

The documentation and process conversion measures necessary to comply with this document shall be completed by 14 July 2026.

INCH-POUND

MIL-PRF-19500/240U
w/AMENDMENT 3
14 April 2026
SUPERSEDING
MIL-PRF-19500/240U
w/AMENDMENT 2
24 July 2024

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, RECTIFIER,
AXIAL LEADED AND SURFACE MOUNT PACKAGES,
TYPES 1N645-1, 1N647-1, AND 1N649-1,
QUALITY LEVELS JAN, JANTX, AND JANTXV

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 use as a general purpose silicon rectifier diode or as a low speed switching rectifier diode. Three levels of product assurance (JAN, JANTX, and JANTXV) are provided for each device type as specified in [MIL-PRF-19500](#).

1.2 Package outlines. The device package outlines are as follows: an axial leaded DO-204AH (formerly DO-35) package in accordance with [figure 1](#) and a round end-cap surface mount DO-213AA package in accordance with [figure 2](#).

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

1.3.1 Ratings applicable to all Part or Identifying Numbers (PIN). Junction temperature: -65°C to $+175^\circ\text{C}$.
Storage ambient temperature: -65°C to $+175^\circ\text{C}$.

1.3.2 Ratings applicable to individual types.

Type (1)	V_{RSM}	V_{RWM}	$I_{O(PCB)}$ $T_A = +25^\circ\text{C}$ (2)	I_O $T_A = +150^\circ\text{C}$	I_{FSM} $t_p = 1/120\text{ s}$ $T_A = +25^\circ\text{C}$	Barometric pressure, reduced	$R_{\theta JL}$ $L =$.375 inch (9.53 mm)	$R_{\theta JEC}$ (UR)
	<u>V (pk)</u>	<u>V dc</u>	<u>mA</u>	<u>mA</u>	<u>A</u>	<u>mm Hg</u>	<u>°C/W</u>	<u>°C/W</u>
1N645-1, UR-1	270	225	400	150	5	8	250	100
1N647-1, UR-1	480	400	400	150	5	8	250	100
1N649-1, UR-1	720	600	400	150	5	8	250	100

- (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 $+25^\circ\text{C}$ to $+150^\circ\text{C}$. Derate 6 mA/°C between $+150^\circ\text{C}$ to $+175^\circ\text{C}$.

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



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1.4 Primary electrical characteristics. Unless otherwise specified at $T_A = +25^\circ\text{C}$.

Type (1)	V_F at $I_F = 400\text{ mA dc}$, 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>$\mu\text{A dc (max)}$</u>	<u>at V_R</u>	<u>$\mu\text{A dc (max)}$</u>	<u>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.

1.5 PIN. The PIN is in accordance with [MIL-PRF-19500](#), and as specified herein. See [6.4](#) for PIN construction example, [6.5](#) for a list of available PINs and [6.6](#) for substitution information.

1.5.1 JAN certification mark and quality level. The quality level designators for encapsulated devices that are applicable for this specification sheet from the lowest to the highest level are as follows: "JAN", "JANTX", and "JANTXV".

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

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

1.5.2.2 Second number symbols. The second number symbols for the devices covered by this specification sheet are as follows: "645", "647", and "649".

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

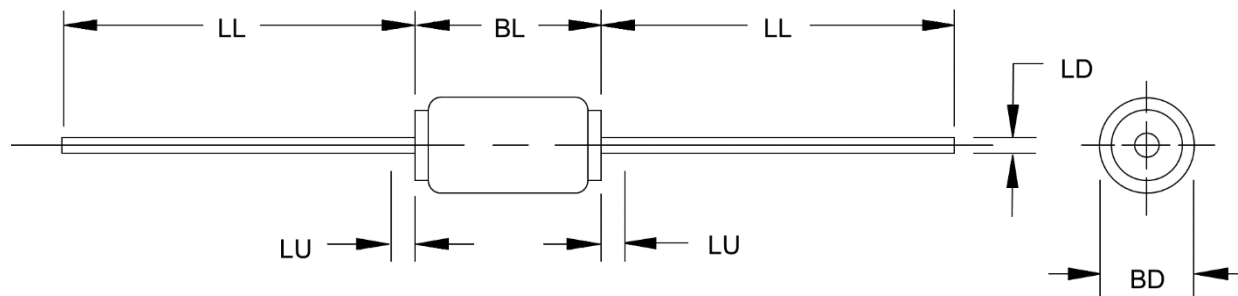
1.5.3.1 Package designators. The suffix symbols (or lack thereof) that designate the package outline for the devices covered by this specification sheet are as follows.

	A blank designator identifies that the package is a DO-204AH (formerly DO-35) in accordance with figure 1 .
UR	A "UR" designator identifies that the package is a DO-213AA surface mount package in accordance with figure 2 .

* 1.5.3.2 Metallurgical bond category. The last suffix symbol "-1" (or lack thereof) designates the diode construction (see [3.4.2](#) and [6.6](#)).

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

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

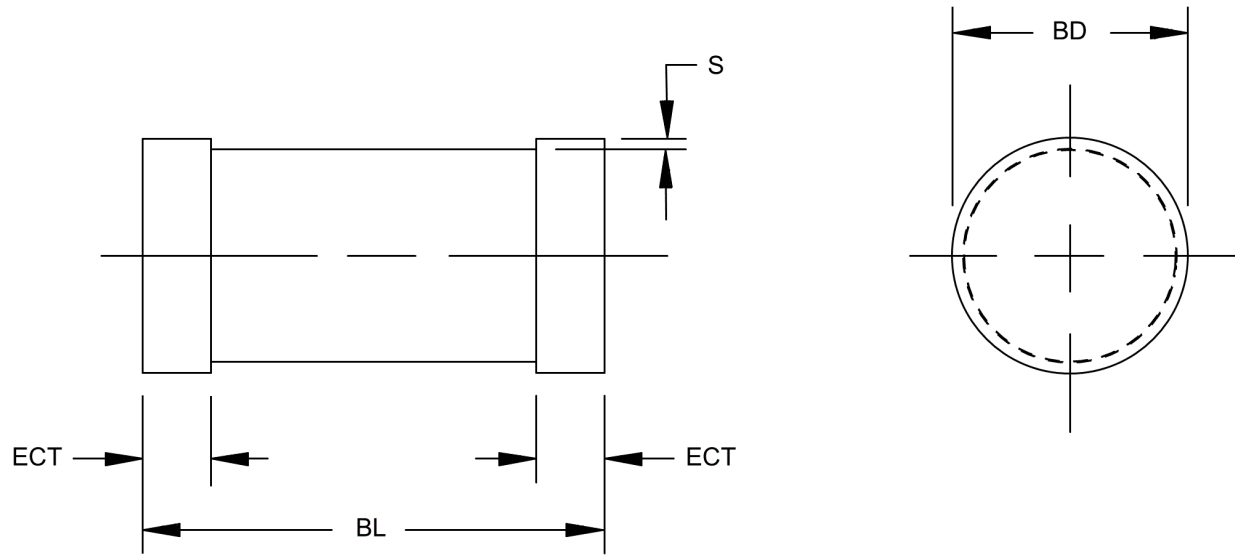
*

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. 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.
3. Dimension BL shall include the entire body including slugs.
4. Dimension LU shall include the sections of the lead over which the diameter is uncontrolled. This uncontrolled area is defined as the zone between the edge of the diode body and extending .050 inch (1.27 mm) onto the leads.

FIGURE 1. Physical dimensions of axial leaded package (DO-204AH).

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Symbol	Inches	Inches	mm	mm
	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		0.03	

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
- * 3. Dimension S is optional however dimension BD (glass body) shall not exceed endcap diameter.

FIGURE 2. Physical dimensions of round end-cap surface mount package (DO-213AA).

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2. APPLICABLE PUBLICATIONS

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.

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-204AH) or 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 of MIL-PRF-19500.

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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 UR devices. For 'UR' suffix devices only, all marking, except polarity, may be omitted from the body, but shall be retained on the initial container.

3.5.2 Polarity. For axial leaded devices the polarity shall be indicated with a contrasting color band to denote the cathode end. For surface mount packages the polarity marking shall consist, as a minimum, of a band similar to that for axial leaded devices or alternatively, three contrasting dots spaced equally around the periphery of the cathode end.

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. 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](#) and [tables I](#) and herein).

4.2 Qualification inspection. Qualification inspection shall be in accordance with [MIL-PRF-19500](#) and as specified herein.

4.2.1 Group E qualification. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of [MIL-PRF-19500](#) and as specified in [table II](#) herein.

4.3 Screening (quality levels JAN, JANTXV, JANTX 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 levels JANTXV and JANTX
3c	Thermal impedance (see 4.3.1)
9	V_{F1}
11	I_{R1}
12	See 4.3.2
(1) 13	Subgroup 2 of table I herein, $\Delta I_{R1} \leq 100$ percent of initial reading or 10 nA dc, whichever is greater. $\Delta V_{F1} \leq \pm 0.025$ V dc change from initial reading

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

4.3.1 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3101 or 4081 of [MIL-STD-750](#) using the guidelines in that method for determining I_M , I_H , t_H , t_{MD} , t_{SW} (V_C and V_H where appropriate). See group E, subgroup 4 of [table II](#) herein. The thermal impedance limit used in screen 3c and [table I](#), subgroup 2 shall be set statistically by the supplier.

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* 4.3.2 Power burn-in conditions. Power burn-in shall be performed in accordance with condition B of method 1038 of MIL-STD-750. The details of 4.5.3 and those that follow shall apply: V_R = rated V_{RWM} ; f = 50 - 60 Hz. T_A = 75°C maximum; $I_{O(PCB)}$ = 400 mA dc (min) or I_F = 400 mA dc (min). The maximum current density of small die shall be submitted to the qualifying activity for approval. With approval of the qualifying activity and preparing activity, alternate burn-in criteria (hours, bias conditions, and mounting conditions) may be used for JANTX and JANTXV quality levels. A justification demonstrating equivalence is required. In addition, the manufacturing site's burn-in data and performance history will be essential criteria for burn-in modification approval.

4.3.3 JAN testing. JAN level devices that are constructed using either a category II or III metallurgical bond shall have temperature cycling and thermal impedance testing performed in accordance with MIL-PRF-19500, JANTX level screening level requirements. Electrical testing shall be in accordance with table I, subgroup 2 herein.

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. Group A inspection shall be performed on each subplot.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and as follows.

<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°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°C.

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-STD-750, and as follows.

<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 = 10 pounds (4.54 kg) (6 pounds (2.72 kg) for hard glass), t = 15 $\pm$ 3 s. Lead fatigue: Test condition E. (Terminal strength not applicable to surface mount devices.)
C5	4081	See 4.3.1. See 1.3 for thermal resistance values.
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.

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4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table E-IX of [MIL-PRF-19500](#) and as specified herein.

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 and life tests. Method 3100 of [MIL-STD-750](#) shall be used to measure T_J . The use of a current limiting or ballast resistor is permitted provided that each device under test still sees the full P_t (minimum) and that the minimum applied voltage, where applicable, is maintained through-out the burn-in period. Alternate mounting conditions shall be submitted to the qualifying activity for approval.

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TABLE I. Group A inspection.

Inspection <u>1/ 2/</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	$Z_{\theta JX}$			°C/W
Forward voltage	4011	Condition B, $I_F = 400$ 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 1N645-1 1N647-1 1N649-1	4016	Condition A or B $V_R = 225$ V dc $V_R = 400$ V dc $V_R = 600$ V dc	I_{R1}		.05 .05 .05	μ A dc μ A dc μ A dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = 150^\circ\text{C}$				
Forward voltage	4011	Condition B, $I_F = 400$ 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 1N645-1 1N647-1 1N649-1	4016	Condition A or B $V_R = 225$ V dc $V_R = 400$ V dc $V_R = 600$ V dc	I_{R2}		50 50 50	μ A dc μ A dc μ A dc
Low temperature operation		$T_A = -55^\circ\text{C}$				
Forward voltage	4011	Condition B, $I_F = 400$ mA dc, (pulsed, see 4.5.1), 2 percent duty cycle maximum, 8.3 ms maximum pulse width.	V_{F3}		1.2	V dc

See footnotes at end of table.

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TABLE I. Group A inspection - Continued.

Inspection <u>1/</u> <u>2/</u>	MIL-STD-750		Symbol	Limits	Limits	Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u>						
Reverse current at peak reverse voltage 1N645-1 1N647-1 1N649-1	4016	Condition C, f = 60 Hz. V _R = 270 V (pk) V _R = 480 V (pk) V _R = 720 V (pk)	I _{RM1}		50 50 50	μA (pk) μA (pk) μA (pk)
Capacitance	4001	V _R = 4 V dc, f = 1 MHz, V _{SIG} = 50 mV(pk-pk) maximum.	C		20	pF
<u>Subgroup 5</u>						
Not applicable						
<u>Subgroup 6</u>						
Surge current	4066	Condition A, mounting conditions in accordance with test method 1026 of MIL-STD-750, T _A = +25°C, I _{FSM} = 5 A, I _O = 150 mA, ten 1/120 s surges, one surge per minute.				
Electrical measurements		In accordance with table III , steps 1, 2, and 5.				
<u>Subgroup 7</u>						
Reverse current, average 1N645-1 1N647-1 1N649-1	4046	T _A = +150°C, I _O = 150 mA V _R = 225 V(pk) V _R = 400 V(pk) V _R = 600 V(pk)	I _R (AV)		100 100 100	μA μA μA

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

2/ Electrical characteristics for all surface mount versions are identical to the corresponding axial leaded versions unless otherwise specified.

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

Inspection	MIL-STD-750		Sample plan
	Method	Conditions	
<u>Subgroup 1</u>			n = 45, c = 0
Temperature cycling	1051	Condition C, 500 cycles, -65°C to +175°C.	
Hermetic seal	1071	Gross leak.	
Electrical measurements		See table III , steps 1, 2, 3, 4, and 5.	
<u>Subgroup 2</u>			n = 22, c = 0
Steady-state dc blocking life	1038	1,000 hours, condition A; $V_R = V_{RWM}$.	
Electrical measurements		See table III , steps 1, 2, 3, and 4.	
<u>Subgroup 4</u>			
Thermal impedance curves		See MIL-PRF-19500 .	
<u>Subgroup 5</u>			n = 22, c = 0
Barometric pressure (reduced), (altitude operation)	1001	Pressure (see 1.3); time = 1 minute minimum; $V_R = V_{RWM}$ (see 1.3); $I_{R1} =$ (see 1.4).	
<u>Subgroup 6</u>			
ESD	1020		
<u>Subgroup 9</u>			n = 45, c = 0
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>			n = 22, c = 0
Monitored mission temperature cycling	1055		
Electrical measurements		See table I , subgroup 2	

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

Step	Inspection <u>4/</u>	MIL-STD-750		Symbol	Limits	Limits	Unit
		Method	Conditions		Min	Max	
1.	Forward voltage	4011	Condition B, $I_F = 400$ mA dc, (pulsed, see <u>4.5.1</u>), 2 percent duty cycle maximum, 8.3 ms maximum pulse width.	V_{F1}	0.8	1.0	V dc
2.	Reverse current 1N645-1 1N647-1 1N649-1	4016	Condition A or B $V_R = 225$ V(pk) $V_R = 400$ V(pk) $V_R = 600$ V(pk)	I_{R1}		.05 .05 .05	μ A dc μ A dc μ A dc
3.	Reverse current 1N645-1 1N647-1 1N649-1	4016	Condition A or B $V_R = 225$ V(pk) $V_R = 400$ V(pk) $V_R = 600$ V(pk)	ΔI_{R1} <u>5/</u>		100 percent of initial value or ± 0.010 μ A dc, whichever is greater.	
4.	Forward voltage change	4011	Condition B, $I_F = 400$ mA dc, pulsed (see <u>4.5.1</u>).	ΔV_{F1}	± 50 mV dc maximum change from previous measured value.		
5.	Thermal impedance	3101	See <u>4.3.1</u>	$Z_{\theta JX}$		35	$^{\circ}\text{C/W}$

- 1/ The electrical measurements for table E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500 are as follows:
- Subgroup 2, see table III herein, steps 1 and 2.
 - Subgroup 3, see table III herein, steps 1, 2, 3, and 5.
 - Subgroup 6, see table III herein, steps 1, 2, 3, and 5.
- 2/ The electrical measurements for table E-VII of MIL-PRF-19500 are as follows:
- Subgroup 2, see table III herein, steps 1, 2, and 5.
 - Subgroup 6, see table III herein, steps 1, 2, 3, and 5.
- 3/ Electrical measurements for table E-IX of MIL-PRF-19500 are as follows:
- Subgroup 1, see table III herein, steps 1, 2, 3, and 5.
 - Subgroup 2, see table III herein, steps 1, 2, 3, 4, and 5.
- 4/ Electrical characteristics for UR suffix devices are identical to the corresponding non-UR suffix devices unless otherwise specified.
- 5/ Devices exceeding table I limits for this test shall not be acceptable.

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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.)

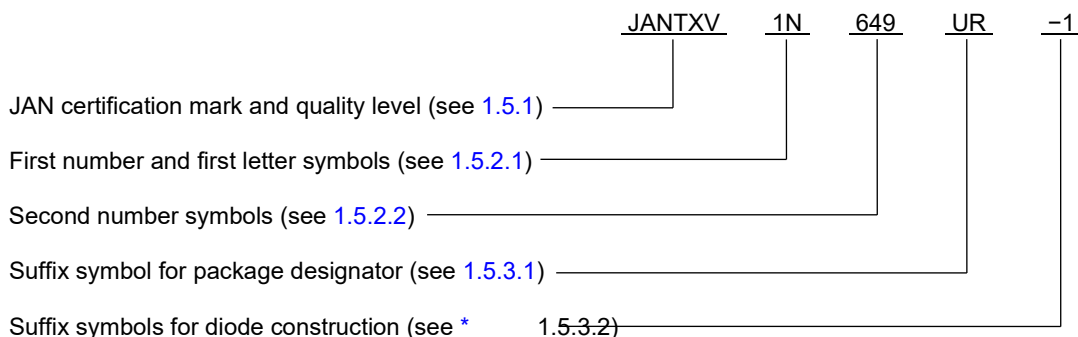
6.1 Intended use. Semiconductors conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

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 material finish may be specified (see 3.4.1).
- d. The complete PIN, see 1.5 and 6.4.

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

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



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

Axial lead package					
Quality level JAN		Quality level JANTX		Quality level JANTXV	
JAN1N645-1	JAN1N645	JANTX1N645-1	JANTX1N645	JANTXV1N645-1	JANTXV1N645
JAN1N647-1	JAN1N647	JANTX1N647-1	JANTX1N647	JANTXV1N647-1	JANTXV1N647
JAN1N649-1	JAN1N649	JANTX1N649-1	JANTX1N649	JANTXV1N649-1	JANTXV1N649

SMD package		
Quality level JAN	Quality level JANTX	Quality level JANTXV
JAN1N645UR-1	JANTX1N645UR-1	JANTXV1N645UR-1
JAN1N647UR-1	JANTX1N647UR-1	JANTXV1N647UR-1
JAN1N649UR-1	JANTX1N649UR-1	JANTXV1N649UR-1

6.6 Substitution information.

* 6.6.1 Substitutability. Pressure bonded (non metallurgical bonded) devices have been removed from this specification. Metallurgical bonded devices are a direct substitute for pressure bonded (non metallurgical bonded) devices and are preferred. Pressure bonded devices in stock are acceptable provided the date code does not exceed 10 February 1993. Existing supplies of the Pressure bonded (Non metallurgical bonded) parts may be used until exhausted. The following table shows the direct substitutability.

Superseding PIN	Superseded PIN
Metallurgical bonded Added in MIL-S-19500/240F dated 21 February 1994	Pressure bonded (non metallurgical bonded) Devices 10 February 1993 or older
1N645-1	1N645
1N647-1	1N647
1N649-1	1N649

6.6.2 Cross reference substitution list for Quality level JANS. JANS devices are prohibited and will no longer be built or qualified to MIL-PRF-19500/240. Completed devices in stock are acceptable provided the date code does not exceed 9420. Devices required for space flight applications are found in [MIL-PRF-19500/587](#). Existing supplies of JANS1N645-1, JANS1N647-1, and JANS1N649-1 can be used until existing supplies are exhausted. PIN for PIN replacement follows, and are directly interchangeable:

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

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6.7 Superseded device types. The following device types were superseded through previous revisions of this specification sheet.

Superseded PINs that were specified within MIL-S-19500/240A dated 28 March 1963	Superseded PINs that were specified within MIL-S-19500/240 dated 23 April 1962	Superseded PINs that were specified within MIL-E-1/1143(USAF) dated 22 April 1958
1N645	1N645M	1N645
1N647	1N647M	1N647
1N649	1N649M	1N649

6.8 Amendment notations. The margins of this specification are marked with asterisks 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.

CONCLUDING MATERIAL

Custodians:

Army – CR
Navy – SH
Air Force – 85
NASA – NA
DLA – CC

Preparing activity:
DLA – CC

(Project 5961-2026-027)

Review activities:

Army – AR, AV, MI
Navy – AS, MC
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>.