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

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

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

Prepared in accordance with MIL-STD-100 — Selected item drawing

REV																						
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REV STATUS OF PAGES	**REV**			A		A						A										
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PMIC N/A	**PREPARED BY** Roger Kissel	**DEFENSE SUPPLY CENTER, COLUMBUS** **COLUMBUS, OH**
Original date of drawing 10 September 2001	**CHECKED BY** Alan Barone	**TITLE** **SEMICONDUCTOR DEVICE, PIN DIODE, SILICON, TYPE 1N5719**
	APPROVED BY Thomas M. Hess	
	SIZE A / **CODE IDENT. NO.** 037Z3	**DWG NO.** 01038
	REV A	**PAGE** 1 **OF** 9

AMSC N/A — 5961-E065

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1. SCOPE

1.1 Scope. This drawing covers the detail requirements for a silicon pin diode. This drawing may be used as a substitute for MIL-S-19500/443, which has been inactivated (see 6.3).

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

01038	-	1N5719	NONTX, TX
Drawing number		Device	Quality level

1.2.1 Device types. The device type shall be as follows:

Device type	Figure number
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}	$R_{\theta JC}$
V (pk)	V (pk)	mW	°C	°C/W
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°C, unless otherwise indicated.

Limits	$V_{(BR)}$ I_R = 10 µA dc	R_S I_F = 100 mA dc 100 MHz	C_{VR} V_R = 100 V dc 100 kHz ≤ f ≤1 MHz	τ_{CL} I_F = 50 mA dc I_R = 250 mA dc
	V dc	Ω	pF	ns
Minimum	150			100
Maximum		1.25	.35	

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

DEPARTMENT OF DEFENSE

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

STANDARD

DEPARTMENT OF DEFENSE

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

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Defense Automated Printing Service (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 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 are those cited in the solicitation.

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 43216-5000).

2.2 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 in accordance with MIL-PRF-19500, and as specified herein.

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

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

3.3 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500 and herein.

3.3.1 Lead finish. Lead finish shall be tin over nickel and be solderable as defined in MIL-PRF-19500, MIL-STD-750, and herein.

3.3.2 Polarity. The polarity shall be indicated by a contrasting color band to denote the cathode end. No color coding shall be permitted.

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 (nonscreened) 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 manufacturer's identification, Commercial and Government Entity (CAGE) code, and lot date code, shall be included on the initial packaging.

3.6 Manufacturer eligibility. To be eligible to supply devices to this drawing, the manufacturer shall 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 a 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 compliance. A certificate of compliance shall be required from manufacturers requesting to be a suggested source of supply.

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. Sampling and inspection shall be 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.

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 paragraph 4.2.2.1. 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 VIb (NON-TX, TX) of MIL-PRF-19500.

Subgroup	Method	Condition
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°C minimum.
B5		Not applicable
B6	1032	T_A = 150° C.

4.3 Screening (TX levels only). Screening shall be in accordance with table 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 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; ΔI_{R1} = ±100 percent of initial value or 250 nA dc, whichever is greater ΔV_{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.

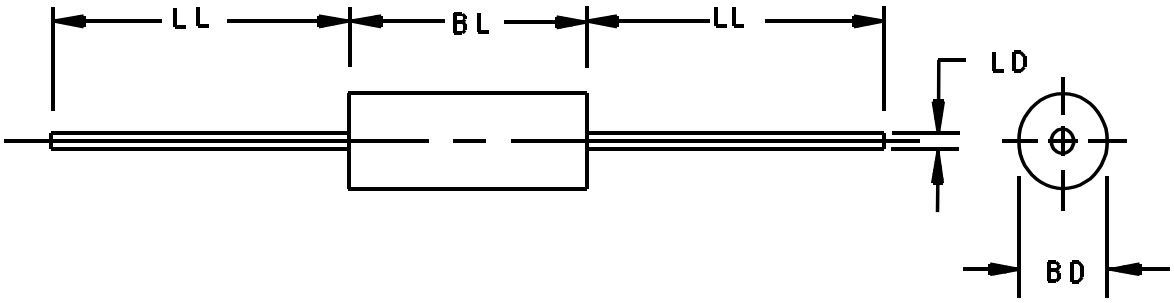
4.4.2 Effective carrier lifetime (τ_{CL}). Carrier lifetime may be measured using any of the following methods.

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).



Dimensions					
Ltr	Inches		Millimeters		Notes
	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:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. 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.
4. Within this zone, lead diameter may vary to allow lead finishes and irregularities other than heat slugs.
5. In accordance with ANSI Y14.5M, diameters are equivalent to ϕx symbology.
6. The cathode shall be indicated by a contrasting color band.

FIGURE 1. Physical dimensions 1N5719.

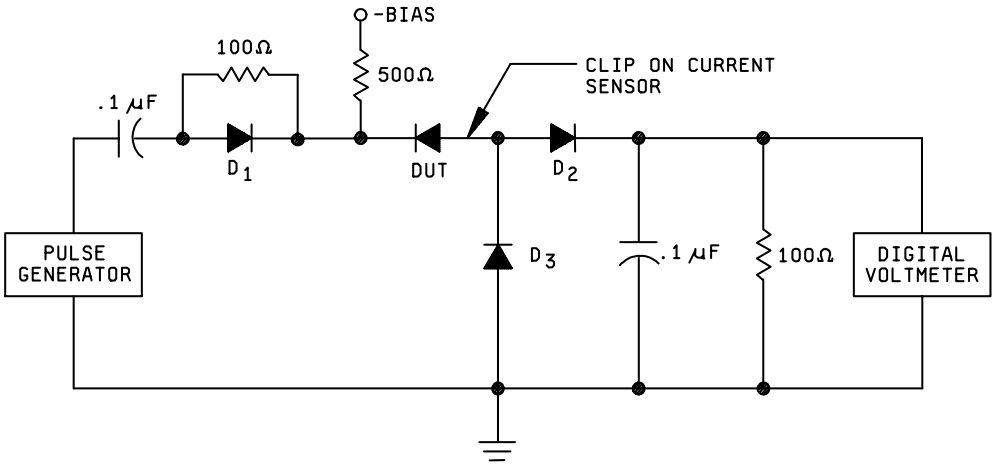
TABLE I. Group A inspection.

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

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

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 mA dc	ΔV_{F1}	±100 mV dc maximum		
2.	Reverse current		DC method V_R = 100 V dc	$\Delta V_{(BR)1}$	±20 percent of initial value or ±50 nA dc (whichever is greater) change from initial group A reading.		



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) in accordance with best practice. When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite 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

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 Ordering data. The contract or purchase order 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.

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

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

6.4 Comments. Comments on this drawing should be directed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, Post Office Box 3990, Columbus, OH 43216-5000.

6.5 Suggested sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have concurred with this drawing and have submitted a certificate of compliance (see 3.8 herein) to DSCC-VAC.

DSCC drawing PIN (1)	Vendor part number	Vendor CAGE	Vendor name and address
01038-1N5719 01038-1N5719TX	MA1N5719 MA1N5719HX	1HJ31	M/A-COM INC 43 SOUTH AVE BURLINGTON, MA 01803

(1) CAUTION: Items not acquired to this number may not satisfy the performance requirements of this drawing.

6.6 Record of users. Military and industrial users should inform Defense Supply Center Columbus when a system application requires configuration control. DSCC-VA will maintain a record of users and this list will be used for coordination and distribution of changes to the drawing. Users should contact DSCC-VA, telephone (614) 692-0510.