

| REVISIONS | | | |
|-----------|--|--------------|----------------------|
| LTR | DESCRIPTION | DATE | APPROVED |
| A | Editorial changes. | 22 June 2005 | Kendall A. Cottongim |
| B | Added paragraph 3.3; Pure tin prohibition. Editorial changes throughout. | 6 Jan 2011 | M. Radecki |
| C | Cancellation Notice | 25 Jan 2016 | M. Radecki |
| D | Reinstate the drawing from cancel to active. Editorial changes throughout, update vendor's address and add QR code. Add subgroups 2,3,4,5,6 to Table II. | 24 Mar 2016 | M. Radecki |
| E | Table I, remove 1 kHz row from Noise Reduction. | 3 June 2016 | M. Radecki |
| F | Remove 1 Amp from Table I, DC Resistance, Condition. | 19 July 2016 | |

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](#)

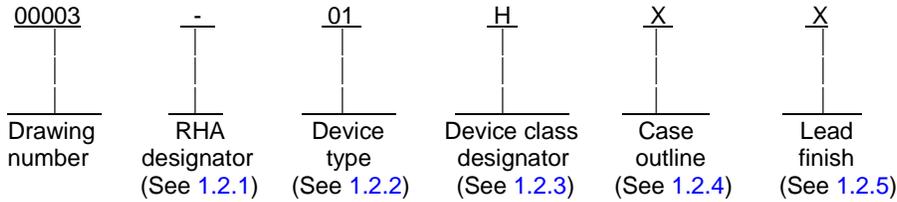
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| REV STATUS OF PAGES | REV | F | F | F | F | F | F | F | F | | | | | | | | | |
| | PAGES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | | | | | |

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| PMIC N/A | PREPARED BY Patrick Kyne | | DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH | | | | | | | | | | | | | | | |
| Original date of drawing 8 June 2000 | CHECKED BY Michael A. Radecki | | TITLE FILTER, EMI, HYBRID | | | | | | | | | | | | | | | |
| | APPROVED BY Kendall A. Cottongim | | | | | | | | | | | | | | | | | |
| | SIZE A | CODE IDENT. NO. 037Z3 | DWG NO. 00003 | | | | | | | | | | | | | | | |
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1. SCOPE

1.1 Scope. This drawing describes the requirements for hybrid microcircuit electromagnetic interference (EMI) suppression filters to be processed in accordance with [MIL-PRF-38534](#). Two product assurance classes consisting of class H (military high reliability) and class K (space application) and a choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of radiation hardness assurance (RHA) levels is reflected in the PIN.

1.2 PIN. The PIN shall be as shown in the following example:



1.2.1 Radiation hardness assurance (RHA) designator. Device classes H and K RHA marked devices meet the [MIL-PRF-38534](#) specified RHA levels and should be marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device types. The device type identifies the circuit function as follows:

| <u>Device type</u> | <u>Generic number</u> | <u>Circuit function</u> |
|--------------------|-----------------------|-------------------------|
| 01 | SFCS 28-461 | EMI filter, 5 A |

1.2.3 Device class designator. This device class designator is a single letter identifying the product assurance level as follows:

| <u>Device class</u> | <u>Device requirements documentation</u> |
|---------------------|---|
| K | Highest reliability class available. This level is intended for use in space applications. Certification and qualification to MIL-PRF-38534 required. |
| H | Standard military reliability level. This level is intended for use in applications where non-space high reliability devices are required. Certification and qualification to MIL-PRF-38534 required. |

1.2.4 Case outline. The case outline is designated in [MIL-STD-1835](#), and as follows:

| <u>Outline letter</u> | <u>Case outline</u> | <u>Package style</u> |
|-----------------------|------------------------------|--------------------------|
| X | see figure 1 | Flange mount, short lead |

1.2.5 Lead finish. The lead finish is as specified in [MIL-PRF-38534](#) for classes H and K. Finish letter "X" will not be marked on the filter or its packaging. The "X" designation is for use when lead finishes A, B, or C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings. ^{1/}

| | |
|--|-------------------|
| Input voltage | +50 V dc |
| Input current | 5 A |
| Power dissipation (Tc = 25°C)..... | 5 W |
| Lead temperature (soldering, 10 seconds) | +300° C |
| Storage temperature | -65° C to +150° C |

^{1/} Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

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1.4 Recommended operating conditions.

Input voltage ----- +16 V dc to +40 V dc
Case operating temperature range ----- -55° C to +125° C

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this drawing. This section does not include documents cited in other sections of this drawing 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 drawing, whether or not they are listed here.

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-38534 - Hybrid Microcircuits, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

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

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take 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-38534** and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in **MIL-PRF-38534** and as specified herein.

3.2.1 Case outline. The case outline shall be in accordance with 1.2.4 herein and **figure 1**.

3.2.2 Terminal connections. The terminal connections shall be as specified on **figure 1**.

3.3 Pure tin prohibition. The use of pure tin as an underplate or final finish in the internal or external construction of the filter and the terminations is prohibited. This includes the discrete devices and solders used internal to the case. The use of tin alloys other than lead is permissible as specified in APPENDIX E of **MIL-PRF-38534**.

3.4 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in **table I** and shall apply over the full specified operating temperature range.

3.5 Electrical test requirements. The electrical test requirements shall be the subgroups specified in **table II**. The electrical tests for each subgroup are defined in **table I**.

3.6 Marking. Marking shall be in accordance with **MIL-PRF-38534**. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed on QML-38534.

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3.7 Manufacturer eligibility. To be eligible for listing as an approved source of supply, the manufacturer shall be certified and qualified to [MIL-PRF-38534](#). In addition to the general requirements of [MIL-PRF-38534](#), the manufacturer of the part described herein shall maintain the electrical test data (variables format) from the initial quality conformance inspection group A lot sample, produced on the certified line, for each device type listed herein. The data should also include a summary of all parameters manually tested, and for those which, if any, are guaranteed. This data shall be maintained under document revision level control by the manufacturer and be made available to the preparing activity, DLA Land and Maritime-VA upon request.

3.8 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to supply to this drawing. The certificate of compliance submitted to DLA Land and Maritime-VAT shall affirm that the manufacturer's product meets the requirements of [MIL-PRF-38534](#) and the requirements herein.

3.9 Certificate of conformance. A certificate of conformance as required in [MIL-PRF-38534](#) shall be provided with each lot of filters delivered to this drawing.

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.

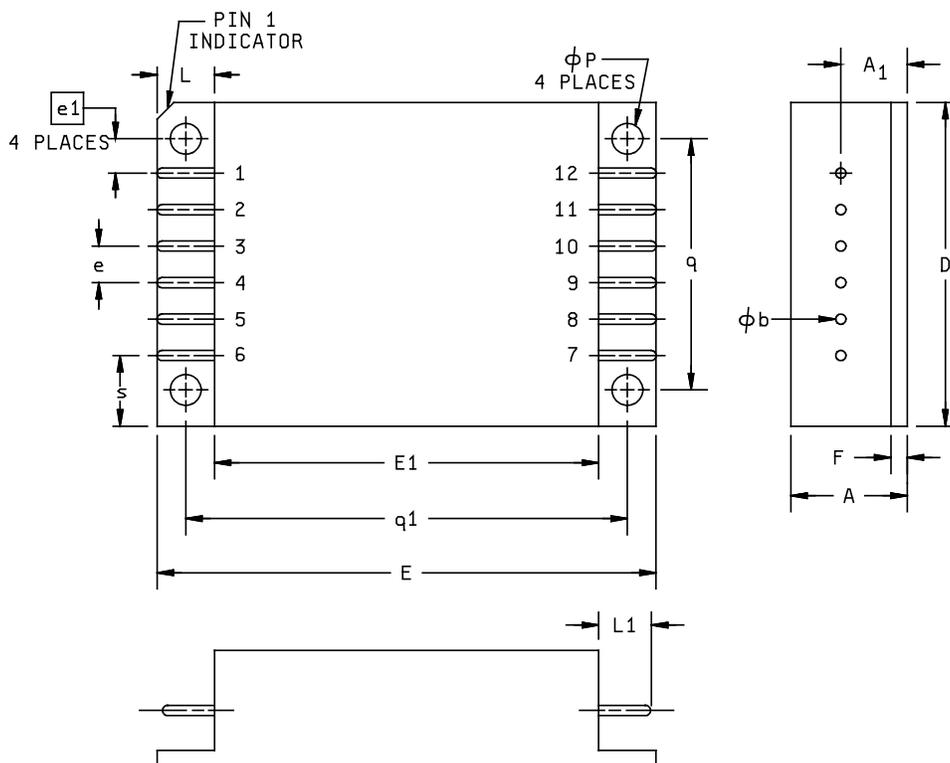
3.11 Workmanship. Filters shall be processed in such a manner as to be uniform in quality and shall be free from cold soldering, corrosion, pits, dents, cracks, rough or sharp edges, misalignments and other defects that will affect life, serviceability, or appearance.

TABLE I. Electrical performance characteristics.

| Test | Symbol | Conditions -55°C ≤ Tc ≤ +125°C unless otherwise specified | Group A subgroup | Device types | Limits | | Units |
|-----------------|-----------------|---|---------------------|-----------------|--------|------|-------|
| | | | | | Min | Max | |
| Input voltage | V _{in} | I _{in} ≤ 500 μA | 1,2,3 | 01 | 0 | 40 | V dc |
| Noise reduction | NO | f = 500 kHz | 4,5,6 | 01 | 60 | ---- | dB |
| | | f = 1 MHz | 4,5,6 | 01 | 60 | ---- | |
| | | f = 5 MHz | 4,5,6 | 01 | 60 | ---- | |
| DC resistance | R _{dc} | | 1 | 01 | ---- | 0.2 | Ω |
| Isolation | ISO | Any pin to case, 500 V dc | 1 | 01 | 100 | ---- | MΩ |
| Capacitance | CAP | Any pin to case @ 1 kHz | 1 | 01 | 50 | 70 | nF |

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Case outline X.



| Symbol | Millimeters | | Inches | |
|----------|-------------|-------|----------|-------|
| | Min | Max | Min | Max |
| A | | 10.16 | | 0.400 |
| A1 | 5.46 | 5.72 | 0.215 | 0.225 |
| ϕb | 0.89 | 1.14 | 0.035 | 0.045 |
| D | 37.97 | 38.23 | 1.495 | 1.505 |
| e | 5.08 BSC | | .200 BSC | |
| e1 | 3.30 BSC | | .130 BSC | |
| E | 75.95 | 76.46 | 2.990 | 3.010 |
| E1 | 63.37 | 63.63 | 2.495 | 2.505 |
| F | 1.14 | 1.40 | 0.045 | 0.055 |
| L | 6.10 | 6.60 | 0.240 | 0.260 |
| L1 | 5.58 | 6.10 | 0.220 | 0.240 |
| ϕP | 3.12 | 3.38 | 0.123 | 0.133 |
| q | 31.88 | 32.13 | 1.255 | 1.265 |
| q1 | 69.97 | 70.23 | 2.755 | 2.765 |
| s | 6.22 | 6.48 | 0.245 | 0.255 |

| Device type | 01 |
|-----------------|-------------------|
| Case outline | X(Figure 1) |
| Terminal number | Terminal symbol |
| 1, 2, 3 | +V _{in} |
| 10, 11, 12 | +V _{out} |
| * | case ground |
| 7, 8, 9 | output return |
| 4, 5, 6 | input return |

* NOTE: Case ground connection is made by contact of the base plate to the chassis.

NOTES:

1. The case was originally designed using inch-pound units of measurement; in the event of conflict between the metric and inch-pound units, the inch-pound shall take precedence.
2. Device weight: 86 grams maximum.

FIGURE 1. Case outline X configuration, dimensions and terminal connections.

| | | | |
|---|-------------------------|---------------------------------------|--------------------------------|
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4. VERIFICATION

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-PRF-38534.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38534. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to DLA Land and Maritime-VAT or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.
 - (2) T_A as specified in accordance with table I of method 1015 of MIL-STD-883.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

TABLE II. Electrical test requirements

| MIL-PRF-38534 test requirements | Subgroups (in accordance with MIL-PRF-38534, group A test table) |
|--|--|
| Interim electrical parameters | |
| Final electrical parameters | 1*, 2, 3, 4, 5, 6 |
| Group A test requirements | 1, 2, 3, 4, 5, 6 |
| Group C end-point electrical parameters | 1, 2, 3, 4, 5, 6 |
| Post irradiation end-point electrical parameters for RHA devices | 1, 2, 3, 4, 5, 6 |

* PDA applies to subgroup 1.

4.3 Conformance inspection. Conformance inspection (CI) and periodic inspection (PI) shall be in accordance with MIL-PRF-38534 and as specified herein.

4.3.1 Group A inspection (CI). Group A inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. Tests shall be as specified in table II herein.
- b. Subgroups 7, 8, 9, 10, and 11 of MIL-PRF-38534, group A shall be omitted.

4.3.2 Group B inspection (PI). Group B inspection shall be in accordance with MIL-PRF-38534.

4.3.3 Group C inspection (PI). Group C inspection shall be in accordance with MIL-PRF-38534 and as follows:

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test conditions A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to DLA Land and Maritime-VAT or the acquiring activity upon request. Also, the test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

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(2) T_A as specified in accordance with [table I](#) of method [1005](#) of [MIL-STD-883](#).

(3) Test duration: 1,000 hours, except as permitted by method [1005](#) of [MIL-STD-883](#).

4.3.4 Group D inspection (PI). Group D inspection shall be in accordance with [MIL-PRF-38534](#).

4.3.5 Radiation Hardness Assurance (RHA). RHA qualification is required only for those devices with the RHA designator as specified herein:

| | RHA level H | Units |
|---|-------------|---------------------------|
| Total ionizing dose tolerance level | 1,000 | kRad (Si) |
| Single event upset survival level at linear energy transfer (LET) | 100 | MeV/(mg/cm ²) |

a. Radiation dose rate in accordance with condition C of method [1019](#) of [MIL-STD-883](#).

b. The manufacturer shall perform a worst-case and radiation susceptibility analysis on the device. This analysis shall show that the minimum performance requirements of each component has adequate design margin under worst-case operating conditions (extremes of line voltage, temperature, load, frequency, radiation environment, etc.). The analysis guarantees the limits specified in [table I](#) reflect post-irradiation exposure. Device analysis shall be repeated for design changes that may effect the RHA performance of the device. Reports shall be filed and controlled in accordance with the manufacturer's configuration management system.

c. The device manufacturer shall designate a RHA program manager to monitor design changes for continued compliance to RHA requirements.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with [MIL-PRF-38534](#).

6. NOTES

6.1 Intended use. Filters conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

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.

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

6.4 Configuration control. All proposed changes to this drawing will be coordinated with the sources of supply and users of record.

6.5 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) 692-0551 or DSN 850-0551.

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.

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6.7 Approved sources 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) 692-0551 or DSN 850-0551.

| DLA Land and Maritime drawing 00003 | Vendor CAGE number | Vendor similar PIN <u>1/</u> |
|--|--------------------|--------------------------------|
| H01HXX H01KXX | 50821 50821 | SFCS28-461/HH SFCS28-461/KH |

1/ Parts must be purchased to the DLA Land and Maritime drawing PIN to assure that all performance requirements and tests are met.

Vendor CAGE

50821

Vendor name and address

Crane Electronics, Inc.
10301 Willows Road NE
Redmond, WA 98052

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