

The documentation and process conversion measures necessary to comply with this revision shall be completed by 3 May 2012.

INCH-POUND
MIL-PRF-19500/187B
w/AMENDMENT 1
3 February 2012
SUPERSEDING
MIL-PRF-19500/187B
10 February 2005

PERFORMANCE SPECIFICATION SHEET
SEMICONDUCTOR DIODE, DILICON, HIGH-VOLTAGE
TYPE JAN1N2361

Inactive for new design after 7 June 1999.

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 semiconductor diodes for use in high-voltage, rectifier circuits, and having the following particular characteristics. One level of product assurance is provided for each device type as specified in MIL-PRF-19500.

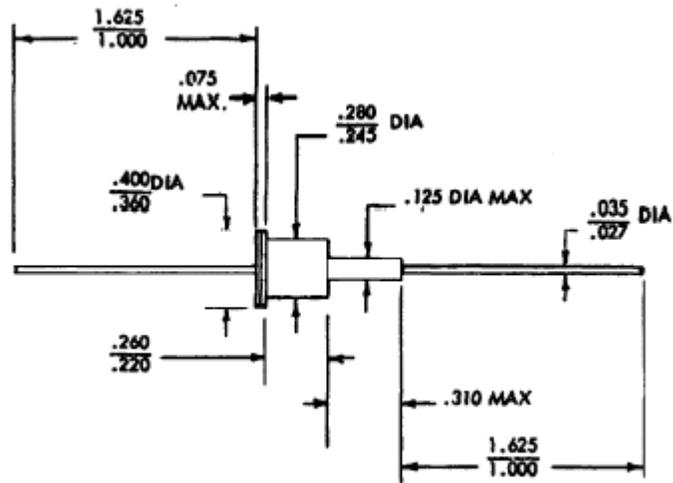
1.2 Physical dimensions. See figure 1.

1.3 Maximum ratings. Unless otherwise specified, maximum ratings apply to all case outlines, $T_A = +25^\circ\text{C}$.

V_r	V_R	I_O	I_O $T_A = +125^\circ\text{C}$	i (surge) (at 1/120 sec)	T_J and T_{STG}	Altitude
<u>V dc</u>	<u>V dc</u>	<u>mA dc</u>	<u>mA dc</u>	<u>A</u>	<u>°C</u>	<u>ft</u>
2,300	2,000	400	50	10	-65 to+150	40,000

* 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.daps.dla.mil/>.

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NOTES:

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

* FIGURE 1. Physical dimensions, 1N2361.

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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 <https://assist.daps.dla.mil/quicksearch/> or <https://assist.daps.dla.mil/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

3. REQUIREMENTS

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

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

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

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figure 1.

3.4.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4.2 Operating position. The semiconductor diode shall be capable of proper operation in any position.

3.4.3 Polarity indication. The graphic symbol for polarity indication on the semiconductor diode shall be as designated in MIL-PRF-19500.

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

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

3.7 Marking. Marking shall be in accordance with MIL-PRF-19500.

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. Conformance inspection (see 4.3, and table I).

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 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 II tests, the tests specified in table II herein shall be performed by the first inspection lot of this revision to maintain qualification. Group E qualification by extension may be granted for this specification if the qualifying activity determines it is structurally identical to other qualified devices.

4.3 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.3.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500 and table I herein.

4.3.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VIb (JAN) of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B2	4066	$I_O = 50 \text{ mA dc}$, $V_R = 1,400 \text{ V dc}$, $T_A = +125^\circ\text{C min.}$ 1 surge = 10 A dc, 5 surges of 1/120 sec each.
B3	1026	$V_R = 1,400 \text{ V dc}$, $I_O = 50 \text{ mA dc}$, $T_A = +125^\circ\text{C min.}$ $f = 60 \text{ Hz}$.

4.3.3 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. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Condition E, weight = 1 lb; condition A, weight = 2 lb, duration = 30 sec.
C6	1026	$V_R = 1,400 \text{ V dc}$, $I_O = 50 \text{ mA dc}$, $T_A = +125^\circ\text{C min.}$ $f = 60 \text{ Hz}$.

* 4.3.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of MIL-PRF-19500 and as specified in table II herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

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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 inspection	2071					
<u>Subgroup 2</u>						
Forward voltage	4011	$I_F = 400 \text{ mA}$	V_{F1}		2	V dc
Reverse current leakage	4016	$V_R = 2,000 \text{ V dc}$	I_{R1}		5	$\mu\text{A dc}$
Reverse current leakage	4016	$V_r = 2,300 \text{ V}$	I_{R2}		100	$\mu\text{A dc}$
<u>Subgroup 3</u>						
High temperature operation:		$T_A = +125^\circ\text{C}$				
Reverse current leakage	4016	$I_O = 50 \text{ mA dc}; V_R = 1,400 \text{ V dc}$	I_{R3}		200	$\mu\text{A dc}$
Low temperature operation:		$T_A = -65^\circ\text{C}$				
Peak reverse voltage	4016	$V_r = 2,000 \text{ V}$	I_{R4}		100	$\mu\text{A dc}$
Forward voltage	4011	$I_F = 400 \text{ mA}$	V_{F2}		2.5	V dc
<u>Subgroups 4, 5, 6, and 7</u>						
Not applicable						

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

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

Inspection	MIL-STD-750		Qualification and large lot quality conformance inspection
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling	1051	-55°C to +150°C, 500 cycles	
Hermetic seal Fine leak Gross leak	1071		
Electrical measurements		Table I, subgroup 2 herein.	
<u>Subgroup 2</u>			45 devices c = 0
Steady-state operation life	1026	$V_R = 1,400$ V dc, $I_O = 50$ mA dc, $T_A = +125^\circ\text{C}$ min. $f = 60$ Hz	
Electrical measurements		Table I, subgroup 2 herein.	
<u>Subgroup 4</u>			
Thermal impedance curves		See subgroup 4, table E-IX of MIL-PRF-19500.	
<u>Subgroup 5</u>			3 devices c = 0
Barometric pressure	1001	See 1.3	
<u>Subgroup 6</u>			
ESD	1020		

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Packaging requirements (see 5.1).
- c. Lead finish (see 3.4.1).
- d. Product assurance level and type designator.

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

* 6.5 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.

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Custodians:

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

Preparing activity:
DLA - CC

(Project 5961-2011-080)

Review activities:

Army - AR, AV, MI, SM
Navy - AS, MC, OS, SH
Air Force - 19, 70, 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.daps.dla.mil>.