

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

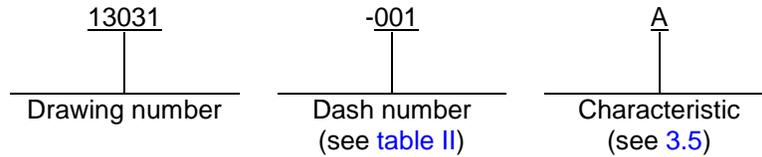
Prepared in accordance with [ASME Y14.100](#)

REV STATUS OF PAGES	REV																			
	PAGES	1	2	3	4	5	6	7	8	9	10									
PMIC N/A	PREPARED BY Fred W. Lester							DESIGN ACTIVITY DLA LAND AND MARITIME COLUMBUS, OH												
Original date of drawing 9 July 13	CHECKED BY Kurt L. Anderson							TITLE FUSE, INSTRUMENT, SUBMINIATURE												
	APPROVED BY Michael A. Radecki																			
	SIZE A	CODE IDENT. NO. 037Z3							DWG NO. 13031											
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1. SCOPE

1.1 Scope. This drawing describes the requirements for a family of subminiature instrument type fuses for use in overcurrent protection.

1.2 Part or Identifying Number (PIN). The complete PIN shall be 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-15160](#) - Fuses, Instrument, Power, and Telephone, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-202](#) - Test Methods for Electronic and Electrical Component Parts.

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

(Copies of these documents are available online at <http://quicksearch.dla.mil/> or <https://assist.dla.mil> or from DLA Document Services, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation or contact.

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION

[J-STD-020D.1](#) - Moisture/Reflow sensitivity Classification for Nonhermetic Solid State Surface Mount Devices.

(Copies of this document are available online at <http://www.jedec.org/> or from JEDEC, 3103 North 10th Street, Suite 240-S, Arlington, VA 22201-2107.)

2.4 Order of precedence. 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.

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3. REQUIREMENTS

3.1 Interface and physical dimensions. The individual item requirements shall be as specified herein and in [table I](#) and [table II](#).

3.2 Operating temperature range. The operating temperature range shall be -55°C to +125°C.

3.3 Moisture sensitivity level. The moisture sensitivity level shall be level 1 in accordance with [J-STD-020D.1](#).

3.4 Materials. This fuse shall have a ceramic body with silver plated caps.

3.5 Electrical characteristics and other requirements. Each PIN (see [1.2](#)) shall include a suffix representing either characteristic A or B. These characteristics are described in [table I](#).

3.6 Voltage rating. See [table II](#).

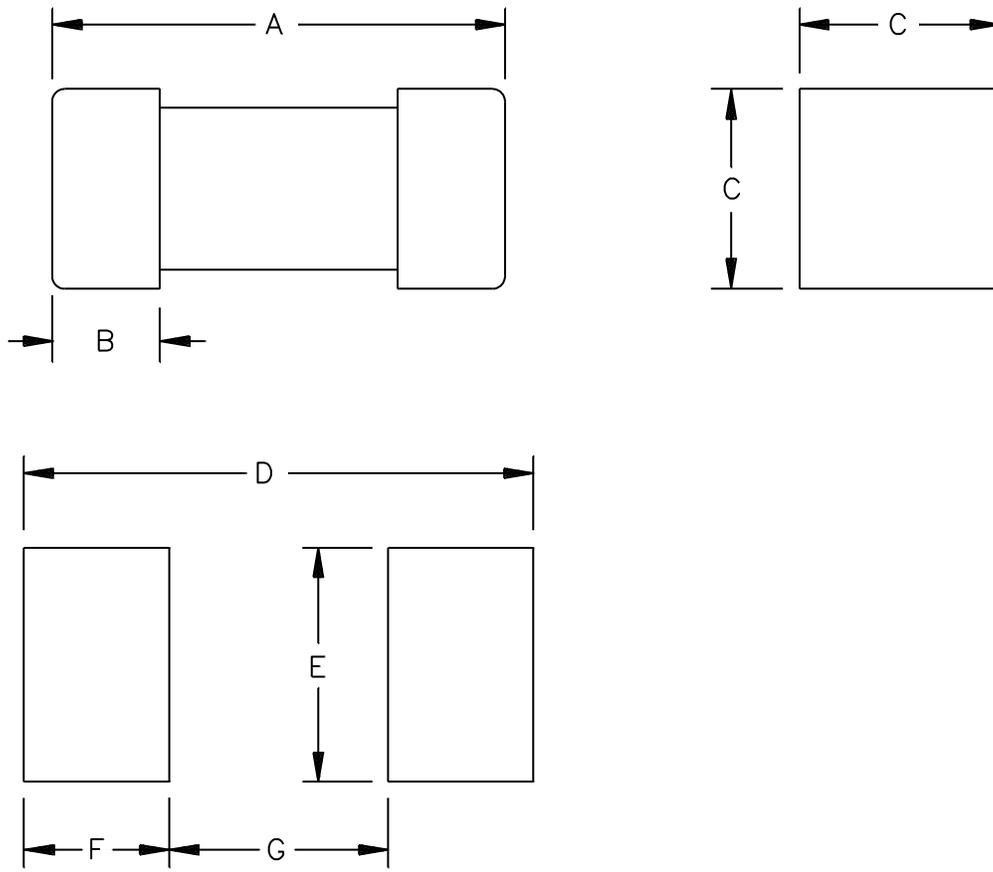
3.7 Current rating. See [table II](#).

3.8 Dimensions and configurations. See [figure 1](#).

3.9 Current-carrying capacity. Current-carrying capacity shall be in accordance with [MIL-PRF-15160](#) and [table I](#).

3.10 Overload interrupt. Overload interrupt shall be in accordance with [MIL-PRF-15160](#) and [table I](#).

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RECOMMEDED PAD LAYOUT

Ltr	mm		Inches	
	Min	Max	Min	Max
A	5.90	6.30	0.232	0.248
B	---	.145	---	0.006
C	2.44	2.94	0.096	0.116
D	---	6.86	---	0.270
E	---	3.15	---	0.124
F	---	1.96	---	0.077
G	---	2.95	---	0.116

NOTES:

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

FIGURE 1. Design and dimensions.

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TABLE I. Characteristics.

Characteristic	Rating (percent)	Opening time
A	100	4 hours, minimum
A	200	10 seconds, maximum (.62 ampere to 10 ampere)
A	200	30 seconds, maximum (12 ampere to 15 ampere)
B	100	4 hours, minimum
B	200	1 second, minimum 1 minute, maximum

TABLE II. Fuse dash number and applicable characteristics.

DLA Land and Maritime drawing PIN 13031-	Current rating (amperes)	Configuration	Voltage rating	AC short circuit interrupt	
				125 volts ac	125 volts dc
001	1/16	A	125	50 A	50 A
002	8/100	A	125	50 A	50 A
003	1/10	A	125	50 A	50 A
004	1/8	A	125	50 A	50 A
005	16/100	A	125	50 A	50 A
006	2/10	A	125	50 A	50 A
007	1/4	A	125	50 A	50 A
008	315/1000	A	125	50 A	50 A
009	3/8	A	125	50 A	50 A
010	3/8	B	125	50 A	50 A
011	4/10	A	125	50 A	50 A
012	1/2	A	125	50 A	50 A
013	1/2	B	125	50 A	50 A
014	63/100	A	125	50 A	50 A
015	3/4	A	125	50 A	50 A
016	3/4	B	125	50A	50 A
017	8/10	A	125	50 A	50 A
018	1	A	125	50 A	50 A
019	1	B	125	50 A	50 A
020	1 1/4	A	125	50 A	50 A
021	1 1/2	A	125	50 A	50 A
022	1 1/2	B	125	50 A	50 A
023	1 6/10	A	125	50 A	50 A

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TABLE II. Fuse dash number and applicable characteristics - continued.

DLA Land and Maritime drawing PIN 13031-	Current rating (amperes)	Configuration	Voltage rating	AC short circuit interrupt	
				125 volts ac	125 volts dc
024	2	A	125	50 A	50 A
025	2	B	125	50 A	50 A
026	2 1/2	A	125	50 A	50 A
027	2 1/2	B	125	50 A	50 A
028	3	A	125	50 A	50 A
029	3	B	125	50 A	50 A
030	3 15/100	A	125	50 A	50 A
031	3 1/2	A	125	50 A	50 A
032	3 1/2	B	125	50 A	50 A
033	4	A	125	50 A	50 A
034	4	B	125	50 A	50 A
035	5	A	125	50 A	50 A
036	5	B	125	50 A	50 A (72 volts, dc)
037	6 3/10	A	125	50 A	50 A
038	7	A	125	50 A	50 A
039	7	B	72	50 A	50 A (72 volts, dc)
040	8	B	72	50 A	50 A (72 volts, dc)
041	10	A	125	35A	50 A
042	12	A	125	50 A (65 volts dc)	50 A (65 volts dc)
043	12	B	72	50 A	50 A (72 volts, dc)
044	15	A	125	50 A (65 volts dc)	50 A (65 volts dc)

3.11 Short circuit interrupt. Short circuit interrupt shall be in accordance with MIL-PRF-15160 and table II.

3.12 Solderability. Solderability shall be in accordance with MIL-STD-202, method 208.

3.13. Insulation resistance (after opening). Insulation resistance (after opening) shall be in accordance with MIL-STD-202, method 302, test condition A (10,000 ohms minimum).

3.14 Thermal shock. Thermal shock shall be in accordance with MIL-STD-202, method 107, test condition B, 5 cycles, (-65°C to +125°C), 15 minutes at each extreme.

3.15 Mechanical shock. Mechanical shock shall be in accordance with MIL-STD-202, method 213, test condition I: Deenergized. 100G's peak amplitude, sawtooth wave 6 milliseconds (ms) duration, 3 cycles XYZ+xyz = 18 shocks.

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3.16 Vibration. Vibration shall be in accordance with MIL-STD-202, method 201: 0.03 inch amplitude, 10 - 55 Hz in 1 minute. 2 hours each XYZ = 6 hours.

3.17 Moisture resistance. Moisture resistance shall be in accordance with MIL-STD-202, method 106, 10 cycles.

3.18 Salt spray. Salt spray shall be in accordance with MIL-STD-202, method 101, test condition B for 48 hours.

3.19 Resistance to soldering heat. Resistance to soldering heat shall be in accordance with MIL-STD-202, method 210, test condition B (10 seconds at 260°C).

3.20 Marking. Marking shall be in accordance with MIL-STD-1285, except the fuses shall be marked with the manufacturer's name or Commercial and Government Entity (CAGE) code and current rating.

3.21 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of crystal oscillator components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.2).

3.22 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.

3.23 Manufacturer eligibility. To be eligible for listing as an approved source of supply a manufacturer shall perform all testing as specified herein on a sample of parts as agreed upon by the manufacturer and DLA Land and Maritime-VA.

3.24 Certificate of compliance. A certificate of compliance shall be required from manufacturers requesting to be an approved source of supply (see 4.4 and 6.6).

3.25 Workmanship. The subminiature, instrument fuses shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Conformance inspection.

4.1.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and B inspections of MIL-PRF-15160.

4.1.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group A requirements in lieu of performing group A tests (see 6.4c).

4.2 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection, examination, and test requirements specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections, examinations, or tests set forth in this description where such inspections, examinations, and tests are deemed necessary to assure supplies and services conform to prescribed requirements.

4.3 Contractor certification statement. The contractor shall certify and maintain objective quality evidence that the product offered meets the requirements of this drawing, and that the product conforms to the producer's own drawings, specifications, standards, quality assurance practices, and is the same as the product provided as a bid sample. The Government reserves the right to require proof of such conformance prior to the first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

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4.4 Certificate of compliance. A certificate of compliance shall accompany all subminiature, instrument fuses supplied to this drawing.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.5). 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 which may be helpful, but is not mandatory.)

6.1 Intended use. Subminiature, instrument fuses conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing, this drawing will become inactive for new design. The qualified product will be the preferred item for all applications.

6.2 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).

6.3 Environmentally preferable materials. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Included in the EPA list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see [Section 3](#)).

6.4 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see [1.2](#)).
- b. Requirements for delivery of 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 (when applicable, see [4.1.1](#)).
- c. Whether the manufacturer performs the group A tests or provides certification of compliance with group A requirements.
- d. Requirements for notification of change in product to acquiring activity, if applicable.
- e. Requirements for packaging, and packing.

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6.5 Users of record. Coordination of this document for future revisions is coordinated only with the approved sources 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 CircuitProtect@dla.mil or if in writing to: DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0548 or DSN 850-0548.

6.6 Submission of certificate of compliance. The certificate of compliance submitted to DLA Land and Maritime/VAT, prior to listing as an approved source, will state the manufacturer's product meets the requirements herein.

6.7 Approved source of supply. An 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 CircuitProtect@dla.mil, or by contacting DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0548 or DSN 850-0548.

DLA Land and Maritime drawing PIN 13031- 1/	Vendor similar designation or type number <u>2/</u>	Vendor CAGE	Vendor name, address and contact information
001	453.062	75915	Littelfuse Incorporated 8755 W. Higgins Road Chicago, IL 60631-2708 Phone number (773) 628-1000 Facsimile number (773) 628-0370 E-mail: electronics@littelfuse.com URL: http://www.littelfuse.com
002	453.080		
003	453.100		
004	453.125		
005	453.160		
006	453.200		
007	453.250		
008	453.315		
009	453.375		
010	454.375		
011	453.400		
012	453.500		
013	454.500		
014	453.630		
015	453.750		
016	454.750		
017	453.800		
018	453001		
019	454001		
020	4531.25		
021	4530.15		
022	45401.5		
023	45301.6		
024	453002		
025	454002		

See footnotes at end of table.

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DLA Land and Maritime drawing PIN 13031- <u>1/</u>	Vendor similar designation or type number <u>2/</u>	Vendor CAGE	Vendor name, address and contact information
026	45302.5	75915	Littelfuse Incorporated 8755 W. Higgins Road Chicago, IL 60631-2708 Phone number (773) 628-1000 Facsimile number (773) 628-0370 E-mail: electronics@littelfuse.com URL: http://www.littelfuse.com
027	45402.5		
028	453003		
029	454003		
030	4533.15		
031	45303.5		
032	45403.5		
033	453004		
034	454004		
035	453005		
036	454005		
037	45306.3		
038	453007		
039	454007		
040	454008		
041	453010		
042	453012		
043	454012		
044	453015		

- 1/ Parts must be purchased to this DLA Land and Maritime PIN to assure that all performance requirements and tests are met.
- 2/ CAUTION: Do not use this number for item acquisition and marking. Items acquired to this number may not satisfy the performance requirements of this drawing.

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