

The documentation and process conversion measures necessary to comply with this document shall be completed by 9 August 2014.

INCH-POUND

MIL-PRF-19500/469E
 9 May 2014
 SUPERSEDING
 MIL-PRF-19500/469D
 10 September 2008

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, SILICON, 69E. HIGH-POWER, SINGLE PHASE,
 FULL WAVE BRIDGE RECTIFIER, TYPES M19500/469-01, -02, -03, -04, -05,
 JANTX AND JANTXV

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, single phase, full wave bridge rectifiers, intended for use in applications at frequencies of 1 kHz or less. Two levels of product assurance are 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 $T_A = +25^\circ\text{C}$.

M19500/469-	V_{RWM}	Bridge (1) I_{O1} at $T_C = +55^\circ\text{C}$	Bridge (2) I_{O2} at $T_C = +100^\circ\text{C}$	$I_F(\text{surge})$ $I_O = 10 \text{ A dc}$ $T_C = +55^\circ\text{C}$ $t_p = 8.3 \text{ ms}$	Barometric pressure reduced
	<u>V (pk)</u>	<u>A dc</u>	<u>A dc</u>	<u>A (pk)</u>	<u>mm Hg</u>
01	200	10	6	100	8
02	400	10	6	100	8
03	600	10	6	100	8
04	800	10	6	100	33
05	1,000	10	6	100	33

(1) Derate from 10 A dc at $+55^\circ\text{C}$ to 6 A dc at $+100^\circ\text{C}$ (88 mA dc/ $^\circ\text{C}$).

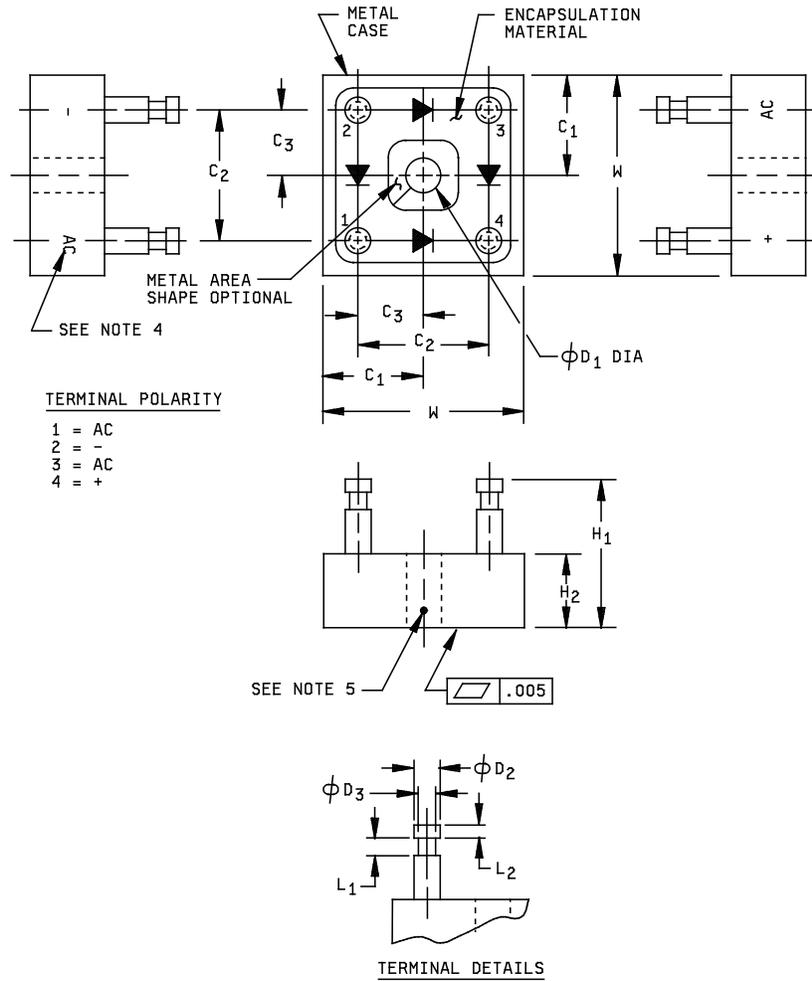
(2) Derate from 6 A dc at $+100^\circ\text{C}$ to 0 A dc at $+150^\circ\text{C}$ (120 mA dc/ $^\circ\text{C}$), $t_{rr} = 2.5 \mu\text{s}$ at $I_F = 0.5 \text{ A}$, $I_R = 1.0 \text{ A}$, $I_{rec} = 0.25 \text{ A}$.

Operating temperature: -65°C to $+150^\circ\text{C}$.

Storage ambient temperature: -65°C to $+150^\circ\text{C}$.

* 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.dla.mil>.

MIL-PRF-19500/469E



NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Polarity shall be marked on the bridge body adjacent to terminals. Terminal numbers are for reference and are not required to be marked on the bridge; however, terminal 1 shall be indicated by a mechanical index such as a line or flattened corner, visible from the top (terminal surface) of the device.
4. Point at which T_C is read shall be in metal part of case as shown on drawing.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
C ₁	.367	.375	9.32	9.53
C ₂	.350	.450	8.89	11.43
C ₃	.175	.225	4.45	5.72
ΦD ₁	.139	.149	3.53	3.78
ΦD ₂	.091	.101	2.31	2.57
ΦD ₃	.066	.076	1.68	1.93
H ₁		.570		14.48
H ₂		.370		9.40
L ₁	.088	.098	2.24	2.49
L ₂	.020	.030	0.51	0.76
W	.735	.750	18.67	19.05

FIGURE 1. Physical dimensions.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 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 of documents cited in sections 3 or 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 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://quicksearch.dla.mil>).

2.2.2 Non-Government publications. The following documents 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.

SAE INTERNATIONAL (SAE)

AS39029/57 - Contacts, Electrical Connectors, Socket Crimp Removable (For MIL-C-24308, MIL-C-38999 Series II, MIL-C-55302/68, /71, /72, /75 and MIL-C-83733 Connectors)

(Copies of these documents are available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or <http://www.sae.org>.)

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 (except for related associated specifications or specification sheets), 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 authorized by the qualifying activity for listing on the applicable qualified products 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](#) and as follows:

n - - number of diodes for each leg

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 Internal construction. The rectifier bridge shall consist of a metal and plastic encased assembly of single or parallel discrete diodes. Each discrete diode shall be a glass-to-metal, ceramic-to-metal, or fused metal oxide-to-metal hermetically sealed package. The silicon die in each discrete diode shall be metallurgically bonded directly to the terminal pins. The completed assembly of diodes and other internal structures shall be encapsulated in a plastic material which polymerizes to a rigid condition by virtue of a chemical cross-linking mechanism. The rectifier bridge shall be free of voids either visible or as evidenced by failure to pass the environment test specified. Only those discrete diodes which have met these requirements shall be used in the rectifier bridge. Discrete diodes shall be JANTX or JANTXV level devices, or equivalent screened non-JAN devices manufactured in a [MIL-PRF-19500](#) certified facility. Parallel diodes may be utilized in construction of this device.

3.4.1.1 Internal devices. Devices used in the construction of this assembly shall be subject to the requirements of [4.3.1](#) with qualification of non-JAN parts performed at the assembly level.

3.4.2 Terminal finish. Terminal finish shall be solderable in accordance with [MIL-PRF-19500](#), [MIL-STD-750](#), and herein. Where a choice of terminal finish is desired, it shall be specified in the acquisition document (see [6.2](#)).

3.4.3 Parallel diode construction. For bridge design that employs more than one diode per leg and n equals the number of diodes per leg, the following matching conditions shall be approved by the qualifying activity.

- a. Individual diode V_F matching at least the minimum rated room temperature I_O . The V_F shall be to within 20 mV on each diode.
- b. Thermal impedance matching.
- c. Similar diode families types shall be utilized.
- d. Care shall be utilized in the design to ensure similar lead lengths and uniform heat paths, so that all diodes in each leg are at similar temperatures.

3.5 Marking. Marking shall be in accordance with [MIL-PRF-19500](#). Manufacturer's identification and date code shall be marked on the devices. Initial container package marking shall be in accordance with [MIL-PRF-19500](#).

3.5.1 Polarity. Polarity shall be as marked on [figure 1](#).

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in [1.3](#) and [table I](#) herein.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in [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](#) and as specified herein.

4.3 Screening (JANTX and JANTXV levels). Screening shall be in accordance with table E-IV of MIL-PRF-19500 and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

4.3.1 Discrete diode screening. One hundred percent of the internal discrete diodes shall be subjected to the following:

Screen (see appendix E, table E-IV of MIL-PRF-19500)	Measurement
	JANTX and JANTXV levels
(1) 3c	Thermal impedance (see 4.5.6)
9	Not applicable
11	I_{R1} and V_{F1}
12	See 4.3.1.1
(2) 13	Subgroup 2 of table I herein. $\Delta V_{F1} = \pm 0.1$ V dc; $\Delta I_{R1} = 100$ percent of initial value or ± 250 nA dc, whichever is greater.

- (1) Shall be performed anytime before screen 3.
- (2) Except thermal impedance, if already performed.

4.3.1.1 Power burn-in conditions. Power burn-in conditions are as follows, method 1038 of MIL-STD-750, test condition B, T_A = room ambient as defined in the general requirements and mounting conditions of MIL-STD-750, V_{RWM} = rated V_{RWM} (see 1.3), $I_O = 3$ A dc, $f = 60$ Hz. See 4.5.1 herein for mounting conditions.

4.3.2 Assembly screening. One-hundred percent of the completed assemblies shall be subjected to the following:

Screen (see appendix E, table E-IV of MIL-PRF-19500)	Measurement
3a	Method 1051 of MIL-STD-750, condition F.
End-point electricals (1)	Subgroup 2 of table I herein.
Dielectric withstanding voltage	See 4.5.2.

- (1) Except thermal impedance.

4.4 Conformance inspection. Conformance inspection shall be performed on the finished rectifier assemblies in accordance with MIL-PRF-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with appendix E, table E-V of MIL-PRF-19500 and table I herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table E-VIb (JANTX, JANTXV) of [MIL-PRF-19500](#) and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of [table II](#) herein.

4.4.2.1. Group B inspection, appendix E, table E-VIb of [MIL-PRF-19500](#).

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B2	1051	Condition F, 25 cycles.
B2	1071	Not applicable.
B3	1027	$I_O = 0$; $T_A = +150^\circ\text{C}$; $V_{RWM} = \text{rated } V_{RWM}$ (see 1.3), $f = 60 \text{ Hz}$, $n = 10$, $c = 0$.
B3		Electrical measurements, see group A, subgroup 2 herein.
B5		Operational thermal cycling, (see 4.5.7).
B5	3105	Junction temperature test (see 4.5.4).
B6		Not applicable.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table E-VII of [MIL-PRF-19500](#) and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of [table II](#) herein.

4.4.3.1 Group C inspection, appendix E, table E-VII of [MIL-PRF-19500](#).

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C2	1056	Not applicable.
C2	2036	Test condition A, 6 pounds, $t = 30$ seconds.
C2	2036	Test condition D1, $t = 10$ seconds, 16 inch-ounces.
C2	1071	Not applicable.
C5	1001	Pressure = 8 mm Hg (M19500/469-01 through 03); 33 mm Hg (M19500/469-04, 05), $I_R = 2.0 \mu\text{A}$ dc maximum, $V_R = \text{rated } V_{RWM}$ (see 1.3), (applied between all terminals to the case); sampling plan = 15, $c = 0$.
C6	1026	$I_O = 0$; $T_A = 150^\circ\text{C}$; $V_{RWM} = \text{rated } V_{RWM}$ (see 1.3), $f = 60 \text{ Hz}$.
C6		Electrical measurements, see group A, subgroup 2 herein.
C7	4066	$V_{RWM} = 0 \text{ V}$, bridge $I_O = 10 \text{ A}$ dc (entire bridge biased); $T_C = 55^\circ\text{C} + 10^\circ\text{C}$, -0°C ; $I_{FSM} = 100 \text{ A}$ (pk) (each device for each bridge leg); $t_p = 8.3 \text{ ms}$; ten surges for each leg at maximum 1 minute intervals; $n = 22$, $c = 0$.
		Alternate condition: Each leg may be biased separately to $I_O = 5 \text{ A}$ dc for each leg. All other conditions shall be the same as above.

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

4.5.1 Mounting conditions. The diodes shall be suspended by the leads with at least 6.0 inches (152.4 mm) of no. 22 or smaller wire between each lead and the power source. The connecting wires may be soldered to the leads or AS39029/57 contacts may be used. Other clips may be used provided they have equal or less mass than the AS39029/57 contact. No forced air shall be permitted and the diodes shall be shielded from drafts.

4.5.1.1 Alternate mounting conditions. At the option of the manufacturer, other chip or heat sink mounting configurations may be utilized provided that I_O is adjusted such that the junction temperature of each diode is maintained at least 120°C above the specified ambient temperature of 25°C.

4.5.2 Dielectric withstanding voltage. This test shall be performed with the metal case of the assembly connected to ground and all four terminals connected to the high potential side of a dc power supply or a scope display test set. The voltage applied between the terminals and the case shall be 2,800 volts and shall be held at that level for 10 seconds. Any discontinuity or dynamic instability of the trace, or a breakdown current in excess of 10 μ A dc, shall be cause rejection.

4.5.3 Reverse-recovery time and trace. See method 4031 of MIL-STD-750 (see figure 2 herein).

4.5.4 Junction temperature test. This test shall be performed in accordance with method 3105 of MIL-STD-750 and figure 3 herein. The maximum junction temperature for any diode in the bridge at the below specified conditions shall be 175°C maximum. The test conditions shall be as follows:

$T_C = 55^\circ\text{C}$, $I_O = 10$ A dc, $I_{\text{ref}} = 10$ mA dc or $T_C = 100^\circ\text{C}$, $I_O = 6$ A dc, $I_{\text{ref}} = 10$ mA dc.

4.5.5 Scope display evaluation. The reverse breakdown characteristics shall be tested in accordance with method 4023 of MIL-STD-750. The test conditions shall be as follows: Vertical sensitivity: 5 to 20 μ A/division; horizontal sensitivity: 50 to 200 V/division. Reverse current over the knee shall be at least 50 μ A. Each device shall exhibit a sharp knee characteristic and any discontinuity or dynamic instability of the trace shall be cause for rejection.

4.5.6 Thermal response. ΔV_F measurement shall be performed in accordance with method 3101 of MIL-STD-750. The following parameters shall apply:

- a. Measurement current (I_M) 10 mA.
- b. Heating current (I_H) 3 A minimum.
- c. Heating time (t_H) 10 ms.
- d. Measurement time delay (t_{MD}) 70 μ s maximum.

The maximum limit for $Z_{\Theta X}$ under these test conditions is 1.5 °C/W.

4.5.7 Operational thermal cycling. This test shall be performed by connecting a three phase 60 Hz sine wave input of 10 to 20 volts rms to the ac terminals of the bridge. The resistive load shall be made variable in order to maintain a rated bridge output current of 10 amperes. Bridge case temperature shall be maintained at 55°C except during the cooling cycle when case temperature shall be permitted to drop 20°C maximum. Life-test duration shall be 2,000 cycles with a heating time of 8 minutes, +2, -0 minutes and a cooling time \geq 2 minutes.

MIL-PRF-19500/469E

* TABLE I. Group A inspection.

Inspection 1/	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 2/	4011	$I_F = 15.7 \text{ A dc (pk)}$ $t_p = 8.3 \text{ ms; duty cycle } \leq 2 \text{ percent}$	V_{F1}		1.35	V (pk)
Reverse current 2/	4016	DC method; $V_R = \text{rated } V_{RWM}$ (see 1.3)	I_{R1}			
Bridge leg					2	$\mu\text{A dc}$
Breakdown voltage 2/	4021	$I_R = 50 \mu\text{A dc}$	V_{BR}			
* M19500/469-01				220		V dc
* M19500/469-02				440		V dc
* M19500/469-03				660		V dc
* M19500/469-04				880		V dc
* M19500/469-05				1,100		V dc
Thermal impedance	3101	See 4.5.6	$Z_{\theta JX}$		1.5	$^{\circ}\text{C/W}$
<u>Subgroup 3</u>						
High temperature operation:		$T_c = 100^{\circ}\text{C}$				
Reverse current/leg	4016	DC method; $V_R = \text{rated } V_{RWM}$ (see 1.3)	I_{R2}		125	$\mu\text{A dc}$
Low temperature operation:		$T_A = -65^{\circ}\text{C}$				
Forward voltage /leg	4011	$I_F = 15.7 \text{ A (pk); } t_p = 8.3 \text{ ms}$	V_{F2}		1.5	V (pk)
Breakdown voltage 2/	4021	$I_R = 50 \mu\text{A dc}$	V_{RWM2}			
M19500/469-01				200		V dc
M19500/469-02				400		V dc
M19500/469-03				600		V dc
M19500/469-04				800		V dc
M19500/469-05				1,000		V dc

See footnotes at end of table.

* TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u> Dielectric withstanding voltage	4031	See 4.5.2	t_{rr}		2.5	μs
Reverse recovery time		Condition B, $I_F = 0.5$ A, $I_R = 1.0$ A, $I_{rec} = 0.25$ A (see figure 2)				
<u>Subgroups 5 and 6</u> Not applicable						
<u>Subgroup 7</u> Scope display evaluation	4023	See 4.5.5, sample size: 116 devices, c = 0				

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

2/ Applies to each discrete diode and each bridge leg.

TABLE II. Groups B and C electrical measurements. 1/ 2/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Forward voltage	4011	Pulse width = 8.3 ms maximum, duty cycle \leq 2 percent maximum; $I_F = 15.7$ A dc	V_{F1}		1.35	V dc
2.	Reverse current	4016	DC method; $V_R =$ rated V_{RWM} (see 1.3)	I_{R1}		2.0	μ A dc
3.	Forward voltage	4011	Pulse width = 8.3 ms maximum; duty cycle \leq 2 percent maximum; $I_F = 15.7$ A dc	ΔV_{F1}	± 0.1		V dc
4.	Reverse current	4016	DC method; $V_R =$ rated V_{RWM} (see 1.3)	ΔI_{R1}	± 250		nA dc

1/ The electrical measurements for appendix E, table E-VIb (JANTX, JANTXV) of MIL-PRF-19500 are as follows:

- a. Subgroup 2, see table II herein, steps 1 and 2.
- b. Subgroup 3, see table II herein, steps 1 and 2.
- c. Subgroup 5, see table II herein, steps 1 and 2.
- d. Subgroup 6, see table II herein, steps 1 and 2.

2/ The electrical measurements for appendix E, table E-VII of MIL-PRF-19500 are as follows:

- a. Subgroup 2, see table II herein, steps 1 and 2.
- b. Subgroup 5, see table II herein, steps 1 and 2.
- c. Subgroup 6, see table II herein, steps 1 and 2.

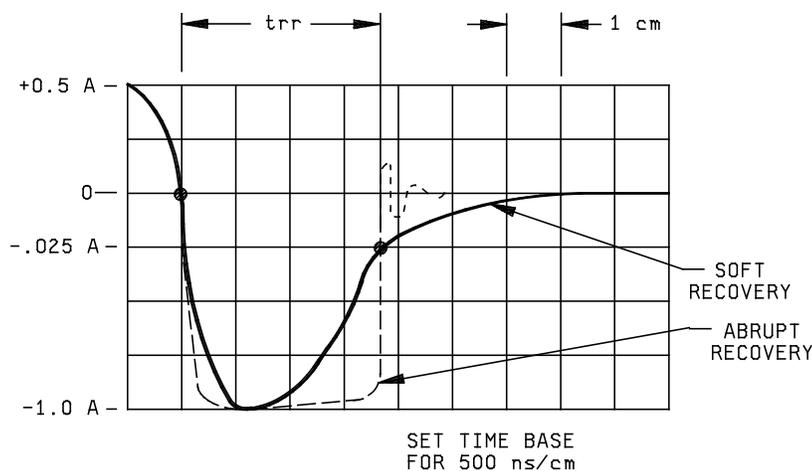


FIGURE 2. Reverse recovery characteristic waveform.

Purpose: To verify that $T_J \leq +175^\circ\text{C}$ at maximum rated current and specified case temperature.

Test circuit:

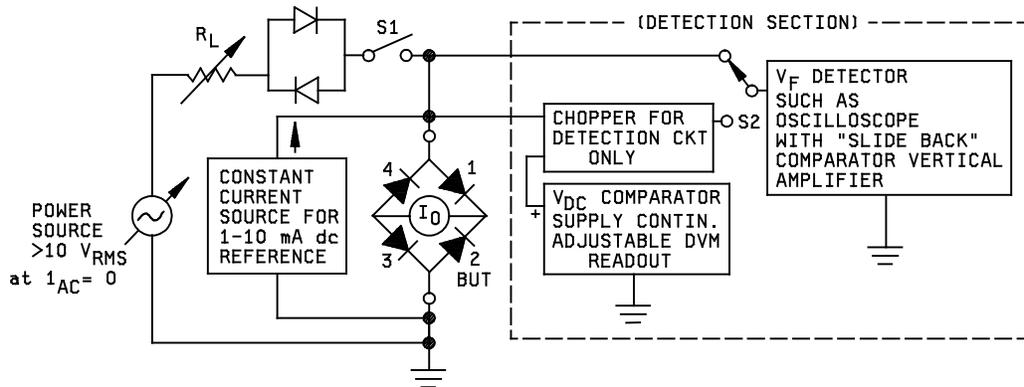


FIGURE 3a. Junction temperature test schematic.

Procedure:

- With S1 open, and B.U.T. at 175°C , read V_{F1} at reference current.
- With device held at a case temperature, close S1 and adjust power source and R_L for maximum rated $I_{O(av.)}$. Establish thermal equilibrium.
- Observe V_{F2} in accordance with figure 3c using the same reference current (± 1 percent) as in figure 3a.
- With S2 "up", locate the correct position for reading V_{F2} (see figure 3b).
- With S2 "down", adjust comparator supply to line up V_{F2} with comparator trace (see figure 3c).
- Read V_{F2} on digital voltmeter.
- Acceptance criterion: V_{F2} shall be $\geq V_{F1}$. (Indicated $T_J \leq 175^\circ\text{C}$).

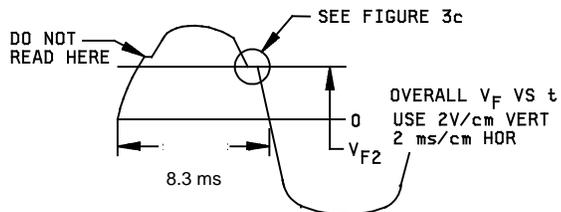


FIGURE 3b. Junction temperature waveform.

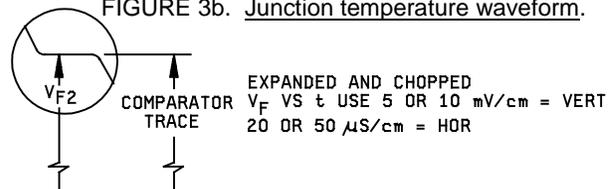


FIGURE 3c. Junction temperature waveform details.

FIGURE 3. Junction temperature test for bridge rectifier.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When 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. The notes specified in [MIL-PRF-19500](#) are applicable to this specification.)

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. Terminal finish (see [3.4.2](#)).
- d. Product assurance level and type designator.
- e. Destructive physical analysis when requested.

* 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.dla.mil>.

6.4 Interchangeability data. JANTX devices are one-way interchangeable for JAN devices (example: JXM19500/469-01 for JM19500/469-01). JAN devices are no longer procurable under this specification. Existing stock of JAN level devices may be used until exhausted.

6.5 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes from the previous issue were made. 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 and relationship to the previous issue.

Custodians:

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

Preparing activity:
DLA - CC

(Project 5961-2014-061)

Review activities:

Army - AR
Navy - AS, MC
Air Force - 19, 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.dla.mil>.