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PMIC N/A	PREPARED BY <i>Donald R. Holmes</i> CHECKED BY <i>Ray Monnin</i> APPROVED BY <i>[Signature]</i> DRAWING APPROVAL DATE 30 NOVEMBER 1988 REVISION LEVEL	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444 MICROCIRCUIT, LINEAR, FAST SETTLING VIDEO OPERATIONAL AMPLIFIER, HYBRID SIZE A CAGE CODE 67268 5962-88579 SHEET 1 OF 11
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A		

DESC FORM 193
SEP 87

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

5962-E840

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:

5962-88579	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	V _{IO} (T _A = +25°C)
01	HOS-050A	Fast settling video operational amplifier	±15 mV
02	HOS-060SH	Fast settling video operational amplifier	±1.5 mV

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

Outline letter	Case outline
X	See figure 1 (12-lead, .605" x .181"), can package

1.3 Absolute maximum ratings.

Supply voltage range (V _S)	- - - - -	±18 V dc
Input voltage range	- - - - -	±18 V dc
Power dissipation (P _D), T _A = +25°C	- - - - -	1.5 W
Storage temperature range	- - - - -	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	- - - - -	+300°C
Junction temperature	- - - - -	+165°C
Thermal resistance, junction-to-case (θ _{JC})	- - -	12°C/W
Thermal resistance, junction-to-ambient (θ _{JA})	- -	98°C/W

1.4 Recommended operating conditions.

Ambient operating temperature range (T _A)	- - - -	-55°C to +125°C
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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 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 2.

3.2.2 Case outline. The case outline 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-M-38510. 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 Manufacturer's eligibility. In addition to the general requirements of MIL-M-38510, appendix G, the manufacturer of the part described herein shall submit for DESC-ECS review electrical test data (variables format) on one QCI group A lot sample, produced on the certified line, for each device type listed herein. The data should also include a summary of all parameters manually tested, and for those which, if any, are guaranteed.

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 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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} < T_A < +125^{\circ}\text{C}$ $V_S = \pm 15.0\text{ V}$ unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Input offset voltage	V_{IO}	$R_S = 100\text{ k}\Omega$, $T_A = +25^{\circ}\text{C}$	1	01 02		± 15 ± 1.5 1/	mV
		$R_S = 100\text{ k}\Omega$, $T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	2, 3	01 02		± 18.5 ± 5.0	mV
Temperature coefficient of input offset voltage	$\frac{\Delta V_{IO}}{\Delta T}$		2, 3	A11		± 35	μV
Input offset current	I_{IO}	$T_A = +25^{\circ}\text{C}$	1	A11		± 0.1	nA
		$T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	2, 3	A11		± 25	
Input bias current	I_{IB}	$T_A = +25^{\circ}\text{C}$	1	A11		± 2.0	nA
		$T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	2, 3	A11		± 50	
Supply current	I_{CC}	$T_A = +25^{\circ}\text{C}$	1	A11		25	mA
		$T_A = -55^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	2, 3	A11		35	
Supply voltage rejection ratio	-SVRR	$V_- = -12\text{ V}$, ($V_+ = +15\text{ V}$) $V_- = -18\text{ V}$	4, 5, 6	A11	50		dB
	+SVRR	$V_+ = +12\text{ V}$, ($V_- = -15\text{ V}$) $V_+ = +18\text{ V}$	4, 5, 6	A11	50		dB
Large signal voltage gain	$A_{VS}(\pm)$	$V_{OUT} = \pm 10\text{ V}$, $R_L = 200\Omega$	4, 5, 6	A11	80		dB

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} < T_A < +125^{\circ}\text{C}$ $V_S = \pm 15.0\text{ V}$ unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Input voltage common mode rejection ratio	CMRR	$V_{IN} = 10\text{ V}, T_A = +25^{\circ}\text{C}$	4	A11	60		dB
		$V_{IN} = 10\text{ V},$ $T_A = -55^{\circ}\text{C} \text{ to } +125^{\circ}\text{C}$	5, 6	A11	55		dB
Maximum output voltage swing	V_{OP}	$R_L = 200\Omega$	1, 2, 3	A11	± 10		V
Voltage gain	AV	$R_L = 200\Omega, f = 1.0\text{ kHz}$	4, 5, 6	A11	80		dB
Slew rate	SR	$R_L = 200\Omega, A_V = 2 \text{ or } -1,$ $T_A = +25^{\circ}\text{C}$	4	A11	230		V/ μs
		$R_L = 200\Omega, A_V = -1,$ $T_A = -55^{\circ}\text{C} \text{ to } +125^{\circ}\text{C}$	5, 6	A11	210		V/ μs
Settling time to 1.0% of final value	t_{SET}	$A_V = -1, R_L = 200\Omega,$ $T_A = +25^{\circ}\text{C}$	9	A11		100	ns
		$A_V = -1, R_L = 200\Omega,$ $T_A = -55^{\circ}\text{C} \text{ to } +125^{\circ}\text{C}$	10, 11	A11		120	

1/ For group C end point tests, the maximum input offset voltage (V_{IO}) limit for device type 02 is $\pm 3.5\text{ mV}$.

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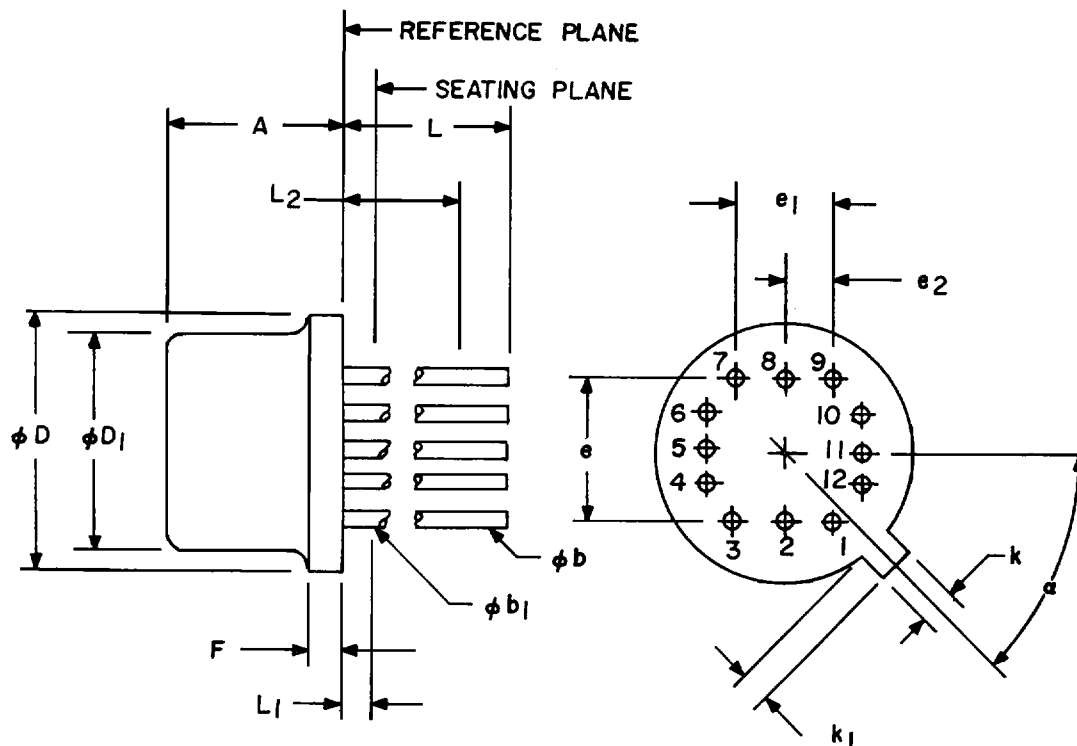


FIGURE 1. Case outline X.

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Symbol	Inches		Millimeters		Notes	Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max			Min	Max	Min	Max	
A	.148	.181	3.76	4.60		F	.022	.030	.56	.76	
ϕb	.016	.020	.41	.48	1,5	k	.026	.036	.66	.91	
ϕb_1	.016	.021	.41	.53	1,5	k_1	.026	.036	.66	.91	2
ϕD	.595	.605	15.11	15.37		L	.500	.560	12.70	14.22	1
ϕD_1	.545	.555	13.84	14.10		L_1	---	.050	---	1.27	1
e	.400	BSC	10.16	BSC	3	L_2	.250	---	6.35	---	1
e_1	.200	BSC	5.08	BSC	3	α	45°	BSC	45°	BSC	3
e_2	.100	BSC	2.54	BSC	3						

NOTES:

1. All leads - ϕb applies between L_1 and L_2 . ϕb_1 applies between L_2 and .500 (12.70 mm) from the reference plane. Diameter is uncontrolled in L_1 and beyond .500 (12.70 mm) from the reference plane.
2. Measured from the maximum diameter of the product.
3. Leads having a maximum diameter .019 (.48 mm) measured in gaging plane .054 (1.37 mm) $+ .001$ (.03 mm), $- .000$ (.00 mm) below the base plane of the product shall be within .007 (.18 mm) of their true position relative to a maximum width tab.
4. The product may be measured by direct methods or by gage.
5. All leads - Increase maximum limit by .003 (.08 mm) when lead finish A is applied.

FIGURE 1. Case outline X - Continued.

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Device type	All
Package	X
Terminal number	Terminal symbol
1	V+
2	Ground
3	Offset adjust*
4	Offset adjust*
5	Inverting input
6	Noninverting input
7	No connection
8	Ground
9	V-
10	V-
11	Output
12	V+

*These pins are for connecting an optional offset adjust potentiometer. Recommended value is 10 k Ω with center arm connected to +15 V.

FIGURE 2. Terminal connections.

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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.

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 5008 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 3.6 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.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5008 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 and 8 in group A electrical test table of method 5008 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

- a. Group C 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 3.6 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.

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TABLE II. Electrical test requirements.

MIL-STD-883, method 5008, test requirements	Subgroups (per method 5008, group A test table)
Interim electrical parameters (pre burn-in)	---
Final electrical test parameters	1*,2,3,4,5,6,9
Group A test requirements	1,2,3,4,5,6, 9,10**,11**
Group C end-point electrical parameters (method 5008)	1

* PDA applies to subgroup 1.

** If not tested, shall be guaranteed to the specified
limits in table I.

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.

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6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part number <u>1/</u>
5962-8857901XX	34031	HOS-050A/883B
5962-8857902XX	34031	HOS-060SH/883B

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

34031

Vendor name
and address

Analog Devices
Computer Labs Division
7910 Triad Center Drive
Greensboro, NC 27409

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