

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Add new tolerance (B). Change RTC to 25 ppm/°C. Dimensional changes. Change voltage to 50 V dc. Add new suppliers.	23 MAY 88	D. Moore
B	Add new requirements for resistance characteristic, power ratings, solderability, and dimensions.	28 MAY 89	D. Moore
C	Correct figure 2, PIN numbering sequence. Add new vendor CAGE 57252. Editorial changes throughout.	17 DEC 91	D. Moore
D	Add new tolerances (B) and (D). Deleted power rating on schematic B. Change figure 1, schematic B. Deleted ozone depleting substance. Editorial changes throughout.	8 OCT 93	D. Moore
E	Add new configuration and vendor; change reference specification to MIL-PRF-914. Editorial corrections throughout.	24 MAR 98	D. Moore
F	Correct part number. Changes RTC and power ratings paragraphs. Editorial changes throughout.	22 JUN 00	K. Cottongim
G	Changes in accordance with NOR 5905-R004-02.	6 JUN 02	K. Cottongim
H	Changes in accordance with NOR 5905-R010-03.	2 APR 03	K. Cottongim
J	Remove vendor from suggest sources. Editorial changes throughout	6 OCT 03	K. Cottongim
K	Inactivate characteristics K and M, add pure tin, manufacturer's eligibility, and pulse application paragraphs. Dimensions changes. Editorial changes throughout.	16 MAR 12	M. Radecki

Notice of Partial Inactivation for New Design
 Characteristics K and M of DLA Land and Maritime Drawing 87017 are inactive for new design and are no longer used, except for replacement purposes. Use [MIL-PRF-914/4](#).

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](#)

Source control drawing

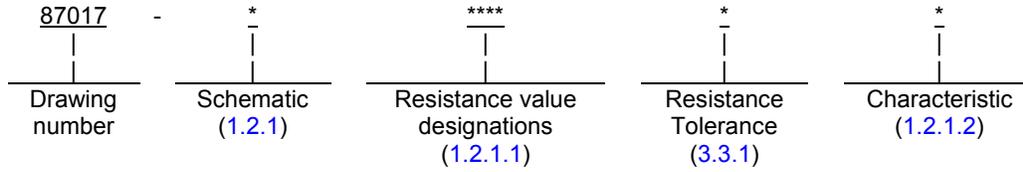
REV STATUS OF PAGES	REV	K	K	K	K	K	K	K	K										
	PAGES	1	2	3	4	5	6	7	8										

PMIC N/A	PREPARED BY Alan R. Knox	DESIGN ACTIVITY: DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO 45444-5000
Original date of drawing: 10 November 1987	CHECKED BY David Wood	TITLE RESISTOR NETWORK, FIXED, FILM, SURFACE MOUNT, 20 PIN, LEADLESS CHIP CARRIER
	APPROVED BY David E. Moore	
	SIZE A	CODE IDENT. NO. 14933
	DWG NO.	87017
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a 20 pin, leadless chip carrier, resistor network. These networks are available only in nonhermetically sealed packages.

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



1.2.1 Schematic. The schematic of the resistor network is identified by a single letter in accordance with figure 1.

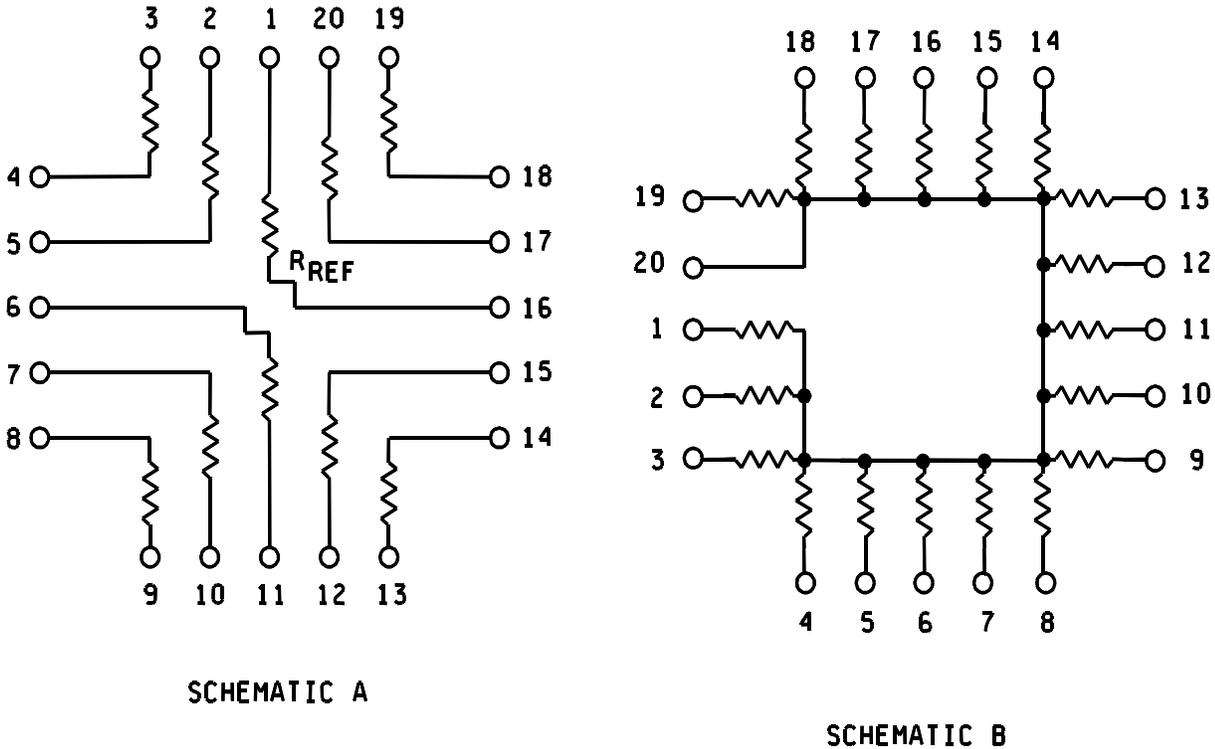


FIGURE 1. Schematics.

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1.2.1.1 Resistance value designations. The resistance value designations are in accordance with MIL-PRF-914.

* 1.2.1.2 Characteristic. Resistor networks are available in characteristics H, R, or V. in accordance with MIL-PRF-914 (see 3.2). Characteristics K, and M are inactive for new design.

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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-914 - Resistor Networks, Fixed, Film, Surface Mount, Nonestablished Reliability, and Established Reliability, General Specification for.

DEPARTMENT OF DEFENSE STANDARD

MIL-STD-790 - Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts Specifications.

MIL-STD-1285 - Marking of Electrical and Electronic Parts.

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

* 2.2 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 (except for related, specification sheets), 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 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-914 and as specified herein.

3.2 Interface and physical dimension requirements. Resistors shall meet the interface and physical dimensions as specified in MIL-PRF-914 and herein (see figure 2).

3.2.1 Termination. Termination finish shall be tin-lead or hot solder dip as specified in MIL-PRF-914.

* 3.2.2 Pure tin. The use of pure tin, as an underplate or final finish is prohibited both internally and externally. Tin content of resistor components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.4).

3.3 Electrical characteristic.

3.3.1 Resistance tolerance. Resistors are available in (B) ± 1 percent, (D) ± 5 percent, (F) ± 1 percent, (G) ± 2 percent, and (J) ± 5 percent tolerances.

3.3.2 Resistor power ratings. The power rating for individual resistors shall be in accordance with table II.

3.3.3 Package power rating. The package power rating shall be in accordance with table II. For temperatures in excess of 70°C, resistors shall be derated in accordance with MIL-PRF-914.

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*

TABLE II. Power ratings.

Schematics	Characteristic K and M <u>1/</u>	Characteristics K and M <u>1/</u>	Characteristics H, R, and V	Characteristics H, R, and V
	Element (watts)	Network (watts)	Element (watts)	Network (watts)
A	0.10	1.00	0.050	0.50
B	0.05	0.95	0.025	0.475

1/ Characteristics K and M are inactivated for new design.

3.3.4 Power conditioning. Power conditioning shall be in accordance with MIL-PRF-914 at 1.5 times rated power specified for individual resistors (see 3.3.2).

3.3.5 Temperature range. The operating temperature range shall be -55°C to +125°C.

3.3.6 Resistance temperature characteristic. The resistance temperature characteristic shall be in accordance with MIL-PRF-914.

3.3.7 Resistance range. The resistance range shall be from 10 ohms to 2.2 megohms.

3.3.8 Operating voltage. The maximum operating voltage shall be 50 V dc.

*

3.4 Environmental characteristic. The environmental characteristics shall be in accordance with MIL-PRF-914 characteristic H, R, or V. Characteristics K and M are inactivated for new design.

3.5 Marking. Marking shall be in accordance with MIL-STD-1285, except the resistor network shall be marked with the PIN as specified herein (see 1.2), the manufacturer's name or CAGE code, and date lot codes.

3.6 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.

*

3.7 Manufacturer eligibility. To be eligible for listing as a approved source of supply, a manufacturer shall be listed on the MIL-PRF-914 Qualified Products List for at least one part, or perform the group A and group B inspections specified herein on a sample agreed upon by the manufacturer and DLA Land and Maritime-VAT.

*

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

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

4. VERIFICATION

4.1 Product assurance program. The product assurance program specified in MIL-PRF-914 and maintained in accordance with MIL-STD-790 is not applicable to this document.

4.2 Qualification inspection. Qualification inspection is not applicable to this document.

4.2.1 Failure rate qualification. The failure rate qualification specified in MIL-PRF-914 is not applicable to this document.

4.3 Conformance inspections.

4.3.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and group B inspections of MIL-PRF-914.

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4.3.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group B requirements in lieu of performing group B tests (see 6.2d).

4.4 Visual and mechanical examination. Resistors shall be examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements of MIL-PRF-914.

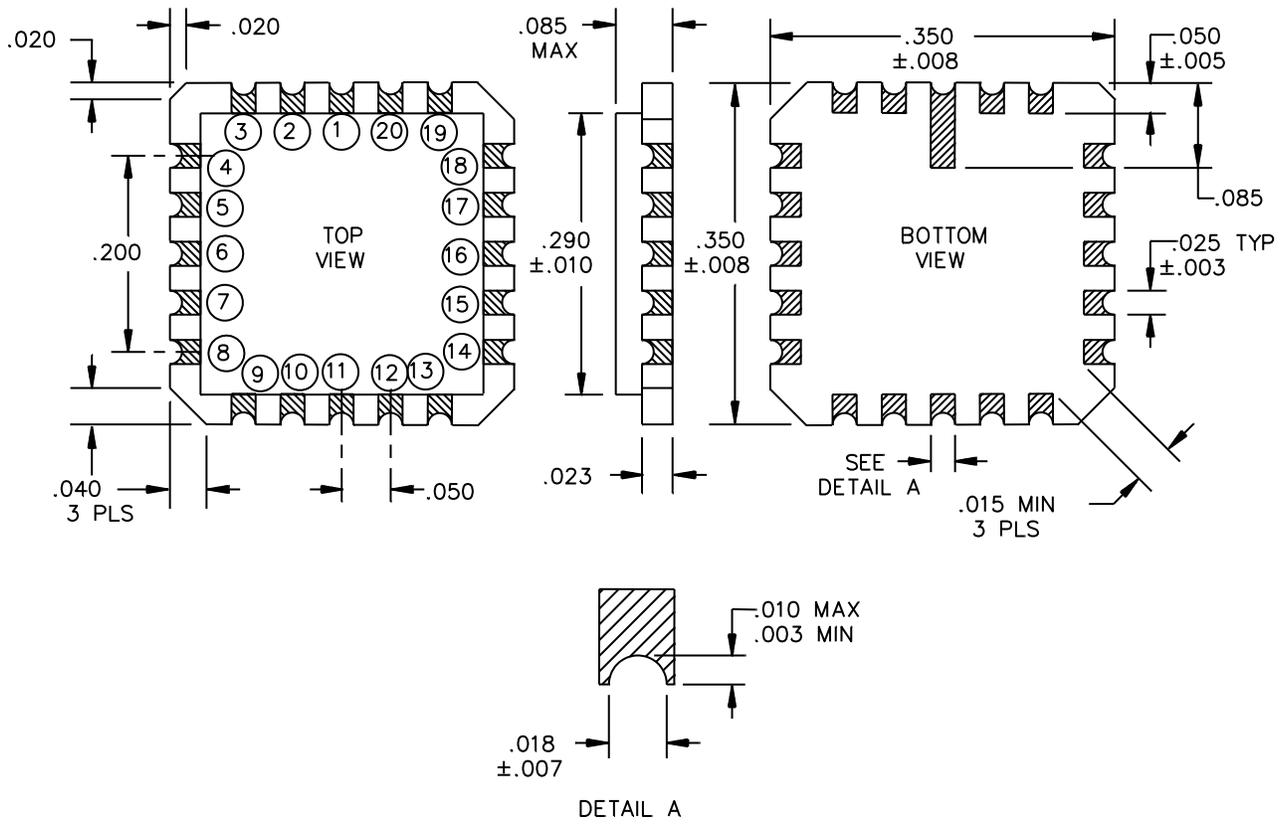
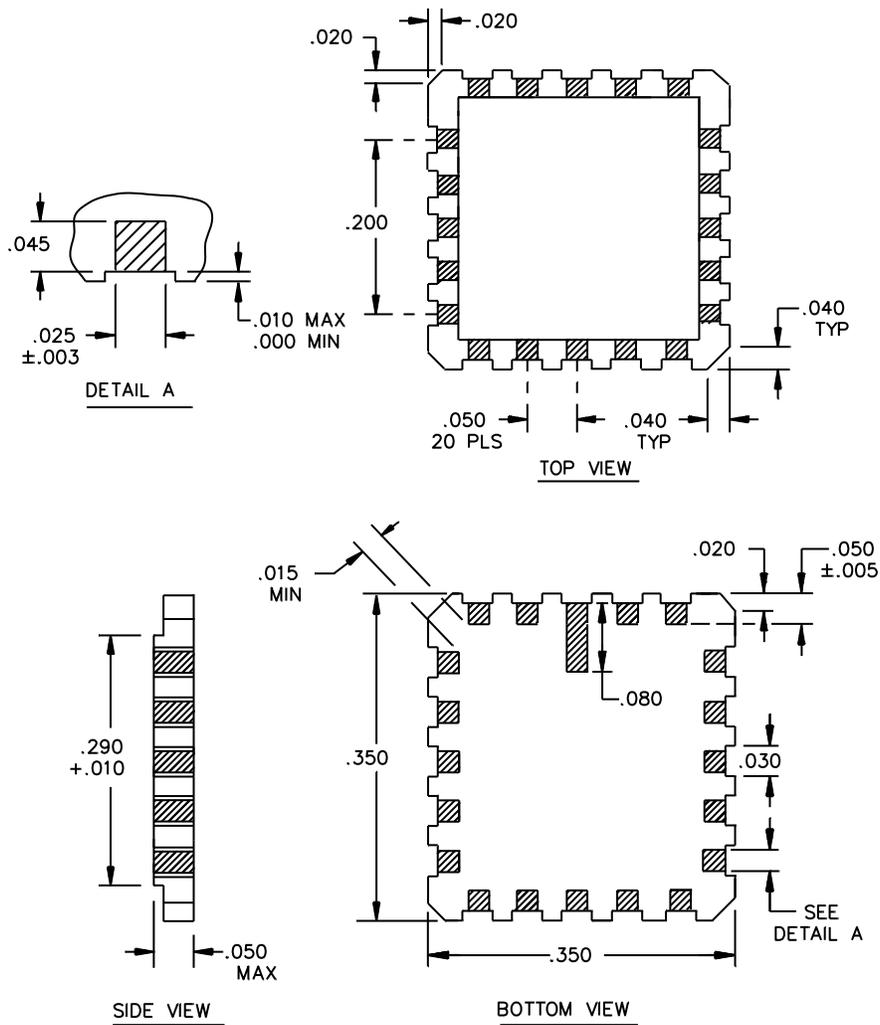


FIGURE 2. Leadless chip carrier.

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Inches	mm	Inches	mm	Inches	mm	Inches	mm
0.003	0.08	0.015	0.38	0.030	0.76	0.085	2.16
0.005	0.13	0.016	0.41	0.040	1.02	0.200	5.08
0.007	0.17	0.018	0.45	0.045	1.14	0.290	7.37
0.008	0.20	0.020	0.51	0.050	1.27	0.350	8.89
0.010	0.25	0.025	0.64	0.080	2.03		

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerances are ±.008 (0.20 mm).
4. Adjacent corner pads may be rounded or diagonally cut to meet the .015 (0.38 mm) minimum requirement.

FIGURE 2. Leadless chip carrier (Optional slot configuration). - continued.

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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 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 activity within the Military Department 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.

6. NOTES

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

6.1 Intended use. Resistor networks are used in surface mounting applications where space is a major concern.

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

- a. Complete PIN (see 1.2).
- b. Requirements for delivery: One copy of the conformance inspection data or certification of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging and packing (i.e. ESD sensitive packaging).
- d. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements (see 4.3.2).

6.3 PIN supersession. PIN's in the original 87017 and revision A have been superseded by a new PIN in revision B that includes a characteristic code to differentiate between hermetically and nonhermetically sealed resistor networks. Table III illustrates a generic PIN substitution:

TABLE III. PIN supersession.

87017	87017A nonhermetic
87017-87017X	87017-87017XM

* 6.4 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 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).

6.5 Electrostatic charge. Under several combinations of conditions, these resistors can be electrically damaged, by electrostatic charges, and drift from specified value. Users should consider this phenomena when ordering or shipping resistors. Direct shipment to the Government is controlled by [MIL-DTL-39032](#) which specifies a preventive packaging procedure.

* 6.6 Pulse applications. Designers are CAUTIONED on using the above resistors in high power pulse applications. Since they have not been qualified nor tested for such applications, damage and premature failure are possible.

* 6.7 User of record. Coordination of this document for future revisions is coordinated only with the approved source 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 resistor@dla.mil or in writing to: DLA Land and Maritime, Attn: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0552 or DSN 850-0552.

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* 6.8 Approved source of supply. Approved source of supply is listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at resistor@dla.mil or contact DLA Land and Maritime, Attn: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0552 or DSN 850-0552.

DLA Land and Maritime drawing PIN 87017-*****	Vendor similar designation or type number <u>1/</u>	Vendor CAGE	Vendor's name and address
Characteristic H, K, M, R, or V resistance values 10 ohms through 150 kilohms; resistance tolerances B, D, F, G, and J. Schematics A and B.	790*	57027	IRC, Incorporated 4222 S. Staples Street Corpus Christi, TX 78411-2702
Characteristic K or M, resistance values 10 ohms through 1 megohms; resistance tolerances F, G, and J. Schematics A and B.	210-014	57489	VISHAY Thin Film 2160 Liberty Drive Niagara Falls, NY 14304-3798
Characteristic K or M, resistance values 10 ohms through 1 megohms; resistance tolerance F, G, and J. Schematics A and B.	HJCB20-----	56235	State of the Art, Incorporated 2470 Fox Hill Rd. State College, PA 16803-1797
Characteristic V and H; resistance values 1K, 2K, and 5K ohms; resistance tolerances F. Schematics B	HC-156-1001-0.5-LR-1 HC-156-2001-0.5-LR-1 HC-156-5001-0.5-LR-1	27851	Spectrum Microwave 400 Nickerson Road Marlborough, MA 01752

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

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