

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVE D
A	Manufacturer's similar part number changed from S555 to S102C. Editorial changes throughout.	12 JUN 1990	D. Moore
B	Addition of new supplier. Editorial changes throughout.	11 SEP 1992	D. Moore
C	Update and validation of drawing. Correct vendor CAGE. Editorial changes throughout.	21 JUL 2000	D. Moore
D	Change vendors name. Editorial changes throughout.	1 MAY 2002	K. Cottongim
E	Add pure tin prohibition, manufacturer eligibility and pulse application paragraphs, and a measurement error of 0.01 ohm. Editorial changes throughout.	8 JUL 2009	M. Radecki
F	Add for the allowance of a high temperature solder within the pure tin prohibition paragraph. Editorial changes throughout.	23 MAR 2012	M. Radecki
G	Change vendor's CAGE code. Add QR code. Editorial changes throughout.	12 FEB 2016	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](#)

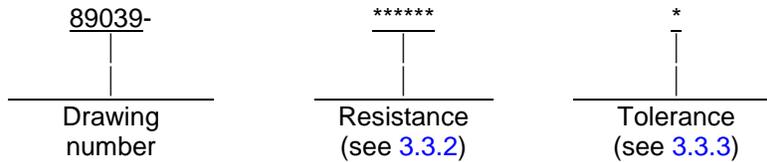
REV STATUS OF PAGES	REV	G	G	G	G	G	G	G	G	G								
	PAGES	1	2	3	4	5	6	7	8	9								

PMIC N/A	PREPARED BY Heraldine Johnson	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OH
Original date of drawing 20 July 1989	CHECKED BY David E. Moore	TITLE RESISTOR, FIXED, FILM, PRECISION
	APPROVED BY David E. Moore	
	SIZE A	CODE IDENT. NO. 14933
	DWG NO.	89039
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a precision, fixed, film, resistor.

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



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-55182](#) - Resistor, Fixed, Film, Non-Established Reliability, Established Reliability, and Space Level, General Specification for.
- [MIL-PRF-55182/9](#) - Resistor, Fixed, Film, Non-Established Reliability, Established Reliability, and Space Level, Style RNC90.

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.
- [MIL-STD-1285](#) - Marking of Electrical and Electronic Parts.

* (Copies of these documents are available online at <http://quicksearch.dla.mil/>.)

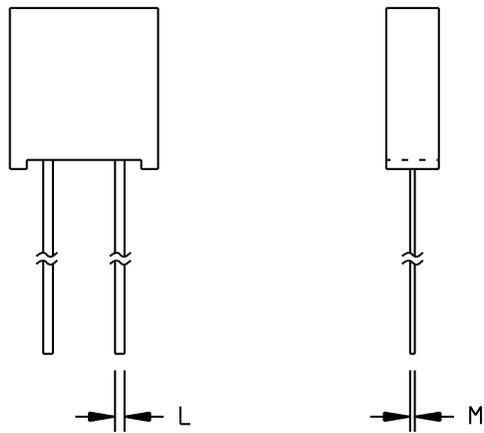
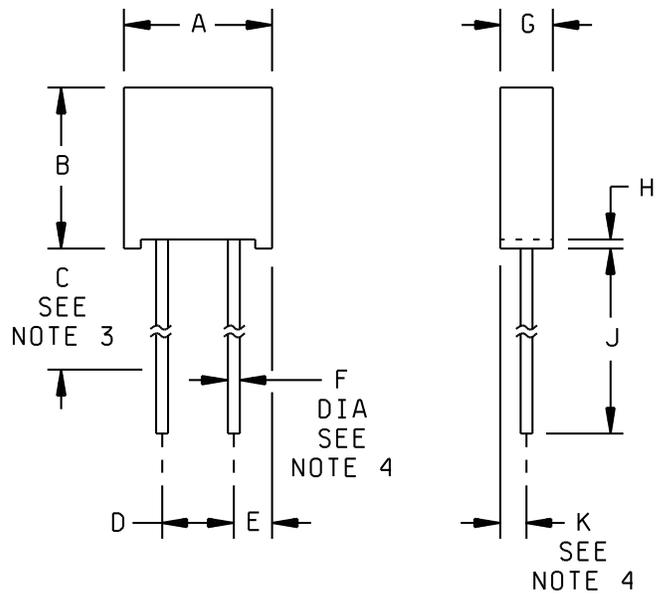
2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with [MIL-PRF-55182](#) and as specified herein.

3.2 Interface and physical dimension requirements. Resistors shall meet the interface and physical dimensions as specified in MIL-PRF-55182 and herein (see [figure 1](#)).

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OPTIONAL LEAD
CONFIGURATION

FIGURE 1. Resistor, fixed, film.

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Ltr	Inches		mm	
	Min	Max	Min	Max
A	.290	.320	7.37	8.13
B	---	.336	---	8.53
C	.375	.625	9.53	15.88
D	.140	.160	3.56	4.06
E	.060	.090	1.52	2.29
F	.023	.027	0.58	0.69
G	.095	.120	2.41	3.05
H	.010	---	0.25	---
J	.875	1.875	22.23	47.63
K	.040	.060	1.02	1.52
L	.017	.023	0.43	0.58
M	.008	.014	0.20	0.36

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Resistance measurement point.
4. The lead measurement shall be made at the point of emergence from the body.
5. Style of standoffs is optional.

FIGURE 1. Resistor, fixed, film - Continued.

3.3 Electrical characteristics.

3.3.1 Resistance value designations. Resistance value designations shall be in accordance with [MIL-PRF-55182/9](#).

3.3.2 Resistance. The resistance limits shall be as follows: 1 ohm minimum and 250 kilohms maximum.

3.3.3 Resistance tolerance. Resistors are available in resistance tolerance specified in table I.

TABLE I. Resistance tolerance.

Symbol	Resistance tolerance (in percent, $\pm\%$)
V	0.005
T	0.010
A	0.050
B	0.100
D	0.500
F	1.000

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3.3.4 Power rating. Power rating shall be as specified in table II.

TABLE II. Power rating.

Resistance range	Wattage at specified temperature	
	70°C	125°C
1 ohm to 100 kilohms	0.6 watt	0.3 watt
>100 kilohms to 250 kilohms	0.4 watt	0.2 watt

3.3.5 Resistance temperature characteristic. The resistance temperature characteristic shall be as specified in table III, from -55°C to +125°C.

TABLE III. Resistance temperature coefficient.

Resistance temperature coefficient (\pm ppm/°C)	Resistance range
5 ppm	>4.98 ohms to 250 kilohms
10 ppm	>2.99 ohms to 4.98 ohms
20 ppm	1.00 ohm to 2.99 ohms

3.3.6 Voltage rating. The maximum continuous working voltage shall not exceed 300 volts.

3.3.7 Thermal shock. When resistors are tested as specified, there shall be no evidence of mechanical damage; the change in resistance shall not exceed ± 0.05 percent +0.01 ohm for thermal shock and overload tests combined.

3.3.8 Short time overload. When resistors are tested as specified with an overload of 6.25 times rated power for 5 seconds, there shall be no evidence of arcing, burning, or charring; the change in resistance shall not exceed 0.05 percent +0.01 ohm for thermal shock and overload tests combined (see 3.3.4). The maximum voltage shall not exceed 450 volts.

3.3.9 Low temperature operation. When resistors are tested as specified, there shall be no evidence of mechanical damage. The change in resistance shall not exceed ± 0.05 percent +0.01 ohm.

3.3.10 Terminal strength. When resistors are tested as specified in 4.5, there shall be no evidence of breaking or loosening of terminals from the resistor form, or chipping of coating, or other evidence of mechanical damage. The change in resistance shall not exceed ± 0.05 percent +0.01 ohm.

3.3.11 Dielectric withstanding voltage. When resistors are tested as specified in 4.6, there shall be no evidence of flashover, mechanical damage, arcing, or insulation breakdown. The change in resistance shall not exceed ± 0.05 percent +0.01 ohm.

3.3.12 Resistance to soldering heat. When resistors are tested as specified, there shall be no evidence of mechanical damage. The change in resistance shall be ± 0.05 percent +0.01 ohm.

3.3.13 Moisture resistance. When resistors are tested as specified in 4.7, there shall be no evidence of mechanical damage. The change in resistance shall not exceed ± 0.05 percent +0.01 ohm. In addition, the dielectric withstanding voltage shall be specified in 3.3.11, and the insulation resistance shall be 100 megohms, minimum.

3.3.14 Shock (specified pulse). When tested as specified, there shall be no evidence of mechanical damage or electrical discontinuity. The change in resistance shall not exceed ± 0.01 percent +0.01 ohm. There shall be no electrical discontinuity during test.

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3.3.15 Vibration, high frequency. When resistors are tested as specified, there shall be no evidence of mechanical damage or electrical discontinuity. The change in resistance shall not exceed ± 0.02 percent +0.01 ohm. There shall be no electrical discontinuity during test.

3.3.16 High temperature exposure. When resistors are tested as specified, there shall be no evidence of electrical or mechanical damage. The change in resistance shall not exceed ± 0.05 percent +0.01 ohm. Following this test, the dielectric withstanding voltage shall be as specified in 3.3.11, and the insulation resistance shall be 1,000 megohms, minimum.

3.3.17 Low temperature exposure. When resistors are tested as specified, there shall be no evidence of electrical or mechanical damage. The change in resistance shall not exceed ± 0.05 percent +0.01 ohm.

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). Only Tin/Silver Sn96.5Ag3.5 alloy high temperature solder with DLA Land and Maritime-VAT approval, may be used where high temperature solder is necessary.

3.5 Marking. Marking shall be in accordance with MIL-STD-1285, except the PIN shall be as specified in 1.2, with the manufacturer's CAGE number or trade mark and date code.

* 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 materials meet or exceed the operational and maintenance requirements, and promote 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-55182/9 Qualified Product List for at least one part, or perform the group A and group B inspections specified herein on a sample of parts 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 a approved source of supply.

3.8 Workmanship. Resistors shall be processed in such a manner as to be uniform in quality and free from defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Reliability assurance program. The reliability assurance program specified in MIL-PRF-55182 and maintained in accordance with MIL-STD-790 are not applicable to this document.

4.2 Qualification inspection. Qualification inspection in accordance with MIL-PRF-55182 is not applicable to this document.

4.2.1 Failure rate qualification. Failure rate qualification in accordance with MIL-PRF-55182 and MIL-STD-690 is not applicable to this document.

4.3 Conformance inspection

4.3.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A (ER level) and group B inspections.

4.3.1.1 Group A inspection. Group A inspection (ER level) shall be in accordance with MIL-PRF-55182. Part per million testing and verification as specified in MIL-PRF-55182 is not applicable to this document.

4.3.1.2 Group B inspection. Group B inspection shall be in accordance with MIL-PRF-55182 and MIL-PRF-55182/9 exceptions.

4.3.1.2.1 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).

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4.4 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-PRF-55182.

4.5 Terminal strength. Resistors shall be tested in accordance with MIL-PRF-55182, the following details and exceptions shall apply:

- a. The body be clamped and the lead pulled in a direction parallel and along the axis or the lead (see figure 2).
- b. Applied force: 2 pounds.

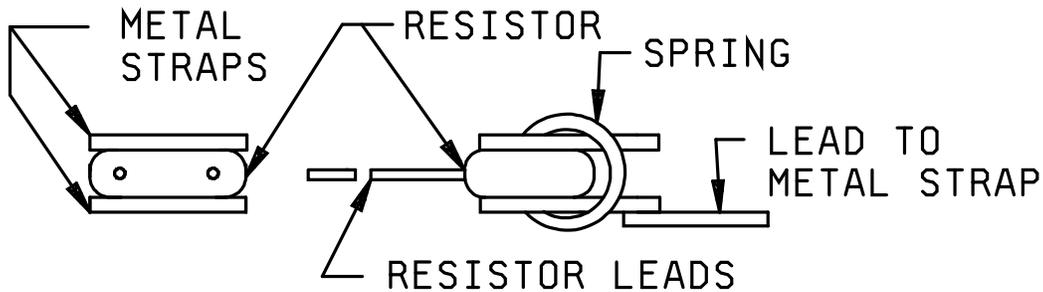


FIGURE 2. Metal strap for dielectric withstanding voltage, moisture resistance and insulation resistance.

4.6 Dielectric withstanding strength. Resistors shall be tested in accordance with MIL-PRF-55182, the following details and exceptions shall apply:

- a. Atmospheric pressure: 300 volts rms.
- b. Barometric pressure (reduced): 200 volts rms.

4.7 Moisture resistance. Resistors shall be tested in accordance with MIL-PRF-55182, except the resistor body shall be held between metal strips during polarization.

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.

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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. Resistor used in electronic circuits where the resistance temperature coefficient must be tightly controlled.

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. Requirements for packaging and packing.
- d. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements (see 4.3.1.2.1).

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 Pulse application. Designers are CAUTIONED on using these 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 5 second overload as part of the group A inspection of these military specifications.

6.5 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.

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* 6.6 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, 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 89039-*****	Vendors similar designation or type number <u>1/</u>	Vendor CAGE	Vendor's name and address
Resistance values: 1 ohm to 121 kilohms Resistance tolerances: A, B, D, F, T and V	S102C	0066A	Vishay Precision Group, Inc. 3 Great Valley Parkway Suite 150 Malvern, PA 19355-1417 <u>Plants:</u> Vishay Advanced Technologies, Ltd. 2 Dr. Felix Zandman Street Holon 58814, Israel
Resistance values: 1 ohm to 250 kilohms Resistance tolerances: A, B, D, F, T and V	S102C/K	2X034	Texas Components Corporation 1716 West Sam Houston Parkway North Houston, TX 77043
Resistance values: 1 ohm to 250 kilohms Resistance tolerances: A, B, D, F, T and V	MAR*****S-6	SB841	Alpha Electronics Corporation Hagoromo Bldg. 2F 1-2-10 Uchikanda, Chiyoda-ku Tokyo, Japan 101-0047 <u>Plant:</u> Alpha Electronics Corporation. 238-1 Aza Itaizawa Akita-ken, Nakatashiro, Yurihonjyo-shi Akita, 018-0901 Japan
Resistance values: 1 ohm to 121 kilohms Resistance tolerances: A, B, D, F, T and V	WAS	0KUU5	Wilbrecht LEDCO, Inc. 1400 Energy Park Dr Suite 20 St. Paul, MN 55108-5248 <u>Plant:</u> Wilbrecht LEDCO, Inc. 155 Wailbel Drive Huron, SD 57350

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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