REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED

REV																									
SHEET																									
REV																									
SHEET																									
REV STATUS OF SHEETS	REV																								
	SHEET	1	2	3	4	5	6	7	8																

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

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DRAWING APPROVAL DATE
17 JULY 1989

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, POSITIVE 10-VOLT ADJUSTABLE PRECISION VOLTAGE REFERENCE, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-89581
A	67268	

SHEET 1

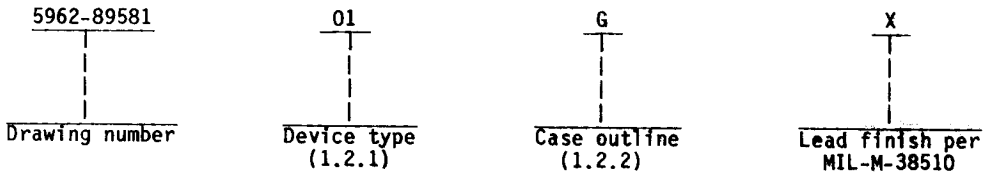
DESC FORM 193
SEP 87

* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

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:



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

Device type	Generic number	Circuit function
01	REF01A	Precision reference +10 volt adjustable output
02	REF01	Precision reference +10 volt adjustable output

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
G	A-1 (8-lead, .370" x .185"), can package
P	D-4 (8-lead, .405" x .310" x .200"), dual-in-line package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Input voltage (V_{IN})	40 V dc
Power dissipation (P_D)	500 mW 1/
Output short circuit duration	Indefinite
Storage temperature	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+150°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

Ambient operating temperature range (T_A)	-55°C to +125°C

1/ Derate above +80°C, 7.1 mW/°C for case outline G. Derate above +75°C, 6.6 mW/°C for case outline P. Derate above +72°C, 7.8 mW/°C for case outline 2.

2. APPLICABLE DOCUMENTS

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, 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.

(Copies of the specification and standard 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 test 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 outlines. The case outlines shall be in accordance with 1.2.2 herein.

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

3.4 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 6.4 herein.

3.5 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 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 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.

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

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Device type	Group A subgroups	Limits Min	Limits Max	Unit
Quiescent supply current	I_{SY}	No load	All	1		1.4	mA
				2, 3		2.0	
Output adjustment range	ΔV_{TRIM}	R_p = 10 kΩ T_A = +25°C	All	1	±3.0		%
Output voltage	V_{OUT}	I_L = 0 mA	01	1	9.97	10.03	V
			02		9.95	10.05	
			01	2, 3	9.95	10.04	
			02		9.905	10.095	
Short circuit current	I_{OS}	V_O = 0 V T_A = +25°C	All	1	+15	+60	mA
Sink current	I_S	T_A = +25°C	All	1	-0.3		mA
Load regulation	LD reg	I_L = 0 to 10 mA 2/ 3/	01	1		0.008	%/mA
			02			0.010	
		I_L = 0 to 8 mA 2/ 3/	01	2, 3		0.012	
			02			0.015	
Line regulation	LN reg	V_{IN} = 8 V to 33 V 2/	All	1		0.01	%/V
		V_{IN} = 13 V to 33 V 2/	All	2, 3		0.015	
Load current	I_L	T_A = +25°C 4/	All	1	10		mA
				2, 3	8		
Output voltage noise	e_{np-p}	0.1 Hz to 10 Hz	All	4		30	μVp-p
Output voltage temperature coefficient	TCV_O	$-55°C \le T_A \le +125°C$ 5/	01	5, 6		±8.5	ppm/°C
			02			±25	

1/ V_{IN} = 15 V.
2/ Line and load regulation specifications include the effect of self-heating.
3/ $LD_{reg} = \Delta I_L / \Delta V_{OUT} \times 100$.
4/ Minimum load current guaranteed by load regulation test.
5/ $TCV_O = \text{ABS} \frac{|V_{MAX} - V_{MIN}|}{10\ V}$ (-55°C to +125°C) 1/180°C x 10^6.

Device types	01 and 02	
Case outlines	G and P	2
Terminal number	Terminal symbol	
1	NC	NC
2	V_{IN}	NC
3	TEMP	NC
4	GND	NC
5	TRIM	V_{IN}
6	V_{OUT}	NC
7	NC	NC
8	NC	NC
9	—	NC
10	—	GND
11	—	NC
12	—	TRIM
13	—	NC
14	—	NC
15	—	V_{OUT}
16	—	NC
17	—	NC
18	—	NC
19	—	NC
20	—	NC

NC = No connection

FIGURE 1. Terminal connections.

3.8 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.

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 A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°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.

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 7, 8, 9, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

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 A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1, 2, 3
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4, 5, 6
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

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. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

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

6.4 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 to this drawing and a certificate of compliance (see 3.5) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
5962-8958101GX	64155 07933 06665	REF01AH/883B REF01AT/883B REF01AJ/883C
5962-8958101PX	64155 07933 06665	REF01AJ8/883B REF01ADE/883B REF01AZ/883C
5962-89581012X	06665	REF01ARC/883C
5962-8958102GX	06665	REF01J/883C
5962-8958102PX	06665	REF01Z/883C
5962-89581022X	06665	REF01RC/883C

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	Vendor name and address
06665	Precision Monolithic, Incorporated 1500 Space Park Drive P.O. Box 58020 Santa Clara, CA 95052-8020
07933	Raytheon Company Semiconductor Division 350 Ellis Street P.O. Box 7016 Mountain View, CA 94039-7016
64155	Linear Technology Corporation 1630 McCarthy Boulevard Milpitas, CA 95035-7487