PERFORMANCE SPECIFICATION SHEET

LIGHT EMITTING DIODE, RED, THROUGH-HOLE MOUNT AND PANEL MOUNT ASSEMBLY, CLEAR AND DIFFUSED LENS, TYPES 1N6092, 1N6609, M19500/51901, M19500/51902, M19500/51903 AND M19500/51904, QUALITY LEVELS JAN AND JANTX

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

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-PRF-19500.

1. SCOPE

1.1 Scope. This specification covers the performance requirements for hermetically-sealed red discrete and panel mount light emitting diodes. Two levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Package outlines. The device packages for the device types are a modified TO–46 in accordance with figure 1 and panel mount assembly in accordance with figure 2.

1.3 Maximum ratings.

<table>
<thead>
<tr>
<th>$I_r$</th>
<th>$I_{ptr}$</th>
<th>$V_{(BR)}$</th>
<th>$P_{FM}$</th>
<th>$T_{op}$ and $T_{stg}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>mA dc</td>
<td>mA (pk)</td>
<td>V dc</td>
<td>mW (pk)</td>
<td>°C</td>
</tr>
<tr>
<td>35</td>
<td>60</td>
<td>1.0</td>
<td>5</td>
<td>–65 to +100</td>
</tr>
</tbody>
</table>

(1) Pulse width maximum 0.5 ms and $P_{FM(AV)}$ less than $P_F$.
(2) $I_{ptr} = 1 \mu s$ pulse width, 300 pulses per second (pps).
(3) $I_R = 10 \mu A$ dc.
(4) Derate linearly from +50°C at 2.4 mW/°C.

1.4 Characteristics, radiometric (physical) and photometric (visual).

<table>
<thead>
<tr>
<th>Limits</th>
<th>$I_{V1}$</th>
<th>$I_{V2}$</th>
<th>$V_F$</th>
<th>$\lambda_V$</th>
<th>$I_R$</th>
<th>$V_R = 3 \text{ V}$</th>
<th>$C$</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Max</td>
<td>mcd</td>
<td>mcd</td>
<td>V dc</td>
<td>nm</td>
<td>µA dc</td>
<td>pF</td>
<td>Red</td>
<td></td>
</tr>
</tbody>
</table>

(1) Applies to diffused lens types only (see 1.5.2.2 and figure 3).
(2) Applies to clear lens types only (see 1.5.2.2 and figure 4).

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.
1.5 **Part or Identifying Number (PIN).** The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.8 for PIN construction example and 6.9 for a list of available PINs.

1.5.1 **JAN certification mark and quality level.** The JAN certification mark and quality level designators for encapsulated devices that are applicable for this specification sheet from the lowest to the highest level are as follows: "JAN" and "JANTX".

1.5.2 **Device types.** There are two different designation system used for the device types of red LEDs covered by this specification sheet. Listed below are the specifics of the device types available under the two systems.

1.5.2.1 **Component designations.** The component designations system is a JEDEC based system that uses the first number and letter symbol "1N" and the second number symbols "6092" and "6609".

1.5.2.2 **Specification designations.** The second is a military PIN based designation system that uses "M19500/" followed by the specification sheet number "519" and a sequential two digit number "01" through "04".

<table>
<thead>
<tr>
<th>Designator</th>
<th>Lens type</th>
<th>Package type</th>
<th>Quality levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1N6092</td>
<td>Diffused</td>
<td>Through-hole mount</td>
<td>JAN and JANTX</td>
</tr>
<tr>
<td>1N6609</td>
<td>Clear</td>
<td>Through-hole mount</td>
<td>JAN and JANTX</td>
</tr>
<tr>
<td>M19500/51901</td>
<td>Diffused</td>
<td>Panel mount assembly</td>
<td>JAN only</td>
</tr>
<tr>
<td>M19500/51902</td>
<td>Diffused</td>
<td>Panel mount assembly</td>
<td>JANTX only</td>
</tr>
<tr>
<td>M19500/51903</td>
<td>Clear</td>
<td>Panel mount assembly</td>
<td>JAN only</td>
</tr>
<tr>
<td>M19500/51904</td>
<td>Clear</td>
<td>Panel mount assembly</td>
<td>JANTX only</td>
</tr>
</tbody>
</table>

1.5.3 **Lens types.** There are two lens types available, diffused and clear. See 6.5 and figures 3 and 4 for the relative luminous intensity of the two lens types. The clear lens types are considered sunlight viewable and are for applications requiring readability in bright sunlight (see 6.5.2).

1.5.4 **Suffix symbols.** Suffix symbols are not applicable for this specification sheet.

1.5.5 **Lead finish.** The lead finishes applicable to this specification sheet are listed on QPDSIS-19500.

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 cited 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**

DEPARTMENT OF DEFENSE STANDARDS


(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 General. The individual item requirements shall be as specified in MIL-PRF-19500 and as modified herein.

3.2 Qualification. Devices furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturer's list (QML) before contract award (see 4.2 and 6.3).

3.3 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500 and herein.

\[ I_P \] Peak operating forward pulse current.
\[ I_{tr} \] Peak transient forward current.
\[ I_V \] Luminous intensity (the subscript V is used to designate a photometric or visual quantity to differentiate from I as used herein for current).
\[ \lambda_V \] Peak radiometric wavelength of diode light emission.
\[ \text{mcd} \] Milli-candela; the candela is a unit of luminous intensity defined such that the luminance of a blackbody radiator at the temperature of solidification of platinum is 60 candelas per square centimeter.
\[ \Theta \] The angle at or off the axis of symmetry of a light source at which luminous intensity is measured.

3.4 Interface and physical dimensions. The interface requirements and physical dimensions shall be as specified in MIL-PRF-19500 and on figures 1 and 2.

3.4.1 Lead finish. The lead finish shall be solderable as defined in MIL-PRF-19500, MIL-STD-750 and herein. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4.2 Polarity. The polarity of the device types shall be as shown on figures 1 and 2.

3.4.3 Terminal lead length. Terminal lead lengths other than that specified on figures 1 and 2 may be furnished when so stipulated in the acquisition document (see 6.2) where the devices covered herein are required directly for particular equipment-circuit installation or for automatic-assembly-technique programs.

3.5 Marking. Devices shall be marked as specified in MIL-PRF-19500.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4, and tables I and II herein.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in tables I and II herein.

3.8 Workmanship. Devices shall be processed in such a manner as to be uniform in quality and shall be free from other defects that will affect life, serviceability, or appearance.
NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Cathode lead; both leads isolated from case.
4. Glass/metal hermetic can.
5. Colored lens or clear glass lens (see 6.2).
6. For sunlight viewable LEDs, dimension BH is .213 inch (5.41 mm) minimum and .260 inch (6.60 mm) maximum (see 6.2).
7. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 1. Physical dimensions for types JAN1N6092, JANTX1N6092, JAN1N6609, and JANTX1N6609.
<table>
<thead>
<tr>
<th>Inches</th>
<th>mm</th>
<th>Inches</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.022</td>
<td>0.56</td>
<td>0.133</td>
<td>3.38</td>
</tr>
<tr>
<td>0.025</td>
<td>0.64</td>
<td>0.139</td>
<td>3.53</td>
</tr>
<tr>
<td>0.028</td>
<td>0.71</td>
<td>0.373</td>
<td>9.47</td>
</tr>
<tr>
<td>0.060</td>
<td>1.52</td>
<td>0.388</td>
<td>9.86</td>
</tr>
<tr>
<td>0.070</td>
<td>1.78</td>
<td>0.500</td>
<td>12.70</td>
</tr>
<tr>
<td>0.095</td>
<td>2.41</td>
<td>0.520</td>
<td>13.21</td>
</tr>
<tr>
<td>0.105</td>
<td>2.67</td>
<td>0.583</td>
<td>14.81</td>
</tr>
</tbody>
</table>

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. The panel mount sleeve is either black conductive composite with a tensile strength of 35,000 psi and surface resistivity of 100 ohms per square, black anodized aluminum, or black finished zinc.
4. Mounting hardware, which includes one lock washer and one hex nut, is included with each panel mountable hermetic solid state lamp.
5. Use of metric drill size 8.20 millimeters or letter gauge drill size P (.323 inch, 8.20 mm) is recommended for producing hole in the panel for panel mounting.
6. Both leads are isolated from the panel mount by nonconductive potting. Lead length is .500 inch (12.70 mm) minimum, .583 inch (14.81 mm) maximum.
7. Conductive surface may extend to threaded area.
8. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 2. Physical dimensions for types JANM19500/51901, JANTXM19500/51902, JANM19500/51903, and JANTXM19500/51904 panel mount assemblies.
4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.2).

b. Screening (see 4.3).

c. Conformance inspection (see 4.4 and tables I and II).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.2.1 Group E qualification. Group E inspection shall be performed for qualification or re-qualification only. In case qualification was awarded to a prior revision of the specification sheet that did not request the performance of table III tests, the tests specified in table III herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

4.3 Screening (quality level JANTX only). Screening shall be in accordance with table E-IV of MIL-PRF-19500 and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

<table>
<thead>
<tr>
<th>Screen</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JANTX level</td>
</tr>
<tr>
<td>2</td>
<td>As given, except condition shall be 24 hours minimum at maximum rated storage temperature.</td>
</tr>
<tr>
<td>3a</td>
<td>See 4.5.2</td>
</tr>
<tr>
<td>7</td>
<td>See 4.5.3</td>
</tr>
<tr>
<td>9 and 10</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>11</td>
<td>( I_{V1}, V_F )</td>
</tr>
<tr>
<td>12</td>
<td>( I_F = 35 \text{ mA dc}; T_A = +25^\circ\text{C}, t = 96 \text{ hours} ).</td>
</tr>
<tr>
<td>13</td>
<td>Subgroup 2 of table I herein; ( \Delta I_{V1} = -20 \text{ percent of initial readings} ). ( \Delta V_F = \pm 50 \text{ mV dc} ).</td>
</tr>
</tbody>
</table>
4.4 **Conformance inspection.** Conformance inspection shall be in accordance with MIL-PRF-19500 and as follows.

a. If the manufacturer chooses the following option(s) for testing, the sample units that are to be used in group C inspection shall be designated as such, prior to conducting the referenced group B tests. Moreover, the number of failed diodes to be counted for lot acceptance or rejected as a result of group C test shall be equal to all failed diodes of the test in group B inspection, which were predesignated for use in group C inspection, plus any additional failures occurring group C testing. For each life test in group C inspection, the manufacturer has the option of using all, or a portion of, the sample already subjected to 340 hours of group B life testing for an additional 660 hours of testing to meet the 1,000 hour requirement.

b. Panel mount assemblies shall be assembled with LEDs that have met the requirements of groups A, B, and C, and the applicable screening requirements specified herein. The quality conformance inspection for panel mount assemblies shall consist of the examinations and inspections specified in table II herein.

4.4.1 **Group A inspection.** Group A inspection shall be conducted in accordance with table E-V of MIL-PRF-19500, and tables I and II herein.

4.4.2 **Group B inspection.** Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VIB of MIL-PRF-19500 and herein.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Method</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>1051</td>
<td>See 4.5.2.</td>
</tr>
<tr>
<td>B2</td>
<td>1071</td>
<td>See 4.5.3.</td>
</tr>
<tr>
<td>B3</td>
<td>1027</td>
<td>$I_F = 35 \text{ mA dc}; T_A = +25^\circ\text{C}; t = 340 \text{ hours} +72, –24 \text{ hours}$ (see 4.4.a).</td>
</tr>
</tbody>
</table>

4.4.3 **Group C inspection.** Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VII of MIL-PRF-19500 and as follows.

<table>
<thead>
<tr>
<th>Subgroup</th>
<th>Method</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>1056</td>
<td>Test condition A.</td>
</tr>
<tr>
<td>C2</td>
<td>2036</td>
<td>Test condition E.</td>
</tr>
<tr>
<td>C2</td>
<td>1071</td>
<td>See 4.5.3.</td>
</tr>
<tr>
<td>C3</td>
<td>2016</td>
<td>Non-operating; 1,500 G's; $t = 0.5 \text{ ms}$; 5 blows in each orientation: X1, Y1, and Y2.</td>
</tr>
<tr>
<td>C3</td>
<td>2056</td>
<td>Non-operating.</td>
</tr>
<tr>
<td>C3</td>
<td>2006</td>
<td>Non-operating; 20,000 G's; X1, Y1, and Y2, one minute in each orientation.</td>
</tr>
<tr>
<td>C6</td>
<td>1026</td>
<td>$I_F = 35 \text{ mA dc}; T_A = +25^\circ\text{C}, 1,000 \text{ hours}$.</td>
</tr>
<tr>
<td>C7</td>
<td></td>
<td>Peak forward pulse current (transient); $t_p = 1 \mu\text{s}$, pps = 300, total test time = 5 s, $I_{prt} = 1.0 \text{ A (pk)}$.</td>
</tr>
<tr>
<td>C8</td>
<td></td>
<td>$t_p = 0.5 \text{ ms}$, $P_{FM} \leq 120 \text{ mW}$, $T_A = +25^\circ\text{C}$, $I_F = 60 \text{ mA}$, 500 hours.</td>
</tr>
</tbody>
</table>
4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows.

4.5.1 Axial luminous intensity. This measurement is made with a photometer.

4.5.2 Temperature cycling. The test for temperature cycling shall be performed in accordance with test method 1051 of MIL-STD-750 using, test condition A with the following exceptions:

a. The hot temperature shall be +100°C, +10°C / –0°C.

b. The number of cycles for group B shall be 25.

4.5.3 Hermetic seal. The test for hermetic seal shall be performed in accordance with test method 1071 of MIL-STD-750 with the following exceptions for screening and groups B and C conformance inspection:

a. Fine leak: Test conditions G or H. For condition H, the leak testing shall be completed no later than 1 hour after pressurization.

b. Gross leak: Test conditions A, E, or J. For condition J, the leak indicator fluid shall be maintained at +100°C ±5°C.
## Table I. Group A inspection.

<table>
<thead>
<tr>
<th>Inspection 1/</th>
<th>MIL-STD-750 Symbol</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Method Conditions</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td><strong>Subgroup 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visual and mechanical examination</td>
<td>2071</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subgroup 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luminous intensity</td>
<td>Θ = 0 degrees;</td>
<td></td>
<td>2/ 3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(see 3.3 and 4.5.1)</td>
<td>3/ 20.0</td>
</tr>
<tr>
<td>Luminous intensity 2/</td>
<td>Θ = 30 degrees;</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>4016</td>
<td>DC method;</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 3 V dc</td>
<td></td>
</tr>
<tr>
<td>Forward voltage</td>
<td>4011</td>
<td>DC method;</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 20 mA dc</td>
<td></td>
</tr>
<tr>
<td><strong>Subgroup 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High temperature operation:</td>
<td></td>
<td>T_A = +100°C</td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>4016</td>
<td>DC method;</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 3 V dc</td>
<td></td>
</tr>
<tr>
<td>Forward voltage</td>
<td>4011</td>
<td>DC method;</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 20 mA dc</td>
<td></td>
</tr>
<tr>
<td>Low temperature operation:</td>
<td></td>
<td>T_A = −55°C</td>
<td></td>
</tr>
<tr>
<td>Reverse current</td>
<td>4016</td>
<td>DC method;</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V_R = 3 V dc</td>
<td></td>
</tr>
<tr>
<td>Forward voltage</td>
<td>4011</td>
<td>DC method;</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I_F = 20 mA dc</td>
<td></td>
</tr>
<tr>
<td><strong>Subgroup 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacitance</td>
<td>4001</td>
<td>V_R = 0; f = 1 MHz</td>
<td>100</td>
</tr>
<tr>
<td><strong>Subgroups 5, 6, and 7</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1/ For sampling plan, see MIL-PRF-19500.
2/ Applies to diffused lens types only (JAN1N6092 and JANTX1N6092).
3/ Applies to clear lens types only (JAN1N6609 and JANTX1N6609).
### TABLE II. Group A inspection for panel mount assemblies.

<table>
<thead>
<tr>
<th>Inspection 1/</th>
<th>MIL-STD-750 Symbol Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method</td>
<td>Conditions</td>
<td>Min</td>
</tr>
<tr>
<td><strong>Subgroup 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External visual examination</td>
<td>2071</td>
<td></td>
</tr>
<tr>
<td><strong>Subgroup 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Luminous intensity</td>
<td>$\Theta = 0$ degrees; $I_F = 20$ mA dc (see 3.3 and 4.5.1)</td>
<td>$I_V1$</td>
</tr>
<tr>
<td>Luminous intensity 2/</td>
<td>$\Theta = 30$ degrees; $I_F = 20$ mA dc</td>
<td>$I_V2$</td>
</tr>
<tr>
<td>Reverse current</td>
<td>4016 DC method; $V_R = 3$ V dc</td>
<td>$I_R$</td>
</tr>
<tr>
<td>Forward voltage</td>
<td>4011 DC method; $I_F = 20$ mA dc</td>
<td>$V_F$</td>
</tr>
<tr>
<td><strong>Subgroup 3, 4, 5, and 6</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subgroup 7</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solderability 4/</td>
<td>2026 15 devices, $c = 0$</td>
<td></td>
</tr>
<tr>
<td>Resistance to solvents</td>
<td>1022 Solutions A and B only. 15 devices, $c = 0$</td>
<td></td>
</tr>
<tr>
<td>Physical dimensions</td>
<td>2066 See figure 2, 45 devices, $c = 0$</td>
<td></td>
</tr>
</tbody>
</table>

1/ For sampling plan, see MIL-PRF-19500.
2/ Applies to diffused lens types only (JANM19500/51901 and JANTXM19500/51902).
3/ Applies to clear lens types only (JANM19500/51903 and JANTXM19500/51904).
4/ The sample size for solderability test applies to the number of leads inspected except in no case shall less than three leads be used to provide the number of leads required.
TABLE III. Group E inspections (all quality levels) for qualification only.

<table>
<thead>
<tr>
<th>Inspections</th>
<th>MIL-STD-750</th>
<th>Quality conformance inspection sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Method</td>
<td>Conditions</td>
</tr>
<tr>
<td>Subgroup 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature cycling</td>
<td>1051</td>
<td>See 4.5.2</td>
</tr>
<tr>
<td>Hermetic seal</td>
<td>1071</td>
<td></td>
</tr>
<tr>
<td>Fine leak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross leak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical measurements</td>
<td></td>
<td>See tables I and II, subgroup 2.</td>
</tr>
<tr>
<td>Subgroup 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermittent operating life</td>
<td>1037</td>
<td>For all devices with organic material.</td>
</tr>
<tr>
<td>Electrical measurements</td>
<td></td>
<td>See tables I and II, subgroup 2.</td>
</tr>
<tr>
<td>Subgroups 5 and 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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. The notes specified in MIL-PRF-19500 are applicable to this specification.)

6.1 Intended use. Semiconductors conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.)
6.2 **Acquisition requirements.** Acquisition documents should specify the following:

   a. Title, number, and date of this specification.

   b. Packaging requirements (see 5.1).

   c. Lead finish (see 3.4.1).

   d. The complete PIN, see 1.5 and 6.9.

6.3 **Qualification.** With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML-19500) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DLA Land and Maritime, ATTN: VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail vqe.chief@dlamil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at http://qpldocs.dla.mil.

6.4 **Applications.** These light emitting diodes are primarily intended for use as visible indicators (ON or OFF) of status. Intensity is easily modulated by varying the forward current, so the level can be adjusted to suit ambient light conditions. The modulation rate capability can be high enough to accommodate video signals. Diodes may be operated in either direct current or pulsed mode depending upon current availability. Pulsed operation is desirable as a means of linear control of average intensity or of improving the average efficiency (ratio of average intensity to average current). A panel mount configuration is provided (see figure 2). The panel mount configuration provides precise and consistent mechanical surfaces for mounting and optical alignment.

6.5 **Operating considerations.** Under normal ambient light conditions (300 to 1,000 lux), a typical forward current of 6 mA is required to produce an adequate on-state luminous intensity. This current level is directly compatible with TTL devices, and only simple buffering is needed when operating from LSTTL, LTTL, CMOS. No consideration of inrush current or keep-alive voltage is necessary. The relative luminous intensity (normalized at 20 mA) is displayed on figure 3 for diffused lens devices and figure 4 for clear, sunlight viewable lens devices.

6.5.1 **Design considerations.** Design consideration should include: Ambient light level and color; viewing background, color and texture; observer, attentiveness, position and operator accessories (glasses, goggles). Where ambient light levels are so high that it is difficult to distinguish between the LED on condition and glint (reflection of light from the surface of the LED lens), a modulated current causing a visible flicker in the LED at 10 Hz is recommended. Color filters, louvered filters, and circular polarizing filters may enhance the desired visual effects of the LED.

6.5.2 **Clear lens (sunlight viewable).** For applications in bright sunlight, sunlight viewable device types are recommended. With the proper enhancement filter, these parts are readable in sunlight ambient conditions.
FIGURE 3. Relative luminous intensity, diffused lens devices.
FIGURE 4. Relative luminous intensity, clear lens (sunlight viewable) devices.
6.6  **Reliability considerations.** There is a correlation between LED luminous intensity degradation and operating current levels. To lengthen the useful life of this device, drive current should be held to a minimum consistent with use conditions. Luminous intensity would have to change by more than 50 percent before becoming apparent to the causal observer.

6.7  **Replacement data.**

6.7.1  **PIN history.** MIL-S-19500/519(EL) Amendment 1, dated 8 March 1977 introduced the panel mountable LED lamp assembly option by using commercially available LED holders with their associated commercial part numbers to be used with the qualified device types. MIL-S-19500/519(EL) Amendment 2, dated 10 March 1978 removed the commercial lamp holder option and replaced it with military PINs M19500/519-01 and M19500/519-02. These two PINs did not use the JAN, JTX or JANTX prefixes. MIL-S-19500/519(ER) Amendment 3, dated 19 January 1983 altered the PIN for the panel mount assembly again by adding the JAN and JTX prefixes and removing the dash ("-“) that separated military specification PIN designator from the sequential dash number. Amendment 3 also notified user that device types JANM19500/51901 and JTXM19500/51902 are direct replacements for device types M19500/519-01 and M19500/519-02, respectively.

6.7.2  **Superseded PINs.** The following supersession data applies to PINs associated with this document:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>JANM19500/51901</td>
<td>JANM19500/51901</td>
<td>M19500/519-01</td>
</tr>
<tr>
<td>JANTXM19500/51902</td>
<td>JTXM19500/51902</td>
<td>M19500/519-02</td>
</tr>
<tr>
<td>JANM19500/51903</td>
<td>JANM19500/51903</td>
<td></td>
</tr>
<tr>
<td>JANTXM19500/51904</td>
<td>JTXM19500/51904</td>
<td></td>
</tr>
</tbody>
</table>

6.7.3  **Interchangeability.** The PINs and device types JANM19500/51901 and JANTXM19500/51902 are interchangeable with the PINs and device types M19500/519-01 and M19500/519-02.

6.8  **PIN construction examples.**

6.8.1  **Through-hole mount devices.** The PIN for through-hole mount devices are in the following form.

```
JANTX  1N6609
```

JAN brand and quality level (see 1.5.1)
Component designation (see 1.5.2.1)

6.8.2  **Panel mount assemblies.** The PIN for panel mount assemblies are in the following form.

```
JANTX  M19500/51904
```

JAN brand and quality level (see 1.5.1)
Specification designation and dash number (see 1.5.2.2)
6.9 **List of PINs.** The following is a list of all possible PINs for the devices available on this specification sheet.

<table>
<thead>
<tr>
<th>PIN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN1N6092</td>
<td>LED, red, diffused lens, through-hole mount, quality level JAN.</td>
</tr>
<tr>
<td>JANTX1N6092</td>
<td>LED, red, diffused lens, through-hole mount, quality level JANTX.</td>
</tr>
<tr>
<td>JAN1N6609</td>
<td>LED, red, clear lens, through-hole mount, quality level JAN.</td>
</tr>
<tr>
<td>JANTX1N6609</td>
<td>LED, red, clear lens, through-hole mount, quality level JANTX.</td>
</tr>
<tr>
<td>JANM19500/51901</td>
<td>LED, red, diffused lens, panel mount assembly, quality level JAN.</td>
</tr>
<tr>
<td>JANTXM19500/51902</td>
<td>LED, red, diffused lens, panel mount assembly, quality level JANTX.</td>
</tr>
<tr>
<td>JANM19500/51903</td>
<td>LED, red, clear lens, panel mount assembly, quality level JAN.</td>
</tr>
<tr>
<td>JANTXM19500/51904</td>
<td>LED, red, clear lens, panel mount assembly, quality level JANTX.</td>
</tr>
</tbody>
</table>

6.10 **Amendment notations.** The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

**Custodians:**
Army – CR  
Air Force – 85  
DLA – CC

**Preparing activity:**
DLA – CC  
(Project 5980–2017–006)

**Review activities:**
Army – MI  
Air Force – 99

**NOTE:** The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at [https://assist.dla.mil](https://assist.dla.mil).