

The documentation and process conversion measures necessary to comply with this revision shall be completed by 18 March 2016.

INCH-POUND

MIL-PRF-19500/550D  
18 December 2015  
SUPERSEDING  
MIL-PRF-19500/550C  
18 October 2007

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, FAST-RECOVERY, HIGH CURRENT, ENCAPSULATED (STUD AND SURFACE MOUNT PACKAGES) AND UN-ENCAPSULATED (DIE),  
TYPES 1N6304, 1N6305, 1N6306, AND R TYPES,  
JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC

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 silicon, high efficiency, fast recovery, switching power rectifier diodes. Three levels of product assurance are provided for each encapsulated device type as specified in MIL-PRF-19500, and two levels of product assurance for each unencapsulated device type die.

1.2 Package outlines and die topography. The device package for the encapsulated device types are as follows: DO-203AB (formerly DO-5) in accordance with figure 1, and Button Tab (BT) surface mount in accordance with figure 2. The dimensions and topography for JANHC and JANKC unencapsulated die are as follows: A version die in accordance with figure 3, B version die in accordance with figure 4, C version die in accordance with figure 5, and D version die in accordance with figure 6.

1.3 Maximum ratings. Unless otherwise specified,  $T_C = +25^\circ\text{C}$ .

Types	$V_R$	$V_{RWM}$	$I_O$ $T_C = +100^\circ\text{C}$ (1) (2)	$I_{FSM}$ $T_C = +55^\circ\text{C}$ $t_p = 8.3 \text{ ms}$	$t_{rr}$	$V_{FM1}$ $I_{FM} = 70 \text{ A (pk)}$ duty cycle $\leq 2 \text{ percent}$ $t_p = 300 \mu\text{s max}$	$I_R$ at rated $I_R$	$T_J$ and $T_{STG}$	$R_{\theta JC}$	$R_{\theta JSP(IS)}$
	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>A dc</u>	<u>ns</u>	<u>V (pk)</u>	<u><math>\mu\text{A dc}</math></u>	<u><math>^\circ\text{C}</math></u>	<u><math>^\circ\text{C/W}</math></u>	<u><math>^\circ\text{C/W}</math></u>
1N6304, R, BT	50	50	70	800	50	0.975	25	-65	0.8	0.8
1N6305, R, BT	100	100	70	800	50	0.975	25	to	0.8	0.8
1N6306, R, BT	150	150	70	800	50	0.975	25	+175	0.8	0.8

- (1) Derate linearly, 875 mA/ $^\circ\text{C}$  from  $T_C = +100^\circ\text{C}$  to  $+150^\circ\text{C}$ , and 1,050 mA/ $^\circ\text{C}$  above  $T_C > +150^\circ\text{C}$ .
- (2) Higher  $I_O$ , up to 1.2 times  $I_O$  is allowable provided that appropriate heat sinking or forced air cooling maintains the maximum junction temperature at or below  $+175^\circ\text{C}$  as proven by the junction temperature rise time.

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to [Semiconductor@dsc.dla.mil](mailto:Semiconductor@dsc.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>.

AMSC N/A

FSC 5961



\* 1.4 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.4 for PIN construction example, and 6.5 for a list of available PINs.

\* 1.4.1 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", "JANTX", "JANTXV", and "JANS".

\* 1.4.1.2 Quality level designators for unencapsulated devices (die). The quality level designators for unencapsulated devices (die) that are applicable for this specification sheet from the lowest to the highest level are as follows: "JANHC" and "JANKC".

\* 1.4.2 Device type. The designation system for the device types covered by this specification sheet are as follows.

\* 1.4.2.1 First number and first letter symbols. The devices of this specification sheet use the first number and letter symbols "1N".

\* 1.4.2.2 Second number symbols. The second number symbols for the devices covered by this specification sheet are as follows: "6304", "6305", and "6306".

\* 1.4.3 Suffix symbols. The following suffix symbols are incorporated in the PIN as applicable.

	A blank suffix symbol indicates a DO-203AB stud diode package (see <a href="#">figure 1</a> ).
R	Indicates reverse polarity.
BT	Indicates a button tab surface mount package (see <a href="#">figure 2</a> ).
RBT	Indicates a reverse polarity button tab surface mount package (see <a href="#">figure 2</a> )

\* 1.4.4 Lead finish. The lead finishes applicable to this specification sheet are listed on [QML-19500](#).

\* 1.4.5 Die identifiers for unencapsulated devices (manufacturers and critical interface identifiers). The manufacturer die identifiers that are applicable for this specification sheet are "A", "B", "C" and "D". (See [figure 3](#) through [figure 6](#), and [6.5](#)).

## 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

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

\* 3.4 Interface requirements and physical dimensions. The interface requirements and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1 (DO-203AB), figure 2 (Button Tab), and figures, 3, 4, 5, and 6 for JANHC and JANKC die herein.

\* 3.4.1 Lead material and finish. Lead material for the DO-203AB shall be copper (terminal number 1) with a steel cap on a copper stud (terminal number 2). 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).

3.5 Marking. Marking shall be in accordance with MIL-PRF-19500.

3.5.1 Marking of JANHC and JANKC die. Marking for JANHC and JANKC shall be in accordance with MIL-PRF-19500

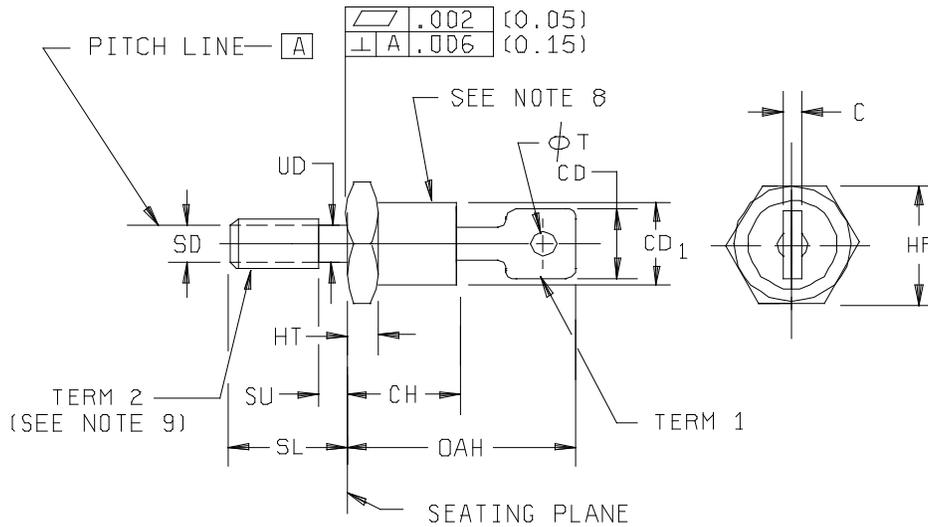
3.6 Polarity. The polarity shall be indicated by a graphic symbol with the arrow pointing toward the cathode terminal. The reversed units shall also be marked with an R following the last digit in the type number.

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

3.8 Electrical test requirements. The electrical test requirements shall be the subgroups specified in 4.4.2 and 4.4.3.

3.9 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.

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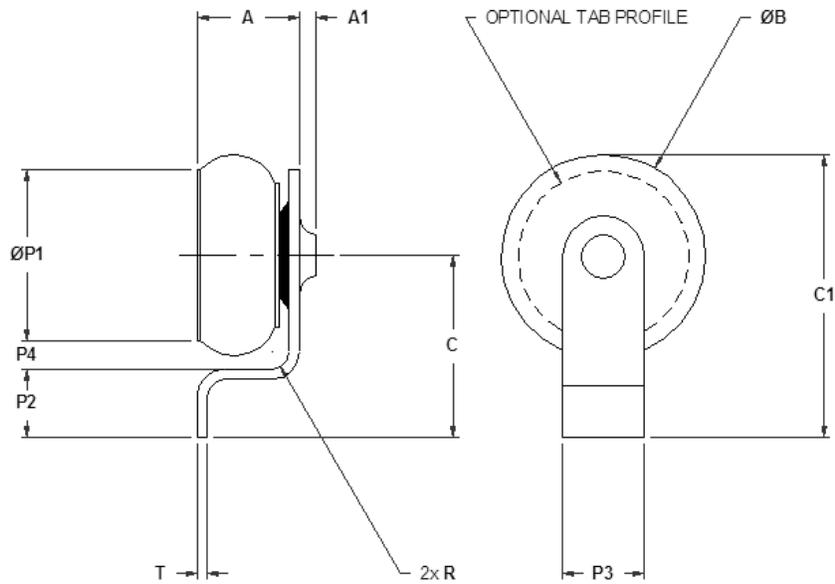
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.375		9.53	7
C		.080		2.03	
HF	.669	.688	16.99	17.48	
HT	.115	.200	2.92	5.08	
CH		.450		11.43	
OAH	.750	1.000	19.05	25.40	
SL	.422	.453	10.72	11.51	
SU		.090		2.29	4
CD <sub>1</sub>		.667		16.94	
SD					5
UD	.220	.249	5.59	6.32	
θT	.140	.175	3.56	4.45	

NOTES:

1. Dimensions are in inches.
2. Millimeter equivalents are given for information only.
3. Units must not be damaged by torque of 30 inch-pound applied to .25-28 UNF-2B nut assembled on thread.
4. Length of incomplete or undercut threads of UD.
5. Maximum pitch diameter of plated threads shall be basic pitch diameter .2268 inch (5.761 mm).
6. A chamfer or undercut on one or both ends of the hex portion is optional; minimum base diameter at seating plane .60 inch (15.2 mm).
7. The angular orientation and peripheral configuration of terminal 1 is undefined.
8. Standard types shall have cathode connected to stud. Reverse types shall have anode connected to stud.
9. Term 2 threads in accordance with FED-STD-H28.
10. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.

FIGURE 1. Physical dimensions (DO-203AB).

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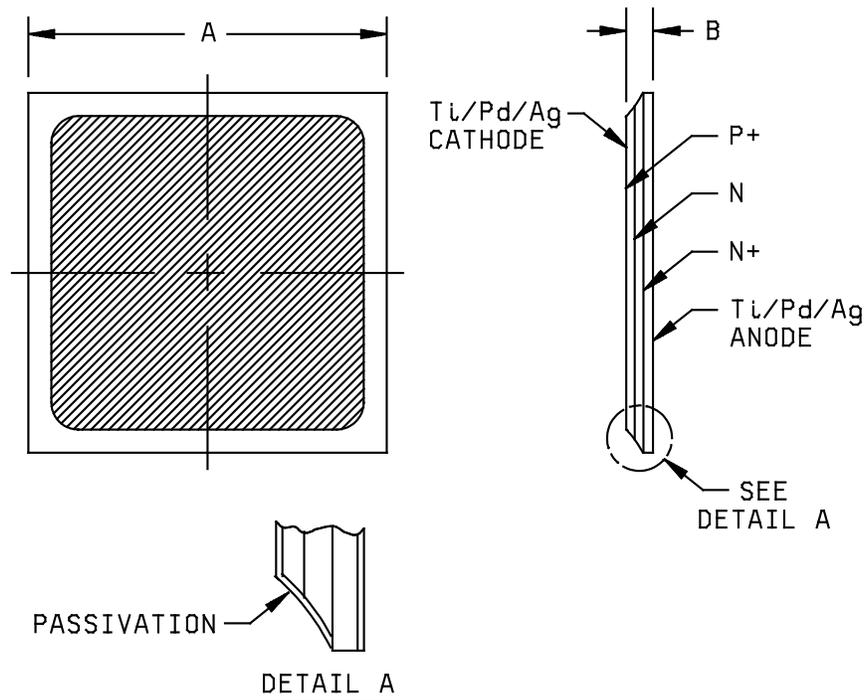


Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.140	.170	3.56	4.32
A1	---	.060	---	1.52
ØB	---	.300	---	7.62
C	.380	.400	9.65	10.16
C1	.415 Ref		10.54 Ref	
ØP1	.240	.260	6.1	6.6
P2	.090	.110	2.29	2.79
P3	.115	.125	2.92	3.18
P4	.040 Ref		1.02 Ref	
T	.010	.020	0.25	0.51
R	.015 Ref		0.38 Ref	

NOTES:

1. Dimensions are in inches.
2. Millimeter equivalents are given for information only.
3. Diode body profile may differ from the one shown for illustration
4. Dimensions prior to solder dipping
5. Standard polarity shown tab to Anode. Reverse polarity tab to Cathode

\* FIGURE 2. Physical Dimensions (BT).



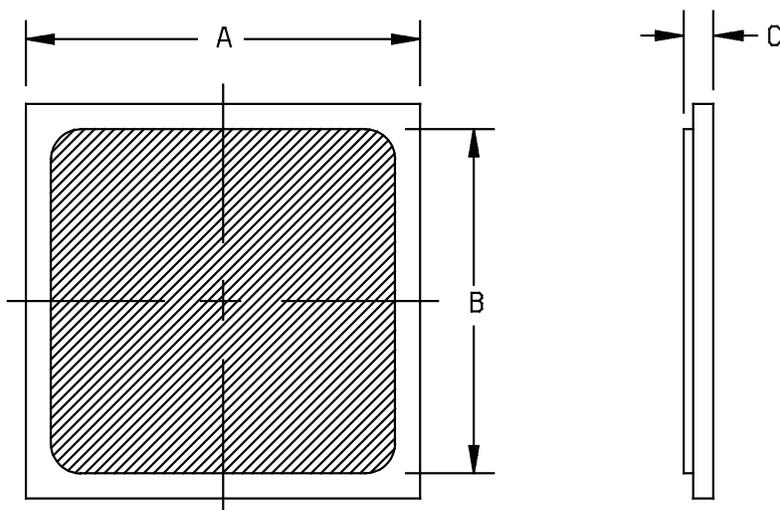
Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.199 SQ	.201 SQ	5.054 SQ	5.105 SQ
B	.009	.011	0.229	0.279

A version

NOTES:

1. Dimensions are in inches.
2. Millimeter equivalents are given for information only.
3. Back metal: Ti - Pd - Ag.
4. Top metal: Ti - Pd - Ag.
5. Metallization: Ti = 700 Å; Pd = 700 Å; Ag = 31,400 Å.
6. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.

\* FIGURE 3. Physical dimensions JANHCA and JANKCA.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.191 SQ	.201 SQ	4.851 SQ	5.105 SQ
B	.173 SQ	.183 SQ	4.394 SQ	4.648 SQ
C	.009	.010	0.229	0.254

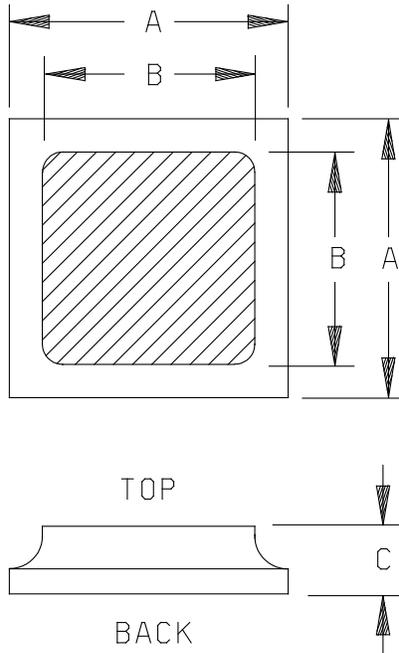
B version

NOTES:

1. Dimensions are in inches.
2. Millimeter equivalents are given for information only.
3. Back metal: Cr - Ni - Ag.
4. Top metal: Cr - Ni - Ag.
5. Metallization: Cr = 800 Å minimum, Ni = 1.5 Å minimum, Ag = 3,000 Å minimum.
6. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$ x symbology.

\* FIGURE 4. Physical dimensions JANHCB and JANKCB.

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Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.196 SQ	.202 SQ	4.98 SQ	5.13 SQ
B	.177 SQ	.183 SQ	4.50 SQ	4.65 SQ
C	.006	.012	0.15	0.30

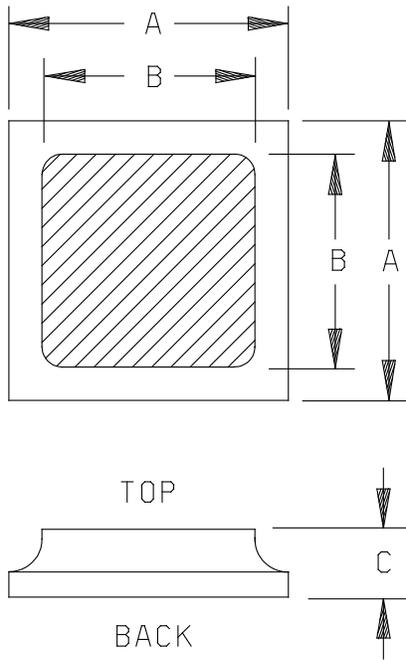
C version

NOTES:

1. Dimensions are in inches.
2. Millimeter equivalents are given for information only.
3. Back (cathode) metal: Silver.
4. Top (anode) metal: Silver.
5. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$ x symbology.

FIGURE 5. Physical dimensions JANHCC and JANKCC.

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Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.196 SQ	.202 SQ	4.98 SQ	5.13 SQ
B	.177 SQ	.183 SQ	4.50 SQ	4.65 SQ
C	.006	.012	0.15	0.30

D version

NOTES:

1. Dimensions are in inches.
2. Millimeter equivalents are given for information only.
3. Back (cathode) metal: Silver.
4. Top (anode) metal: Aluminum.
5. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.

FIGURE 6. Physical dimensions JANHCD and JANKCD.

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).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500.

\* 4.3 Screening (JANS, JANTXV and JANTX levels only). Screening shall be in accordance with appendix E, table E-IV of MIL-PRF-19500 and as specified herein. Specified electrical measurements shall be made in accordance with [table I](#) herein. Devices that exceed the limits of [table I](#) herein shall not be acceptable.

Screening (see appendix E, table E-IV of MIL-PRF-19500) (3) (4)	Measurement	
	JANS level	JANTX and JANTXV levels
(1) 3b	Surge (see 4.3.3)	Surge (see 4.3.3)
(1) 3c	Thermal response (see 4.3.4)	Thermal response (see 4.3.4)
4	Not applicable	Not applicable
9	Not applicable	Not applicable
10	Not applicable	Not applicable
11	$V_{FM1}$ and $I_{R1}$ (2)	$V_{FM1}$ and $I_{R1}$ (2)
12	Burn-in (see 4.3.2), t = 240 hours	Burn-in (see 4.3.2), t = 48 hours
13	Subgroup 2 and 3 of <a href="#">table I</a> herein, $V_{FM1}$ and $I_{R1}$ ; $\Delta V_{FM1} \leq \pm 0.1$ V (pk); $\Delta I_{R1} \leq \pm 5$ $\mu$ A dc or 100 percent from the initial value, whichever is greater	Subgroup 2 of <a href="#">table I</a> herein, $V_{FM1}$ and $I_{R1}$ ; $\Delta V_{FM1} \leq \pm 0.1$ V (pk); $\Delta I_{R1} \leq \pm 5$ $\mu$ A dc or 100 percent from the initial value, whichever is greater

- \* (1) May be performed at any time after screen 3a; TX and TXV levels do not need to be repeated in screening requirements. Surge shall precede thermal response.
- (2)  $I_{R1}$  measurement shall not be indicative of an open condition.
- \* (3) For BT packages PIND not applicable, Hermetic seal may be satisfied by the use of method 2068.
- \* (4) For DO-203AB devices manufactured with a hermetic internal element Hermetic seal and PIND testing not required.

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4.3.1 Screening (JANHC and JANKC). Screening of die shall be in accordance with appendix G of MIL-PRF-19500, as a minimum die shall be 100 percent probed in accordance with group A, subgroup 2, except test current shall not exceed 20 A.

\* 4.3.2 Burn-in conditions. Burn-in conditions for all levels are as follows: Method 1038 of MIL-STD-750, test condition A;  $T_C = +125^\circ\text{C}$ ,  $V_R = 0.8$  to  $0.85$  rated dc (see 1.3).

\* 4.3.2.1 Alternate burn-in conditions. For TX and TXV levels only.  $T_C = +150^\circ\text{C}$ ,  $V_R =$  rated  $V_R$  (see 1.3),  $I_O = 0$ ,  $f = 50$  to  $60$  Hz,  $t = 48$  hours.

4.3.3 Surge current. Surge current, see method 4066 of MIL-STD-750.  $I_O = 0$ ;  $V_{RWM} = 0$ ;  $I_{FSM} = 800$  A; six surges;  $T_A = +25^\circ\text{C}$ ;  $t_p = 8.3$  ms.

4.3.4 Thermal response  $Z_{\theta JX}$  measurements. The  $Z_{\theta JX}$  measurements shall be performed in accordance with method 3101 of MIL-STD-750. The  $Z_{\theta JX}$  conditions and maximum  $Z_{\theta JX}$  limit shall be derived by each vendor and shall not exceed the  $R_{\theta JC}$  (see 1.3). The chosen  $Z_{\theta JX}$  measurement and conditions for each device in the qualification lot shall be submitted in the qualification report and a thermal response curve shall be plotted. The chosen  $\Delta V_F$  value shall be considered final after the manufacturer has had the opportunity to test five consecutive lots.  $t_H = 100$  to  $250$  ms; heating current  $I_H = 30$  A. Measurement current:  $50 \leq I_M \leq 250$  mA;  $t_{MD} \leq 250$   $\mu\text{s}$ .

\* 4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500. For BT packages hermeticity may be satisfied by the use of test method 2068. For DO-203AB devices manufactured with a hermetic internal element Hermeticity testing not applicable.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with appendix E, 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 appendix E, table E-VIA(JANS) and table E-VIb (JANTX and JANTXV) of MIL-PRF-19500 and as follows. Electrical measurements (end-points) shall be in accordance with the applicable steps of table I, group A, subgroup 2 ( $V_{FM1}$ ,  $I_{R1}$ , and  $Z_{\theta JX}$  only) herein.

\* 4.4.2.1 Group B inspection, table E-VIA (JANS) of MIL-PRF-19500.

	<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
*	B3	4066	Condition A, $T_C = +55^\circ\text{C}$ ; $V_R =$ rated $V_R$ (see 1.3); six 8.3 ms surges; 1 surge/minute; $I_F$ (surge) = 800 A dc, $I_O = 0$ .
*	B4	1037	2,000 cycles, 25 percent rated $I_O \leq I_O$ applied $\leq$ rated $I_O$ (see 4.5.2). For BT Devices $I_O = 2.8$ A minimum unheatsunk. For irradiated devices, include $t_{rr}$ as an end-point measurement.
*	B5	1038	Condition A, $t = 1000$ hours, $T_C = +150^\circ\text{C}$ $V_R = 80$ percent of $V_{RWM}$ (pk) (see 1.3).
*	B6	4081 or 3101	$R_{\theta JC} = 0.8^\circ\text{C/W}$ , (see 4.5.4).
*	B8	1018	Only to be performed when organics or silicones are present in the device package; $n = 3$ , $c = 0$ .

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\* 4.4.2.2 Group B inspection, appendix E, table E-VIb (JANTX and JANTXV) of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
* B2	4066	Condition A, $T_C = +55^\circ\text{C}$ ; $V_R = \text{rated } V_R$ (see 1.3); six 8.3 ms surges; 1 surge/minute; $I_F$ (surge) = 800 A dc, $I_O = 0$ .
B3	1037	25 percent rated $I_O \leq I_O$ applied $\leq$ rated $I_O$ , 2,000 cycles (see 4.5.2). For BT Devices $I_O = 2.8$ A minimum unheatsunk. For irradiated devices, include $t_{rr}$ as an end-point measurement.
B5	4081 or 3101	$R_{\theta JC} = 0.8^\circ\text{C/W}$ , (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 appendix E, table E-VII of MIL-PRF-19500, and as follows. Electrical measurements (end-points) shall be in accordance with the applicable steps of table I, group A, subgroup 2 ( $V_{FM1}$ ,  $I_{R1}$ , and  $Z_{\theta JX}$  only) herein.

\* 4.4.3.1 Group C inspection, appendix E, table E-VII of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	DO-203AB only: Tension, test condition A, weight = 10 pounds (4.54 kg), $t = 15\text{s}$ .
C2	2036	DO-203AB only: Bending stress, test condition F, method B; weight = 15 pounds (6.8 kg), $t = 15\text{ s}$ .
C2	2036	DO-203AB only: Seal torque, test condition D1, torque = 3 inch-pound, $t = 15\text{ s}$ .
C2	2036	DO-203AB only: Stud torque, test condition D2, torque = 30 inch-pound, $t = 15\text{ s}$ .
C2	2036	BT Only: Lead Fatigue test Condition E
C6	1037	25 percent rated $I_O \leq I_O$ applied $\leq$ rated $I_O$ , 6,000 cycles (see 4.5.2). For BT Devices $I_O = 2.8$ A minimum unheatsunk. For irradiated devices, include $t_{rr}$ as an end-point measurement.

\* 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 herein.

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

4.5.1 Pulse measurements. Conditions for pulse measurements shall be as specified in section 4 of MIL-STD-750.

4.5.2 DC intermittent operation life. A cycle shall consist of an "on" period, when power is applied suddenly, not gradually, to the device for the time necessary to achieve a delta case temperature of  $+85^\circ\text{C}$ ,  $+15^\circ\text{C}$ ,  $-5^\circ\text{C}$ , followed by an "off" period, when the power is suddenly removed for cooling. Auxiliary (forced) cooling is permitted during the off period only.  $30\text{ s} \leq t_{\text{heating}} \leq 180\text{ s}$ .

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4.5.4 Thermal resistance. Thermal resistance measurements shall be performed in accordance with method 4081 or method 3101 of MIL-STD-750. The case reference temperature shall be held to equilibrium within the range of 20°C to 80°C during the power application and shall be measured at the hex flat. The maximum limit of  $R_{\theta JC}$  shall be 0.8°C/W. The following parameter measurements shall be used:

- a.  $I_H = I_F \geq 10$  A.
- b.  $I_M \leq 250$  mA.
- c.  $t_{MD} \leq 250$   $\mu$ s.

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\* TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical inspection	2071					
<u>Subgroup 2</u>						
* Forward voltage	4011	Condition B, $I_{FM} = 70$ A (pk); duty cycle $\leq 2$ percent (pulsed, see 4.5.1) $t_p = 300$ $\mu$ s maximum	$V_{FM1}$	.975		V (pk)
* Forward voltage	4011	Condition B, $I_{FM} = 150$ A (pk); duty cycle $\leq 2$ percent (pulsed, see 4.5.1) $t_p = 300$ $\mu$ s maximum	$V_{FM2}$	1.18		V (pk)
Reverse current	4016	DC method; $V_R =$ rated $V_R$ (see 1.3)	$I_{R1}$		25	$\mu$ A dc
* Thermal impedance <u>2/</u>	3101	See 4.3.4	$Z_{\theta JX}$			$^{\circ}$ C/W
<u>Subgroup 3</u>						
High temperature operation:		$T_C = +150^{\circ}$ C				
Reverse current	4016	DC method; $V_R =$ rated $V_R$ (see 1.3)	$I_{R2}$		30	mA dc
Forward voltage	4011	$I_{FM} = 70$ A (pk); duty cycle $\leq 2$ percent (pulsed, see 4.5.1) $t_p = 300$ $\mu$ s maximum	$V_{FM3}$	.84		V (pk)
Low temperature operation:		$T_C = -55^{\circ}$ C				
* Breakdown voltage	4021	$I_R = 1$ mA	$V_{(BR)}$			
1N6304, R, BT				50		V dc
1N6305, R, BT				100		V dc
1N6306, R, BT				150		V dc

See footnote at end of table.

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TABLE I. Group A inspection - continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u>						
Reverse recovery time	4031	Condition B; $I_F = 0.5$ A dc, $I_R = 1$ A dc, $I_{REC} = 0.25$ A dc, $d_i/d_t = 85$ A/ $\mu$ s (minimum)	$t_{rr1}$		50	ns
Reverse recovery time	4031	Condition C, $I_{FM} = 70$ A dc, $d_i/d_t = 130$ A/ $\mu$ s	$t_{rr2}$		60	ns
Junction capacitance	4001	$V_R = 10$ V, $f = 1$ MHz $V_{sig} = 50$ mV (p-p) maximum	$C_J$		600	pF
<u>Subgroups 5 and 6</u>						
Not applicable						
<u>Subgroup 7</u>						
* Forward recovery voltage	4026	$I_{FM} = 1$ A, $t_p \geq 20$ ns, $t_r = 8$ ns	$V_{FRM}$		2.2	V(pk)
Forward recovery time	4026	$I_{FM} = 1$ A	$t_{fr}$		15	ns

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

\* 2/ This test required for the following end-point measurements only:  
 Group B, subgroups 2 and 3 (JAN, JANTX, JANTXV).  
 Group B, subgroups 3 and 4 (JANS).  
 Group C, subgroups 2 and 6.  
 Group E, subgroup1.

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

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Thermal shock (glass strain)	1056	0°C to +100°C, 100 cycles.	
Hermetic seal <u>1/</u>	1071		
Electrical measurements		See <a href="#">table I</a> , subgroup 2	
<u>Subgroup 2</u>			45 devices c = 0
Steady-state dc blocking life	1038	Test condition A, except in accordance with <a href="#">4.3.2</a> ; 1,000 hours.	
Electrical measurements		See <a href="#">table I</a> , subgroup 2.	
<u>Subgroup 3</u>			
Not applicable			
<u>Subgroup 4</u>			
Thermal impedance curves	3101 or 4081	See MIL-PRF-19500.	
<u>Subgroup 5</u>			
Not applicable			

\* (1) For BT packages Hermetic seal may be satisfied by the use of method 2068.

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.

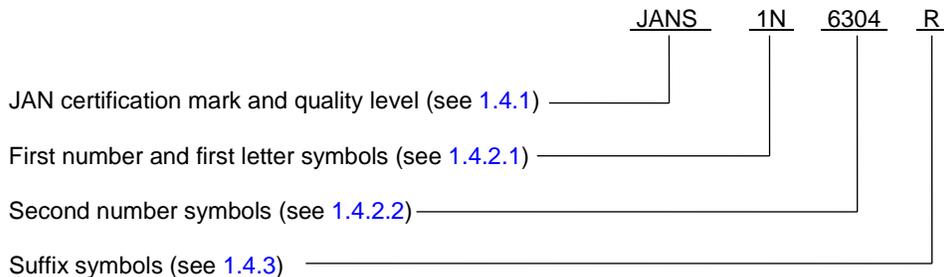
6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Packaging requirements (see 5.1).
- c. Lead material and finish (see 3.4.1).
- \* d. The complete PIN, see 1.4, 6.4 and 6.5.

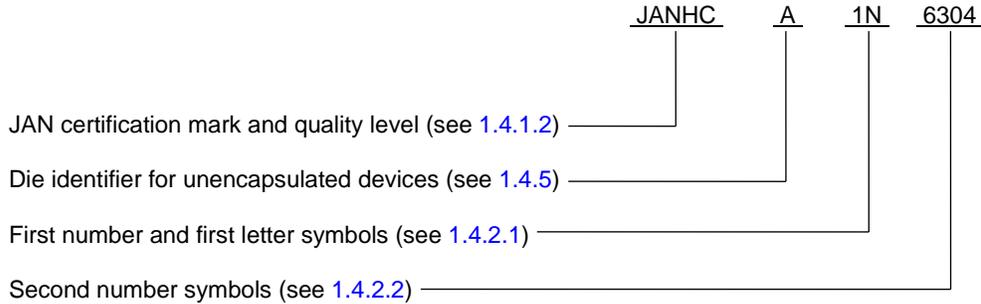
6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention 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 Defense Supply Center, Columbus, ATTN: DSCC/VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail [vqe.chief@dla.mil](mailto: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 PIN construction example.

6.4.1 Encapsulated devices. The PINs for encapsulated devices are constructed using the following form.



6.4.2 Un-encapsulated devices. The PINs for un-encapsulated devices are constructed using the following form.



\* 6.5 List of PINs.

\* 6.5.1 PINs for encapsulated devices. The following is a list of possible PINs for encapsulated devices available on this specification sheet.

PINs for types 1N6304, 1N6305, 1N6306		
JAN1N6304	JAN1N6305	JAN1N6306
JAN1N6304R	JAN1N6305R	JAN1N6306R
JAN1N6304BT	JAN1N6305BT	JAN1N6306BT
JAN1N6304RBT	JAN1N6305RBT	JAN1N6306RBT
JANTX1N6304	JANTX1N6305	JANTX1N6306
JANTX1N6304R	JANTX1N6305R	JANTX1N6306R
JANTX1N6304BT	JANTX1N6305BT	JANTX1N6306BT
JANTX1N6304RBT	JANTX1N6305RBT	JANTX1N6306RBT
JANTXV1N6304	JANTXV1N6305	JANTXV1N6306
JANTXV1N6304R	JANTXV1N6305R	JANTXV1N6306R
JANTXV1N6304BT	JANTXV1N6305BT	JANTXV1N6306BT
JANTXV1N6304RBT	JANTXV1N6305RBT	JANTXV1N6306RBT
JANS1N6304	JANS1N6305	JANS1N6306
JANS1N6304R	JANS1N6305R	JANS1N6306R
JANS1N6304BT	JANS1N6305BT	JANS1N6306BT
JANS1N6304RBT	JANS1N6305RBT	JANS1N6306RBT

6.5.2 Suppliers of JANHC and JANKC die. The qualified die suppliers will be identified on the QPL (example JANHCA1N6304).

JANHC and JANKC ordering information				
Military PIN	Manufacturer			
	12969	12969	59377	59377
1N6304, R	JANHCA1N6304	JANKCA1N6304	JANHCB1N6304	JANKCB1N6304
1N6305, R	JANHCA1N6305	JANKCA1N6305	JANHCB1N6305	JANKCB1N6305
1N6306, R	JANHCA1N6306	JANKCA1N6306	JANHCB1N6306	JANKCB1N6306

JANHC and JANKC ordering information				
Military PIN	Manufacturer			
	12969	12969	12969	12969
1N6304, R	JANHCC1N6304	JANKCC1N6304	JANHCD1N6304	JANKCD1N6304
1N6305, R	JANHCC1N6305	JANKCC1N6305	JANHCD1N6305	JANKCD1N6305
1N6306, R	JANHCC1N6306	JANKCC1N6306	JANHCD1N6306	JANKCD1N6306

\* (1) The JANHCA1N6304 and the JANKCA1N6304 die is listed for historical purposes only, but is obsolete at this time.

\* (2) The JANHCB1N6304 and the JANKCB1N6304 die is listed for historical purposes only, but is obsolete at this time.

\* (3) The JANHCC1N6304 and the JANKCC1N6304 die is listed for historical purposes only, but is obsolete at this time.

\* (4) The JANHCD1N6304 and the JANKCD1N6304 die is listed for historical purposes only, but is obsolete at this time.

6.6 Changes from previous issue. The margins of this specification are marked with asterisks 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 last previous issue.

Custodians:

Army - CR

Navy - EC

\* Air Force - 85

NASA - NA

DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2015-092)

Review activities:

Army - AR, MI, SM

Navy - AS, MC

Air Force - 19, 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>.