

The documentation and process conversion measures necessary to comply with this document shall be completed by 29 March 2025.

INCH-POUND

MIL-PRF-19500/718A
w/AMENDMENT 1
29 October 2024
SUPERSEDING
MIL-PRF-19500/718A
22 March 2019

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, BIPOLAR TRANSIENT VOLTAGE SUPPRESSOR,
TYPES 1N6950 THROUGH 1N6986,
QUALITY LEVELS JAN, JANTX, JANTXV, AND JANS

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 5,000 watt, peak, pulse power, silicon, transient voltage suppressor diodes. Four levels of product assurance (JAN, JANTX, JANTXV, and JANS) are provided for each device as specified in [MIL-PRF-19500](#).

1.2 Physical dimensions. The device package for the encapsulated device type is a surface mount UTK2 package in accordance with [figure 1](#).

1.3 Maximum ratings. Maximum ratings are as shown in the [electrical characteristics and ratings table](#) herein (see [3.8](#)), and as follows:

- a. $P_{M(AV)} = 5.0 \text{ W}$ (derate at $33.35 \text{ mW/}^\circ\text{C}$ above $T_A = +25^\circ\text{C}$) (see [figure 2](#), and [6.6](#)).
- b. $P_{PP} = 5,000 \text{ W}$ (see [figure 3](#)) at $t_p = 1 \text{ ms}$ (see [figure 4](#)).
- c. $-65^\circ\text{C} \leq T_j \leq +175^\circ\text{C}$ (ambient), $-65^\circ\text{C} \leq T_{STG} \leq +175^\circ\text{C}$ (ambient).

1.4 Primary electrical characteristics at $T_A = +25^\circ\text{C}$. Primary electrical characteristics are as shown in maximum test ratings herein (see [3.8](#)).

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

AMSC N/A
DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.



MIL-PRF-19500/718A
w/AMENDMENT 1

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.

1.5.1 JAN certification mark and quality level 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", "JANTXV" and "JANS".

1.5.2 Device type. The designation system for the device types of semiconductors covered by this specification sheet are as follows.

1.5.2.1 First number and first letter symbols. The semiconductors 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 semiconductors covered by this specification sheet are as follows: "6950" through "6986".

1.5.3 Lead finish. The lead finishes applicable to this specification sheet are listed on [QPDSIS-19500](#).

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

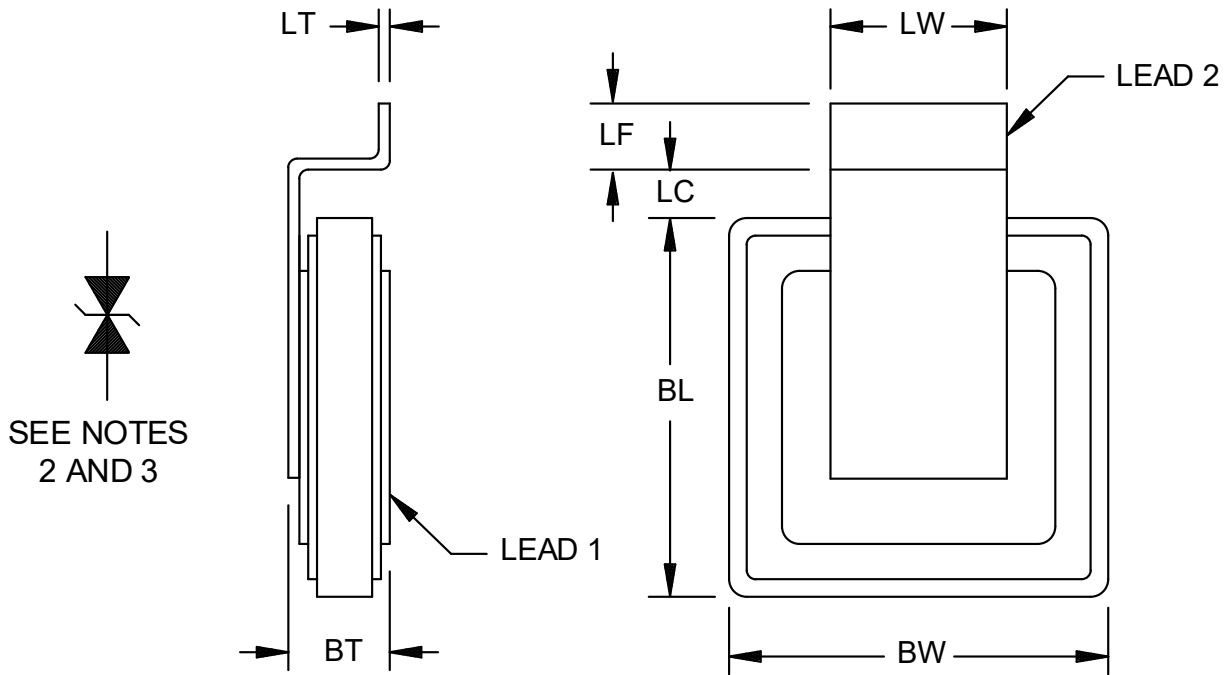
[MIL-PRF-19500](#) – Semiconductor Devices, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-750](#) – Test Methods for Semiconductor Devices.

(Copies of these documents are available online at <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.



Symbol	Dimensions			
	Inch	Inch	mm	mm
	Min	Max	Min	Max
BW	.420	.440	10.67	11.0
BL	.420	.440	10.67	11.0
BT	.085	.105	2.16	2.67
LW	.195	.205	4.95	5.21
LT	.010	.015	0.25	0.38
LF	.070	.080	1.78	2.03
LC	.040	.070	1.02	1.78

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Symbol for internal construction of bipolar transient suppressor.
3. The bottom of the case is lead 1 and the gull wing is lead 2.

FIGURE 1. Physical dimensions of a UTK2 surface mount package

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 before contract award (see [4.2](#) and [6.3](#)).

3.3 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in [MIL-PRF-19500](#).

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in [MIL-PRF-19500](#), and on [figure 1](#) herein.

3.4.1 Diode construction. These devices shall be constructed utilizing double plug construction with eutectic bonding between both sides of the silicon die and terminal pins (see [MIL-PRF-19500](#)). Metallurgical bond shall be in accordance with the requirements of category II in [MIL-PRF-19500](#). The diode body is ceramic. All seals are eutectic solder. Strap material is a copper alloy or copper sandwich.

3.4.2 Lead finish. Unless otherwise specified, lead finish (pads, bottom pad and strap foot) shall be solderable in accordance with [MIL-PRF-19500](#), [MIL-STD-750](#) and herein. Where a choice of lead finish or formation is desired, it shall be specified in the acquisition document (see [6.2](#)).

3.5 Marking. Marking shall be in accordance with [MIL-PRF-19500](#).

3.6 Electrical performance characteristics. Unless otherwise specified, 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 as specified in [table I](#) subgroup 2, [table II](#), and [table III](#).

3.8 Maximum test ratings. Test ratings for the devices specified herein shall be as shown in [table IV](#).

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](#)).

4.1.1 Sampling and inspection. Sampling and inspection shall be in accordance with [MIL-PRF-19500](#), and as specified herein except lot accumulation shall be 3-months in lieu of 6-weeks.

MIL-PRF-19500/718A
w/AMENDMENT 1

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 qualification shall be performed herein for qualification or requalification 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 shall be performed on the first inspection lot to this revision to maintain qualification.

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

Screen	Measurements for quality level JANS	Measurements for quality levels JANTX and JANTXV
3	T _(high) = +175°C	T _(high) = +175°C
9, 10, 11	Not applicable	Not applicable
12	See 4.5.1	See 4.5.1
13	Interim electrical, delta, and table 1, subgroups 2 and 3, electrical parameters herein not applicable for this screen (performed in screen 12).	Interim electrical, delta, and table 1, subgroups 2 and 3, electrical parameters herein not applicable for this screen (performed in screen 12).

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 [MIL-PRF-19500](#) and [table I](#) herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VIA (JANS) and table E-VIB (JAN, JANTX, and JANTXV) of [MIL-PRF-19500](#). Delta measurement shall be in accordance with the applicable steps of [table III](#) herein.

4.4.2.1 Quality level JANS (table E-VIA of [MIL-PRF-19500](#)).

Subgroup	Method	Conditions
B3	1056	-55°C to 100°C, 25 cycles, n = 22, c = 0.
	1051	-55°C to +175°C, 100 cycles, n = 22, c = 0. Surge not applicable.
B4		Not applicable.
B5	1027	Condition for accelerated steady-state operation life are as follows: See 4.5.2 , T _A = +100°C (min); T _J = +225°C (min); t = 168 hours minimum.
B6		Not applicable.

NOTE: All electrical measurements and tests shall be performed twice, once in each direction.

MIL-PRF-19500/718A
w/AMENDMENT 1

4.4.2.2 Quality levels JAN, JANTX, and JANTXV (table E-VIB of [MIL-PRF-19500](#)).

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B2	1056	-55°C to 100°C, 10 cycles, n = 22, c = 0.
	1051	-55°C to 175°C, 25 cycles, n = 22, c = 0. Surge not applicable.
B3	1027	See 4.5.1, 1 ms pulse only (see 4.5.2).
B5		Not applicable

NOTE: All electrical measurements and tests shall be performed twice, once in each direction.

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](#). Delta measurements shall be in accordance with the applicable steps of [table III](#) herein.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C2	2036	Lead tension: Test condition A; weight = 5 pounds (2.27 kg); t = 15 ±3 s.
C3		Not applicable
C5		Not applicable
C6	1026	See 4.5.1, (see 4.5.2).
C7	1018	
C8		Conditions for temperature coefficient of breakdown voltage are as follows: $I_{(BR)} = \text{column 3 of table IV}, T_1 = +25^\circ\text{C} \pm 3^\circ\text{C}, T_2 = T_1 + 100^\circ\text{C}; n = 22, c = 0.$
C9		Conditions for maximum peak pulse current are as follows: See 4.5.3.a, (20 μs pulse only) 10 pulses; n = 22, c = 0.

NOTE: All electrical measurements and tests shall be performed twice, once in each direction.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of [MIL-PRF-19500](#) and as specified herein. Electrical measurements (end-points) shall be in accordance with [table I](#), subgroup 2 herein. See [table III](#) for delta measurements when applicable.

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

MIL-PRF-19500/718A
w/AMENDMENT 1

4.5.1 Power burn-in (HTRB) and steady-state operation life test conditions. For the purposes of this test, the direction in which the device is first pulsed shall be considered polarity A and the reverse direction polarity B.

4.5.1.1 Screening and groups B and E procedure. The test conditions and order of events shall be as follows:

- a. Pulse in accordance with 4.5.3.b, in polarity A 10 times for screening and group B and 50 times for group C at $T_A = +25^{\circ}\text{C}$.
- b. Pulse in accordance with 4.5.3.b, in polarity B 10 times for screening and group B and 50 times for group C at $T_A = +25^{\circ}\text{C}$.
- c. Read I_D in polarities A and B at $T_A = +25^{\circ}\text{C}$, remove defective devices and record the number of failures.
- d. Apply the working peak reverse voltage (V_{WM}) (column 4 of table IV) at polarity A at $T_A = +150^{\circ}\text{C}$ as follows:
 - (1) For 48 hours (JANTX and JANTXV) and 120 hours (JANS) for the screening test.
 - (2) For 170 hours (JAN, JANTX, and JANTXV) for group B steady-state operation life test.
 - (3) For 500 hours for group C steady-state operation life test.
- e. Read I_D in polarity A at $T_A = +25^{\circ}\text{C}$. Devices with $\Delta I_D > 50$ percent (100 percent for steady-state operation life) of the initial reading or 1 μA dc, whichever is greater shall be considered defective. Remove defective devices and record the number of failures. 1/
- f. Apply the working peak reverse voltage (V_{WM}) (column 4 of table IV) at polarity B at $T_A = +150^{\circ}\text{C}$ as follows:
 - (1) For 48 hours (JANTX and JANTXV) and 120 hours (JANS) for the screening test.
 - (2) For 170 hours (JAN, JANTX, and JANTXV) for group B steady-state operation life test.
 - (3) For 500 hours for group C steady-state operation life test.
- g. Read I_D in polarity B at $T_A = +25^{\circ}\text{C}$. Devices with $\Delta I_D > 50$ percent (100 percent for steady-state operation life) of the initial reading or 1 μA dc, whichever is greater shall be considered defective. Remove defective devices and record the number of failures.
- h. Read $V_{(BR)}$ in polarities A and B at $T_A = +25^{\circ}\text{C}$. Devices with $\Delta V_{(BR)} > 2$ percent (± 5 percent for steady-state operation life) of the initial reading shall be considered defective. Remove defective devices and record the number of failures.
- i. Read I_D in polarity A at $T_A = +25^{\circ}\text{C}$, remove defective devices and record the number of failures.

4.5.1.2 Groups C steady-state operation life test (alternate procedure). When the group B, 340-hour life test is continued on test to 1,000 hours to satisfy the group C life test requirements, the test shall be performed as given in 4.5.1.1 with the following exceptions:

- a. In 4.5.1.1, steps a and b shall be moved and performed following step g.
- b. In 4.5.1.1, steps e and g shall be repeated after step a and b are performed and before step i is completed (step i may be omitted when this procedure is used).

MIL-PRF-19500/718A
w/AMENDMENT 1

4.5.2 Accelerated steady-state operation life (JANS). This test shall be conducted with the devices subjected to the breakdown current specified in column 10 of [table IV](#) in opposite polarities for 84 +8, -4 hours in each polarity. At the beginning of the test and at the end of each time period, the devices shall be temperature stabilized at $T_A = +25^{\circ}\text{C}$ and subjected to pulse conditions at the rate of one pulse per minute (max) for 10 pulses in accordance with [4.5.3](#) as specified.

4.5.3 Maximum peak pulse current (I_{PP}). The peak pulse currents specified in column 7 of [table IV](#) shall be applied while simultaneously maintaining a bias voltage of not less than the applicable voltage specified in column 4 of [table IV](#), in the same polarity as the peak pulse current. The peak pulse current shall be applied with a current vs time waveform as follows (1 pulse per minute maximum):

- a. Pulse current shall reach 100 percent of I_{PP} at $t \leq 8 \mu\text{s}$ and decay to 50 percent of I_{PP} at $t \geq 20 \mu\text{s}$ for $t_p = 20 \mu\text{s}$ (see [figure 5](#)).
- b. Pulse current shall reach 100 percent of I_{PP} at $t \leq 10 \mu\text{s}$ and decay to 50 percent of I_{PP} at $t \geq 1 \text{ ms}$ for $t_p = 1 \text{ ms}$ (see [figure 4](#)).

4.5.4 Clamping voltage. The peak pulse clamping voltage shall be measured across the diode in a 1 ms time interval. The response detector shall demonstrate equipment accuracy of ± 3 percent. The peak clamping voltage as specified in column 6 of [table IV](#) shall be applicable to the 1 ms pulse of [4.5.3.b](#) only.

MIL-PRF-19500/718A
w/AMENDMENT 1

TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit <u>2/</u>	Limit <u>2/</u>	Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2 3/</u>						
Standby current	4016	Condition A or B, $V_R = V_{WM}$ (column 4 of table IV)	I_D		Column 5	μA dc
Breakdown voltage	4022	$I_{(BR)} =$ column 3 of table IV , $t_p \leq 300$ ms, duty cycle ≤ 2 percent	$V_{(BR)}$	Column 2	Column 2	V dc
<u>Subgroup 3 3/</u>						
Low temperature operation		$T_A = -55^\circ C$				
Minimum breakdown voltage	4022	$I_{(BR)} =$ column 3 of table IV , $t_p \leq 300$ ms, duty cycle ≤ 2 percent	$V_{(BR)}$	Column 9		V dc
<u>Subgroup 4 3/</u>						
Clamping voltage maximum (pulsed)		See 4.5.4 , $t_p = 10/1000$ μs (see 4.5.3.b), $I_{PP} =$ column 7 of table IV	V_C		Column 6	V (pk)
<u>Subgroups 5, 6, and 7</u>						
Not applicable						

1/ For sampling plan, see [MIL-PRF-19500](#).

2/ Column references are to [table IV](#).

3/ All electrical testing shall be performed twice, once in each direction.

MIL-PRF-19500/718A
w/AMENDMENT 1

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

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
<u>Subgroup 1</u>			45 devices, c = 0
Thermal shock	1056	500 cycles, condition A, 0°C to +100°C.	
Temperature cycling	1051	500 cycles, condition C, -65°C to +175°C.	
Electrical measurements		See table III , steps 1, 2, and 5.	
<u>Subgroup 2</u>			22 devices, c = 0
Life test		1,000 hours, see 4.5.1 .	
Electrical measurements		See table III , steps 1, 2, 3, 4, and 5.	
<u>Subgroup 4</u>			
Thermal impedance curves		Each supplier shall submit their (typical) design thermal impedance curves to the qualifying activity. In addition, the optimal test conditions and $Z_{\theta JA}$ limit shall be provided to the qualifying activity in the qualification report	
<u>Subgroup 5</u>			
Not applicable			
<u>Subgroup 6</u>			
Peak pulse current		See 4.5.3 . I_{PP} shall be characterized by the supplier and this data shall be available to the government. Test shall be performed on highest and lowest voltage in each structurally identical grouping. Test until failure occurs on all devices within the chosen sample size to characterize each voltage, or until the rated I_{PP} is exceeded by 30%.	
Electrical measurements		See table III , steps 1 and 2.	
<u>Subgroup 7</u>			45 devices, c = 0
Resistance to soldering heat	2031	1 cycle	

MIL-PRF-19500/718A
w/AMENDMENT 1

TABLE III. Groups B and C electrical and delta measurements. 1/ 2/ 3/ 4/

Step	Inspection			Symbol	Limit 5/	Limit 5/	Unit
		Method	Conditions		Min	Max	
1.	Standby current	4016	Condition A or B; $V_R = V_{WM}$ (column 4 of table IV)	I_D		Column 5	μA dc
2.	Breakdown voltage	4022	$t_p \leq 300$ ms, duty cycle ≤ 2 percent, $I_{(BR)} =$ column 3 of table IV	$V_{(BR)}$	Column 2	Column 2	V dc
3.	Standby current	4016	Condition A or B; $V_R = V_{WM}$ (column 4 of table IV)	ΔI_D 6/	100 percent of initial reading or 20 percent of column 5 of table IV, whichever is greater.		
4.	Breakdown voltage	4022	$I_{(BR)} =$ column 3 of table IV; $t_p \leq 300$ ms, duty cycle ≤ 2 percent	$\Delta V_{(BR)}$ 6/			± 5 percent of initial value
5.	Clamping voltage		$t_p = 10/1000$ μs (see 4.5.3.b); $I_{PP} =$ column 7 of table IV	V_C		Column 6	V (pk)

1/ All electrical testing shall be performed twice, once in each direction.

2/ The electrical measurements taken during group B inspection for quality level JANS (table E-VIA of MIL-PRF-19500) shall be as follows:

a. In addition to the measurements specified for subgroup 3, the measurements of steps 1, 2 and 5 of this table shall also be taken.

b. In addition to the measurements specified for subgroup 5, the measurements of 4.5.1 shall also be taken.

3/ The electrical measurements taken during group B inspection for quality levels JAN, JANTX, and JANTXV (table E-VIB of MIL-PRF-19500) shall be as follows:

a. In addition to the measurements specified for subgroup 2, the measurements of steps 1 and 2 of this table shall also be taken.

b. In addition to the measurements specified for subgroup 3, the measurements of 4.5.1 shall also be taken.

c. In addition to the measurements specified for subgroup 6, the measurements of steps 1, 2, 3 and 4 of this table shall also be taken.

4/ The electrical measurements taken during group C inspection for all quality levels (table E-VII of MIL-PRF-19500) shall be as follows:

a. In addition to the measurements specified for subgroups 2 and 9, the measurements of steps 1 and 2 of this table shall also be taken.

b. In addition to the measurements specified for subgroup 6, the measurements of 4.5.1 shall also be taken.

5/ Column references are to table IV.

6/ Devices which exceed the table I limits for this test shall not be accepted.

MIL-PRF-19500/718A
w/AMENDMENT 1

TABLE IV. Characteristics and ratings.

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7		Col 8	Col 9	Col 10
Type	Breakdown voltage	Test current	Working peak reverse voltage	Maximum standby current	Maximum clamping voltage	Maximum peak pulse current (I_{PP})		Maximum temperature coefficient of $V_{(BR)}$	Minimum breakdown voltage at $I_{(BR)}$	Breakdown current $I_{(BR)}$
	$V_{(BR)}$ at $I_{(BR)}$	$I_{(BR)}$	V_{WM}	I_D	V_C at I_{PP}	$t_p = 20 \mu s$ $t_r = 8 \mu s$	$t_p = 1 ms$ $t_r = 10 \mu s$	$\alpha V_{(BR)}$	$T_A = -55^\circ C$	Maximum dc current $T_A = +25^\circ C$
	Min V dc	mA dc	V (pk)	μA dc	V (pk)	A (pk)	A (pk)	$\alpha/^\circ C$	V dc	mA dc
1N6950	7.13	10	6.0	1000	11.3	2500	440	0.061	6.66	625.0
1N6951	7.79	10	7.0	500	12.1	2333	413	0.065	7.24	575.0
1N6952	8.65	10	7.5	200	13.4	2100	373	0.068	8.01	520.0
1N6953	9.50	1	8.5	50	14.5	1950	343	0.073	8.75	475.0
1N6954	10.50	1	9.0	10	15.6	1817	320	0.075	9.65	430.0
1N6955	11.40	1	10.0	5	16.7	1700	300	0.078	10.40	365.0
1N6956	12.40	1	11.0	5	18.2	1550	273	0.081	11.30	350.0
1N6957	14.30	1	12.0	5	21.2	1333	237	0.084	13.00	315.0
1N6958	15.20	1	13.0	5	22.5	1250	223	0.086	13.70	295.0
1N6959	17.10	1	15.0	5	25.2	1117	198	0.088	15.40	265.0
1N6960	19.00	1	17.0	5	27.7	1018	180	0.090	17.10	235.0
1N6961	20.90	1	18.0	5	30.6	917	163	0.092	18.80	215.0
1N6962	22.80	1	20.0	5	33.2	850	150	0.094	20.50	195.0
1N6963	25.70	1	22.0	5	37.5	750	133	0.096	23.00	175.0
1N6964	28.50	1	25.0	5	41.4	683	120	0.097	25.50	155.0
1N6965	31.40	1	28.0	5	45.7	617	110	0.098	29.00	140.0
1N6966	34.20	1	30.0	5	49.9	567	100	0.098	30.50	130.0
1N6967	37.10	1	33.0	5	53.9	518	93.3	0.100	33.10	120.0
1N6968	40.90	1	36.0	5	59.3	483	84.3	0.101	36.40	110.0
1N6969	44.70	1	40.0	5	64.8	433	77.3	0.101	39.80	100.0

MIL-PRF-19500/718A
w/AMENDMENT 1

TABLE IV. Characteristics and ratings – Continued.

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7		Col 8	Col 9	Col 10
Type	Breakdown voltage $V_{(BR)}$ at $I_{(BR)}$	Test current $I_{(BR)}$	Working peak reverse voltage V_{WM}	Maximum standby current I_D	Maximum clamping voltage V_C at I_{PP}	Maximum peak pulse current (I_{PP})		Maximum temperature coefficient of $V_{(BR)}$ $\alpha V_{(BR)}$	Minimum breakdown voltage at $I_{(BR)}$ $T_A = -55^\circ\text{C}$	Breakdown current $I_{(BR)}$ Maximum dc current $T_A = +25^\circ\text{C}$
						$t_p = 20 \mu\text{s}$ $t_r = 8 \mu\text{s}$	$t_p = 1 \text{ ms}$ $t_r = 10 \mu\text{s}$			
	Min V dc	mA dc	V (pk)	μA dc	V (pk)	A (pk)	A (pk)	$\alpha/^\circ\text{C}$	V	mA dc
1N6970	48.50	1	43.0	5	70.1	400	71.3	0.102	43.10	90.0
1N6971	53.20	1	47.0	5	77.0	367	65	0.103	47.30	85.0
1N6972	58.90	1	53.0	5	85.0	333	59	0.104	52.30	75.0
1N6973	64.60	1	58.0	5	92.0	300	54.3	0.104	57.30	70.0
1N6974	71.30	1	64.0	5	103.0	273	48.7	0.105	63.20	60.0
1N6975	77.90	1	70.0	5	113.0	250	44.3	0.105	69.00	55.0
1N6976	86.50	1	75.0	5	125.0	227	40	0.106	76.50	50.0
1N6977	95.00	1	82.0	5	137.0	207	36.7	0.106	84.10	47.5
1N6978	105.00	1	94.0	5	152.0	183	33	0.107	92.80	42.5
1N6979	114.00	1	100.0	5	168.0	167	29.7	0.107	100.00	37.5
1N6980	124.00	1	110.0	5	182.0	157	27.3	0.107	109.00	35.0
1N6981	143.00	1	128.0	5	213.0	133	23.3	0.108	126.00	30.0
1N6982	162.00	1	145.0	5	245.0	120	20.3	0.108	143.00	27.5
1N6983	171.00	1	150.0	5	261.0	113	19	0.108	151.00	26.0
1N6984	181.00	1	160.0	5	278.0	107	18	0.108	157.00	25.0
1N6985	190.00	1	170.0	5	294.0	100	17	0.108	169.00	23.5
1N6986	209.00	1	185.0	5	328.0	83	15.3	0.108	184.00	21.5

Temperature-Power Derating Curve

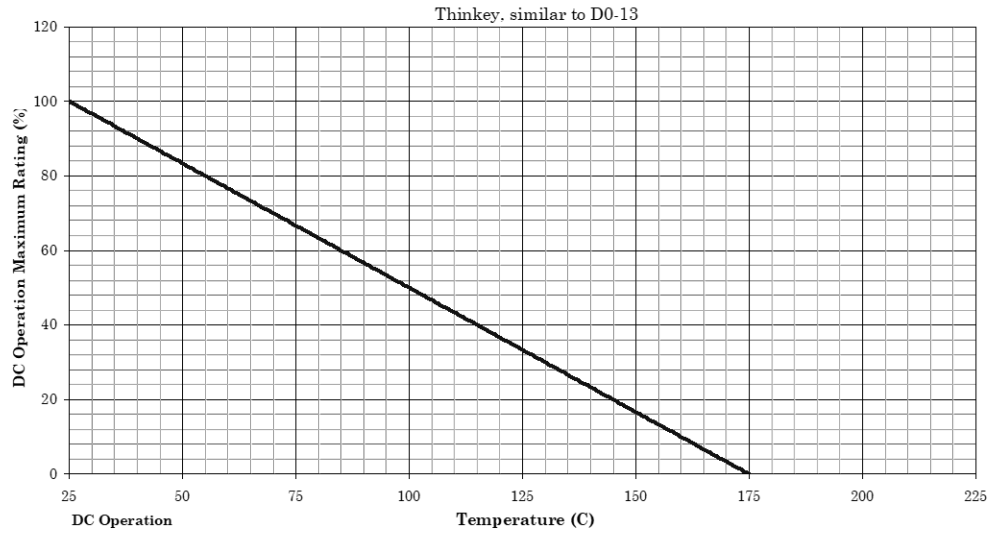


FIGURE 2. Derating curve.

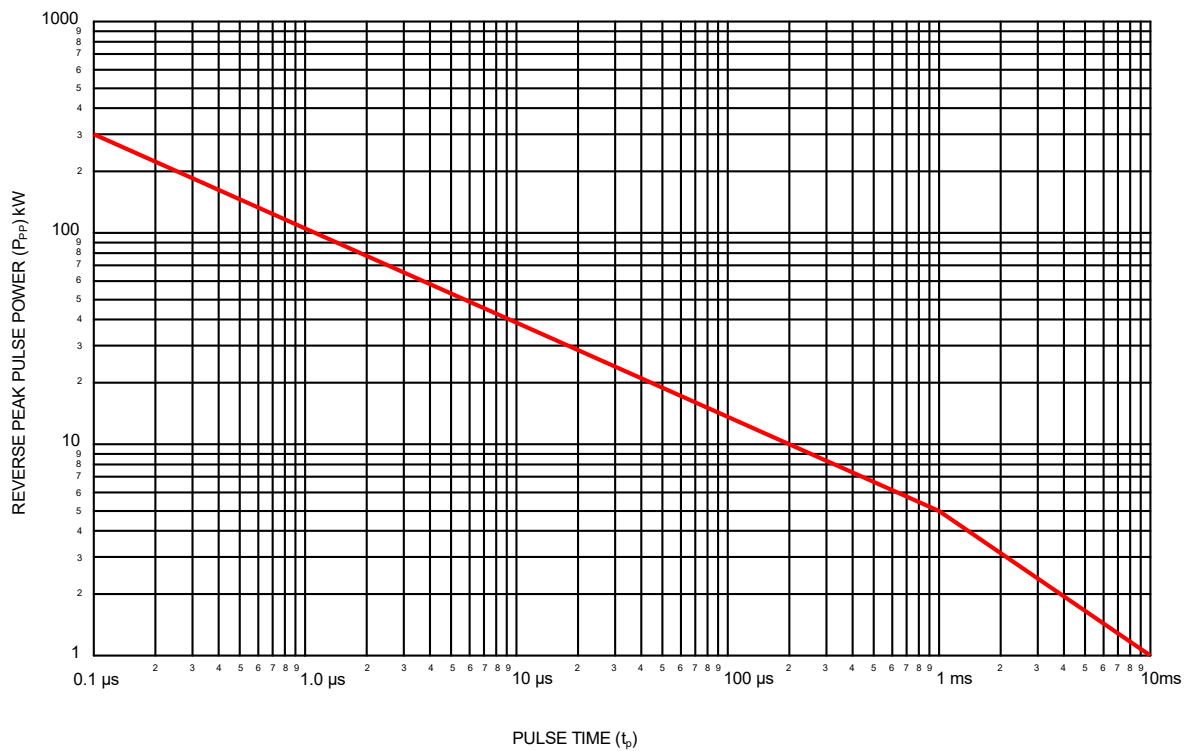
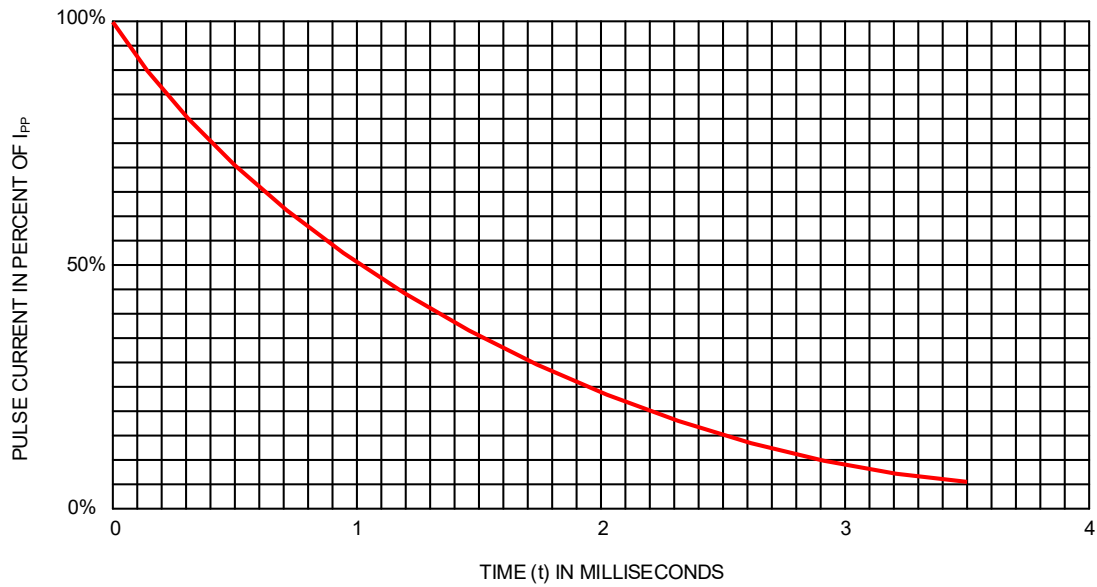
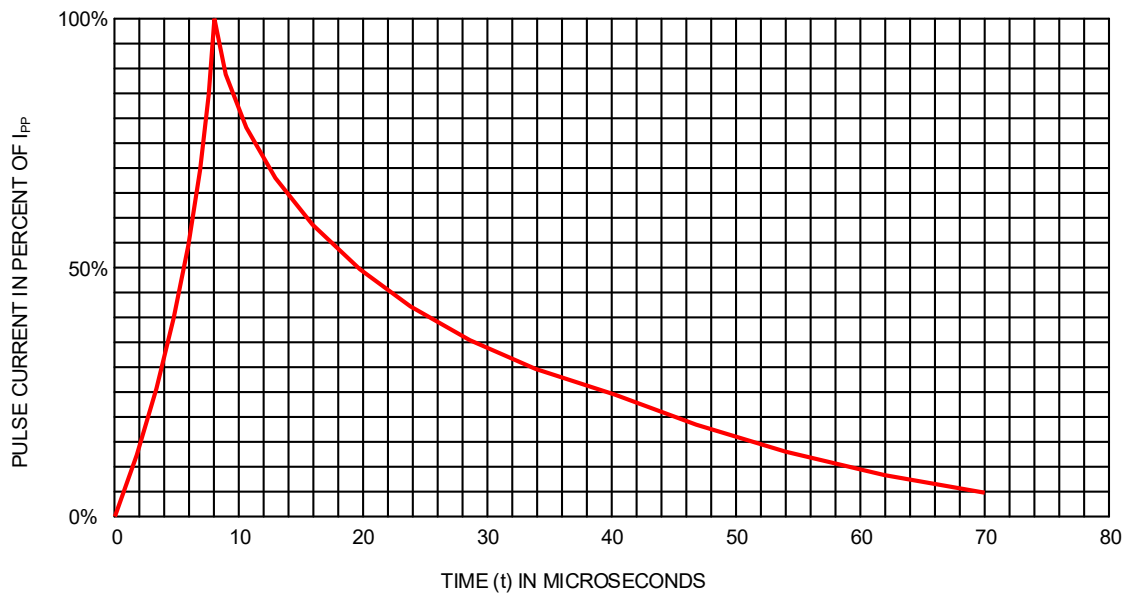


FIGURE 3. Peak pulse power versus pulse time.



NOTE: Pulse time duration is defined as that point where the pulse current decays to 50 percent of I_{PP} .
(Rise time to 100 percent of I_{PP} = 10 μ s).

FIGURE 4. Current impulse waveform.



NOTE: Pulse time duration is defined as that point where the pulse current decays to 50 percent of I_{PP} .
(Rise time to 100 percent of I_{PP} = 8 μ s).

FIGURE 5. Current impulse waveform.

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.)

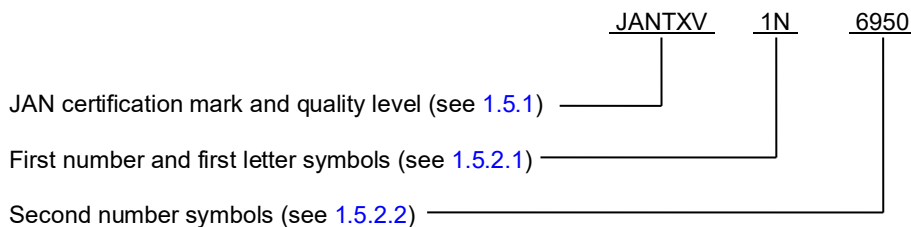
6.1 Intended use. The notes specified in [MIL-PRF-19500](#) are applicable to this specification.

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 3.4.2).
- d. The complete PIN, see 1.5 and 6.5.

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

6.4 PIN construction example. The PINs for encapsulated devices are constructed using the following form.



MIL-PRF-19500/718A
w/AMENDMENT 1

6.5 List of PINs. The following is a list of possible PINs available on this specification sheet.

PINs for types 1N6950 through 1N6986.			
JAN1N6950	JANTX1N6950	JANTXV1N6950	JANS1N6950
JAN1N6951	JANTX1N6951	JANTXV1N6951	JANS1N6951
JAN1N6952	JANTX1N6952	JANTXV1N6952	JANS1N6952
JAN1N6953	JANTX1N6953	JANTXV1N6953	JANS1N6953
JAN1N6954	JANTX1N6954	JANTXV1N6954	JANS1N6954
JAN1N6955	JANTX1N6955	JANTXV1N6955	JANS1N6955
JAN1N6956	JANTX1N6956	JANTXV1N6956	JANS1N6956
JAN1N6957	JANTX1N6957	JANTXV1N6957	JANS1N6957
JAN1N6958	JANTX1N6958	JANTXV1N6958	JANS1N6958
JAN1N6959	JANTX1N6959	JANTXV1N6959	JANS1N6959
JAN1N6960	JANTX1N6960	JANTXV1N6960	JANS1N6960
JAN1N6961	JANTX1N6961	JANTXV1N6961	JANS1N6961
JAN1N6962	JANTX1N6962	JANTXV1N6962	JANS1N6962
JAN1N6963	JANTX1N6963	JANTXV1N6963	JANS1N6963
JAN1N6964	JANTX1N6964	JANTXV1N6964	JANS1N6964
JAN1N6965	JANTX1N6965	JANTXV1N6965	JANS1N6965
JAN1N6966	JANTX1N6966	JANTXV1N6966	JANS1N6966
JAN1N6967	JANTX1N6967	JANTXV1N6967	JANS1N6967
JAN1N6968	JANTX1N6968	JANTXV1N6968	JANS1N6968
JAN1N6969	JANTX1N6969	JANTXV1N6969	JANS1N6969
JAN1N6970	JANTX1N6970	JANTXV1N6970	JANS1N6970
JAN1N6971	JANTX1N6971	JANTXV1N6971	JANS1N6971
JAN1N6972	JANTX1N6972	JANTXV1N6972	JANS1N6972
JAN1N6973	JANTX1N6973	JANTXV1N6973	JANS1N6973
JAN1N6974	JANTX1N6974	JANTXV1N6974	JANS1N6974
JAN1N6975	JANTX1N6975	JANTXV1N6975	JANS1N6975
JAN1N6976	JANTX1N6976	JANTXV1N6976	JANS1N6976
JAN1N6977	JANTX1N6977	JANTXV1N6977	JANS1N6977
JAN1N6978	JANTX1N6978	JANTXV1N6978	JANS1N6978
JAN1N6979	JANTX1N6979	JANTXV1N6979	JANS1N6979
JAN1N6980	JANTX1N6980	JANTXV1N6980	JANS1N6980
JAN1N6981	JANTX1N6981	JANTXV1N6981	JANS1N6981
JAN1N6982	JANTX1N6982	JANTXV1N6982	JANS1N6982
JAN1N6983	JANTX1N6983	JANTXV1N6983	JANS1N6983
JAN1N6984	JANTX1N6984	JANTXV1N6984	JANS1N6984
JAN1N6985	JANTX1N6985	JANTXV1N6985	JANS1N6985
JAN1N6986	JANTX1N6986	JANTXV1N6986	JANS1N6986

MIL-PRF-19500/718A
w/AMENDMENT 1

6.6 Steady state power rating. This rating is not relevant for most applications.

6.7 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
Navy – SH
Air Force – 85
NASA – NA
DLA – CC

Preparing activity:

DLA – CC

(Project 5961–2024–064)

Review activities:

Army – MI
Air Force – 19

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.