

| REVISIONS |                                                                                                                                                                         |             |              |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|
| LTR       | DESCRIPTION                                                                                                                                                             | DATE        | APPROVED     |
| A         | Add new paragraph on resistance. Editorial changes throughout.                                                                                                          | 31 JUL 1989 | D. Moore     |
| B         | Revise 3.3.6 to include ranges for resistance temperature coefficient. Revise 4.8 to include provisions for test fixturing.                                             | 10 JAN 1990 | D. Moore     |
| C         | Revise 3.3.5 to reflect new voltage rating. Editorial changes throughout.                                                                                               | 12 JUN 1990 | D. Moore     |
| D         | Add new characteristic E. Revise 3.3.4 to reflect new power ratings. Revise 3.3.6 to list characteristic E. Add new vendor, similar PIN. Editorial changes throughout.  | 26 FEB 1992 | D. Moore     |
| E         | Revise 3.3.5 voltage rating to 200 volts. Dimensional change. Editorial changes throughout.                                                                             | 13 FEB 1995 | E. Back      |
| F         | Add new source of supply. Add resistance tolerance 0.1 percent and 5.0 percent. Dimension changes in accordance with MIL-PRF-55342/9. Editorial corrections throughout. | 5 APR 1999  | J. Crum      |
| G         | Extend minimum resistance value to 1 ohm for characteristic K & M, 1 percent tolerance. Editorial corrections throughout.                                               | 20 JUL 2000 | K. Cottongim |
| H         | Group B tests to be performed on ceramic boards to meet the 2 watt power rating. Update to present DOD policy requirements.                                             | 28 JUN 2004 | K. Cottongim |
| J         | Add pure tin prohibition paragraph. Extend minimum resistance value to 1 ohm for characteristic K. Editorial changes throughout.                                        | 21 NOV 2006 | M. Radecki   |
| K         | Add manufacturer eligibility, thermal management, and pulse application paragraphs. Editorial changes throughout.                                                       | 24 JUN 2014 | M. Radecki   |
| L         | Add new vendor and QR code. Editorial changes throughout.                                                                                                               | 6 FEB 2015  | M. Radecki   |
| M         | Add new vendor.                                                                                                                                                         | 4 MAY 2015  | M. Radecki   |
|           |                                                                                                                                                                         |             |              |

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3  
HAS CHANGED NAMES TO:  
DLA LAND AND MARITIME  
COLUMBUS, OHIO 43218-3990



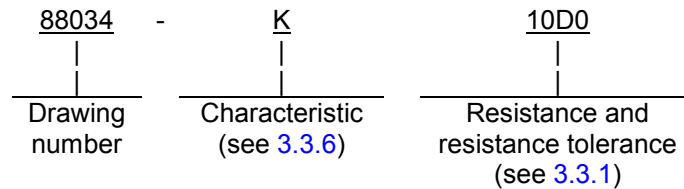
Prepared in accordance with [ASME Y14.100](#)

|                                           |                                      |                                 |   |   |   |   |   |                                                                                         |                                    |   |  |  |  |  |  |  |  |  |  |
|-------------------------------------------|--------------------------------------|---------------------------------|---|---|---|---|---|-----------------------------------------------------------------------------------------|------------------------------------|---|--|--|--|--|--|--|--|--|--|
| <b>REV STATUS OF PAGES</b>                | <b>REV</b>                           | M                               | M | M | M | M | M | M                                                                                       | M                                  | M |  |  |  |  |  |  |  |  |  |
|                                           | <b>PAGES</b>                         | 1                               | 2 | 3 | 4 | 5 | 6 | 7                                                                                       | 8                                  | 9 |  |  |  |  |  |  |  |  |  |
| <b>PMIC N/A</b>                           | <b>PREPARED BY</b><br>ALLAN R. KNOX  |                                 |   |   |   |   |   | <b>DESIGN ACTIVITY:</b><br><b>DEFENSE ELECTRONIC SUPPLY CENTER</b><br><b>DAYTON, OH</b> |                                    |   |  |  |  |  |  |  |  |  |  |
| Original date of drawing<br><br>23 May 88 | <b>CHECKED BY</b><br>DAVID E. MOORE  |                                 |   |   |   |   |   | <b>TITLE</b><br>RESISTOR, FIXED, FILM, CHIP, LOW VALUES,<br>HIGH POWER, STYLE 2512      |                                    |   |  |  |  |  |  |  |  |  |  |
|                                           | <b>APPROVED BY</b><br>DAVID E. MOORE |                                 |   |   |   |   |   |                                                                                         |                                    |   |  |  |  |  |  |  |  |  |  |
|                                           | <b>SIZE A</b>                        | <b>CODE IDENT. NO.</b><br>14933 |   |   |   |   |   |                                                                                         | <b>DWG NO.</b><br><br><b>88034</b> |   |  |  |  |  |  |  |  |  |  |
|                                           | <b>REV M</b>                         |                                 |   |   |   |   |   | <b>PAGE 1 OF 8</b>                                                                      |                                    |   |  |  |  |  |  |  |  |  |  |

## 1. SCOPE

1.1 Scope. This drawing describes the requirements for a fixed, film, .250 X .125 chip resistors.

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-55342** - Resistors, Fixed, Film, Chip, Nonestablished Reliability, Established Reliability, Space Level, General Specification For

#### DEPARTMENT OF DEFENSE STANDARDS

**MIL-STD-202** - Test Method Standard Electronic and Electrical Component Parts.  
**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 contract, 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

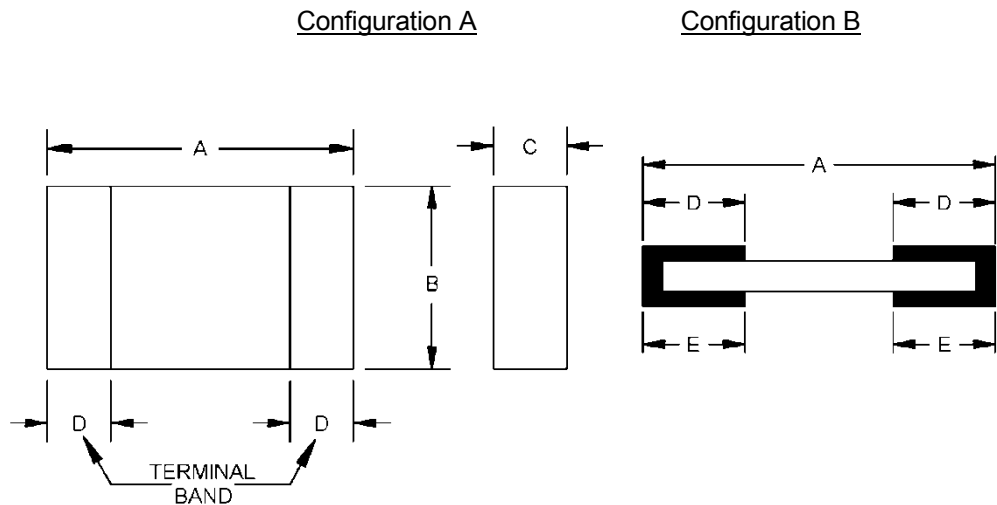
3.1 Item requirements. The individual item requirements shall be in accordance with **MIL-PRF-55342**, and as specified herein.

3.2 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-55342 and herein (see [figure 1](#)).

3.3 Electrical characteristics.

|                                                          |                   |                                 |                          |
|----------------------------------------------------------|-------------------|---------------------------------|--------------------------|
| <b>DEFENSE ELECTRONIC SUPPLY CENTER<br/>DAYTON, OHIO</b> | <b>SIZE<br/>A</b> | <b>CODE IDENT NO.<br/>14933</b> | <b>DWG NO.<br/>88034</b> |
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3.3.1 Resistance and resistance tolerance. The nominal resistance expressed in ohms is identified by four characters consisting of three digits and a letter. The letter is used simultaneously as a decimal point, multiplier, and resistance tolerance designator in accordance with MIL-PRF-55342 and herein (see table I). Minimum and maximum resistance values shall be as specified in 3.3.2, 3.3.6, and 6.10. 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 this drawing. The standard values for every decade shall follow the sequence demonstrated for the "10 to 100" decade table specified in MIL-PRF-55342.



| A                         | B               | C           | D               | E               |
|---------------------------|-----------------|-------------|-----------------|-----------------|
| 0.259<br>+0.009<br>-0.015 | 0.124<br>±0.005 | 0.015/0.033 | 0.020<br>±0.005 | 0.020<br>±0.005 |

| Inches | mm   |
|--------|------|
| 0.005  | 0.13 |
| 0.009  | 0.23 |
| 0.015  | 0.38 |
| 0.020  | 0.51 |
| 0.033  | 0.84 |
| 0.124  | 3.15 |
| 0.259  | 6.58 |

- NOTES:
- 1. Dimensions are in inches.
  - 2. Metric equivalents are given for general information only.
  - 3. The pictorial view is 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 aspect of the device are acceptable.

FIGURE 1. Chip resistor.

3.3.2 Resistance range. The resistance range shall be from 1 ohm to 15 megohms as specified (see 3.3.6).

|                                                  |                  |                                |                         |
|--------------------------------------------------|------------------|--------------------------------|-------------------------|
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3.3.3 Resistance tolerance. The resistance tolerance for chip resistors shall be  $\pm 0.1$  percent,  $\pm 1$  percent, and  $\pm 5$  percent in accordance with MIL-PRF-55342 and table I herein.

TABLE I. Designator of resistance values for resistance tolerances.

| Designator for 0.1 percent tolerance | Resistance (ohms) |           |           |
|--------------------------------------|-------------------|-----------|-----------|
| 1A00 to 9A88 inclusive               | 1.00 to           | 9.88      | inclusive |
| 10A0 to 98A8 inclusive               | 10.0 to           | 98.8      | inclusive |
| 100A to 988A inclusive               | 100 to            | 988       | inclusive |
| 1B00 to 9B88 inclusive               | 1,000 to          | 9880      | inclusive |
| 10B0 to 98B8 inclusive               | 10,000 to         | 98800     | inclusive |
| 100B to 988B inclusive               | 100,000 to        | 988,000   | inclusive |
| 1C00 to 9C88 inclusive               | 1,000,000 to      | 9,880,000 | inclusive |
| 10C0 to                              | 10,000,000 to     |           |           |
| Designator for 1.0 percent tolerance | Resistance (ohms) |           |           |
| 1D00 to 9D88 inclusive               | 1.00 to           | 9.76      | inclusive |
| 10D0 to 98D8 inclusive               | 10.0 to           | 97.6      | inclusive |
| 100D to 988D inclusive               | 100 to            | 976       | inclusive |
| 1E00 to 9E88 inclusive               | 1,000 to          | 9760      | inclusive |
| 10E0 to 98E8 inclusive               | 10,000 to         | 97600     | inclusive |
| 100E to 988E inclusive               | 100,000 to        | 976,000   | inclusive |
| 1F00 to 9F88 inclusive               | 1,000,000 to      | 9,760,000 | inclusive |
| 10F0 to                              | 10,000,000 to     |           |           |
| Designator for 5.0 percent tolerance | Resistance (ohms) |           |           |
| 1J00 to 9J88 inclusive               | 1.00 to           | 9.10      | inclusive |
| 10J0 to 98J8 inclusive               | 10.0 to           | 91.0      | inclusive |
| 100J to 988J inclusive               | 100 to            | 910       | inclusive |
| 1K00 to 9K88 inclusive               | 1,000 to          | 9100      | inclusive |
| 10K0 to 98K8 inclusive               | 10,000 to         | 91000     | inclusive |
| 100K to 988K inclusive               | 100,000 to        | 910,000   | inclusive |
| 1L00 to 9L88 inclusive               | 1,000,000 to      | 9,100,000 | inclusive |
| 10L0 to                              | 10,000,000 to     |           |           |

3.3.4 Power rating. The power rating for chip resistors shall be 2.0 watts at  $+70^{\circ}\text{C}$  for characteristics K and M and 1.0 watt for characteristics E and H derated to zero power at  $+150^{\circ}\text{C}$  (see figure 2).

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

3.3.6 Resistance temperature coefficient. The resistance temperature coefficient shall be in accordance with MIL-PRF-55342 and not exceed the values specified below:

| Characteristic | Resistance range           | Resistance tolerance |
|----------------|----------------------------|----------------------|
| E and H        | 100 ohms thru 5.62 Megohms | 0.1 percent          |
| E and H        | 10 ohms thru 5.62 Megohms  | 1.0 percent          |
| K and M        | 1.0 ohm thru 15 Megohms    | 1.0 percent          |
| K and M        | 1.0 ohm thru 15 Megohms    | 5.0 percent          |

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

|                                                  |                  |                                |                         |
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3.3.8 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 6.6).

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  $\pm (0.5 \text{ percent} \pm 0.01 \text{ ohm})$ .

3.3.12 Solderability. When resistors are tested as specified in 4.9, they shall meet the criteria for surface mount leadless components in the test method.

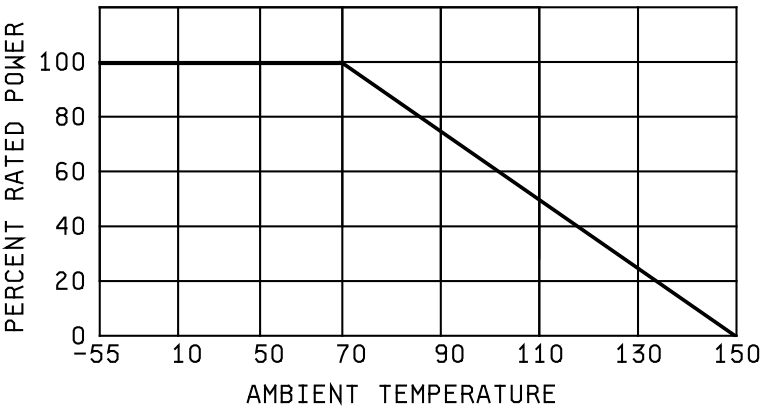


FIGURE 2. Derating curve.

3.4 Marking. Marking of the individual chip resistors is not required; however, each unit package shall be marked in accordance with MIL-STD-1285 and include the PIN as specified herein (see 1.2), the manufacturer's name or Commercial and Government Entity (CAGE) code, and date lot codes.

3.5 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.

3.6 Manufacturer eligibility. To be eligible for listing 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 DLA Land and Maritime-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 Product level qualification. The product level 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 the groups A and B inspections.

4.4.1.1 Group A inspection. Group A inspection shall consist of the inspections specified in [table II](#), and shall be made on the same set of sample units, in the order shown.

4.4.1.1.1 Subgroup 1. Subgroup I tests shall be performed on a production lot basis 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.

4.4.1.1.2 Subgroup 2. Subgroup II tests shall be performed on an inspection lot basis. 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 the document.

4.4.1.1.3 Subgroup 3. Subgroup 3 tests shall be performed as specified in MIL-PRF-55342.

4.4.2 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-55342 except subgroup 1 and subgroup 2 tests shall be performed on ceramic boards.

4.4.2.1 Certification. The manufacturer shall submit a certificate of compliance in lieu of group B inspection, when group B is not in the ordering data (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](#).

TABLE II. Group A inspection.

| Inspection                                                                                 | Requirement                                                                                        | Method                                                                                   | Sampling procedure            |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------|
| <u>Subgroup 1</u><br>DC resistance<br>Thermal shock<br>Power conditioning<br>DC resistance | <a href="#">3.3.9</a><br><a href="#">3.3.10</a><br><a href="#">3.3.11</a><br><a href="#">3.3.9</a> | <a href="#">4.6</a><br><a href="#">4.7</a><br><a href="#">4.8</a><br><a href="#">4.6</a> | 100 percent                   |
| <u>Subgroup 2</u><br>Visual inspection                                                     | <a href="#">3.2, 3.4, 3.7</a>                                                                      | <a href="#">4.5</a>                                                                      | 13 samples, 0 failures        |
| <u>Subgroup 3</u><br>Solderability                                                         | <a href="#">3.3.12</a>                                                                             | <a href="#">4.9</a>                                                                      | See <a href="#">4.4.1.1.3</a> |

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](#).

|                                                                |                         |                                       |                                |
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4.8 Power conditioning. Resistors shall be tested in accordance with method 108 of [MIL-STD-202](#). The following details and exceptions shall apply:

- a. Method of mounting: Chip resistor sample units shall be mounted 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 full wave rectified ac voltage shall be applied intermittently, 1.5 hours "on", and 0.5 hour "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.

## 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.

## 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. Resistors are also for use in surface mount applications.

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 certificate 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.

|                                                                |                         |                                       |                                |
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6.3 PIN supersession. PIN's of revision E of this document have been superseded by a new PIN in revision F that includes a combination resistance value and resistance tolerance in accordance with [MIL-PRF-55342](#) and herein.

6.4 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.

6.5 Short Time Overload Test. The short time overload test in Group B inspection of MIL-PRF-55342 is to be performed on ceramic boards.

6.6 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).

6.7 Thermal management. The temperature of larger chip sizes shall not exceed 150°C. The larger chip sizes are conduction cooled devices and reliable operation depends upon maintaining the resistor film at or below 150°C. Adjusting the ambient temperature may be necessary.

6.8 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 onetime pulse (Short-time overload) as part of the group B inspection of MIL-PRF-55342.

6.9 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](mailto: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.

\* 6.10 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](mailto: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.

|                                                                |                         |                                       |                                |
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| DLA Land and Maritime<br>drawing PIN<br>88034-****                                                                                                                                                                                       | Vendor similar<br>designation or type<br>number <u>1/</u> | Vendor<br>CAGE | Vendor name<br>and address                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Characteristics: K and M,<br>resistance values: 1 ohm<br>through 15 megohms,<br>resistance tolerance: 1 and 5<br>percent.                                                                                                                | J1500-****F<br>J1500-****J                                | 50316          | MINI-SYSTEMS, INC.<br>20 David Road<br>N. Attleboro, MA 02761-0069                                                                                                                                 |
| Characteristics: E, H, K, and M,<br>resistance values: 1 ohm<br>through 15 megohms,<br>resistance tolerance: 0.1, 1.0,<br>and 5.0 pct.                                                                                                   | H2512CPX***** (DEC034)<br>H2512CA***** (DEC034)           | 56235          | State of the Art, Inc.<br>2470 Foxhill Road<br>State College, PA 16803-1797                                                                                                                        |
| Characteristics: E and H,<br>resistance values 100 ohms<br>through 5.62 megohms;<br>resistance tolerance .1 percent.                                                                                                                     | 112-273-****                                              | 57498          | Vishay Thin Film<br>2160 Liberty Drive<br>Niagara Falls, NY 14304                                                                                                                                  |
| Characteristics: K and M,<br>resistance values: 5.62 ohms<br>through 15 megohms,<br>resistance tolerance: 1 and 5<br>percent.<br>Characteristic: M,<br>resistance values: 1 ohm<br>through 5.6 ohms,<br>resistance tolerance: 5 percent. | RCWP-2512-80                                              | SH903          | Vishay Dale Electronics, Inc.<br>1122 23 <sup>rd</sup> Street<br>Columbus, NE 68601-3647<br><br><u>Plant:</u><br>Vishay Israel, LTD<br>EMEK-Sara "B" Industrial Park<br>Be'er Sheva, 84874, Israel |

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

|                                                          |                   |                                 |                          |
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