

The documentation and process conversion measures necessary to comply with this revision shall be completed by 18 January 2005.

INCH-POUND

MIL-PRF-19500/587B
 18 October 2004
 SUPERSEDING
 MIL-PRF-19500/587A
 20 October 1998

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, RECTIFIER,
 TYPES 1N6661, 1N6662, 1N6663, 1N6661US, 1N6662US, AND 1N6663US,
 JAN, JANTX, JANTXV, AND JANS

JANS1N645-1, JANS 1N647-1 and JANS 1N649-1 are nonpreferred part numbers and are inactive for new design. The preferred part numbers are JANS1N6661, JANS1N6662, JANS1N6663.

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 diodes. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (similar to DO-41) and figure 2 (MO-036A).

* 1.3 Maximum ratings. Unless otherwise specified $T_A = 25^\circ\text{C}$.

Type	V_{RWM}	I_{O2} (1)	I_{O1} (1) (2) (3) (4)	I_{FSM}	T_J and T_{STG}	Barometric pressure reduced
		$T_A = +150^\circ\text{C}$	$T_A = +25^\circ\text{C}$	$t_p = 1/120\text{s}$ $T_A = +25^\circ\text{C}$	(ambient temperature)	
	<u>V(pk)</u>	<u>mA</u>	<u>mA</u>	<u>A</u>	<u>°C</u>	<u>mmHg</u>
1N6661, US	225	150	500	5	-65 to +175	8
1N6662, US	400	150	500	5	-65 to +175	8
1N6663, US	600	150	500	5	-65 to +175	8

- (1) No forced air or heat sinking shall be permitted for I_O ratings.
- (2) $T_{EC} = 110^\circ\text{C}$.
- (3) Devices with leads. Derate 2.8 mA/°C between 25°C and 150°C. Derate 6 mA/°C between 150°C and 175°C.
- (4) US suffix devices. Derate 8.75 mA/°C at T_{EC} between 110°C and 150°C. Derate 6 mA/°C at T_{EC} between 150°C and 175°C.

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

1.4 Unless otherwise indicated, primary electrical characteristics at $T_A = +25^\circ\text{C}$.

Type	V_F at $I_F = 400$ mA dc 2 percent duty cycle, 8.3 ms max pulse width	I_R at $T_A = +25^\circ\text{C}$		I_R at $T_A = +150^\circ\text{C}$	
	V dc (max)	μA dc (max)	at V_R	μA dc (max)	at V_R
1N6661, US	1.0	.050	225 V dc	15	225 V dc
1N6662, US	1.0	.050	400 V dc	15	400 V dc
1N6663, US	1.0	.050	600 V dc	25	600 V dc

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

* DEPARTMENT OF DEFENSE SPECIFICATIONS

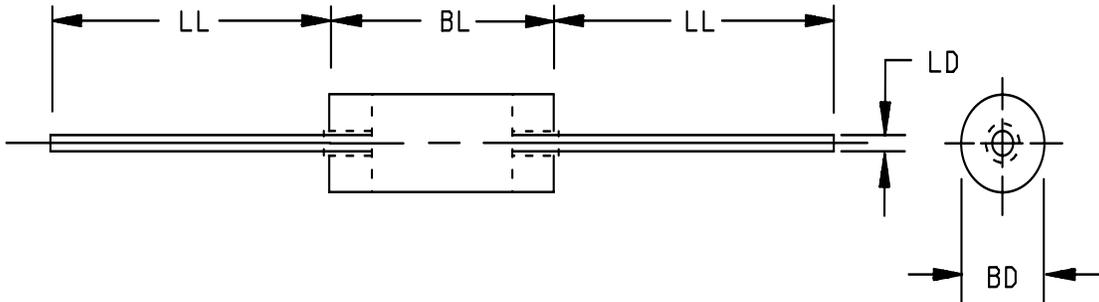
MIL-PRF-19500 - Semiconductor Devices, General Specification for.

* DEPARTMENT OF DEFENSE STANDARDS

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

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

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

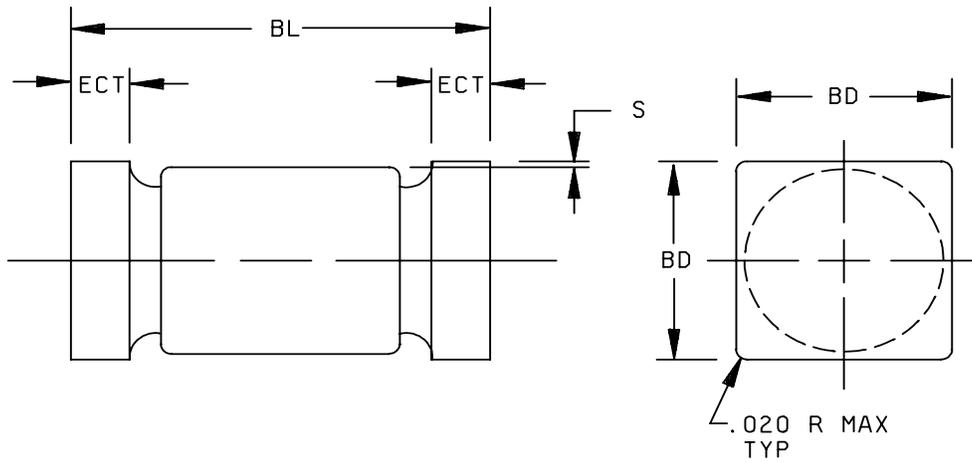


Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.060	.090	1.52	2.29	2
BL	.120	.200	3.05	5.08	
LD	.018	.022	0.46	0.56	3
LL	1.000	1.500	25.40	38.10	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. The specified lead diameters apply in the zone between .050 inch (1.27 mm) from the diode body to the end of the lead. Outside of this zone the lead diameter shall not exceed the maximum of dimension BD.
4. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions.



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.091	.103	2.31	2.62
BL	.168	.200	4.27	5.08
ECT	.019	.028	0.48	0.71
S	.003		0.08	

NOTES:

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

* FIGURE 2. Physical dimensions of surface mount family.

3. REQUIREMENTS

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

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

3.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-19500.

3.4 Interface and physical dimensions. The interface and physical dimensions shall be specified in MIL-PRF-19500 and figure 1 (DO-41) and figure 2 (surface mount) herein.

* 3.4.1 Lead finish. Unless otherwise specified, lead or end cap finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. When solder alloy is used for finish, the maximum lead temperature is limited to 175°C maximum. Where a choice of finish is desired, it shall be specified in the acquisition document (see 6.2).

* 3.4.2 Diode construction. These devices shall be metallurgically bonded-thermally-matched-noncavity-double plug construction, utilizing a category I bond, in accordance with MIL-PRF-19500, except for JANHC and JANKC. UL and US version devices shall be structurally identical to the nonsurface mount version devices except for lead configuration.

3.5 Marking. Devices shall be marked in accordance with MIL-PRF-19500.

* 3.5.1 Marking of US-suffix devices. For US -suffix devices, all marking (except as stated in 3.5.2) may be omitted from the body, but shall be retained on the initial container.

* 3.5.2 Polarity. The polarity shall be indicated with a contrasting color band to denote the cathode end. No color coding will be permitted. For US -suffix devices the cathode end may be identified by three evenly spaced dots of a contrasting color or a solid band.

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

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

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).

* 4.2 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 by 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 appendix E, table IV of MIL-PRF-19500 and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screen (see appendix E, table IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
3a	Temperature cycling	Temperature cycling
(1) 3c	Thermal impedance (see 4.3.1)	Thermal impedance (see 4.3.1)
7b	Optional	Optional
9	$V_{F1} I_{R1}$	Not applicable
11	$V_{F1} I_{R1} \Delta V_{F1} \Delta I_{R1}$	$V_{F1} I_{R1}$
12	See 4.3.2	See 4.3.2
(2) (3) 13	Subgroups 2 and 3 of table I herein; $\Delta I_{R1} \leq 100$ percent of initial reading or $\pm 0.010 \mu A$ dc whichever is greater. $\Delta V_{F1} \leq \pm 25$ mV dc. scope display (see 4.5.3).	Subgroup 2 of table I herein; $\Delta I_{R1} \leq 100$ percent of initial reading or $\pm 0.010 \mu A$ dc whichever is greater. $\Delta V_{F1} \leq 25$ mV dc. scope display (see 4.5.3).
(3) 14b	Required	Required

- (1) Thermal impedance shall be performed any time after sealing provided temperature cycling is performed in accordance with MIL-PRF-19500, screen 3 prior to this thermal test.
- (2) $Z_{\theta JX}$ need not be repeated if performed prior to screen 13.
- (3) For clear glass diodes, the hermetic seal (gross leak) may be performed at any time after temperature cycling.

4.3.1 Thermal impedance. Thermal impedance $Z_{\theta JX}$ measurements shall be performed in accordance with method 3101 of MIL-STD-750. The maximum limit for $Z_{\theta JX}$ is screening (appendix E, table IV of MIL-PRF-19500) shall be derived by each vendor by means of Process Control (PC). When three (minimum) successive sealing lots have exhibited control, the data from these three lots minimum will be used to establish a fixed screening limit, (not to exceed the table I, subgroup 2 limit). Once a fixed limit has been established, monitor all future sealing lots using a three piece sample from each production lot to be plotted on the applicable X bar R chart.

4.3.1.1 Thermal impedance conditions for group A ($Z_{\theta JX}$).

- a. $I_H = 1$ to 5 A.
- b. $t_H = 10$ ms.
- c. $I_M = 1$ mA.
- d. $t_{MD} = 70$ to 100 μ s.

Type	$Z_{\theta JX(max)}$
1N6661, US	20°C/W
1N6662, US	20°C/W
1N6663, US	20°C/W

4.3.2 Power burn-in conditions (method 1038, condition B (a) of MIL-STD-750). All devices shall be operated under one of the following conditions (see 4.5.2).

Type	$T_A = +125^\circ\text{C}; f = 60$ Hz	$T_A = +25^\circ\text{C}; f = 60$ Hz	$T_A = +25^\circ\text{C}$
1N6661, US	$V_R = 225$ V (pk); $I_O = 200$ mA	$V_R = 225$ V (pk); $I_O = 400$ mA	I_F (dc) = 400 mA
1N6662, US	$V_R = 400$ V (pk); $I_O = 200$ mA	$V_R = 400$ V (pk); $I_O = 400$ mA	I_F (dc) = 400 mA
1N6663, US	$V_R = 600$ V (pk); $I_O = 200$ mA	$V_R = 600$ V (pk); $I_O = 400$ mA	I_F (dc) = 400 mA

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 MIL-PRF-19500, and table I herein. (End-point electrical measurements shall be in accordance with the applicable steps of table III 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 VIa (JANS) and table VIb (JANTX and JANTXV) of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable steps of table III herein.

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

	<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
*	B3	1056	0°C to +100°C, 25 cycles.
*	B3	1051	-55°C to +175°C, 100 cycles.
*	B3	4066	I_{FSM} = rated I_{FSM} (see 1.3); 10 surges of 8.3 ms each at 1 minute intervals, superimposed on $I_O = 0$, $V_{RWM} = 0$.
	B4	1037	$I_O = 500$ mA; $f = 60$ Hz, $T_A = +25^\circ\text{C} \pm 3^\circ\text{C}$; $t_{ON} = t_{OFF} = 3$ minutes (minimum) for 2,-000 cycles; mounting conditions in accordance with method 1026 of MIL-STD-750 (see 4.5.2). 1N6661, $US = V_{RM} = 225$ V(pk) 1N6662, $US = V_{RM} = 400$ V(pk) 1N6663, $US = V_{RM} = 600$ V(pk)
	B5	1027	Adjust I_O to achieve specified T_J ; $f = 60$ Hz; (see 4.5.2). 1N6661, $US = V_{RM} = 225$ V(pk) 1N6662, $US = V_{RM} = 400$ V(pk) 1N6663, $US = V_{RM} = 600$ V(pk) or Option 1: $T_A = + 30^\circ\text{C}$ max. ; $T_J = 225^\circ\text{C}$ minimum; $t = 216$ hours; $n = 45$, $c = 0$. Option 2: $T_A = + 75^\circ\text{C}$ max. ; $T_J = 275^\circ\text{C}$ minimum; $t = 96$ hours.
*	B6		Not applicable.
*	B7		Peak reverse power, see 4.5.5 and figure 3 herein. $P_{RM} \geq 500$ W. Test shall be performed on each subplot; sampling plan $n = 10$, $c = 0$, end-points, see 4.4.2.

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

	<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
*	B2	1056	0°C to +100°C, 25 cycles.
*	B2	1051	-55°C to +175°C, 25 cycles.
	B2	4066	T _A = +25°C, I _{FSM} = 5 A, ten 8.3 ms surges at 1 surge per minute. Mounting conditions are in accordance with method 1026 of MIL-STD-750.
	B3	1027	I _O = 150 mA dc; f = 60 Hz; T _A = +150°C (see 4.5.1). 1N6661, US = V _{RM} = 225 V(pk) 1N6662, US = V _{RM} = 400 V(pk) 1N6663, US = V _{RM} = 600 V(pk)
	B5		Not applicable
	B6	1032	T _A = + 175°C (nonoperating). (Note: Leaded samples from the same lot may be used in lieu of US suffix samples for all subgroups.)

* 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 VII of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable steps of table III herein.

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

	<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
*	C2	1056	0°C to +100°C, 10 cycles.
*	C2	1051	-55°C to +175°C, 20 cycles.
	C2	2036	Lead tension: Test condition A; weight = 2 pounds; t = 30 ± 3s. Lead fatigue: Condition E. NOTE: Not applicable to U-suffix devices.
	C3		Not applicable.
*	C5	3101 or 4081	See 4.5.4
	C6	1026	T _A = +150°C; f = 60 Hz; I _O = 150 mA (see 4.5.1). 1N6661, US = V _{RM} = 225 V(pk) 1N6662, US = V _{RM} = 400 V(pk) 1N6663, US = V _{RM} = 600 V(pk) NOTE: Leaded devices from the same lot may be used in lieu of U-suffix devices.
	C7		Not applicable.

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

4.5.1 Pulse measurements. Conditions of pulsed measurements shall be specified in section 4 of MIL-STD-750.

4.5.2 Steady-state operation life. A half-sine wave of the specified peak voltage shall be impressed across the diode in the reverse direction followed by a half-sine waveform of the specified average rectified current. The forward conducted angle of the rectified current shall not be greater than 180 degrees nor less than 150 degrees.

4.5.3 Scope display evaluation. The reverse breakdown characteristics shall be viewed on an oscilloscope with display calibration factors of 20 μA per division and 50 or 100 V per division as applicable. Reverse current over the knee shall be at least 100 μA and less than 200 μA . Any discontinuity or dynamic instability of the trace shall be cause for rejection of that device.

4.5.4 Thermal resistance. Thermal resistance shall be measured in accordance with method 3101 or 4081 of MIL-STD-750. On lead mounted devices the reference point shall be the lead temperature at .375 inch (9.53 mm) from the body of the device, and shall be held between 25°C and 85°C. For US-suffix devices, the reference point shall be the end cap, and shall be maintained at a temperature between 25°C and 110°C.

$R_{\theta JL} \leq 160^\circ\text{C/W}$; $L = .375$ inch (9.53 mm). For surface mount devices (US version), $R_{\theta JEC} \leq 35^\circ\text{C/W}$, $L = 0$.

- a. $I_H = 75$ mA to 300 mA.
- b. $t_H = 25$ s minimum.
- c. $I_M = 1$ mA to 10 mA.
- d. $t_{MD} = 100$ μs maximum.

LS = lead spacing = .375 inch (9.53 mm) for non-surface mount devices and 0 inch for surface mount devices as defined on figure 3:

* 4.5.5 Peak reverse power test. This test shall be measured in the circuit of figure 4, or equivalent. A 20 microsecond half-sine waveform of current shall be used and peak reverse power shall be determined by the product of peak reverse voltage and peak reverse current.

* 4.5.6 Burn-in and life tests. These tests shall be conducted with a half-sine waveform of the specified peak voltage impressed across the diode in the reverse direction followed by a half-sine waveform of the specified average rectified current. The forward conduction angle of the rectified current shall be neither greater than 180 degrees, nor less than 150 degrees.

* 4.5.6.1 Free air burn-in. Deliberate heat sinking, baffles to create an oven, forced air-cooling or heating is prohibited unless otherwise approved by the qualifying activity. The use of a current limiting or ballast resistor is permitted provided that each DUT still sees the full P_t (minimum) and that the minimum applied voltage, where applicable, is maintained through out the burn-in period. $T_J = 135^\circ\text{C}$ minimum for 96 hours. Use method 3100 of MIL-STD-750 to measure T_J .

TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Thermal impedance	3101	See 4.3.1	$Z_{\theta JX}$		20	$^{\circ}\text{C} / \text{W}$
Forward voltage	4011	$I_F = 400 \text{ mA dc}$; 2 percent duty cycle max, 8.3 ms max pulse width; (pulsed, see 4.5.1)	V_{F1}	0.8	1.0	V dc
Reverse current	4016	DC method	I_{R1}			
1N6661, US		$V_R = 225 \text{ V dc}$			0.050	$\mu\text{A dc}$
1N6662, US		$V_R = 400 \text{ V dc}$			0.050	$\mu\text{A dc}$
1N6663, US		$V_R = 600 \text{ V dc}$			0.050	$\mu\text{A dc}$
Breakdown voltage	4021	$I_R = 100 \mu\text{A dc}$	V_{BR1}			
1N6661, US				270		V dc
1N6662, US				480		V dc
1N6663, US				720		V dc
<u>Subgroup 3</u>						
High temperature operation:		$T_A = +150^{\circ}\text{C}$				
Forward voltage	4011	$I_F = 400 \text{ mA dc}$; 2 percent duty cycle max, 8.3 ms max pulse width; (pulses, see 4.5.1)	V_{F2}	0.70	0.95	V dc
Reverse current	4016	DC method	I_{R2}			
1N6661, US		$V_R = 225 \text{ V dc}$			25	$\mu\text{A dc}$
1N6662, US		$V_R = 400 \text{ V dc}$			25	$\mu\text{A dc}$
1N6663, US		$V_R = 600 \text{ V dc}$			25	$\mu\text{A dc}$

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u> - Continued						
Low temperature operation:		$T_A = -55^\circ\text{C}$				
Forward voltage	4011	$I_F = 400\text{ mA dc}$; 2 percent duty cycle max, 8.3 ms max pulse width; (pulsed; see 4.5.2)	V_{F3}		1.2	V dc
<u>Subgroup 4</u>						
Capacitance	4001	$V_R = 4\text{ V dc}$; $f = 1\text{ MHz}$; $V_{\text{sig}} = 50\text{ mV p-p}$ maximum	C		20	pF
<u>Subgroup 5</u>						
Not applicable						
<u>Subgroup 6</u> <u>2/</u>						
Surge current	4066	Mounting conditions in accordance with test method 1026 of MIL-STD-750; $T_A = 25^\circ\text{C}$; $I_{\text{FSM}} = 5\text{ A}$; ten 8.3 ms surges; 1 surge per minute				
Electrical measurements		See table I, subgroup 2.				

1/ For sampling plan, see MIL-PRF-19500.2/ All devices required by the specified sampling plan shall be randomly selected from the devices subjected to subgroup 2, 3, and 4.

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

Inspection <u>1/</u>	MIL-STD-750		Sampling plan
	Method	Conditions	
<u>Subgroup 1</u>			22 devices, c = 0
Temperature shock (glass strain)	1056	500 cycles	
Hermetic seal	1071		
Electrical measurements		See table I, subgroup 2.	
<u>Subgroup 2</u>			22 devices, c = 0
Burn-in (blocking life)	1038	$V_R = 80$ percent of rated V_{RWM} (see 1.3) $T_A = 150^\circ\text{C}$; $t = 1,000$ hours min.	
Electrical measurement		See table I, subgroup 2 and table III, step 5.	
<u>Subgroup 4</u>			
Thermal impedance curves		Each supplier shall submit their qual-lot average and design thermal impedance curves to the qualifying activity. In addition, the optimal test conditions and $Z_{\theta JX}$ limit shall be provided to the qualifying activity in the qualification report.	
<u>Subgroup 5</u>			15 devices, c = 0 each type
Barometric pressure, reduced (altitude operation)	1001	8 mmHg; $t = 60$ s	
Measurement during test:			
Reverse current	4016	DC method	
1N6661, US		$V_R = 225$ V dc; $I_R = .050$ μA dc maximum.	
1N6662, US		$V_R = 400$ V dc; $I_R = .050$ μA dc maximum.	
1N6663, US		$V_R = 600$ V dc; $I_R = .100$ μA dc maximum.	
<u>Subgroup 6</u>			n = 3, c = 0
ESD	1020		

See footnote at end of table.

* TABLE II. Group E inspection (all quality levels) for qualification and requalification only - Continued.

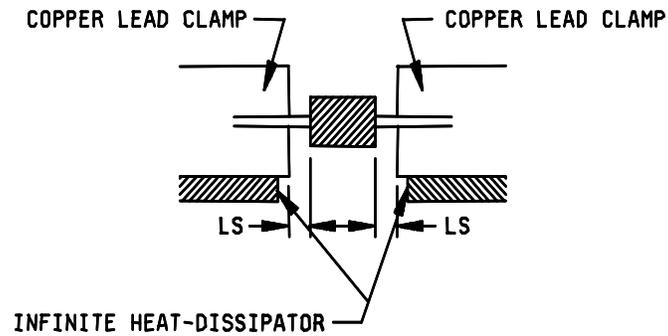
Inspection <u>1/</u>	MIL-STD-750		Sampling plan
	Method	Conditions	
<u>Subgroup 8</u> Peak reverse power Electrical measurement		See 4.5.5 and figure 4 herein. Peak reverse power (P_{RM}) = shall be characterized by the supplier and this data shall be available to the Government. Test shall be performed on each subplot. During the P_{RM} test, the voltage (V_{BR}) shall be monitored to verify it has not collapsed. Any collapse in V_{BR} during or after the P_{RM} test or rise in leakage current (I_R) after the test that exceeds I_{R1} in table I shall be considered a failure to that level of applied P_{RM} . Progressively higher levels of P_{RM} shall be applied until failure occurs on all devices within the chosen sample size to characterize each subplot.	n = 45 22 devices, c = 0
<u>Subgroup 9</u> <u>1/</u> Resistance to glass cracking	1057	Test condition B. Step stress to destruction by increasing cycles or up to a maximum of 25 cycles.	
<u>Subgroup 10</u> Forward surge Electrical measurement	4066	Condition A, I_{FSM} = rated I_{FSM} (see 1.3); 10 surges of 8.3 ms each at 1 minute intervals, I_O = rated (see 1.3), V_{RWM} = rated (see 1.3). See table I, subgroup 2.	

1/ For sampling plan, see MIL-PRF-19500.

* TABLE III. Groups A, B, C, and E delta measurements. 1/ 2/ 3/ 4/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Reverse current	4016	DC method	ΔI_{R1} 5/	100 percent of initial value or $\pm .010 \mu\text{A}$ dc, whichever is greater.		
	1N6661, US 1N6662, US 1N6663, US		$V_R = 225 \text{ V dc}$ $V_R = 400 \text{ V dc}$ $V_R = 600 \text{ V dc}$				
2.	Forward voltage	4011	$I_F = 400 \text{ mA dc}$ (pulsed) 2 percent duty cycle max; 8.3 ms max pulse width	ΔV_{F1} 5/	$\pm 25 \text{ mV dc}$ change from previously measured value.		

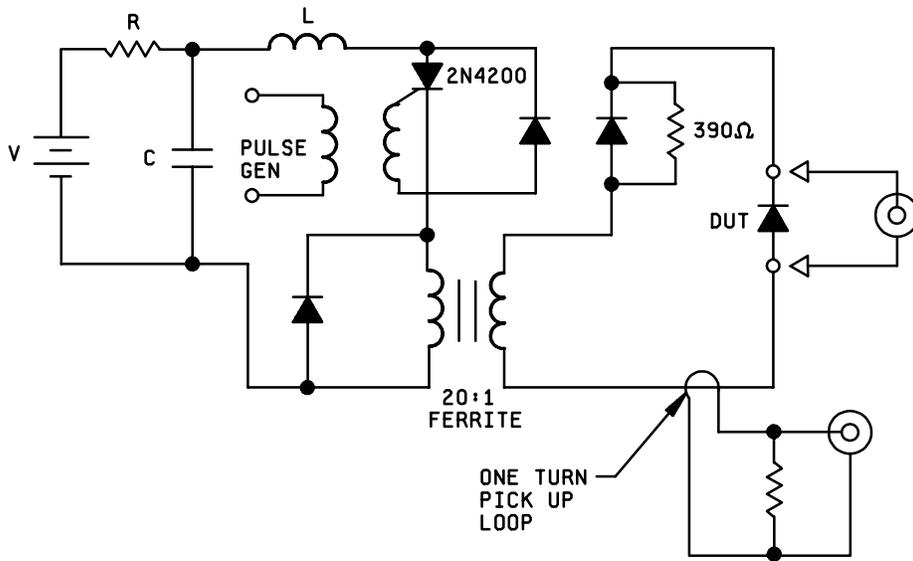
- 1/ The delta measurements for appendix E, table VIa (JANS) of MIL-PRF-19500 are as follows:
 - a. Subgroup 3, see table III herein, step 2.
 - b. Subgroup 4, see table III herein, step 2.
 - c. Subgroup 5, see table III herein, steps 1 and 2.
- 2/ The delta measurements for appendix E, table VIb (JANTX and JANTXV) of MIL-PRF-19500 are as follows:
 - a. Subgroup 2, see table III herein, step 1.
 - b. Subgroup 3, see table III herein, step 1.
 - c. Subgroup 6, see table III herein, step 1.
- 3/ The delta measurements for table VII of MIL-PRF-19500 are as follows:
 - a. Subgroup 2, see table III herein, steps 1 and 2 (JANS).
 - b. Subgroup 6, see table III herein, steps 1 and 2 (JANS); step 1 (JANTX and JANTXV).
- 4/ The delta measurements for table IX of MIL-PRF-19500 are as follows; subgroup 2, see table III herein, step 1.
- 5/ Devices which exceed the table I limits for this test shall not be accepted.



NOTES:

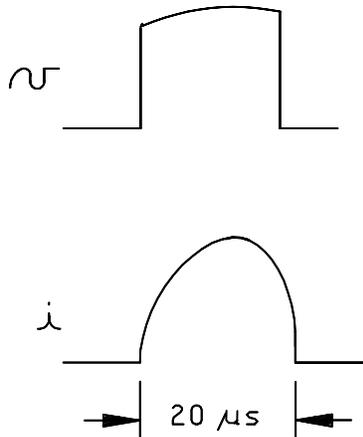
1. The lead temperature, T_L shall be measured on a lead at a point adjacent to the heat sink clamp (reference point).
2. The clamping force on each lead shall be 4 ± 0.5 pounds.
3. The DUT shall be shielded from drafts.
4. The heat sink clamps shall be placed equal distance from each end of the diode body.
5. For surface mount devices, the end caps shall be clamped to the heat sinks.

FIGURE 3. Mounting conditions.



NOTES:

1. L - 13T #22 pm 1 inch (25.4 mm) diameter form (air core).
2. C - 1 to 10 μ f to give 20 μ s pulse width.
3. V - adjustable to 200 volts for power desired in device under test.



TYPICAL WAVE FORMS

FIGURE 4. Peak reverse power measurement circuit and waveforms.

5. PACKAGING

* 5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual 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 3.4.1).
- 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 No. 19500) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center, Columbus, ATTN: DSCC/VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail vqe.chief@dla.mil.

6.4 Cross reference substitution list. JANS level will no longer be built to MIL-PRF-19500/240. Devices required for space flight applications are found herein.

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 - 11
NASA – NA
DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2747)

Review activities:

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

* 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 <http://www.dodssp.daps.mil>.