

| REVISIONS | | | |
|-----------|--|-------------|----------------|
| LTR | DESCRIPTION | DATE | APPROVED |
| A | Changes in accordance with NOR 5905-R003-94 | 26 Apr 1994 | David E. Moore |
| B | Add new source of supply. Update to present DoD policy requirements. Extensive editorial changes throughout. | 14 Jul 1998 | M. Radecki |
| C | Add Group B certification. Editorial changes throughout. | 9 May 2001 | K. Cottongim |
| D | Update vendor. Update to present DoD policy requirements. Extensive editorial changes throughout. | 25 Jan 2006 | M. Radecki |
| E | Update vendor data. Editorial changes throughout. | 17 May 2013 | M. Radecki |
| F | Change vendor's CAGE code. Add QR code. Editorial changes throughout. | 12 Feb 2016 | M. Radecki |

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
 DEFENSE LOGISTICS AGENCY
 DLA LAND AND MARITIME
 COLUMBUS, OHIO 43216-5000



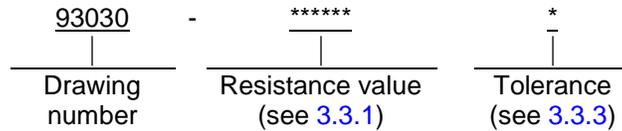
Prepared in accordance with [ASME Y14.100](#)

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| REV STATUS OF PAGES | REV | F | F | F | F | F | F | F | F | | | | | | | | |
| | PAGES | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | | | | |
| PMIC N/A | PREPARED BY Andrew R. Ernst | | | | | | | DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OH | | | | | | | | | |
| Original date of drawing 24 February 1993 | CHECKED BY Andrew R. Ernst | | | | | | | TITLE RESISTOR, CHIP, FIXED, BULK METAL FOIL, ULTRA PRECISION, STYLE 2018 | | | | | | | | | |
| | APPROVED BY David E. Moore | | | | | | | | | | | | | | | | |
| | SIZE A | CODE IDENT. NO. 14933 | | | | | | DWG NO. 93030 | | | | | | | | | |
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a bulk metal foil, ultra precision, chip resistor, style 2018.

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



2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. 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 cited in the solicitation or contract (see 6.2).

DEPARTMENT OF DEFENSE SPECIFICATION

[MIL-PRF-55342](#) - Resistor, Chip, Fixed, Film, Nonestablished Reliability, Established Reliability, Space Level, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-690](#) - Failure Rate Sampling Plans and Procedures.

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

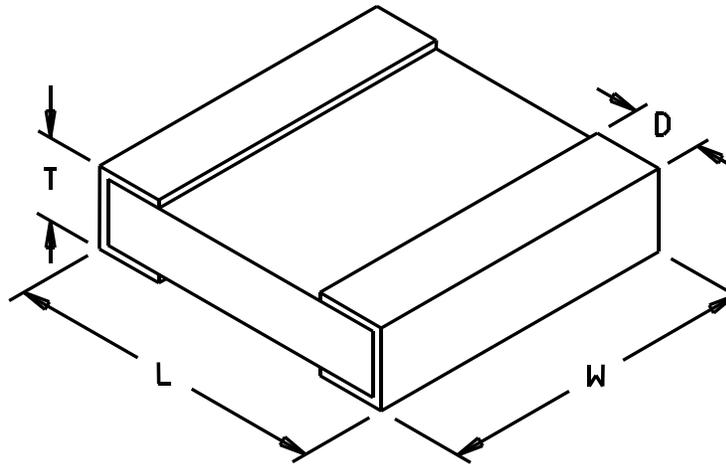
2.2 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence unless otherwise noted. Nothing in this document, 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 as specified herein.

3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified in [MIL-PRF-55342](#) and herein (see [figure 1](#)). Passivation is not applicable, however, a protective coating over the element shall be provided.

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BOTTOM VIEW

| <u>mm</u> | <u>Inches</u> |
|-----------|---------------|
| 0.13 | .005 |
| 0.46 | .018 |
| 0.64 | .025 |
| 4.67 | .184 |
| 5.18 | .204 |

| L | W | T | D |
|-------|-------|------|-------|
| 5.18 | 4.67 | 0.64 | 0.46 |
| ±0.13 | ±0.13 | Max | ±0.13 |

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for general information only.
2. The pictorial view of the styles above 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. Chip resistor.

3.3 Electrical characteristics.

3.3.1 Resistance. The nominal resistance expressed in ohms is identified by six characters, consisting of five digits and a letter. The letter is used simultaneously as a decimal point and as a multiplier. For resistance values:

- a. Greater than or equal to 1 ohm but less than 1,000 ohms, the letter "R" is used to represent a decimal point.
- b. Greater than or equal to 1,000 ohms but less than 1 megohm, the letter "K" is used to denote that a decimal point is located three places to the right.

All digits preceding and following the letters (R or K) of the group represent significant figures. The resistance value designations are shown in [table I](#). Minimum and maximum resistance values shall be as specified herein. The standard values for every decade shall follow the sequence specified in the 10 to 100 decade table of [MIL-PRF-55342](#) for resistance tolerances D and F. The resistance values for tolerances Q, T, A, B, and C may be any value within the limits specified herein, but it is preferred that values be chosen from the "B" column of the 10 to 100 decade table of MIL-PRF-55342. The resistance values for tolerance D shall follow the standard values listed under tolerance B of MIL-PRF-55342.

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TABLE I. Designation of resistance values.

| Designation | | | | Resistance ohms | | |
|-------------|----|--------|-----------|-----------------|----|-------------------|
| 10R000 | to | 99R900 | inclusive | 10.0 | to | 99.9 inclusive |
| 100R00 | to | 999R00 | inclusive | 100 | to | 999 inclusive |
| 1K0000 | to | 9K9900 | inclusive | 1,000 | to | 9,990 inclusive |
| 10K000 | to | 99K900 | inclusive | 10,000 | to | 99,900 inclusive |
| 100K00 | to | 150K00 | inclusive | 100,000 | to | 150,000 inclusive |

3.3.2 Resistance range. The resistance range shall be from 5 ohms to 150 kilohms (see 3.3.6).

3.3.3 Resistance tolerance. Resistors are available in resistance tolerances as specified in table II and paragraph 3.3.3.1.

TABLE II. Resistance tolerance.

| Symbol | Resistance tolerance percent | Symbol | Resistance tolerance percent |
|--------|------------------------------|--------|------------------------------|
| T | ± 0.01 | C | ± 0.25 |
| Q | ± 0.02 | D | ± 0.5 |
| A | ± 0.05 | F | ±1.0 |
| B | ± 0.1 | | |

3.3.3.1 Resistance tolerance versus resistance value. The tightest resistance tolerance available is value specific as indicated by the following.

| Resistance (ohms) | Tolerance (percent) | Resistance (ohms) | Tolerance (percent) |
|-------------------|---------------------|-------------------|---------------------|
| 5 to 10 | ± 0.5 | 50 to 100 | ± 0.05 |
| 10 to 25 | ± 0.25 | 100 to 250 | ± 0.02 |
| 25 to 50 | ± 0.1 | 250 to 150,000 | ± 0.01 |

3.3.4 Power rating. The power rating for chip resistors shall be .300 watt at +70°C derated to +125°C at zero power (see figure 2).

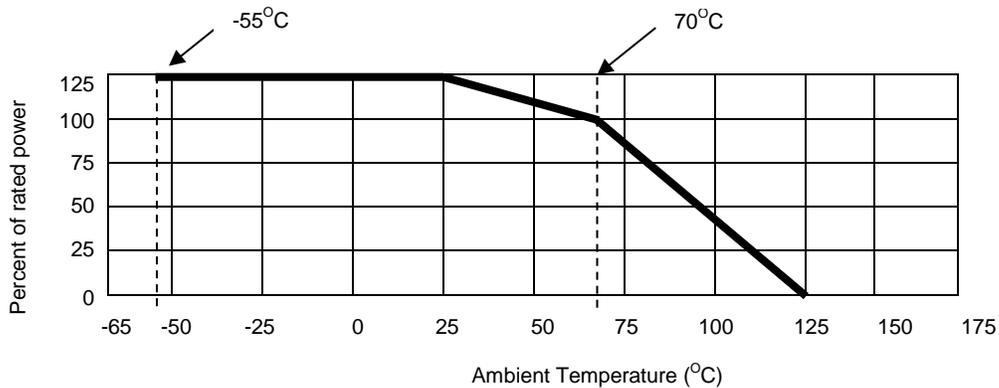


FIGURE 2. Derating curve.

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3.3.5 Voltage rating. The maximum continuous working voltage shall not exceed 200 volts.

3.3.6 Resistance temperature coefficient. When resistors are tested as specified in MIL-PRF-55342 the resistance temperature coefficient shall not exceed the values specified below:

| Resistance Temperature Coefficient (RTC) (ppm/°C) | Resistance range |
|---|-----------------------|
| ± 20 | 5 ohms to 50 ohms |
| ± 10 | 50 ohms to 100 ohms |
| ± 5 | 100 ohms to 150 kohms |

3.3.7 Termination. The termination material shall be in accordance with MIL-PRF-55342, code letter B.

3.3.7.1 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).

3.4 Thermal shock. When resistors are tested as specified in MIL-PRF-55342 for thermal shock the change in resistance shall not exceed ±0.05 percent +0.01 ohm.

3.5 Low temperature operation. When resistors are tested as specified in MIL-PRF-55342 for low temperature operation the change in resistance shall not exceed ±0.05 percent +0.01 ohm.

3.6 Short time overload. When resistors are tested as specified in MIL-PRF-55342 for short time overload the change in resistance shall not exceed ±0.05 percent +0.01 ohm.

3.7 High temperature exposure. When resistors are tested as specified in MIL-PRF-55342 for high temperature exposure the change in resistance shall not exceed ±0.05 percent +0.01 ohm.

3.8 Resistance to bonding exposure. When resistors are tested as specified in MIL-PRF-55342 for resistance to bonding exposure the change in resistance shall not exceed ±0.05 percent +0.01 ohm.

3.9 Moisture resistance. When resistors are tested as specified in MIL-PRF-55342 for moisture resistance the change in resistance shall not exceed ±0.1 percent +0.01 ohm.

3.10 Power conditioning. When resistors are tested as specified in MIL-PRF-55342 for life the change in resistance shall not exceed ±0.2 percent +0.01 ohm.

3.11 Resistance temperature characteristic. When resistors are tested as specified in MIL-PRF-55342 the RTC shall not exceed the values specified (see 3.3.6).

3.12 Marking. Marking is not required on this resistor; however, each waffle pack and each unit package shall be marked with the PIN assigned herein (see 1.2), the manufacturer's identification code, the date code, and the lot code. At the option of the manufacturer, the resistor may be marked (i.e., laser, color dot, etc.). The marking shall remain legible after all tests.

3.13 Manufacturer eligibility. To be eligible for listing as a approved source of supply, a manufacturer shall be listed on the MIL-PRF-55342 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.

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3.13.1 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be listed as approved sources of supply.

* 3.14 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 materials meet or exceed the operational and maintenance requirements, and promote economically advantageous life cycle costs.

3.15 Workmanship. Resistors shall be processed in such a manner as to be uniform in quality and be 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 product assurance program specified in MIL-PRF-55342 and maintained in accordance with [MIL-STD-790](#) is not applicable to this document.

4.3 Product level qualification. The product level qualification specified in MIL-PRF-55342 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 inspection (ER level only) and group B inspection of [MIL-PRF-55342](#).

4.4.1.1 Group A inspection. Group A inspection (ER level) shall be in accordance with MIL-PRF-55342. PPM testing, subgroup 1, subgroup 3 and verification as specified in MIL-PRF-55342 are not applicable to this document.

4.4.1.2 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-55342.

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](#)).

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 requisite 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 Department's Services System Command. 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. Chip resistors are intended to be used in thick or thin film circuits where microcircuitry is intended, also, for use in surface mounting application.

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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 a certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Packaging requirements.
- 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 Tolerance caution. Soldering temperature used during installation may cause resistance to shift up to 0.05 percent.

6.5 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-55342](#).

6.6 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](#) that specifies a preventive packaging procedure.

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-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-8754 or DSN 850-8754.

* 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-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-8754 or DSN 850-8754.

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| DLA Land and Maritime drawing PIN | Vendor similar designation or type number 1/ | Vendor CAGE | Vendor name and address |
|-----------------------------------|--|-------------|---|
| 93030-***** | VSM2018*****B | 0066A | Vishay Precision Group, Inc. 3 Great Valley Parkway Suite 150 Malvern, PA 19355 Plant: Vishay Advanced Technologies, Ltd. 2 Dr. Felix Zandman Street Holon 58125, Israel |
| 93030-***** | VSM2018*****B | 2X034 | Texas Components Corp. 1716 W. Sam Houston Parkway N. Houston, TX 77043-2723 |

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

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