

| REVISIONS | | | |
|-----------|--|-----------|--------------|
| LTR | DESCRIPTION | DATE | APPROVED |
| A | Update and validation of drawing. Editorial changes throughout. | 11 JAN 02 | K. Cottongim |
| B | Change vendor plant address. Editor changes throughout. | 22 APR 04 | K. Cottongim |
| C | Add pure tin, manufacturer eligibility, and high power pulse paragraphs. Editorial changes throughout. | 26 MAR 10 | M. Radecki |
| | | | |

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

Source control drawing

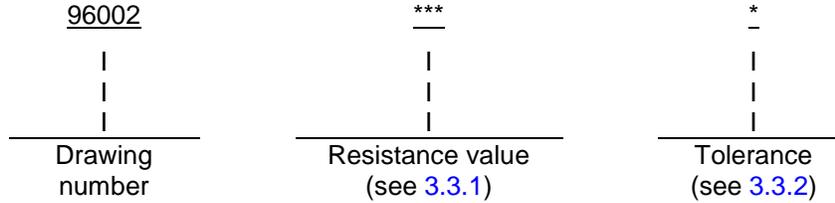
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| REV STATUS OF PAGES | REV | C | C | C | C | C | C | | | | | | | | | | | |
| | PAGES | 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | | | | |

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| PMIC N/A | PREPARED BY Andrew R. Ernst | DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH | |
| Original date of drawing 28 May 1997 | CHECKED BY Andrew R. Ernst | TITLE RESISTOR, FIXED, FILM, INSULATED, LOW INDUCTANCE | |
| | APPROVED BY David E. Moore | | |
| | SIZE A | CODE IDENT. NO. 037Z3 | DWG NO. 96002 |
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1. SCOPE

1.1 Scope. This drawing describes the requirements for an insulated, fixed, film resistor which exhibits low inductance over a frequency range of 1 MHz to 30 MHz.

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



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 SPECIFICATIONS

MIL-PRF-39017 - Resistors, Fixed, Film (Insulated), Nonestablished Reliability, and Established Reliability, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-690 - Failure Rate Sampling Plans and Procedures.
MIL-STD-790 - Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts Specifications.

* (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 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-39017** and as specified herein.

3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified in **MIL-PRF-39017** and herein (see **figure 1**).

3.3 Electrical characteristics.

3.3.1 Resistance. The nominal resistance expressed in ohms is identified by four digits; the first three digits represent significant figures and the last digit specifies the number of zeros to follow. When the value of resistance is less than 100 ohms, or fractional values of an ohm are required, the letter "R" shall be substituted for one of the significant figures. The resistance value designations are shown in **table I**. Minimum and maximum resistance values shall be as specified in **MIL-PRF-39017**. Resistance values not listed in table VI of **MIL-PRF-39017** for the appropriate resistance tolerance shall be considered nonconforming to the specification.

3.3.2 Resistance tolerance. The resistance tolerances shall be (F) ±1 percent and (G) ±2 percent.

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3.3.3 Power rating. The power rating shall be 0.25 watt.

TABLE I. Resistance value designations.

| Designation | Resistance ohms |
|------------------------|------------------------|
| 1R00 to 9R76 inclusive | 1.00 to 9.76 inclusive |
| 10R0 to 49R9 inclusive | 10.0 to 49.9 inclusive |

* 3.4 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 6.3).

3.5 Voltage rating. The continuous voltage shall not exceed 250 volts.

3.6 Resistance. Minimum and maximum resistance values for temperature characteristic of ± 100 parts per million (PPM) shall be as follows:

| | | |
|--------------------|--------------|---------------|
| | <u>10 nH</u> | <u>8 nH</u> |
| Minimum resistance | 1 Ω | 11 Ω |
| Maximum resistance | 10 Ω | 49.9 Ω |

3.7 Maximum weight. The maximum weight shall not exceed 0.5 gram.

3.8 Maximum inductive resistance. When resistors are tested as specified in 4.5, they shall not exceed the inductance level as described in 3.6.

3.9 Marking. Resistors shall be marked with the PIN assigned herein (see 1.2) and manufacturer's identification code (CAGE or logo).

3.10 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.

* 3.11 Manufacturer eligibility. To be eligible for listing as a approved source of supply, a manufacturer shall be listed on the MIL-PRF-39017 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 DSCC-VA.

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

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

4. VERIFICATION

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

4.2 Reliability assurance program. The reliability assurance provisions specified in MIL-PRF-39017 and maintained in accordance with MIL-STD-790 are not applicable to this document.

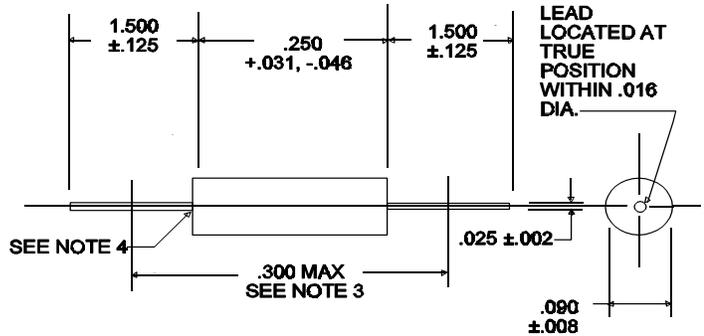
4.3 Failure rate qualification. Failure rate qualification specified in MIL-PRF-39017 and MIL-STD-690 is not applicable to this document.

4.4 Conformance inspection.

4.4.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and group B inspections.

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4.4.1.1 Group A inspection. Group A inspection shall be in accordance with MIL-PRF-39017. PPM testing and verification as specified in MIL-PRF-39017 are not applicable to this document.



| Inches | mm |
|--------|-------|
| .002 | 0.05 |
| .008 | 0.20 |
| .016 | 0.41 |
| .025 | 0.64 |
| .031 | 0.79 |
| .046 | 1.17 |
| .090 | 2.29 |
| .125 | 3.18 |
| .250 | 6.35 |
| .300 | 7.62 |
| 1.500 | 38.10 |

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Maximum length is "clean lead" to "clean lead".
4. The end of the body shall be that point at which the body diameter equals the nearest drill size larger than 250 percent of the nominal diameter.
5. Lead length for tape and reel packaging shall be 1 inch minimum.

FIGURE 1. Fixed, film, insulated resistor.

4.4.1.2 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-39017.

4.4.1.2.1 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).

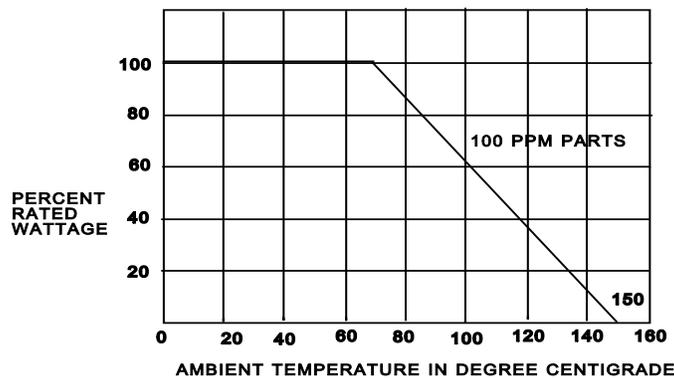


FIGURE 2. Derating curve for high ambient temperatures.

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4.4.1.3 Visual and mechanical inspection. Resistors shall be examined to verify that the materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements 3.2, 3.3, 3.9, and 3.12.

4.5 Inductive reactance. When tested at 1 MHz and 30 MHz, the inductance reactance shall not exceed 10 nH for nominal resistance values less than 10 ohms, or 8 nH for resistance values greater than 10 ohms and less than or equal to 50 ohms. Measurements shall be made using a Hewlett-Packard model 4191A impedance analyzer and either Hewlett-Packard spring clip test fixture model 16092A or binding post test fixture model 16093A, or equivalent devices. Measurements with model 6092A fixture shall be taken with the resistor positioned between spring clips which are adjusted for 0.5 inch spacing. When using the model 16092A fixture, the resistor lead that is beyond the area of electrical contact on the signal (right side of the fixture) shall be bent 90 degrees vertically from the ground plane to reduce shunt capacitance. Measurements with the 16093A fixture shall be taken with the resistor positioned in a straight axial lead configuration between the (fixed position) binding posts so that the binding posts contact the resistor leads at the end of the body (nearly zero lead length).

4.6 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-PRF-39017.

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 material 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 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. The film resistors described herein are intended to be used in electronic circuits where semi-precision characteristic, low inductive reactance and small sizes are required.

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.
- d. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements (see 4.4.1.2.1).

* 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 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 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. These resistors only see a one time pulse (Short-time overload) as part of the group B inspection of MIL-PRF-39017.

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* 6.5 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: DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0552 or DSN 850-0552.

* 6.6 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 DSCC-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0552 or DSN 850-0552.

| DSCC drawing PIN | Vendor similar designation or type number <u>1/</u> | Vendor CAGE | Vendor name and address |
|------------------|---|-------------|--|
| 96002**** | ERL07-62 | 91637 | Vishay Dale P.O. Box 609 Columbus, NE 68601-0609 |

1/ Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.

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