The documentation and process conversion measures necessary to comply with this revision shall be completed by 28 December 2001.

INCH-POUND

MIL-PRF-19500/193D
28 September 2001
SUPERSEDING
MIL-S-19500/193C
15 September 1971

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, DIODE, SILICON, RECTIFIER
TYPES 1N457, 1N458, AND 1N459,
JAN

Inactive for new design.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the performance requirements for silicon diode rectifiers. One level of product assurance is provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (similar to D0-7).

1.3 Maximum ratings.

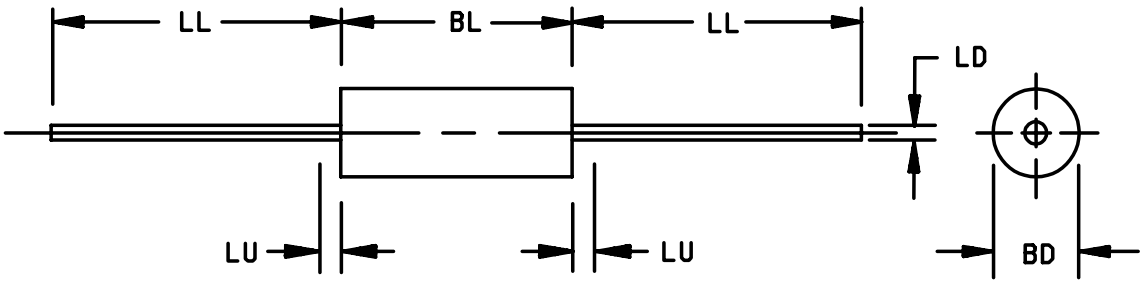
Type (1)	V_{RM}	V_{RWM}	I_O T_A = +25°C (1)	T_{op} and T_{STG}	i_F
	V (pk)	V (pk)	mA dc	°C	mA
1N457	70	60	75	-65 to +175	225
1N458	150	125	55	-65 to +175	165
1N459	200	175	40	-65 to +175	120

(1) Derate I_O linearly to 0.0 mA dc at +150°C.

1.4 Primary electrical characteristics at T_A = +25°C, unless otherwise indicated.

Type	V_{F1}	I_{R1} at V_{RWM}	I_{R2} at V_{RWM} T_A = +150°C
	V dc	nA dc	µA dc
1N457	1.0	25	5
1N458	1.0	25	5
1N459	1.0	25	5

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.



Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.085	.130	2.16	3.30	3
BL	.230	.300	5.84	7.62	
LD	.018	.023	0.46	0.58	2
LL	1.000	1.500	25.40	38.10	
LU		.050		1.27	

NOTES:
1. Dimensions are in inches. Metric equivalents are given for general information only.
2. The specified lead diameter applies in the zone between .050 (12.7 mm) and 1.00 inch (25.4 mm) from the diode body. Outside this zone the lead diameter is not controlled.
3. The minimum body diameter shall be maintained over .15 inch (3.18 mm) of body length.
4. In accordance with ANSI Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions.

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 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

DEPARTMENT OF DEFENSE

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

STANDARD

DEPARTMENT OF DEFENSE

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, 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 requirements for acquiring the product described herein shall consist of this document and MIL-PRF-19500.

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. 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 herein.

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 (see MIL-PRF-19500, paragraph 30.14 and subparagraphs).

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, 1.4, and table I.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in paragraphs 4.4.2 and 4.4.3.

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.

4.3 Screening. Screening is not required for JAN level devices.

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. Electrical measurements (end-points) shall be in accordance with the table I, group A, subgroup 2 herein. The following test conditions shall be used for $Z_{\theta JX}$, group A inspection:

a. I_M measurement 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 us (max).

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) of MIL-PRF-19500 and as follows. Electrical measurements (end-points) shall be in accordance with the table I, group A, subgroup 2 herein.

4.4.2.1 Group B inspection, table VIb (JAN) of MIL-PRF-19500.

Subgroup	Method	Condition
B3	1027	All devices shall be operated under one of the following conditions:

Type	T_A = +25°C, ±3°C I_O = 200 mA f = 60 Hz	T_A = +25°C, ±3°C
1N457	V_{RWM} = 60 V(pk)	I_F = 175 mA
1N458	V_{RWM} = 125 V(pk)	I_F = 175 mA
1N459	V_{RWM} = 175 V(pk)	I_F = 175 mA

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 the table I, group A, subgroup 2 herein (except for thermal impedance).

Subgroup	Method	Condition
C2	2036	Lead fatigue: Test condition E.
C6	1026	All devices shall be operated under one of the following conditions:

Type	T_A = +25°C, ±3°C I_O = 200 mA f = 60 Hz	T_A = +25°C, ±3°C
1N457	V_{RWM} = 60 V(pk)	I_F = 175 mA
1N458	V_{RWM} = 125 V(pk)	I_F = 175 mA
1N459	V_{RWM} = 175 V(pk)	I_F = 175 mA

4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Thermal impedance	3101	See 4.4.1 (not required for end-point electricals)	$Z_{\theta JX}$		70	°C/W
Forward voltage	4011		V_{F1}		1.0	V
1N457		I_F = 20 mA				
1N458		I_F = 7 mA				
1N459		I_F = 3 mA				
Reverse current	4016	DC method	I_{R1}			
1N457		V_R = 60 V			25	nA dc
1N458		V_R = 125 V			25	nA dc
1N459		V_R = 175 V			25	nA dc
Reverse current	4016	AC method, f = 60 Hz	I_{R2}			
1N457		V_R = 70 V (pk)			100	µA dc
1N458		V_R = 150 V (pk)			100	µA dc
1N459		V_R = 200 V (pk)			100	µA dc
Subgroup 3						
High temperature operation		T_A = +150°C				
Reverse current	4016		I_{R3}			
1N457		V_R = 60 V (pk)			5	µA dc
1N458		V_R = 125 V (pk)			5	µA dc
1N459		V_R = 175 V (pk)			5	µA dc
Subgroups 4, 5, and 6						
Not applicable						

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 personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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. The acquisition requirements are as specified in MIL-PRF-19500.

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) 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.

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - CR
DLA - CC

Review activities:
Army - AR, MI, SM

Preparing activity:
DLA - CC

(Project 5961-2490)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-19500/193D	2. DOCUMENT DATE 28 September 2001

3. **DOCUMENT TITLE** SEMICONDUCTOR DEVICE, DIODE, SILICON, RECTIFIER TYPES 1N457, 1N458, AND 1N459, JAN

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) COMMERCIAL DSN FAX EMAIL	7. DATE SUBMITTED

8. PREPARING ACTIVITY

a. Point of Contact Alan Barone	b. TELEPHONE Commercial 614-692-0510	 DSN 850-0510	 FAX 614-692-6939	 EMAIL alan.barone@dscc.dla.mil
c. ADDRESS Defense Supply Center Columbus ATTN: DSCC-VAC P.O. Box 3990 Columbus, OH 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman, Suite 2533 Fort Belvoir, VA 22060-6221 Telephone (703) 767-6888 DSN 427-6888			