The documentation and process conversion measures necessary to comply with this revision shall be completed by 25 May 2004.

INCH-POUND
MIL-PRF-19500/199C
25 February 2004
SUPERSEDING
MIL-PRF-19500/199B
8 July 2003

* PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, FORWARD-VOLTAGE REGULATOR, TYPE 1N816, JAN

MIL-PRF-19500/199C is inactive for new design as of 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, forward-voltage regulator, with a nominal forward-voltage drop of 0.64 V dc at 1 mA dc and with the following ratings and characteristics. One level of product assurance is provided for each type of device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (DO-7).

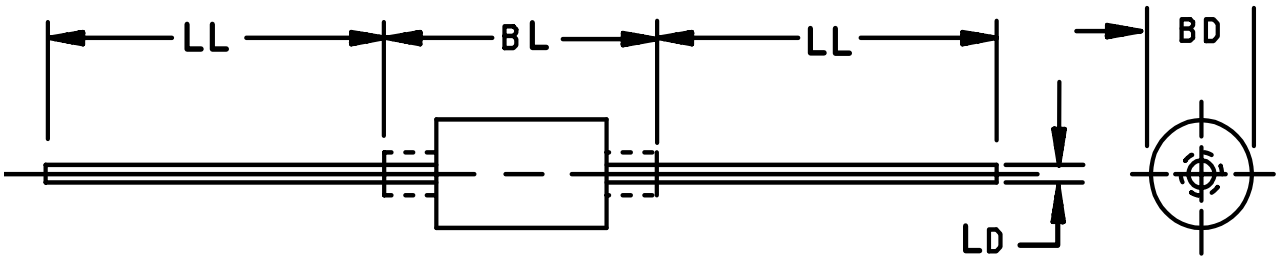
1.3 Maximum ratings.

V_r	$V_{RM(wkg)}$	I_F	$I_{f(surge)}$ 1/120 sec	T_J	T_{STG}
V(pk)	V(pk)	mA dc	mA dc	-65°C to +150°C	-65°C to +175°C
10	6	150	500		

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.

* 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@dscc.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/.



Dimensions					Notes
Ltr	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.085	.130	2.16	3.30	3
BL	.230	.300	5.84	7.62	4
LD	.018	.022	0.46	0.56	4
LL	1.000	1.500	25.40	38.10	

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimension BD shall be measured at the largest diameter.
4. Dimensions BL and LD include all components of the diode periphery except the sections of the leads over which the diameter is controlled.
5. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions (DO-7).

2.2 Government documents.

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

* DEPARTMENT OF DEFENSE SPECIFICATIONS

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

* DEPARTMENT OF DEFENSE STANDARDS

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

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

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

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 Diode construction. All devices shall be metallurgically bonded double plug construction in accordance with the requirements of category I, II, or III.

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

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.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in paragraph 1.3 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. Conformance inspection (see 4.3).

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

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. End-point electrical measurements shall be in accordance with table I, subgroup 2 herein.

4.3.1.1 Thermal impedance $Z_{\Theta JX}$ measurements. Thermal impedance $Z_{\Theta JX}$ measurements shall be performed in accordance with method 3101 of MIL-STD-750.

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

4.3.2.1 Group B inspection, table VIb of MIL-PRF-19500.

Subgroup	Method	Condition
B3	1027	I_f = 150 mA dc, V_{RWM} = 6 V (pk) (see 4.4.1).
B5		Not applicable.

4.3.3 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 the table I, subgroup 2 herein.

Subgroup	Method	Condition
C2	2036	Lead fatigue: Test condition E.
C6	1026	I_f = 150 mA dc, V_{RWM} = 6 V (pk) (see 4.4.1).

4.4 Methods of inspection. Methods of inspection shall be as specified in table I, and as follows:

4.4.1 Steady-state operation life. This test may be conducted with a half-sine wave form of the specified peak voltage impressed across the diode in the reverse direction followed by a half-sine wave form of the specified average rectifier current. The forward conduction angle of the rectified current shall not be greater than 180 degrees nor less than 150 degrees, and the power shall be equal to or greater than that of a half-sine wave.

4.4.2 Surge current I_f(surge). The surge current (I_f(surge) = 500 mA dc) shall be applied in the forward direction and shall be superimposed on the current (I_O = 150 mA dc) a total of ten surges at 1 minute intervals. Each individual surge shall be a square wave pulse of 1/120 second duration or an equivalent one half sine wave with the same effective (rms) current.

* 4.4.3 Pulse measurements. Conditions for pulse measurements shall be specified in section 4 of MIL-STD-750.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Thermal impedance	3101	See 4.3.1.1	$Z_{\Theta JX}$		70	°C/W
Forward voltage	4011	I_F = 1.0 mA dc	V_F	0.576	0.704	V dc
Forward voltage	4011	I_F = 100 mA dc	V_{F1}		1.0	V dc
Dynamic resistance		I_F = 1.0 mA dc; I_{AC} = 0.1 mA (rms); f = 60 cps	R		50	ohms
Reverse current at peak reverse voltage	4016	V_R = 10 V (pk)	I_r		10	µA (pk)
Reverse current	4016	V_R = 6 V dc	I_R		100	nA dc
Subgroup 3						
High temperature operation:		T_A = +150°C				
Reverse current	4016	DC method, V_R = 6 V dc	I_{R2}		10	µA dc
Low temperature operation:		T_A = -55°C				
Forward voltage	4011	I_F = 100 mA (pk) (pulsed); t_p = 8.5 ms (max), duty cycle ≤ 2%.	V_{F2}		1.2	V dc
Subgroups 4 and 5						
Not applicable						
Subgroup 6						
Surge current	4066	I_F = 150 mA dc; T_A = 25°C, I_{FSM} = 500 ma (pk), ten 1 µs surges, 1 surge/minute				
Electrical measurements		See table I, subgroup 2				

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

5. PACKAGING

* 5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The notes specified in MIL-PRF-19500 are applicable to this specification.

* 6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.

b. Packaging requirements (see 5.1).

c. Lead finish (see 3.4.1).

d. Product assurance level and type designator.

* 6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML-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.

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2859)

Review activities:
Army - AR, 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 http://www.dodssp.daps.mil/.