The documentation and process conversion measures necessary to comply with this revision shall be completed by 15 December 1997

INCH POUND

MIL-PRF-19500/437D
15 September 1997
SUPERSEDING
MIL-S-19500/437C
20 December 1994

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, LOW-NOISE VOLTAGE REGULATOR TYPES, 1N5518B-1, 1N5518C-1, 1N5518D-1 THROUGH 1N5546B-1, 1N5546C-1, 1N5546D-1, 1N5518BUR-1, 1N5518CUR-1, 1N5518DUR-1 THROUGH 1N5546BUR-1, 1N5546CUR-1, 1N5546DUR-1 JAN, JANTX, JANTXV, JANHC, AND JANKC

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

1. SCOPE

1.1 Scope. This specification covers the performance requirements for 500 milliwatt, silicon, low-noise, voltage regulator diodes with voltage tolerances of 5 percent, 2 percent, and 1 percent. Three levels of product assurance is provided for each encapsulated device type as specified in MIL-PRF-19500, and two levels of product assurance for each unencapsulated device type die. For JANHC and JANKC quality levels (see 6.5).

1.2 Physical dimensions. See figures 1 (DO-7 and DO-35), 2 (DO-213AA), and 3 (JANHC and JANKC).

1.3 Maximum ratings. Maximum ratings are shown in columns 3, 4, and 10 of table IV herein and as follows:

a. P_T = 500 mW (DO-7 and D0-35) at T_L = +50°C, L = .375 inch (9.53 mm); both ends of case or diode body to heat sink at L = .375 inch (9.53 mm). (Derate I_Z to 0.0 mA dc at +175°C).

b. P_T = 500 mW (D0-213AA) at T_{EC} = +125°C. (Derate to 0 at +175°C).

c. -65°C ≤ T_{op} ≤ +175°C; -65°C ≤ T_{STG} ≤ +175°C.

1.4 Primary electrical characteristics. Primary electrical characteristic columns 1, 6, 8, and 9 of table IV herein and as follows:

a. 3.3 V dc ≤ V_Z ≤ 33 V dc.

b. $R_{\theta JL}$ = 250°C/W (maximum) at L = .375 inch (9.53 mm) (D0-7 and D0-35).

c. $R_{\theta JEC}$ = 100°C/W (maximum) junction to endcaps (D0-213AA).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5961

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

2. APPLICABLE DOCUMENTS

2.1 Government 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 documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-19500 - Semiconductor Devices, General Specification for.

STANDARD

MILITARY

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), 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 Qualification. Devices furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.2 Associated specification. The individual item performance requirements shall be in accordance with MIL-PRF-19500, and as specified herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions shall be as specified in MIL-PRF-19500 and as follows:

UR .... Unleaded or surface mounted diodes with round endcaps.

C-.. 2 percent voltage tolerance devices.

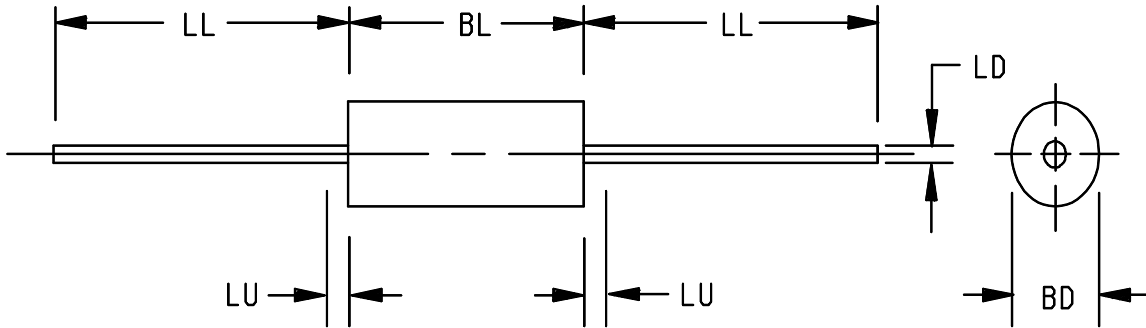
D-.. 1 percent voltage tolerance devices.

JANH .... High reliability product assurance level for unencapsulated devices.

JANK .... Space reliability product assurance level for unencapsulated devices.

3.3 Interface requirements, and physical dimensions. The interface requiements and physical dimensions shall be as specified in MIL-PRF-19500, and figures 1, 2, and 3 herein.

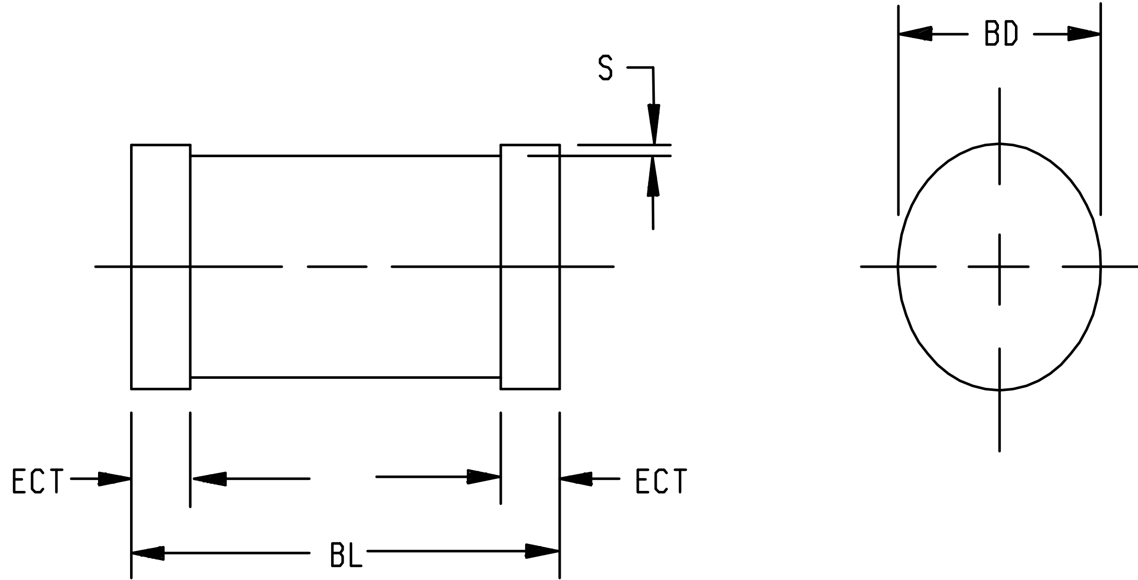
3.3.1 Lead finish. Unless otherwise specified, lead finish shall be solderable as defined in MIL-PRF-19500, MIL-STD-750, and herein.



Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.055	.107	1.40	2.72	3
BL	.120	.300	3.05	7.62	3
LD	.018	.022	0.46	0.56	
LL	1.000	1.500	25.40	38.10	
LU	- - -	.050	- - -	1.27	4

NOTES:
1. Dimensions are in inches.
2. Metric equivalents 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. For DO-7 packages (see 3.4.1).

FIGURE 1. Physical dimensions types 1N5518B-1, C-1, and D-1 through 1N5546B-1, C-1, D-1 (DO-7 and DO-35).

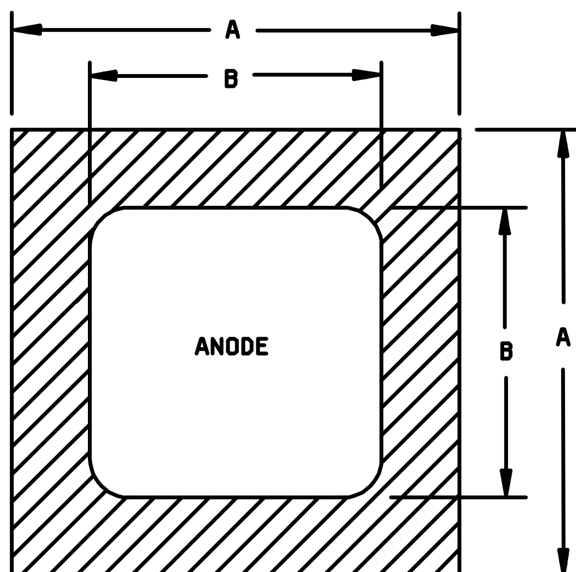


Ltr	Dimensions			
	Inches		Millimeter	
	Min	Max	Min	Max
BD	.063	.067	1.60	1.70
BL	.130	.146	3.30	3.71
ECT	.016	.022	0.41	0.56
S	.001 min		0.03 min	

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 2. Physical dimensions 1N5518BUR-1, CUR-1, and DUR-1 through 1N5546BUR-1, CUR-1, DUR-1 (DO-213AA).



Ltr	JANHCA and JANKCA die dimensions				Ltr	JANHCB and JANKCB die dimensions			
	Inche		Millimeters			Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	.021	.025	0.53	0.64	A	.024	.028	0.61	0.71
B	.013	.017	0.33	0.43	B	.017	.021	0.43	0.53

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The JANHCA and JANKCA die thickness is .010 inch (0.25 mm) ±.002 inches (0.05 mm). Anode metallization: Al, thickness = 25,000 Å minimum; cathode metallization: Thickness = 4,000 Å minimum.
4. The JANHCB and JANKCB die thickness is .010 inch (0.25 mm) ±.002 inch (0.05 mm). Anode metallization: Al, thickness = 40,000 Å minimum; cathode metallization: Au, thickness = 5,000 Å minimum.
5. Circuit layout data: For zener operation, cathode must be operated positive with respect to anode.
6. Requirements in accordance with appendix G, MIL-PRF-19500, are performed in a TO-5 package (see 6.5).

FIGURE 3. Physical dimensions JANHC and JANKC die.

3.3.2 Diode construction. These devices shall be constructed in a manner and using material which enable the diode to meet the applicable requirements of MIL-PRF-19500 and this document. Dash one (-1) diodes shall be of metallurgically bonded double plug or straight through construction in accordance with the requirements of category I, II, or III (see MIL-PRF-19500).

3.3.3 Package outlines. 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 acquisition order. If package style is not specified, the manufacturer may supply either package (see 6.2).

3.4 Marking. Marking shall be as specified in MIL-PRF-19500.

3.4.1 DO-7 package. All DO-7 package devices shall be marked with a "D7" on the device within the marking area.

3.4.2 Marking of U suffix devices. For U suffix (surface mount) devices only, all marking (except polarity) may be omitted from the body, but shall be retained on the initial container.

3.4.3 Marking of JANHC and JANKC die. Marking shall be as specified in MIL-PRF-19500.

3.5 Selection of tight tolerance devices. The C and D suffix devices shall be selected from JAN, JANTX, or JANTXV devices which have successfully completed all applicable screening, and groups A, B, and C testing as 5 percent tolerance devices. All sublots of C and D suffix devices shall pass group A, subgroup 2 at the tightened tolerances. The T_L or T_{EC} for C and D suffix devices shall be maintained at 30°C ±2°C for V_Z correlation on tight tolerances.

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

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

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.

4.2.1 Alternate qualification. For alternate qualification (see 4.5.4).

4.2.2 JANHC and JANKC devices. JANHC and JANKC devices shall be qualified in accordance with appendix G, of MIL-PRF-19500.

4.2.3 Sampling and inspection. Lot accumulation is 6 months in lieu of 6 weeks.

4.3 Screening (JANTX and JANTXV levels only). Screening shall be in accordance with appendix E, table 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.

Screening, appendix E, table IV of MIL-PRF-19500)	Measurement	
	JANTX and JANTXV levels	JAN level
3a	Temperature cycling	Temperature cycling in accordance with MIL-PRF-19500, JANTX level.
3c 1/	Thermal impedance (see 4.5.5)	Thermal impedance (see 4.5.5)
9	Not applicable	Not applicable
11	I_R and V_Z	Not applicable
12	See 4.3.2, t = 48 hours	Not applicable
13 2/	$\Delta I_{R1} \leq$ 100 percent of initial reading' or 10 nA dc, whichever is greater; $\Delta V_Z \leq \pm 2$ percent of initial reading subgroup 2 of table I herein.	Not applicable

1/ Thermal impedance may be performed any time after sealing provided temperature cycling is performed in accordance with MIL-PRF-19500, screen 3 prior to this thermal test.
2/ PDA = 5 percent for screen 13, applies to ΔI_{R1} and ΔV_Z. Thermal impedance ($Z_{\theta JX}$) is not required in screen 13.

4.3.1 Screening (JANHC and JANKC). Screening of JANHC and JANKC die shall be in accordance with MIL-PRF-19500, appendix G.

4.3.2 Power burn-in conditions. Power burn-in conditions are as follows: I_{ZM} = column 10 of table IV minimum; mounting and test conditions in accordance with MIL-STD-750, method 1038, test condition B, TEC = +75°C to +125°C for surface mount devices. To better utilize burn-in equipment, higher values of I_Z shall be permitted provided:

a. The junction temperature does not exceed +175°C.

b. The power dissipation does not exceed 500 mW.

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

4.4.1 Alternate conformance inspection. Alternate conformance inspection shall consist of the following requirements:

a. Select devices which have passed the quality conformance requirements for JAN, JANTX, or JANTXV as specified in MIL-PRF-19500/117, MIL- PRF -19500/127, or MIL- PRF -19500/435.

b. One hundred percent test to the requirements of group A inspection, subgroups 2, 3, and 4. Any device not passing these tests may be returned to the original lot.

c. Remark JAN, JANTX, or JANTXV (as applicable), 1N5518B-1 through 1N5546B-1 any devices passing the inspection of 4.4.2, retaining the original lot identification code.

4.4.2 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500, appendix E, table V, and table I herein.

4.4.3 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table VIb (JANTXV and JANTX) of MIL-PRF-19500, and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with table III herein.

4.4.3.1 Group B inspection, appendix E, table VIb of MIL-PRF-19500.

Subgroup	Method	Conditions
B2	4066	I_{ZSM} = column 4 of table IV.
B3	1027	I_{ZM} = column 10 of table IV.

4.4.4 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table VII of MIL-PRF-19500 and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with table III herein.

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

Subgroup	Method	Conditions
C2	2036	Test condition A; 4 pounds; t = 15 seconds. Not applicable to U suffix devices.
	2036	Test condition E, (not applicable for "U" suffix devices).
C6	1026	I_Z = column 10 of table IV.
C7	4071	I_Z = column 11 of table IV, T_1 = +25°C ±5°C, T_2 = +125°C ±5°C, $\propto V_Z$ = column 8 of table IV, sampling plan = 22 devices, c = 0.

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

4.5.1 Surge current (I_{ZSM}). The peak currents shown in column 4 of table IV shall be applied in the reverse direction and these shall be superimposed on the current (I_Z = column 11 of table IV) a total of 5 surges at 1 minute intervals. Each individual surge shall be one-half square-wave-pulse of 8.3 second duration or an equivalent one-half sinewave with the same effective rms current.

4.5.2 Regulator voltage measurements. The test current shall be applied until thermal equilibrium is attained (20 ± 2 seconds) prior to reading the breakdown 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 a temperature of +25°C +8°C, -2°C. This measurement may be performed after a shorter time following application of the test current than that which provides thermal equilibrium if correlation to stabilized readings can be established to the satisfaction of the Government.

4.5.3 Temperature coefficient of regulator voltage ($\propto V_Z$). The device shall be temperature stabilized with current applied prior to reading regulator voltage at the specified ambient temperature as specified in 4.4.4.1, group C, subgroup 7.

4.5.4 Alternate qualification requirements. Upon request, qualification will be granted to manufacturers qualified to MIL-PRF-19500/117, MIL-PRF-19500/127 or MIL-PRF-19500/435 provided that devices supplied to this specification are structurally identical and electrically similar (except for group A inspection, subgroups 2 and 3), to those supplied under MIL-PRF-19500/117, MIL-PRF-19500/127, or MIL-PRF-19500/435. A list of critical design features (DESC Form 36D) shall be submitted to the qualifying activity along with the request for QPL approval. In addition, group A variables data shall be submitted on 20 devices of the highest and lowest voltage types of each process variation (see 4.4.1).

4.5.5 Thermal impedance ($Z_{\theta JX}$ measurements). The $Z_{\theta JX}$ measurements shall be performed in accordance with MIL-STD-750, method 3101. The maximum limit for $Z_{\theta JX}$ in screening (appendix E, table IV of MIL-PRF-19500) shall be derived by each vendor by means of process control (not to exceed the group A, subgroup 2 limits)

a. I_M measurement current.. 1 mA to 10 mA.

b. I_H forward heating current .... 0.5 A to 1.0 A.

c. t_H heating time... 10 ms.

d. t_{MD} measurement delay time .... 70 µs maximum.

4.5.5.1 For initial qualification or requalification. Read and record data ($Z_{\theta JX}$) shall be supplied to the qualifying activity on one lot (random sample of 500 devices minimum). Twenty-two serialized devices shall be sent to the qualifying activity for test correlation.

4.5.6 Thermal resistance. Thermal resistance measurement shall be in accordance with MIL-STD-750, method 3101 or 4081. Forced moving air or draft shall not be permitted across the device during test. The maximum limit for $R_{\theta JL}$ under these test conditions shall be $R_{\theta JL}$ (maximum) = 250°C/W; $R_{\theta JEC}$ (maximum) = 100°C/W. . The following conditions shall apply when using method 3101:

a. I_M .... 1 mA to 10 mA.

b. I_H .... 200 mA to 400 mA.

c. t_H .... 25 seconds minimum.

d. t_{MD} .... 70 µs maximum.

LS = Lead spacing = .375 inch (9.53 mm) as defined on figure 4 below, 0 inch (0.00 mm) lead spacing for surface mount devices.

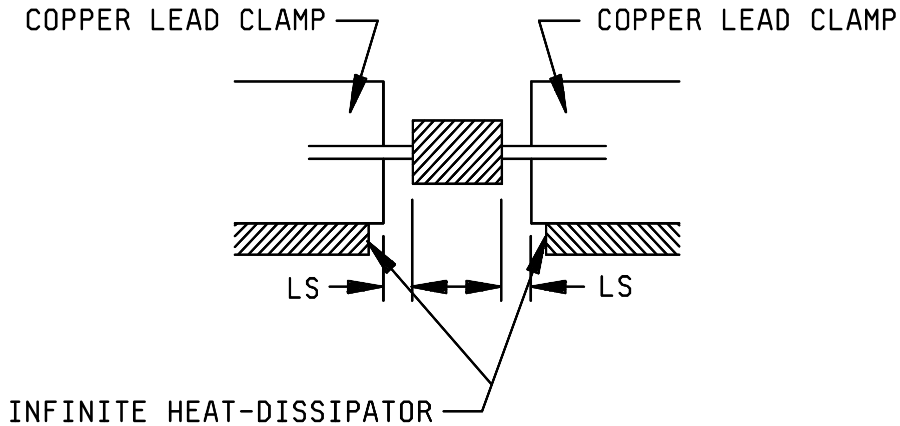
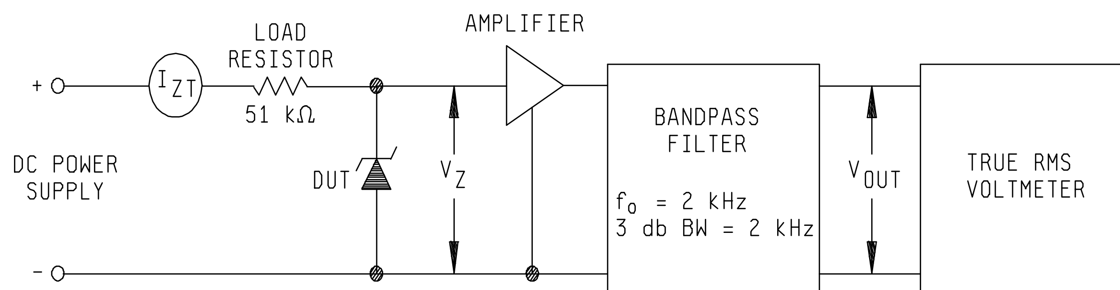


FIGURE 4. Mounting conditions.

4.5.6.1 For initial qualifications and requalifications. Read and record data in accordance with group E herein and shall be included in the qualification report.

4.5.7 Decap internal visual scribe and break. Scratch glass at cavity area with diamond scribe. Carefully snap open. Using 30X magnification examine the area where die (or bonding material) are in contact with the plugs, verify metallurgical bonding area. If the verification of the metallurgical bonding area is in question, the test method 3101 and test condition limits herein $Z_{\theta JX}$ shall be used to determine suitability for use.

4.5.8 Noise density. Noise density shall be measured using a noise density test circuit as shown on figure 5. Place a low-noise resistor, equivalent in value to the dynamic impedance of the diode under test, in the test clips and adjust test current (I_{ZT}) and measure output- noise voltage. Remove resistor, insert diode under test in test clips, readjust test current to 250 µA dc and measure output-noise voltage again. To obtain noise density (N_D), subtract rms resistor output-noise voltage from rms diode output-noise voltage and divide by product of overall system gain and square root of bandwidth. All measurements shall be made at +25°C.



NOTES:
1. Input voltage and lead resistance should be high so that zener can be driven from a constant current source.
2. Input impedance of band pass filter should be high compared with the dynamic impedance of the diode under test.
3. Filter bandwidth characteristics shall be as follows:

f_o = 2,000 Hz

Shape factor, -40 db to -3 db, approximately 2.
Passband at the -3 db is 1,000 Hz ±50 Hz to 3,000 Hz ±150 Hz.
Passband at the -40 db is 500 Hz ±50 Hz to 6,000 Hz ±600 Hz.

FIGURE 5. Circuit for determination of noise density.

4.5.9 Regulation factor. Breakdown voltage shall be measured at a low current, I_{ZL} as shown in column 13 of table IV. This voltage shall be subtracted from the breakdown voltage measured at I_Z in column 11 of table IV. The difference is the regulation factor (ΔV_Z) and shall be less than the maximum value shown in column 12 of table IV.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits 2/		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechical examination	2071					
Subgroup 2						
Forward voltage	4011	I_F = 200 mA dc	V_F		1.1	V dc
Reverse current	4016	DC method, V_R = column 5 of table IV	I_{R1}		Column 6	µA dc
Regulator voltage (see 4.5.2)	4022	I_Z = column 11 of table IV	V_Z	Column 1 -V_Z tol	Column 1 +V_Z tol	V dc
Regulation factor (se 4.5 8)		I_Z = column 11, and I_{ZL} = column 13 of table IV	ΔV_Z		Column 12	V dc
Thermal impedance	3101	See 4.5.5	$Z_{\Theta JX}$		35	°C/W
Subgroup 3						
High temperature operation:		T_A = +150°C				
Reverse current	4016	DC method; V_R = column 5 of table IV	I_{R2}		Column 2	µA dc
Subgroup 4						
Small-signal reverse breakdown impedance	4051	I_Z = column 11 I_{SIG} = 10 percent of I_Z	Z_{ZT}		Column 3	Ω
Noise density (see 4.5.8)		I_Z = 250 µA dc	N_D		Column 9	$\mu V/\sqrt{Hz}$
Subgroups 5, 6, and 7						
Not applicable						

1/ For sampling plan, see MIL-PRF-19500.
2/ Column references are to table IV herein.

TABLE II. Group E inspection (all product assurance levels).

Inspection 1/	MIL-STD-750		Qualification conformance inspection
	Method	Conditions	
Subgroup 1			
Temperature cycling	1051	500 cycles	22 devices, c = 0
Electrical measurements		See table I, subgroup 2	
Subgroup 2			
Intermittent operation life	1037	6,000 cycles	22 device, c = 0
Electrical measurements		See table I, subgroup 2	
Subgroup 3			
Not applicable			
Subgroup 4			22 devices, c = 0
Thermal resistance unleaded or surface mount	3101 or 4081	See 4.5.6	
Thermal resistance leaded only	3101 or 4081	See 4.5.6	

1/ A separate sample may be pulled for each test.

TABLE III. Group A, B, and C electrical end-point measurements. 1/ 2/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Reverse current	4016	DC method; V_R = column 5 of column 4 of table IV	I_{R1}		column 6 of table IV	µA dc
2.	Reverse current	4016	DC method, V_R = column 5 of column 4 of table IV	I_{R3}		column 7 of table IV	µA dc
3.	Regulator voltage (see 5.4.2)	4022	I_Z = column 11 of table IV	V_Z		column 1 of table IV	V dc
4.	Small-signal breakdown impedance	4051	I_Z = column 11 of table IV I_{Sig} = 10 percent of I_Z (AC)	Z_{ZT}		column 3 of table IV	Ω
5.	Thermal impedance	3101	See 4.5.5	$Z_{\theta JX}$		35	°C/W

1/ The electrical measurements for appendix E, table VIb (JANTX and JANTXV) of MIL-PRF-19500 are as follows:

a. Subgroup 2, see table III herein, steps 1, 3, 4, and 5.

b. Subgroup 3, see table III herein, steps 2, 3, and 4.

c. Subgroup 6, see table III herein, steps 2, 3, and 4.

2/ The electrical measurements for appendix E, table VII of MIL-PRF-19500 are as follows:

a. Subgroup 2 and 3, see table III herein, steps 1, 3, 4, and 5.

b. Subgroup 6, see table III herein, steps 2, 3, and 4.

TABLE IV. Test ratings.

Type	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13
	V_Z Nom 1/ V dc	I_{R2} T_A = 150°C µA dc	Z_{ZT} Ω	I_{ZSM} mA	V_R V dc	I_{R1} µA dc	I_{R3} (life test end points) µA dc	$\propto V_Z$ T_1 = +25°C T_2 = +125°C %/°C	N_D µV/$\sqrt{Hz}$	I_{ZM} mA	I_Z test current mA	ΔV_Z V dc	I_{ZL} mA
1N5518B-1	3.3	10.0	26	1,600	1.0	5.0	10.0	-.07	0.5	115	20	0.90	2.0
1N5519B-1	3.6	6.0	24	1,500	1.0	3.0	6.0	-.065	0.5	105	20	0.90	2.0
1N5520B-1	3.9	4.0	22	1.250	1.0	1.0	2.0	-.060	0.5	98	20	0.85	2.0
1N5521B-1	4.3	6.0	18	1,100	1.5	3.0	6.0	-.055+.02	0.5	88	20	0.75	2.0
1N5522B-1	4.7	6.0	22	950	2.0	2.0	6.0	-.043+.025	0.5	81	10	0.60	1.0
1N5523B-1	5.1	6.0	26	750	2.5	2.0	6.0	-.03+.03	0.5	75	5.0	0.65	0.25
1N5524B-1	5.6	4.0	30	700	3.5	2.0	4.0	-.03+.045	1.0	68	3.0	0.30	0.25
1N5525B-1	6.2	4.0	30	650	5.0	1.0	4.0	+.05	1.0	61	1.0	0.20	0.01
1N5526B-1	6.8	5.0	30	650	6.2	1.0	5.0	+.052	1.0	56	1.0	0.10	0.01
1N5527B-1	7.5	5.0	35	650	6.8	0.5	1.0	+.058	2.0	51	1.0	0.05	0.01
1N5528B-1	8.2	5.0	40	650	7.5	0.5	1.0	+.062	4.0	46	1.0	0.05	0.01
1N5529B-1	9.1	5.0	45	650	8.2	1.0	1.0	+.068	4.0	42	1.0	0.05	0.01
1N5530B-1	10.0	5.0	60	650	9.1	0.05	0.5	+.075	4.0	38	1.0	0.10	0.01
1N5531B-1	11.0	5.0	80	590	9.9	0.05	0.5	+.075	5.0	35	1.0	0.20	0.01
1N5532B-1	12.0	5.0	90	540	10.8	0.05	0.1	+.08	10	32	1.0	0.20	0.01
1N5533B-1	13.0	5.0	90	500	11.7	0.01	0.05	+.08	15	29	1.0	0.20	0.01
1N5534B-1	14.0	5.0	100	464	12.6	0.01	0.05	+.082	20	27	1.0	0.20	0.01
1N5535B-1	15.0	5.0	100	433	13.5	0.01	0.05	+.082	20	25	1.0	0.20	0.01
1N5536B-1	16.0	5.0	100	406	14.4	0.01	0.05	+.083	20	24	1.0	0.20	0.01
1N5537B-1	17.0	5.0	100	382	15.3	0.01	0.05	+.085	20	22	1.0	0.20	0.01
1N5538B-1	18.0	5.0	100	361	16.2	0.01	0.05	+.085	20	21	1.0	0.20	0.01
1N5539B-1	19.0	5.0	100	342	17.1	0.01	0.05	+.086	20	20	1.0	0.20	0.01
1N5540B-1	20.0	5.0	100	325	18.0	0.01	0.05	+.086	20	19	1.0	0.20	0.01
1N5541B-1	22.0	5.0	100	295	19.8	0.01	0.05	+.087	25	17	1.0	0.25	0.01
1N5542B-1	24.0	5.0	100	271	21.6	0.01	0.05	+.088	30	16	1.0	0.30	0.01
1N5543B-1	25.0	5.0	100	260	22.4	0.01	0.05	+.09	35	15	1.0	0.35	0.01
1N5544B-1	28.0	5.0	100	240	25.2	0.01	0.05	+.091	40	14	1.0	0.40	0.01
1N5545B-1	30.0	5.0	100	216	27.0	0.01	0.05	+.091	45	13	1.0	0.45	0.01
1N5546B-1	33.0	5.0	100	197	29.7	0.01	0.05	+.092	50	12	1.0	0.50	0.01

1/ Voltage tolerance devices (examples: 1N5518B-1 are ±5 percent, 1N5518C-1 are ±2 percent, and 1N5518D-1 are ±1 percent tolerance.)

5. PACKAGING

5.1 Packaging. Packaging shall prevent mechanical damage of the devices during shipping and handling and shall not be detrimental to the device. When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

5.2 Marking. Unless otherwise specified (see 6.2), marking shall be in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

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

6.2 Acquisition requirements. See MIL- PRF-19500.

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 Products List QPL No.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 purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000.

6.4 Substitution information.

6.4.1 Substitutability of 2 percent and 1 percent tolerance devices. Devices of tighter tolerance are a direct one way substitute for the looser tolerance devices (example: JANTX1N5518D-1 substitutes for JANTX1N5518B-1).

6.5 Suppliers of JANHC and JANKC die. The qualified JANHC and JANKC suppliers with the applicable letter version (example: JANHCA5518B) will be identified on the QPL.

JANHC and JANKC ordering information 1/

PIN	Manufacturer CAGE		PIN	Manufacturer CAGE	
	55801	12954		55801	12954
1N5518B	A1N5518B	B1N5518B	1N5533B-1	A1N5533B	B1N5533B
1N5519B	A1N5519B	B1N5519B	1N5534B-1	A1N5534B	B1N5534B
1N5520B	A1N5520B	B1N5520B	1N5535B-1	A1N5535B	B1N5535B
1N5521B	A1N5521B	B1N5521B	1N5536B-1	A1N5536B	B1N5536B
1N5522B	A1N5522B	B1N5522B	1N5537B-1	A1N5537B	B1N5537B
1N5523B	A1N5523B	B1N5523B	1N5538B-1	A1N5538B	B1N5538B
1N5524B	A1N5524B	B1N5524B	1N5539B-1	A1N5539B	B1N5539B
1N5525B	A1N5525B	B1N5525B	1N5540B-1	A1N5540B	B1N5540B
1N5526B	A1N5526B	B1N5526B	1N5541B-1	A1N5541B	B1N5541B
1N5527B	A1N5527B	B1N5527B	1N5542B-1	A1N5542B	B1N5542B
1N5528B	A1N5528B	B1N5528B	1N5543B-1	A1N5543B	B1N5543B
1N5529B	A1N5529B	B1N5529B	1N5544B-1	A1N5544B	B1N5544B
1N5530B	A1N5530B	B1N5530B	1N5545B-1	A1N5545B	B1N5545B
1N5531B	A1N5531B	B1N5531B	1N5546B-1	A1N5546B	B1N5546B
1N5532B	A1N5532B	B1N5532B			

1/ C and D tolerance suffix are also applicable to JANHC and JANKC chips.

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 17
NASA - NA

Review activities:
Air Force - 13, 19, 85, 99

Preparing activity:
DLA - CC

(Project 5961-1831)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** MIL-PRF-19500/437D	**2. DOCUMENT DATE (YYMMDD)** 970915

3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, DIODE, SILICON, LOW-NOISE VOLTAGE REGULATOR TYPES, 1N5518B-1, 1N5518C-1, 1N5518D-1 THROUGH 1N5546B-1, 1N5546C-1, 1N5546D-1, 1N5518BUR-1, 1N5518CUR-1, 1N5518DUR-1 THROUGH 1N5546BUR-1, 1N5546CUR-1, 1N5546DUR-1; JAN, JANTX, JANTXV, JANHC, AND JANKC

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

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c. ADDRESS (Include Zip Code) Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340