

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

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:

5962-89921	01	X	X
⋮	⋮	⋮	⋮
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device types. The device types shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	LM129A	6.9 volt precision reference
02	LM129B	6.9 volt precision reference
03	LM129C	6.9 volt precision reference

1.2.2 Case outline. The case outline shall be as designated as follows:

Outline letter	Case outline
X	See figure 1, T0-46 (2-lead) metal can package

1.3 Absolute maximum ratings.

Reverse breakdown current (I_R)	30 mA
Forward current (I_F)	2 mA
Power dissipation (P_D)	210 mW
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	300°C
Thermal resistance, junction-to-case (θ_{JC})	80°C/W
Thermal resistance, junction-to-ambient (θ_{JA})	440°C/W

1.4 Recommended operating conditions.

Reverse breakdown current (I_R)	0.6 mA to 15 mA
Ambient operating temperature range (T_A)	-55°C to +125°C

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2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Case outline. The case outline shall be in accordance with figure 2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C < T _A < +125°C unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Reverse breakdown voltage	V _R	0.6 mA < I _R < 15 mA T _A = +25°C	A11	1	6.7	7.2	V
Reverse breakdown change with current	V _R (I)	0.6 mA < I _R < 15 mA T _A = 25°C	A11	1		14	mV
RMS noise	V _N	10 Hz < F < 10 kHz T _A = +25°C	A11	4		20	μV
Quiescent current	I _Q	T _A = +25°C	A11	1		0.6	mA
Zener peak noise <u>1/</u>	V _{NPK}	10 Hz < F < 10 kHz T _A = +25°C	A11	4		80	μV
Forward voltage	V _F	I _F = 1 mA, T _A = +25°C	A11	1	-1	-0.2	V
Temperature coefficient	T _C	I _R = 1.0 mA	01	2, 3	-12.4	12.4	mV
			02		-24.8	24.8	
			03		-62.1	62.1	

1/ If not tested, shall be guaranteed to the limits specified in table I herein.

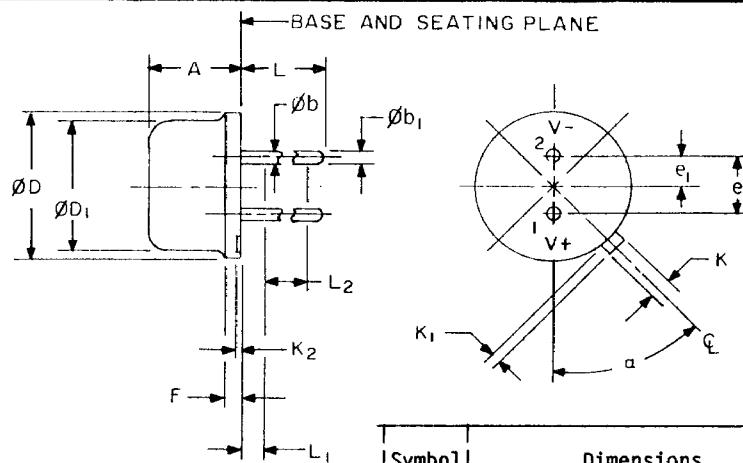
3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

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Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
A	.075	.105	1.90	2.36	
ϕb	.016	.019	0.41	0.48	3
ϕb ₁	.016	.021	0.41	0.53	3
ϕD	.209	.219	5.31	5.56	
ϕD ₁	.178	.195	4.52	4.95	
e	.100 BSC		2.54 BSC		5
e ₁	.050 BSC		1.27 BSC		5

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
F	---	.050	---	1.27	
K	.036	.046	0.91	1.17	
K ₁	.028	.048	0.71	1.22	4
K ₂	.009	.041	0.23	1.04	
L	.500	---	12.70	---	
L ₁	---	.050	---	1.27	
L ₂	.250	---	6.35	---	
α	45° BSC		45° BSC		5

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. (All leads) ϕb applies between L₁ and L₂, ϕb_1 applies between L₂ and .500 (12.70 mm) from the reference plane. Diameter is uncontrolled in L₁ and beyond .500 (12.70 mm) from the reference plane.
4. Measured from the maximum diameter of the product.
5. Leads having a maximum diameter .019 (0.48 mm) measured in gauging plane .054 (1.37 mm) +.001 (0.03 mm) -.000 (0.00 mm) below the base plane of the product shall be within .007 (0.18 mm) of their true-position relative to a maximum width tab.
6. The product may be measured by direct methods or by gauge.

FIGURE 1. Case outline and terminal connections.

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4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

- a. Burn-in test, method 1015 of MIL-STD-883.
 - (1) Test condition B or D using the circuit submitted with the certificate of compliance (see 3.6 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
- b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1,* 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4
Group C and D end-point electrical parameters (method 5005)	1

*PDA applies to subgroup 1.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

- a. Tests shall be as specified in table II herein.
- b. Subgroups 5, 6, 7, 8, 9, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

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4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883.
 - (1) Test condition B or D using the circuit submitted with the certificate of compliance (see 3.6 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Replaceability is determined as follows:

- a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.
- b. When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/124XXBXX.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5375.

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6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. Additional sources will be added to MIL-BUL-103 as they become available. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS. The approved sources of supply listed below are for information purposes only and are current only to the date of the last action of this document.

Military drawing part number	Vendor CAGE number	Vendor 1/ similar part number	Replacement military specification part number
5962-8992101XX	27014	LM129AH/883	M38510/12402BXX
	64155	LM129AH/883	
5962-8992102XX	27014	LM129BH/883	M38510/12406BXX
	64155	LM129BH/883	
5962-8992103XX	64155	LM129CH/883	---

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE
number

27014

Vendor name
and address

National Semiconductor Corporation
2900 Semiconductor Drive
P.O. Box 58090
Santa Clara, CA 95052-8090

64155

Linear Technology Corporation
1630 McCarthy Boulevard
Milpitas, CA 95035-7487

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