



DEFENSE LOGISTICS AGENCY
LAND AND MARITIME
P.O. BOX 3990
COLUMBUS, OHIO 43218-3990

April 14, 2016

MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION

SUBJECT: Initial Draft of DLA drawing 95010 Revision D
Project number 5915-2016-E07.

The draft of the above subject document is being sent to you for review and comments. This draft consists of the following changes:

Editorial changes throughout, update vender's Address and add QR code.

If this document is interest to you, please provide your comments electronically. This can be in the form of a return e-mail, with or without an attached text file. A 30 day coordination cycle from the date of this letter has been allotted. Please provide your comments within that time period. If no comments are received in the allotted 30 day coordination cycle, concurrence is assumed and all comments received after will be held to the first amendment. If an electronic response is not possible we will still accept comments via letter, facsimile or phone call but only after you have contacted the project officer listed below. The draft document can be found at the following DLA Land and Maritime web page:

<http://www.landandmaritime.dla.mil/programs/milspec/>

This process still requires military departments to identify their comments as "Essential" or "Suggested". Essential comments must be justified with supporting data. Military review activities should forward comments to their custodians or this office, as applicable, in sufficient time to allow for consolidating the department reply.

If there are any questions, please contact Yeasvina Afroz by the preferred method of E-Mail at Yeasvina.Afroz@dla.mil or by telephone at commercial 614-692-0551, DSN 850-0551; or by facsimile at 614-693-1644. Our mailing address as a last resort is DLA Land and Maritime, VAT, P.O. Box 3990, Columbus, OH 43218-3990. If you have further questions or concerns you may contact me at Michael.Radecki@dla.mil by telephone at 614-692-0561 or by facsimile at 614-692-6939.

/SIGNED/
MICHAEL A. RADECKI
Chief
Electronic Components Branch

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Editorial changes throughout.	29 Sep '00	K.A. Cottongim
B	Editorial changes throughout. Page 3, paragraph 3.3 - Added pure tin prohibition.	26 Jul '06	M. A. Radecki
C	Editorial changes to reflect organization name change.	7 April '11	M.A. Radecki
D	Editorial changes throughout, update vender's address and add QR code.	DRAFT	

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
HAS CHANGED NAMES TO:
DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990



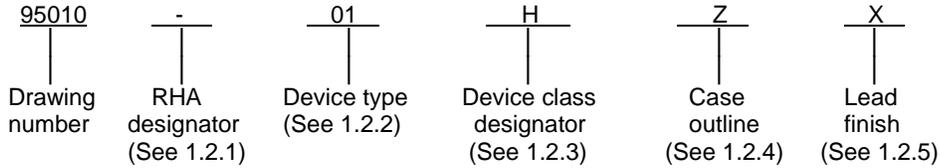
Prepared in accordance with [ASME Y14.100](#)

REV STATUS OF PAGES	REV	D	D	D	D	D	D	D	D	D								
	PAGES	1	2	3	4	5	6	7	8	9								
PMIC N/A	PREPARED BY Patrick Kyne							DESIGN ACTIVITY DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OH										
Original date of drawing: 6 February 1995	CHECKED BY Andrew R. Ernst							TITLE FILTER, EMI, and TRANSIENT SUPPRESSION, HYBRID										
	APPROVED BY David E. Moore																	
	SIZE A	CODE IDENT. NO. 14933					DWG NO. 95010											
	REV D							PAGE 1 OF 9										

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 military high reliability (device class H) and space application (device class K) and a choice of 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 Part or Identifying Number (PIN). The PIN is shown in the following example:



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

1.2.2 Device type. The device type will identify the circuit function as follows:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	AFM704A/CH	EMI filter/transient suppression module

1.2.3 Device class designator. The device class designator will be 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 is 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 is required.

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

<u>Outline letter</u>	<u>Package style</u>	<u>Terminals</u>	<u>Case outline</u>
Z	Flange mount	6	See figure 1

1.2.5 Lead finish. The lead finish will 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 finish A, B, or C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings. 1/

Input voltage range:	
Continuous	----- +50 V dc
100 ms	----- $R_s = 0$ ohms, 80 V dc
60 ms	----- $R_s = 0.5$ ohms, 100 V dc
20 μ s	----- $R_s = 50$ ohms, 600 V dc
Input current	----- 2.5 A
Power dissipation:	
Continuous	----- 15 W
Peak	----- 200 W
Lead temperature (soldering, 10 seconds)	----- +300°C
Storage temperature	----- -65°C to +150°C

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 95010
		REV D	PAGE 2

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.

1.4 Recommended operating conditions.

Input voltage ----- +16 V dc to +40 V dc
Case operating temperature range (T_C) ----- -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.
[MIL-STD-1835](#) - Microcircuit Case Outlines.

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

2.2 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 2.

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 fully 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.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 95010
		REV D	PAGE 3

3.7 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 (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-VA 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.

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-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_C 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.

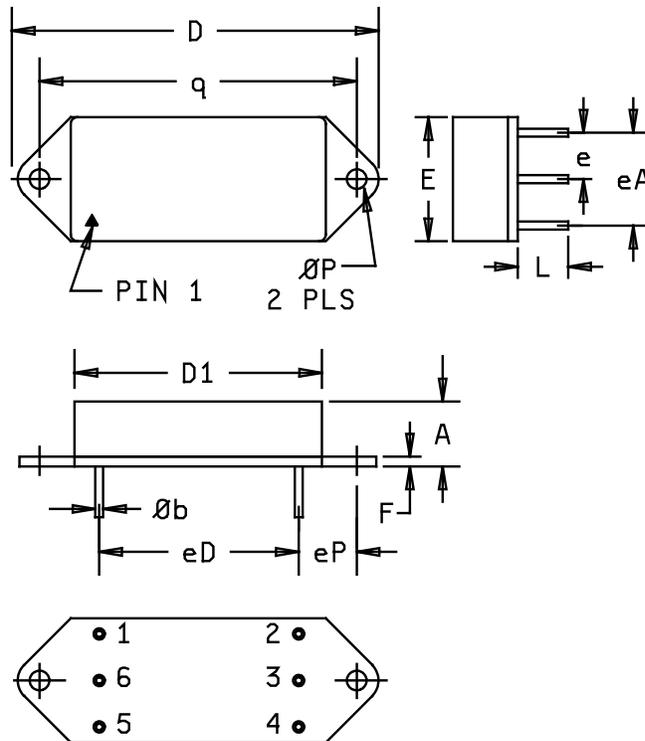
<p>DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO</p>	<p>SIZE A</p>	<p>CODE IDENT NO. 14933</p>	<p>DWG NO. 95010</p>
		<p>REV D</p>	<p>PAGE 4</p>

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ ±125°C V _{IN} = 28 V dc ±5%, C _L = 0 unless otherwise specified	Group A subgroups	Device types	Limits		Units
					Min	Max	
Input current	I _{NNL}	No load, V _{IN} = 16, 28, 40 V dc	1,2,3	01		5	mA
	I _{NINH}	Inhibited, V _{IN} = 16, 28, 40 V dc				2	
Output clamp voltage	V ₀₈₀	V _{IN} = 80 V dc, T _{pw} = 100 ms Z _S = ≤ 0.1 Ω, P _{out} = 4 W, 40 W	1,2,3	01	40	50	V
	V ₀₁₀₀	V _{IN} = 100 V dc, T _{pw} = 60 ms Z _S = 0.5 Ω, P _{out} = 4 W, 40 W					
	V ₀₆₀₀	V _{IN} = 600 V dc, T _{pw} = 10 μs Z _S = 50 Ω, P _{out} = 4 W, 40 W					
Output voltage drop	V _{DR16}	V _{IN} = 16 V dc, I _{LOAD} = 2.5 A	1,3	01			1.13
			2				2.25
	V _{DR28}	V _{IN} = 28 V dc, I _{LOAD} = 1.4 A	1,3				0.63
			2				1.26
	V _{DR40}	V _{IN} = 40 V dc, I _{LOAD} = 1 A	1,3				0.45
			2				0.90
Undervoltage lockout	V _{ULH}	V _{IN} = increasing	1,2,3	01	13	15	V
	V _{ULL}	V _{IN} = decreasing					
Inhibit pin voltage	V _{INH}	V _{IN} = 28 V dc inhibit (pin 6) = open	1,2,3	01	2.4	5.2	V
Output voltage inhibited	V _{OINH}	V _{IN} = 16, 28, and 40 V dc RL = 1 kΩ	1,2,3	01		50	mV
Differential noise reduction	NO	V _{IN} = 28 V dc, F = 1 kHz	4	01	1	-1	dB
		V _{IN} = 28 V dc, F = 100 kHz			40		
		V _{IN} = 28 V dc, F = 10 MHz			60		
Capacitance	C	Any pin to case	1	01	7000	13000	pf
Isolation	ISO	Any pin to case, 500 V dc, T _C = +25°C	1	01	100		MΩ

1/ Parameter shall be tested as part of design characterization and after design or process changes. Thereafter parameters shall be guaranteed to the limits specified in table 1.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 95010
		REV D	PAGE 5



Symbol	Millimeters		Inches		Symbol	Millimeters		Inches	
	Min	Max	Max	Min		Min	Max	Min	Max
A		9.65		.380	F	1.22	1.52	0.048	0.060
ob	0.89	1.14	0.035	0.045	L	6.35	6.86	0.250	0.270
D		73.15		2.880	oP	3.99	4.24	0.157	0.167
D1		53.85		2.120	q	64.52	65.02	2.540	2.560
e	10.03	10.29	0.395	0.405	eD	40.51	40.77	1.595	1.605
E		28.45		1.120	eP	11.94	12.19	0.470	0.480
eA	20.19	20.45	0.795	0.805					

NOTES:

1. The U.S. government preferred system of measurement is the metric SI. This case outline was designed using inch-pound units of measurement. In case of problems involving conflicts between the metric and inch-pound units, the inch-pound units shall rule.
2. Case outline Z weight: 58 grams maximum.

FIGURE 1. Case outline Z.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE	CODE IDENT NO.	DWG NO.
	A	14933	95010
		REV D	PAGE 6

Device type	01
Case outline	Z
Terminal number	Terminal symbol
1	Positive input
2	Positive output
3	Case ground
4	Output return
5	Input return
6	Inhibit input

FIGURE 2. Terminal connections.

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 test parameters	1*, 2, 3, 4
Group A test requirements	1, 2, 3, 4, 5, 6
Group C end-point electrical parameters	1
End-point electrical parameters for RHA devices	1, 2, 3, 4, 5, 6

* PDA applies to subgroup 1.

** When applicable, the subgroups shall be defined.

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-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_C 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.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 95010
		REV D	PAGE 7

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 is in accordance with condition C of method 1019 of [MIL-STD-883](#). Unless otherwise specified, components are tested at a rate of 9 rad (Si)/s, 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

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

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, and one copy of the conformance inspection data or a 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 Record of users. 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.

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 95010
		REV D	PAGE 8

6.7 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 95010	Vendor CAGE number	Vendor similar PIN <u>1/</u>
-01HZX	52467	AFM704A/CH

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 number

52467

Vendor name and address

International Rectifier Corporation
 2520 Junction Ave
 San Jose, CA 95134-1902
 United States

DEFENSE ELECTRONICS SUPPLY CENTER, DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 95010
		REV D	PAGE 9