The documentation and process conversion measures necessary to comply with this revision shall be completed by 25 August 2014.

INCH–POUND

MIL–PRF–19500/553F
25 February 2014
SUPERSEDING
MIL–PRF–19500/553E
21 July 2011

PERFORMANCE SPECIFICATION SHEET

# SEMICONDUCTOR DEVICE, DIODE, SILICON, SCHOTTKY BARRIER, FAST RECOVERY, TYPE 1N6391, JAN, JANTX, JANTXV, JANS, AND JANHC

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 a silicon, fast recovery, schottky barrier diode, intended for use as a power rectifier in rectifier recovery circuits, or as a flyback diode in power switching applications. Four levels of product assurance are provided for each encapsulated device type as specified in MIL–PRF–19500. One level of product assurance is provided for each unencapsulated device type (die) as specified in MIL–PRF–19500.

1.2 Physical dimensions. The device package styles are as follows: Stud mount case (DO–4) in accordance with figure 1 for device type 1N6391 and unencapsulated JANC die in accordance with figure 2 for device type JANHC.

1.3 Maximum ratings. Unless otherwise specified, $T_A$ = +25°C.

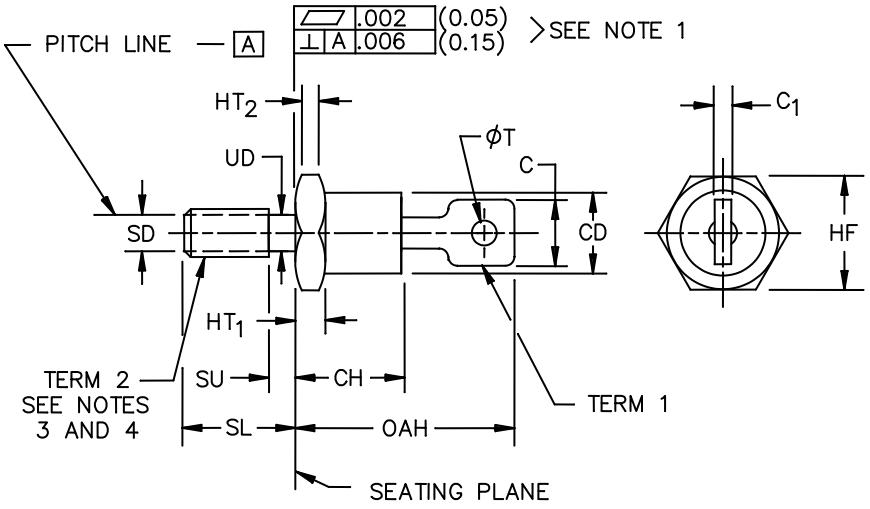
| Type | $V_{RRM}$ and $V_{RWM}$ (1) | $V_{RSM}$ | $V_R$ (1) | $I_{FM}$ (2) $T_C$ = +125°C | $I_O$ (3) $T_C$ = +125°C | $I_{FSM}$ | $T_J$ and $T_{STG}$ | Max $R_{\theta JC}$ |
|---|---|---|---|---|---|---|---|---|
| | V(pk) | V(pk) | V dc | A dc | A dc | A (pk) | °C | °C/W |
| 1N6391 | 45 | 54 | 45 | 25 | 22.5 | 600 | –55 to +175 | 2.0 |

(1) Full rated $V_{RRM}$ and $V_{RWM}$ is applicable over the range of $T_C$ = –55°C to +165°C for $I_{FM}$ = 0. Full rated $V_R$ is applicable over the temperature range of $T_C$ = –55 to +155°C. When $V_R$ = 45 V dc and $T_C$ = +155°C, then $T_J$ = 175°C.
(2) Average current with a 50 percent duty cycle square wave including reverse amplitude equal to the magnitude of full rated $V_{RWM}$. Derate linearly at 0.625 A dc/°C for $T_C$ > +125°C.
(3) Full rated $V_{RRM}$ is applicable over the range $T_C$ = –55°C to +169°C $I_O$ = 0 and $T_J$ = 175°C.
(4) For temperature-current derating curves, see figure 3.

1.4 Primary electrical characteristics. Unless otherwise specified, $T_C$ = +25°C.

| Type | Max $V_{FM1}$ $I_{FM}$ = 50 A (pk) | Max $V_{FM2}$ $I_{FM}$ = 5 A (pk) | Max $I_{RM}$; $V_{RM}$ = 45 V (pk) $T_J$ = +25°C | Max $I_{RM}$; $V_{RM}$ = 45 V (pk) $T_J$ = +175°C | Max $C_T$ $V_R$ = 5 V dc |
|---|---|---|---|---|---|
| | V (pk) | V (pk) | mA (pk) | mA (pk) | pF |
| 1N6391 | 0.68 | 0.50 | 1.5 | 220 | 2,000 |

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.

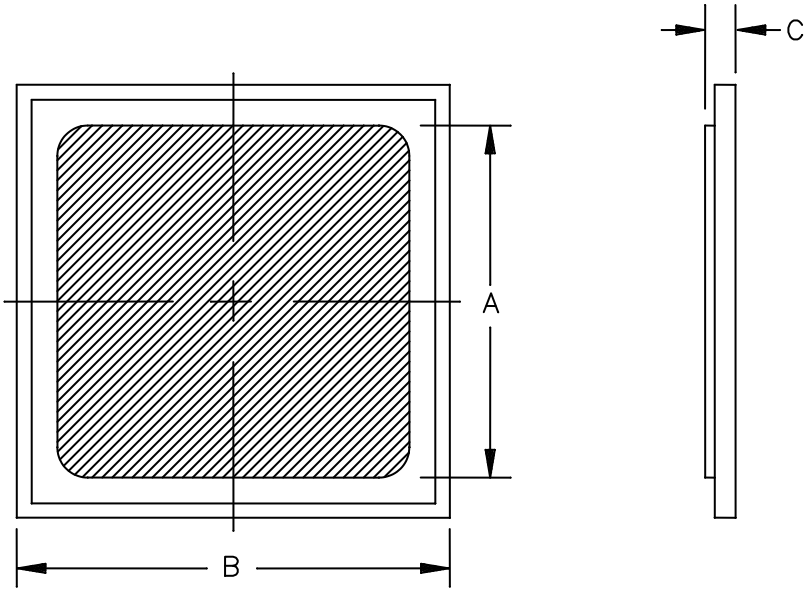



| Ltr | Dimensions | | | | Notes |
|---|---|---|---|---|---|
| | Inches | | Millimeters | | |
| | Min | Max | Min | Max | |
| C | | .250 | | 6.35 | 5 |
| CD | .265 | .424 | 6.73 | 10.77 | 6 |
| CH | .300 | .405 | 7.62 | 10.29 | |
| $C_1$ | .018 | .065 | 0.46 | 1.65 | 5 |
| HF | .403 | .437 | 10.24 | 11.10 | 6 |
| $HT_1$ | .075 | .175 | 1.91 | 4.45 | 7 |
| $HT_2$ | .060 | | 1.53 | | 7 |
| OAH | .600 | .800 | 15.24 | 20.32 | |
| SD | | | | | |
| SL | .422 | .453 | 10.72 | 11.51 | |
| SU | | .078 | | 1.98 | 8 |
| UD | .163 | .189 | 4.14 | 4.80 | |
| ΦT | .060 | .103 | 1.52 | 2.62 | |

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. See 3.4.2 for the polarity of the terminals.
3. Threads are 10–32 UNF–2A in accordance with FED–STD–H28, "Screw-Thread Standards for Federal Services". Maximum pitch diameter (SD) of plated threads shall be basic pitch diameter .1697 inch (4.31 mm).
4. Device shall not be damaged by a torque of 15 inch–pounds applied to a 10–32 UNF–2B nut assembled on thread.
5. The angular orientation and peripheral configuration of terminal 1 is undefined; however, the major surfaces over dimension C and $C_1$ shall be flat.
6. Dimension CD shall not exceed dimension HF.
7. A chamfer or undercut on one or both ends of the hex portion is optional; minimum base diameter at seating plane .403 inch (10.24 mm).
8. Length of incomplete or undercut threads UD.
9. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 1. Physical dimensions (DO–4).




| Ltr | Dimensions | | | |
|---|---|---|---|---|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| A | .167 | .177 | 4.24 | 4.50 |
| B | .175 | .185 | 4.45 | 4.70 |
| C | .012 | .013 | 0.305 | 0.330 |

The metallization characteristics of the die are:

Anode (front): Ag
Cathode (back): Ag

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 2. Physical dimensions for JANC die (A version for JANHC).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 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 or 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–19500 – Semiconductor Devices, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL–STD–750 – Test Methods for Semiconductor Devices.

(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. The abbreviations, symbols, and definitions used herein shall be as specified in MIL–PRF–19500.

$I_H$ – heating current

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL–PRF–19500, figure 1 (DO–4), and figure 2 (die) herein.

3.4.1 Lead finish. Unless otherwise specified, lead finish shall be solderable in accordance with MIL–PRF–19500, MIL–STD–750, and herein (see 6.2).

3.4.2 Polarity. Devices in DO–4 package (see figure 1) shall have the cathode electrically connected to the stud (term 2). The polarity of unpackaged JANHC die shall be as identified on figure 2.

3.5 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in paragraph 1.3, 1.4, and table I.

3.6 Electrical test requirements. The electrical test requirements shall be as specified in table I herein.

3.7 Marking. Marking shall be in accordance with MIL–PRF–19500.

3.8 Workmanship. Semiconductor 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.

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

4.2.1 JANHC devices. Qualification for JANHC devices shall be in accordance with MIL–PRF–19500.

4.2.2 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 II tests, the tests specified in table II herein that were not performed in the prior revision shall be performed on the first inspection lot to this revision to maintain qualification.

4.3 Screening.

4.3.1 Screening of packaged devices (quality levels JANS, JANTXV, and JANTX only). The screening of packaged devices 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.

| Screen (see table E–IV of MIL–PRF–19500) | Measurement | |
|---|---|---|
| | JANS level | JANTXV and JANTX levels |
| 3a | Condition C | Condition C |
| 3b (1) | Surge current, see 4.3.1.1 | Surge current, see 4.3.1.1 |
| 3c (2) | Thermal impedance, see 4.3.1.2 | Thermal impedance, see 4.3.1.2 |
| 4 | Not applicable | Not applicable |
| 9 (3) | Reverse energy test (see 4.5.2), followed by $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2. | Not applicable |
| 10 | Test method 1038 of MIL–STD–750, test condition A; t = 48 hrs. | Not applicable |
| 11 (3) | $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2; $\Delta V_{FM1}$ = 0.05 V(pk), $\Delta I_{RM1}$ = ±100 percent or 5 mA dc, whichever is greater. | Reverse energy test (see 4.5.2), followed by $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2. |
| 12 | Burn-in, see 4.3.1.3. | Burn-in, see 4.3.1.3. |
| 13 (4) | $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2; $\Delta V_{FM1}$ = 0.05 V (pk), $\Delta I_{RM1}$ = ±100 percent or 5 mA dc, whichever is greater. Scope display evaluation (see 4.5.3). | $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2; $\Delta V_{FM1}$ = 0.05 V (pk), $\Delta I_{RM1}$ = ±100 percent or 5 mA dc, whichever is greater. Scope display evaluation (see 4.5.3). |

(1) Surge current shall precede thermal response. These tests shall be performed anytime after screen 3a and before screen 10.
(2) Thermal impedance shall be performed any time after sealing provided temperature cycling (screen 3a) is performed in accordance with MIL–PRF–19500, screen 3 prior to this thermal impedance. Quality levels JANTX and JANTXV do not need to be repeated in screening requirements.
(3) $I_{RM1}$ shall not be indicative of an open condition.
(4) All devices shall be subjected to the scope display evaluation test and reverse energy test.

4.3.1.1 Surge current. Surge current shall be performed in accordance with test method 4066 of MIL–STD–750, with the following conditions: $I_{FSM}$ = 600 A, 6 surges, $t_p$ = 8.3 ms, 1/2 sine wave, or rectangular pulse of equivalent $I_{RMS}$, $I_O$ = 0, $V_{RWM}$ = 0, duty factor one percent minimum, $T_A$ = +25°C.

4.3.1.2 Thermal impedance. Thermal impedance measurements shall be performed in accordance with test method 3101 of MIL–STD–750. Read and record data shall be supplied to the qualifying activity on one lot (random sample of 500 devices minimum) prior to shipment. Twenty-two samples shall be serialized and provided to the qualifying activity for test correlation. The following conditions shall apply:

a. $I_H \geq$ rated $I_O$.

b. $t_H$ = 150 to 400 ms.

c. $I_M$ = 50 mA to 250 mA.

d. $t_{MD}$ = 50 to 300 μs.

The maximum limit for thermal impedance under these test conditions is $Z_{\theta JC\ (max)}$ = 2°C/W.

4.3.1.3 Burn-in. Burn-in shall be performed in accordance with test method 1038 of MIL–STD–750, with the following conditions: Test condition A, $T_J$ = +150°C minimum, $V_R$ = 36 V dc, t = 48 hrs.

4.3.2 Screening of unencapsulated die (JANHC). The screening of unencapsulated die shall be in accordance with appendix G of MIL–PRF–19500 and as specified herein. Die shall be 100-percent probed in accordance with table I, subgroup 2.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL–PRF–19500 and as specified herein.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with table E–V of MIL–PRF–19500, and table I 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–VIA (JANS) and table E–VIB (JAN, JANTX, and JANTXV) of MIL–PRF–19500, and as follows. Electrical measurements (end-points) shall be $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2 herein.

4.4.2.1 Quality level JANS (table E–VIa of MIL–PRF–19500).

| Subgroup | Method | Conditions |
|---|---|---|
| B3 | 4066 | $I_{FSM}$ = 600 A (pk); six surges of $t_p$ = 8.3 ms each at 1 minute intervals; $I_O$ = 22.5 A dc; $V_R$ = rated (see 1.3); 100°C ≤ $T_C$ ≤ 125°C; $T_J$ ≤ 150°C. |
| B4 | 1037 | 2,000 cycles, 25 percent rated $I_O$ (see 4.5.6). |
| B5 | 1027 | $I_F$ = 20 A average at $T_C$ = +130°C, for 340 hours, f = 60 Hz, $V_R$ = $V_{RWM}$ (see figure 3). |
| B6 | 4081 | $R_{\theta JC}$ = 2.0°C/W; $t_H \geq$ 20 seconds; $I_H \geq$ rated $I_O$; $t_{MD} \leq$ 300 μs; measurement current 50 mA ≤ $I_M$ ≤ 250 mA (see 4.5.4). |

4.4.2.2 Quality level JAN, JANTX, and JANTXV (table E–VIb of MIL–PRF–19500).

| Subgroup | Method | Conditions |
|---|---|---|
| B2 | 4066 | $I_{FSM}$ = 600 A (pk); ten surges of $t_p$ = 8.3 ms each at 1 minute intervals; $I_O$ = 22.5 A dc; $V_{RM}$ = 45 V (pk); 100°C < $T_C$ < 125°C; $T_J$ ≤ 150°C. |
| B3 | 1048 | $T_J$ = 150°C minimum, $V_R$ = 36 V dc, $I_O$ = 0, t = 48 hours. |
| B5 | 4081 | See 4.5.4. |

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. Electrical measurements (end-points) shall be $V_{FM1}$ and $I_{RM1}$ of table I, subgroup 2 herein.

| Subgroup | Method | Conditions |
|---|---|---|
| C2 | 2036 | Test condition A, 10 lbs (4.54 Kg), t = 15 s.<br>Test condition F (method B), 5 pounds (2.27 Kg), t = 15 s.<br>Test condition D1, 10 ounce-inch (0.070 newton meter), t = 15 s.<br>Test condition D2, 15 pound-inch (1.69 newton meter), t = 15 s. |
| C5 | 4081 | $R_{\Theta JC}$ = 2.0°C/W maximum in accordance with 4.5.4 except $t_H$ = 20 s (minimum). |
| C6 | 1048 | $T_J$ = 150°C minimum, $V_R$ = 36 V dc, $I_O$ = 0. |
| C6 | 1037 | Operational power cycling, $I_O$ = 20 A dc, $T_C$ (low) = 40°C +0, –15°C; $T_C$ (high) = 115°C +5, –0°C; 6,000 cycles (may be continued from JANS group B, subgroup 4); (see 4.5.6). |

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table E–IX of MIL–PRF–19500 and as specified in table II herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

4.5 Methods of inspection. Methods of inspection shall be as specified in appropriate tables and as follows.

4.5.1 Pulse response measurements. The conditions for the pulse response measurements shall be as specified in section 4 of MIL–STD–750.

4.5.2 Peak reverse energy test. The peak reverse energy test is to be performed as on figure 4. The Schottky rectifier under test shall be capable of absorbing the reverse energy, as defined, and meet the electrical requirements of subgroup 4 of table I herein.

4.5.3 Scope display evaluation. A curve trace visual display of the reverse characteristics (voltage versus current) shall be made using a calibration of 10 mA for each division vertical sensitivity, and 10 V for each division horizontal sensitivity. Increase the reverse voltage until the reverse current reaches 50 mA minimum to 70 mA maximum. Observe the curve characteristics. Any device with an erratic pattern, such as double trace, other than capacitance effects, intermittence, discontinuities other than zener noise at the knee of the curve, or shorts shall be removed from the lot. Time limit for this test shall be 5 seconds minimum. This test shall be the last test performed on the device in the 100 percent screening tests. The percent defective result for evaluation against the percent defective allowed (PDA) shall be determined prior to the results of this test.

4.5.4 Thermal resistance. Thermal resistance measurement shall be performed in accordance with test method 4081 of MIL–STD–750. Read and record data in accordance with table II herein shall be included in the qualification report.

a. $I_H \geq$ rated $I_O$.

b. $t_H$ = 20 seconds minimum.

c. $I_M$ = 50 mA to 250 mA.

d. $t_{MD}$ = 300 μs maximum.

4.5.5 Reverse current at peak reverse voltage, alternate test. The reverse current at peak reverse voltage test requirement may be satisfied by performing the reverse energy test of 4.5.2 and measuring breakdown voltage to ensure $V_{BR} \geq 54$ V (pk) with $I_{RM}$ = 2.0 A (pk).

4.5.6 DC intermittent operation life. DC intermittent operation life shall be performed in accordance with test method 1037 of MIL–STD–750. A cycle shall consist of an "on" period, when forward current is applied suddenly, not gradually, to the device for the time necessary to achieve an increase (delta) case temperature of +85°C +15°C, –5°C followed by an "off" period, when the current is suddenly removed for cooling, the case through a similar delta temperature. Auxiliary (forced) cooling is permitted during the "off" period only. Forward current or "on" time, within specific limits, and "off" time may be adjusted to achieve the delta case temperature. Heat sinks shall only be used if, and to the degree necessary, to maintain test samples within the desired delta temperature tolerance. The heating time shall be such that 30 s ≤ $t_{heating}$ ≤ 180 s. The forward current may be steady-state dc, full-wave rectified dc, or the equivalent half-sine wave dc, of the specified value. The test duration shall be the specified number of cycles. Within the time interval of 50 cycles before and 500 cycles after the termination of the test, the sample units shall be removed from the specified test conditions and allowed to reach room ambient conditions. Specified end-point measurements for qualification and quality conformance inspections shall be completed within 96 hours after removal of sample units from the specified test conditions. Additional readings may be taken at the discretion of the manufacturer.

4.5.7 Inspection conditions. Unless otherwise specified in MIL–PRF–19500 or herein, all inspections shall be conducted at a $T_C$ of 25°C ±3°C.

TABLE I. Group A inspection.

| Inspection 1/ | MIL–STD–750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 1 | | | | | | |
| Visual and mechanical examination | 2071 | | | | | |
| Subgroup 2 | | | | | | |
| Thermal impedance | 3101 | See 4.3.1.2 | $Z_{\theta JC}$ | | 2.0 | °C/W |
| Forward voltage | 4011 | $I_{FM}$ = 50 A (pk), pulsed (see 4.5.1)<br>$I_{FM}$ = 5 A (pk), pulsed (see 4.5.1) | $V_{FM1}$<br>$V_{FM2}$ | | 0.68<br>0.50 | V (pk)<br>V (pk) |
| Reverse current | 4016 | $V_{RM}$ = 45 V (pk) pulsed (see 4.5.1) | $I_{RM1}$ | | 1.5 | mA (pk) |
| Subgroup 3 | | | | | | |
| High temperature operation | | | | | | |
| Reverse current leakage | 4016 | $V_{RM}$ = 45 V (pk) pulsed (see 4.5.1)<br>$T_J$ = 175°C<br>$T_J$ = 125°C | <br>$I_{RM2}$<br>$I_{RM3}$ | | <br>220<br>40 | <br>mA (pk)<br>mA (pk) |
| Low temperature operation | | $T_C$ = –55°C | | | | |
| Reverse current leakage | 4016 | $V_{RM}$ = 45 V (pk) pulsed (see 4.5.1) | $I_{RM4}$ | | 1.5 | mA (pk) |
| Forward voltage | 4011 | $I_F$ = 5 A (pk) pulsed (see 4.5.1) | $V_{FM3}$ | | 0.60 | V (pk) |
| Subgroup 4 | | | | | | |
| Reverse current leakage at peak reverse voltage | 4016 | Peak reverse energy test (see 4.5.2)<br>$V_{RSM}$ = 54 V (pk), (alternate test see 4.5.5). | $I_{RM5}$ | | 2.0 | A (pk) |
| Capacitance | 4001 | $V_R$ = 5 V dc; f = 1 MHz,<br>100 KHz ≤ f ≤ 1 MHz | $C_T$ | | 2,000 | pF |

See footnote at end of table.

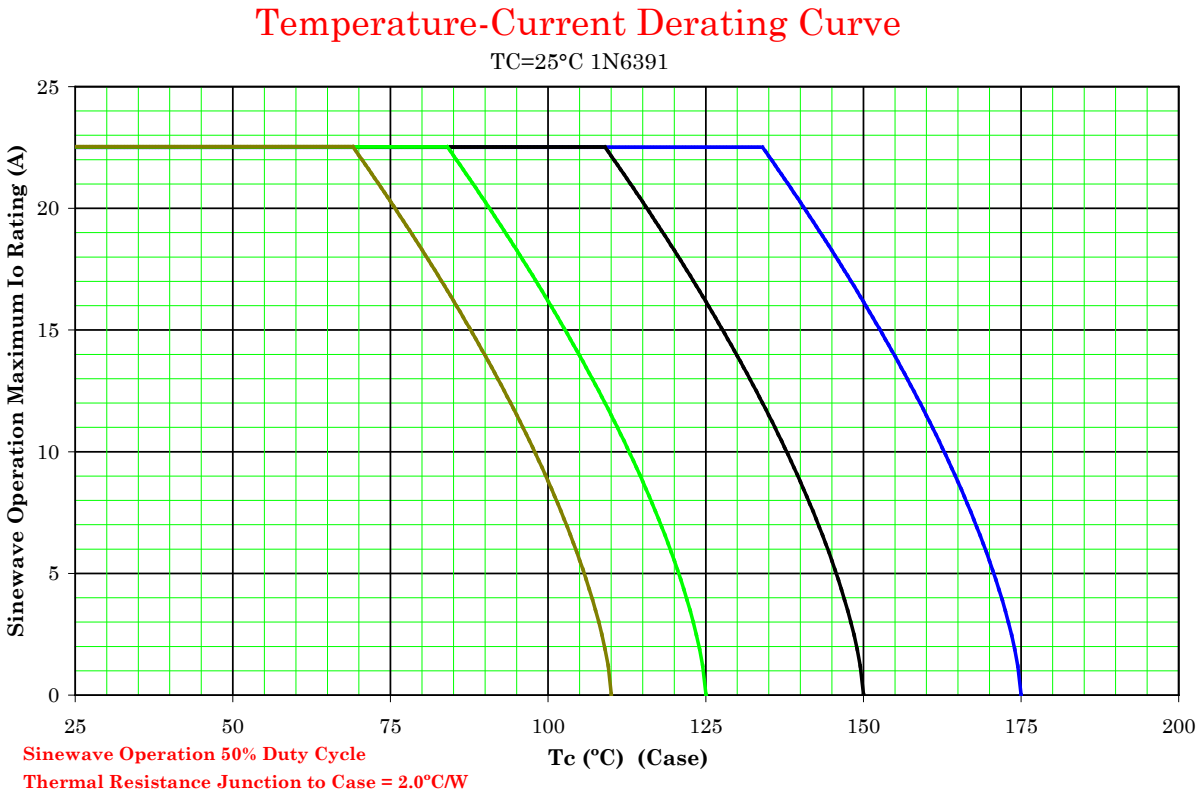
TABLE I. Group A inspection – Continued.

| Inspection 1/ | MIL–STD–750 | | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|
| | Method | Conditions | | Min | Max | |
| Subgroup 5 | | | | | | |
| Not applicable | | | | | | |
| Subgroup 6 | | | | | | |
| Forward surge | 4066 | $I_{FSM}$ = 600 A (pk); ten surges of $t_p$ = 8.3 ms each at 1 minute intervals, superimposed on $I_O$ = 22.5 A dc; $V_{RWM}$ = rated $V_{RWM}$ (see 1.3); $T_A$ = +100°C. | | | | |
| Electrical end-points | | See subgroup 2 of this table. | | | | |
| Subgroup 7 | | | | | | |
| Not applicable | | | | | | |

1/ For sampling plan, see MIL–PRF–19500.

TABLE II. Group E inspection (all quality levels) for qualification and requalification only.

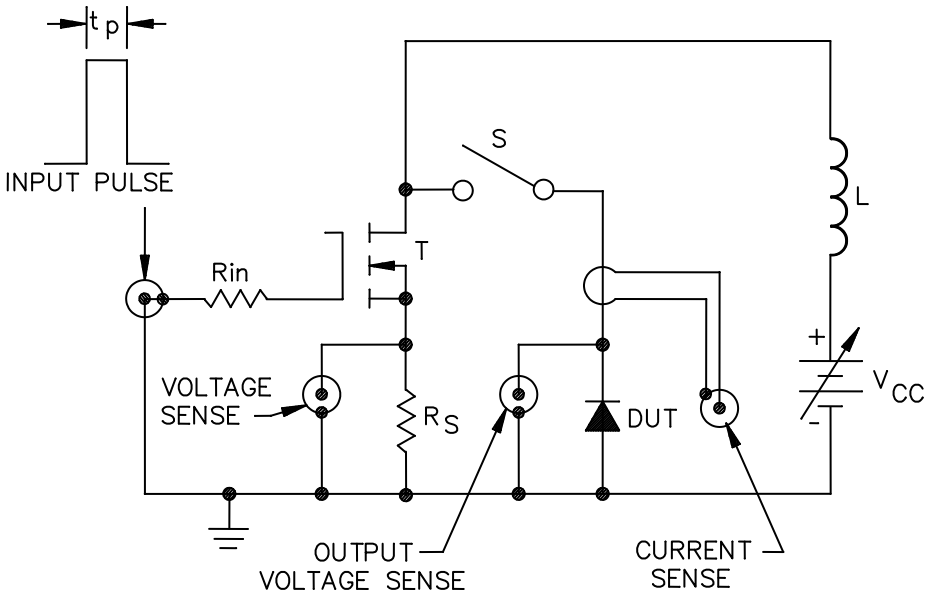
| Inspection | MIL–STD–750 | | Sampling plan |
|---|---|---|---|
| | Method | Conditions | |
| Subgroup 1 | | | 45 devices<br>c = 0 |
| Thermal shock | 1056 | 100 cycles, 0°C to 100°C. | |
| Hermetic seal | 1071 | | |
| Electrical measurement | | See table I, subgroup. | |
| Subgroup 2 | | | 45 devices<br>c = 0 |
| Steady-state reverse bias | 1038 | Test condition A, t = 1,000 hours. | |
| Electrical measurement | | See table I, subgroup 2. | |
| Subgroup 4 | | | Sample size N/A |
| Thermal impedance curves | | See MIL–PRF–19500. | |
| Subgroup 5 | | | |
| Not applicable | | | |
| Subgroup 10 | | | |
| Surge | 4066 | Condition A; $T_A$ = +25°C; $I_{FSM}$ = 600 A, 100 surges. | 22 devices<br>c = 0 |
| Electrical measurement | | See table I, subgroup 2. | |




NOTES:

1. All devices are capable of operating at ≤ $T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum $T_J$ allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J$ ≤ 175°C) and current rating specified (see 1.3 herein.)
3. Derate design curves chosen at $T_J$ ≤ 150°C, 125°C, and 110°C to show current rating where users want to limit $T_J$ in their application.

FIGURE 3. Temperature current derating curve.




| | |
|---|---|
| Input pulse | $R_{in}$ = 50 ohms, 1 watt |
| $V_G$ = 10 volts | $R_S$ = 0.1 ohms, 1 watt |
| $R_G$ = 50 ohms | $V_{CC} \approx$ 10 volts |
| P.W.≈ 30 μs | L = 260 μH |
| Duty cycle ≤ 1percent | T = IRF130/2N6756 or equivalent |

PROCEDURES:

1. With S open, adjust pulse width to test current of 2 amps across $R_S$.
2. Close S, verify test current with current sense.
3. Read peak output voltage (see 4.5.5).

FIGURE 4. Peak reverse energy test circuit.

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 Part or Identifying Number (PIN), see title and section 1.

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@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at https://assist.dla.mil.

6.4 Suppliers of JANHC die. The qualified JANHC suppliers with the applicable letter version will be identified on the QML. An example for unencapsulated die type JANHCA1N6391 is as follows:

| Manufacturer CAGE 43611 | |
|---|---|
| Encapsulated device PIN | JANHC die PIN |
| JAN1N6391 | JANHCA1N6391 |

6.5 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. 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 and relationship to the previous issue.

Custodians:
Air Force – 85
DLA – CC

Review activities:
Air Force – 19, 99

Preparing activity:
DLA – CC

(Project 5961–2013–036)

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.