MIL-S-19500/259A
24 OCTOBER 1963
SUPERSEDING
MIL-S-19500/259(EL)
18 DECEMBER 1962

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICES, DIODES, SILICON, POWER RECTIFIERS

TYPES JAN-1N1130 AND JAN-1N1131

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for silicon semiconductor diodes for use in rectifier circuitry.

1.1.1 JAN-types 1N1130 and 1N1131 are identical except that the 1N1130 is cathode-to-stud, and the 1N1131 is anode-to-stud. Therefore, tests on one type shall be considered as tests on either type.

1.2 Ratings.

	v_r	V_R	I_o $T_C = 100°C.$	V_{RM} (Wkg)	I_o $T_C = 150°C.$	I_f (surge) (1/120 sec) $T_C = 150°C.$	Barometric pressure
	v	*Vdc*	*mAdc*	*v (pk)*	*mAdc*	*a*	*mm Hg*
Minimum	.....	.....	.....	.....	.....	.....	84
Maximum	1700	1500	300	1500	100	1.5	.....

Derating curves for I_o and V_R are shown on figure 2.

OPERATING CASE TEMPERATURE: −65° to +175°C.

STORAGE TEMPERATURE: −65° to +175°C.

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 this specification to the extent specified herein.

FSC 5960

SPECIFICATIONS

MILITARY

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

STANDARDS

MILITARY

MIL-STD-750—Military Standard 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.)

3. REQUIREMENTS.

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

3.2 Abbreviations and symbols.

(a) The abbreviations and symbols used herein are defined in Specification MIL-S-19500, and as follows:

V_{RM}(Wkg) Working peak reverse voltage, MAXIMUM (peak) total value

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.

3.4.1 *Torque (stud).* There shall be no evidence of mechanical damage.

3.5 Marking. The following marking shall be placed on the device:

(a) "JAN" prefix.
(b) Type designation.
(c) Polarity (graphic symbol).
(d) Qualification designating code.
(e) Acceptance date and inspection lot identification.

3.5.1 The manufacturer, at his option, may include the following marking:

(a) Manufacturer's identification.
(b) Country of origin.

3.5.2 All the above markings, except polarity, shall be placed on the unit package.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with Specification 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 Acceptance inspection. Acceptance inspection shall consist of groups A, B, and C.

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

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

4.3.3 *Group C inspection.* Group C inspection shall consist of the examinations and tests specified in table III.

4.3.4 *Salt spray (corrosion).* The devices shall be examined for destructive corrosion and illegible marking.

4.4 Methods of examination and test.

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

4.4.1 *Inspection conditions.* Unless otherwise specified herein, all inspections shall be made at case temperature (T_C) of 25°C.

4.2.2 *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 180°; and the power shall be equal to or greater than that of a half-sine wave.

TABLE I. *Group A inspection*

Examination or test	MIL-STD-750 Method	MIL-STD-750 Details	LTPD	Min Reject No.	Symbol	Limits Min	Limits Max	Limits Unit
Subgroup 1								
Visual and mechanical examination.	2071		5	4	.....	.....	.....	.....
Subgroup 2								
Forward voltage	4011	I_F = 0.8 Adc	5	4	V_F	.....	4	Vdc
Reverse current	4016	V_R = 1500 Vdc			I_R	.....	15	uAdc
Reverse current	4016	T_C = 150°C. V_R = 1500 Vdc			I_R	.....	400	uAdc
Reverse current at peak reverse voltage.	4016	v_r = 1700 v(pk)			i_r	.....	100	uA(pk)

TABLE II. *Group B inspection*

Examination or test	MIL-STD-750 Method	MIL-STD-750 Details	LTPD	Min Reject No.	Symbol	Limits Min	Limits Max	Limits Unit
Subgroup 1								
Physical dimensions ...	2066		10	5	.....	.....	.....	.....
Subgroup 2								
Temperature cycling ..	1051	Test cond C T(high) = 175°C.	10	5	.....	.....	.....	.....
Thermal shock (glass strain).	1056	Test cond A			.....	.....	.....	.....
Moisture resistance[1, 2] ..	1021				.....	.....	.....	.....
End points:								
Forward voltage ..	4011	I_F = 0.8 Adc			V_F	.....	5	Vdc
Reverse current ...	4016	V_R = 1500 Vdc			I_R	.....	30	uAdc
Subgroup 3[1]								
Shock	2016	500G, t = 1 msec; 8 blows each orientation X_1, Y_1, and Y_2.	10	5	.....	.....	.....	.....
Vibration fatigue (non-operating).	2046	10G			.....	.....	.....	.....

See notes below table.

TABLE II. *Group B inspection* (continued)

Examination or test	MIL-STD-750 Method	MIL-STD-750 Details	LTPD	Min Reject No.	Symbol	Limits Min	Limits Max	Limits Unit
Vibration, variable frequency (nonoperating).	2056	10G			.....	.....	.....	.....
Constant acceleration ..	2006	20,000G X_1, Y_1, and Y_2 orientations			.....	.....	.....	.....
End Points: (Same as subgroup 2).								
Subgroup 4[1]			10	5				
Terminal strength:								
Tension	2036	Test cond. A 2 lbs. t = 15 ± 3 sec			.....	.....	.....	.....
Torque (stud) (see 3.3.1).	2036	Test cond. D 15 lbs. in. t = 15 ± 3 sec			.....	.....	.....	.....
Torque (seal)	2036	Test cond. D 10 oz. in. t = 15 ± 3 sec			.....	.....	.....	.....
Bending stress (axial strain).	2036	Test cond. F Method B 3 lbs. t = 15 ± 3 sec			.....	.....	.....	.....
End Points: (Same as subgroup 2).								
Subgroup 5			10	5				
Surge current	4066	i_f(surge) = 1500 mAdc I_F = 100 mAdc T_C = 150°C. 1 surge/minute t_p = 1/120 sec, 5 cycles			.....	.....	.....	.....
End Points: (Same as subgroup 2).								
Subgroup 6[1]			10	5				
Salt spray (corrosion).	1046	Test cond. B, 48 hr.			.....	.....	.....	.....
End points: (Same as subgroup 2).								
Subgroup 7			λ = 5	4				
High-temperature life (nonoperating).	1031	T_A = 175°C.			.....	.....	.....	.....
End points: (Same as subgroup 2).								

See notes below table.

TABLE II. *Group B inspection* (continued)

Examination or test	MIL-STD-750		LTPD	Min Reject No.	Symbol	Limits		
	Method	Details				Min	Max	Unit
Subgroup 8			$\lambda = 10$	4				
Steady state operation (See 4.4.2).	1026	I_o = 100 mAdc V_{RM} (Wkg) = 1500v (pk) T_C = 150°C.			.....	.....	.....	.....
End points: (Same as subgroup 2).								

[1] Destructive tests.
[2] Omit initial conditioning.

TABLE III. *Group C inspection*

Examination or test	MIL-STD-750		LTPD	Min Reject No.	Symbol	Limits		
	Method	Details				Min	Max	Unit
Subgroup 1[1]			10	5				
Barometric pressure, reduced (altitude operation).	1001	34 mm Hg t = 60 sec			.....	.....	.....	.....
Measurement during test:								
Reverse current ...	4016	V_R = 800 Vdc			I_R	.....	15	uAdc

[1] This test shall be conducted on the initial lot and thereafter every six months.

5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery shall conform to Specification MIL-S-19500.

6. NOTES

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

Custodians:

Army—EL

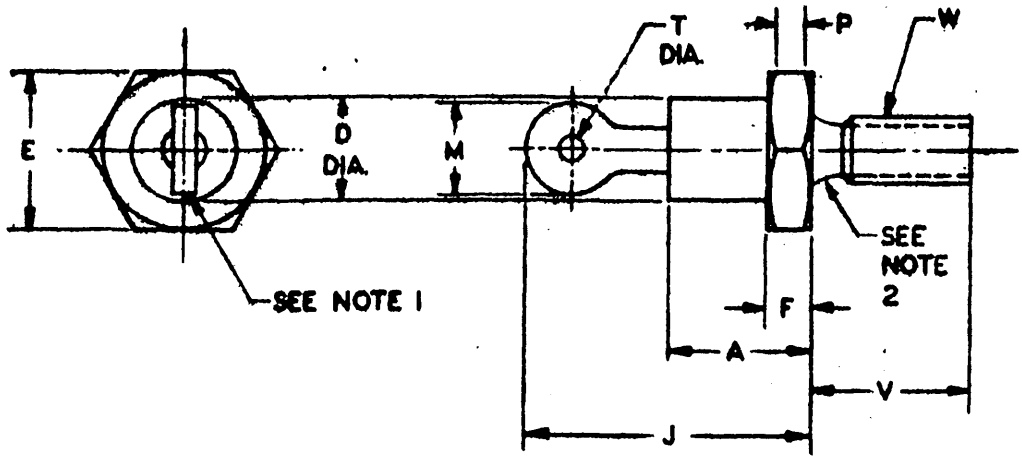
Navy—Ships

Air Force—ASD

Preparing activity:

Army—EL

Project No. 5960-1579



	DIMENSIONS				
DIM.	INCHES		MILLIMETERS		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	---	.405	---	10.29	
D	---	.424	---	10.77	
E	.424	.437	10.77	11.10	
F	.075	.175	1.90	4.44	
J	---	.800	---	20.32	
M	---	.250	---	6.35	7
P	.060	---	1.52	---	
T	.060	---	1.52	---	
V	.422	.453	10.72	11.51	
W	---	---	---	---	4,5,6

NOTES:
1. Angular orientation of this terminal is undefined.
2. Dia of unthreaded portion 0.189"(4.80 mm) Max; 0.163"(4.14 mm) Min.
3. The A.S.A. thread reference is 10–32 UNF 2A.
4. Max. pitch dia. of plated threads shall be basic pitch dia. 0.1697"(4.3104 mm).
5. Unit must not be damaged by torque of 15 in-lb applied to 10–32 NF 2B nut assembled on thread.
6. Complete threads shall extend to within 2-1/2 threads of the seating plane.
7. Terminal end shape is unrestricted.

Figure 1. Semiconductor devices, diode, types JAN–1N1130 and JAN–1N1131.

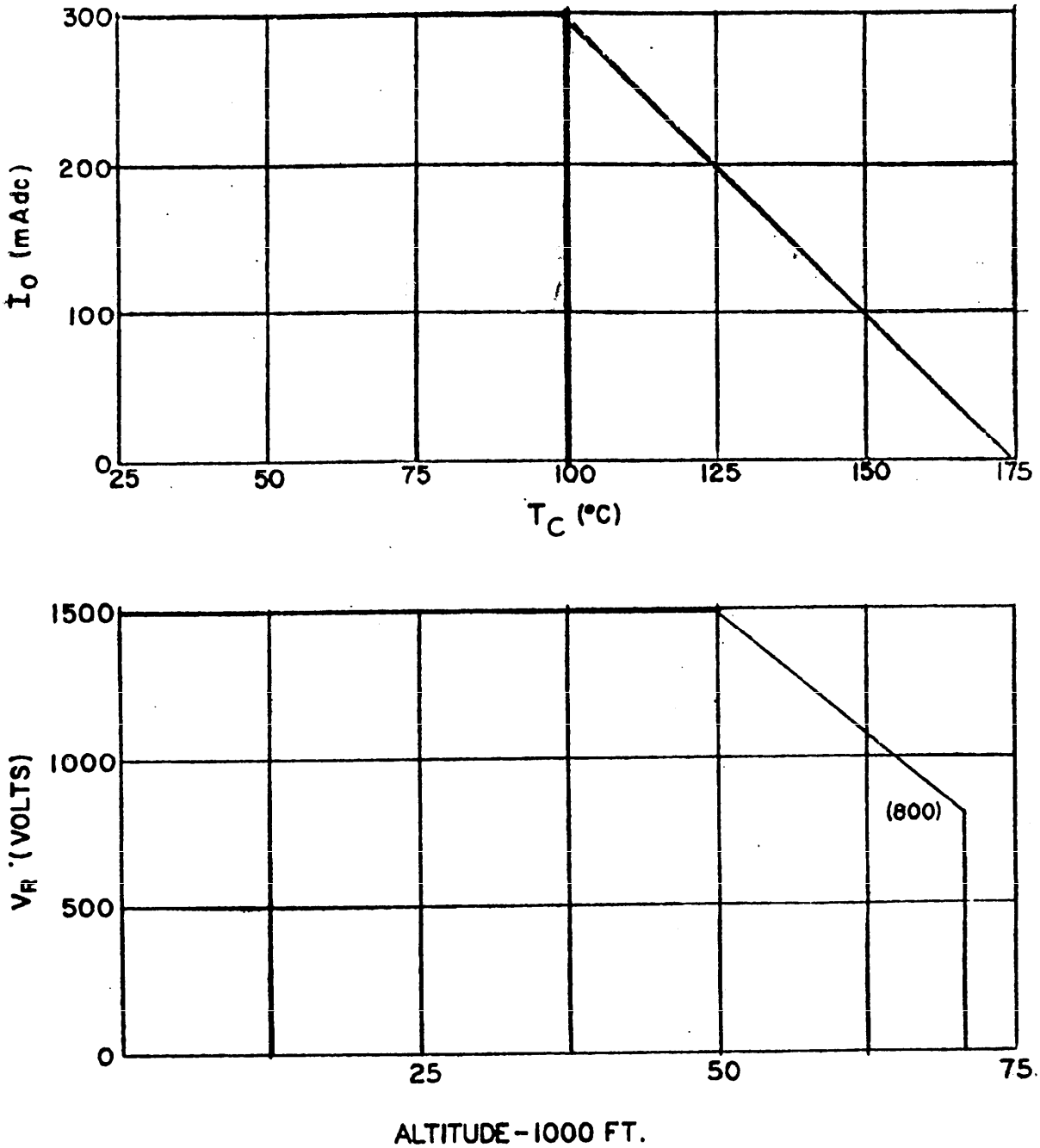


Figure 2. Derating curves.