

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Page 3, paragraph 3.5 marking. Page 9, added vendor part number reference to paragraph 6.5.	2002-04-08	Thomas M. Hess
B	Update lead finish, manufacturer information, editorial and format changes.	2008-08-18	Thomas M. Hess
C	Update manufacturer information and PINs, editorial and format changes to comply with Section 508 requirements.	2022-09-28	Muhammad Akbar

MIL-PRF-19500/443 HAS BEEN CANCELLED.
THIS DRAWING MAY BE USED AS A SUBSTITUTE.



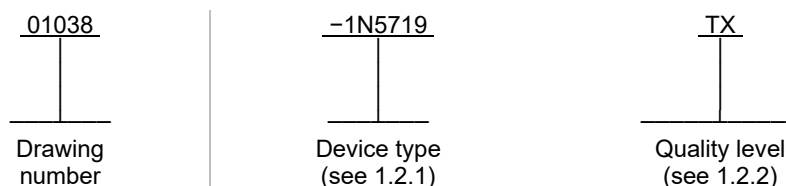
Prepared in accordance with [ASME Y14.100](#) Source controlled drawing

Revision Status of Sheets																			
REV																			
SHEET																			
REV	C	C	C	C	C	C	C	C	C	C	C								
SHEET	1	2	3	4	5	6	7	8	9	10	11								
PMIC N/A Original date of drawing 10 September 2001			PREPARED BY Roger Kissel									DEFENSE SUPPLY CENTER COLUMBUS COLUMBUS, OH 43218-3990							
			CHECKED BY Jason Hochstetler									TITLE SEMICONDUCTOR DEVICE, DIODE, SILICON PIN DIODE, TYPE 1N5719							
			APPROVED BY Thomas M. Hess																
			SIZE A		CAGE CODE 037Z3				DWG NO. 01038										
			REV C				PAGE 1 OF 11												

1. SCOPE

1.1 Scope. This drawing covers the detail requirements for a silicon pin diode. Two levels of product assurance are provided for each device type as specified in [MIL-PRF-19500](#). This drawing may be used as a substitute for MIL-PRF-19500/443, which has been canceled (see 6.3).

1.2 Part or Identifying Number (PIN). The complete PIN shall be as follows:



1.2.1 Device type. The device types are as follows:

<u>Device type</u>	<u>Figure number</u>
01038-1N5719	1
01038-1N5719TX	1

1.2.2 Quality level. The NON-TX and TX suffix relates to the JAN and JANTX quality level requirements of [MIL-PRF-19500](#).

1.2.3 Package outline. The device package outline is a round body, axial lead similar to DO-xx in accordance with [figure 1](#) for all device types.

1.3 Maximum ratings. Unless otherwise specified, $T_C = +25^{\circ}\text{C}$.

V_{RWM} working	V_{RM} non-repetitive	P_T (1)	T_{OP} and T_{STG}	$R_{\theta JC}$
<u>V (pk)</u> 100	<u>V (pk)</u> 150	<u>mW</u> 250	<u>°C</u> -65 to +150	<u>°C/W</u> 500

(1) Derate 2.0 mA/°C above 25°C.

1.4 Primary electrical characteristics. Unless otherwise specified, $T_A = +25^{\circ}\text{C}$.

Limits	$V_{(BR)}$ $I_R = 10 \mu\text{A dc}$	R_S $I_F = 100 \text{ mA dc}$ 100 MHz	C_{VR} $V_R = 100 \text{ V dc}$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	τ_{CL} $I_F = 50 \text{ mA dc}$ $I_R = 250 \text{ mA dc}$
Minimum Maximum	<u>V dc</u> 150	<u>Ω</u> 1.25	<u>pF</u> .30	<u>ns</u> 100

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

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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 (see 6.2).

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>.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications 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.

C68001 – Test Fixture For Effective Minority Carrier Lifetime.

(Copies of the above drawing are available from DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990).

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.

3. REQUIREMENTS

3.1 General. The individual item requirements shall be as specified in MIL-PRF-19500 and as modified herein All semiconductor devices described herein shall meet all requirements of MIL-PRF-19500 as specified herein except qualification is not required for these devices.

3.2 Certification and manufacturer eligibility.

3.2.1 Certification as approved source of supply. In order to be listed as an approved source of supply of diodes compliant to this drawing (see 6.5), a manufacturer shall submit a certificate of compliance to DLA Land and Maritime – VAC prior to listing as an approved source of supply.

3.2.2 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be either listed on the MIL-PRF-19500 Qualified Manufacturers List for at least one device type or, when specified, perform eligibility inspection in accordance with this drawing (see 4.2) on a sample of parts agreed upon by the manufacturer and DLA Land and Maritime VAC.

3.2.3 Certificate of conformance. A certificate of conformance shall be included with each shipment of devices delivered in accordance with this drawing to the customer.

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3.3 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500 and as follows:

C_{VR}	Total capacitance with reverse bias.
τ_{CL}	Effective carrier lifetime.
P_{FM}	Peak forward power dissipation.
R_S	Residual series resistance.

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified on figure 1.

3.4.1 Lead finish. Lead finish shall be gold, solder, or tin-lead in accordance with MIL-PRF-19500. Where a choice of lead material or finish is desired, it shall be specified in the contract or order. Tin content of components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass. Pure tin shall not be used as an undercoat.

3.4.2 Polarity. The polarity shall be indicated by a contrasting color band to denote the cathode end.

3.5 Marking. The marking shall be in accordance with MIL-PRF-19500. Part marking shall be 01038-1N5719 (non-screened) or 01038-1N5719TX (screened), but marking may be reduced to 38N5719 or 38N5719X, respectively. It is not necessary that marking be on one line. Complete marking, which shall include PIN (see 1.2), manufacturer's identification, Commercial and Government Entity (CAGE) code, and lot date code, shall be included on the initial packaging.

3.6 Electrical performance characteristics. The electrical performance characteristics shall be as specified in 1.3, 1.4, tables I and II.

3.7 Electrical test requirements. The electrical test requirements shall be in accordance with tables I, II and III as applicable.

3.8 Recycled, recovered, environmentally preferable or biobased materials. Recycled, recovered, or environmentally preferable, or biobased materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.9 Workmanship. The semiconductor shall be uniform in quality and free from any defects that will affect life, serviceability or appearance.

4. VERIFICATION

4.1 Sampling and inspection. Unless otherwise specified, sampling and inspection procedures shall be performed in accordance with MIL-PRF-19500 and as specified herein.

4.1.1 Inspection of product for delivery. Inspection of product for delivery shall consist of conformance inspection in accordance with 4.4.1 and 4.4.2 (groups A and B inspection).

4.2 Eligibility verification. When conformance testing is used to verify a device manufacturer eligibility, a sample of devices shall be subjected to inspection of product for delivery in accordance with 4.1.1. When specified, group E inspection shall be performed. In addition, the device manufacturer shall make available to DLA Land and Maritime VAC, upon request, all pertinent test data on its production of the listed parts, including, but not limited to, the results of testing in accordance with tables I, II and III as applicable.

4.2.1 Group E inspection. Group E inspection shall be performed on test specimens that are representative of subsequent production.

4.2.2 Inspection routines. Group E inspection shall consist of either a full inspection or partial inspection as directed by DLA Land and Maritime VAC.

4.2.2.1 Full inspection. A sample of test specimens shall be submitted for group E inspection and subjected to the testing of each subgroup of table III in the order shown. Alternately, separate samples of test specimens of the same PIN may be tested for each subgroup. All product characteristics of the PINs to be listed for a manufacturer shall be covered in the full group E inspection.

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4.2.2.2 Partial inspection. At the discretion of DLA Land and Maritime VAC, a manufacturer may be required to perform a partial group E inspection for the reasons listed in 4.2.3. The manufacturer shall coordinate with DLA Land and Maritime VAC to determine the applicable subgroups of [table III](#) and sample quantities required to be tested.

4.2.3 Extent of listing. A group E inspection on a particular diode PIN shall be extended to cover all other diode PINs of this drawing.

4.2.4 Design, location, material, or process changes. A full or partial group E inspection may be required when any of the following events occurs:

- a. A change in the design affecting form, fit, or function of the part.
- b. A change in the location of the manufacture.
- c. A change in manufacturing source(s), process(es), inspection method(s), tooling or materials, affecting form, fit, or function.
- d. A natural or man-made event, which may adversely affect the manufacturing process.

4.2.5 Nonconformance. The group E inspection is not complete until all non-conformances affecting the part are addressed and corrective actions have been implemented and accepted. The group E inspection shall be repeated for the affected characteristics and the results recorded.

4.3 Screening (TX levels 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	Measurement for TX levels
9	Not applicable
11	I_{R1} , V_{F1}
12	See 4.3.1
13	Subgroup 2 of table I herein; $\Delta I_{R1} = \pm 100$ percent of initial value or 250 nA dc, whichever is greater $\Delta V_{F1} = 100$ mV (peak)

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: T_A = room ambient as defined in the general requirements of [MIL-STD-750](#), minimum, $I_O = 50$ mA dc, $V_R = 120$ V(pk), $f = 60$ Hz.

4.4 Conformance inspections. Conformance inspection shall consist of the examinations and tests specified in groups A and B herein.

4.4.1 Group A inspection. Group A inspection shall consist of the inspections and tests specified in [table I](#).

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VIB (non-TX, TX) of [MIL-PRF-19500](#) and herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of [table I](#), group A, subgroup 2 herein. Delta measurements shall be in accordance with [table II](#) herein.

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<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B2	1056	Test condition A.
B3	1027	$I_o = 50$ mA dc minimum, $V_R = 120$ V(pk), $f = 60$ Hz. T_A = room ambient as defined in the general requirements of MIL-STD-750 , minimum, $T_J = 150^\circ\text{C}$ minimum.
B5		Not applicable.
B6	1032	$T_A = 150^\circ\text{C}$.

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

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

4.5.2 Effective carrier lifetime (τ_{CL}). Carrier lifetime may be measured using any of the following methods.

4.5.2.1 Reverse recovery time method. This test shall be conducted in accordance with method 4031 of [MIL-STD-750](#), condition B with the device installed in the test fixture, drawing C68001 or equivalent. The test parameters shall be: $I_F = 50$ mA, $I_r = 30$ mA, $I_{(rec)} = 3$ mA.

4.5.2.2 Stored charge meter method. A pulse from a 20 kHz ± 200 Hz pulse generator and forward bias from a power supply shall be applied to the diode under test. Reverse current shall be 250 mA dc and forward bias shall be 50 mA dc. Read voltage on digital voltmeter and divide by 100 ohms to obtain average reverse current. Divide average reverse current by the product of pulse repetition frequency and bias current to obtain carrier lifetime (or equivalent) (see [figure 2](#)).

4.5.2.3 Stored charge meter method (using commercial meter). Determine stored charge using meter manufacturer's instructions and a forward bias of 50 mA dc. Calculate the carrier lifetime by dividing the stored charge (coulombs) by the forward bias (amperes).

4.5.3 Series resistance (R_s). This test shall be performed utilizing an appropriate impedance analyzer such as the Hewlett Packard Model 4191A (or equivalent) or a vector network analyzer such as the Hewlett Packard Model 8753B (or equivalent).

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TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit	Limit	Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Forward voltage	4011	Condition A or B; $I_F = 100$ mA dc	V_{F1}		1.0	V dc
Reverse current	4016	Condition A or B; $V_R = 100$ V dc	I_{R1}		250	nA dc
Breakdown voltage	4021	$I_R = 10$ μ A dc	$V_{(BR)1}$	150		V dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = +150^\circ\text{C}$				
Reverse current	4016	Condition A or B; $V_R = 100$ V dc	I_{R2}		15	μ A dc
Low temperature operation		$T_A = -55^\circ\text{C}$				
Forward voltage	4011	Condition A or B; $I_F = 100$ mA dc	V_{F2}		1.15	V dc
Breakdown voltage	4021	$I_R = 10$ μ A dc	$V_{(BR)2}$	150		V dc
<u>Subgroup 4</u>						
Capacitance	4001	$V_R = 100$ V dc; 100 kHz $\leq f \leq 1$ MHz	C		0.3	pF
<u>Subgroups 5 and 6</u>						
Not applicable						
<u>Subgroup 7</u>						
Series resistance		See 4.5.3; $I_F = 100$ mA dc; 100 kHz $\leq f \leq 1$ MHz	R_s		1.25	Ω
Effective carrier lifetime		See 4.5.2; $I_F = 50$ mA dc	τ_{CL}	100		ns

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

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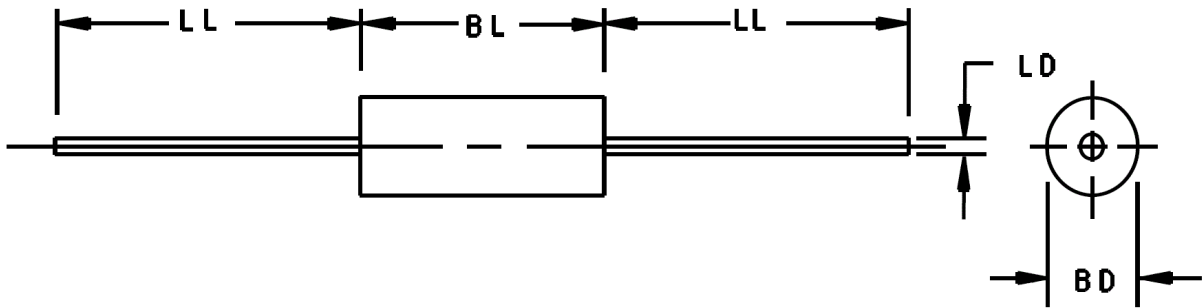
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TABLE II. Groups B delta measurements.

Step	Inspection	MIL-STD-750		Symbol	Limits	Limits	Unit
		Method	Conditions		Min	Max	
1.	Forward voltage	4011	Condition A or B, I _F = 100 mA dc	ΔV _{F1}	±100 mV dc maximum ±20 percent of initial value or ±50 nA dc (whichever is greater) change from initial group A reading.		
2.	Reverse current	4016	Condition A or B, V _R = 100 V dc	ΔV _{(BR)1}			

TABLE III. Group E inspection.

Inspections	MIL-STD-750	
	Method	Conditions
<u>Subgroup 1</u>		
Temperature shock (glass strain)	1056	
Hermetic seal	1071	Gross leak only.
End-point electrical measurements		See table I , subgroup 2 herein.
<u>Subgroup 2</u>		
Intermittent operation life	1037	10,000 cycles; $I_F = 100$ mA dc, $t_{on} = t_{off} = 1$ minute.
End-point electrical measurements		See table I , subgroup 2 herein.
<u>Subgroups 4, 5, 6, and 7</u>		
Not applicable		
<u>Subgroup 8</u>		
Resistance to glass cracking	1057	Test condition B. Test until failure occurs or to a maximum of 25 cycles, whichever comes first.

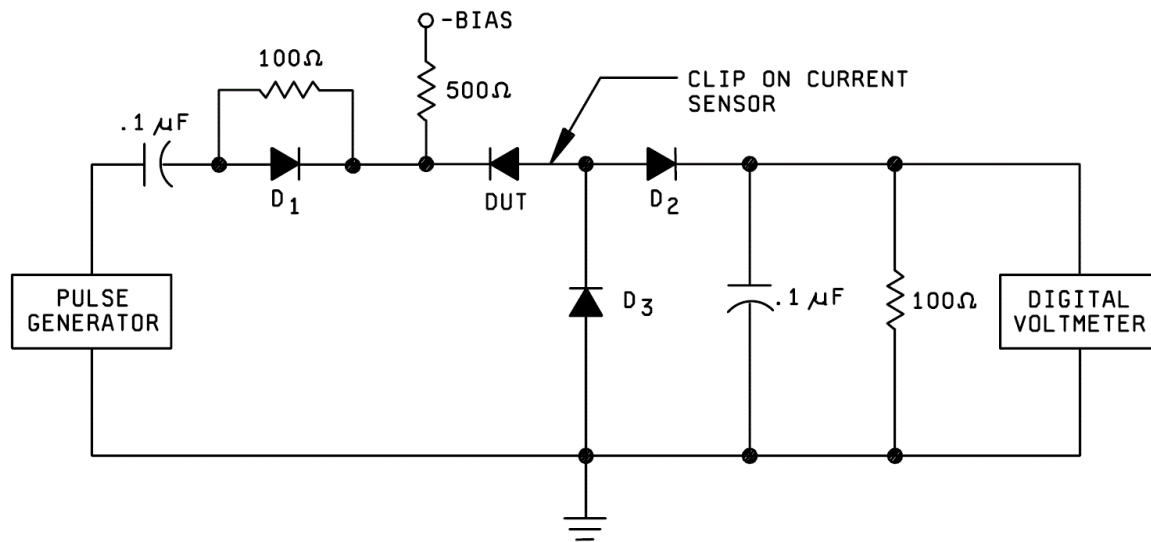


Symbol	Inch	Inch	mm	mm	Notes
	Min	Max	Min	Max	
BD	.045	.076	1.14	1.93	2
BL	.100	.170	2.54	4.32	2
LD	.014	.022	0.36	0.56	3
LL	.975	1.5	24.77	38.10	

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Package contour optional within BD and BL. Heat slugs, if any, shall be included within this cylinder but shall not be subject to minimum limit BD.
3. Within this zone, lead diameter may vary to allow lead finishes and irregularities other than heat slugs.
4. The cathode shall be indicated by a contrasting color band.

FIGURE 1. Physical dimensions 1N5719.



NOTE: D₁ and D₂ are 1N4456 high conductive diodes, or equivalent. D₃ is HP 5082-2835, or equivalent.

FIGURE 2. Stored charge meter method.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD 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 activity within the Military Department or Defense Agency, or within the Military Department's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use. Devices conforming to this drawing are intended for use when performance specifications do not exist and qualified performance devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of duplicate specifications, drawings, and stock number listings.

6.2 Acquisition requirements. The acquisition requirements should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging and packing.

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6.3 Replaceability. Devices covered by this drawing may be used as a substitute for MIL-PRF-19500/443.

DSCC drawing PIN	Military part number
01038-1N5719	JAN1N5719
01038-1N5719TX	JANTX1N5719

6.4 Comments. Comments on this drawing should be addressed to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to semiconductor@dla.mil.

6.5 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed with this drawing and have submitted a certificate of compliance (see 3.2.1 herein) to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990 or emailed to semiconductor@dla.mil.

DSCC drawing PIN (1)	Vendor similar designation or type number (2)	Vendor CAGE	Vendor name and address
01038-1N5719 01038-1N5719TX	MA1N5719HX	52GC4	VPT Components 100 Chelmsford Road Lowell, MA 01851 URL: https://www.vptcomponents.com

- (1) Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.
- (2) Do not use vendor PIN's for acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

6.6 Users of record. Coordination of this document for future revisions are coordinated only with the suggested sources of supply and the users of record of this document. Requests to be added as a recorded user of this drawing should be in writing to: DLA Land and Maritime, ATTN: VAC, Post Office Box 3990, Columbus, OH 43218-3990 or by E-mail to semiconductor@dla.mil.

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