

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, DIODE, SILICON, HIGH-CONDUCTANCE

TYPE JAN-1N3207

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

1. SCOPE

1.1 Scope. This specification covers the detail requirements for silicon, high-conductance diodes, for use as thin-film or magnetic-core drivers.

1.2 Maximum ratings:

v_r	$V_{RM}(wkg)$	$I_O \frac{1}{T_A = 25^\circ C}$	i_f (surge) (at 1 μ sec)
<u>v(pk)</u>	<u>v(pk)</u>	<u>mAdc</u>	<u>a</u>
60	45	100	2.0

$\frac{1}{}$ Derate at 0.8 mAdc/ $^\circ C$ above $T_A = 25^\circ C$.

OPERATING AMBIENT TEMPERATURE: $-65^\circ C$ to $+150^\circ C$

STORAGE TEMPERATURE: $-65^\circ C$ to $+200^\circ C$

BAROMETRIC PRESSURE, REDUCED: 8 mm Hg

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein:

SPECIFICATIONS

Military

MIL-S-19500 - Semiconductor Devices, General Specification for

STANDARDS

Military

MIL-STD-750 - Test Methods for Semiconductor Devices

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

FSC 5960

3. REQUIREMENTS

3.1 General. Requirements shall be in accordance with MIL-S-19500, and as specified herein.

3.2 Abbreviations and symbols. The abbreviations and symbols used herein are defined in MIL-S-19500.

3.3 Design and construction. The semiconductor diodes shall be of the design, construction, and physical dimensions specified in figure 1.

3.4 Performance characteristics. Performance characteristics shall be as specified in tables I, II, and III.

3.5 Marking. The marking specified in MIL-S-19500 shall be placed on either the unit package, a tag, or holding strip of the device (see figure 1).

3.6 Salt spray (corrosion). The markings shall be legible after the test. There shall be no evidence (when examined with no magnification) of flaking or pitting of the finish or corrosion that will interfere with the mechanical and electrical application of the device.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-S-19500, and as specified herein.

4.2 Qualification inspection. Qualification inspection shall consist of the examinations and tests specified in tables I, II, and III.

4.3 Quality conformance inspection. Quality conformance inspection shall consist of the examinations and tests specified in Groups A, B and C inspections.

4.4 Group A inspection. Group A inspection shall consist of the examinations and tests specified in table I.

4.5 Group B inspection. Group B inspection shall consist of the examinations and tests specified in table II.

4.6 Group C inspection. Group C inspection shall consist of the tests specified in table III and shall be conducted during qualification and thereafter every 6 months (when in production).

4.7 Methods of examination and test. Methods of examination and test shall be as specified in tables I, II, and III, and as follows:

4.7.1 High-temperature operation test. The specified measurements for reverse current test shall be made after thermal equilibrium has been reached in the chamber at the temperature specified.

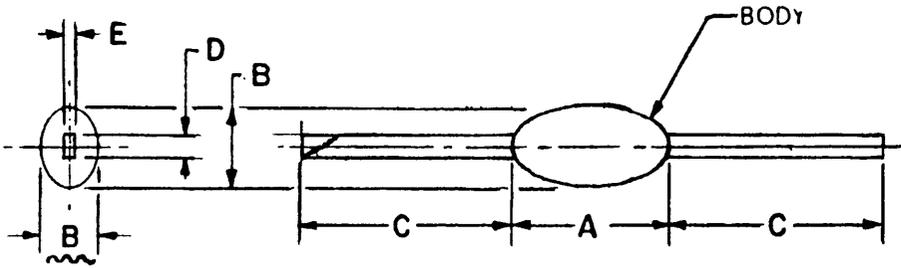
4.7.2 Steady state operation life. This test shall be conducted with a half-sine wave of the specified peak voltage impressed across the diode in the reverse direction followed by a half-sine wave form of the specified average rectified current. The forward conduction angle of the rectified current shall not be greater than 180° nor less than 130°, and the power shall be equal to or greater than that of a half-sine wave.

4.7.3 Pulse measurement. Pulse measurements shall be in accordance with Section 4 of MIL-STD-750.

4.7.4 Handling precautions. There shall be a spacing of 0.4 inch, minimum, between the clips holding the diodes on the life-test rack; with the diode body centrally located between the clips.

4.7.5 Salt spray (corrosion). The diode shall be examined for evidence of corrosion and legibility of marking before the specified measurements are made.

4.7.6 End points. The end points for steady state operation life test shall be conducted at 340, 670 and 1,000 hours.



DIMENSIONS					NOTE
LTR	INCHES		MILLIMETERS		
	MIN	MAX	MIN	MAX	
A		.100		2.54	4
B		.045		1.14	
C	.465		11.82		
D	.018	.022	.46	.55	
E	.003	.005	.08	.12	

NOTES:

1. Dimensions are in inches.
2. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
3. For marking see 3.5.
4. Both leads shall be within the specified limit.
5. A contrasting dot or color band shall be placed on the cathode end of the device.

Figure 1. Semiconductor device, type 1N3207.

Table I. Group A inspection.

Examination or test	MIL-STD-750		L T P D	Symbol	Limits		
	Method	Details			Min	Max	Unit
<u>Subgroup 1</u>			5				
Visual and mechanical examination	2071			---	---	---	---
<u>Subgroup 2</u>			5				
Forward voltage (see 4.7.3)	4011	Pulse; $I_F = 150 \text{ mAdc}$		V_F	---	1.0	Vdc
Reverse current	4016	$V_{RM}(wkg) = 20 \text{ Vdc}$		I_R	---	.05	μAdc
Reverse recovery time	4031	Test cond B; $I_F = 10 \text{ mAdc}$; $V_R = 6 \text{ Vdc}$; $I_R = 1.0 \text{ mAdc}$; $R_L = 100 \text{ ohms} \pm 5\%$; $C = 15 \text{ pf}$		t_{rr}	---	6.0	nsec
Capacitance	4001	$V_R = 0 \text{ Vdc}$ $f = 1 \text{ mc}$ $V_{sig} = 50 \text{ mv (p-p), max}$		C	---	15	pf
Reverse current (see 4.7.1)	4016	$T_A = 150^{+5}_{-0} \text{ }^\circ\text{C}$ $V_{RM}(wkg) = 20 \text{ Vdc}$		I_R	---	60	μAdc
Reverse current at peak reverse voltage	4016	$v_r = 60 \text{ v(pk)}$		I_r	---	100	$\mu\text{a(pk)}$

Table II. Group B inspection.

Examination or test	MIL-STD-750		L T P D	Symbol	Limits		
	Method	Details			Min	Max	Unit
<u>Subgroup 1</u>			10				
Physical dimensions	2066			---	---	---	---
<u>Subgroup 2</u>			10				
Solderability	2026			---	---	---	---
Thermal shock (temperature cycling)	1051	Test cond C; 10 cycles		---	---	---	---
Thermal shock (glass strain)	1056	Test cond B; $T(\text{high}) = 200^{+5}_{-0} \text{ }^\circ\text{C}$ $T(\text{low}) = -65^{+0}_{-5} \text{ }^\circ\text{C}$		---	---	---	---
Moisture resistance	1021	No initial conditioning		---	---	---	---
End points:							
Forward voltage (see 4.7.3)	4011	Pulse; $I_F = 150 \text{ mAdc}$		V_F	---	1.0	Vdc
Reverse current	4016	$V_{RM}(wkg) = 20 \text{ Vdc}$		I_R	---	.05	μAdc
<u>Subgroup 3</u>			10				
Shock	2016	Nonoperating; 500 G; 3 blows 1 msec each in orientations X_1 and Y_1		---	---	---	---

Table II. Group B inspection. - Continued

Examination or test	MIL-STD-750		L T P D	Symbol	Limits		
	Method	Details			Min	Max	Unit
<u>Subgroup 3 - Continued</u>							
Vibration fatigue (nonoperating)	2046	10 G in orientations X_1 and Y_1		---	---	---	---
Vibration, variable frequency (nonoperating)	2056	Orientations X_1 and Y_1		---	---	---	---
Constant acceleration	2006	20,000 G in orientations X_1 and Y_1		---	---	---	---
End points: (Same as subgroup 2)							
<u>Subgroup 4</u>							
Terminal strength (lead fatigue)	2036	Test cond. E	10	---	---	---	---
End points: (Same as subgroup 2)							
<u>Subgroup 5</u>							
Surge current	4066	Ten 1 μ sec surges at 1 minute intervals; i_f (surge) = 2 a superimposed on $I_0 = 100$ mAdc	10	---	---	---	---
End points: (Same as subgroup 2)							
<u>Subgroup 6</u>							
High-temperature life (nonoperating) (see 4.7.4)	1031	$T_A = +200 \begin{smallmatrix} +5 \\ -0 \end{smallmatrix} ^\circ\text{C}$	$\lambda = 5$	---	---	---	---
End points: (Same as for subgroup 2)							
<u>Subgroup 7</u>							
Steady state operation life (see 4.7.2 and 4.7.4)		$T_A = 25^\circ\text{C};$ $v_r = 45$ v (peak) $I_0 = 100$ mAdc $f = 60$ cps	$\lambda = 5$	---	---	---	---
End points: (Same as subgroup 2, see 4.7.6)							

Table III. Group C inspection.

Examination or test	MIL-STD-750		L T P D	Symbol	Limits		
	Method	Details			Min	Max	Unit
<u>Subgroup 1</u>			10				
Barometric pressure, reduced (altitude operation)	1001	Pressure = 8 mm Hg		---	---	---	---
Measurement during test:							
Reverse current	4016	$V_R = 45$ Vdc; $t = 60$ sec		I_R	---	0.5	μ Adc
<u>Subgroup 2</u>			10				
Salt spray (corrosion) (see 4.7.5)	1046	Test cond. B		---	---	---	---
End points: (Same as subgroup 2, group B)							

5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery. Preparation for delivery shall be in accordance with MIL-S-19500.

6. NOTES

6.1 Notes. The notes specified in MIL-S-19500 are applicable to this specification.

Custodians:

Army - EL
Navy - SH
Air Force - 11

Preparing activity:
Army - EL

(Project 5960-2001)

Review activities:

Army - EL
Navy - SH
Air Force - 11, 17, 85

User activities:

Army - EL, MI
Navy - WP, MC, CG
Air Force - None

SPECIFICATION ANALYSIS SHEET

Form Approved Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.

SPECIFICATION

ORGANIZATION

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

DIRECT GOVERNMENT CONTRACT

SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

YES

NO

IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE

DD FORM 1426
1 APR 63

REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE

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