

| REVISIONS | | | |
|-----------|--|------------|----------------------|
| LTR | DESCRIPTION | DATE | APPROVED |
| A | Add requirement for solder mounting integrity, paragraph 4.4.1.2. Update document to current DoD policy. | 1998-05-14 | W. E. Sindelar |
| B | Five year document review. Update to present DoD policy requirements. | 2003-11-07 | Kendall A. Cottongim |
| C | Inactivation for new design. | 2009-10-13 | Michael A. Radecki |
| D | Update to present DoD policy requirements. Add QR code. Editorial changes throughout. | 2018-05-11 | Michael A. Radecki |

Notice of Inactivation for New Design
 DLA Land and Maritime drawing 95014 is inactive for new design and is no longer used, except for replacement purposes. Use [MIL-PRF-55342/11](https://www.dla.mil/PRF/55342/11).

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

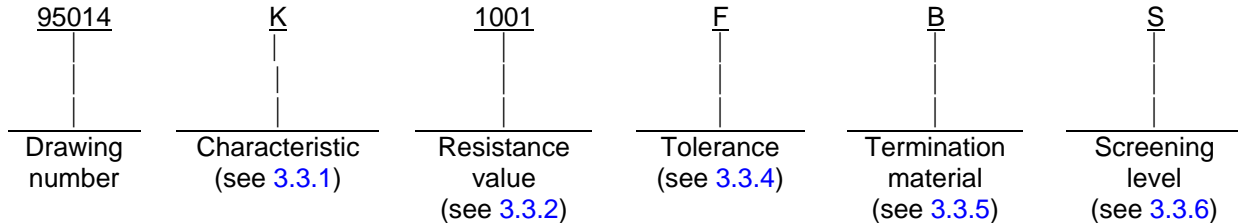
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| REV STATUS OF PAGES | REV | D | D | D | D | D | D | D | D | | | | | | | | |
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| Original date of drawing: 5 July 1995 | PREPARED BY DENNIS L. CROSS | | DESIGN ACTIVITY: DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OH | | | | | | | | | | | | | | | |
| | CHECKED BY DENNIS L. CROSS | | TITLE RESISTOR, CHIP, FIXED, FILM, STYLE 0402 | | | | | | | | | | | | | | | |
| | APPROVED BY DAVID E. MOORE | | | | | | | | | | | | | | | | | |
| | SIZE A | CODE IDENT. NO. 14933 | | DWG NO. 95014 | | | | | | | | | | | | | | |
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a fixed, film, chip resistor, style 0402.

1.2 Part or Identifying Number (PIN). The complete PIN is shown in the following example:



2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards 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-55342 - Resistor, Chip, Fixed, Film, Nonestablished Reliability, Established Reliability, Space Level, General Specification for

* DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202-108 - Test Method Standard Method 108, Life (at Elevated Ambient Temperature)
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. 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-55342**, and specified herein.

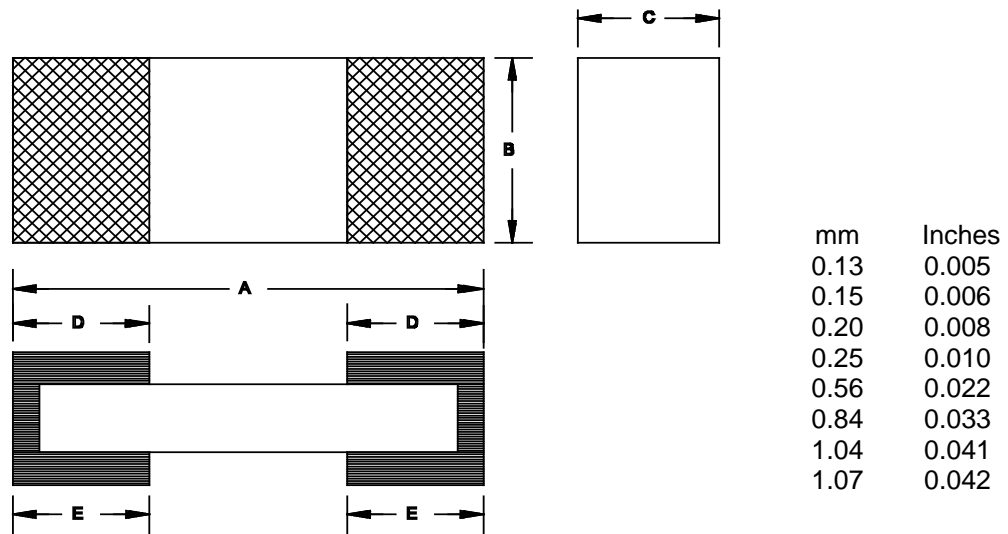
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3.2 Interface and physical dimensions. The resistor shall meet the interface and physical dimensions as specified in MIL-PRF-55342 and herein (see figure 1).

3.3 Electrical characteristics.

3.3.1 Resistance temperature characteristic. The resistance temperature characteristic shall not exceed the values specified below:

| <u>Characteristic</u> | <u>Resistance range</u> |
|----------------------------------|-------------------------|
| K (± 100 ppm/ $^{\circ}$ C) | 100 ohms to 100 kilohms |
| M (± 300 ppm/ $^{\circ}$ C) | 1 ohm to 10 megohms |



| A | B | C | D | E |
|-----------------|-----------------|-----------|-----------------|-----------------|
| 1.07 \pm 0.20 | 0.56 \pm 0.13 | 0.25/0.84 | 0.25 \pm 0.13 | 0.25 \pm 0.13 |

NOTES:

1. Dimensions are in millimeters.
2. Inch equivalents are given for general information only.
3. 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. Chip resistor.

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3.3.2 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 when 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 3.3.3. Resistance values not listed in the "10 to 100" decade table of MIL-PRF-55342 for the appropriate resistance tolerance shall be considered as not conforming to the specification. The standard values for every decade shall follow the sequence demonstrated for the "10 to 100" decade table specified in MIL-PRF-55342.

TABLE I. Resistance value designations.

| Designation | Resistance ohms | | |
|--------------------|-----------------|----|-------------------|
| 1R00 to 9R88 incl. | 1.00 | to | 9.88 incl. |
| 10R0 to 98R8 incl. | 10.0 | to | 98.8 incl. |
| 1000 to 9880 incl. | 100.0 | to | 988.0 incl. |
| 1001 to 9881 incl. | 1,000.0 | to | 9,880.0 incl. |
| 1002 to 9882 incl. | 10,000.0 | to | 98,800.0 incl. |
| 1003 to 9883 incl. | 100,000.0 | to | 988,000.0 incl. |
| 1004 to 9884 incl. | 1,000,000.0 | to | 9,880,000.0 incl. |

3.3.3 Resistance range. The resistance range shall be from 1 ohm to 10 megohms (see 3.3.1).

3.3.4 Resistance tolerance. Resistors are available in resistance tolerances as specified in table II.

TABLE II. Resistance tolerance.

| Symbol | Resistance tolerance percent |
|--------|------------------------------|
| D | ±0.5 |
| F | ±1.0 |
| G | ±2.0 |
| J | ±5.0 |
| K | ±10.0 |

3.3.5 Termination. Termination material shall be in accordance with MIL-PRF-55342 code letter B.

3.3.5.1 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).

3.3.6 Screening level. Resistors are available screened (S) or partially screened (P) as specified in 4.4.1.1.1.1, 4.4.1.1.1.2, and table III herein.

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3.3.7 Power rating. The power rating for chip resistors shall be 50 milliwatts at +70°C derated to zero power at +150°C (see figure 2).

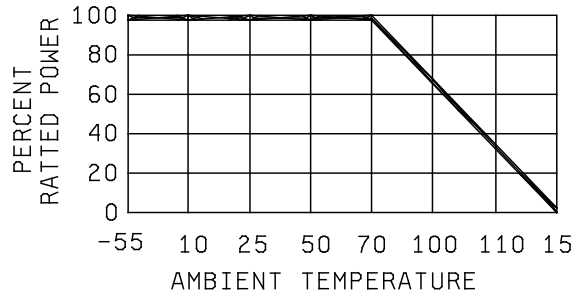


FIGURE 2. Derating curve.

3.3.8 Voltage rating. The maximum continuous working voltage shall not exceed 30 volts.

3.3.9 DC resistance. When resistors are tested as specified in 4.6, the dc resistance shall be within the specified tolerance of the nominal resistance.

3.3.10 Thermal shock. When resistors are tested as specified in 4.7, there shall be no evidence of mechanical damage.

3.3.11 Power conditioning. When resistors are tested as specified in 4.8, there shall be no evidence of mechanical damage. The change in resistance between initial and final measurements shall not exceed $\pm(0.5 \text{ percent} + 0.01 \text{ ohm})$.

3.3.12 Solderability. The requirements for solderability shall be as specified in MIL-PRF-55342 and 4.4.1.1.3 herein.

* 3.4 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.

3.5 Marking. Marking is not required on the resistor; however, each unit package shall be marked with the PIN assigned herein (see 1.2), manufacturer's identification code and date and lot codes.

* 3.6 Manufacturer eligibility. To be eligible for being added as an 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 DSCC-VAT.

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

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-55342 and maintained in accordance with MIL-STD-790 is not applicable to this document.

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

4.3 Failure rate qualification. The failure rate qualification specified in [MIL-PRF-55342](#) 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 groups A and B inspections.

4.4.1.1 Group A inspection. Group A inspection shall consist of the inspections specified in [table III](#), and shall be made on the same set of sample units, in the order shown. Part per million testing and verification as specified in [MIL-PRF-55342](#) is not applicable to this document.

4.4.1.1.1 Subgroup I.

4.4.1.1.1.1 Screened (S). Screened (S) tests shall be performed on 100 percent of the product supplied under this document. Resistors that are out of resistance tolerance, or which experience a change in resistance greater than that permitted for the tests of this subgroup shall be removed from the lot. Lots having more than 5 percent total rejects, due to exceeding the specified resistance tolerance change limit shall not be furnished on contracts.

4.4.1.1.1.2 Partially screened (P). Partially screened (P) tests shall be as specified in [4.4.1.1.1.1](#) except only the 100 percent dc resistance test shall be performed.

4.4.1.1.2 Subgroup II. A sample of 13 parts shall be randomly selected, if one or more defects are found, the lot shall be rescreened and defects removed. A new sample of 13 parts shall then be randomly selected. If one or more defects are found in this second sample, the lot shall be rejected and shall not be supplied against this document.

4.4.1.1.3 Subgroup III. A sample of five parts shall be randomly selected, if one or more defects are found, the lot shall be rejected/rescreened in accordance with [MIL-PRF-55342](#).

TABLE III. Group A inspection.

| Inspection | Requirement paragraph | Method paragraph | Sampling procedure |
|---------------------|-------------------------------|---------------------|---------------------------|
| <u>Subgroup I</u> | | | |
| DC resistance | 3.3.9 | 4.6 | 100 percent |
| Thermal shock | 3.3.10 | 4.7 | |
| Power conditioning | 3.3.11 | 4.8 | |
| DC resistance | 3.3.9 | 4.6 | |
| <u>Subgroup II</u> | | | |
| Visual inspection | 3.2, 3.5, 3.7 | 4.5 | 13 samples, 0 failures |
| <u>Subgroup III</u> | | | |
| Solderability | 3.3.12 | 4.9 | 5 samples 0 failures |

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4.4.1.2 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-55342 except that the force applied for Subgroup 2, solder mounting integrity shall be 1 kilogram.

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).

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-55342.

4.6 DC resistance. DC resistance shall be tested in accordance with MIL-PRF-55342.

4.7 Thermal shock. Thermal shock shall be tested in accordance with MIL-PRF-55342.

* 4.8 Power conditioning. Resistors shall be tested in accordance with MIL-STD-202-108. The following details and exceptions shall apply:

- a. Method of mounting: Chip resistors sample units shall be loaded on a test fixture.
- b. Test temperature: +70°C ±5°C.
- c. Initial resistance measurement of mounted resistors: Initial dc resistance measurement shall be measured at +25°C.
- d. Operating conditions: Rated dc continuous working voltage or filtered, nonfiltered full-wave rectified ac voltage shall be applied intermittently, 1 hour and 30 minutes "on", and 30 minutes "off", for the applicable number of hours and applicable test temperature. "On time" shall be three quarters of the total elapsed time. During the "on" cycle, the voltage shall be regulated and controlled to maintain ±5 percent of the rated continuous working voltage.
- e. Duration: 100 hours ±4 hours.
- f. Stabilization and final dc resistance measurement: Resistors shall be removed from chambers for a minimum of 45 minutes and stabilized prior to final resistance measurement.
- g. Examination after test: Resistors shall be examined for evidence of mechanical damage.

4.9 Solderability. Solderability shall be tested in accordance with MIL-PRF-55342 and 4.4.1.1.3 herein.

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 requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military 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.

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6. NOTES

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

6.1 Intended use. Chip resistors are intended for use in thick or thin film circuits where microcircuitry is intended, also, for use in surfacing mounting applications.

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

6.5 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 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.

- * 6.7 Approved source(s) of supply. Approved source(s) 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 | Vendor CAGE number | Vendor similar PIN ^{1/} | Vendor name and address |
|-----------------------------------|--------------------|--|---|
| 95014-K***** 95014-M***** | 56235 | H0402CPX*****10(D95014) H0402CPX*****30(D95014) | State of the Art, Incorporated 2470 Foxhill Road State College, PA 16803-1797 |

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

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