

REVISIONS																			
LTR		DESCRIPTION								DATE (YR-MO-DA)				APPROVED					
A		Update vendor's name and hyperlinks.								25-06-02				Mark Rush					



Prepared in accordance with ASME Y14.24

Selected Item Drawing

Revision Status of Sheets																			
REV																			
SHEET																			
REV	A	A	A	A	A	A	A	A											
SHEET	1	2	3	4	5	6	7	8											

PMIC N/A Original date of drawing 2024-12-25	PREPARED BY Jesus V. Garcia III							DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990											
	CHECKED BY Andrew R. Ernst							TITLE Resistor, Fixed, Metal Foil, Current Sense, 2 Terminal, Style 2512											
	APPROVED BY																		
	SIZE A			CAGE CODE 037Z3				DWG NO. 25006											
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a fixed, metal foil, 6.35 mm x 3.05 mm, 2 terminal current sense, resistor. Space level testing is available for these parts.

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

25006 - *****FA

25006- - Drawing number
***** - Resistance (See 3.3.1)
F - Resistance tolerance (See 3.3.2)
A - Testing requirement (See 3.3.4)

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-32773](#) - Resistor, Fixed, Metal Strip, Current Sensing, Ambient Temperature Rated, Industrial, High Reliability, Space Level, General Specification for

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-202-108](#) - Method 108, Life (At Elevated Ambient Temperature)
[MIL-STD-790](#) - Established Reliability and High Reliability Qualified Products List (QPL) Systems for Electrical, Electronic, and Fiber Optic Parts Specification
[MIL-STD-1285](#) - Marking of Electrical and Electronic Parts

(Copies of these documents are available online at <https://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.

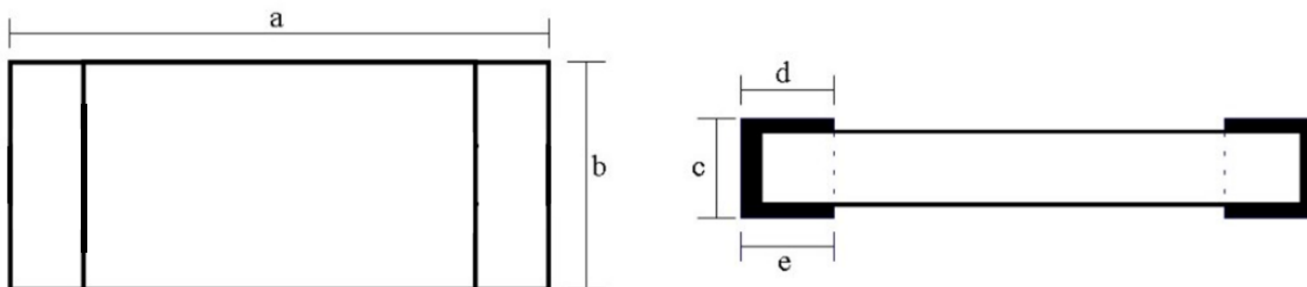
3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with [MIL-PRF-32773](#) and as specified herein.

3.2 Interface and physical dimensions. The resistor shall meet the interface and physical dimensions as specified in [MIL-PRF-32773](#) and herein (see [figure 1](#)).

3.2.1 Design documentation. The design documentation shall be in accordance with [MIL-PRF-32773](#) and unless otherwise specified in the contract or purchase order, shall be retained by the manufacturer and available for review by the acquiring activity or contractor upon request.

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a	b	c	d	e
6.35	3.05	0.40	0.50	0.90
±0.30	±0.20	±0.15	±0.20	±0.20

mm	Inches	mm	Inches	mm	Inches	mm	Inches
0.15	0.006	0.30	0.012	0.50	0.020	3.05	0.12
0.20	0.008	0.40	0.016	0.90	0.035	6.35	0.25

NOTES:

1. Dimensions are in millimeters.
2. Inch equivalents are given for general information only.
3. The pictorial view of the style above is given as representative 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. Resistor, Fixed, Metal Strip, Current Sense, Style 2512.

3.3 Electrical characteristics.

3.3.1 Resistance. The resistance values are expressed in ohms and is identified by five digits. The letter "R" is substituted for one of the significant digits to represent the decimal point. The succeeding digits of the group represent the significant figures. The discrete values specified in table I are the standard offerings. The resistance values may be of any value within the resistance range (see [table II](#)) and maybe ordered depending on the manufacturer's capability, however, it is preferred that the values be chosen from those listed in table I.

TABLE I. Resistance value designations.

Resistance code	Resistance ohms	Resistance code	Resistance ohms	Resistance code	Resistance ohms
0R005	0.005	0R039	0.039	0R200	0.200
R0068	0.0068	0R040	0.040	0R220	0.220
0R010	0.010	0R047	0.047	0R240	0.240
0R012	0.012	0R050	0.050	0R270	0.270
0R015	0.015	0R056	0.056	0R300	0.300
0R020	0.020	0R068	0.068	0R330	0.330
0R022	0.022	0R082	0.082	0R470	0.470
0R025	0.025	0R100	0.100	0R500	0.500
0R027	0.027	0R120	0.120	0R680	0.680
0R030	0.030	0R150	0.150	1R000	1.000
0R033	0.033	0R180	0.180		

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3.3.1.1 Resistance range. The resistance range shall be 0.005 ohm to 1.00 ohm.

TABLE II. Resistance value designations.

Designation	Resistance ohms
0R005 to 1R000 incl.	0.005 to 1.000 incl.

3.3.1.2 Resistance tolerances. The resistance tolerances shall be (D) ± 0.5 percent and (F) ± 1 percent.

3.3.2 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).

3.3.3 Resistance temperature characteristic. The resistance temperature characteristic shall be ± 50 ppm/ $^{\circ}\text{C}$.

3.3.4 Testing requirements. The requirement for testing shall be identified by a single letter in accordance with table III.

TABLE III. Testing.

Symbol	Testing requirements
A (see 4.3.1)	Group A (M level) <u>1/</u>
B (see 4.3.2)	Group A (T level), Group B (T level) <u>1/</u>
T (see 4.3.3)	Group A (T level), Group B (T level), <u>1/</u> and Life test (see 4.5)

1/ Per MIL-PRF-32773.

3.3.5 Temperature range. The temperature range shall be -65°C to $+170^{\circ}\text{C}$.

3.3.6 Power rating. The power rating shall be 2.0 watts at $+70^{\circ}\text{C}$, derated to zero power at $+170^{\circ}\text{C}$ (see figure 2).

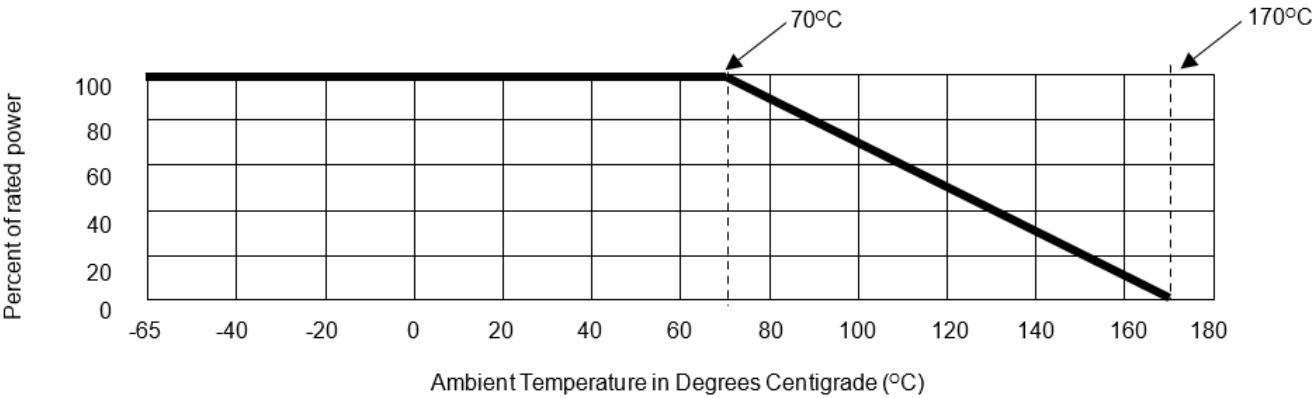


FIGURE 2. Derating curves for high ambient temperatures.

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

3.4 Thermal shock. When resistors are tested as specified in [MIL-PRF-32773](#). There shall be no evidence of mechanical damage; the change in resistance shall not exceed ± 0.5 percent ± 0.001 ohm.

3.5 High Temperature Exposure. When resistors are tested as specified in [MIL-PRF-32773](#). There shall be no evidence of mechanical damage; the change in resistance shall not exceed ± 0.5 percent ± 0.001 ohm.

3.6 Solder mounting integrity. When resistors are tested as specified in [MIL-PRF-32773](#), there shall be no evidence of mechanical damage. A force of 3.0 kilogram shall be used.

3.7 Short time overload. When resistors are tested as specified in [MIL-PRF-32773](#), exception the resistors shall be submitted to 3.5 times the rated power for a duration of 5 second and there shall be no evidence of mechanical damage and the change in resistance shall not exceed ± 0.25 percent ± 0.001 ohm.

3.8 Life test (test code T). Resistors shall be tested in accordance with [MIL-STD-202-108](#), there shall be no evidence of mechanical damage. The change in resistance between the initial measurement and any succeeding measurements up to and including 1,000 hours shall not exceed ± 0.5 percent ± 0.001 ohm. (see [4.4](#)).

3.9 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, date, and lot codes.

3.10 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.

3.11 Manufacturer eligibility. To be eligible for being added as an approved source of supply, a manufacturer shall be listed on the [MIL-PRF-32773 Qualified Products List](#) for at least one part, or see [table III](#) on a sample of parts agreed upon by the manufacturer and DLA Land and Maritime-VAT.

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

3.12 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-32773](#) 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 Conformance inspection.

4.3.1 Inspection of product for delivery (test code A). Inspection of product for delivery for each PIN ordered shall consist of group A (M level) inspection per [MIL-PRF-32773](#).

4.3.2 Inspection of product for delivery (test code B). Inspection of product for delivery for each PIN ordered (each production lot) shall consist of: Group A (T level) and Group B (T level) inspection per [MIL-PRF-32773](#).

4.3.3 Inspection of product for delivery (test code T). Inspection of product for delivery for each PIN ordered (each inspection lot) shall consist of: Group A (T level), Group B (T level) inspection per [MIL-PRF-32773](#), and Life test (see [3.8](#) and [4.5](#)) specified herein.

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4.4 Group A inspection (subgroups 1 and 2). Resistors shall be tested as specified in [MIL-PRF-32773](#).

4.4.1 Subgroup 3 (visual inspection). The subgroup 3 test shall be performed on an inspection lot basis for product level M and production lot basis for space level product T. A sample of parts shall be randomly selected in accordance with table V. If one or more defects are found, the lot shall be reworked or screened and defectives removed. After reworking or screening and removal of defectives, a new sample of parts shall be randomly selected in accordance with table V. If one or more defects are found in this second sample for the same quality characteristic, the lot shall be rejected and shall not be supplied to this specification.

TABLE V Sampling plans for subgroup 3, subgroup 4, and subgroup 5.

Lot size	Sample size for subgroup 3	Sample size for subgroup 4	Sample size for subgroup 5
1 to 5	100%	100%	12
6 to 13	100%	5	
14 to 150	37	5	
15 to 280	37	5	
281 to 500	37	5	
501 to 1,200	37	5	
1,201 to 3,200	37	5	
3,201 to 10,000	74	20	
10,001 to 35,000	74	20	
35,001 to 150,000	74	20	

4.4.2 Subgroup 4 (solderability) test. The subgroup 4 test shall be performed on an inspection lot basis for product level M and production lot basis for space level product T. A sample shall be randomly selected from each lot in accordance with table V. As an option, the manufacturer may use electrical rejects from the subgroup 2 tests for all or part of the sample. If there are one or more defects, the lot shall be considered to have failed. The subgroup 4 test shall be performed on an inspection lot basis for product level M and production lot basis for space level product T. A sample shall be randomly selected from each lot in accordance with table V. As an option, the manufacturer may use electrical rejects from the subgroup 2 tests for all or part of the sample. If there are one or more defects, the lot shall be considered to have failed.

4.4.3 Subgroup 5. The manufacturer may use electrical rejects from the subgroup 1 screening tests for all or part of the samples to be used for the subgroup 5 testing. In case there are one or more defects, the lot shall be considered to have failed.

- a. Laser marked resistors. Twelve samples of laser marked resistors shall be selected randomly from each inspection lot and subjected to the subgroup 4 tests (six to resistance to solvents and six to marking legibility).
- b. Ink marked or color dot marked resistors. Six resistors marked with color dots or screen-printed characters shall be subjected to resistance to solvents test only.

4.4.4 Rejected lots. In the event of one or more defects, the inspection lot is rejected. If the lot fails this solderability test, the lot may be reworked and retested. Any inspection lot that fails the solderability retest shall be considered to have failed and that lot will not be supplied to the requirements of the specification.

4.4.5 Disposition of samples. The solderability test is considered a destructive test and samples submitted to the solderability test shall not be supplied on the contract.

4.5 Life test (test code T). Resistors shall be tested in accordance with [MIL-STD-202-108](#). The following details and exceptions shall apply:

- a. Method of mounting: Resistors shall be mounted on an appropriate test board(s).
- b. Test temperature and tolerance: 70°C ±5°C.
- c. Initial resistance measurement of mounted resistors: Measurements may be made inside or outside the chamber. The DC resistance shall be measured in accordance with 4.8.3 of [MIL-PRF-32773](#).
 - (1) Inside chamber: When measurements are to be made inside the chamber, the initial DC resistance shall be measured after mounting at the applicable test temperature, after a thirty minutes +90 minutes, -15 minutes stabilization period, and within 8 hours of exposure of the resistors to the test temperature. This initial measurement shall be used as the reference DC resistance for all subsequent measurements under the same condition.
 - (2) Outside chamber: When measurements are to be made outside the chamber, the initial DC resistance shall be measured after mounting at room temperature. This initial measurement shall be used as the reference DC resistance for all subsequent measurements under the same condition.
- d. Operating conditions: Rated DC continuous working voltage or filtered or non-filtered full wave rectified ac voltage, shall be applied intermittently, 90 minutes "on" and 30 minutes "off", for the applicable number of hours and at the 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. Test condition: 1,000 hours.
- f. Measurements during test: DC resistance shall be measured at the end of the 30 minutes "off" periods after 250 hours +72 hours, -24 hours; 500 hours +72 hours, -24 hours; 1,000 hours +72 hours, -24 hours have elapsed.
- g. Examination after test: Resistors shall be examined for evidence of mechanical damage.

4.6 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-32773](#).

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 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 DLA Land and Maritime CAGE CODE (037Z3) and 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.

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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 of conditions, these resistors can be electrically damaged, by electrostatic charges, and drift from specified value. Users should consider this phenomenon 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 onetime pulse (Short-time overload) as part of the group B inspection of [MIL-PRF-32773](#).

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) 692-4546 or DSN 850-4546.

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 or contact DLA Land and Maritime, Attn: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-4546 or DSN 850-4546.

DLA Land and Maritime drawing PIN 25006-*****	Vendors similar designation or type number <u>1/</u>	Vendor CAGE	Vendor's name and address
Resistance: All values (see 3.3.1) Resistance tolerance: D and F (see 3.3.2) Testing requirement: A, B, and T (see 3.3.5)	VMS-*****	07XX3	Isabellenhuette USA, Inc. 1199 Gar Highway Swansea, MA 02777-4262 <u>Plant:</u> Isabellenhütte Heusler GmbH & Co. KG Eibacher Weg 3-5 Dillenburg, Germany 35683 https://www.isabellenhuette.de/

1/ Parts must be purchased to the DLA Land and Maritime CAGE CODE (037Z3) and PIN to assure that all performance requirements and test are met.

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