REVISIONS			
LT	**DESCRIPTION**	**DATE**	**APPROVED**

Prepared in accordance with MIL-STD-100 Selected item drawing

REV STATUS OF PAGES	**REV**																	
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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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AMSC N/A 5915-E041

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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 are reflected in the PIN.

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

00003	-	01	H	X	X
Drawing number	RHA designator (See 1.2.1)	Device type (See 1.2.2)	Device class designator (See 1.2.3)	Case outline (See 1.2.4)	Lead finish (See 1.2.5)

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

1.2.2 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	SFCS 28-461	EMI filter, 5 A

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

Device class	Device requirements documentation
H or K	Certification and qualification to MIL-PRF-38534

1.2.4 Case outline. The case outline shall be as designated in MIL-STD-1835, and as follows:

Outline letter	Case outline	Package style
X	see figure 1	Flange mount, short lead

1.2.5 Lead finish. The lead finish shall be 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

1.4 Recommended operating conditions.

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

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 those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-PRF-38534 - Hybrid Microcircuits, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-973 - Configuration Management.
MIL-STD-1835 - Microcircuit Case Outlines.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Document Automation and Production Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. 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 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.

3.4 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.

3.5 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.

3.6 Manufacturer eligibility. 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 (DSCC-VA) upon request.

3.7 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 DSCC-VA shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38534 and the requirements herein.

3.8 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.

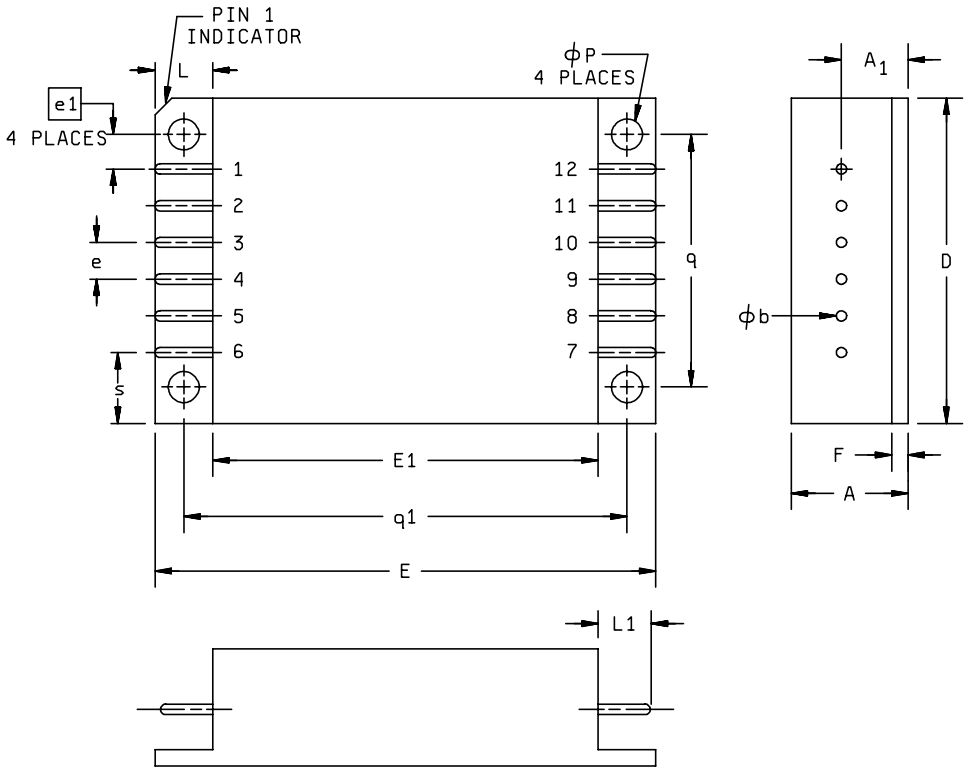
3.9 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.10 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 $-55°C \leq Tc \leq +125°C$ unless otherwise specified	Group A subgroup	Device types	Limits		Units
					Min	Max	
Input voltage	V_{in}	$I_{in} \leq 500\ \mu A$	1,2,3	01	0	40	V dc
Noise reduction	NO	f = 1 kHz	4,5,6	01	1	-1	dB
		f = 500 kHz	4,5,6	01	60	----	
		f = 1 MHz	4,5,6	01	60	----	
		f = 5 MHz	4,5,6	01	60	----	
DC resistance	R_{dc}	@ 1A	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

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.

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 DSCC-VA 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
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 DSCC-VA 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.

(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 (LET)	100	MeV

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 users of record. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.5 Record of users. Military and industrial users of this drawing shall inform Defense Supply Center Columbus when a system application requires configuration control. DSCC-VA will maintain a record of users and this list will be used for coordination and distribution of changes to the drawing. Users should contact DSCC-VA, telephone (614) 692-0562 or facsimile (614) 693-1644.

6.6 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact DSCC-VA, PO Box 3990, Columbus, OH 43216-5000.

DSCC drawing 00003	Vendor CAGE number	Vendor similar PIN 1/
H01HXX	50821	SFCS28-461/HH
H01KXX	50821	SFCS28-461/KH

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE	Vendor name and address
50821	Interpoint Corporation 10301 Willows Road P.O. Box 97005 Redmond, WA 98073-9705