JAN JANTX JANTXV JANS

1N7068

SERIES

MIL-PRF-19500/768

REQUEST **SAMPLES**

IN **STOCK**

QPL CERTIFIED

FEATURES

10A	200V	250A	.775V	.830V	30nS
FORWARD CURRENT	REVERSE VOLTAGE	SURGE CURRENT	TYP VF @ 3A	TYP VF @ 6A	REVERSE RECOVERY

On July 29, 2014, DLA Land and Maritime approved SSDI's qualification data for 1N7066 - 1N7068. This series of hyperfast rectifiers is available in JAN, JANTX, JANTXV, and JANS screening levels in accordance with MIL-PRF-19500/768.

The 1N7068 series boasts a rugged package with a true category I eutectic metallurgical bond and void free ceramic frit glass construction. These products are currently in stock and available for samples / orders. For more information, please contact us today at (562) 404-4474 or ssdi@ssdi-power.com .

PROGRAMS / APPLICATIONS

Many engineers have already incorporated the 1N7068 series to enhance their designs with the higher efficiency and increased guard band offered by these products. The following are a few types of programs currently implementing the 1N7068 devices:

- Satellites
- Helicopters
- Docking Station
- Launch Vehicles

Many of our major Military and Space customers are also actively considering the 1N7068 for applications such as:

- Electronic Warfare
- Control Systems
- Military Computers
- Missile Systems
- Sensor Systems
- Power Systems
- Power Bus
- Motor Control
- Data Systems
- Fire Control Systems

...and more...

Solid State Devices, Inc.
ISO 9001 & AS9100 Certified
JANS Certified MFR | www.ssdi-power.com

SSDI

COMPANY OVERVIEW

SSDI Delivers HiRel Product Innovation & Solutions for New / Legacy Designs

+

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3H FOCUS

- 50+ years serving the HiRel market
- JANS certified
- ISO 9001 / AS9100 certified
- Developing new, innovative products with performance not matched by other manufacturers' products
- Exploring new technology (e.g. GaN, SiC, etc.)

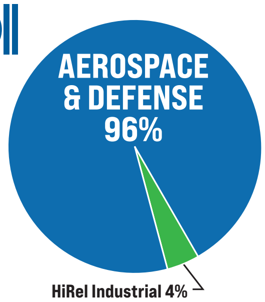
DESIGN & PACKAGING FLEXIBILITY

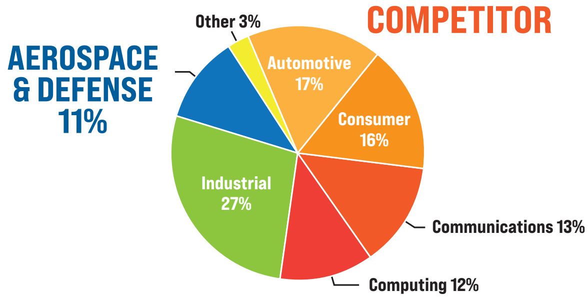
- Target specific electrical characteristics to satisfy customer requirements
- Wide range of packaging options from surface mount to legacy packages
- Improve density of board design which leads to overall system cost improvements

SOLUTIONS

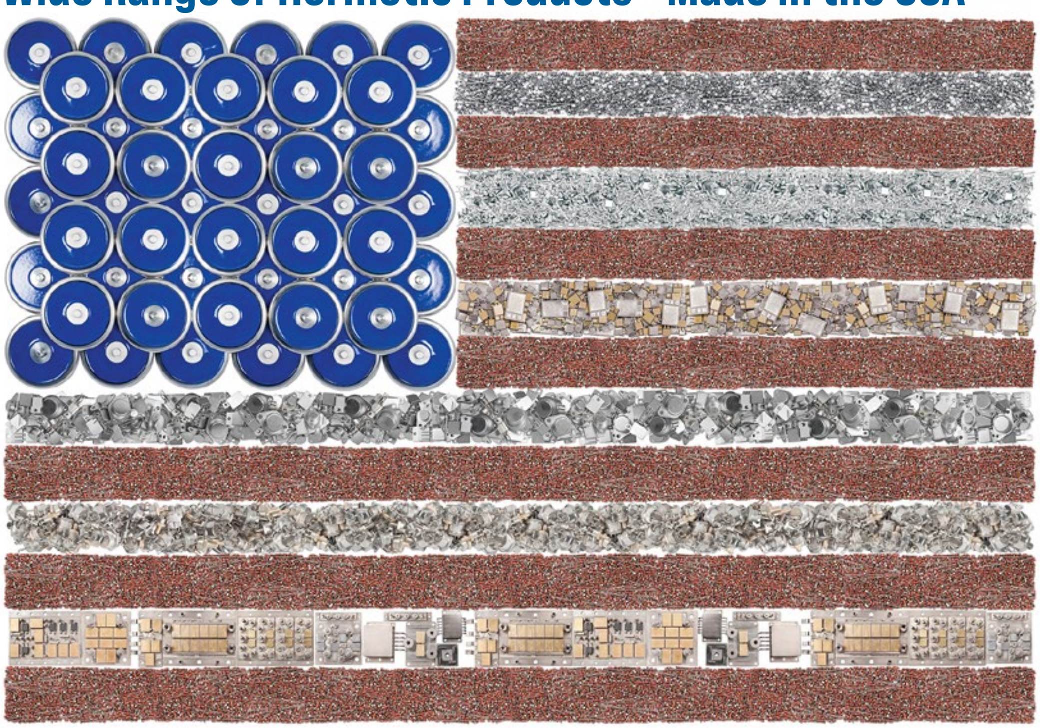
- Broad capabilities: catalog showcases capability, not limited to current offerings
- Offer replacements for most products from competitors (e.g. Microsemi, Infineon / IR, TI, Siliconix, etc.)
- Sustainment: support for the life of programs; work with customer to accommodate small to medium quantities

Sales by Sector





Wide Range of Hermetic Products - Made in the USA



SILICON

- Rectifiers
- Schottkys
- Zeners
- TVS
- MOSFETs
- Bipolar Transistors
- JFETs
- PIN Diodes
- Thyristors
- IGBTs

SILICON CARBIDE (SiC)

- Schottkys
- MOSFETs

GALLIUM NITRIDE (GaN)

- Power FETs

ASSEMBLY PRODUCTS

- LDO
- DC-DC Converters
- Hybrids
- Assemblies
- Power Modules

Notes: Minimum order may apply.
Most products available in die form.

1N7068 | MIL-PRF-19500/768

**TX, TXV, and S-level screening available for all devices. Screening based on MIL-PRF-19500. Screening flows available on request.*

1N7066 - 1N7068 SERIES

Features

- 10 Amps
- 100 - 200 Volts
- Hyper Fast Reverse Recovery: 30 nsec max
- High Surge Current: 250 A max
- Hermetically Sealed
- Void Free Ceramic Frit Glass Construction
- High Temperature Category I Eutectic Metallurgical Bond
- Low Forward Voltage Drop: 0.95 V @ 10 A
- Low Thermal Resistance
- Solid Silver Leads
- Axial Lead Higher Current Replacement for:
  1N5807, 1N5809, 1N5811 (similar physical size)
- Possible SMS Replacements for Stud Mount:
  1N5812, 1N5814, 1N5816
- TX, TXV, and S Level Screening Available

DEFENSE LOGISTICS AGENCY
LAND AND MARITIME
POST OFFICE BOX 3990
COLUMBUS, OH 43218-3990

July 29, 2014

Mr. Brian Greene
Solid State Devices Inc.
14701 Firestone Blvd.
La Mirada, CA 90631

Dear Mr. Greene:

Re: Notification of Qualification Extension, MIL-PRF-19500P, Amend 1, FSC 5961; VQ (VQE-14-028363); CAGE Code: 30043; Ctrl # 043623

Qualification by extension of your products are granted under the current issue of the specification as a result of successful qualification testing of device type JANS1N7068 as allowed by paragraph E.4.2.2 of Performance Specification MIL-PRF-19500P, Amendment 1, Semiconductor Devices, FSC 5961, and performance specification /768, Revision A. Therefore, your products will be listed as shown below in Qualified Manufacturers List (QML) 19500. The effective date of this qualification is July 28, 2014. The starting lot date code is 1332.

The qualification lot thermal impedance conditions and upper limit is as follows (subject to change after 5 lots with approval of the qualifying activity):

Package	I_M	I_H	t_H	t_{MD}	ZΘJX
US	10 mA	30 A	65 msec	70 µs	1.34°C/W max
Axial	10 mA	30 A	65 msec	70 µs	1.6°C/W max

Government Designation	ESD Class 6/	Manufacturer Designation	Test Report Reference	Prf Spec	Lead Finish	Manufacturer Name & Address
S 1N7066 through 1N7068;US	3A	CDVL	19500-4221-14	/768	J	Same as above

6/ Testing is compliant to the latest revision of MIL-STD-750 Test Method1020.3
S Includes JANS quality level only

Plant 1:Same as above

This qualification approval is based upon test report numbers 19500-4221-14 for your die and package , 19500-4106-14 for your group C & E data, 19500-4222-14 for your US package, your letter dated May 23, 2014, and subsequent emails with data is subject to the conditions as stated in the SD-6 and DOD 4120.24M.

Because we are held responsible for the accuracy and currency of this Qualified Manufacturers List, please let us know if your company discontinues production of these products. Also, manufacturers are required to inform this office immediately after learning of a potential issuance of a GIDEP alert, problem advisory, or other problem notification on their QML product. If you have any questions, please contact Mr. DelloStritto at 614-692-0616.

Sincerely,

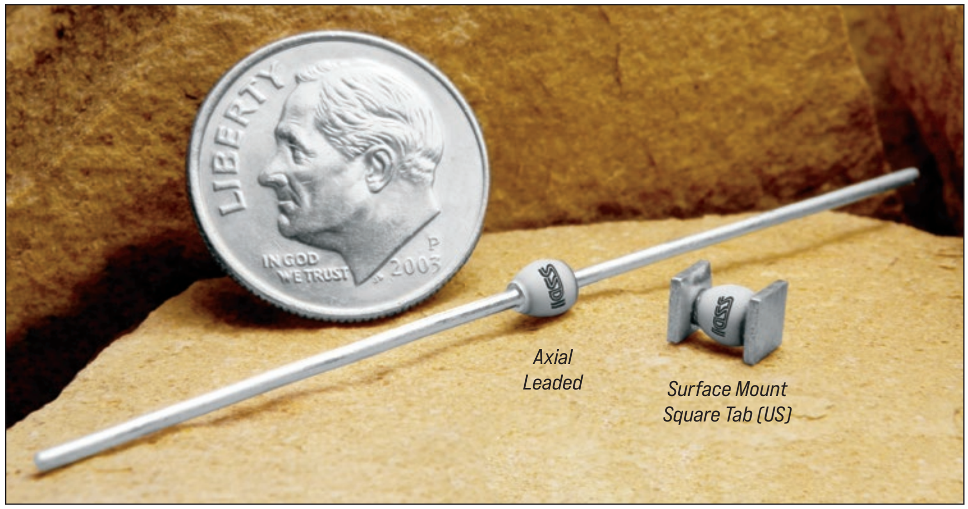
FOR

JOSEPH GEMPERLINE
Chief
Sourcing and Qualifications Division

DLA APPROVES MIL-PRF-19500/768

On July 10, 2012, DLA Land and Maritime approved the MIL-PRF-19500/768 performance specification sheet for SSDI's 1N7066 - 1N7068 series. A digital copy is available on the DLA Land and Maritime website at:

https://landandmaritimeapps.dla.mil/Downloads/MilSpec/Docs/MIL-PRF-19500/prf19500ss768.pdf



The 1N7068 series of silicon rectifiers features 10 amps of average rectified forward current, a voltage range of 100 - 200 volts, and a hyperfast reverse recovery of 30 nsec max. These devices also offer a low forward voltage drop of .95 volts at 10 amps and a high surge current of 250 amps.

Today's system designers continually face the challenge of upgrading or creating new systems that are smaller, lighter and higher power at a lower cost. SSDI developed the 1N7066 - 1N7068 family of devices as a high current replacement for the 1N5811 device. The 1N7068US device is a drop in replacement for the 1N5811US device and will not require redesign or board modification in most cases.

The key advantages of the 1N7068 over the 1N5811 include higher average rectified forward current (1N7068: 10A vs. 1N5811: 6A), higher peak surge current (1N7068: 250A vs. 1N5811: 125A), lower instantaneous forward voltage drop (1N7068: 0.900V @ 6A vs. 1N5811: 0.925V @ 6A), and lower thermal resistance (1N7068: 8°C/W (L=.125"), 1N7068US: 4.5°C/W vs. 1N5811: 22°C/W (L=.375"), 1N5811US: 6.5°C/W). For a more detailed comparison, see pages 5 - 6.

The 1N7068 series is manufactured with a void free ceramic frit glass construction technique, which results in an unsurpassed ability to withstand severe thermal shock. These devices have been subjected to thermal shock from -210°C to +175°C over 50 cycles without impact to performance.

Glass to metal sealed packages such as the TO-257, TO-254, and DO-4 are also candidates for replacement by the 1N7068 series. Glass to metal sealed packages are well documented for hermeticity and PIND issues after thermal shock. These issues are eliminated with the void free ceramic frit glass construction of the 1N7068. Through hole mounting and hand wiring are also eliminated when TO-257, TO-254, and DO-4 packages are replaced with the 1N7068US surface mount devices that can utilize solder reflow assembly with ceramic DBC for heat management. For more information or to request samples, contact SSDI at (562) 404-4474 or visit www.ssdi-power.com.

Unless otherwise specified, T_A = +25°C

Maximum Ratings / Electrical Characteristics		Symbol	Value	Unit
Peak Repetitive Reverse Voltage and DC Blocking Voltage	1N7066 1N7067 1N7068	V_{RRM} V_{RWM} V_R	100 150 200	V
Average Rectified Forward Current $T_L \leq$ +55°C, L = .125 in. (9.52 mm) or TEC < +100°C 1/2/		I_O	10	A
Peak Surge Current @ +25°C, operating at I_O, t_P = 8.3 ms		I_{FSM}	250	A (pk)
Reverse Recovery Time		t_{RR}	30	nS
Thermal Resistance	Junction to Lead for Axial, L=.125" Junction to End Case for Surface Mount	$R_{\theta JL}$ $R_{\theta JEC}$	8 4.5	°C/W
Breakdown Voltage I_R = 100µA	1N7066 1N7067 1N7068	B_{VR}	110 165 220	V
Instantaneous Forward Voltage Drop	I_{FM} = 6A, pulsed (section 4 of MIL-STD-750) I_{FM} = 10A, pulsed (section 4 of MIL-STD-750)	V_F	0.900 0.950	V
Reverse Leakage Current	$V_R = V_{RWM}$, T_A = +25°C, pulsed $V_R \leq$ 20 ms $V_R = V_{RWM}$, T_A = +125°C, pulsed $V_R \leq$ 20 ms	I_{R1} I_{R2}	1.0 100	µA µA

1/ Axial lead, derate at 83.3 mA/°C above rated T_L
2/ Surface mount, derate at 133.3 mA/°C above rated T_{EC}

The documentation and process conversion measures necessary to comply with this document shall be completed by 15 August 2022.

INCH-POUND

MIL-PRF-19500/768D
w/AMENDMENT 1
13 May 2022
SUPERSEDING
MIL-PRF-19500/768D
23 January 2020

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, DIODE, SILICON, ULTRAFAST RECOVERY, POWER RECTIFIER, TYPES 1N7066, 1N7067, 1N7068, AXIAL LEADED AND SURFACE MOUNT PACKAGES, QUALITY LEVELS JAN, JANTX, JANTXV, AND JANS

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, ultra fast recovery, power rectifier diodes. Four levels of product assurance (JAN, JANTX, JANTXV and JANS) are provided for each encapsulated device type as specified in MIL-PRF-19500.

1.2 Package outlines. The device package outlines are as follows: An axial leaded package in accordance with figure 1 and square end-cap surface mount package (US) in accordance with figure 2.

1.3 Maximum ratings. Unless otherwise specified, T_A = +25°C.

1.3.1 Ratings applicable to all Part or Identifying Numbers (PIN). T_{STG} = $T_{J(max)}$ = −65°C to +175°C.

* 1.3.2 Ratings applicable to individual types.

Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
Types	V_{RWM}	I_O $T_L \leq$ +55°C L = .125 inch (3.175 mm) or T_{EC} < +100°C (1) (2)	I_{FSM} at T_A = +25°C operating at I_O t_p = 8.3 ms	t_{rr}	$R_{\theta JL}$ at L = .125 inch (3.175 mm)	$R_{\theta JEC}$
		A	A(pk)	ns	°C/W	°C/W
1N7066, US	100	10	250	30	8	4.5
1N7067, US	150	10	250	30	8	4.5
1N7068, US	200	10	250	30	8	4.5

(1) Axial lead, derate at 83.3 mA/°C above rated T_L.
(2) Surface mount, derate at 133.3 mA/°C above rated T_{EC}.

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, 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.

AMSC N/A
FSC 5961

* DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

* 1.4 Primary electrical characteristics. Unless otherwise specified, T_A = +25°C.

Types	V_{BR} at 100 µA, pulse ≤ 20 ms	I_{R1} at V_R = V_{RWM} T_A = +25°C, pulsed V_R ≤ 20 ms	I_{R2} at V_R = V_{RWM} T_A = +125°C, pulsed V_R ≤ 20 ms
	Volts	µA	mA
1N7066, US	110	10	1
1N7067, US	160	10	1
1N7068, US	210	10	1

1.5 PIN. The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.4 for PIN construction example and 6.5 for a list of available PINs.

1.5.1 JAN certification mark and quality level. The quality level designators for encapsulated devices that are applicable for this specification sheet from the lowest to the highest level are as follows: "JAN", "JANTX", "JANTXV" and "JANS".

1.5.2 Device type. The designation system for the devices covered by this specification sheet is as follows.

1.5.2.1 First number and first letter symbols. The devices of this specification sheet use the first number and letter symbols "1N".

1.5.2.2 Second number symbols. The second number symbols for the devices covered by this specification sheet are as follows: "7066", "7067", and "7068".

1.5.3 Suffix symbols. The following suffix symbol(s) are incorporated into the PINs for this specification sheet.

	A blank suffix symbol identifies that the package is an axial leaded device.
US	A "US" designators identifies that the device is in a SMD package configuration.

1.5.4 Lead finish. The lead finishes applicable to this specification sheet are listed on QPDSIS-19500.

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 of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

MIL-PRF-19500/768D
w/AMENDMENT 1

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

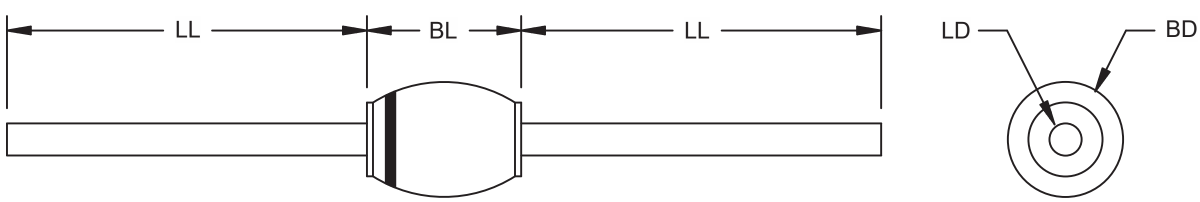
MIL-PRF-19500 - Semiconductor Devices, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

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

(Copies of these documents are available online at https://quicksearch.dla.mil.)

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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.



LTR	Dimensions				Notes
	Inches	Inches	mm	mm	
	Min	Max	Min	Max	
BD	.135	.165	3.43	4.19	2
BL	.135	.155	3.43	3.94	3
LD	.036	.042	0.91	1.07	3
LL	.900	1.30	22.86	33.02	

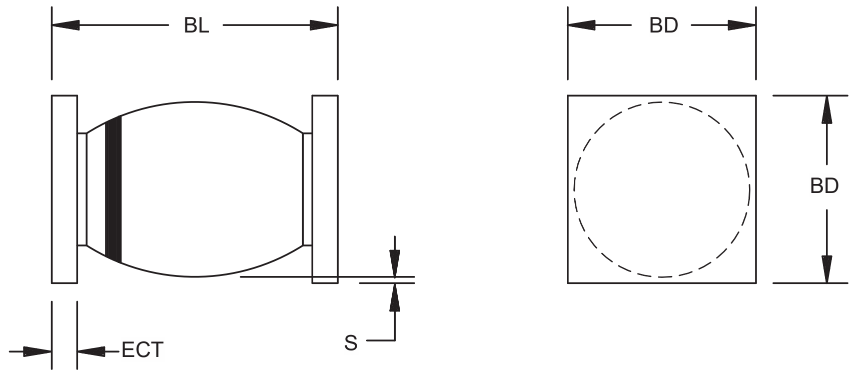
NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimension BD shall be measured at the largest diameter.
3. Dimension BL shall include the entire body including slugs and sections of the lead over which the diameter is uncontrolled. This uncontrolled area is defined as the zone between the edge of the diode body and extending .050 inch (1.27 mm) maximum onto the leads.

* 4. In accordance with ASME Y14.5, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions of axial leaded package.

3

MIL-PRF-19500/768D
w/AMENDMENT 1



LTR	Dimensions				Notes
	Inches	Inches	mm	mm	
	Min	Max	Min	Max	
BD	.172	.180	4.37	4.57	
BL	.180	.220	4.57	5.58	
ECT	.020	.028	0.51	0.71	
S	.002		0.05		3

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. Dimensions are pre-solder dip.
3. Minimum clearance of diode body to mounting surface on all orientations.
4. Cathode marking to be either in color band or a color dot on the face of the end tab.
5. Color dots will be .020 inch (0.51 mm) diameter minimum and shall not lie within .020 inch (0.51 mm) of the mounting surface.

* 6. In accordance with ASME Y14.5, diameters are equivalent to ϕx symbology.

FIGURE 2. Physical dimensions of US surface mount package.

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 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 and as follows:

EC	End-cap.
$I_{(BR)}$	Current for testing breakdown voltage.
V_{fr}	Forward recovery voltage.

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500, and figures 1 and 2 herein.

3.4.1 Diode construction. These devices shall be constructed utilizing high temperature metallurgical bonding between both sides of the silicon die and terminal pins. Metallurgical bond shall be in accordance with the requirements of category I, appendix A of MIL-PRF-19500. No point contacts are permitted. Silver button dumet design is prohibited. US version devices shall be structurally identical to the non-surface mount devices except for lead terminations.

3.4.2 Lead finish. Unless otherwise specified, lead or end-cap finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4.3 Lead material. Unless otherwise specified, lead or end-cap material shall be in accordance with appendix H of MIL-PRF-19500, and herein. Where a choice of material is desired, it shall be specified in the acquisition document (see 6.2).

3.5 Marking. Devices shall be marked as specified in MIL-PRF-19500.

3.5.1 Marking of US versions. For US versions only, all marking may be omitted from the device except for the cathode marking. All marking which is omitted from the body of the devices shall appear on the label of the initial container.

3.5.2 Polarity. The polarity shall be indicated with a contrasting color band to denote the cathode end. Alternately, for surface mount (US) devices, a minimum of three evenly spaced contrasting color dots around the periphery of the cathode end may be used. No color coding will be permitted.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

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 and tables I, II).

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

4.2.2 Group E qualification. Group E inspection shall be performed for qualification or re-qualification only. In case qualification was awarded to a prior revision of the specification sheet that did not request the performance of table II tests, the tests specified in table II herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

4.3 Screening (quality levels JANS, JANTXV and JANTX only). 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.

Screen	Measurements for JANS level	Measurements for JANTXV and JANTX level
(1) 3c	Thermal impedance (see 4.3.1)	Thermal impedance (see 4.3.1)
5	Not applicable	Not applicable
6	Not applicable	Not applicable
9	Group A, subgroup 2	Not required
10	Method 1038 of MIL-STD-750, condition A, T_A = 150°C, t = 48 hours	Method 1038 of MIL-STD-750, condition A, T_A = 150°C, t = 48 hours
* 11	Group A, subgroup 2, $\Delta I_{R1} \leq \pm 100$ percent of initial reading or ±1 μA dc, whichever is greater, $\Delta V_{FM1} \leq \pm 50$ mV of initial reading.	Group A, subgroup 2, $\Delta I_{R1} \leq \pm 100$ percent of initial reading or ±1 μA dc, whichever is greater, $\Delta V_{FM1} \leq \pm 50$ mV of initial reading.
12	Burn-In (see 4.3.2), t = 240 hours min	Burn-In (see 4.3.2), t = 96 hours min
* 13	Table I, subgroup 2 and 3, $\Delta I_{R1} \leq \pm 100$ percent of initial reading or ±1 μA dc, whichever is greater, $\Delta V_{FM1} \leq \pm 50$ mV of initial reading, scope display evaluation (see 4.5.2)	Table I, subgroup 2, $\Delta I_{R1} \leq \pm 100$ percent of initial reading or ±1 μA dc, whichever is greater, $\Delta V_{FM1} \leq \pm 50$ mV of initial reading, scope display evaluation (see 4.5.2).
14a	Not applicable	Not applicable
14b	Opaque glass diodes may use method 2068 in lieu of hermeticity testing.	Opaque glass diodes may use method 2068 in lieu of hermeticity testing.

(1) Shall be performed anytime after temperature cycling, screen 3a; JANTX and JANTXV levels do not need to be repeated in screening requirements.

4.3.1 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3101 of MIL-STD-750 using the guidelines in that method for determining I_M, I_H, t_H, t_{MD} and K factor where appropriate. The limits will be statistically derived. See table E-IX, subgroup 4 of MIL-PRF-19500 and table II, subgroup 4 herein.

4.3.2 Free air power burn-in conditions. Power burn-in shall be in accordance with condition B of method 1038 of MIL-STD-750. The details of 4.5.3 and those that follow shall apply: $I_{O(min)}$ = 3A, $V_{r(pk)}$ = rated V_{RWM}, T_A = 55°C maximum. Adjust I_O or T_A to achieve the required T_J. T_J = 135°C minimum.

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. The $Z_{\theta JX}$ end-point shall be derived by the supplier and approved by the qualifying activity. This $Z_{\theta JX}$ end-point shall also be documented in the qualification report.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the tests and conditions specified for subgroup testing in table E-VIA (JANS) and table E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and herein.

4.4.2.1 Quality level JANS.

	Subgroup	Method	Condition
*	B3	4066	Condition A, I_{FSM} = 250 A; ten surges of 8.3 ms each at 1 minute intervals, superimposed on I_O = 10A, V_{RWM} = rated, see column 2 of 1.3.2. T_A = 25°C.
	B3	1071	Fine leak not required. Opaque glass diodes may use method 2068 in lieu of hermeticity.
*	B4	1037	I_O = 5 A minimum (see 1.3.2); V_R = rated V_{RWM} (see 1.3.2); 2,000 cycles.
	B4	1071	Fine leak not required. Opaque glass diodes may use method 2068 in lieu of hermeticity.
*	B5	1027	I_O = 3 A minimum, t = 1,000 hours, V_{Rpk} = 80 percent minimum of rated V_{RWM} (see column 2 of 1.3.2) adjust I_O or T_A to achieve T_J = 175°C minimum; f = 50 - 60 Hz. T_A = 55°C max. For irradiated devices, include t_{rr} as an end-point measurement.
	B8	4065	Peak reverse power, $P_{RM} \geq$ 636 W square wave. Test shall be performed on each sublot; sampling plan: n = 10, c = 0, electrical end-points, see table I, subgroup 2 herein.

4.4.2.2 Quality levels JAN, JANTX, and JANTXV.

	Subgroup	Method	Condition
	B2	1071	Fine leak not required. Opaque glass diodes may use method 2068 in lieu of hermeticity.
*	B3	1037	I_O = 5 A minimum (see 1.3.2); V_R = rated V_{RWM} (see 1.3.2); 2,000 cycles.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VII of MIL-PRF-19500.

	Subgroup	Method	Condition
	C2	2036	Condition A, 12 pounds (5.44 kg)(silver leads) 20 pounds (9.07 kg) (copper leads), t = 15 seconds. Condition E, 2 pounds (0.91 kg). (Lead fatigue not applicable to US device.)
	C2	2038	Condition B, US devices: 20 pounds (9.07 kg) (copper tabs), t = 15 seconds.
	C2	1071	Fine leak not required. Opaque glass diodes may use method 2068 in lieu of hermeticity.
	C5	4081	$R_{\theta JL}/R_{\theta JEC}$ in accordance with 1.3.2 herein.
*	C6	1037	I_O = 5 A minimum (see 1.3.2); V_R = rated V_{RWM} (see 1.3.2); 6,000 cycles total, may continue from Group B.

* 4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of MIL-PRF-19500 and as specified herein.

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

4.5.1 Pulse measurements. Conditions for pulse measurement shall be as specified in section 4 of MIL-STD-750.

4.5.2 Scope display evaluation. Scope display evaluation shall be stable in accordance with method 4023 of MIL-STD-750, condition A, max lift = 20 µA. Scope display may be performed on ATE (automatic test equipment) for screening only with the approval of the qualifying activity. Scope display in table I, subgroup 4 shall be performed on a curve tracer. The reverse current (I_{BR}) shall be 100 µA peak.

4.5.3 Burn-in and life tests. These tests shall be conducted with a half-sine waveform of the specified peak voltage impressed across the diode in the reverse direction followed by a half-sine waveform of the specified average rectified current. The forward conduction angle of the rectified current shall be neither greater than 180 degrees nor less than 150 degrees.

4.5.3.1 Junction temperature measurements. Use method 3100 of MIL-STD-750 to measure T_J. The use of a current limiting or ballast resistor is permitted provided that each DUT still sees the I_O and that the required voltage, where applicable, is maintained through-out the burn-in period.

4.5.3.2 Mounting conditions. At the option of the manufacturer, any clips or heat sink mounting configurations may be utilized provided that I_O is increased such that the junction temperature of each diode is maintained at +135°C minimum for screening, +150°C minimum for life test, and that the minimum required voltage V_{RWM} is maintained throughout the burn-in period.

4.5.4 Thermal resistance. Thermal resistance measurement shall be performed in accordance with method 4081 of MIL-STD-750 using the guidelines in that method for determining I_M, I_H, t_{MD} and t_H. See subgroup 4 of table E-IX of MIL-PRF-19500 and figure 3 herein. Forced moving air or draft shall not be permitted across the devices during test.

MIL-PRF-19500/768D
w/AMENDMENT 1

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750 Method	MIL-STD-750 Conditions	Symbol	Limit Min	Limit Max	Unit
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Thermal impedance 2/	3101	See 4.3.1	$Z_{\theta JX}$			°C/W
Forward voltage	4011	Condition B; pulsed (see 4.5.1)				
		I_{FM} = 6.0 A	V_{FM1}		0.900	V
		I_{FM} = 10 A	V_{FM2}		0.950	V
		I_{FM} = 20 A	V_{FM3}		1.050	V
* Reverse current	4016	Condition A or B, DC method; V_R = rated (1.3.2, column 2);	I_{R1}		10	µA
* Breakdown voltage	4021	$I_{(BR)}$ = 100 µA, pulse ≤ 20 ms	V_{BR}			
1N7066				110		V
1N7067				160		V
1N7068				210		V
Subgroup 3						
High temperature operation:		T_A = +125°C				
* Reverse current	4016	Condition A or B, DC method; V_R = rated (1.3.2, column 2);	I_{R2}		1	mA
Forward voltage	4011	Condition B; I_{FM} = 6.0 A; pulsed (see 4.5.1)	V_{FM4}		0.850	V
High temperature operation:		T_A = +150°C				
* Reverse current	4016	Condition A or B, DC method; V_R = rated (1.3.2, column 2)	I_{R3}		4	mA
Forward voltage	4011	Condition B; I_{FM} = 6.0 A; pulsed (see 4.5.1)	V_{FM5}		0.780	V

See footnotes at end of table.

9

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit	Limit	Unit
	Method	Conditions		Min	Max	
Subgroup 3 - continued.						
Low-temperature operation:		$T_A = -55°C$				
Forward voltage	4011	Condition B; I_{FM} = 6.0 A; pulsed (see 4.5.1)	V_{FM6}		1.050	V
Subgroup 4						
Reverse recovery time	4031	Condition B; $I_F = I_{RM}$ = 1.0 A $i_{(REC)}$ = 0.1 A; di/dt = 100 A/μs (min)	t_{rr}		30	ns
Capacitance	4001	V_R = 10 V; f = 1 MHz; V_{sig} = 50 mV (p-p)	C_J		80	pF
Scope display evaluation	4023	See 4.5.2, n = 116, c = 0				
Subgroup 5						
Not applicable						
Subgroup 6						
Forward surge	4066	Condition A, ten surges of 8.3 ms each at 1 minute intervals superimposed on I_O = 10 A; V_{RWM} = rated (see 1.3.2); $T_A = +25°C$	I_{FSM}	250		A(pk)
Electrical measurements		See table I, subgroup 2 except $Z_{\theta JX}$				
Subgroup 7						
Not applicable						

1/ For sampling plan, see MIL-PRF-19500.
2/ For end-point measurements, this test is required for the following subgroups:
Group B, subgroups 2 and 3 (JAN, JANTX, JANTXV).
Group B, subgroups 3 and 4 (JANS).
Group C, subgroups 2 and 6.
Group E, subgroup 1.

MIL-PRF-19500/768D
w/AMENDMENT 1

TABLE II. Group E inspection (all quality levels) for qualification and requalification only.

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
Subgroup 1			45 devices c = 0
Thermal shock (liquid to liquid)	1056	20 cycles, condition D except low temperature shall be -195°C (achieved using liquid nitrogen). After the test, perform a visual examination for cracked glass.	
Temperature cycling (air to air)	1051	-65°C to +175°C, 500 cycles.	
Hermetic seal 1/	1071	Fine leak not required. Opaque glass diodes may use method 2068 in lieu of hermeticity.	
Electrical measurement		See table I, subgroup 2.	
Subgroup 2			45 devices c = 0
Steady-state dc blocking life	1048	t = 1,000 hours; T_A = +150°C; V_R dc = 80 - 85 percent rated V_{RWM} (see 1.3.2).	
Electrical measurement		See table I, subgroup 2 herein, except $Z_{\theta JX}$ need not to be performed. For irradiated devices, include t_{rr} as an end-point measurement.	
Subgroup 4			Sample size N/A
Thermal impedance curves		See MIL-PRF-19500.	
Subgroup 5			
Not applicable			
Subgroup 6			
ESD	1020		
Subgroup 7			
Resistance to soldering heat	2031	Conditions A, B, and C	3 devices
Hermetic seal 1/	1071	Fine leak not required. Opaque glass diodes may use method 2068 in lieu of hermeticity.	

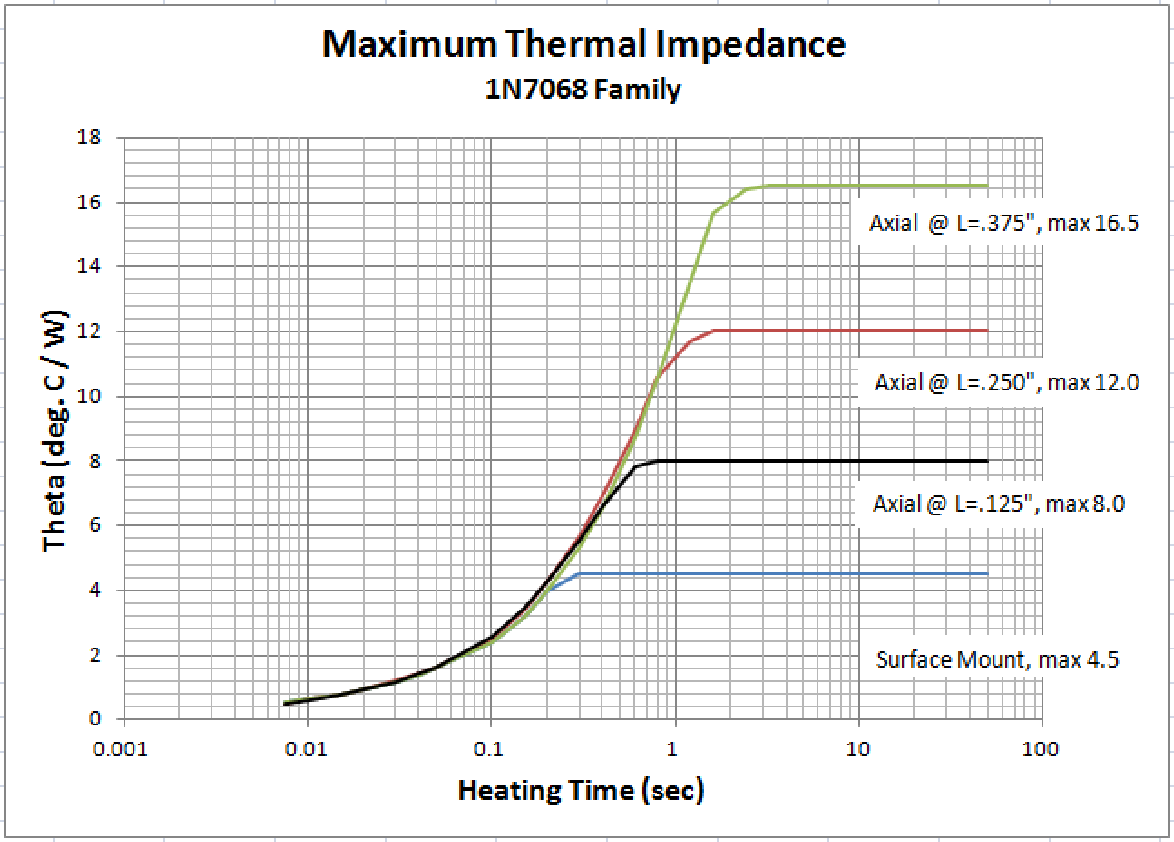
See footnotes at end of table.

MIL-PRF-19500/768D
w/AMENDMENT 1

TABLE II. Group E inspection (all quality levels) for qualification and requalification only – Continued.

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
Subgroup 8			n = 45
Peak reverse power	4065	Peak reverse power, (P_{RM}) = 636 W. The test shall be performed on each sublot.	
Electrical measurement		During the P_{RM} test, the voltage (V_{BR}) shall be monitored to verify it has not collapsed. Any collapse in V_{BR} during or after the P_{RM} test, or rise in leakage current (I_R) after the test exceeds I_R in table I, shall be considered a failure. Progressively higher levels of P_{RM} shall be applied until failure occurs on all devices within the chosen sample size, or 1,000 W is obtained.	
Subgroup 9			n = 45
Resistance to glass cracking	1057	Step stress to destruction by increasing cycles or up to a maximum of 25 cycles.	
Subgroup 10			22 devices c = 0
Forward surge	4066	Condition A, I_{FSM} = rated (see 1.3.2); ten surges of 8.3 ms each at 1 minute intervals superimposed on I_O = I_{O1} rated (see 1.3.2); V_{RWM} = rated (see 1.3.2); T_A = + 25°C.	
Electrical measurement		See table I, subgroup 2.	

1/ Opaque glass non-cavity axial lead diodes may use test method 2068 in lieu of test method1071 of MIL-STD-750.



NOTE: $Z_{\theta JX}$ = 2.0 °C/W max at 65 ms.

FIGURE 3. Thermal impedance curves.

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. Lead finish (see 3.4.2).

d. The complete PIN, see 1.5 and 6.4.

e. Lead material (see 3.4.3).

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://qpldocs.dla.mil.

6.4 PIN construction example. The PINs are constructed using the following form.

JANS 1N 7068

JAN certification mark and quality level (see 1.5.1) → JANS

First number and first letter symbols (see 1.5.2.1) → 1N

Second number symbols (see 1.5.2.2) → 7068

* 6.5 List of PINs. The following is a list of possible PINs available for encapsulated devices covered by this specification sheet.

PINs for devices of the base quality level	PINs for devices of the "TX" quality level	PINs for devices of the "TXV" quality level	PINs for devices of the "S" quality level
JAN1N7066	JANTX1N7066	JANTXV1N7066	JANS1N7066
JAN1N7067	JANTX1N7067	JANTXV1N7067	JANS1N7067
JAN1N7068	JANTX1N7068	JANTXV1N7068	JANS1N7068

6.6 Request for new types and configurations. Requests for new device types or configurations for inclusions in this specification sheet should be submitted to: DLA Land and Maritime, ATTN: VAC, Post Office Box 3990, Columbus, OH 43218-3990 or by electronic mail at Semiconductor@dla.mil or by facsimile (614) 693-1642 or DSN 850-6939.

* 6.7 Amendment notations. The margins of this specification are marked with asterisks to indicate modifications generated by this amendment. 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.

Custodians:
Army - CR
* Navy - SH
Air Force - 85
NASA - NA
DLA - CC

Review activities:
Army - AR, AV, MI, SM
Navy - AS, MC
Air Force - 19, 71

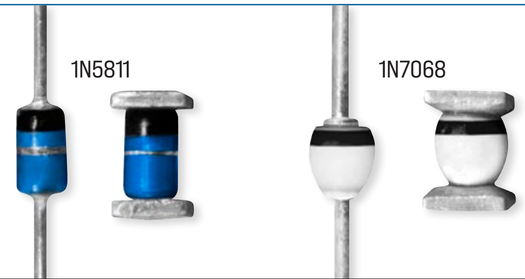
Preparing activity:
DLA - CC

(Project 5961-2022-034)

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.

1N7068 VS. 1N5811

A comparative study of the 1N7068 series and the industry standard, 1N5811, revealed that the 1N7068 offers significant electrical improvements up to 100% in comparison to the 1N5811.



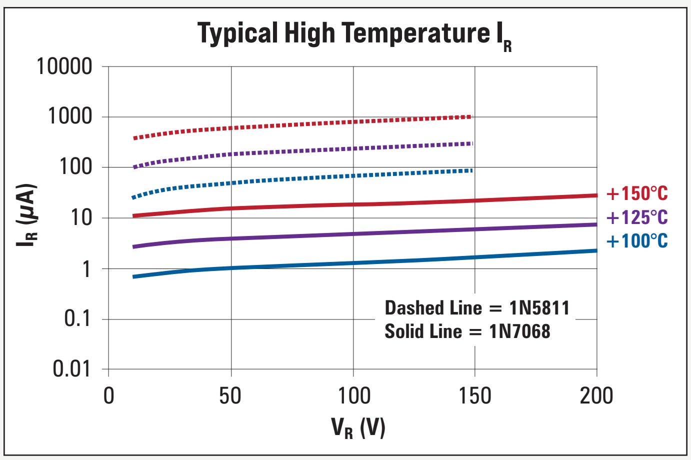
SSDI's 1N7068US device is a drop in replacement for the 1N5811US

ABSOLUTE MAXIMIUM RATINGS

Parameter		1N5811	1N7068	Improvement
Average Rectified Forward Current (I_0)		6.0 A	10.0 A	67%
Peak Surge Current (I_{FSM})		125 A	250 A	100%
Peak Repetitive Reverse Voltage and DC Blocking Voltage (V_{RRM}, V_{RWM}, V_R)		150 V	200 V	33%
Thermal Resistance	$R_{\theta JL}$	22°C/W	8°C/W	64%
	$R_{\theta JEC}$	6.5°C/W	4.5°C/W	31%

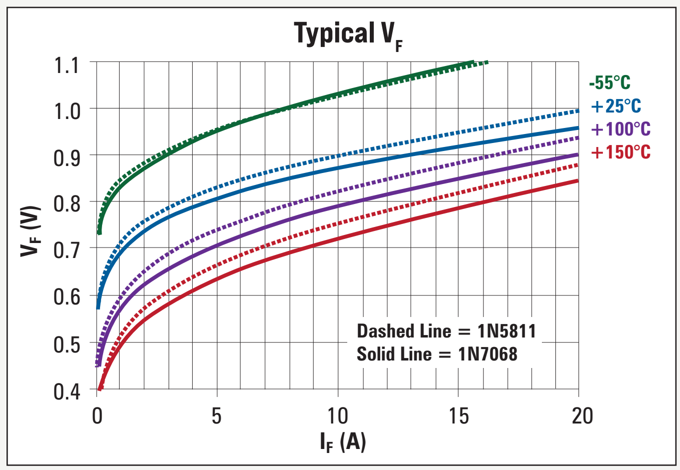
REVERSE LEAKAGE

The 1N7068 device's high temperature leakage display 98% less leakage current on average than the 1N5811.



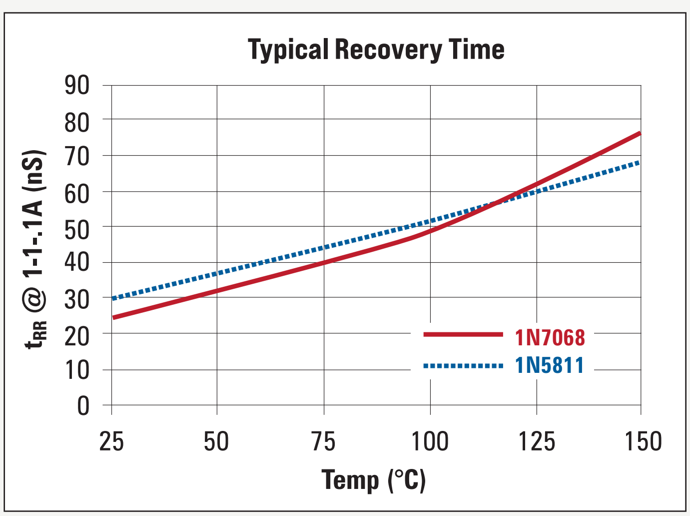
FORWARD VOLTAGE DROP

The 1N7068 device's forward voltage drop is 20 - 40 mV less on average than the 1N5811 when operated at the same current.



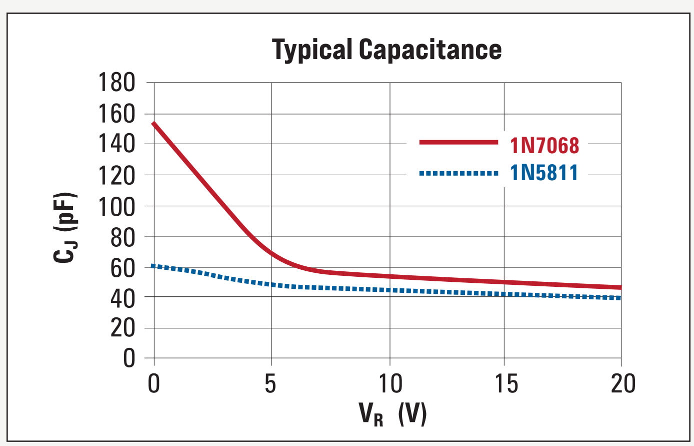
REVERSE RECOVERY TIME

The 1N7068 device displays faster recovery time on average than the 1N5811 at junction temperatures below 120 ˚ C.



CAPACITANCE

The 1N7068 device is designed with a larger junction than the 1N5811 resulting in higher capacitance. Although the 1N7068 device is rated higher in capacitance than the 1N5811, it typically meets the 1N5811 capacitance specification at normal operating voltages.



1N7068 VS. 1N5811 / CASE OUTLINES

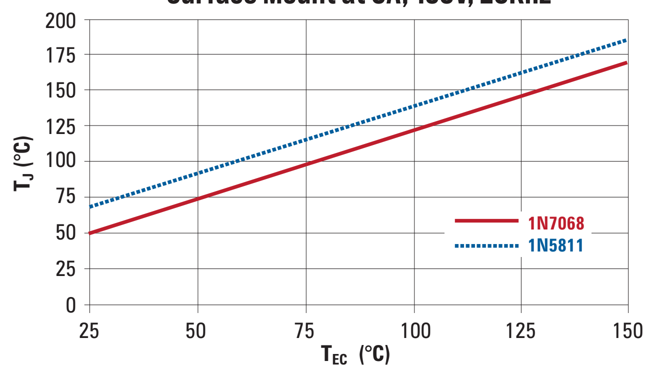
OPERATION

Compared to the 1N5811, the typical performance of the 1N7068 provides:

- reduced power consumption of 3% to 8% on average per device, depending upon application
- lower junction temperatures of 6% to 30% on average depending upon application

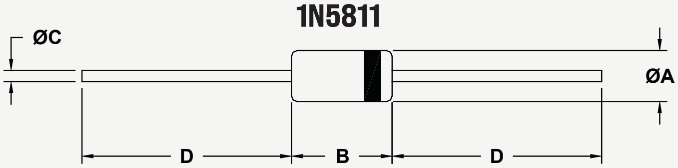
The adjacent chart displays the improved thermal management of the 1N7068 compared to the 1N5811 at typical operating conditions. On average, the 1N7068 operates 20 ˚ C cooler resulting in improved efficiency and system reliability.

Surface Mount at 6A, 150V, 20Khz



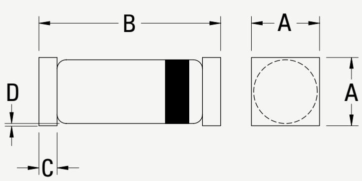
CASE OUTLINES

1N5811



Axial

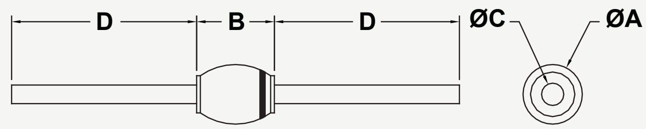
DIM	MIN	MAX
A	.115”	.142”
B	.130”	.300”
C	.036”	.042”
D	.900”	1.30”



Surface Mount

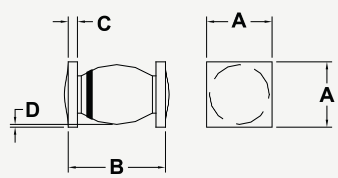
DIM	MIN	MAX
A	.137”	.148”
B	.200”	.225”
C	.019”	.028”
D	.003”	--

1N7066 - 1N7068 Series



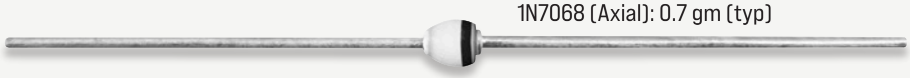
Axial

DIM	MIN	MAX
A	.135”	.165”
B	.135”	.155”
C	.036”	.042”
D	.900”	1.30”



Surface Mount

DIM	MIN	MAX
A	.172”	.180”
B	.180”	.220”
C	.020”	.028”
D	.002”	--



1N7068 (Axial): 0.7 gm (typ)

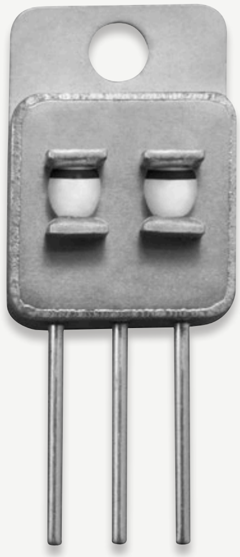
1N5811 (Axial): 0.75 gm (typ)

1N5811 (Surface Mount): 0.54 gm (typ)

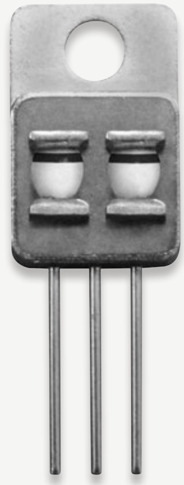
1N7068 (Surface Mount): 0.5 gm (typ)

1N7068 SERIES: POSSIBLE SOLUTIONS FOR SIMILAR PARTS

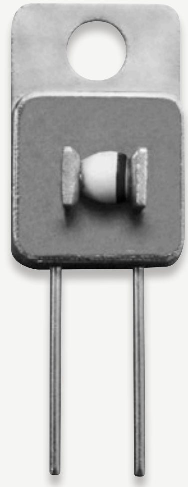
DO-4
/478: 1N5816
6.0 gr (typ)



TO-254AA
/594: 1N6666, R
/616: 1N6659, R
/642: 1N6765, R
6.3 gr (typ)



TO-257AA
/644: 1N6771, R
3.2 gr (typ)



TO-257AA (2 pins)
/646: 1N6777
3 gr (typ)

TO-59 Isolated Stud
1N6653
5.4 gr (typ)

PRODUCT DEVELOPMENT: 1N7068 BRIDGE ASSEMBLIES

Three Phase Bridge History

For over 25 years, SSDI has been producing bridge assemblies with its high current diodes. The SDA113 series was the first bridge assembly developed by SSDI and originally featured 7.5 amps of output current and 1000 volts. Fifteen years ago, SSDI delivered higher power densities with the the SDA195 by changing the internal diodes to the SPD610 - SPD630 series. This bridge had an increased current to 30 amps with 100, 200, and 300 volt versions available.

Internal Diode

The internal diode selection is paramount to the end item module performance. Typically throughout the industry, the 1N5811 and SSDI's SPD620 (6A, 200V, 40nS) diodes have been commonly selected as the building blocks in the construction of these bridge assemblies. Since the diode performance is the limiting factor to increasing the current rating of the bridge assemblies, higher power levels are achieved through the improvement of the internal diodes.

Module Construction

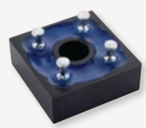
SDA195

SSDI is currently developing bridge assemblies using the 1N7068 diode. The 1N7068 diode has a higher IO and IFSM rating, which achieves lower thermal resistance compared to the 1N5811. Initial research and development indicates that SSDI's SDA195 module would exhibit improved forward current, thermal resistance, forward voltage drop, and reverse leakage current with the replacement of the internal diodes with the same number of 1N7068 diodes.

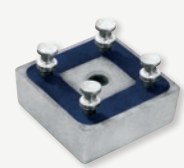
Bridge assemblies using the 1N7068 diodes can possibly improve the performance of current bridge assemblies on the market such as the three examples shown below. For more information about the current modules in development or to investigate how the high current 1N7068 diodes can improve your bridge assemblies, contact the factory at (562) 404-4474.

1N7068 Bridge Assemblies: Possible Solutions for Similar Bridge Assemblies

/483: M19500/483-01 to -04

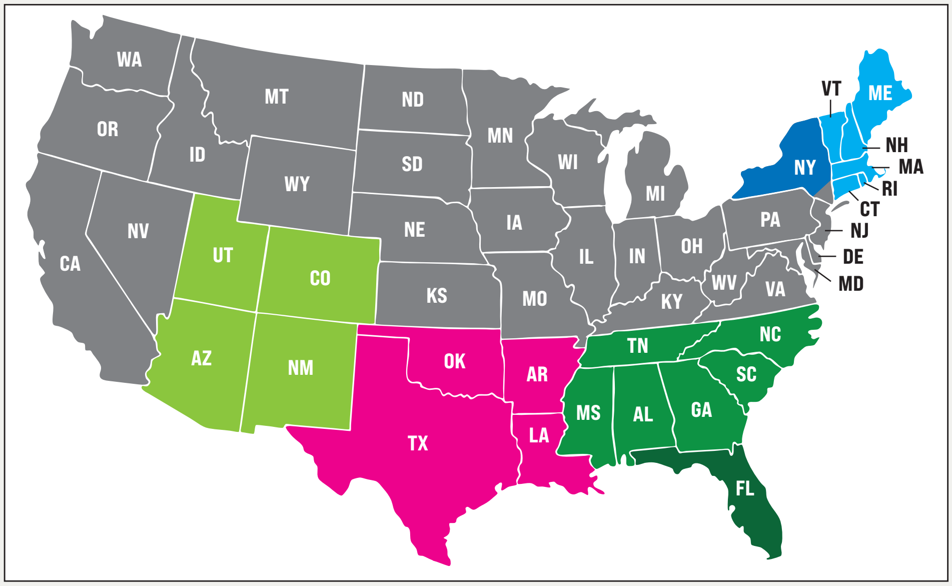


/469: M19500/469-01 to -05



/446: SPA25, SPB25, SPC25, SPD25

Domestic Sales Representatives



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Website: www.zimmermansales.com
sales@zimmermansales.com

Electronic Marketing Associates, Inc.
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Raleigh, NC 27615
Phone: 919-847-8800
info@emarep.com

FLA. Technology Sales, Inc. *(FL)*
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eFax: 734-939-4411
Email: terry@flatechnology.com

Thom Luke Sales *(CO, UT, AZ, NM)*
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Website: www.thomlukesales.com
CO / UT: colorado@thomlukesales.com
AZ / NM: arizona@thomlukesales.com

CentraMark Technical Sales Associates
(TX, OK, AR, LA)
1705 Analog Dr.
Richardson, TX 75081-1944
Phone: 972-414-8188
Website: cmatex.com

SSDI Direct
Phone: 562-404-4474
Website: ssdi-power.com

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dvjohnson@ssdi-power.co.uk

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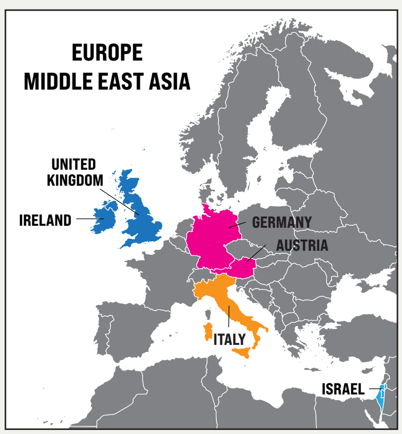

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