MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, DIODE, SILICON

TYPE 1N31

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for a silicon semiconductor diode for use as a video detector.

1.2 Physical dimensions. See figure 1.

1.3 Ratings and characteristics.

<table>
<thead>
<tr>
<th>Limits</th>
<th>Rv (Ohms)</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min.</td>
<td>6,000</td>
<td>55</td>
</tr>
<tr>
<td>Max.</td>
<td>23,000</td>
<td>---</td>
</tr>
</tbody>
</table>

OPERATING AMBIENT TEMPERATURE: -65° to +70°C.
STORAGE TEMPERATURE: -65° to +70°C.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids, or request for proposal, form a part of the specification to the extent specified herein:

SPECIFICATION
MILITARY

STANDARD
MILITARY

DRAWING
ARMED SERVICES ELECTRO-STANDARDS AGENCY
118-JAN - Holder, Test, Figure of Merit; for Crystal Diode Type 1N31.

(Copies of specifications, standards, drawings and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

FSC 5961
NOTES:
1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. Finish: .0002 (.01 mm) tin plate over nickel flash, or .001 (.03 mm) gold plate or .0001 (.00 mm) silver plate.
4. Axis of center conductor (pin) not to deviate from axis of outer conductor referred to its outside diameter more than .004 (.10 mm).
5. Forward polarity units shall have the cathode connected to the center pin.
6. Outside diameter, .215 (5.46 mm) to .220 (5.59 mm), applies for length of dimension "J."
7. This device shall be free of sharp edges and burrs.

FIGURE 1. Semiconductor device, diode, type 1N31.
3. REQUIREMENTS

3.1 General. Requirements shall be in accordance with MIL-S-19500 and as specified herein.

3.2 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-S-19500, and as follows:

- M - - - - - - - - Figure of merit.
- RA - - - - - - - - Noise-generating resistance.
- RV - - - - - - - - Video resistance.

3.3 Design, construction, and physical dimensions. The diode shall be of the design, construction, and physical dimensions specified on figure 1.

3.3.1 Plating. The diode shall be plated as specified on figure 1.

3.4 Performance characteristics. Performance characteristics shall be as specified in tables I and II.

3.5 Marking. The marking shall be as specified in MIL-S-19500, except that the country of origin may be omitted.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-S-19500, and as specified herein.

4.2 Test conditions. Unless otherwise specified herein, the test conditions, when applicable, shall be as follows:

- \( P = 5 \mu W \) max
- \( f = 9,375 \pm 10 \text{ MHz} \)
- \( RA = 1,200 \text{ ohms} \)
- Holder 118-JAN

4.3 Qualification inspection. Qualification inspection shall consist of the examinations and tests specified in tables I and II.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the examinations and tests specified in groups A and B.

4.4.1 Group A inspection. Group A inspection shall consist of the examinations and tests specified in table I.

4.4.2 Group B inspection. Group B inspection shall consist of the examinations and tests specified in table II.

4.5 Methods of examination and test. Methods of examination and test shall be as specified in tables I and II.
### TABLE I. Group A inspection

<table>
<thead>
<tr>
<th>Examination or test</th>
<th>MIL-STD-750 Method</th>
<th>MIL-STD-750 Details</th>
<th>LTPD</th>
<th>Limits</th>
<th>Symbol</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgroup 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual and mechanical examination</td>
<td>2071</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video resistance</td>
<td>4131</td>
<td>Test method A or B</td>
<td>RV</td>
<td>6,000</td>
<td>23,000</td>
<td>Ohms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figure of merit (see 4.2)</td>
<td>4111</td>
<td></td>
<td>M</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE II. Group B inspection

<table>
<thead>
<tr>
<th>Examination or test</th>
<th>MIL-STD-750 Method</th>
<th>MIL-STD-750 Details</th>
<th>LTPD</th>
<th>Limits</th>
<th>Symbol</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgroup 1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical dimensions</td>
<td>2066</td>
<td>(See figure 1)</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dim. A, C, D, E, F, and N</td>
<td>2066</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dim. B, J, k, and note 2;</td>
<td>2066</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Dim. E, G, K, and note 1 are for qualification only.)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Subgroup 2</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal shock</td>
<td>1051</td>
<td>Test cond F; T(high) = +70°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Immersion</td>
<td>1011</td>
<td>Test cond. A, 1 cycle; T = 40°C max.</td>
<td></td>
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</tr>
<tr>
<td>End points:</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video resistance</td>
<td>4131</td>
<td>Test method A or B</td>
<td>RV</td>
<td>5,000</td>
<td>24,000</td>
<td>Ohms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figure of merit (see 4.2)</td>
<td>4111</td>
<td></td>
<td>M</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subgroup 3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burnout by repetitive pulsing</td>
<td>4141</td>
<td>t = 1 minute; Vp = 1.5 Vdc; Rg = 25 ohms; tp = 1.0 µsec; PRF = 800 - 1,000 pps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(See figure 2)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>End points:</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(Same as for subgroup 2)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Subgroup 4</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock</td>
<td>2016</td>
<td>Nonoperating; 500 G; t = 0.5 msec; 5 blows in each orientation: X1, Y1, and Y2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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4
### TABLE II. Group B inspection - Continued

<table>
<thead>
<tr>
<th>Examination or test</th>
<th>MIL-STD-750</th>
<th>LTPD</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Method</td>
<td>Details</td>
<td>Symbol</td>
</tr>
<tr>
<td><strong>Subgroup 4 - Continued</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration, variable frequency</td>
<td>2056</td>
<td>50 to 2,000 Hz</td>
<td>---</td>
</tr>
<tr>
<td>Constant acceleration</td>
<td>2006</td>
<td>Nonoperating; 5,000 G; in X1, Y1, and Y2 orientations</td>
<td>---</td>
</tr>
<tr>
<td><strong>End points:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Same as for subgroup 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subgroup 5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High temperature life (nonoperating)</td>
<td>1031</td>
<td>$T_A = 70^\circ$C</td>
<td>$\lambda = 20$</td>
</tr>
<tr>
<td><strong>End points:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Same as for subgroup 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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![DIAGRAM](image)

**FIGURE 2.** Pulse circuit for test burnout.

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5
5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery. Preparation for delivery shall be in accordance with MIL-S-19500.

6. NOTES

6.1 The notes specified in MIL-S-10550 are applicable to this specification.

Custodians:
Army - EL
Navy - EC
Air Force - 17

Review activities:
Army - MI, MU
Air Force - 11, 80
DSA - ES

User activities:
Army - SM
Navy - AS, OS, MC, CG, SH
Air Force - 13, 15, 19

Preparing activity:
Navy - EC

Agent:
DSA - ES

(Project 5961-0195-7)
This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

**SPECIFICATION**

**ORGANIZATION (of submitter)  CITY AND STATE**

**CONTRACT NO.  QUANTITY OF ITEMS PROCURED  DOLLAR AMOUNT**

**MATERIAL PROCURED UNDER A**

☐ DIRECT GOVERNMENT CONTRACT  ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   A. GIVE PARAGRAPH NUMBER AND WORDING.

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?
   ☐ YES  ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

**SUBMITTED BY** (Printed or typed name and activity)  **DATE**

DD FORM 1426  REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE