The documentation and process conversion measures necessary to comply with this revision shall be completed by 4 May 2009.

INCH-POUND

MIL-PRF-19500/452J
4 February 2009
SUPERSEDING
MIL-PRF-19500/452H
26 March 2008

PERFORMANCE SPECIFICATION SHEET

* SEMICONDUCTOR DEVICE, DIODE, SILICON, TEMPERATURE COMPENSATED, VOLTAGE-REFERENCE, TYPES 1N4565A-1 THROUGH 1N4584A-1, AND 1N4565AUR-1 THROUGH 1N4584AUR-1, JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC, RADIATION HARDENED (TOTAL DOSE ONLY) TYPES JANTXVM, D, L, R, F, G, H; JANSM, D, L, R, F, G, H, JANHCM, D, L, R, F, G, H; AND JANKCM, D, L, R, F, G, H

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 6.4 volts ±5 percent, silicon, low bias current, temperature compensated, voltage-reference diodes. Four 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. Seven levels of radiation hardened (total dose only) product assurance are provided for each encapsulated device type, and two levels of product assurance for each unencapsulated device type die as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (DO-7 and DO-35), figure 2 (DO-213AA), figure 3 (JANHCA and JANKCA), figure 4 (JANHCB and JANKCB), and figure 5 (JANHCC and JANKCC).

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

P_T	T_{STG} and T_J	I_{ZM} (1)	Power derating above T_A = +25°C
mW	°C	mA dc	mW/°C
500	-55 to +175	70	3.33

(1) To guarantee voltage temperature stability, it is necessary to maintain the proper I_Z as specified in 1.4 herein.

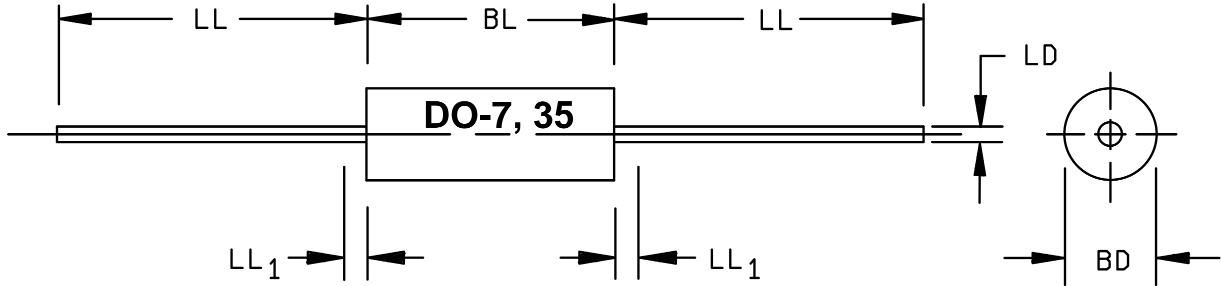
Comments, suggestions, or questions on this document should be addressed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to semiconductor@dscc.dla.mil . Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil .

AMSC N/A FSC 5961

1.4 Primary electrical characteristics. Unless otherwise specified, primary electrical characteristics at T_A = +25°C.

Column 1	Column 2	Column 3	Column 4		Column 5
Type (1)	ΔV_Z (voltage-temperature stability) (2)	Z_Z I_Z = 0.5 mA dc	V_Z I_Z = 0.5 mA dc		I_R V_R = 3.0 V
			Min	Max	
	V dc	ohms	Volts	Volts	µA
1N4565A-1, 1N4565AUR-1	0.100	200	6.08	6.72	2.0
1N4566A-1, 1N4566AUR-1	0.050	200	6.08	6.72	2.0
1N4567A-1, 1N4567AUR-1	0.020	200	6.08	6.72	2.0
1N4568A-1, 1N4568AUR-1	0.010	200	6.08	6.72	2.0
1N4569A-1, 1N4569AUR-1	0.005	200	6.08	6.72	2.0
Type (1)	ΔV_Z (voltage-temperature stability) (2)	Z_Z I_Z = 1.0 mA dc	V_Z I_Z = 1.0 mA dc		I_R V_R = 3.0 V
			Min	Max	
	V dc	ohms	Volts	Volts	µA
1N4570A-1, 1N4570AUR-1	0.100	100	6.08	6.72	2.0
1N4571A-1, 1N4571AUR-1	0.050	100	6.08	6.72	2.0
1N4572A-1, 1N4572AUR-1	0.020	100	6.08	6.72	2.0
1N4573A-1, 1N4573AUR-1	0.010	100	6.08	6.72	2.0
1N4574A-1, 1N4574AUR-1	0.005	100	6.08	6.72	2.0
Type (1)	ΔV_Z (voltage-temperature stability) (2)	Z_Z I_Z = 2.0 mA dc	V_Z I_Z = 2.0 mA dc		I_R V_R = 3.0 V
			Min	Max	
	V dc	ohms	Volts	Volts	µA
1N4575A-1, 1N4575AUR-1	0.100	50	6.08	6.72	2.0
1N4576A-1, 1N4576AUR-1	0.050	50	6.08	6.72	2.0
1N4577A-1, 1N4577AUR-1	0.020	50	6.08	6.72	2.0
1N4578A-1, 1N4578AUR-1	0.010	50	6.08	6.72	2.0
1N4579A-1, 1N4579AUR-1	0.005	50	6.08	6.72	2.0
Type (1)	ΔV_Z (voltage-temperature stability) (2)	Z_Z I_Z = 4.0 mA dc	V_Z I_Z = 4.0 mA dc		I_R V_R = 3.0 V
			Min	Max	
	V dc	ohms	Volts	Volts	µA
1N4580A-1, 1N4580AUR-1	0.100	25	6.08	6.72	2.0
1N4581A-1, 1N4581AUR-1	0.050	25	6.08	6.72	2.0
1N4582A-1, 1N4582AUR-1	0.020	25	6.08	6.72	2.0
1N4583A-1, 1N4583AUR-1	0.010	25	6.08	6.72	2.0
1N4584A-1, 1N4584AUR-1	0.005	25	6.08	6.72	2.0

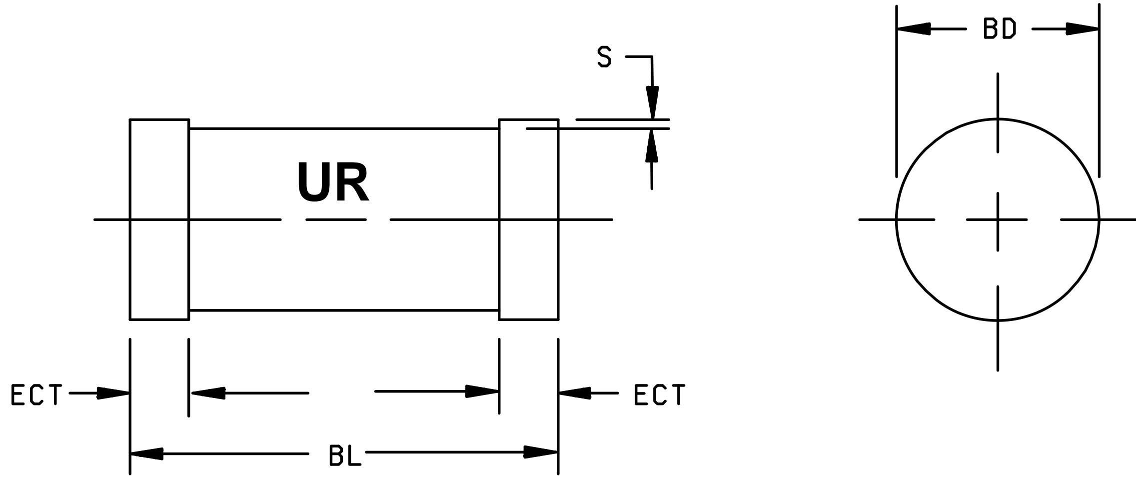
(1) Electrical characteristics and test conditions for "A-1, and AUR-1" devices are identical.
(2) To guarantee voltage temperature stability, it is necessary to maintain the proper I_Z as specified herein.



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.060	.107	1.52	2.72	3
BL	.120	.300	3.05	7.62	3
LD	.018	.023	0.46	0.58	
LL	1.000	1.500	25.40	38.10	
LL_1		0.050		1.27	4

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Package contour optional within BD and length BL. Heat slugs, if any, shall be included within this cylinder but shall not be subject to minimum limit of BD.
4. Within this zone, lead diameter may vary to allow for lead finishes and irregularities, other than heat slugs.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 1. Physical dimensions 1N4565A-1 through 1N4584A-1 (DO-7 and DO-35).

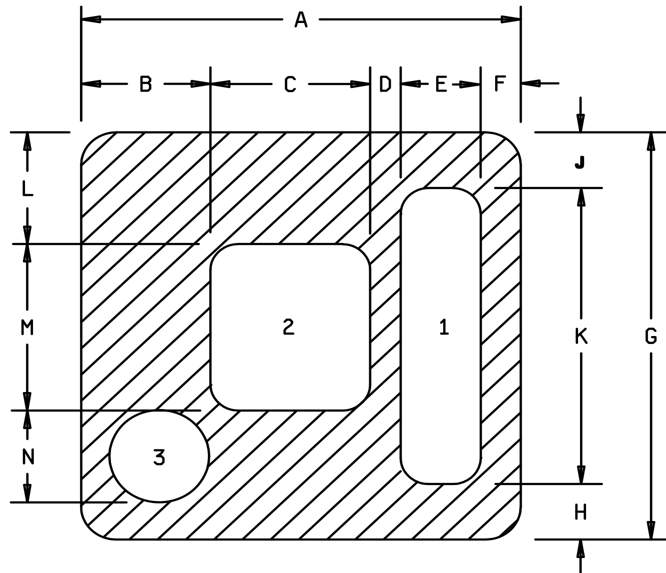


Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.063	.067	1.60	1.70
ECT	.016	.022	0.41	0.56
BL	.130	.146	3.30	3.71
S	.001 Min		0.03 Min	

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

FIGURE 2. Physical dimensions 1N4565AUR-1 through 1N4584AUR-1 (DO-213AA).

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.0280	.0320	.711	.813
B	.0080	.0100	.203	.254
C	.0104	.0106	.264	.269
D	.0019	.0021	.048	.053
E	.0054	.0056	.137	.142
F	.0020	.0040	.050	.102
G	.0280	.0320	.711	.813
H	.0030	.0050	.076	.127
J	.0030	.0050	.076	.127
K	.0209	.0211	.531	.536
L	.0080	.0100	.203	.254
M	.0104	.0106	.264	.269
N	.0059	.0061	.150	.155



Backside must be electrically isolated
to ensure proper performance.

Design data

Metallization:

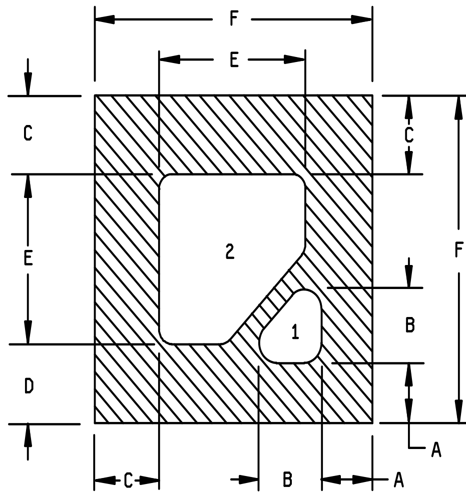
Top: 1 (Cathode) Al — Circuit layout data:
2 (Anode) Al — For zener operation, cathode must be operated positive with respect to anode.
3 (Test pad) Al — Test pad is for wire bond evaluation only. No electrical contact is made with test pad.

Back: Au

Al thickness 25,000Å minimum.
Gold thickness 4,000Å minimum.
Chip thickness .010 inch (0.25 mm) ±0.002 inch (±0.05 mm).

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

FIGURE 3. JANHC and JANKC (A-version) die dimensions.



BACKSIDE MUST BE ELECTRICALLY ISOLATED

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.0035	.0065	.088	.165
B	.0050	.0080	.127	.203
C	.0050	.0065	.127	.165
D	.0050	.0065	.127	.165
E	.0150	.0165	.381	.419
F	.0260	.0290	.660	.737

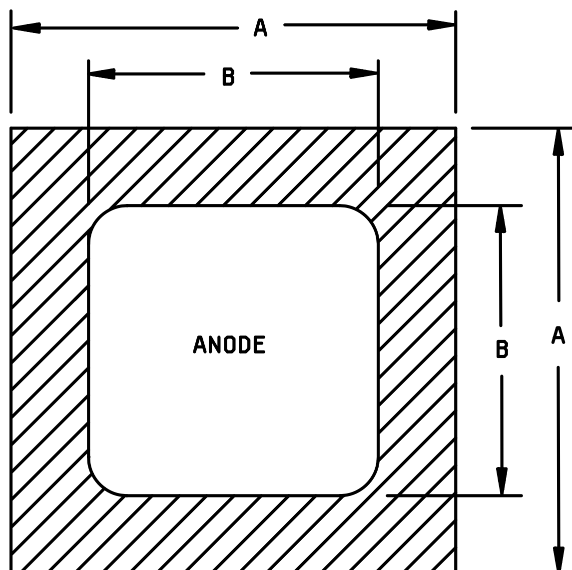
Design data

Metallization:
Top: 1 (Cathode) Al
2 (Anode) Al
Back: Au

Circuit layout data:
For zener operation, cathode must be operated positive with respect to anode.
Al thickness 40,000Å minimum.
Gold thickness 5,000Å minimum.
Chip thickness .010 inch (0.25 mm) ±0.002 inch (±0.05 mm).

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

FIGURE 4. JANHC and JANKC (B-version) die dimensions.



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.024	.037	0.61	0.94
B	.014	.029	0.36	0.74

Design data

Metallization:
Top: (Anode) Al
Back: (Cathode) Au

Circuit layout data:
For zener operation, cathode must be operated positive with respect to anode.
Al thickness 40,000Å minimum.
Gold thickness 5,000Å minimum.
Chip thickness .010 inch (0.25 mm) ±.002 inch (±0.05 mm).

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

FIGURE 5. JANHC and JANKC (C-version) die dimensions.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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, 4, or 5 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://assist.daps.dla.mil/quicksearch/ or http://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

* 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.

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500 and figures 1, 2, 3, 4, and 5 herein.

3.4.1 Lead finish. Lead finish shall be solderable in accordance with 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 Diode construction. These devices shall be constructed in a manner and using material which enable the diodes to meet the applicable requirements of MIL-PRF-19500 and this document.

3.4.3 Dash-one construction. Shall be as specified in MIL-PRF-19500.

3.4.4 JANS construction. Construction shall be dash-one, category I or II metallurgical bond in accordance with MIL-PRF-19500.

3.4.5 JANHC and JANKC construction. JANHC and JANKC construction may differ in die size and bonding pad layout provided the manufacturing technology is identical (example: Diffused junction, alloy junction).

3.4.6 Package outline. This specification contains two standard packages; DO-7 and DO-35. Any user of this specification that has a specific package outline requirement shall specify their preference in the document order. If package is not specified, the manufacturer may supply either package (see 6.2).

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 table I.

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

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).

4.1.1 Sampling inspection. Sampling inspection shall be in accordance with MIL-PRF-19500 and as specified herein, except that lot accumulation period shall be 3 months in lieu of 6 weeks.

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 require 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 of this revision to maintain qualification.

4.2.2 JANHC and JANKC devices. Qualification for JANHC and JANKC devices shall be in accordance with MIL-PRF-19500.

4.2.3 Radiation hardened devices. See MIL-PRF-19500 and 4.4.4 herein.

* 4.3 Screening (JANS, JANTXV and JANTX levels only). Screening shall be in accordance with 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.

Screen (see table E-IV of MIL-PRF-19500)	JANS level	JANTXV and JANTX level
1a 1b	Required Required	Not required Required (JANTXV only)
2	Not required	Not required
3a 3b 3c	Required Not applicable Not applicable	Required Not applicable Not applicable
4	Not applicable	Not applicable
5	Not applicable	Not applicable
6	Not applicable	Not applicable
7a 7b	Not applicable Optional	Not applicable Optional
8	Required	Not required
9	Required	Not applicable
10	Not applicable	Not applicable
11	Required V_Z, Z_Z	Required V_Z, Z_Z
12	Required, see 4.3.1	Required, see 4.3.1
13	Required Subgroups 2 and 3 of table I herein; $\Delta Z_Z \leq \pm 15$ percent of initial reading $\Delta V_Z \leq \pm 0.005$ V dc from initial value at $T_A = +25°C \pm 2°C$	Required Subgroup 2 of table I herein $\Delta Z_Z \leq \pm 15$ percent of initial reading. $\Delta V_Z \leq \pm 0.005$ V dc from initial value at $T_A = +25°C \pm 2°C$
14a 14b	Not applicable Required (1) (2)	Not applicable Required (1) (2)
15	Required	Not required
16	Required	Not required

(1) See MIL-PRF-19500.
(2) For clear glass diodes, the hermetic seal (gross leak) may be performed at any time after temperature cycling.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

a. 1N4565 through 1N4569: I_Z = 0.5 mA dc ±0.05 mA dc, T_A = +150 +5°C, -0°C.

b. 1N4570 through 1N4574: I_Z = 1.0 mA dc ±0.1 mA dc, T_A = +150 +5°C, -0°C.

c. 1N4575 through 1N4579: I_Z = 2.0 mA dc ±0.2 mA dc, T_A = +150 +5°C, -0°C.

d. 1N4580 through 1N4584: I_Z = 4.0 mA dc ±0.4 mA dc, T_A = +150 +5°C, -0°C.

To better utilize burn-in equipment, higher values of I_Z shall be permitted provided the junction temperature does not exceed +175°C.

4.3.2 Screening (JANHC and JANKC). Screening of JANHC and JANKC die shall be in accordance with MIL-PRF-19500.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and herein.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with 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 tables VIa (JANS) and VIb (JAN, JANTX, JANTXV) of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with the applicable steps of table I, subgroup 2 herein.

4.4.2.1 Group B inspection, table E-VIa (JANS) of MIL-PRF-19500. For purposes of JANS inspection, a single device type shall be defined as devices from a single wafer lot (for each die type used in the construction). The conformance inspection sample shall be selected from the part category with the lowest ΔV_Z rating in the inspection lot.

Subgroup	Method	Conditions
B1	2066	As specified.
B2	2026	As specified.
B2	1022	As specified.
B3	1056	Test condition A, 25 cycles.
B3	4066	Not applicable.
B3	1071	Test condition E.
B3	2075	As specified.
B4	1037	I_Z = 35 mA dc at T_A = room ambient; t_{on} = t_{off} = 30 seconds minimum for 4,000 cycles.
B5	1027	I_{ZM} = 70 mA dc for 96 hours. T_A = +75°C or adjusted as required, to give an average lot T_J = +200°C.
B6		Not applicable.

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

Subgroup	Method	Conditions
B1	2026	As specified.
B1	1022	As specified.
B2	1056	Test condition A, 25 cycles.
B2	4066	Not applicable.
B2	1071	Test condition E.
B3	1027	Conditions for "A-1" and "AUR-1" versions: (see 4.3.1).
B4	2075	As specified.
B5		Not applicable.
B6	1032	As specified.

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. Electrical measurements (end-points) requirements shall be in accordance with the applicable steps of table I, subgroup 2 herein.

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

Subgroup	Method	Conditions
C1	2066	As specified.
C2	1056	Test condition A, 25 cycles.
C2	2036	Tension: Test condition A; 4 pounds weight, t = 15 ±3 seconds; Lead fatigue: Test condition E (lead fatigue and tension tests are not applicable to surface mount "UR" version devices).
C2	1071	Test condition E.
C2	1021	Omit initial conditioning.
C3		Not applicable.
C4	1041	As specified.
C5		Not applicable.
C6	1026	Conditions for "A-1 and AUR-1" versions of: 1N4565 through 1N4569: I_Z = 0.5 mA dc, T_A = +100°C (see 4.5.2). 1N4570 through 1N4574: I_Z = 1.0 mA dc, T_A = +100°C (see 4.5.2). 1N4575 through 1N4579: I_Z = 2.0 mA dc, T_A = +100°C (see 4.5.2). 1N4580 through 1N4584: I_Z = 4.0 mA dc, T_A = +100°C (see 4.5.2).
C7		Not applicable.

4.4.4 Group D inspection. Group D inspection shall be conducted in accordance with table E-VIII of MIL-PRF-19500 and table II herein. Submitted lots for group D sample inspection must be constructed using one homogeneous wafer lot for the zener and one wafer lot for the compensating die (die), as also described in the submitted DSCC Design and Construction form 36D (see table II herein).

4.4.5 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup tests in table E-IX of MIL-PRF-19500 and table III herein.

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

4.5.1 Voltage temperature stability. The breakdown voltage of each type shall be measured and recorded at each of the specified temperatures. The lowest measured voltage shall be subtracted from the highest measured voltage for each diode. The difference value obtained shall not exceed the specified ΔV_Z for each diode type.

4.5.2 Reference voltage time stability. The breakdown voltage shall be measured prior to life testing, at 340 hours, and at the conclusion of the life test. The 340-hour reading shall be compared with the 0-hour reading and the 1,000-hour reading compared with the 340-hour reading. The change in breakdown voltage shall not exceed the limits specified. The test temperature for breakdown voltage shall be the same as the specified ambient life test temperature (see table IV herein).

4.5.3 Reference voltage. The test current shall be applied until thermal equilibrium is attained (15 s maximum) prior to reading the reference voltage. For this test, the diode shall be suspended by its leads with mounting clips whose inside edge is located at .375 inch (9.53 mm) from the body and the mounting clips shall be maintained at the specified temperature. This measurement may be performed after a shorter time following application of the test current than that which provide thermal equilibrium if correlation to stabilized readings can be established to the satisfaction of the Government.

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 2/						
Reference voltage	4022	See 4.5.3	V_Z	6.08	6.72	
1N4565 through 1N4569		I_Z = 0.5 ±0.01 mA dc				V dc
1N4570 through 1N4574		I_Z = 1.0 ±0.01 mA dc				V dc
1N4575 through 1N4579		I_Z = 2.0 ±0.01 mA dc				V dc
1N4580 through 1N4584		I_Z = 4.0 ±0.01 mA dc				V dc
Small signal breakdown impedance	4051		Z_Z			ohms
1N4565 through 1N4569		I_Z = 0.5 ±0.01 mA dc, I_{sig} = 0.05 mA rms			200	
1N4570 through 1N4574		I_Z = 1.0 ±0.01 mA dc, I_{sig} = 0.1 mA rms			100	
1N4575 through 1N4579		I_Z = 2.0 ±0.01 mA dc, I_{sig} = 0.2 mA rms			50	
1N4580 through 1N4584		I_Z = 4.0 ±0.01 mA dc, I_{sig} = 0.4 mA rms			25	
Subgroup 3						
Voltage-temperature stability (see 4.5.1 and 4.5.3)		T_A = -55°C, 0°C, +25°C, +75°C, +100°C ±2°C, I_Z = column 4 of 1.4	ΔV_Z			
1N4565A-1, 1N4565AUR-1					100	mV dc
1N4570A-1, 1N4570AUR-1					100	mV dc
1N4575A-1, 1N4575AUR-1					100	mV dc
1N4580A-1, 1N4580AUR-1					100	mV dc
1N4566A-1, 1N4566AUR-1					50	mV dc
1N4571A-1, 1N4571AUR-1					50	mV dc
1N4576A-1, 1N4576AUR-1					50	mV dc
1N4581A-1, 1N4581AUR-1					50	mV dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3 - Continued		T_A = -55°C, 0°C, +25°C, +75°C, +100°C ±2°C, I_Z = column 4 of 1.4	ΔV_Z			
1N4567A-1, 1N4567AUR-1					20	mV dc
1N4572A-1, 1N4572AUR-1					20	mV dc
1N4577A-1, 1N4577AUR-1					20	mV dc
1N4582A-1, 1N4582AUR-1					20	mV dc
1N4568A-1, 1N4568AUR-1					10	mV dc
1N4573A-1, 1N4573AUR-1					10	mV dc
1N4578A-1, 1N4578AUR-1					10	mV dc
1N4583A-1, 1N4583AUR-1					10	mV dc
1N4569A-1, 1N4569AUR-1					5	mV dc
1N4574A-1, 1N4574AUR-1					5	mV dc
1N4579A-1, 1N4579AUR-1					5	mV dc
1N4584A-1, 1N4584AUR-1					5	mV dc
Subgroups 4, 5, and 6						
Not applicable						
Subgroup 7						
Reverse leakage current	4016	DC method; V_R = 3.0 Vdc	I_R		2.0	µA

1/ For sampling plan, see MIL-PRF-19500.
2/ Electrical characteristics apply to all package styles.

TABLE II. Group D inspection.

Inspection 1/ 2/	MIL-STD-750		Symbol	JANTXV and JANS Pre-irradiation limits		JANTXV and JANS Post-irradiation limits		$\Delta V_{Z\Theta}$ Pre-, Post-irradiation change		Unit
	Method	Conditions		M, D, L, R, F, G, and H		M, D, L, R, F, G, and H				
				Min	Max	Min	Max	Min	Max	
Subgroup 1										
Not applicable										
Subgroup 2		T_C = +25°C								
Steady-state total dose irradiation	1019	I_Z = column 4 of 1.4, Condition A								
Reference voltage	4022	I_Z = column 4 of 1.4, (see 4.5.3)	V_Z	6.08	6.72	6.08	6.72			V dc
Small-signal breakdown impedance	4051	I_Z = column 4 of 1.4	Z_Z							ohms
1N4565		I_{sig} = 0.05 mA ac			200		200			
1N4566		I_{sig} = 0.05 mA ac			200		200			
1N4567		I_{sig} = 0.05 mA ac			200		200			
1N4568		I_{sig} = 0.05 mA ac			200		200			
1N4569		I_{sig} = 0.05 mA ac			200		200			
1N4570		I_{sig} = 0.1 mA ac			100		100			
1N4571		I_{sig} = 0.1 mA ac			100		100			
1N4572		I_{sig} = 0.1 mA ac			100		100			
1N4573		I_{sig} = 0.1 mA ac			100		100			
1N4574		I_{sig} = 0.1 mA ac			100		100			
1N4575		I_{sig} = 0.2 mA ac			50		50			
1N4576		I_{sig} = 0.2 mA ac			50		50			
1N4577		I_{sig} = 0.2 mA ac			50		50			
1N4578		I_{sig} = 0.2 mA ac			50		50			
1N4579		I_{sig} = 0.2 mA ac			50		50			
1N4580		I_{sig} = 0.4 mA ac			25		25			
1N4581		I_{sig} = 0.4 mA ac			25		25			
1N4582		I_{sig} = 0.4 mA ac			25		25			
1N4583		I_{sig} = 0.4 mA ac			25		25			
1N4584		I_{sig} = 0.4 mA ac			25		25			

See footnotes at end of table.

TABLE II. Group D inspection - Continued.

Inspection 1/ 2/	MIL-STD-750 Method	MIL-STD-750 Conditions	Symbol	JANTXV and JANS Pre-irradiation limits M, D, L, R, F, G, and H Min	JANTXV and JANS Pre-irradiation limits M, D, L, R, F, G, and H Max	JANTXV and JANS Post-irradiation limits M, D, L, R, F, G, and H Min	JANTXV and JANS Post-irradiation limits M, D, L, R, F, G, and H Max	$\Delta V_{Z\Theta}$ Pre-, Post-irradiation change Min	$\Delta V_{Z\Theta}$ Pre-, Post-irradiation change Max	Unit
Subgroup 2 - Continued.										
Reverse current leakage	4016	DC method; V_R = 3.0 V dc	I_R		2.0		2.0			µA
Voltage stability (see 4.5.1)	4022	I_Z = Column 4 of 1.4. T_A = +25°C ±2°C	ΔV_Z							mV
1N4565									±3	
1N4566									±3	
1N4567									±2	
1N4568									±1.5	
1N4569									±1	
1N4570									±3	
1N4571									±3	
1N4572									±2	
1N4573									±1.5	
1N4574									±1	
1N4575									±3	
1N4576									±3	
1N4577									±2	
1N4578									±1.5	
1N4579									±1	
1N4580									±3	
1N4581									±3	
1N4582									±2	
1N4583									±1.5	
1N4584									±1	

1/ For sampling plan, see MIL-PRF-19500.
2/ Electrical characteristics and test conditions for " A-1 and AUR-1" devices are identical.

TABLE III. Group E inspection qualification and requalification (all product assurance levels).

Inspection	MIL-STD-750		Qualification conformance inspection (sampling plan)
	Method	Conditions	
Subgroup 1			22 devices, c = 0
Temperature cycling	1051	500 cycles.	
Electrical measurements		See table I, subgroup 2 herein.	
Subgroup 2			22 devices, c = 0
Steady-state operation life	1038	Condition B, 1,000 hours. (see 4.3.1).	
Electrical measurements		See table I, subgroup 2 herein.	
Subgroup 3			3 devices, c = 0
Decap analysis	2101	Cross section and scribe and break. Separate samples shall be used for each test.	
Subgroups 4, 5, 6, and 7			
Not applicable			
Subgroup 8			45 devices
Resistance to glass cracking	1057	Step stress to destruction by increasing cycles or up to a maximum of 25 cycles.	

TABLE IV. Reference voltage time stability.

Step	Inspection	MIL-STD-750		Symbol	Limit		Unit
		Method	Condition		Min	Max	
1.	Reference-voltage stability		T_A = +100°C ±2°C 0 to 340 hours (see 4.5.2 and 4.5.3)	ΔV_Z			mV dc
	1N4565, 1N4570 1N4575, 1N4580					10 10	
	1N4566, 1N4571 1N4576, 1N4581					8 8	
	1N4567, 1N4572 1N4577, 1N4582					7 7	
	1N4568, 1N4573 1N4578, 1N4583					6 6	
	1N4569, 1N4574 1N4579, 1N4584					5 5	
2.	Reference-voltage stability		T_A = +100°C ±2°C 340 to 1,000 hours (see 4.5.2 and 4.5.3)	ΔV_Z			mV dc
	1N4565, 1N4570 1N4575, 1N4580					5 5	
	1N4566, 1N4571 1N4576, 1N4581					4 4	
	1N4567, 1N4572 1N4577, 1N4582					4 4	
	1N4568, 1N4573 1N4578, 1N4583					3 3	
	1N4569, 1N4574 1N4579, 1N4584					3 3	

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. Product assurance level and type designator.

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

6.4 Suppliers of JANHC and JANKC die. The qualified JANHC and JANKC suppliers with the applicable letter version (example, JANHCAM1N4565A) will be identified on the parts list of MIL-PRF-19500.

JANC ordering information						
PIN	Manufacturer					
	43611	43611 Radiation designators M,D,L,R,F,G,H	12954	12954 Radiation designators M,D,L,R,F,G,H	12954
1N4565A through 1N4584A	JANHCA1N4565A through JANHCA1N4584A	JANHCA1N4565A through JANHCA1N4584A	JANHCB1N4565A through JANHCB1N4584A	JANHCB1N4565A through JANHCB1N4584A	JANHCC1N4565A through JANHCC1N4584A
1N4565A through 1N4584A	JANKCA1N4565A through JANKCA1N4584A	JANKCA1N4565A through JANKCA1N4584A	JANKCB1N4565A through JANKCB1N4584A	JANKCB1N4565A through JANKCB1N4584A	JANKCC1N4565A through JANKCC1N4584A

6.5 Substitutability of dash-one parts. Non-dash-one devices have been deleted from this specification. Dash-one devices are a direct substitute for non dash-one devices and are preferred. The following table shows the direct substitutability.

Superseded PIN	Superseding PIN		Superseded PIN	Superseding PIN
1N4565A	1N4565A-1		1N4575A	1N4575A-1
1N4566A	1N4566A-1		1N4576A	1N4576A-1
1N4567A	1N4567A-1		1N4577A	1N4577A-1
1N4568A	1N4568A-1		1N4578A	1N4578A-1
1N4569A	1N4569A-1		1N4579A	1N4579A-1
1N4570A	1N4570A-1		1N4580A	1N4580A-1
1N4571A	1N4571A-1		1N4581A	1N4581A-1
1N4572A	1N4572A-1		1N4582A	1N4582A-1
1N4573A	1N4573A-1		1N4583A	1N4583A-1
1N4574A	1N4574A-1		1N4584A	1N4584A-1

6.6 Substitution of radiation hardened devices. See MIL-PRF-19500.

6.7 Substitution of devices ΔV_Z. Device types within this series with higher type numbers (lower ΔV_Z) are a direct one way substitution for lower type numbers (higher ΔV_Z).

6.8 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

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Review activities:
Army - AR, MI, SM
Navy - AS, MC
Air Force - 19, 99

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