The documentation and process conversion measures necessary to comply with this document shall be completed by 31 July 2026.

INCH-POUND

MIL−PRF−19500/437K
w/AMENDMENT 1
4 March 2026
SUPERSEDING
MIL−PRF−19500/437K
5 December 2020

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,
ENCAPSULATED (AXIAL LEADED AND SURFACE MOUNT PACKAGE) AND UNENCAPSULATED,
5, 2, AND 1 PERCENT VOLTAGE TOLERANCE, QUALITY LEVELS JAN, JANTX, JANTXV, 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 500 milliwatt, silicon, low-noise, voltage regulator diodes with voltage tolerances of 5 percent, 2 percent, and 1 percent. Three levels of product assurance (JAN, JANTX, and JANTXV) are provided for each encapsulated device type and two levels of product assurance (JANHC and JANKC) are provided for each un-encapsulated device type die as specified in MIL-PRF-19500.

1.2 Physical dimensions.

1.2.1 Package outlines. The device package outlines for encapsulated device types are as follows: Axial leaded DO-204AH (formerly DO-35) in accordance with figure 1, round end cap surface mount (DO-213AA) in accordance with figure 2, surface mount (UB) in accordance with figure 3, and surface mount (UD) in accordance with figure 4.

1.2.2 Un-encapsulated die. The dimensions and topography for JANHC and JANKC un-encapsulated die are in accordance with figure 5.

1.3 Maximum ratings. Maximum ratings are shown in maximum test ratings herein (see 3.8) herein and as follows:

a. P_{TL} = 500 mW (DO-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 to 0 at +175°C).

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

c. $P_{T(PCB)}$ = 400 mW, T_A = +55°C (see note 1). (Derate to 0 at +175°C).

d. $P_{SP(IS)}$ = 500 mW (UB and UD) at $T_{SP(IS)}$ = +125°C. (Derate to 0 at +175°C).
-65°C ≤ T_J ≤ +175°C; -65°C ≤ T_{STG} ≤ +175°C.

e. $P_{T(PCB)}$ = 400 mW (UB and UD) at T_A = +75°C. (Derate to 0 at +175°C.)

Comments, suggestions, or questions on this document should be addressed to DLA Weapons Support, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

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1.3 Maximum ratings. – continued.

(1) The printed circuit board (PCB) details for determining ratings when axial leaded or UR devices are mounted horizontally and in still air are as follows. Base material is FR4 .0625 inch (1.59 mm) thick, 1-layer of 1 oz Cu. PCB pad size for UR devices = .05 inch (1.27 mm) x .087 inch (2.21 mm). PCB land sizes for axial leaded devices is .092 inch (2.34 mm) diameter with L ≤ .125 inch (3.18 mm) lead length. Strips connected to the lands and pads are .030 inch (0.762 mm) x 1 inch (25.4 mm) long.

1.4 Primary electrical characteristics. Primary electrical characteristics are shown in maximum test ratings herein (see 3.8) herein and as follows:

a. 3.3 V dc ≤ V_Z ≤ 33 V dc.

b. Noise density see 4.5.1 and figure 6.

c. For derating curves, see figures 7, 8, 9, 10 and 11.

d. For thermal impedance curves, see figures 12, 13, 14, 15, 16, 17 and 18. As further detailed in 1.4.e through 1.4.k below.

e. $R_{\theta JA}$ = 300°C/W for junction to ambient including PCB (see figure 12). $R_{\theta JA}$ with a defined thermal resistance condition included is measured at IZ = as defined in test ratings herein.

f. $R_{\theta JL}$ = 250°C/W (maximum) at L = .375 inch (9.53 mm) for DO-35 (see figure 13).

g. $R_{\theta JEC}$ = 100°C/W (maximum) for junction to end-caps for DO-213AA (see figure 14).

h. $R_{\theta JSP(IS)}$ = 90°C/W (maximum) for junction to solder pad (IS) for UB (see figure 15).

i. $R_{\theta JA(PCB)}$ = 250°C/W (maximum) for junction to ambient (PCB) for UB (see figure 16).

j. $R_{\theta JSP(IS)}$ = 80°C/W (maximum) for junction to solder pad (IS) for UD (see figure 17).

k. $R_{\theta JA(PCB)}$ = 228°C/W (maximum) for junction to ambient (PCB) for UD (see figure 18).

1.5 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, and 6.6 for supersession information.

1.5.1 JAN certification mark and quality level.

1.5.1.1 Quality level designators for encapsulated devices. The 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", and "JANTXV".

1.5.1.2 Quality level designators for unencapsulated die. The quality level designators for unencapsulated devices that are applicable for this specification sheet are "JANHC" and "JANKC".

1.5.2 Device type. The designation system for the devices covered by this specification sheet is as follows.

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

1.5.2.2 Second number symbols. The second number symbols for the devices covered by this specification sheet are as follows:

	5520	5523	5526	5529	5532	5535	5538	5541	5544
5518	5521	5524	5527	5530	5533	5536	5539	5542	5545
5519	5522	5525	5528	5531	5534	5537	5540	5543	5546

1.5.3 Suffix symbols. The following suffix symbol(s) are incorporated into the PINs for this specification sheet.

1.5.3.1 Voltage tolerance. All devices covered by this specification sheet use a suffix symbol to designate the voltage tolerance of the device as follows.

B	Indicates a modified version of the diode that have a nominal voltage tolerance of ±5 percent over the basic numbered (non-suffix) device for all types covered by this specification.
C	Indicates a modified version of the diode that have a nominal voltage tolerance of ±2 percent over the basic numbered (non-suffix) device for all types covered by this specification.
D	Indicates a modified version of the diode that have a nominal voltage tolerance of ±1 percent over the basic numbered (non-suffix) device for all types covered by this specification.

1.5.3.2 Package designators. The suffix symbols (or lack thereof) that designate the package outline for the devices covered by this specification sheet are as follows.

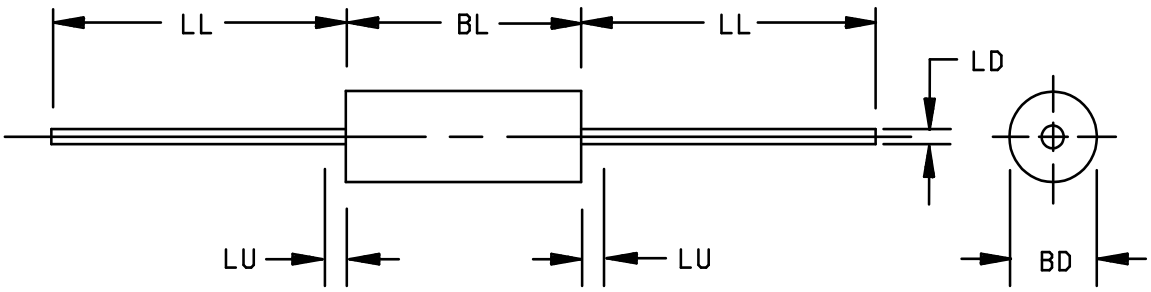
-1	A dash-one ("−1") designator identifies that the package is a DO-204AH using a metallurgically bonded double plug construction (see figure 1).
UR-1	This designator identifies the package is a DO-213AA using a metallurgically bonded double plug construction (see figure 2).
UB	Indicates a 3 terminal, 4 pad surface mount package (see figure 3).
UD	Indicates a 2 terminal, 3 pad surface mount package (see figure 4).

1.5.3.3 Internal circuit schematic suffix designators (for UB package only). The suffix symbols that designate the internal circuit schematic (see schematic on figure 3) of the UB surface mount packages are as follows:

	Indicates a unidirectional, single diode circuit.
CA	Indicates dual diode with a common anode pin.
CC	Indicates a dual diode with a common cathode pin.
D	Indicates a dual diode doubler.

1.5.4 Lead finish. The lead finishes applicable to this specification sheet are listed on QPDSIS−19500.

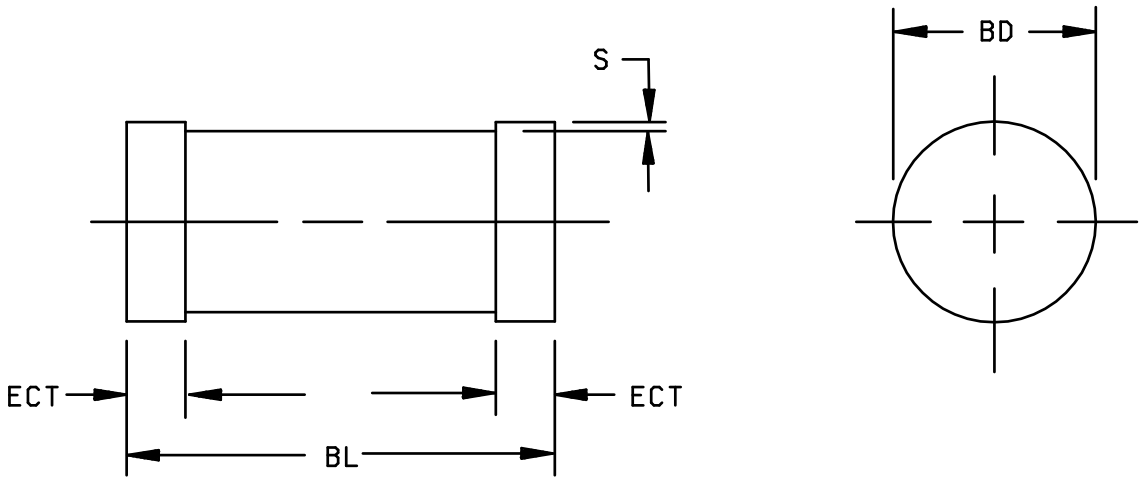
1.5.5 Die identifiers for unencapsulated devices (manufacturers and critical interface identifiers). The manufacturer die identifiers that are applicable for this specification sheet are "A", "B", "C", "D", and "E" (see figure 5 and 6.5.2).



Symbol	Dimensions				Notes
	inch	inch	mm	mm	
	Min	Max	Min	Max	
BD	.055	.090	1.40	2.29	2
BL	.120	.200	3.05	5.08	2
LD	.018	.022	0.46	0.56	
LL	1.000	1.500	25.40	38.10	
LU		.050		1.27	3

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. Package contour optional within dimension BD and length dimension BL. Heat slugs, if any, shall be included within this cylinder but shall not be subject to minimum limit of dimension BD. The dimension BL shall include the entire body including slugs.
3. Within this zone lead, diameter may vary to allow for lead finishes and irregularities other than heat slugs.

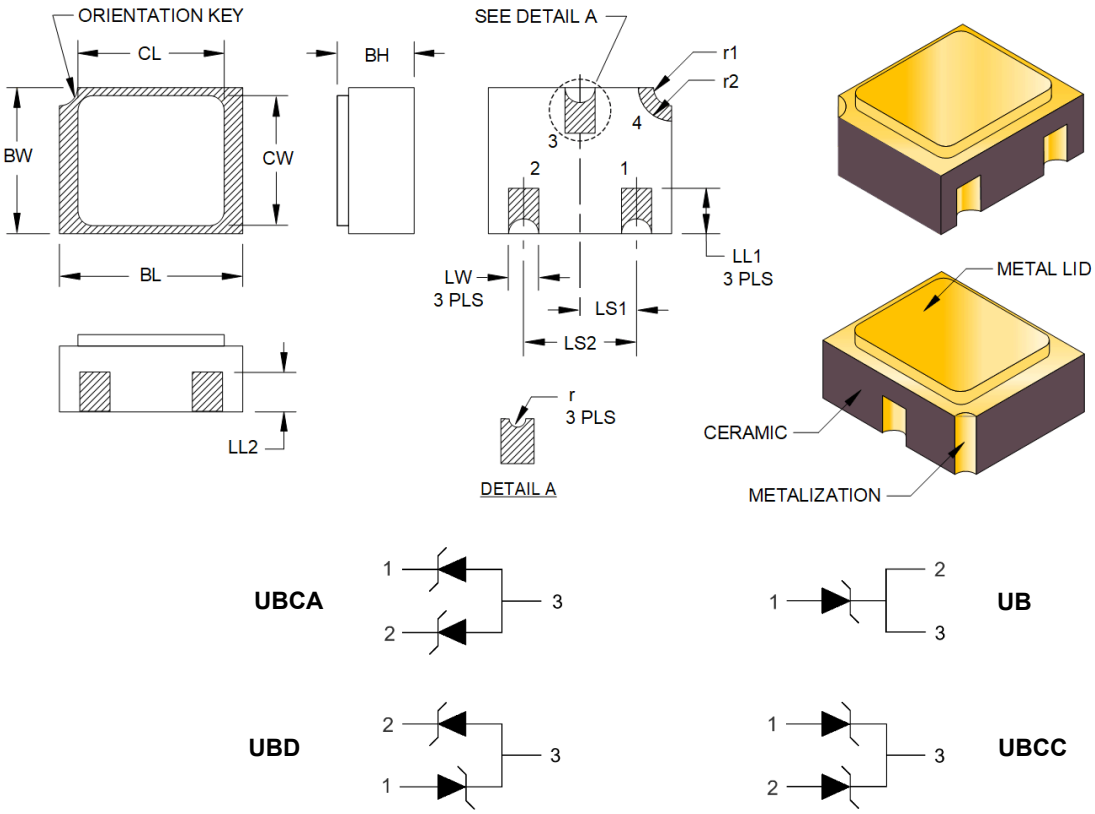
FIGURE 1. Physical dimensions for axial leaded DO-204AH package.



Symbol	Dimensions			
	inch	inch	mm	mm
	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. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
3. Dimension S is optional however the glass body diameter shall not exceed endcap diameter.

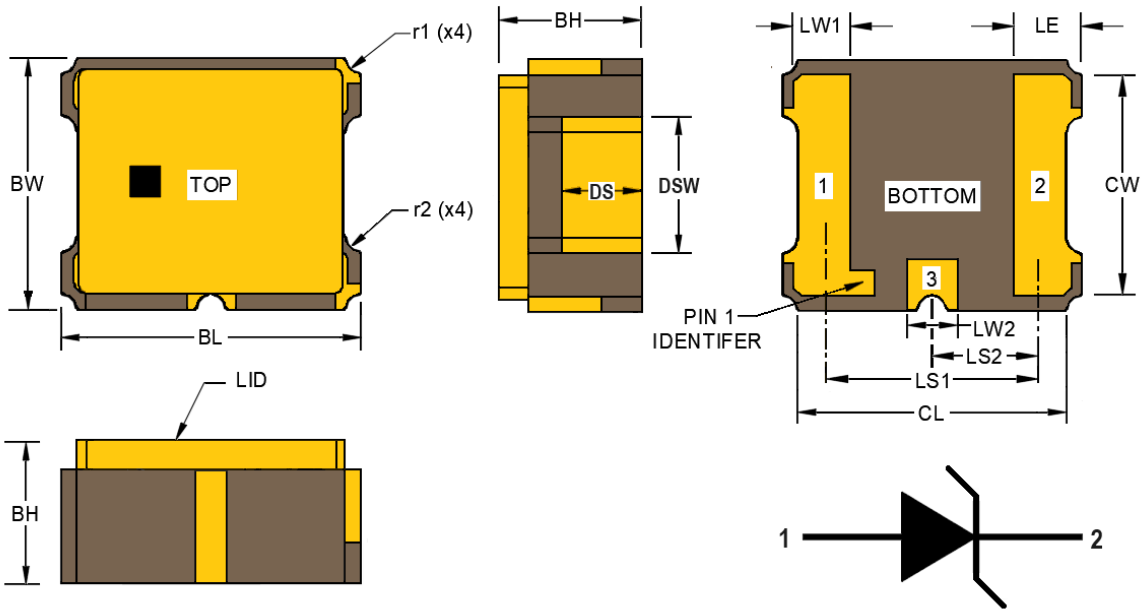
FIGURE 2. Physical dimensions for SMD DO-213AA package.



Symbol	Dimensions				Symbol	Dimensions			
	inch	inch	mm	mm		inch	inch	mm	mm
	Min	Max	Min	Max		Min	Max	Min	Max
BH	.040	.056	1.02	1.42	LS1	.035	.039	0.89	0.99
BL	.115	.128	2.92	3.25	LS2	.071	.079	1.80	2.01
BW	.085	.108	2.16	2.74	LW	.016	.024	0.41	0.61
CL		.128		3.25	r		.008		0.20
CW		.108		2.74	r1		.012		0.31
LL1	.022	.038	0.56	0.97	r2		.022		0.56
LL2	.017	.035	0.43	0.89					

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. Ceramic package only.
3. Hatched areas on package denote metallized areas. Pad 4 = shielding, connected to the lid.
4. Dimensions are pre-solder dip.

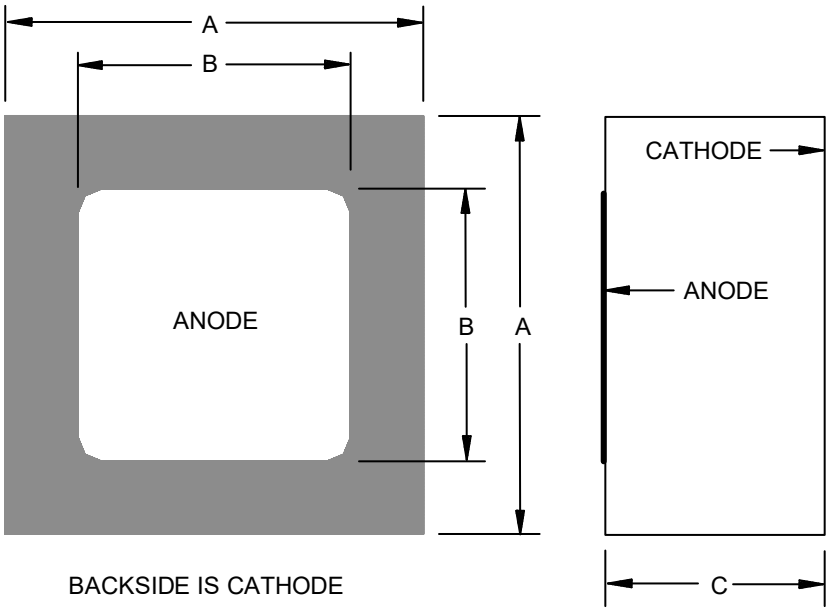
FIGURE 3. Physical dimensions, surface mount (UB version).



Symbol	inch	inch	mm	mm	Symbol	inch	inch	mm	mm
	Min	Max	Min	Max		Min	Max	Min	Max
BH	0.078	0.092	1.979	2.329	LE	0.021	0.033	0.540	0.840
BL	0.112	0.128	2.850	3.250	LS1	0.085	0.093	2.160	2.360
BW	0.092	0.108	2.340	2.740	LS2	0.043	0.047	1.080	1.180
CL	0.103	0.113	2.620	2.880	LW1	0.019	0.027	0.490	0.690
CW	0.083	0.093	2.120	2.360	LW2	0.019	0.021	0.490	0.530
DS	0.028	0.034	0.720	0.880	r1		0.006		0.150
DSW	0.051	0.057	1.330	1.430	r2		0.006		0.150

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. Pad 3 is connected to the lid braze ring for shielding.
3. Cathode marked with a square.
4. Pads 1 and 2 layout is equivalent to those for 1N5518-1 through 1N5546-1, and 1N5518UR-1 through 1N5546UR-1.
5. Diode outline shown in ISO third angle projection.

FIGURE 4. Physical dimensions of 2 terminal UD surface mount package.



LTR	JANHCA and JANKCA				LTR	JANHCB and JANKCB			
	Inches		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
C	.008	.012	0.20	0.30	C	.008	.012	0.20	0.30

LTR	JANHCC and JANKCC				LTR	JANHCD and JANKCD			
	Inches		Millimeters			Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	.019	.023	0.48	0.58	A	.023	.027	0.58	0.69
B	.013	.017	0.33	0.43	B	.015	.019	0.38	0.48
C	.008	.012	0.20	0.30	C	.008	.012	0.20	0.30

LTR	JANHCE and JANKCE			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.011	.015	0.28	0.38
B	.005	.009	0.13	0.23
C	.006	.010	0.15	0.25

FIGURE 5. Physical dimensions JANHC and JANKC die.

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. For JANHCA and JANKCA
   Anode metallization: Al, thickness = 25,000 Å minimum;
   Cathode metallization: Thickness = 4,000 Å minimum.
3. JANHCB and JANKCB
   Anode metallization: Al, thickness = 40,000 Å minimum;
   Cathode metallization: Au, thickness = 5,000 Å minimum.
4. For JANHCC and JANKCC
   Anode metallization: Al, thickness = 25,000 Å minimum;
   Cathode metallization: Au, thickness = 4,000 Å minimum.
5. For JANHCD and JANKCD
   Anode metallization: Al, thickness = 34,000 Å minimum;
   Cathode metallization: Ti/Au, Ti thickness = 200 Å nominal; Au thickness = 4,350 Å nominal.
6. For JANHCE and JANKCE
   Anode metallization: Al, thickness = 20,000 Å minimum;
   Cathode metallization: Au, thickness = 8,000 Å nominal.
7. Circuit layout data: For zener operation, cathode must be operated positive with respect to anode.

FIGURE 5. Physical dimensions JANHC and JANKC die. Continued.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 or 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

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

(Copies of these documents are available online at https://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-19500) before contract award (see 4.2 and 6.3).

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

I_{ZL}	Low V_Z current value used to determine regulation factor.
N_D	Noise density in microvolts per square-root hertz.
Z_{ZT}	Zener impedance.

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500, and figures 1 (DO-204AH), figure 2 (DO-213AA), figure 3 (UB), figure 4 (UD), and figure 5 (JANHC and JANKC) 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. All devices shall be in accordance with the requirements of MIL-PRF-19500 and as specified herein.

3.4.2.1 Dash one construction. Dash one (-1) diodes shall be of metallurgically bonded double plug construction or straight through construction in accordance with the requirements of category I, II, or III (see MIL-PRF-19500).

3.4.2.2 Bottom solder pad surface mount cavity package construction. The UB and UD version devices die shall be eutectically mounted and wire bonded in a ceramic package.

3.5 Marking. Marking shall be in accordance with MIL-PRF-19500 and herein. Manufacturer's identification and date code shall be marked on the devices. Initial container package marking shall be in accordance with MIL-PRF-19500. The prefixes JAN, JANTX, and JANTXV may be abbreviated as J, JX, and JV respectively. (Example: The PIN for an axial leaded device 1N5518 may be reduced to J5518, JX5518, JV5518, or JS5518.) No color coding shall be permitted for part identification.

3.5.1 Axial leaded devices. For axial leaded versions only, the polarity shall be indicated with a contrasting color band to denote the cathode end.

3.5.2 UR devices. For 'UR' version devices only, all marking, except polarity (and serial number for JANS) may be omitted from the body. Polarity shall be identified with a cathode band as a minimum. Alternatively, a minimum of three evenly spaced contrasting color dots around the periphery of the cathode end may be used.

3.5.3 UB devices. The 'UB' devices do not require polarity marking.

3.5.4 UD devices. The 'UD' devices shall mark the cathode with a square symbol on the lid.

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.

3.6.1 Selection of tight tolerance devices. The suffix "C" and "D" voltage tolerance devices shall be selected from JAN, JANTX, or JANTXV devices which have successfully completed all applicable screening, groups A, B and C testing as 5 percent tolerance devices. All sublots of suffix "C" and "D" voltage tolerance devices shall pass table I, subgroup 2 at the tightened tolerances.

3.6.2 Mounting clip tolerance. Tighter tolerances for mounting clip temperature shall be maintained for reference purpose to establish correlation. For suffix "C" and "D" voltage tolerance devices, the T_L or T_{EC} shall be maintained at 30°C ±2°C for V_Z correlation on tight tolerances.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in 4.4.1, 4.4.2 , and table II and III.

3.8 Maximum and primary characteristics test ratings. Maximum test ratings for voltage regulator diodes are specified in table IV, columns 3, 4, and 10 herein. The primary electrical characteristics are specified in table IV, columns 1, 6, 8, and 9.

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.

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).

d. Element evaluation of unencapsulated die (see 4.6).

4.1.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-PRF-19500 and herein, except lot accumulation period shall be 6 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 request the performance of table II tests, the tests specified in table II herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

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

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

Screening	Measurements for JANTX and JANTXV levels
(1) 3c	Thermal impedance (see 4.3.2)
11	I_{R1} and V_Z
12	See 4.3.3
(2) 13	$\Delta I_{R1} \leq$ 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.

(1) Thermal impedance may be performed any time after sealing provided temperature cycling is performed in accordance with MIL-PRF-19500, screen 3a; JANTX and JANTXV levels do not need to be repeated in screening requirements.
(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.
(3) For clear glass diodes, the test for hermetic seal (gross leak) may be performed at anytime after temperature cycling.

4.3.1 JAN testing. JAN level product shall have temperature cycling and thermal impedance performed in accordance with MIL-PRF-19500 to JANTX screening level requirements.

4.3.2 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3101 or 4081 as applicable of MIL-STD-750 using the guidelines in that method for determining I_M, I_H, t_H, t_{MD} (and V_C where appropriate). See group E (table II, subgroup 4) herein.

4.3.3 Power burn-in conditions. The power burn-in conditions shall be in accordance with condition B of method 1038 of MIL-STD-750. The details of 4.5.2 and those that follows shall apply: T_A = 55°C maximum. Adjust I_Z or T_A to achieve the required T_J. T_J = 125°C minimum. With approval of the qualifying activity and preparing activity, alternate burn-in criteria (hours, bias conditions, T_J, mounting conditions) may be used for JANTX and JANTXV quality levels. A justification demonstrating equivalence is required. In addition, the manufacturing site's burn-in data and performance history shall be essential criteria for burn-in modification approval.

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

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with 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-VIB (JANTXV and JANTX) of MIL-PRF-19500, and as follows. Delta electrical measurements (end-points) shall be in accordance with table III herein.

Subgroup	Method	Conditions
B3	1027	I_{ZM} = 50 percent of column 10 of table IV (minimum). Adjust I_Z or T_A to ensure a T_J = +150°C (min).
B3	2075	For UB and UD only.
B4	2101	Decap analysis scribe and break only. Not applicable for UB and UD devices.
B5		Not applicable

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. Delta electrical measurements (end-points) shall be in accordance with table III herein.

Subgroup	Method	Conditions
C2	1056	0°C to +100°C, 10 cycles.
C2	1051	−55°C to +175°C, 25 cycles.
C2	2036	Test condition A; 10 pounds (4.54 kg); t = 15 seconds (not applicable to UR, UB and UD suffix devices). Lead fatigue: Condition E, (not applicable to UR, UB and UD suffix devices.
C2	1071	Test condition E for axial leaded and UR devices (not applicable for UB and UD devices). Fine and gross leak are required for UB and UD devices.
C5	4081	See 4.3.2.
C6	1026	I_{ZM} = 50 percent of column 10 of table IV (minimum). Adjust I_Z or T_A to ensure a T_J = +150°C (min).
C8	4071	See 4.5.5. I_Z = column 11 of table IV, T_1 = +25°C ±5°C, T_2 = +125°C ±5°C, α_{VZ} = column 8 of table IV, sampling plan n = 22 devices, c = 0.

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 table II herein.

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

4.5.1 Noise density (N_D). Noise density shall be measured using a noise density test circuit as shown on figure 6. 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 400 µA dc and measure output noise voltage again. To obtain noise density, 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.

4.5.2 Free air burn-in and life tests. The use of a current limiting or ballast resistor is permitted provided that each DUT still sees the $I_{Z(min)}$ described in 4.3.3 and that the minimum applied voltage, where applicable, is maintained throughout the burn-in period. Use method 3100 of MIL-STD-750 to measure T_J.

4.5.3 Maximum zener surge current (I_{ZSM}). The maximum zener surge current test shall be performed in accordance with condition B of test method 4066 of MIL-STD-750. 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 five (5) surges at 1 minute intervals. Each individual surge shall be one-half square-wave-pulse of 8.3 ms duration or an equivalent one-half sinewave with the same effective (rms) current.

4.5.4 Regulator voltage (V_Z) measurements. The regulator voltage shall be measured in accordance with method 4022 of MIL-STD-750. The test current shall be applied until thermal equilibrium is attained (20 ±2 seconds) prior to reading the breakdown voltage. For this test, the axial leaded device 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.

4.5.5 Temperature coefficient of regulator voltage (α_{VZ}). The temperature coefficient of regulator voltage test shall be performed in accordance with test method 4071 of MIL-STD-750. The device shall be temperature stabilized with current applied prior to reading regulator voltage (V_Z) at the ambient temperature specified in 4.4.3, subgroup C8.

4.5.6 Regulation factor (ΔV_Z). 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.

4.6 Element evaluation of unencapsulated die. The element evaluation of unencapsulated die shall be in accordance with appendix G of MIL-PRF-19500. The test of subgroups 3 and higher shall be performed in a TO-5 package. For subgroup 4, the burn-in duration for the JANKC level shall follow the JANS requirements and the JANHC shall follow the JANTX requirements.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limit 2/	Limit 2/	Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Thermal impedance	3101	See 4.3.2	$Z_{\theta JX}$			°C/W
Forward voltage	4011	Condition B, I_F = 200 mA dc	V_F		1.1	V dc
Reverse current	4016	DC method Condition A or B, V_R = column 5 of table IV	I_{R1}		Column 6 of table IV	µA dc
Regulator voltage	4022	See 4.5.4. I_Z = column 11 of table IV	V_Z	Column 1 of table IV $-V_Z$ tol	Column 1 of table IV $+V_Z$ tol	V dc
Regulation factor		See 4.5.6. I_Z = column 11 of table IV, I_{ZL} = column 13 of table IV	ΔV_Z		Column 12 of table IV	V dc
Subgroup 3						
High temperature operation:		T_A = +150°C				
Reverse current	4016	DC method Condition A or B; V_R = column 5 of table IV	I_{R2}		Column 2 of table IV	µA dc
Subgroup 4						
Small-signal reverse breakdown impedance	4051	I_Z = column 11 of table IV I_{SIG} = 10 percent of I_Z	Z_{ZT}		Column 3 of table IV	ohms
Noise density		I_Z = 400 µA dc; (see 4.5.1)	N_D		Column 9 of table IV	$\mu V/\sqrt{Hz}$
Subgroup 5						
Not applicable						
Subgroup 6						
Surge current	4066	Condition B, See 4.5.3				
Electrical measurements		Table I, subgroup 2				

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

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

Inspection 1/	MIL-STD-750		Sampling plan
	Method	Conditions	
Subgroup 1			45 devices, c = 0
Temperature cycling	1051	500 cycles.	
Electrical measurements		See table III, steps 1, 3, 4, and 5.	
Subgroup 2			
Steady-state dc intermittent life	1037	6,000 cycles. I_Z = column 10 (min) of table IV.	
Electrical measurements		See table III, steps 2, 3, 4, and 5. Provide read and record $\Delta Z_{\theta JX}$ data to the qualifying activity.	
Subgroup 4			
Thermal impedance curves		See MIL-PRF-19500.	N/A
Subgroups 5 and 6			
Not applicable			
Subgroup 9			
Resistance to glass cracking	1057	Condition B. Cool down after solder immersion is permitted. Test until failure occurs on all devices or to a maximum of 25 cycles, whichever comes first. Not applicable for UB and UD devices.	n =45

1/ Unless otherwise specified, for sampling plan, see MIL-PRF-19500.
2/ A separate sample may be pulled for each test.

* TABLE III. Group A, B, C and E electrical and delta measurements. 1/ 2/ 3/

Step	Inspection	MIL-STD-750		Symbol	Limit	Limit	Unit
		Method	Conditions		Min	Max	
1.	Reverse current	4016	DC method Condition A or B; V_R = column 5 of table IV	I_{R1}		Column 6 of table IV	µA dc
2.	Reverse current	4016	DC method Condition A or B, V_R = column 5 of table IV	I_{R3}		Column 7 of table IV	µA dc
3.	Regulator voltage	4022	I_Z = column 11 of table IV (see 4.5.4)	V_Z	Column 1 of table IV $-V_Z$ tol	Column 1 of table IV $+ V_Z$ tol	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	ohms
5.	Thermal impedance	3101	See 4.3.2	$\Delta Z_{\theta JX}$		10 percent of initial reading max.	°C/W

1/ The electrical measurements for group B inspection of table E-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, 4, and 5.
   c. Subgroup 6, see table III herein, steps 2, 3, and 4.

2/ The electrical measurements for group C inspection of table E-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, 4, and 5.

3/ The electrical measurements for group E inspection of table E-IX of MIL-PRF-19500 are as follows:
   a. Subgroup 1 see table III herein, steps 1, 3, 4, and 5.
   b. Subgroup 2, see table III herein, steps 2, 3, 4, and 5.

TABLE IV. Test ratings.

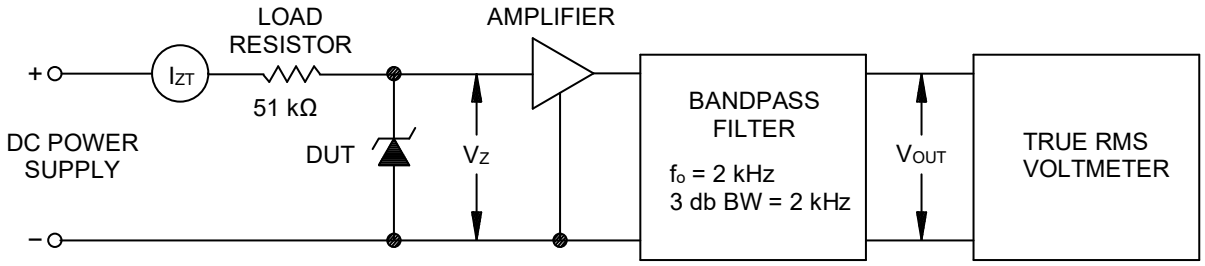
Device type	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11		Col 12	Col 13
	V_Z Nom 1/	I_{R2} T_A = 150°C	Z_{ZT}	I_{ZSM}	V_R	I_{R1}	I_{R3} (life test end points)	α_{VZ} T_1 = +25°C T_2 = +125°C	N_D μV/√Hz	I_{ZM}	I_Z test current 2/	I_Z UB, UD test current 3/	ΔV_Z	I_{ZL}
	V dc	μA dc	ohms	mA	V dc	μA dc	μA dc	%/°C		mA	mA	mA	V dc	mA
1N5518B-1	3.3	10.0	26	1,600	1.0	5.0	10.0	−.07	0.5	115	20	6.3	0.90	2.0
1N5519B-1	3.6	6.0	24	1,500	1.0	3.0	6.0	−.065	0.5	105	20	6.3	0.90	2.0
1N5520B-1	3.9	4.0	22	1.250	1.0	1.0	2.0	−.060	0.5	98	20	6.3	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	6.3	0.75	2.0
1N5522B-1	4.7	6.0	22	950	2.0	2.0	6.0	−.043+.025	0.5	81	10	3.0	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	1.6	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	0.9	0.30	0.25
1N5525B-1	6.2	4.0	30	650	5.0	1.0	4.0	+.05	1.0	61	1.0	0.3	0.20	0.01
1N5526B-1	6.8	5.0	30	650	6.2	1.0	5.0	+.052	1.0	56	1.0	0.3	0.10	0.01
1N5527B-1	7.5	5.0	35	650	6.8	0.5	1.0	+.058	2.0	51	1.0	0.3	0.05	0.01
1N5528B-1	8.2	5.0	40	650	7.5	0.5	1.0	+.062	4.0	46	1.0	0.3	0.05	0.01
1N5529B-1	9.1	5.0	45	650	8.2	1.0	1.0	+.068	4.0	42	1.0	0.3	0.05	0.01
1N5530B-1	10.0	5.0	60	650	9.1	0.05	0.5	+.075	4.0	38	1.0	0.3	0.10	0.01
1N5531B-1	11.0	5.0	80	590	9.9	0.05	0.5	+.075	5.0	35	1.0	0.3	0.20	0.01
1N5532B-1	12.0	5.0	90	540	10.8	0.05	0.1	+.08	10	32	1.0	0.3	0.20	0.01
1N5533B-1	13.0	5.0	90	500	11.7	0.01	0.05	+.08	15	29	1.0	0.3	0.20	0.01
1N5534B-1	14.0	5.0	100	464	12.6	0.01	0.05	+.082	20	27	1.0	0.3	0.20	0.01

See footnotes at end of table.

TABLE IV. Test ratings – continued.

Device type	Col 1 V_Z Nom 1/	Col 2 I_{R2} T_A = 150°C	Col 3 Z_{ZT}	Col 4 I_{ZSM}	Col 5 V_R	Col 6 I_{R1}	Col 7 I_{R3} (life test end points)	Col 8 α_{VZ} T_1 = +25°C T_2 = +125°C	Col 9 N_D $\mu V/\sqrt{Hz}$	Col 10 I_{ZM}	Col 11		Col 12 ΔV_Z	Col 13 I_{ZL}
											I_Z test current 2/	I_Z UB, UD test current 3/		
	V dc	µA dc	ohms	mA	V dc	µA dc	µA dc	%/°C		mA	mA	mA	V dc	mA
1N5535B-1	15.0	5.0	100	433	13.5	0.01	0.05	+.082	20	25	1.0	0.3	0.20	0.01
1N5536B-1	16.0	5.0	100	406	14.4	0.01	0.05	+.083	20	24	1.0	0.3	0.20	0.01
1N5537B-1	17.0	5.0	100	382	15.3	0.01	0.05	+.085	20	22	1.0	0.3	0.20	0.01
1N5538B-1	18.0	5.0	100	361	16.2	0.01	0.05	+.085	20	21	1.0	0.3	0.20	0.01
1N5539B-1	19.0	5.0	100	342	17.1	0.01	0.05	+.086	20	20	1.0	0.3	0.20	0.01
1N5540B-1	20.0	5.0	100	325	18.0	0.01	0.05	+.086	20	19	1.0	0.3	0.20	0.01
1N5541B-1	22.0	5.0	100	295	19.8	0.01	0.05	+.087	25	17	1.0	0.3	0.25	0.01
1N5542B-1	24.0	5.0	100	271	21.6	0.01	0.05	+.088	30	16	1.0	0.3	0.30	0.01
1N5543B-1	25.0	5.0	100	260	22.4	0.01	0.05	+.09	35	15	1.0	0.3	0.35	0.01
1N5544B-1	28.0	5.0	100	240	25.2	0.01	0.05	+.091	40	14	1.0	0.3	0.40	0.01
1N5545B-1	30.0	5.0	100	216	27.0	0.01	0.05	+.091	45	13	1.0	0.3	0.45	0.01
1N5546B-1	33.0	5.0	100	197	29.7	0.01	0.05	+.092	50	12	1.0	0.3	0.50	0.01

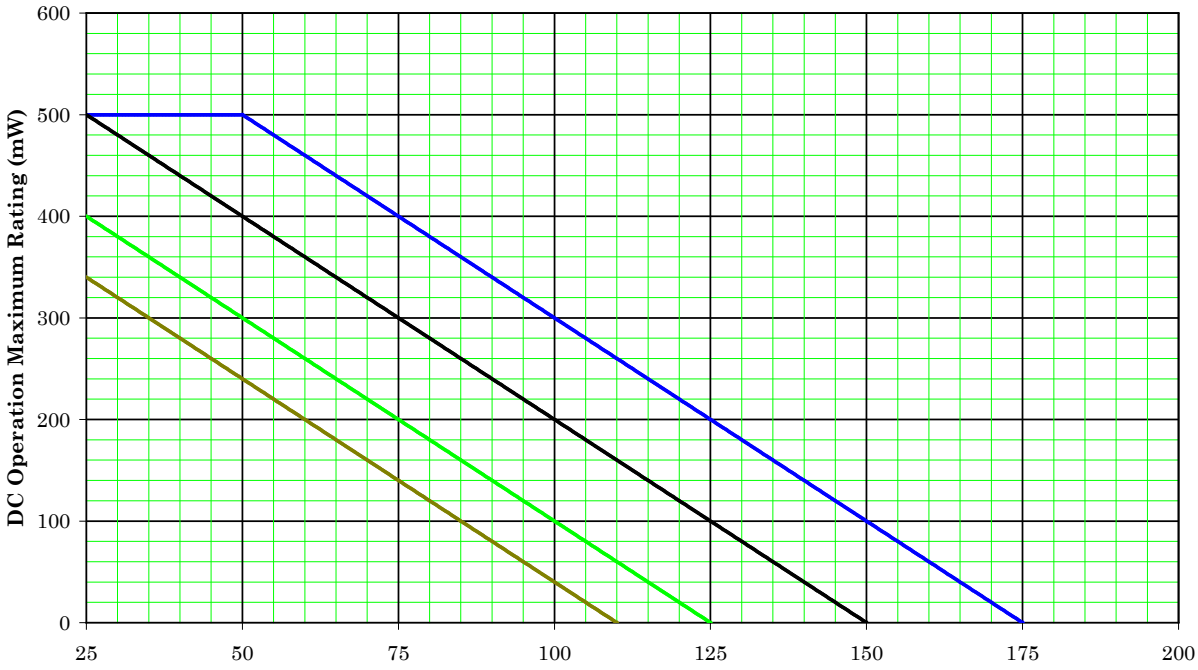
1/ Voltage tolerance devices (examples: 1N5518B-1 are ±5 percent, 1N5518C-1 are ±2 percent, and 1N5518D-1 are ±1 percent tolerance).
2/ Applicable for axial leaded and UR devices.
3/ Applicable for UB and UD devices.
4/ Unless otherwise specified, electrical characteristics, ratings, and conditions for the -1 suffix devices are identical to the corresponding UR, UB, UD suffix devices.



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:
   a. f_O = 2,000 Hz
   b. Shape factor, −40 db to −3 db, approximately 2.
   c. Passband at the −3 db is 1,000 Hz ±50 Hz to 3,000 Hz ±150 Hz.
   d. Passband at the −40 db is 500 Hz ±50 Hz to 6,000 Hz ±600 Hz.

FIGURE 6. Test circuit for determination of noise density.

TEMPERATURE-POWER DERATING CURVE
DO-204AH

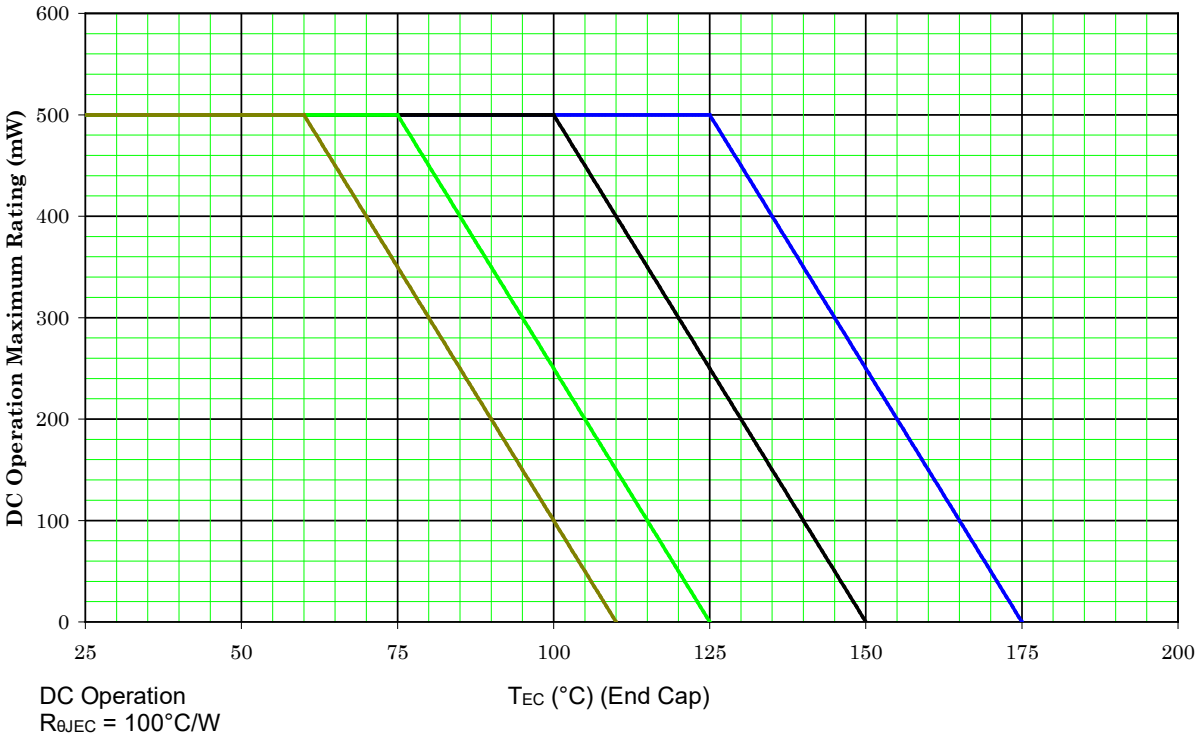


NOTES:

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

FIGURE 7. Temperature-power derating curve (T_L) for DO-204AH.

TEMPERATURE-POWER DERATING CURVE
DO-213AA

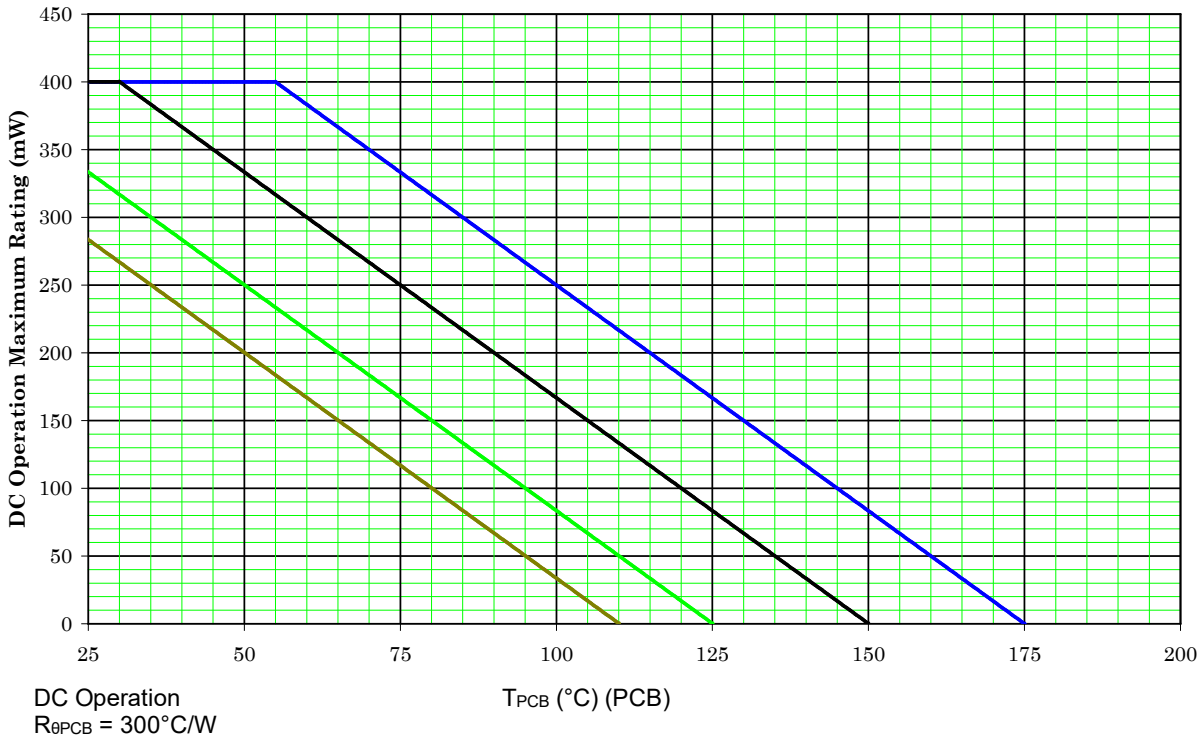


NOTES:

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

FIGURE 8. Temperature-power derating curve (T_{EC}) for DO-213AA.

TEMPERATURE-POWER DERATING CURVE
DO-204AH and DO-213AA

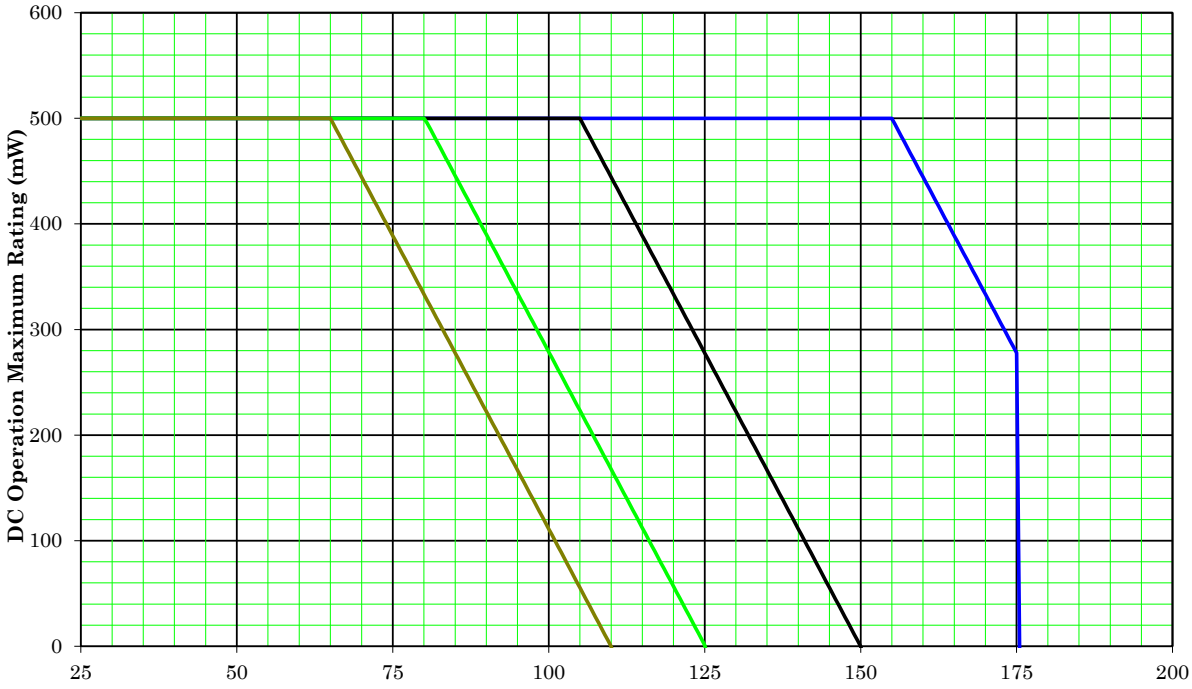


NOTES:

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

FIGURE 9. Temperature-power derating curve (T_{PCB}) for DO-204AH and DO-213AA.

TEMPERATURE-POWER DERATING CURVE
UD Packages

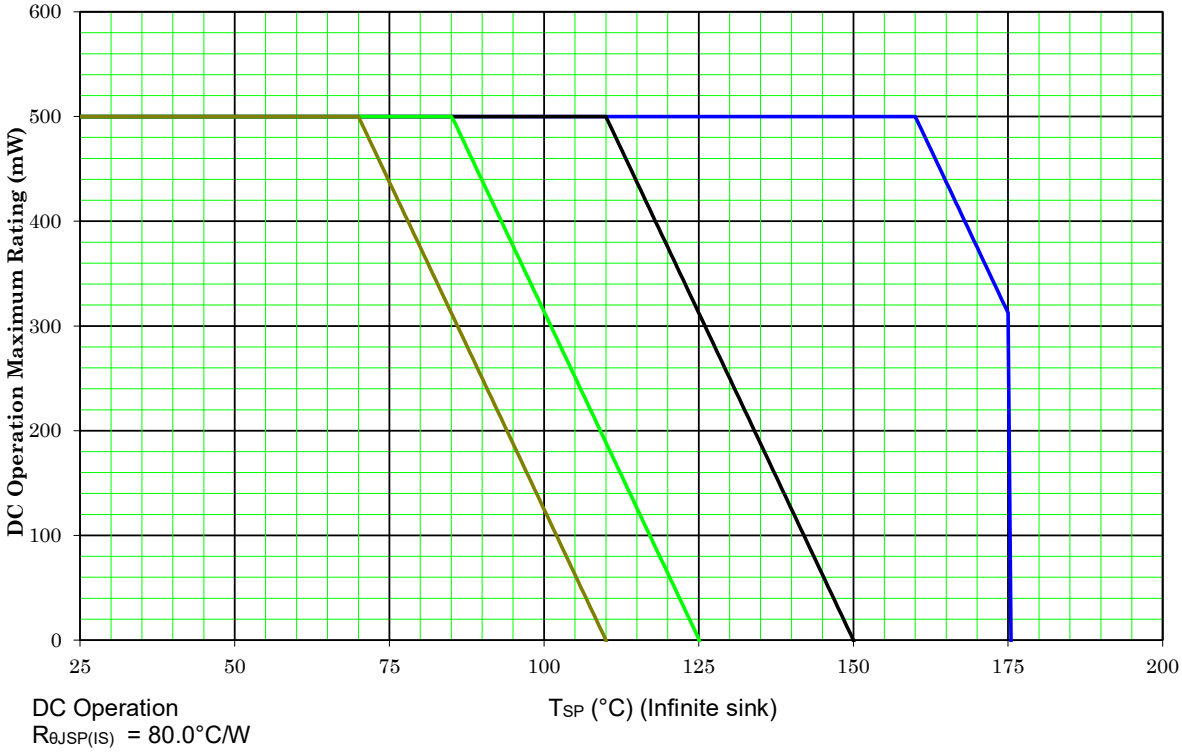


DC Operation
$R_{\theta JSP(IS)}$ = 90.0°C/W

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

FIGURE 10. Temperature-power derating curve for surface mount UB package.

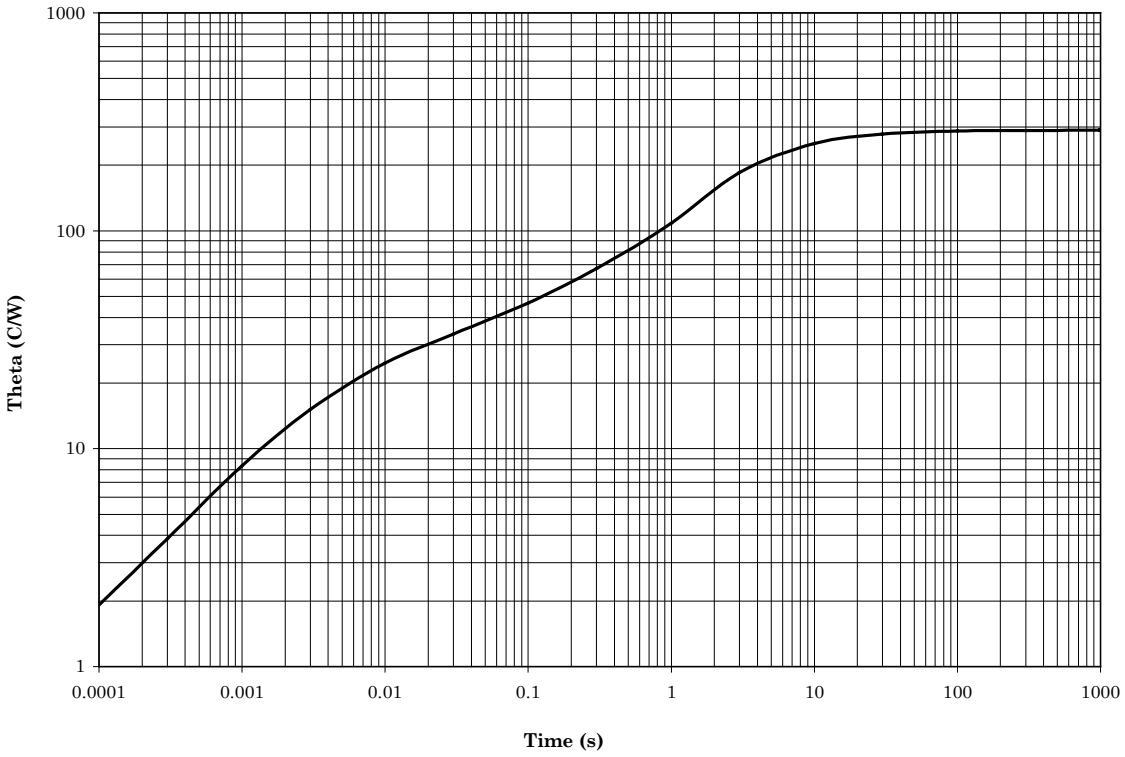
TEMPERATURE-POWER DERATING CURVE
UD Packages



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

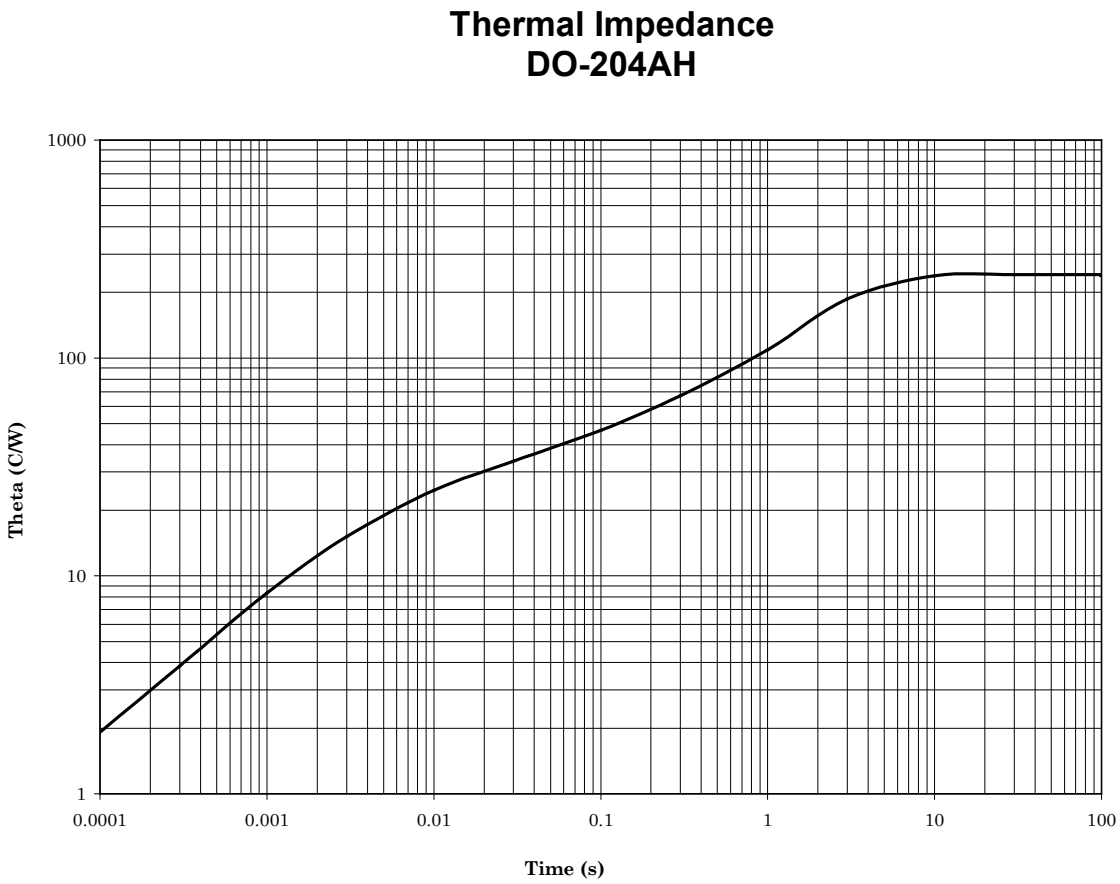
FIGURE 11. Temperature-power derating curve for surface mount UD package.

THERMAL IMPEDANCE
PCB mount, DO-204AH and DO-213AA



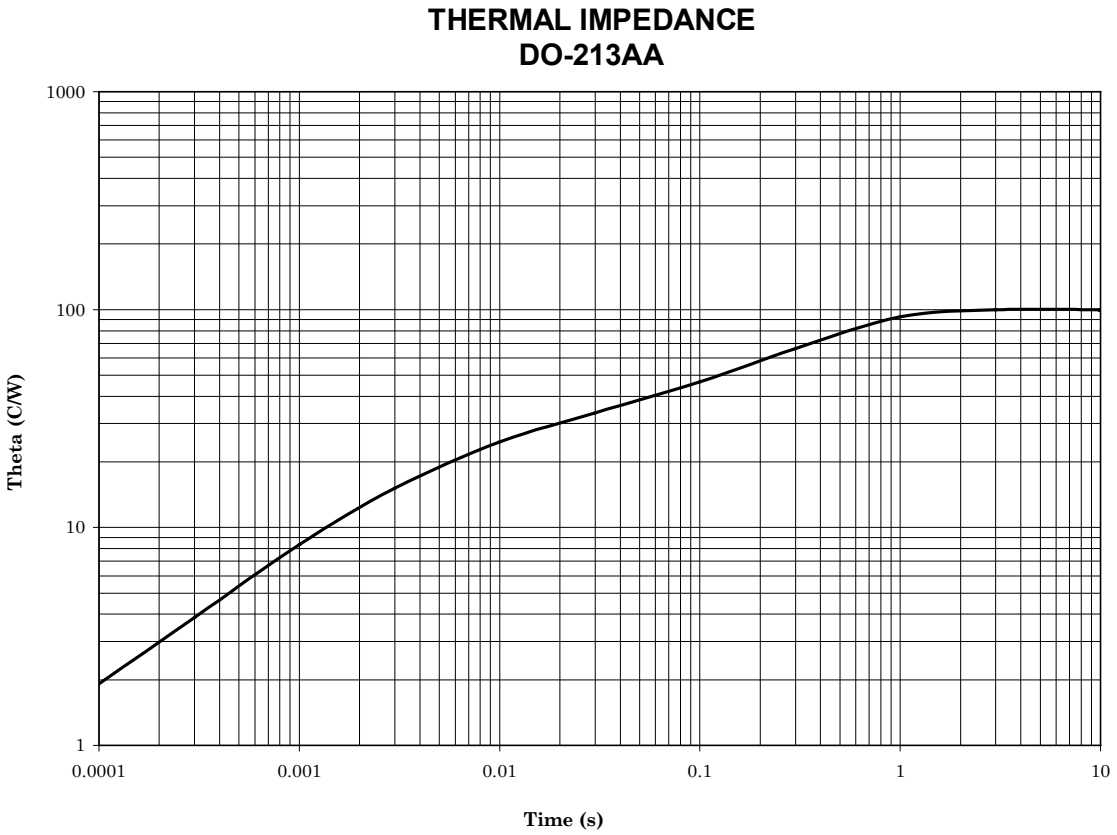
NOTES:
1. Thermal impedance testing for DO-204AH axial leaded or UR when mounted to PCB. T_A = +55°C for both axial leaded and UR packages when tested horizontally in still air.
2. Thermal resistance = 300°C/W.

FIGURE 12. Thermal impedance (DO-204AH and DO-213AA) PCB mount.



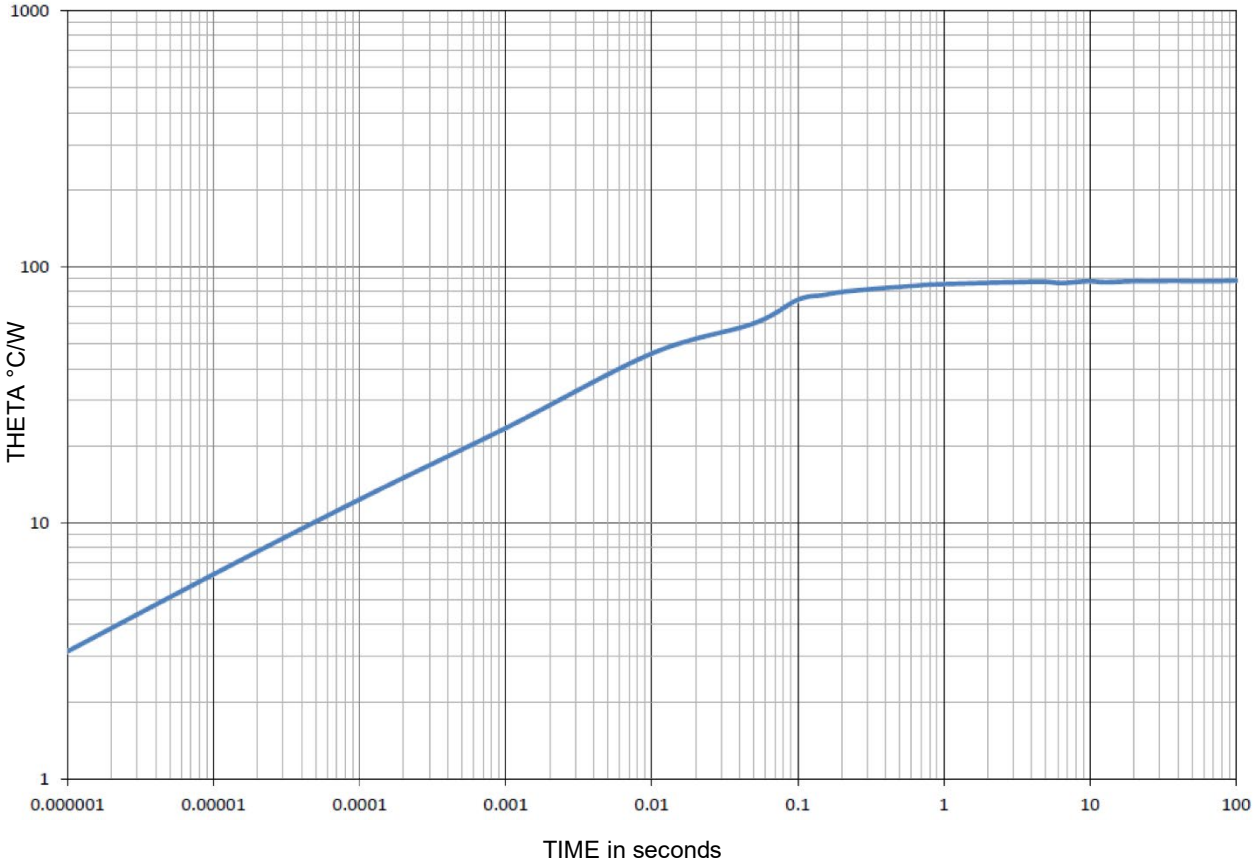
NOTES:
1. Thermal impedance DO-204AH axial leaded at L = .375 inch (9.525 mm) from body.
2. Thermal resistance = 250°C/W.

FIGURE 13. Thermal impedance ~~(~~DO-204AH~~)~~ axial leaded only, junction to lead.



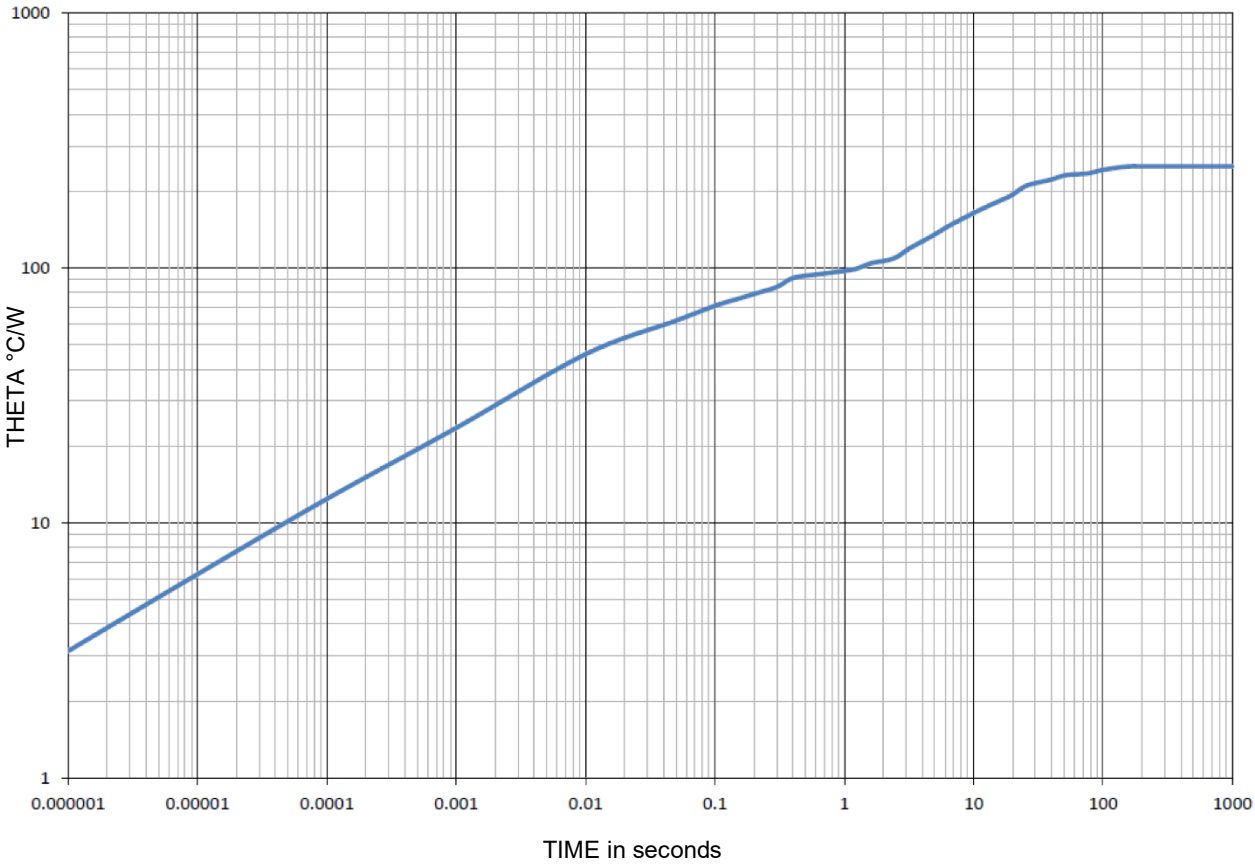
NOTES:
1. Thermal impedance DO-213A surface mount at T_{EC} = 25°C.
2. Thermal resistance = 100°C/W. Power rating = 500 mW at T_{EC} = 125°C.

FIGURE 14. Thermal impedance (DO-213) MELF.



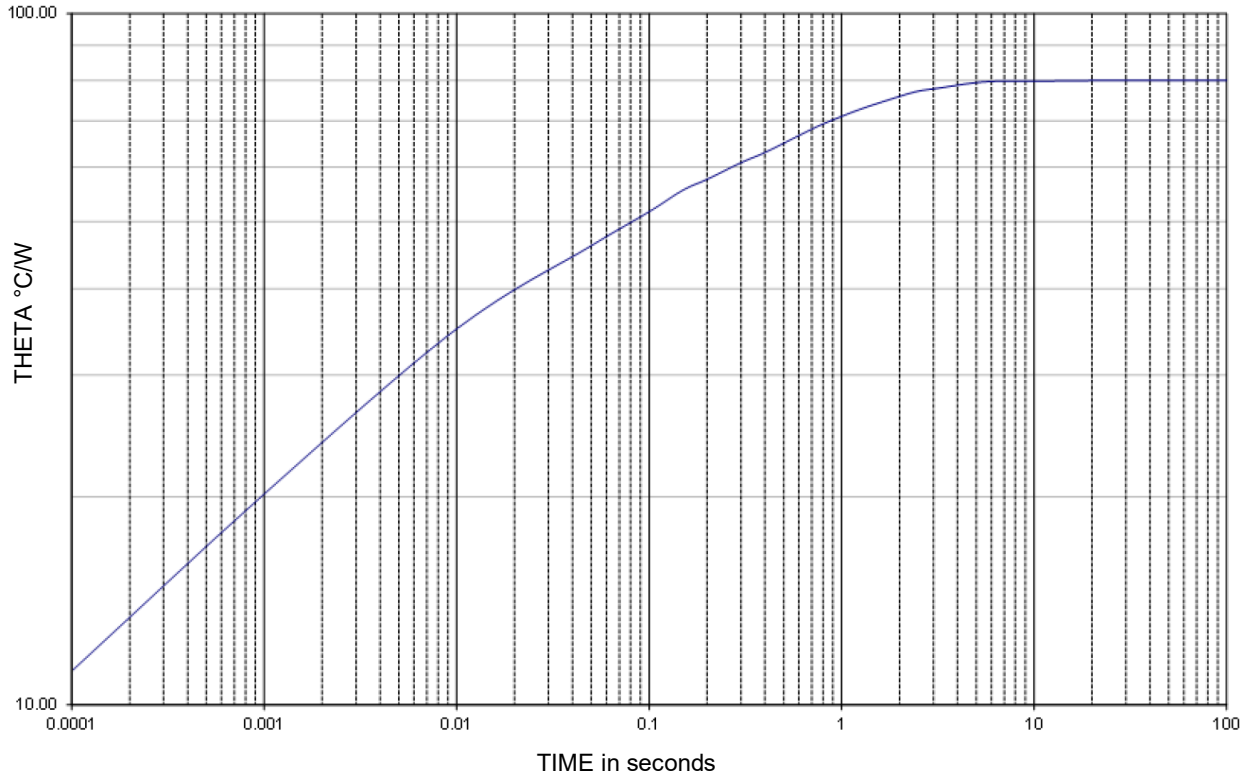
NOTES:
1. $R_{\theta JSP(IS)}$ = 90°C/W.
2. $Z_{\theta JX}$ = 45°C/W maximum at 10 ms.

FIGURE 15. Thermal impedance $R_{\theta JSP(IS)}$ for UB packages.



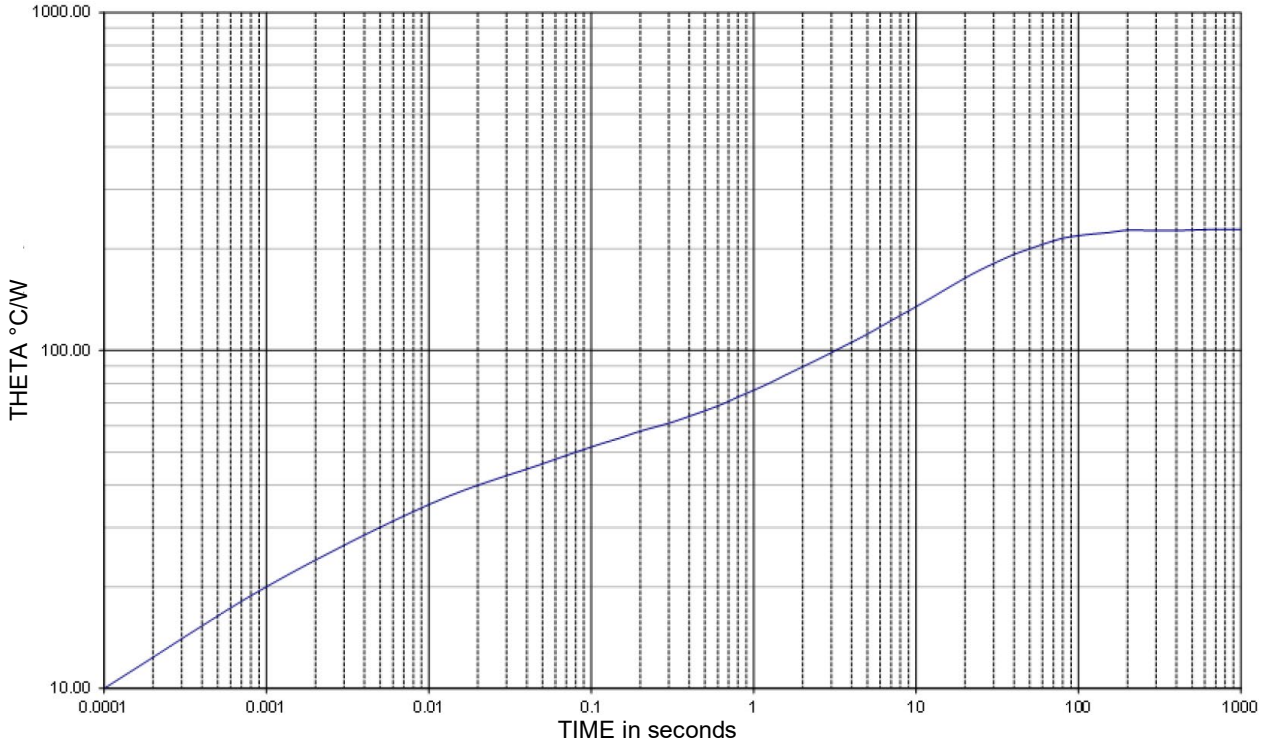
NOTES:
1. $R_{\theta JA(PCB)}$ = 250°C/W.
2. $Z_{\theta JX}$ = 45°C/W maximum at 10 ms.

FIGURE 16. Thermal impedance figure $R_{\theta JA(PCB)}$ for UB packages.



NOTES:
1. $R_{\theta JSP(IS)}$ = 80°C/W.
2. $Z_{\theta JX}$ = 35°C/W maximum at 10 ms.

FIGURE 17. Thermal impedance $R_{\theta JSP(IS)}$ for UD devices.



NOTES:
1. $R_{\theta JA(PCB)}$ = 228°C/W.
2. $Z_{\theta JX}$ = 35°C/W maximum at 10 ms.

FIGURE 18. Thermal impedance $R_{\theta JA(PCB)}$ for UD devices.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory. The notes specified in MIL-PRF-19500 are applicable to this specification.)

6.1 Intended use. Semiconductors conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Packaging requirements (see 5.1).

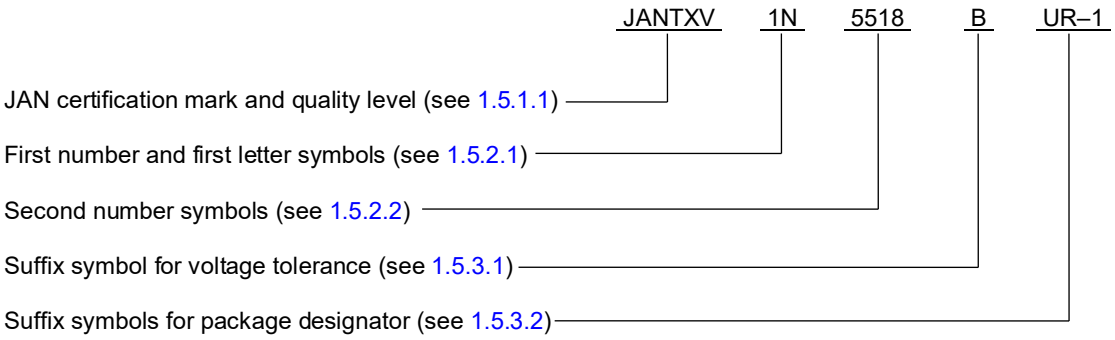
c. Lead finish (see 3.4.1).

d. The complete PIN, see 1.5 and 6.4.

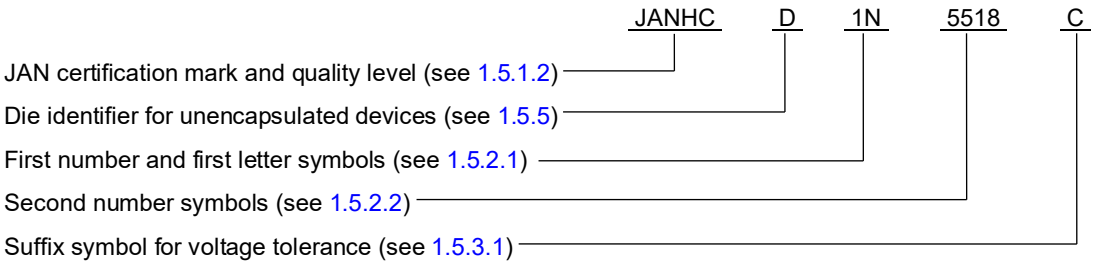
6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention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

6.4 PIN construction example. The PINs for encapsulated and unencapsulated devices and are constructed using the following forms.

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



6.4.2 Unencapsulated devices. The PINs for unencapsulated devices are constructed using the following form.



6.5 List of PINs.

6.5.1 Encapsulated devices. The following is a list of possible PINs available for encapsulated devices and covered by this specification sheet.

Quality level JAN level (1)	Quality level JANTX level (1)	Quality level JANTXV level (1)
JAN1N5518#@-1	JANTX1N5518#@-1	JANTXV1N5518#@-1
JAN1N5519#@-1	JANTX1N5519#@-1	JANTXV1N5519#@-1
JAN1N5520#@-1	JANTX1N5520#@-1	JANTXV1N5520#@-1
JAN1N5521#@-1	JANTX1N5521#@-1	JANTXV1N5521#@-1
JAN1N5522#@-1	JANTX1N5522#@-1	JANTXV1N5522#@-1
JAN1N5523#@-1	JANTX1N5523#@-1	JANTXV1N5523#@-1
JAN1N5524#@-1	JANTX1N5524#@-1	JANTXV1N5524#@-1
JAN1N5525#@-1	JANTX1N5525#@-1	JANTXV1N5525#@-1
JAN1N5526#@-1	JANTX1N5526#@-1	JANTXV1N5526#@-1
JAN1N5527#@-1	JANTX1N5527#@-1	JANTXV1N5527#@-1
JAN1N5528#@-1	JANTX1N5528#@-1	JANTXV1N5528#@-1
JAN1N5529#@-1	JANTX1N5529#@-1	JANTXV1N5529#@-1
JAN1N5530#@-1	JANTX1N5530#@-1	JANTXV1N5530#@-1
JAN1N5531#@-1	JANTX1N5531#@-1	JANTXV1N5531#@-1
JAN1N5532#@-1	JANTX1N5532#@-1	JANTXV1N5532#@-1
JAN1N5533#@-1	JANTX1N5533#@-1	JANTXV1N5533#@-1
JAN1N5534#@-1	JANTX1N5534#@-1	JANTXV1N5534#@-1
JAN1N5535#@-1	JANTX1N5535#@-1	JANTXV1N5535#@-1
JAN1N5536#@-1	JANTX1N5536#@-1	JANTXV1N5536#@-1
JAN1N5537#@-1	JANTX1N5537#@-1	JANTXV1N5537#@-1
JAN1N5538#@-1	JANTX1N5538#@-1	JANTXV1N5538#@-1
JAN1N5539#@-1	JANTX1N5539#@-1	JANTXV1N5539#@-1
JAN1N5540#@-1	JANTX1N5540#@-1	JANTXV1N5540#@-1
JAN1N5541#@-1	JANTX1N5541#@-1	JANTXV1N5541#@-1
JAN1N5542#@-1	JANTX1N5542#@-1	JANTXV1N5542#@-1
JAN1N5543#@-1	JANTX1N5543#@-1	JANTXV1N5543#@-1
JAN1N5544#@-1	JANTX1N5544#@-1	JANTXV1N5544#@-1
JAN1N5545#@-1	JANTX1N5545#@-1	JANTXV1N5545#@-1
JAN1N5546#@-1	JANTX1N5546#@-1	JANTXV1N5546#@-1

(1) The pound sign (#) represents the voltage tolerance suffix "B", "C", or "D" (see 1.5.3.1) and the at-sign (@) represents the package suffix of either blank or "UR" (see 1.5.3.2).

6.5.2 Un-encapsulated devices. The following is a list of possible PINs available for un-encapsulated devices covered by this specification sheet.

PINs for die of quality level JANHC (1)	PINs for die of quality level JANKC (1)	PINs for die of quality level JANHC (1)	PINs for die of quality level JANKC (1)
JANHC@1N5518#	JANKC@1N5518#	JANHC@1N5533#	JANKC@1N5533#
JANHC@1N5519#	JANKC@1N5519#	JANHC@1N5534#	JANKC@1N5534#
JANHC@1N5520#	JANKC@1N5520#	JANHC@1N5535#	JANKC@1N5535#
JANHC@1N5521#	JANKC@1N5521#	JANHC@1N5536#	JANKC@1N5536#
JANHC@1N5522#	JANKC@1N5522#	JANHC@1N5537#	JANKC@1N5537#
JANHC@1N5523#	JANKC@1N5523#	JANHC@1N5538#	JANKC@1N5538#
JANHC@1N5524#	JANKC@1N5524#	JANHC@1N5539#	JANKC@1N5539#
JANHC@1N5525#	JANKC@1N5525#	JANHC@1N5540#	JANKC@1N5540#
JANHC@1N5526#	JANKC@1N5526#	JANHC@1N5541#	JANKC@1N5541#
JANHC@1N5527#	JANKC@1N5527#	JANHC@1N5542#	JANKC@1N5542#
JANHC@1N5528#	JANCK@1N5528#	JANHC@1N5543#	JANKC@1N5543#
JANHC@1N5529#	JANKC@1N5529#	JANHC@1N5544#	JANKC@1N5544#
JANHC@1N5530#	JANKC@1N5530#	JANHC@1N5545#	JANKC@1N5545#
JANHC@1N5531#	JANKC@1N5531#	JANHC@1N5546#	JANKC@1N5546#
JANHC@1N5532#	JANKC@1N5532#		

(1) The at-sign (@) represents the die version "A", "B", "C", “D”, or "E" (see 1.5.5) and the pound sign (#) represents the voltage tolerance suffix "B", "C", or "D" (see 1.5.3.1).

6.6 Substitution information.

6.6.1 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).

6.6.2 Substitutability of dash-one parts. The non-dash-one devices that were listed on past revisions have been deleted from this specification as of MIL-S-19500/437B dated 22 July 1994. 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		Superseded PIN	Superseding PIN
1N5518B	1N5518B-1		1N5528B	1N5528B-1		1N5538B	1N5538B-1
1N5519B	1N5519B-1		1N5529B	1N5529B-1		1N5539B	1N5539B-1
1N5520B	1N5520B-1		1N5530B	1N5530B-1		1N5540B	1N5540B-1
1N5521B	1N5521B-1		1N5531B	1N5531B-1		1N5541B	1N5541B-1
1N5522B	1N5522B-1		1N5532B	1N5532B-1		1N5542B	1N5542B-1
1N5523B	1N5523B-1		1N5533B	1N5533B-1		1N5543B	1N5543B-1
1N5524B	1N5524B-1		1N5534B	1N5534B-1		1N5544B	1N5544B-1
1N5525B	1N5525B-1		1N5535B	1N5535B-1		1N5545B	1N5545B-1
1N5526B	1N5526B-1		1N5536B	1N5536B-1		1N5546B	1N5546B-1
1N5527B	1N5527B-1		1N5537B	1N5537B-1			

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

PIN	JANHC and JANKC ordering information (1)				
	Manufacturer CAGE				
	43611	12954	52GC4	13409	52GC4
1N5518	JAN@CA1N5518#	JAN@CB1N5518#	JAN@CC1N5518#	JAN@CD1N5518#	JAN@CE1N5518#
1N5519	JAN@CA1N5519#	JAN@CB1N5519#	JAN@CC1N5519#	JAN@CD1N5519#	JAN@CE1N5519#
1N5520	JAN@CA1N5520#	JAN@CB1N5520#	JAN@CC1N5520#	JAN@CD1N5520#	JAN@CE1N5520#
1N5521	JAN@CA1N5521#	JAN@CB1N5521#	JAN@CC1N5521#	JAN@CD1N5521#	JAN@CE1N5521#
1N5522	JAN@CA1N5522#	JAN@CB1N5522#	JAN@CC1N5522#	JAN@CD1N5522#	JAN@CE1N5522#
1N5523	JAN@CA1N5523#	JAN@CB1N5523#	JAN@CC1N5523#	JAN@CD1N5523#	JAN@CE1N5523#
1N5524	JAN@CA1N5524#	JAN@CB1N5524#	JAN@CC1N5524#	JAN@CD1N5524#	JAN@CE1N5524#
1N5525	JAN@CA1N5525#	JAN@CB1N5525#	JAN@CC1N5525#	JAN@CD1N5525#	JAN@CE1N5525#
1N5526	JAN@CA1N5526#	JAN@CB1N5526#	JAN@CC1N5526#	JAN@CD1N5526#	JAN@CE1N5526#
1N5527	JAN@CA1N5527#	JAN@CB1N5527#	JAN@CC1N5527#	JAN@CD1N5527#	JAN@CE1N5527#
1N5528	JAN@CA1N5528#	JAN@CB1N5528#	JAN@CC1N5528#	JAN@CD1N5528#	JAN@CE1N5528#
1N5529	JAN@CA1N5529#	JAN@CB1N5529#	JAN@CC1N5529#	JAN@CD1N5529#	JAN@CE1N5529#
1N5530	JAN@CA1N5530#	JAN@CB1N5530#	JAN@CC1N5530#	JAN@CD1N5530#	JAN@CE1N5530#
1N5531	JAN@CA1N5531#	JAN@CB1N5531#	JAN@CC1N5531#	JAN@CD1N5531#	JAN@CE1N5531#
1N5532	JAN@CA1N5532#	JAN@CB1N5532#	JAN@CC1N5532#	JAN@CD1N5532#	JAN@CE1N5532#
1N5533	JAN@CA1N5533#	JAN@CB1N5533#	JAN@CC1N5533#	JAN@CD1N5533#	JAN@CE1N5533#
1N5534	JAN@CA1N5534#	JAN@CB1N5534#	JAN@CC1N5534#	JAN@CD1N5534#	JAN@CE1N5534#
1N5535	JAN@CA1N5535#	JAN@CB1N5535#	JAN@CC1N5535#	JAN@CD1N5535#	JAN@CE1N5535#
1N5536	JAN@CA1N5536#	JAN@CB1N5536#	JAN@CC1N5536#	JAN@CD1N5536#	JAN@CE1N5536#
1N5537	JAN@CA1N5537#	JAN@CB1N5537#	JAN@CC1N5537#	JAN@CD1N5537#	JAN@CE1N5537#
1N5538	JAN@CA1N5538#	JAN@CB1N5538#	JAN@CC1N5538#	JAN@CD1N5538#	JAN@CE1N5538#
1N5539	JAN@CA1N5539#	JAN@CB1N5539#	JAN@CC1N5539#	JAN@CD1N5539#	JAN@CE1N5539#
1N5540	JAN@CA1N5540#	JAN@CB1N5540#	JAN@CC1N5540#	JAN@CD1N5540#	JAN@CE1N5540#
1N5541	JAN@CA1N5541#	JAN@CB1N5541#	JAN@CC1N5541#	JAN@CD1N5541#	JAN@CE1N5541#
1N5542	JAN@CA1N5542#	JAN@CB1N5542#	JAN@CC1N5542#	JAN@CD1N5542#	JAN@CE1N5542#
1N5543	JAN@CA1N5543#	JAN@CB1N5543#	JAN@CC1N5543#	JAN@CD1N5543#	JAN@CE1N5543#
1N5544	JAN@CA1N5544#	JAN@CB1N5544#	JAN@CC1N5544#	JAN@CD1N5544#	JAN@CE1N5544#
1N5545	JAN@CA1N5545#	JAN@CB1N5545#	JAN@CC1N5545#	JAN@CD1N5545#	JAN@CE1N5545#
1N5546	JAN@CA1N5546#	JAN@CB1N5546#	JAN@CC1N5546#	JAN@CD1N5546#	JAN@CE1N5546#

(1) The at-sign (@) represents the quality level "H" or "K" (see 1.5.1.2) and the pound sign (#) represents the voltage tolerance suffix "B", "C", or "D" (see 1.5.3.1).

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

Custodians:
Army − CR
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Air Force − 85
NASA − NA
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Review activities:
Air Force − 19

Preparing activity:
DLA − CC

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