. Test condition letter D (except maximum temperature +85°C florinert).
- b. Examination after test: not applicable.
- c. There shall be no evidence of leakage (bubbling).

3.3.4 Life. Life shall be in accordance with [MIL-STD-202, Method 108](#), with the following exceptions:

- a. Test condition letter F (2000 hours).
- b. Test temperature +85°C ±2°C.
- c. Measurements during exposure: DC leakage shall be measured as specified at 0; 240 +48, -0 hours, 500 +48, -0 hours, 1,000 +48, -0 hours and 2000 +48, -0 hours. The manufacturer may option to measure dc leakage at +85°C; however; if the capacitors fail to meet the dc leakage requirement in [3.2.5](#), the measurement shall be made at +25°C.

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3.4 Physical characteristics.

3.4.1 Shock (specified pulse). Capacitors shall be tested in accordance with [Table II](#).

3.4.2 Vibration, high frequency. Vibration, high frequency shall be in accordance with [Table II](#).

3.4.3 Resistance to solder heat. The capacitor shall withstand solder of the terminals at 260°C for 10 seconds in accordance with [MIL-STD-202, method 210](#), test condition B. The capacitor shall not be visibly damaged and the electrical characteristics shall not be affected.

3.4.4 Terminal strength. The capacitor terminals shall withstand a 5 pound pull test for 30 seconds in accordance with [MIL-STD-202, method 211](#), test condition A. the capacitor shall not be visibly damaged and the electrical characteristics shall not be affected.

3.4.5 Solderability. The terminations shall be solderable per [MIL-STD-202, Method 208](#).

3.4.6 Resistance to solvents. Resistance to solvents shall be in accordance with [MIL-STD-202, method 215](#).

3.5 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.

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

3.7 Manufacturer eligibility. To be eligible for listing as an approved source of supply a manufacturer shall perform all testing specified herein on a sample of parts agreed upon by the manufacturer and DSCC-VA.

3.8 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](#))

3.9 Marking. Marking shall be in accordance with [MIL-STD-1285](#), except the (part name) 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 codes.

3.10 Workmanship. The capacitor shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not required.

4.2 Quality conformance inspections.

4.2.1 Inspection of product for delivery. All capacitor assemblies are seal tested in accordance with [MIL-STD-202, method 112](#), test condition D (except maximum temperature +85°C). They are also checked for dc leakage, capacitance, and dissipation factor or ESR before being shipped.

4.2.2 Certification. The procuring activity, at its discretion, may accept a certificate of compliance for [Table II](#) requirements in lieu of performing [Table II](#) tests.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order ([see 6.2](#)). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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 covered by this drawing are intended mainly for use as a standby power source for low-power memories during power outages lasting up to several days. Since these capacitors have relatively high ESR (0.5 to 24 ohms), they are not recommended for filtering applications.

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 inspections, or provides certification of compliance with group B inspections.
- e. Requirements for notification of change of product to procuring activity, if applicable.

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.

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

6.5 Similar vendor PIN's. See [table II](#).

6.6 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) 692-0563 or DSN 850-0563.

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 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) 692-0563 or DSN 850-0563.

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Table III. Similar vendor PIN.

| DSCC 92001- | Vendor similar PIN ^{1/} |
|-------------|----------------------------------|
| 02 | RE055105 |
| 05 | RE055104 |
| 07 | RS055105 |
| 09 | RE110474 |
| 14 | RS110564 |

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

Vendor CAGE
Number

06MN5

Vendor name
and address

Evans Capacitor Company
72 Boyd Avenue
East Providence, RI 02914

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