

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Correction to figure, addition of capacitor values.	04-11-19	Kendall Cottongim
B	Correction to capacitor values	05-06-24	Kendall Cottongim
C	Correction to capacitor values	07-12-07	Michael A. Radecki
C	Approved sources of supply. Inspection of product for delivery. Certification.	09-10-21	Michael A. Radecki
D	Add optional capacitance tolerance and optional stud mounting and update throughout.	16-08-15	Michael A. Radecki
E	Added an approved source of supply.	17-06-23	Michael A. Radecki
F	Editorial and formatting updates.	25-08-21	Mark Rush

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](#)

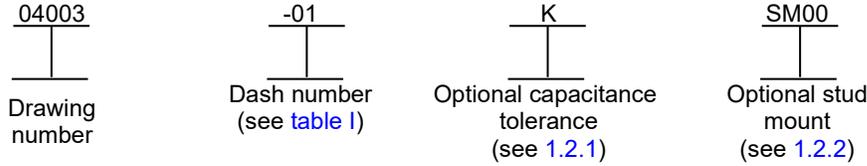
Selected item drawing

REV STATUS OF PAGES	REV	F	F	F	F	F	F	F	F								
	PAGES	1	2	3	4	5	6	7	8								
PMIC N/A	PREPARED BY Ken Bernier						DESIGN ACTIVITY DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH										
Original date of drawing 04-09-08	CHECKED BY Ken Bernier						TITLE CAPACITOR, TANTALUM, HYBRID, HERMETICALLY SEALED										
	APPROVED BY Kendall Cottongim																
	SIZE A	CAGE CODE 037Z3				DWG NO. 04003											
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1. SCOPE

1.1 Scope. This drawing contains specific electrical, mechanical, and environmental requirements and specifications for tantalum case hybrid capacitors, hermetically sealed in welded tantalum case with glass to metal anode terminal seal.

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



1.2.1 Optional capacitance tolerance. The standard capacitance tolerance is ± 20 percent. Optional ±10 percent capacitance tolerance is identified by the letter K. If the optional ±10 percent capacitance tolerance is not required, this location will be left blank.

1.2.2 Optional stud mount. Optional stud mount (see [figure 2](#)) is identified by a four character code as shown below. If stud mounting is not required, this location will be left blank.

Symbol	Stud length (Dimension A of figure 2) (inches (mm))
SM00	.22 (5.59)
SM01	.28 (7.11)
SM02	.41 (10.41)
SM03	.16 (4.06)
SM04	.19 (4.83)
SM05	.36 (9.14)

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 STANDARDS

MIL-STD-202-105	-	Method 105, Barometric Pressure (Reduced)
MIL-STD-202-106	-	Method 106, Moisture Resistance
MIL-STD-202-107	-	Method 107, Thermal Shock
MIL-STD-202-112	-	Method 112, Seal
MIL-STD-202-204	-	Method 204, Vibration, High Frequency
MIL-STD-202-210	-	Method 210, Resistance to Soldering Heat
MIL-STD-202-211	-	Method 211, Terminal Strength
MIL-STD-202-213	-	Method 213, Shock (Specified Pulse)
MIL-STD-202-214	-	Method 214, Random Vibration
MIL-STD-202-215	-	Method 215, Resistance to Solvents

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

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2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation or contract.

| IPC INTERNATIONAL (IPC)

| [EIA/IPC/JEDEC J-STD-002](#) - Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires

(Copies of these documents are available online at www.IPC.org.)

2.4 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 herein (see [figure 1](#)).

3.1.1 Case. The case shall be tantalum.

3.1.2 Capacitor element. The capacitor shall utilize sintered tantalum anodes and ruthenium oxide or palladium coated cathodes operating in aqueous electrolyte.

3.1.3 Mass. 10 - 50 volts: 84 grams max; 63 - 125 volts: 102 grams max.

3.1.4 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](#))

3.1.5 Storage temperature. The storage temperature shall be -62°C to +130°C.

3.1.6 Operating temperature range. The operating temperature range shall be -55°C to +85°C or +125°C with voltage de-rating (see [table I](#)).

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 or +125°C with voltage derating (see [table I](#)).

3.2.2 Surge voltage. When tested in accordance with the following, the capacitor must not be visibly damaged and the electrical characteristics must remain within specification:

- a. Applied voltage and test temperature: 110 percent of rated voltage (see [table I](#)) at +85°C
- b. Number of cycles: 1000.
- c. Procedure: Each cycle shall consist of a 30 second surge voltage application followed by 330 second discharge period. The capacitor shall be charged and discharged through a 1000 ohm resistor.

3.2.3 Capacitance. When measured at 120 Hz and +25°C, the capacitance shall be as specified (see [table I](#)).

3.2.4 Capacitance tolerance. The capacitance tolerance shall be ± 20 percent or ± 10 percent (see [1.2.1](#)).

3.2.5 Equivalent series resistance (ESR). When measure at 1 kHz and +25°C, the maximum ESR shall be as specified (see [table I](#)).

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

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3.2.7 Life at +85°C. When tested in accordance with the following, the capacitor shall meet all electrical specifications:

- a. Test temperature: +85°C.
- b. Test duration: 2,000 hours.
- c. Test voltage: Rated (see [table I](#)).

3.2.8 Life at +125°C. When tested in accordance with the following, the capacitor shall meet all electrical specifications:

- a. Test temperature: +125°C.
- b. Test duration: 2,000 hours.
- c. Test voltage: Derated (see [table I](#)).

3.3 Environmental requirements. During environmental testing, the capacitor shall be rigidly clamped to the test fixture with the leads upright.

3.3.1 Shock (specified pulse). When tested in accordance with [MIL-STD-202-213](#), test condition G (50 g's), the capacitor shall not be visibly damaged and the electrical characteristics shall remain within specification.

3.3.2 Vibration, high frequency. When tested in accordance with [MIL-STD-202-204](#), test condition D (20 g's), the capacitor shall not be visibly damaged and the electrical characteristics shall remain within specification.

3.3.3 Random vibration. When tested in accordance with [MIL-STD-202-214](#), test condition II, letter E (19.64 g's, rms), the capacitor shall not be visibly damaged and the electrical characteristics shall remain within specification.

3.3.4 Moisture resistance. When tested in accordance with [MIL-STD-202-106](#) at a polarization voltage of 6 V_{dc}, the capacitor shall not be visibly damaged and the electrical characteristics shall remain within specification.

3.3.5 Thermal shock. When tested in accordance with [MIL-STD-202-107](#), test condition A, the capacitor shall not be visibly damaged and the electrical characteristics shall remain within specification.

3.3.6 Barometric pressure (reduced). When tested in accordance with [MIL-STD-202-105](#), test condition D (100,000 feet), the capacitor shall not be visibly damaged and the electrical characteristics shall remain within specification.

3.4 Seal. When tested in accordance with [MIL-STD-202-112](#), condition C, procedure IIIa, the capacitor shall not leak electrolyte or vent any gas.

3.5 Solderability. When tested in accordance with [J-STD-002](#), the terminations shall be solderable.

3.6 Resistance to soldering heat. When tested in accordance with [MIL-STD-202-210](#), test condition B (+260°C for 10 seconds), the capacitor shall not be visibly damaged and the electrical characteristics shall not be affected.

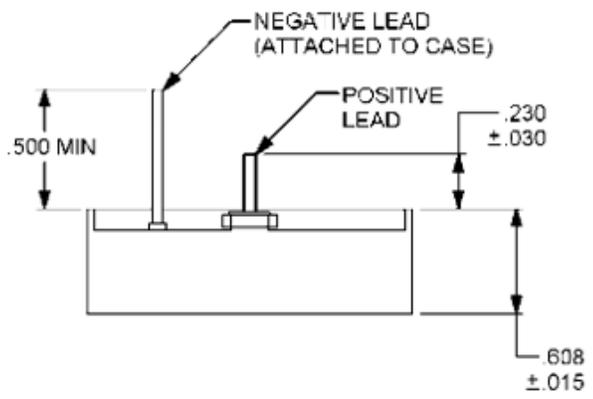
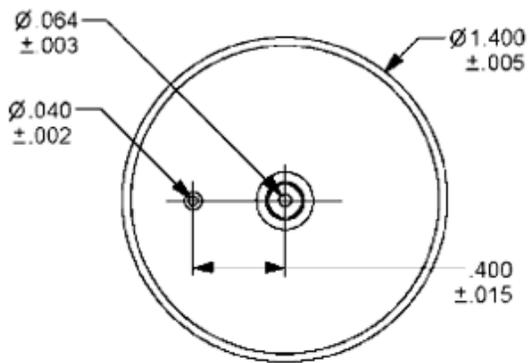
3.7 Terminal strength. When tested in accordance with [MIL-STD-202-211](#), the capacitor shall not be visibly damaged and the electrical characteristics shall not be affected. The following details and exceptions shall apply:

- a. Test condition: A.
- b. Applied force: 5 pounds.
- c. Duration of applied force: 30 seconds.

3.8 Resistance to solvents. When tested in accordance with [MIL-STD-202-215](#), the capacitor markings shall remain legible.

3.9 Fungus resistance. The capacitor materials shall not support fungus growth and shall not be a nutrient to fungus.

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Inches	mm	Inches	mm
.002	0.05	.064	1.63
.003	0.08	.230	5.84
.005	0.13	.400	10.16
.015	0.38	.500	12.70
.030	0.76	.608	15.44
.040	1.02	1.400	35.56

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are in millimeters and are given for general information only.

FIGURE 1. Case dimensions and configuration.

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3.10 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.

3.11 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 DLA Land and Maritime-VA.

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

3.13 Marking. Capacitors shall be permanently marked with the PIN as specified herein (see 1.2), the manufacturer's name and Commercial and Government Entity (CAGE) code, serial number, date / lot code, and polarity.

3.14 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 Conformance inspections.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of DCL, capacitance, and ESR as specified in 3.2.6, 3.2.4, and 3.2.5.

TABLE I. Electrical characteristics.

DLA Land and Maritime drawing PIN 04003- 1/	Capacitance (μF)	+85°C voltage (V _{dc})	+125°C voltage (V _{dc})	DCL (max.) (μA)	ESR (max.) (Ω)
01 --	150,000	10	6	300	.025
02 --	90,000	16	9.5	300	.025
03 --	54,000	25	15	300	.035
04 --	36,000	35	20	300	.035
05 --	24,000	50	30	400	.035
06 --	12,000	63	38	400	.035
07 --	8,200	80	48	500	.040
08 --	5,700	100	60	500	.050
09 --	4,500	110	65	500	.075
10 --	3,300	125	75	500	.075

1/ Complete PIN includes symbols to indicate optional capacitance tolerance, if applicable, and optional stud mounting, if applicable (see 1.2).

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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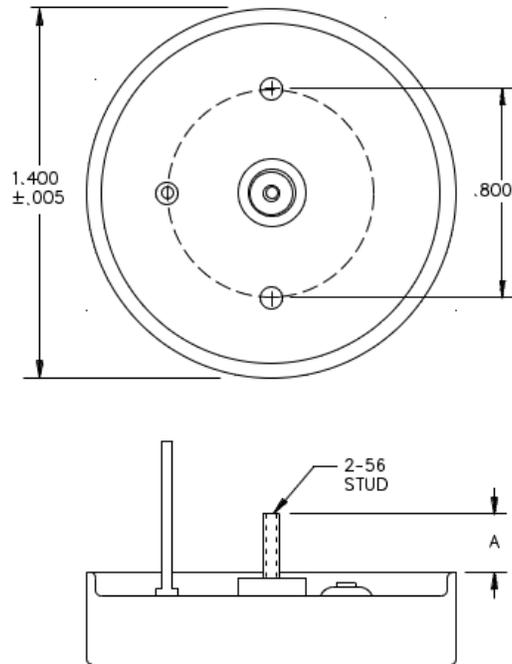


FIGURE 2. Optional stud mount.

6. NOTES

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

6.1 Intended use. Hybrid capacitors covered by this drawing are intended mainly for use in defense electronic systems, avionics, and weapon systems.

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

- a. Complete DLA Land and Maritime CAGE code and 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 (see 5.1).
- d. Requirements for notification of change of product to acquiring 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. Alloys of 3 percent lead, by mass, have been 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 Changes from previous issue. 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 previous issue.

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6.6 Users of record. Coordination of this document for future revisions is coordinated only with the approved source(s) 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.

6.7 Approved source(s) of supply. Approved source(s) 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.

DLA Land and Maritime drawing PIN 04003- 1/ 2/	Vendor A similar type 2/	Vendor B similar type 2/
01 --	THQ3010154 --	HE5C243 - 050 - ZSS
02 --	THQ3016903 --	
03 --	THQ3025543 --	
04 --	THQ3035363 --	
05 --	THQ3050243 --	
06 --	THQ3063123 --	
07 --	THQ3080822 --	
08 --	THQ3100572 --	
09 --	THQ3110452 --	
10 --	THQ3125332 --	

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

2/ Complete PIN includes symbols to indicate capacitance tolerance, if applicable, and optional stud mounting, if applicable (see 1.2).

<u>Vendor</u>	<u>Vendor CAGE</u>	<u>Vendor name and address</u>
A	06MN5	Evans Capacitor Company 72 Boyd Avenue East Providence, RI 02914-1202
B	05079	Vishay Sprague, Inc. 2813 West Road Bennington, VT 05201-9812

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