

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Page 3, paragraph 3.5 marking. Page 9, added vendor part number reference to paragraph 6.5.	8 April 2002	Thomas M. Hess
B	Update lead finish, manufacturer information, editorial and format changes.	18 August 2008	Thomas M. Hess

**MIL-PRF-19500/443 has been canceled.  
This drawing may be used as a substitute.**

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

Prepared in accordance with ASME 14.100

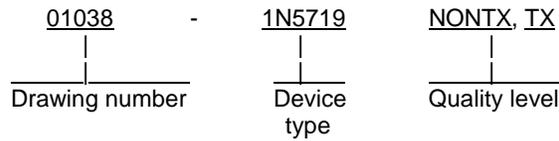
Selected item drawing

REV STATUS OF PAGES	REV	B	B	B	B	B	B	B	B	B								
	PAGES	1	2	3	4	5	6	7	8	9								
PMIC N/A	PREPARED BY Roger Kissel							DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH <a href="http://www.dsc.dla.mil/programs/milspec/docsearch.asp">http://www.dsc.dla.mil/programs/milspec/docsearch.asp</a>										
Original date of drawing  10 September 2001	CHECKED BY Jason Hochstetler							TITLE  SEMICONDUCTOR DEVICE, PIN DIODE, SILICON, TYPE 1N5719										
	APPROVED BY Thomas M. Hess																	
	SIZE A	CODE IDENT. NO. 037Z3						DWG NO.  01038										
							PAGE 1 OF 9											

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 types. The device type shall be as follows:

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

1.2.2 Ratings.

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

(1) Derate 2.0 mA/°C above 25°C.

1.3 Primary electrical characteristics at  $T_A = +25^\circ\text{C}$ , unless otherwise indicated.

Limits	$V_{(BR)}$ $I_R = 10 \mu\text{A dc}$	$R_S$ $I_F = 100 \text{ mA dc}$ 100 MHz	$C_{VR}$ $V_R = 100 \text{ V dc}$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$\tau_{CL}$ $I_F = 50 \text{ mA dc}$ $I_R = 250 \text{ mA dc}$
	<u>V dc</u>	<u><math>\Omega</math></u>	<u>pF</u>	<u>ns</u>
Minimum Maximum	150	1.25	.35	100

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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, 4, or 5 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.

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://assist.daps.dla.mil/quicksearch> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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 Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990).

2.3 Order of precedence. 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.

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

- C<sub>VR</sub> Total capacitance with reverse bias.
- τ<sub>CL</sub> Effective carrier lifetime.
- P<sub>FM</sub> Peak forward power dissipation.
- R<sub>S</sub> Residual series resistance.

3.3 Interface and physical dimensions. Interface and physical dimensions shall be as specified on figure 1.

3.3.1 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.

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

3.4 Performance characteristics. Performance characteristics shall be in accordance with tables I and II.

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. No color coding for part number shall be permitted. Complete marking shall include part number, manufacturer's identification, Commercial and Government Entity (CAGE) code, and lot date code shall be included on the initial packaging.

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3.6 Manufacturer eligibility. To be approved to supply devices to this drawing, the manufacturer shall supply a certificate of compliance to DSCC and then perform conformance inspection in accordance with procuring activity's requested first article testing requirements in accordance with 4.3 herein. Devices specified herein shall meet traceability and lot formation requirements of MIL-PRF-19500 except as modified by the procuring activity.

3.7 Submission of certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.5. The certificate of compliance submitted to DSCC-VAC, prior to listing as a source of supply in 6.5, shall state that the manufacturer's product meets the applicable requirements of MIL-PRF-19500 and the requirements herein.

3.8 Certificate of conformance. A certificate of conformance shall be included with each shipment of devices delivered to the customer.

3.9 Recycled, recovered, or environmentally preferable materials. Recycled, recovered or environmentally preferable 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.

3.10 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.

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

4.2.1 Group A inspection. Group A inspection shall consist of the inspections and tests specified in table I.

4.2.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in 4.2.2.1 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.

4.2.2.1 Group B inspection, table E-VIb (non-TX, TX) of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B2	1056	Test condition A.
B3	1027	$I_O = 50 \text{ mA}$ dc minimum, $V_R = 120 \text{ V(pk)}$ , $f = 60 \text{ Hz}$ . $T_A =$ 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	$T_A = 150^\circ \text{C}$ .

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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 (see table E-IV of MIL-PRF-19500)	Measurement
	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 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables.

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

4.4.2 Effective carrier lifetime ( $\tau_{CL}$ ). Carrier lifetime may be measured using any of the following methods.

4.4.2.1 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.

4.4.2.2 Stored charge meter method. A pulse from a 20 kHz  $\pm 200$  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).

4.4.2.3 Stored charge meter method. 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).

4.4.3 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.

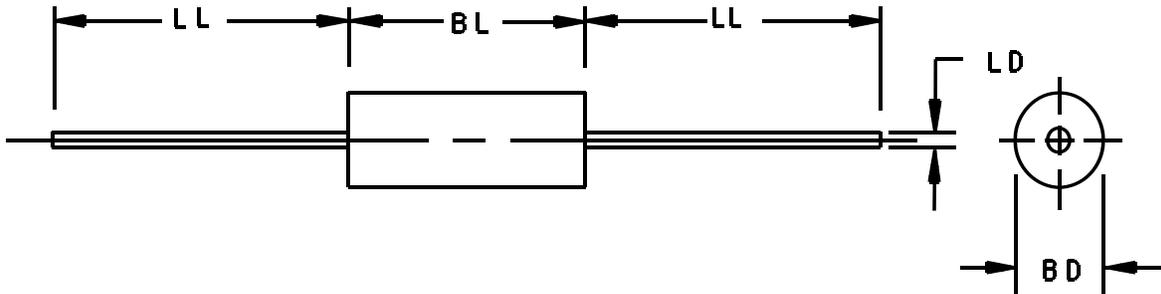
Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Forward voltage	4011	$I_F = 100 \text{ mA dc}$	$V_{F1}$		1.0	V dc
Reverse current	4016	DC method; $V_R = 100 \text{ V dc}$	$I_{R1}$		250	nA dc
Breakdown voltage	4021	$I_R = 10 \text{ } \mu\text{A dc}$	$V_{(BR)1}$	150		V dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = +150^\circ\text{C}$				
Reverse current	4016	DC method; $V_R = 100 \text{ V dc}$	$I_{R2}$		15	$\mu\text{A dc}$
Low temperature operation		$T_A = -55^\circ\text{C}$				
Forward voltage	4011	$I_F = 100 \text{ mA dc}$	$V_{F2}$		1.15	V dc
Breakdown voltage	4021	$I_R = 10 \text{ } \mu\text{A dc}$	$V_{(BR)2}$	150		V dc
<u>Subgroup 4</u>						
Capacitance	4001	$V_R = 100 \text{ V dc};$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	C		0.3	pF
<u>Subgroups 5 and 6</u>						
Not applicable						
<u>Subgroup 7</u>						
Series resistance		$I_F = 100 \text{ mA dc}$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$R_S$		1.25	$\Omega$
Effective carrier lifetime		$I_F = 50 \text{ mA dc}$ (see 4.4.2)	$\tau_{CL}$	100		ns

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

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TABLE II. Groups B delta measurements.

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Forward voltage	4011	$I_F = 100 \text{ mA dc}$	$\Delta V_{F1}$	$\pm 100 \text{ mV dc maximum}$		
2.	Reverse current		DC method $V_R = 100 \text{ V dc}$	$\Delta V_{(BR)1}$	$\pm 20$ percent of initial value or $\pm 50 \text{ nA dc}$ (whichever is greater) change from initial group A reading.		



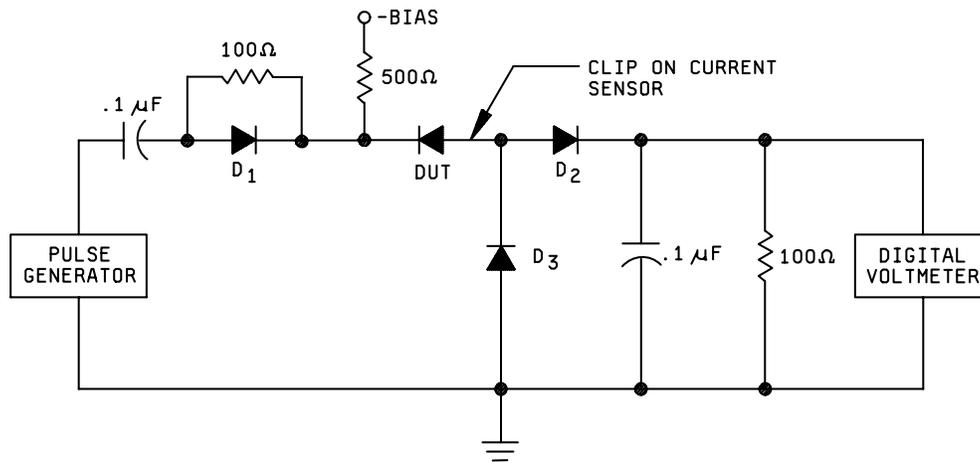
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.045	.076	1.14	1.93	3
BL	.100	.170	2.54	4.32	3
LD	.014	.016	0.36	0.41	4
LL	.975	1.5	24.77	38.10	

NOTES:

- Dimensions are in inches.
- Millimeters are given for general information only.
- 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.
- Within this zone, lead diameter may vary to allow lead finishes and irregularities other than heat slugs.
- The cathode shall be indicated by a contrasting color band.
- In accordance with ASME Y14.5M, diameters are equivalent to  $\Phi x$  symbology.

FIGURE 1. Physical dimensions 1N5719.

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NOTE: D<sub>1</sub> and D<sub>2</sub> are 1N4456 high conductive diodes, or equivalent. D<sub>3</sub> 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 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.)

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 01038-1N5719TX	JAN1N5719 JANTX1N5719

6.4 Comments. Comments on this drawing should be addressed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to [semiconductor@dsc.dla.mil](mailto:semiconductor@dsc.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 3.7 herein) to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990 or emailed to [Semiconductor@dsc.dla.mil](mailto:Semiconductor@dsc.dla.mil).

DSCC drawing PIN (1)	Vendor similar designation or type number	Vendor CAGE	Vendor name and address
01038-1N5719 01038-1N5719TX	MA1N5719 MA1N5719HX	96341	Tyco Electronics 1011 Pawtucket Boulevard Lowell, MA 01853

(1) Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.

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: Defense Supply Center, Columbus, ATTN: DSCC/VAC, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0510 or DSN 850-0510.

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