

REVISIONS			
LT	DESCRIPTION	DATE	APPROVED
A	Add new paragraph on resistance. Dimensional changes. Editorial changes throughout	7 JUL 89	D. Moore
B	Eliminate characteristic H. Add characteristic M. Change resistance range for characteristic K. Reword paragraph 4.8a. Change vendor PIN. Editorial changes throughout	1 OCT 93	D. Moore
C	Add vendor. Editorial changes throughout.	27 JAN 00	K. Cottongim
D	Add vendor, and expand resistance range for characteristics K and M. Editorial changes throughout.	8 SEP 05	K. Cottongim
E	Inactivation for new design.	11 MAR 11	M. Radecki

**Notice of Inactivation for New Design**  
 DLA Land and Maritime drawing 88027 is inactive for new design and is no longer used, except for replacement purposes.  
 Use [MIL-PRF-55342/2](#).

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](#)

Source control drawing

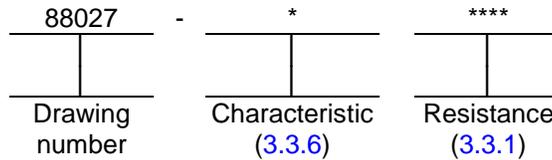
REV STATUS OF PAGES	REV	E	E	E	E	E	E	E									
	PAGES	1	2	3	4	5	6	7									

<b>PMIC N/A</b>	<b>PREPARED BY</b> Allen R. Knox	<b>DESIGN ACTIVITY:</b> <b>DEFENSE ELECTRONIC SUPPLY CENTER</b> <b>DAYTON, OHIO 45444-5000</b>
Original date of drawing  13 June 1988	<b>CHECKED BY</b> David E. Moore	<b>TITLE</b>  RESISTOR, CHIP, FIXED, FILM, STYLE 0504
	<b>APPROVED BY</b> David E. Moore	
	<b>SIZE</b> A	<b>CODE IDENT. NO.</b> 14933
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a fixed, film, chip, resistor, style 0504.

1.2 Part or Identifying Number (PIN). The complete PIN is as follows, and is available in a wrap around termination:



2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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, Chip, Fixed, Film, 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 <https://assist.daps.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

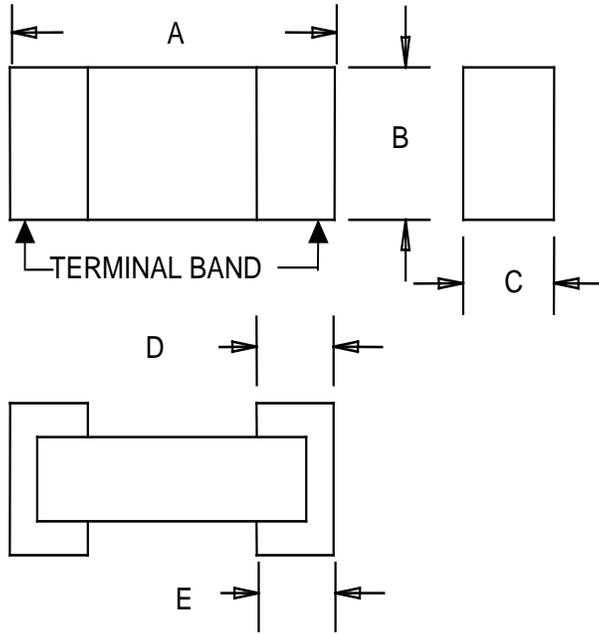
\* 2.2 Order of precedence. Unless otherwise noted herein or in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws 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-55342** and as specified herein.

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](#)).

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	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.045	.060	1.14	1.40
B	.035	.045	0.89	1.14
C		.025		0.51
D	.005	.017	0.18	0.43
E	.004	.017	0.10	0.43

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. 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 devices are acceptable.

FIGURE 1. Chip resistor style RM0504.

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 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 [3.3.2](#). Resistance values not listed in "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](#).

3.3.2 Resistance range. The resistance range for characteristic "K" and "M" shall be 1 ohm to 22 megohms.

3.3.3 Resistance tolerance. The resistance tolerance for chip resistors shall be (F)  $\pm 1$  percent.

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TABLE I. Resistance value designations.

Designation	Resistance ohms	
1R00 to 9R76	1 to	9.76
10R0 to 97R6	10 to	97.6
1000 to 9760	100 to	976
1001 to 9761	1,000 to	9,760
1002 to 9762	10,000 to	97,600
1003 to 9763	100,000 to	976,000
1004 to 9764	1,000,000 to	9,760,000
1005 to 2205	10,000,000 to	22,000,000

3.3.4 Power rating. The power rating for chip resistors shall be 0.125 watts at 70°C derated to zero power at 150°C (see figure 2).

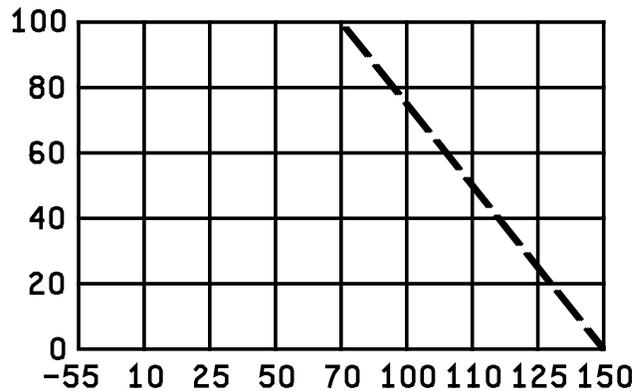


FIGURE 2. Derating curve.

3.3.5 Voltage rating. The maximum continuous working voltage shall not exceed 40 volts.

3.3.6 Resistance temperature coefficient (RTC). The RTC shall not exceed  $\pm 100$  ppm/°C for characteristic "K" and  $\pm 300$  ppm/°C for characteristic "M".

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

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

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

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

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

\* 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 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.

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3.6 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.

\* 3.7 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.

\* 3.7.1 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be listed as an approved source of supply.

3.8 Workmanship. Resistors shall be uniform in quality and free from 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.

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 group A inspection and group B inspection.

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 1 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 2 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](#).

TABLE II. Group A inspection.

Inspection	Requirement	Method	Sampling procedure
<u>Subgroup 1</u>			
DC resistance	<a href="#">3.3.8</a>	<a href="#">4.6</a>	100 percent
Thermal shock	<a href="#">3.3.9</a>	<a href="#">4.7</a>	
Power conditioning	<a href="#">3.3.10</a>	<a href="#">4.8</a>	
DC resistance	<a href="#">3.3.8</a>	<a href="#">4.6</a>	
<u>Subgroup 2</u>			
Visual inspection	<a href="#">3.2, 3.4, 3.8</a>	<a href="#">4.5</a>	13 samples, 0 failures
<u>Subgroup 3</u>			
Solderability	<a href="#">3.3.11</a>	<a href="#">4.9</a>	See <a href="#">4.4.1.1.3</a>

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4.4.2 Group B inspection. Group B inspection shall be in accordance with [MIL-PRF-55342](#).

4.4.2.1 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 method 108 of [MIL-STD-202](#). The following details and exceptions shall apply:

- a. Method of mounting: Chip resistor sample units shall be loaded in 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 packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service 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. Chip resistors are intended for use in thick or thin film circuits where microcircuitry is intended, also in most 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 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 [4.4.2.1](#)).

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- \* 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](mailto:resistor@dla.mil) or in writing to: DLA Land and Maritime-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0552 or DSN 850-0552.
- \* 6.7 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-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	Vendors similar designation or type number <u>1/</u>	Vendor CAGE	Vendor's name and address
88027-K**** 88027-M****	H0504CPX****F10 H0504CPX****F30	56235	State of the Art, Incorporated 2470 Fox Hill Road State College, PA 16803-1797
88027-K**** 88027-M****	RCWP-540-XX	91637	Vishay Dale Electronics PO Box 609 Columbus, NE 68602-0609  <u>Plant:</u> Vishay Israel, Ltd Emek-Sara "B" Industrial Park Beer Sheva, Israel 84874
88027-K**** 88027-M****	WA19PS-XXXXF-NS62C	50316	MINI-SYSTEMS, INC. Thick Film Division 20 David Road N. Attleboro, MA 02761-0069

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

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