The documentation and process conversion measures necessary to comply with this revision shall be completed by 13 November 2012.

INCH-POUND

MIL-PRF-19500/575E
13 August 2012
SUPERSEDING
MIL-PRF-19500/575D
13 August 2009

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, HIGH VOLTAGE POWER RECTIFIER, FAST RECOVERY, TYPES 1N6512 THROUGH 1N6519, 1N6512US THROUGH 1N6519US, 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 silicon, high voltage, fast recovery power rectifier diodes. Four levels of product assurance are provided for each device as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figures 1 and 2.

* 1.3 Maximum ratings. Unless otherwise specified, T_A = 25ºC.

Types	V_{RWM}	I_{FSM}	I_O		t_{rr}	T_{STG}	T_J	$R_{\theta JL1}$ L =.25 inch (6.35 mm) (Air)	$R_{\theta JL2}$ L =.25 inch (6.35 mm) (Oil bath) (3)	$R_{\theta JEC}$ (4)
		t_p = 8.3 ms	(1)	(2)						
	V dc	A (pk)	A dc	A dc	ns	°C	°C	°C/W	°C/W	°C/W
1N6512, US	1,500	100	1.5	1.0	70	-65 to +200	-65 to +175	16	12	4
1N6513, US	2,000	100	1.5	1.0	70	-65 to +200	-65 to +175	16	12	4
1N6514, US	2,500	60	1.0	0.65	70	-65 to +200	-65 to +175	16	12	4
1N6515, US	3,000	60	1.0	0.65	70	-65 to +200	-65 to +175	16	12	4
1N6516, US	4,000	40	0.75	0.5	70	-65 to +200	-65 to +175	16	12	5
1N6517, US	5,000	40	0.75	0.5	70	-65 to +200	-65 to +175	16	12	5
1N6518, US	7,500	25	0.5	0.35	70	-65 to +200	-65 to +175	16	12	5
1N6519, US	10,000	25	0.5	0.35	70	-65 to +200	-65 to +175	16	12	5

See notes on next page.

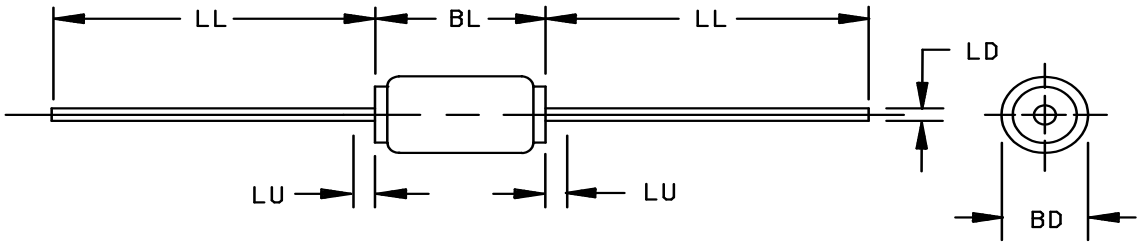
* Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the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

* 1.3 Maximum ratings - Continued.

* (1) Derate linearly for air (+55°C ≤ T_A ≤ +100°C. I_O at T_A = +55°C to I_O at T_A = +100°C.), for oil bath (+80°C ≤ T_L ≤ +100°C. I_O at T_L = +80°C to I_O at T_A = +100°C.), and for end cap (+100°C ≤ T_A ≤ +125°C. I_O at T_{EC} = +100°C to I_O at T_{EC} = +125°C.)
* (2) Derate linearly for air (+100°C ≤ T_A ≤ +175°C. I_O at T_A = +100°C to I_O = 0 A at T_A = +175ºC), for oil bath (+100°C ≤ T_L ≤ +175°C. I_O at T_L = +100°C to I_O = 0 A at T_A = +175ºC), and for end cap (+125°C ≤ T_A ≤ +175°C. I_O at T_{EC} = +125°C to I_O = 0 A at T_A = +175ºC).
* (3) Oil or fluorocarbon fluid with leads heat sunk at specified L.
(4) $R_{\theta JEC}$ is junction to end-cap thermal impedance with "US" suffix identification, i.e., 1N6512US. Surface mount types, see figure 3.

1.4 Primary electrical characteristics.

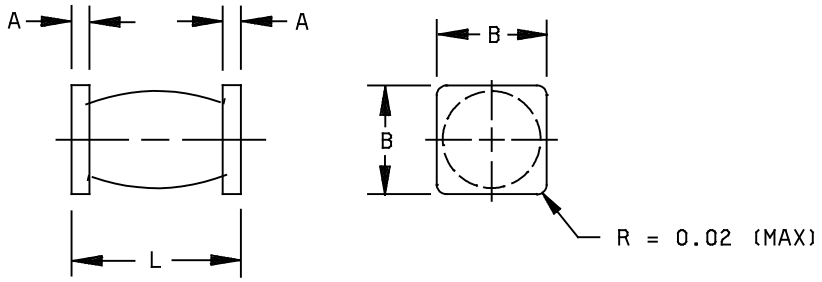
Types	V_{RWM}	I_O T_A = +55°C	I_{R1} T_A = +25°C	V_{F1} at I_O	C at V_R = 50 V F_O = 1 kHz
	V dc	A dc	µA dc	V (pk)	pF
1N6512, 1N6512US	1,500	1.5	1.0	3.5	25
1N6513, 1N6513US	2,000	1.5	1.0	3.5	25
1N6514, 1N6514US	2,500	1.0	1.0	6.0	20
1N6515, 1N6515US	3,000	1.0	1.0	6.0	20
1N6516, 1N6516US	4,000	0.75	1.0	8.0	16
1N6517, 1N6517US	5,000	0.75	1.0	8.0	16
1N6518, 1N6518US	7,500	0.5	1.0	13.0	8
1N6519, 1N6519US	10,000	0.5	1.0	13.0	8



PIN	Dimensions															
	BL				LL				LD				BD			
	Inches		Millimeters		Inches		Millimeters		Inches		Millimeters		Inches		Millimeters	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1N6512	.25	.31	6.35	7.87	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6513	.25	.31	6.35	7.87	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6514	.27	.33	6.86	8.38	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6515	.27	.33	6.86	8.38	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6516	.29	.35	7.37	8.9	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6517	.29	.35	7.37	8.9	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6518	.34	.40	8.64	10.2	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46
1N6519	.34	.40	8.64	10.2	1.0	1.3	25.4	33.0	.037	.043	0.94	1.09	.155	.215	3.94	5.46

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. The specified lead diameter applies in the zone between .05 inch (1.27 mm) from the body to the end of the lead. Outside of this zone lead shall not exceed the body diameter.
4. Dimension LU defines region of uncontrolled diameter .050 inch max (1.27 mm).
5. In accordance with ASME Y14.5M, diameters are equivalent to ϕX symbology.

FIGURE 1. Physical dimensions (for non-US suffix devices only).



PIN	Dimensions											
	L				A				B			
	Inches		Millimeters		Inches		Millimeters		Inches		Millimeters	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1N6512US	.225	.245	5.72	6.22	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6513US	.225	.245	5.72	6.22	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6514US	.245	.265	6.22	6.73	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6515US	.245	.265	6.22	6.73	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6516US	.265	.285	6.73	7.24	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6517US	.265	.285	6.73	7.24	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6518US	.325	.345	8.26	8.76	.026	.036	0.66	0.91	.170	.180	4.32	4.57
1N6519US	.325	.345	8.26	8.76	.026	.036	0.66	0.91	.170	.180	4.32	4.57

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

FIGURE 2. Physical dimensions (surface mount devices).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-750 - Test Methods for Semiconductor Devices.
MIL-STD-1276 - Leads for Electronic Component Parts

* (Copies of these documents are available online at https://assist.daps.dla.mil/quicksearch/ or https://assist.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 General. The individual item requirements shall be as specified in MIL-PRF-19500 and as modified herein.

3.2 Qualification. Devices furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturer's list (QML) before contract award (see 4.2 and 6.3).

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

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1 (axial leads) and 2 (square end surface mount) herein. Plastic packages are prohibited.

3.4.1 Lead material and finish. Lead material shall be type C, 99.9 percent silver or copper in accordance with MIL-STD-1276. Lead finish shall be in accordance with MIL-PRF-19500 and MIL-STD-750. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4.2 Diode construction. These devices shall be constructed in a manner and using materials which enable the diodes to meet the applicable requirements of MIL-PRF-19500 and this document.

3.4.2.1 Surface mount. The surface mount (US) version shall be considered structurally identical to the non-surface mount version except for lead attach.

3.5 Marking. Devices shall be marked as specified in MIL-PRF-19500. Manufacturer's identification and date code shall be marked on the devices. The polarity shall be indicated with a contrasting color band to denote the cathode end. The prefixes JAN, JANTX, and JANTXV may be abbreviated as J, JX, JV and JS, respectively. The part number may be reduced to J6512, JX6512, JV6512 or JS6512. No color coding will be permitted for part numbering.

3.5.1 Marking for surface mount (US) devices. For 'US' version devices only, all marking, except polarity may be omitted from the body, but shall be retained on the initial container. Polarity marking of 'US' devices shall consist of, as a minimum, a band or three contrasting dots spaced equally around the periphery of the cathode. Initial container package marking will be in accordance with MIL-PRF-19500.

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

* 3.7 Electrical test requirements. The electrical test requirements shall be as specified in table I.

3.8 Workmanship. Semiconductor devices shall be processed in such a manner as to be uniform in quality and shall be free from other defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.2).

b. Screening (see 4.3).

c. Conformance inspection (see 4.4).

4.1.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-PRF-19500 and herein.

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

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 (JANS, JANTX, and JANTXV levels 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 (see appendix E, table E-IV of MIL-PRF-19500)	Measurement	
	JANS	JANTX and JANTXV levels
3c	Thermal impedance (see 4.3.3)	Thermal impedance (see 4.3.3)
(1)	Surge, see 4.3.2	Surge, see 4.3.2
7a and 7b	Optional	Optional
9	I_{R1} and V_{F1}	Not applicable
11	I_{R1} and V_{F1}; ΔI_{R1} and ΔV_{F1}, see table II herein	I_{R1} and V_{F1}
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein: ΔI_{R1} and ΔV_{F1}, see table II herein. $I_{R1}$and V_{F1}	Subgroup 2 of table I herein; ΔI_{R1}, ΔV_{F1} see table II herein. I_{R1} and V_{F1}
14a and 14b	Required	Required

(1) Surge screening shall be performed anytime after screen 3a of MIL-PRF-19500 and before screen 10.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: Method 1038 of MIL-STD-750, condition B, T_A = room ambient as defined in the general requirements in 4.5 of MIL-STD-750, V_{RWM} = 1,000; f ≥ 60 Hz.

Types	I_O (A dc)
1N6512, 1N6512US 1N6513, 1N6513US	1.5
1N6514, 1N6514US 1N6515, 1N6515US	1.0

Types	I_O (A dc)
1N6516, 1N6516US 1N6517, 1N6517US	0.75
1N6518, 1N6518US 1N6519, 1N6519US	0.5

4.3.2 Surge screening. Method 4066 of MIL-STD-750; T_A = +25°C, V_{RWM} = 0. Six surges. Apply 20 x I_O rated at T_A = 55°C, 8.3 ms.

* 4.3.3 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_{SW} (V_C and V_H where appropriate). Measurement delay time (t_{MD}) = 70 μs max. See figure 3 and table II, group E, subgroup 4 herein.

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

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with 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 tables E-VIA (JANS) and E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table III herein.

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

	Subgroup	Method	Condition
	B3	4066	I_O at T_A = 55°C, I_{FSM} = rated I_{FSM}, see 1.3, one surge, 8.3 ms, V_{RWM} = 0 V.
	B4	1037	See 4.3.1, t_{on} = t_{off} = 3 minutes minimum, 2,000 cycles.
	B5	1027	T_A = +150°C minimum, I_O = rated I_O (see 1.3) or adjust I_O and T_A as required to achieve T_J = +275°C for a minimum of 96 hours at V_{RWM} = 1,000 V.
*	B6	4081	T_A = +25°C; $R_{\theta JL1}$ = rated $R_{\theta JL1}$ (see 1.3); $R_{\theta JL2}$ = rated $R_{\theta JL2}$ (see 1.3); $R_{\theta JEC}$ = rated $R_{\theta JEC}$ (see 1.3).

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

	Subgroup	Method	Condition
	B2	4066	I_O = I_O at T_A = 55°C one surge, 8.3 ms; I_{FSM} = rated I_{FSM} (see 1.3), V_{RWM} = 0 V.
	B3	1027	T_A = room ambient as defined in the general requirements in 4.5 of MIL-STD-750 minimum, I_O = rated I_O (see 4.3.1); adjust I_O or T_A as required to achieve $T_J \geq$ +125°C, V_{RWM} = 1,000 V.
*	B5	4081	T_A = +25°C; $R_{\theta JL1}$ = rated $R_{\theta JL1}$ (see 1.3); $R_{\theta JL2}$ = rated $R_{\theta JL2}$ (see 1.3); $R_{\theta JEC}$ = rated $R_{\theta JEC}$ (see 1.3).

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. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table III herein.

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

Subgroup	Method	Condition
C2	2036	Test condition A, weight = 20 lbs, t = 30s.
C6	1027	T_A = +25°C minimum, I_O = I_O (see 4.3.1), I_O = rated I_O; adjust I_O or T_A as required to achieve $T_J \geq$ +125°C, V_{RWM} = 1,000 V.

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) requirements shall be in accordance with the applicable inspections of table I, subgroup 2 herein. For delta requirements see table III herein.

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

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

4.5.2 Inspection of conditions. Unless otherwise specified, all inspections shall be conducted at an ambient T_A = +25°C ±3°C.

4.5.3 Reverse-recovery time. The reverse recovery time shall be measured in the circuit on figure 4 or an equivalent circuit. The recovery conditions shall be 0.5 A forward current to 1.0 A reverse current. The reverse recovery time is defined as the time the rectifier begins to conduct in the reverse direction (crosses I = zero) until the reverse current decays to -0.25 A. The point of contact on the leads shall be no less than .375 inch (9.52 mm) from the diode body for leaded devices. Point of contact shall be the mounting surface for surface mounted devices with "U" suffixes.

4.5.4 Scope display evaluation. Scope display evaluation shall be sharp and stable in accordance with method 4023 of MIL-STD-750. Scope display may be performed on ATE (automatic test equipment) for screening only, with the approval of the qualifying activity. Scope display in table I, subgroup 4 shall be performed on a scope. The reverse current (I_{BR}) over the knee shall be 50 μA peak.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits 2/		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical inspection	2071					
Subgroup 2						
Thermal impedance	3101	See 4.3.3.	$Z_{\theta JX}$			°C/W
Forward voltage	4011		V_{F1}			
1N6512, 1N6512US 1N6513, 1N6513US		I_F = 1.5 A			3.5	V dc
1N6514, 1N6514US 1N6515, 1N6515US		I_F = 1.0 A			6.0	V dc
1N6516, 1N6516US 1N6517, 1N6517US		I_F = 0.75 A			8.0	V dc
1N6518, 1N6518US 1N6519, 1N6519US		I_F = 0.5 A			13.0	V dc
Reverse current leakage	4016	DC method; V_R = rated V_R (see 1.3)	I_{R1}		1.0	µA dc
Breakdown voltage	4021	I_R = 50 µA	$V_{(BR)R1}$			
1N6512, 1N6512US 1N6513, 1N6513US				1,650 2,200		V dc
1N6514, 1N6514US 1N6515, 1N6515US				2,750 3,300		V dc
1N6516, 1N6516US 1N6517, 1N6517US				4,400 5,500		V dc
1N6518, 1N6518US 1N6519, 1N6519US				8,250 11,000		V dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits 2/		Unit
	Method	Conditions		Min	Max	
Subgroup 3						
High temperature operation:		T_A = +150°C				
Reverse current leakage	4016	DC method; V_R = rated V_R (see 1.3)	I_{R2}		500	µA dc
Low temperature operation:		T_A = -55°C				
Forward voltage	4011		V_{F2}			
1N6512, 1N6512US 1N6513, 1N6513US		I_F = 1.5 A			5.6	V dc
1N6514, 1N6514US 1N6515, 1N6515US		I_F = 1.0 A			9.6	V dc
1N6516, 1N6516US 1N6517, 1N6517US		I_F = 0.75 A			12.8	V dc
1N6518, 1N6518US 1N6519, 1N6519US		I_F = 0.5 A			20.8	V dc
Breakdown voltage	4021	I_R = 50 µA	V_{RWM2}			V dc
1N6512, 1N6512US 1N6513, 1N6513US				1,500 2,000		
1N6514, 1N6514US 1N6515, 1N6515US				2,000 3,000		
1N6516, 1N6516US 1N6517, 1N6517US				4,000 5,000		
1N6518, 1N6518US 1N6519, 1N6519US				7,500 10,000		

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits 2/		Unit
	Method	Conditions		Min	Max	
Subgroup 4						
Reverse recovery time		See 4.5.3 and figure 4	t_{rr}		70	ns
Capacitance	4001	V_R = 50 V dc; 1 kHz ≤ f ≤ 100 kHz	C			
1N6512, 1N6512US 1N6513, 1N6513US					25	pF
1N6514, 1N6514US 1N6515, 1N6515US					20	pF
1N6516, 1N6516US 1N6517, 1N6517US					16	pF
1N6518, 1N6518US 1N6519, 1N6519US					8	pF
Scope display evaluation	4023	See 4.5.4, n = 116, c = 0.				
Subgroups 5, 6, and 7						
Not applicable						

1/ For sampling plan, see MIL-PRF-19500.
2/ Electrical characteristics for 'US' suffix versions are identical to the corresponding no-suffix versions unless otherwise noted.

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

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
Subgroup 1			45 devices c = 0
Temperature cycling	1051	500 cycles, condition C	
Hermetic seal Gross leak	1071		
Electrical measurements		See table III, steps 1 and 2	
Subgroup 2			45 devices c = 0
Steady-state dc blocking life	1038	Condition A, t = 1,000 hours	
Electrical measurements		See table III, steps 1 and 2	
Subgroup 4			Sample size N/A
Thermal impedance curves		See MIL-PRF-19500.	
Subgroup 5			3 devices c = 0
Barometric pressure (reduced)		V_R = rated V_R (see 1.3) Pressure = 8 mm Hg, t = 1 minute (minimum). Dielectric fluid may be used.	
Subgroup 6, and 8			
Not applicable			
Subgroup 9			45 devices
Resistance to glass cracking	1057	Step stress to destruction by increasing cycles or up to a maximum of 25 cycles.	

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

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Forward voltage	4011	Pulsed (see 4.5.1)	V_{F1}			
	1N6512, 1N6512US 1N6513, 1N6513US		I_F = 1.5 A			3.5	V (pk)
	1N6514, 1N6514US 1N6515, 1N6515US		I_F = 1.0 A			6.0	V (pk)
	1N6516, 1N6516US 1N6517, 1N6517US		I_F = 0.75 A			8.0	V (pk)
	1N6518, 1N6518US 1N6519, 1N6519US		I_F = 0.5 A			13.0	V (pk)
2.	Reverse current	4016	DC method, V_R = rated V_R (see 1.3)	I_{R1}		1.0	µA dc
3.	Reverse recovery time		See 4.5.3 and figure 4	t_{rr}		70	ns
4.	Capacitance	4001	V_R = 50 V dc, 1 kHz ≤ f ≤ 100 kHz	C			
	1N6512, 1N6512US 1N6513, 1N6513US					25	pF
	1N6514, 1N6514US 1N6515, 1N6515US					20	pF
	1N6516, 1N6516US 1N6517, 1N6517US					16	pF
	1N6518, 1N6518US 1N6519, 1N6519US					8	pF
5.	Forward voltage	4011	Pulsed (see 4.5.1)	ΔV_{F1}			
	1N6512, 1N6512US 1N6513, 1N6513US		I_F = 1.5 A			±0.2	V (pk)
	1N6514, 1N6514US 1N6515, 1N6515US		I_F = 1.0 A			±0.4	V (pk)
	1N6516, 1N6516US 1N6517, 1N6517US		I_F = 0.75 A			±0.8	V (pk)
	1N6518, 1N6518US 1N6519, 1N6519US		I_F = 0.5 A			±1.2	V (pk)
6.	Reverse current	4016	DC method	ΔI_{R1}		±250 nA dc or 100 percent, whichever is greater.	

See footnotes at the end of the table.

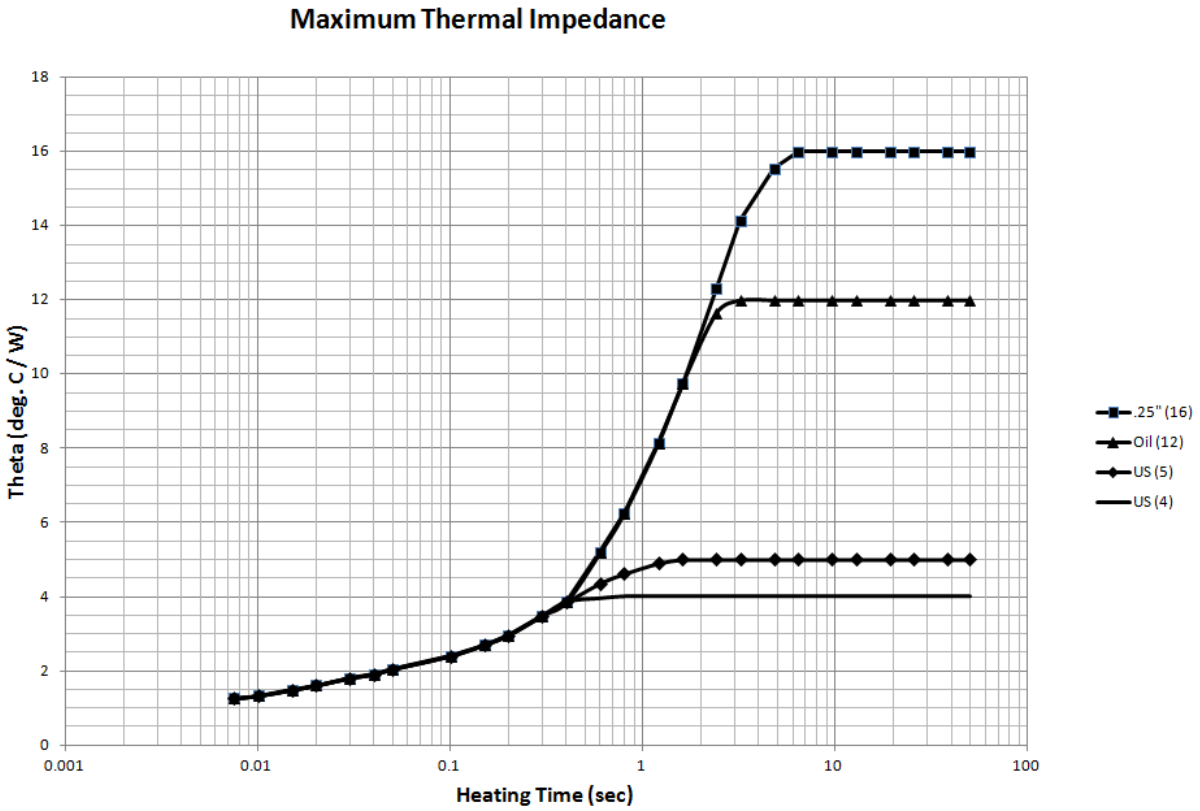
TABLE III. Groups B and C electrical measurements - Continued. 1/ 2/ 3/ 4/

1/ The electrical measurements for table E-VIA (JANS) of MIL-PRF-19500 are as follows:
   a. Subgroup 3, see table III herein, steps 1, 2, 3, 4, 5, and 6.
   b. Subgroup 4, see table III herein, steps 1, 2, 3, 4, 5, and 6.
   c. Subgroup 5, see table III herein, steps 1, 2, 3, 4, 5, and 6.

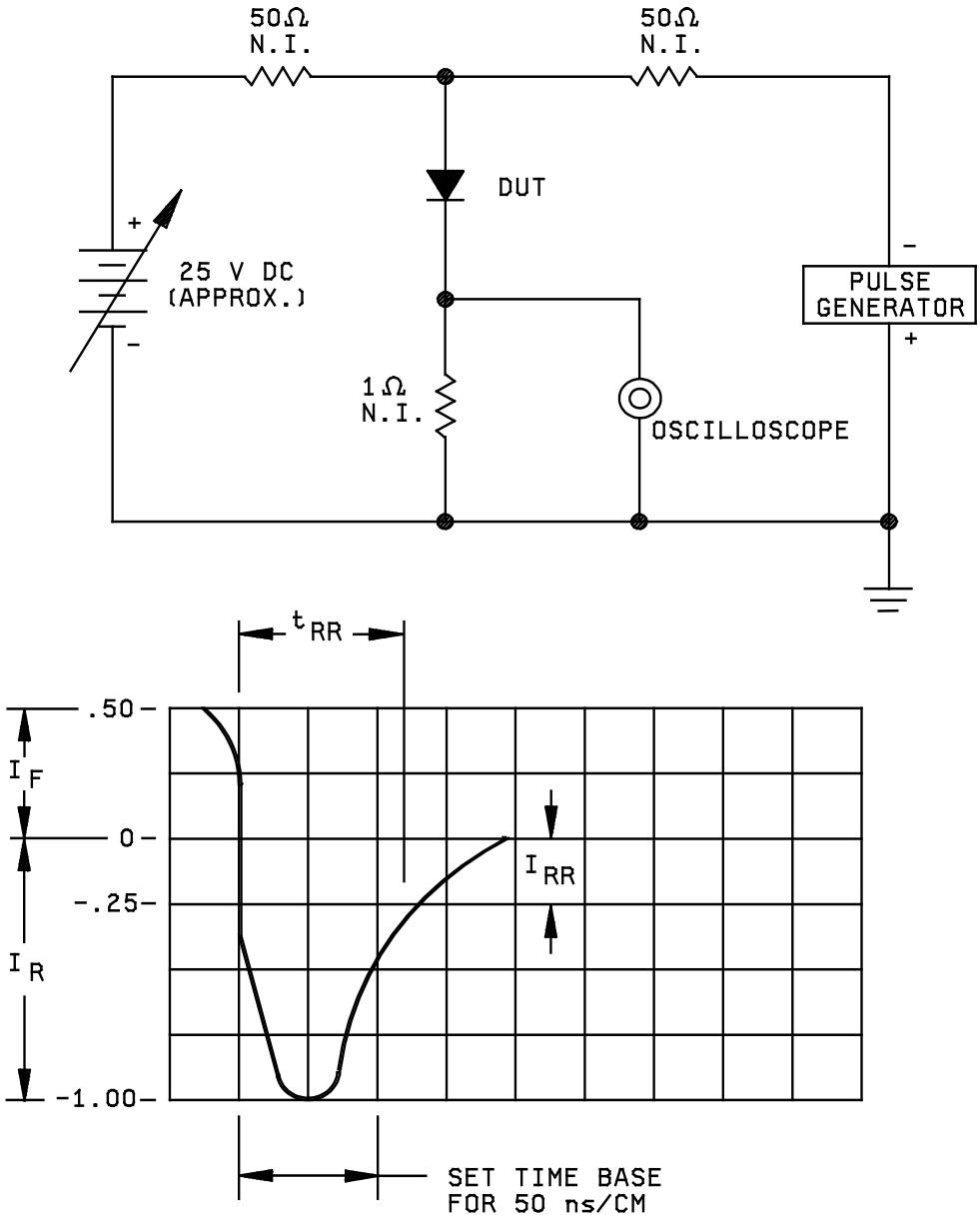
2/ The electrical measurements for table E-VIB (JANTX and JANTXV) of MIL-PRF-19500 are as follows:
   a. Subgroup 2, see table III herein, steps 1, 2, and 3.
   b. Subgroup 3, see table III herein, steps 1, 2, 3, and 4.
   c. Subgroup 6, see table III herein, steps 1, 2, 3, and 4.

3/ The electrical measurements for table E-VII of MIL-PRF-19500 are as follows:
   a. Subgroup 2, see table III herein, steps 1, 2, 3, 4, 5, and 6 (JANS); and steps 1, 2, and 3 (JANTX and JANTXV).
   b. Subgroup 3, see table III herein, steps 2 and 3.
   c. Subgroup 6, see table III herein, steps 1, 2, 3, 4, 5, and 6 (JANS); and steps 1, 2, 3, 4, and 5 (JANTX and JANTXV).

4/ The electrical measurements for table E-IX of MIL-PRF-19500 are as follows: Subgroup 2 and 5, see table III herein, steps 5 and 6.



* FIGURE 3. Thermal impedance curves.



NOTES:

1. Oscilloscope-rise time ≤ 7 ns; input impedance = 1 megohm; 22 pF.
2. Pulse generator - rise time ≤ 10 ns; source impedance 50 ohms.
3. Recovery time shall be measured on the above circuit and with equipment as shown. The pulse generator shall have a pulse repetition frequency of 1 kHz and a pulse width of 200 ns recovery conditions .50 A forward current to 1.00 A reverse current. Recovery time measured when rectifier recovers to .25 A.

FIGURE 4. Reverse recovery time test circuit and characteristic nomograph.

5. PACKAGING

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

6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Packaging requirements (see 5.1).

c. Lead finish (see 3.4.1).

d. Product assurance level and type designator.

* 6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from 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://assist.dla.mil .

6.4 Supersession information. Devices covered by this specification supersedes the manufacturers' and users' Part or Identifying Number (PIN). This information in no way implies that manufacturers' PIN are suitable as a substitute for the military PIN.

PIN	Manufacturer's CAGE code	Manufacturer's and user's PIN
1N6512	60211	Z15UFG RZ110 RZ111 Z15FG
1N6513	60211	RZ192 Z20UFG RZ112 Z20FG
1N6514	60211	Z25FG Z25UFG RZ113
1N6515	60211	Z30UFG Z30FG RZ114
1N6516	60211	Z40UFG RZ164 RZ115 Z40FG
1N6517	60211	RZ107 RZ172 RZ184 RZ185 Z50UFG Z50FG RZ160 RZ133 RZ116 RZ138 RZ131
1N6518	60211	RZ117 Z60UFG Z60FG
1N6519	60211	RZ163 RZ183 Z80UFG Z100UFG RZ161 RZ135 RZ151 RZ118 RZ119 Z80FG Z100FG

6.5 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army - CR
Navy - EC
Air Force - 85
NASA – NA
DLA – CC

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

Preparing activity:
DLA - CC

(Project 5961-2012-091)

* 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/ .