

The documentation and process conversion measures necessary to comply with this revision shall be completed by 7 August 2004.

INCH-POUND

MIL-PRF-19500/240J
 7 May 2004
 SUPERSEDING
 MIL-PRF-19500/240H
 24 February 2000

PERFORMANCE SPECIFICATION SHEET

* SEMICONDUCTOR DEVICE, DIODE, SILICON, RECTIFIER,
 TYPES 1N645-1, 1N647-1, 1N649-1, 1N645UR-1, 1N647UR-1, 1N649UR-1,
 JAN, JANTX, AND JANTXV 1/

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 general purpose silicon diode. Three 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-35), figure 2 (similar to DO-213AA), and 3.4 herein.

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

Type (1)	V_{RSM}	V_{RWM}	I_O $T_A = +150^\circ\text{C}$	I_O (2) $T_A = +25^\circ\text{C}$	I_{FSM} $t_p = 1/120 \text{ s}$ $T_A = +25^\circ\text{C}$	T_J and T_{STG}	Barometric pressure, reduced
	<u>V (pk)</u>	<u>V dc</u>	<u>mA</u>	<u>mA</u>	<u>A</u>	<u>°C</u>	<u>mm Hg</u>
1N645-1, UR-1	270	225	150	400	5	-65 to +175	8
1N647-1, UR-1	480	400	150	400	5	-65 to +175	8
1N649-1, UR-1	720	600	150	400	5	-65 to +175	8

(1) Electrical characteristics for UR suffix devices are identical to the corresponding non-UR suffix devices unless otherwise specified.

(2) Derate 2.0 mA/°C between +25°C to +150°C. Derate 6 mA/°C between +150°C to +175°C.

1/ See 6.2.2

* Comments, suggestions, or questions on this document should be addressed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43216-5000, 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 Primary electrical characteristics at $T_A = +25^\circ\text{C}$, unless otherwise specified.

Type (1)	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 $T_A = 150^\circ\text{C}$
	<u>V dc (max)</u>	<u>μA dc (max) at V_R</u>	<u>μA dc (max) at V_R</u>
1N645-1	1.0	.05 225 V dc	50 225 V dc
1N647-1	1.0	.05 400 V dc	50 400 V dc
1N649-1	1.0	.05 600 V dc	50 600 V dc

- (1) Electrical characteristics for UR suffix devices are identical to the corresponding non-UR suffix devices unless otherwise specified.

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

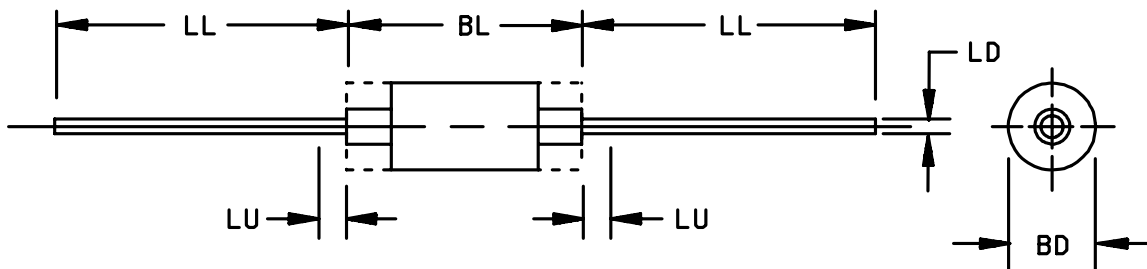
MIL-PRF-19500 - Semiconductor Devices, General Specification for.
MIL-PRF-19500/587 - Semiconductor Device, Diode, Silicon, Rectifier, Types 1N6661, 1N6662,
1N6663, 1N6661US, 1N6662US and 1N6663US, JAN, JANTX, JANTXV, AND
JANS

* 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 www.dodssp.dap.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.

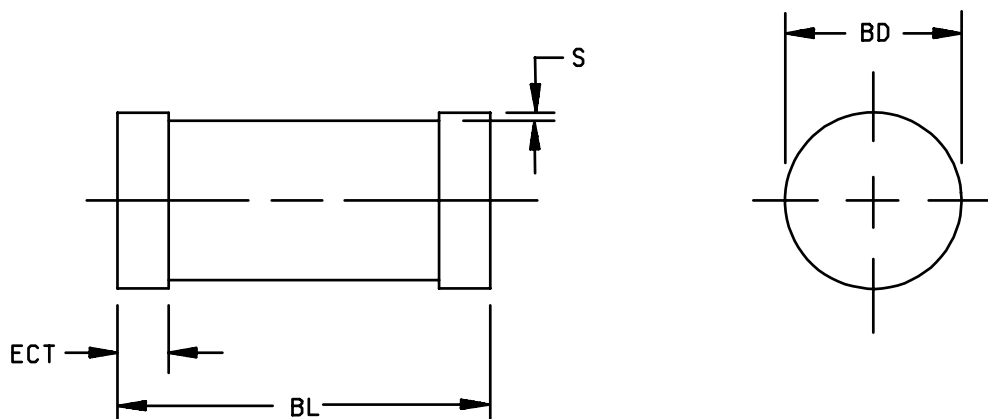


Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.055	.090	1.40	2.29	3, 5
BL	.120	.200	3.05	5.08	
LD	.018	.022	0.46	0.56	
LL	1.000	1.500	25.40	38.10	
LU		.050		1.27	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Symbol BD shall be measured at the largest diameter.
4. Within LU lead, diameter may vary to allow for flash, lead finish build-up, and minor irregularities other than heat slugs.
5. The specified lead diameters apply in the zone between .050 (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 dimension BD.
6. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions for types 1N645-1, 1N647-1, and 1N649-1.



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

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are presolder dip.
4. Referencing dimension S, minimum clearance of glass body to mounting surface on all orientations.
5. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 2. Physical dimensions for types 1N645UR-1, 1N647UR-1, and 1N649UR-1.

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 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 figure 1 (similar to DO-35), figure 2 (similar to DO-213AA) herein.

* 3.4.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein (see 6.2).

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

3.5 Marking. Devices shall be marked in accordance with MIL-PRF-19500. At the option of the manufacturer, the marking of the country of origin may be omitted from the body of the diode.

3.5.1 Polarity. The polarity shall be indicated with a contrasting color band to denote the cathode end. No color coding will be permitted.

3.5.2 Marking of UR version devices. For UR version devices only, all marking (except polarity) may be omitted from the body, but shall be retained on the initial container.

3.5.3 Part number marking. Parts processed as JANS1N6661, JANS1N6662 and JANS1N6663 to the requirements of MIL-PRF-19500/587 may alternately be marked as JANS1N645-1, JANS1N647-1 and JANS1N649-1 for a period of 3 years after the date of revision H. This allowance is for reprourement only; JANS1N6661, JANS1N6662, and JANS1N6663 remain the preferred parts for new design.

3.6 Electrical performance characteristics. Unless otherwise specified herein, 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 the subgroups 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).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

* 4.2.2 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 III tests, the tests specified in table III herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

4.3 Screening (JANTXV, JANTX levels only). Screening shall be in accordance with 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 table IV of MIL-PRF-19500)	Measurement
	JANTX and JANTXV levels
3a	Temperature cycling
3c	Thermal impedance (see 4.3.1 and 4.4.1)
9	Not applicable
11	I_{R1} , V_{F1}
12	See 4.3.2, $t = 48$ hours
(1) 13	Subgroup 2 of table I herein, $\Delta I_{R1} \leq 100$ percent of initial reading or 10 nA dc, whichever is greater. $\Delta V_F \leq \pm 0.025$ V dc change from initial reading

(1) Thermal impedance need not be repeated at this step.

4.3.1 Thermal impedance $Z_{\theta JX}$ measurements for screening. Thermal impedance $Z_{\theta JX}$ measurements shall be performed in accordance with method 3101 of MIL-STD-750. The maximum limit shall not exceed the table I, subgroup 2 limit for $Z_{\theta JX}$ in screening (table II of MIL-PRF-19500) and atypical devices shall be removed.

* 4.3.2 Power burn-in conditions. All devices shall be operated under one of the following conditions:

Type (1)	Method 1038 of MIL-STD-750, condition B, $T_A = +125^\circ\text{C}$, $f = 60$ Hz, (see 4.5.2)	Method 1038 of MIL-STD-750, condition B, $T_A = (2)$, $f = 60$ Hz, (see 4.5.2)	Method 1038 of MIL-STD-750, condition B, $T_A = +125^\circ\text{C}$	Method 1038 of MIL-STD-750, condition B, $T_A = (2)$
1N645-1	$V_R = 225$ V(pk), $I_O = 200$ mA	$V_R = 225$ V(pk), $I_O = 400$ mA	$I_F = 200$ mA	$I_F = 400$ mA
1N647-1	$V_R = 400$ V(pk), $I_O = 200$ mA	$V_R = 400$ V(pk), $I_O = 400$ mA	$I_F = 200$ mA	$I_F = 400$ mA
1N649-1	$V_R = 600$ V(pk), $I_O = 200$ mA	$V_R = 600$ V(pk), $I_O = 400$ mA	$I_F = 200$ mA	$I_F = 400$ mA

- (1) Electrical characteristics for UR suffix devices are identical to the corresponding non-UR suffix devices unless otherwise specified.
- (2) Room ambient as defined in the general requirements of MIL-STD-750.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. Group A inspection shall be performed on each subplot.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500, and table I herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein. The following test conditions shall be used for $Z_{\theta JX}$, group A inspection:

- a. I_M measure current 1 mA - 10 mA.
- b. I_H forward heating current 0.5 A - 1.0 A.
- c. t_H heating time 10 ms.
- d. t_{MD} measurement delay time 100 μ s. (maximum).

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and 4.4.2.1 herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein. Delta measurements shall be in accordance with table III herein.

* 4.4.2.1 Group B inspection, 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, 10 cycles.
*	B2	1051	-55°C to +175°C, 25 cycles.
	B3	1027	$I_O = 150$ mA min, $f = 50 - 60$ Hz, $T_J = +150^\circ\text{C}$ min., supplier may adjust T_A to obtain a minimum T_J of +150°C, (see 4.5.2). $V_R = 225$ V(pk) for 1N645-1; $V_R = 400$ V(pk) for 1N647-1; $V_R = 600$ V(pk) for 1N649-1.
	B5		Not applicable
	B6	1032	$T_A = +175^\circ\text{C}$

* 4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500, and as follows. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table III herein.

	<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
*	C2	1056	0°C to +100°C, 15 cycles.
*	C2	1051	-55°C to +175°C, 20 cycles.
	C2	2036	Tension: Test condition A; weight = 2 pounds, t = 30 ±3 s. Lead fatigue: Test condition E. (Terminal strength not applicable to surface mount devices.)
*	C5	3101 or 4081	See paragraph 4.5.5
	C6	1026	I _O = 150 mA, f = 50 – 60 Hz, T _J = +150°C min., supplier may adjust T _A to obtain a minimum T _J of +150°C, (see 4.5.2). V _R = 225 V(pk) for 1N645-1; V _R = 400 V(pk) for 1N647-1; V _R = 600 V(pk) for 1N649-1

* 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 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 limits when applicable.

4.5 Methods of inspection. Methods of inspection shall be as 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 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 conduction angle of the rectified current shall not be greater than 180 degrees nor less than 150 degrees.

* 4.5.3 Free air burn-in. Deliberate heat sinking baffles to create an oven or forced air-cooling 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.

* 4.5.4 Peak reverse power test. This test shall be measured in the circuit of figure 3, 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.

* 4.5.5 Thermal resistance. Thermal resistance measurement shall be in accordance with method 3101 or 4081 of MIL-STD-750. Forced moving air or draft shall not be permitted across the device during test. R_{θJL} (maximum) 250 °C/W; L = .375 inch (9.53 mm). For surface mount devices (UR version) R_{θJEC} ≤100°C/W; L = 0 inch. The following conditions shall apply when using method 3101 (see figure 4 for mounting conditions):

- a. I_H ----- 75 mA to 300 mA.
- b. t_H----- 25 seconds minimum.
- c. I_M----- 1 mA to 10 mA.
- d. t_{MD} ----- 70 us maximum.

MIL-PRF-19500/240J

* TABLE I. Group A inspection.

Inspection 1/ 2/	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 and 4.4.1	$Z_{\theta JX}$		35	$^{\circ}\text{C} / \text{W}$
Forward voltage	4011	$I_F = 400 \text{ mA dc}$, (pulsed, see 4.5.1), 2 percent duty cycle maximum, 8.3 ms maximum pulse width.	V_{F1}	0.8	1.0	V dc
Reverse current	4016	DC method	I_{R1}			
1N645-1		$V_R = 225 \text{ V dc}$.05	$\mu\text{A dc}$
1N647-1		$V_R = 400 \text{ V dc}$.05	$\mu\text{A dc}$
1N649-1		$V_R = 600 \text{ V dc}$.05	$\mu\text{A dc}$
<u>Subgroup 3</u>						
High temperature operation		$T_A = 150^{\circ}\text{C}$				
Forward voltage	4011	$I_F = 400 \text{ mA dc}$, (pulsed, see 4.5.1), 2 percent duty cycle maximum, 8.3 ms maximum pulse width.	V_{F2}	0.7	0.95	V dc
Reverse current	4016	DC method	I_{R2}			
1N645-1		$V_R = 225 \text{ V dc}$			50	$\mu\text{A dc}$
1N647-1		$V_R = 400 \text{ V dc}$			50	$\mu\text{A dc}$
1N649-1		$V_R = 600 \text{ V dc}$			50	$\mu\text{A dc}$

See footnotes at end of table.

* TABLE I. Group A inspection - Continued.

Inspection 1/ 2/	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	$I_F = 400 \text{ mA dc}$, (pulsed, see 4.5.1), 2 percent duty cycle maximum, 8.3 ms maximum pulse width.	V_{F3}		1.2	V dc
<u>Subgroup 4</u>						
Reverse current at peak reverse voltage	4016	AC method, $f = 60 \text{ HZ}$ --micro	I_{RM1}			
1N645-1		$V_R = 270 \text{ V (pk)}$			50	$\mu\text{A (pk)}$
1N647-1		$V_R = 480 \text{ V (pk)}$			50	$\mu\text{A (pk)}$
1N649-1		$V_R = 720 \text{ V (pk)}$			50	$\mu\text{A (pk)}$
Capacitance	4001	$V_R = 4 \text{ V dc}$, $f = 1 \text{ MHz}$, $V_{\text{sig}} = 50 \text{ mV(pk-pk)}$ maximum.	C		20	pF
<u>Subgroup 5</u>						
Not applicable						
<u>Subgroup 6</u>						
Surge current	4066	Mounting conditions in accordance with test method 1026 of MIL-STD-750, $T_A = +25^\circ\text{C}$, $I_{FSM} = 5 \text{ A}$, $I_O = 150 \text{ mA}$, ten 1/120 s surges, 1 surge per minute.				
Electrical measurements		In accordance with table I, subgroup 2 herein				

See footnotes at end of table.

* TABLE I. Group A inspection - Continued.

Inspection <u>1/</u> <u>2/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 7</u>						
Reverse current, average	4046	$T_A = +150^\circ\text{C}$, $I_O = 150 \text{ mA}$	$I_R (AV)$			
1N645-1		$V_R = 225 \text{ V(pk)}$			100	μA
1N647-1		$V_R = 400 \text{ V(pk)}$			100	μA
1N649-1		$V_R = 600 \text{ V(pk)}$			100	μA

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

2/ Electrical characteristics for UR suffix devices are identical to the corresponding non-UR suffix devices unless otherwise specified.

MIL-PRF-19500/240J

* 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
Temperature cycling	1051	500 cycles, -65°C to +175°C, condition C.	
Hermetic seal gross leak	1071		
Electrical measurements 1/ <u>Subgroup 2</u>		See table I, subgroup 2	22 devices c = 0
Steady-state dc blocking life	1038	1,000 hours, condition A; $V_R = V_{RWM}$	
Electrical measurements 1/ <u>Subgroup 3</u>		See table I, subgroup 2	3 devices c = 0
DPA	2101	Cross section and scribe and break. Separate samples shall be used for each test.	
* <u>Subgroup 4</u>			22 devices c = 0
Thermal impedance curves	3101 or 4081	Each supplier shall submit their (typical) design thermal impedance curves. In addition, test conditions and $Z_{\theta JX}$ limit shall be provided to the qualifying activity in the qualification report.	
<u>Subgroup 5</u>			22 devices c = 0
Barometric pressure, reduced (altitude operation)	1001	Pressure (see 1.3); t = 1 min. DC method; $V_R = V_{RWM}$ (see 1.3); $I_{R1} =$ (see 1.4).	
* <u>Subgroup 6</u>			
ESD	1020		

See footnote at end of table.

MIL-PRF-19500/240J

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

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
* <u>Subgroup 8</u> Peak reverse power Electrical measurement		See 4.5.5 and figure 3 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
<u>Subgroup 9 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	$I_{FSM} = 80$ A(pk); 10 surges of 8.3 ms each at 1 minute intervals, superimposed on $I_O = 2$ A dc; $V_{RWM} =$ rated V_{RWM} (see 1.3). $T_A = +100^\circ\text{C}$. See table I, subgroup 2 herein.	22 devices c = 0

1/ $Z_{\theta JX}$ not applicable.

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

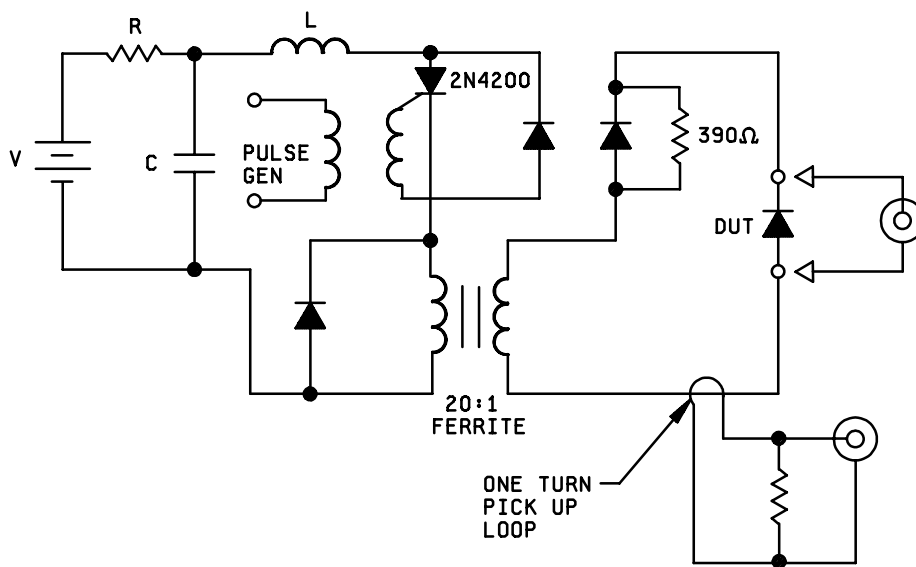
Step	Inspection 3/	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Reverse current 1N645-1 1N647-1 1N649-1	4016	DC method; $V_R = 225 \text{ V(pk)}$ $V_R = 400 \text{ V(pk)}$ $V_R = 600 \text{ V(pk)}$	ΔI_{R1} 4/			100 percent of initial value or $\pm 0.010 \mu\text{A dc}$, whichever is greater.

1/ The delta measurements for table VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 are as follows: Subgroups 3 and 6, see table III herein, step 1.

2/ The delta measurements for table VII of MIL-PRF-19500 are as follows: Subgroup 6, see table III herein, step 1 (JAN, JANTX, and JANTXV).

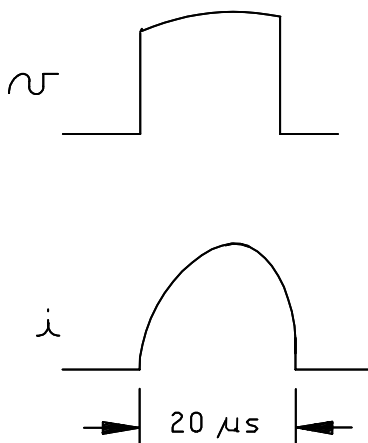
3/ Electrical characteristics for UR suffix devices are identical to the corresponding non-UR suffix devices unless otherwise specified.

4/ Devices exceeding table I limits for this test shall not be acceptable.



NOTES:

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



TYPICAL WAVE FORMS

* FIGURE 3. Peak reverse power measurement circuit and waveforms.

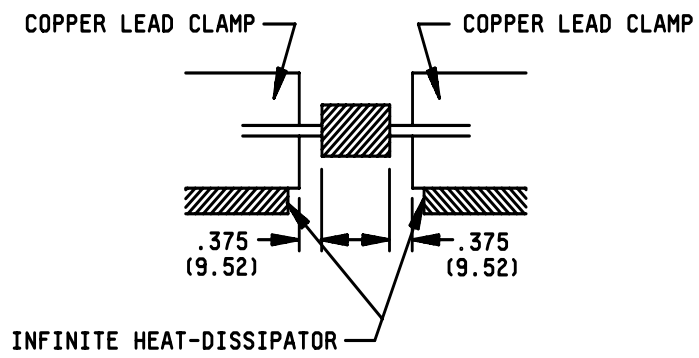


FIGURE 4. Mounting arrangement.

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.

6.2.1 Substitutability. Non dash-one devices have been deleted from this specification. Dash-one devices are a direct substitute for non dash-one devices and are preferred. Devices in stock are acceptable provided the date code does not exceed 10 February 1993. Existing supplies of the non dash-one parts may be used until exhausted.

6.2.2 Cross reference substitution list. JANS level will no longer be built to MIL-PRF-19500/240. Devices in stock are acceptable provided the date code does not exceed the date of implementation of MIL-PRF-19500/240F. Devices required for space flight applications are found in MIL-PRF-19500/587. Existing supplies of 1N645-1, 1N647-1, and 1N649-1 can be used until existing supplies are exhausted. PIN for PIN replacement follows, and directly interchangeable:

Non-preferred PIN	Preferred PIN
JANS1N645-1	JANS1N6661
JANS1N647-1	JANS1N6662
JANS1N649-1	JANS1N6663

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 Defense Supply Center, Columbus, ATTN: DSCC/VQE, P.O. Box 3990, Columbus, OH 43216-5000 or e-mail vqe.chief@dla.mil.

6.4 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
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2777)

Review activities:

Army - AR, AV, MI
Navy - AS, MC

* 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>.