

The documentation and process conversion measures necessary to comply with this document shall be completed by 10 December 2014.

INCH-POUND

MIL-PRF-19500/240T
 10 September 2014
 SUPERSEDING
 MIL-PRF-19500/240R
 13 August 2009

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 use as a general purpose silicon rectifier diode or as a low speed switching rectifier 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](#) (DO-35) and [figure 2](#) (DO-213AA).

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

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} $t_p = 1/120 \text{ s}$ $T_A = +25^\circ\text{C}$	T_J and T_{STG}	Barometric pressure, reduced	$R_{\theta JL}$ L = .375 inch (9.53 mm)	$R_{\theta JEC}$ (UR)
	V (pk)	V dc	mA	mA	A	$^\circ\text{C}$	mm Hg	$^\circ\text{C/W}$	$^\circ\text{C/W}$
1N645-1, UR-1	270	225	400	150	5	-65 to +175	8	250	100
1N647-1, UR-1	480	400	400	150	5	-65 to +175	8	250	100
1N649-1, UR-1	720	600	400	150	5	-65 to +175	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/ $^\circ\text{C}$ between $+25^\circ\text{C}$ to $+150^\circ\text{C}$. Derate 6 mA/ $^\circ\text{C}$ between $+150^\circ\text{C}$ to $+175^\circ\text{C}$.

^{1/} See [6.2.2](#).

* 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>.

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

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.

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

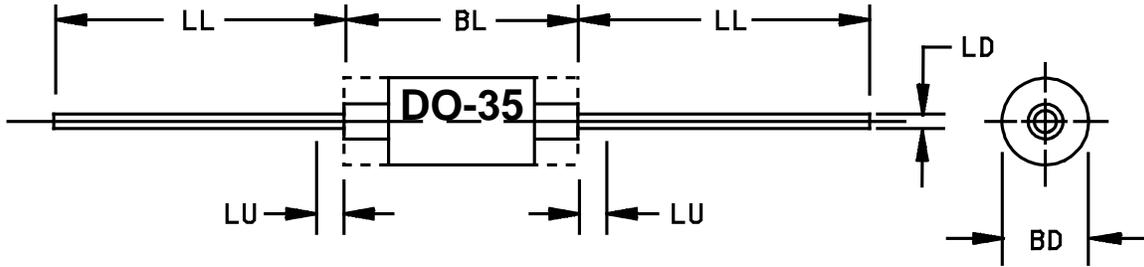
MIL-PRF-19500/587 - Semiconductor Device, Diode, Silicon, Rectifier, Types 1N6661, 1N6662, 1N6663, 1N6661US, 1N6662US and 1N6663US, JAN, JANTX, JANTXV, AND JANS

DEPARTMENT OF DEFENSE STANDARDS

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

* (Copies of these documents are available online at <http://quicksearch.dla.mil>.)

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

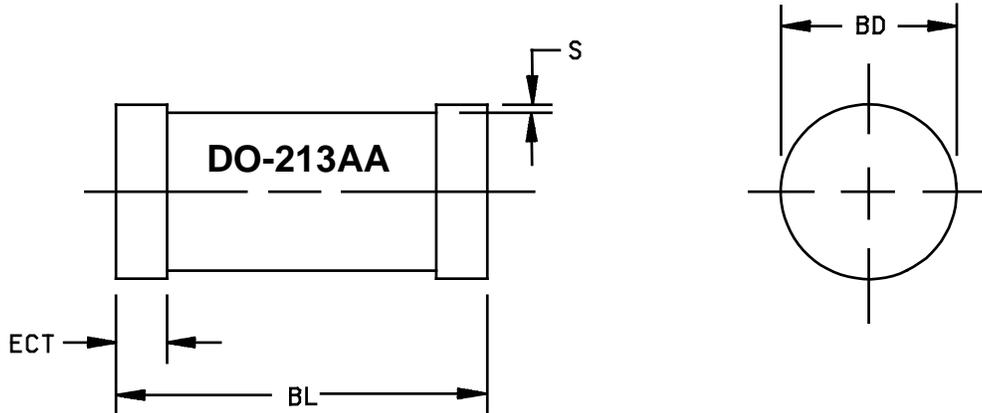


Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.055	.090	1.40	2.29	5
BL	.120	.200	3.05	5.08	3
LD	.018	.022	0.46	0.56	
LL	1.000	1.500	25.40	38.10	
LU		.050		1.27	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. The BL dimension 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.
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 (DO-35).



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		0.03	

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 Φ x symbology.

FIGURE 2. Physical dimensions for types 1N645UR-1, 1N647UR-1, and 1N649UR-1(DO-213AA).

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 UR devices. For 'UR' version devices only, all marking, except polarity, may be omitted from the body, but shall be retained on the initial container. Polarity marking shall consist, as a minimum, a band or three contrasting dots spaced equally around the periphery of the cathode.

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.

3.6 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 Diode, Silicon, Rectifier 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 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 III](#) herein.

4.3 Screening (JANTXV, JANTX 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 table E-IV of MIL-PRF-19500)	Measurement
	JANTXV and JANTX levels
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_{SW} (V_C and V_H where appropriate). Measurement delay time (t_{MD}) = 70 μ s max. 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.

4.3.2 Power burn-in conditions. Power burn-in conditions are as follows (see [4.5.3](#)): Method 1038 of [MIL-STD-750](#), condition B. V_R = rated V_{RWM} ; $f = 50 - 60$ Hz. $T_A = 35^\circ\text{C}$ maximum; $I_O(\text{PCB}) = 400$ 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 product which is either category II or III 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. 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.

* 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 [4.4.2.1](#) herein.

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4.4.2.1 Group B inspection, table E-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 E-VII of MIL-PRF-19500, 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, $t = 15 \pm 3$ 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, $T_J = +150^\circ\text{C}$ 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.

* 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. 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. Method 3100 of MIL-STD-750 shall be used to measure T_J .

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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	$I_F = 400$ 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	4016	DC method	I_{R1}			
1N645-1		$V_R = 225$ V dc			.05	μA dc
1N647-1		$V_R = 400$ V dc			.05	μA dc
1N649-1		$V_R = 600$ V dc			.05	μA dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = 150^\circ\text{C}$				
Forward voltage	4011	$I_F = 400$ 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	4016	DC method	I_{R2}			
1N645-1		$V_R = 225$ V dc			50	μA dc
1N647-1		$V_R = 400$ V dc			50	μA dc
1N649-1		$V_R = 600$ V dc			50	μA dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/2/</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	$I_F = 400\text{ mA dc}$, (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, $f = 60\text{ Hz}$.	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	$V_R = 4\text{ V dc}$, $f = 1\text{ MHz}$, $V_{SIG} = 50\text{ mV(pk-pk)}$ 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, one surge per minute.				
Electrical measurements		In accordance with table III , steps 1, 2, and 5.				

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 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		Sampling plan
	Method	Conditions	
<u>Subgroup 1</u>			n = 45
Temperature cycling	1051	500 cycles, -65°C to +175°C, condition C.	
Hermetic seal gross leak	1071		
Electrical measurements		See table III , steps 1, 2, 3, 4, and 5.	
<u>Subgroup 2</u>			n = 22
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
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		
<u>Subgroup 9</u>			n = 45
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	

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

Step	Inspection 4/	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Forward voltage	4011	$I_F = 400$ 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
2.	Reverse current	4016	DC method;	I_{R1}			
	1N645-1		$V_R = 225$ V(pk)			.05	μ A dc
	1N647-1		$V_R = 400$ V(pk)			.05	μ A dc
	1N649-1		$V_R = 600$ V(pk)			.05	μ A dc
3.	Reverse current	4016	DC method;	ΔI_{R1} 5/			
	1N645-1		$V_R = 225$ V(pk)				
	1N647-1		$V_R = 400$ V(pk)				
	1N649-1		$V_R = 600$ V(pk)				
4.	Forward voltage change	4011	$I_F = 400$ mA dc, pulsed (see 4.5.1).	ΔV_{F1}		± 50 mV dc maximum change from previous measured value.	
5.	Thermal impedance	3101	See 4.3.1	$Z_{\theta JX}$		35	$^{\circ}$ C/W

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

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 Part or Identifying Number (PIN), see title and section 1.

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.

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6.2.2 Cross reference substitution list. JANS level is prohibited and will no longer be built or qualified to MIL-PRF-19500/240. 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

6.2.3 Substitutability of dash-one parts. 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. The following table shows the direct substitutability.

Superseded PIN	Superseding PIN
1N645	1N645-1
1N647	1N647-1
1N649	1N649-1

* 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 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 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 previous issue.

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

Preparing activity:
DLA - CC

(Project 5961-2014-131)

Review activities:
Army - AR, AV, MI
Navy - AS, MC
Air Force - 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 <https://assist.dla.mil>.