

REVISIONS			
LT	DESCRIPTION	DATE	APPROVED
A	5 year review cycle. Editorial and procedural changes throughout.	05-02-02	K. Cottongim
B	Add pure tin, manufacturer eligibility, and high power pulse paragraphs. Editorial changes throughout.	10-03-12	M. Radecki
C	Update Hyperlinks. Editorial changes throughout.	18-05-10	M. Radecki

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](#)

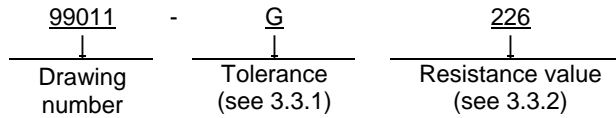
Selected Item Drawing

REV STATUS OF PAGES	REV	C	C	C	C	C													
	PAGES	1	2	3	4	5													
PMIC N/A	PREPARED BY Dennis L. Cross					DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH													
Original date of drawing 99-19-07	CHECKED BY Andrew R. Ernst					TITLE RESISTOR, FIXED, FILM (INSULATED), 1/4 WATT													
	APPROVED BY Kendall A. Cottongim																		
	SIZE A	CAGE CODE 037Z3					DWG NO. 99011												
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1. SCOPE

1.1 Scope. This drawing describes the requirements for insulated, fixed, film, 1/4 watt resistors available in 2 percent, 5 percent, and 10 percent resistance tolerances. These resistors are capable of full-load operation at an ambient temperature of 70°C. Designers are CAUTIONED on using these resistors in high power pulse applications (see 6.4).

1.2 Part or Identifying Number (PIN). The complete PIN shall be 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](#) - Resistor, Fixed, Film (Insulated), Nonestablished Reliability, Established Reliability, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-790](#) - Standard Practice for 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 <http://quicksearch.dla.mil>).

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.

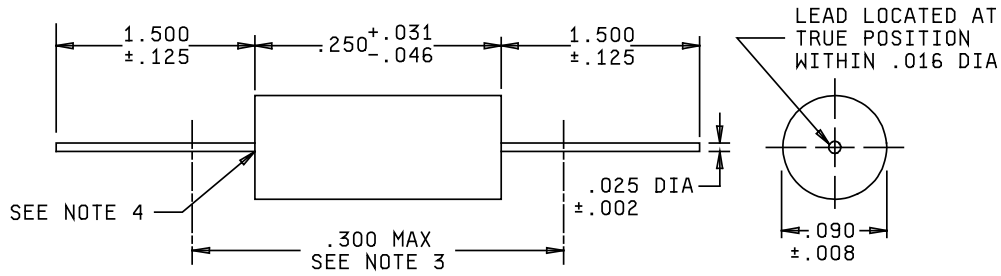
3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified in [MIL-PRF-39017](#) and herein (see [figure 1](#)).

3.3 Electrical characteristics.

3.3.1 Resistance tolerance. The resistance tolerance available shall be (G) ±2 percent, (J) ±5 percent, and (K) ±10 percent.

3.3.2 Resistance. The nominal resistance expressed in ohms is identified by three digits; the first two digits represent significant figures and the last digit specifies the number of zeros to follow. Minimum and maximum resistance values shall be as specified in [3.3.3](#). Resistance values not listed in the "10 to 100" decade of [table I](#) for the appropriate resistance tolerance shall be considered nonconforming to the specification.

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

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 lead diameter.
5. Lead length for tape and reel packaging shall be 1 inch (25.4 mm) minimum (see 6.2).
6. The pictorial view of the style above does not depict the actual size and is given as representative of the envelope of the item. Slight deviations from the outline shown, which are contained within the envelope, and do not alter the functional aspects of the device are acceptable.

FIGURE 1. Fixed, film, resistor.

TABLE I. Standard resistance values for 10 to 100 decade.

Tolerance (±%)		Tolerance (±%)		Tolerance (±%)	
2.0 (G)/5.0 (J)	10.0 (K)	2.0 (G)/5.0 (J)	10.0 (K)	2.0 (G)/5.0 (J)	10.0 (K)
10.0	10.0	22.0	22.0	47.0	47.0
11.0	---	24.0	---	51.0	---
12.0	12.0	27.0	27.0	56.0	56.0
13.0	---	30.0	---	62.0	---
15.0	15.0	33.0	33.0	68.0	68.0
16.0	---	36.0	---	75.0	---
18.0	18.0	39.0	39.0	82.0	82.0
20.0	---	43.0	---	91.0	---

3.3.3 Resistance range. Minimum and maximum resistance values for temperature characteristic of ±350 parts per million (ppm) shall be 11 megohm and 22 megohms, respectively.

3.3.4 Power rating. The power rating shall be 1/4 watt at +70°C. For operation at temperatures higher than +70°C, derate in accordance with [figure 2](#).

3.3.5 Voltage rating. The maximum continuous working voltage shall not exceed 250 volts.

3.3.6 Termination. Termination material shall be in accordance with [MIL-PRF-39017](#).

3.3.6.1 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](#)).

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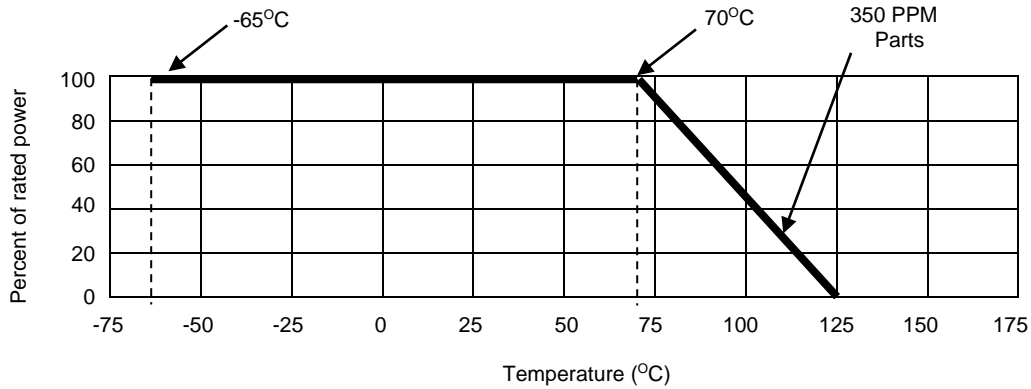


FIGURE 2. Derating curve

3.3.7 Solderability. The requirement for solderability shall be as specified in [MIL-PRF-39017](#).

3.4 Marking. Full marking shall be in accordance with [MIL-STD-1285](#), except the resistors shall be marked with the PIN as specified herein (see [1.2](#)), the manufacturer's name or Commercial and Government Entity (CAGE) code, and date lot codes is required on the unit package. Due to size limitations, this style resistor shall be marked with the following minimum information in the order shown:

- 9XXX - Last four digits of this DLA Land and Maritime drawing number.
- 826D - Year and week manufactured and the manufacturers code (see qualified products list [MIL-PRF-39017](#) for manufacturer's code symbol).
- G220 - Resistance tolerance and resistance value.

3.5 Manufacturer eligibility. To be eligible for listing as an 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 DLA Land and Maritime-VAT.

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

3.6 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.

3.7 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-39017](#) 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.

4.3 Product level qualification. The product level qualification specified in [MIL-PRF-39017](#) is not applicable to this document.

4.4 Conformance inspections.

4.4.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and group B inspections of [MIL-PRF-39017](#).

4.4.2 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 [6.2e](#)).

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4.5 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-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 materiel 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 which may be helpful, but is not mandatory.)

6.1 Intended use. Resistors conforming to this drawing are intended for use when military specifications do not exist. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing, this drawing becomes obsolete and will not be used for new design.

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

- a. Complete DLA Land and Maritime CAGE CODE and PIN (see [1.2](#)).
- b. Requirements for delivery: One copy of the conformance inspection results or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Terminal finish.
- d. Requirements for packaging and packing.
- e. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements (see [4.2.2](#)).

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](#).

6.5 Users of record. User of record. Coordination of this document for future revisions is coordinated only with the approved sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved on-line at resistor@dla.mil or in writing to: DLA Land and Maritime - VAT, P.O. Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-8754 or DSN 850-8754.

6.6 Approved source of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained on on-line at resistor@dla.mil or contact DLA Land and Maritime - VAT, P.O. Box 3990, Columbus, OH 43218-3990, or by telephone (614) 692-8754 or DSN 850-8754.

DLA Land and Maritime drawing PIN (see 1.2)	Vendors similar designation or type number ^{1/}	Vendor CAGE	Vendor's name and address
99011-****	ERL-07-100	91637	Vishay Dale, Inc. P.O. Box 609 Columbus, NE 68602-0609

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

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