REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change total supply voltage in 1.3. Change in table I; output voltage swings test limits, clock to center frequency ratio, with conditions sides A, B, C and pin 17 high, also side D pin 17 high, test limits, Q accuracy test limits. Add clock to center frequency, side-to-side matching test. Change dc offset voltage test conditions and limits. Change power supply current test conditions and limits. Change subgroups for output voltage swing in table I and groups C and D end-point electricals in table II. Editorial changes throughout.	92-03-23	M. A. Frye

REV																			
SHEET																			
REV																			
SHEET																			

REV STATUS OF SHEETS	REV	A	A	A	A	A				A	A				
	SHEET	1	2	3	4	5	6	7	8	9	10				

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

PREPARED BY
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DRAWING APPROVAL DATE
30 OCTOBER 1990

REVISION LEVEL
A

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, CMOS, QUAD, UNIVERSAL FILTER BUILDING BLOCK, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-89483
A	67268	

SHEET 1 OF 10

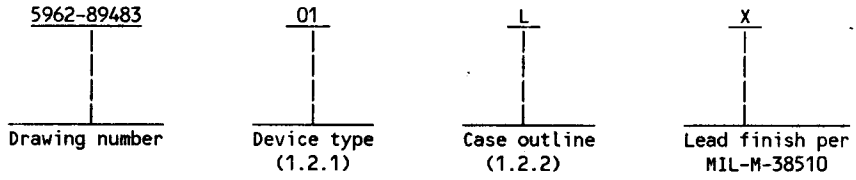
DESC FORM 193
JUL 91

5962-E140

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 or Identifying Number (PIN). The complete PIN shall be as shown in the following example:



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

Device type	Generic number	Circuit function
01	LTC1064	CMOS, quad, universal filter building block

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

Outline letter	Case outline
L	D-3 (24-lead, 1.290" x .310" x .225"), dual-in-line package

1.3 Absolute maximum ratings.

Total supply voltage ($+V_S$ to $-V_S$)	16.5 V dc
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Power dissipation (P_D)	500 mW
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C
Thermal resistance, junction-to-ambient (θ_{JA})	60°C/W
Junction temperature (T_J)	+175°C

1.4 Recommended operating conditions.

Supply voltage ($\pm V_S$)	±5 V dc
Operating supply voltage range	±2.37 V dc to ±8.0 V dc
Ambient operating temperature range (T_A)	-55°C to +125°C

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 Block diagram. The block diagram shall be as specified on figure 2.

3.2.3 Equivalent input offsets. The equivalent input offsets shall be as specified on figure 3.

3.2.4 Case outline. The case outline shall be in accordance with 1.2.2 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 PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $V_S = \pm 5.0$ V, $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Limits Min	Limits Max	Unit
Internal operational amplifiers						
Output voltage swings	V_{OUT}	R_L = 5.0 kΩ	4	-3.2	+3.2	V
			5,6	-3.1	+3.1	
Complete filter (TTL clock input level, unless otherwise specified)						
Clock to center frequency ratio	f_{CLK}/f_O	Sides A, B, and C = mode 1, R1 = R3 = 50 kΩ, R2 = 5.0 kΩ, f_{CLK} = 1.0 MHz, Q = 10, f_O = 20 kHz, pin 17 high (condition A)	7,8A,8B	49.6	50.4	
		Side D = mode 3, R1 = R3 = 50 kΩ, R2 = R4 = 5.0 kΩ, f_O = 20 kHz, f_{CLK} = 1.0 MHz, pin 17 high, Q = 10 (condition B)		49.55	50.45	
		Sides A, B, and C = mode 1, R1 = R3 = 50 kΩ, R2 = 5.0 kΩ, f_{CLK} = 1.0 MHz, Q = 10, f_O = 10 kHz, pin 17 low (condition C)		99.2	100.8	
		Side D = mode 3, R1 = R3 = 50 kΩ, R2 = R4 = 5.0 kΩ, f_O = 10 kHz, f_{CLK} = 1.0 MHz, pin 17 low, Q = 10 (condition D)		99.1	100.9	
Q accuracy	Q_{ACC}	f_{CLK} = 1.0 MHz, Q = 10; Sides A, B, and C = mode 1	7,8A,8B	-6.0	6.0	%
		f_{CLK} = 1.0 MHz, Q = 10; Side D = mode 3		-8.0	8.0	
Clock to center frequency ratio; side-to-side matching	f_o vs f_o	f_{CLK}/f_o conditions A through D.	7,8A,8B	-1.0	1.0	%

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $V_S = \pm 5.0$ V $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Complete filter (TTL clock input level, unless otherwise specified) - Continued						
DC offset voltage	V_{OS1}	See figure 3, f_{CLK}/f_O = 50:1, f_{CLK} = 1.0 MHz,	4,5,6	-15	15	mV
	V_{OS2}	f_{CLK}/f_O = 50:1 and 100:1 f_{CLK} = 1.0 MHz, see figure 3	4,5,6	-45	45	
	V_{OS3}			-45	45	
Power supply current	I_{CC}	$V_S = \pm 5.0$ V	1		22	mA
			2,3		26	

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.

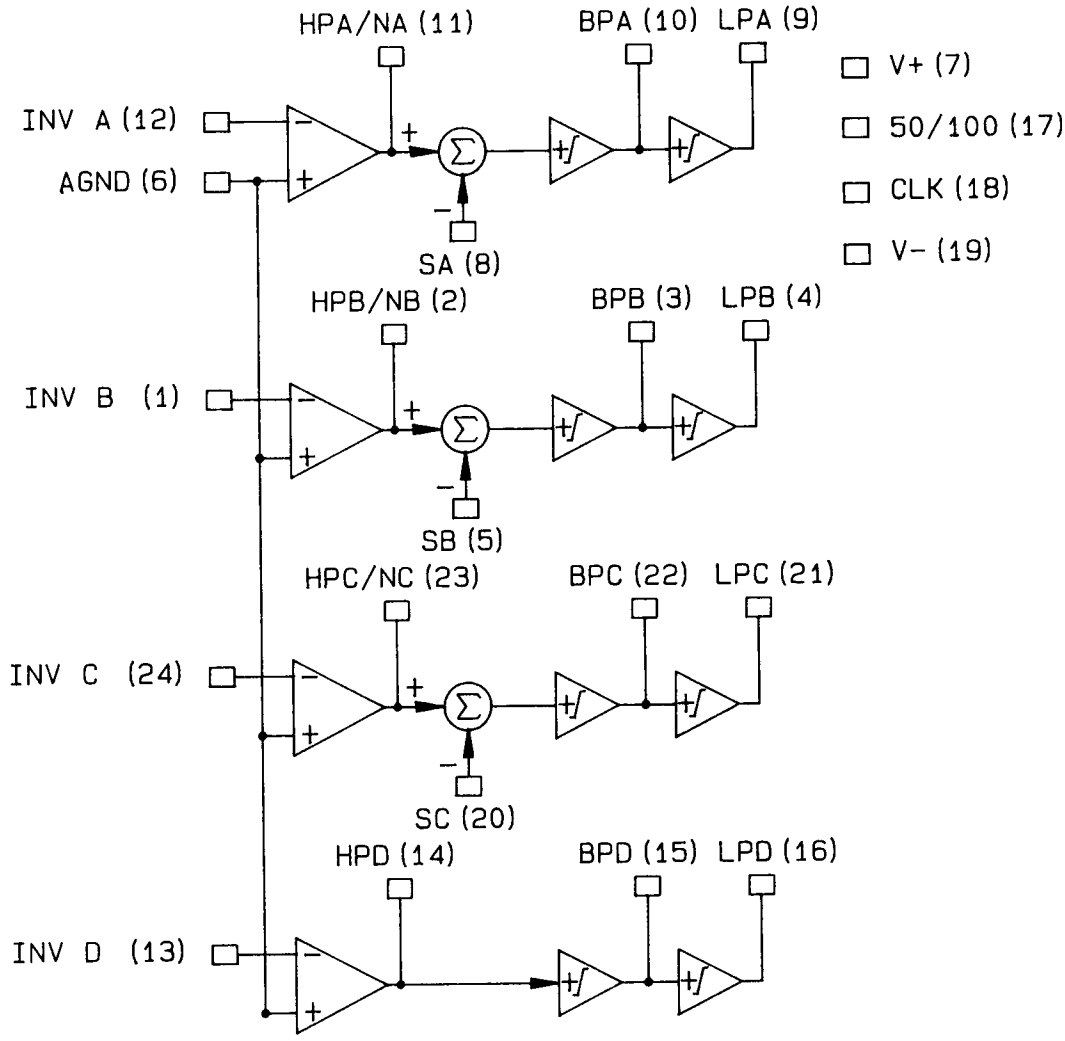
3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

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.

Device type	01
Case outline	L
Terminal number	Terminal symbol
1	INV B
2	HPB/NB
3	BPB
4	LPB
5	SB
6	AGND
7	$+V_S$
8	SA
9	LPA
10	BPA
11	HPA/NA
12	INV A
13	INV D
14	HPD
15	BPD
16	LPD
17	50/100
18	CLK
19	$-V_S$
20	SC
21	LPC
22	BPC
23	HPC/NC
24	INV C

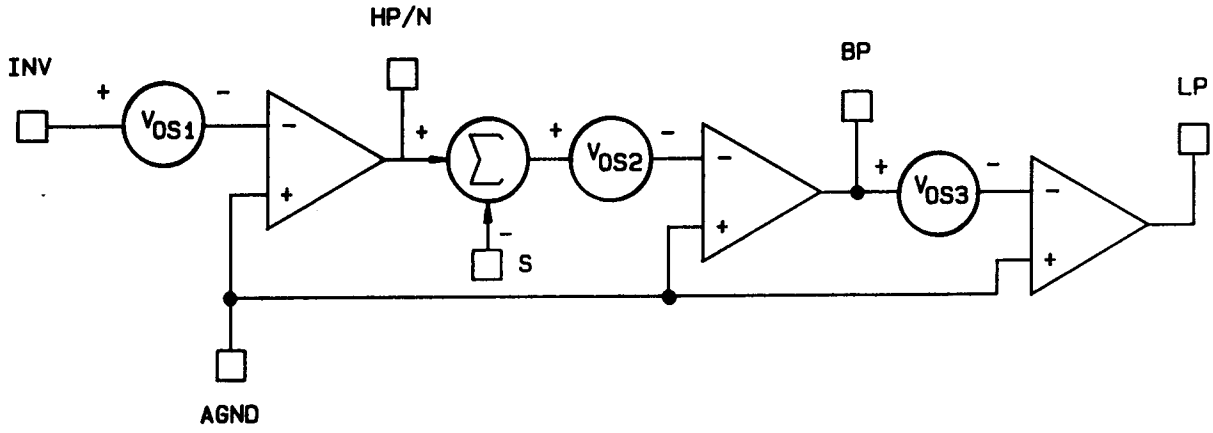
FIGURE 1. Terminal connections.



Operational notes.

1. By tying pin 17 to V+, all sections operate with (f_{CLK}/f_o) = (50:1).
2. By tying pin 17 to V-, all sections operate with (f_{CLK}/f_o) = (100:1).
3. By tying pin 17 to AGND, sections B and C operate with (f_{CLK}/f_o) = (50:1) and sections A and D operate at (100:1).

FIGURE 2. Block diagram.



NOTE: This represents one quarter of the filter building block.

FIGURE 3. Equivalent input offsets.

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 C using the circuit submitted with the certificate of compliance (see 3.6 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 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 C using the circuit submitted with the certificate of compliance (see 3.6 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)	---
Final electrical test parameters (method 5004)	1*,2,3,4,5,6, 7,8A,8B
Group A test requirements (method 5005)	1,2,3,4,5,6, 7,8A,8B
Groups C and D end-point electrical parameters (method 5005)	1,4,7

* 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 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.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. 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.