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	SHEET	1	2	3	4	5	6	7	8	9	10	11					
PMIC N/A	PREPARED BY <i>Marcia B. Kelleher</i>					DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444											
<b>STANDARDIZED MILITARY DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A	CHECKED BY <i>Ray Monnin</i>					MICROCIRCUIT, LINEAR, 10-BIT ANALOG TO DIGITAL CONVERTER, MONOLITHIC SILICON											
	APPROVED BY <i>[Signature]</i>					DRAWING APPROVAL DATE 19 JULY 1988					SIZE <b>A</b>	CAGE CODE <b>67268</b>	<b>5962-88505</b>				
	REVISION LEVEL										SHEET 1 OF 11						

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SEP 87

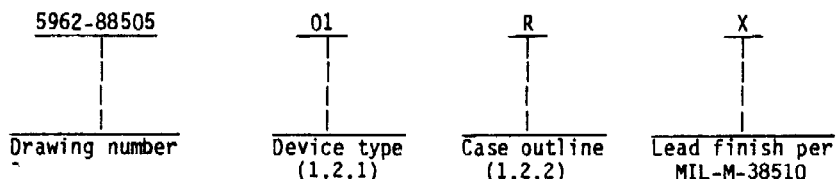
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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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:



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

Device type	Generic number	Circuit function
01	AD573	10-bit A/D converter w/ microprocessor interface
02	AD673	8-bit A/D converter w/ microprocessor interface

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
R	D-8 (20 lead, 1.060" X .310" X .200"), dual-in-line package

1.3 Absolute maximum ratings.

V <sub>CC</sub> to digital common - - - - -	+7 V dc
V <sub>EE</sub> to digital common - - - - -	-16.5 V dc
Analog common to digital common - - - - -	±1 V dc
Analog input to analog common - - - - -	±15 V dc
Control inputs - - - - -	0 V to V <sub>CC</sub>
Digital outputs (high impedance state) - - - - -	0 V to V <sub>CC</sub>
Storage temperature range - - - - -	-65°C to +150°C
Lead temperature (soldering 10 seconds) - - - - -	300°C
Power dissipation (P <sub>D</sub> ) - - - - -	800 mW
Thermal resistance (θ <sub>JA</sub> ) - - - - -	85°C/W
Thermal resistance (θ <sub>JC</sub> ) - - - - -	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

V <sub>CC</sub> - - - - -	+5 V dc
V <sub>EE</sub> - - - - -	-15 V dc
Ambient operating temperature range (T <sub>A</sub> ) - - - - -	-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 1.

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-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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions <sup>1/</sup> -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Device types	Group A subgroups	Limits		Unit	
					Min	Max		
Relative accuracy	RA	Unipolar and bipolar major transactions ±3 codes	A11	1	-.195	+.195	% of	
			01	2,3,12	-.098	+.098	FS	
			02	2,3	-.195	+.195		
Differential nonlinearity	DNR	All codes test unipolar and bipolar <sup>2/</sup>	01	1	8		Bits	
			01	2,3,12	10			
			02	1,2,3	8			
Full-scale error	Ae	Unipolar <sup>3/</sup>	A11	1	-40	+40	mV	
		Bipolar <sup>3/</sup>	A11	1	-20	+20		
Full-scale temperature drift	$\frac{\Delta Ae}{\Delta t}$		01	2,3	-.488	+.488	% of FS	
			02	2,3	-.781	.781		
Offset error	V <sub>OS</sub>	First transition	A11	1	-20	+20	mV	
			01	12	-10	10		
Offset temperature drift	$\frac{\Delta V_{OS}}{\Delta t}$		01	2,3	-.195	+.195	% of FS	
			02	2,3	-.391	+.391		
Bipolar zero error	BpZE	Low side MSB transaction bipolar	A11	1	-20	+20	mV	
			01	12	-10	+10		
Bipolar zero temperature drift	$\frac{\Delta BpZE}{\Delta t}$	Low side MSB transaction bipolar	01	2,3	-.195	+.195	% of FS	
			02	2,3	-.391	+.391		
Tri-state leakage current	I <sub>OLT</sub>	V <sub>OH</sub> = 5.0 V V <sub>OL</sub> = 0.0 V	DB0 - DB9	01	1,2,3	-40	+40	μA
			DB0 - DB9	02	1,2,3	-40	+40	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Device types	Group A subgroups	Limits		Unit
					Min	Max	
Power supply rejection ratio	PSRR	V <sub>CC</sub> = 5.0 V, -15.75 V ≤ V <sub>EE</sub> ≤ 14.25 V	A11	1,2,3	-78.1	+78.1	mV
		V <sub>CC</sub> = 5.0 V, -12.6 V ≤ V <sub>EE</sub> ≤ -11.4 V	01	12	-19.5	+19.5	
Power supply current	I <sub>CC</sub>	DATA READY low or DATA READY high (during conversion), T <sub>A</sub> = 25°C	A11	1		15	mA
	I <sub>EE</sub>	T <sub>A</sub> = 25°C	A11	1	-15		
Input voltage (high)	V <sub>IH</sub>	4/	A11	1,2,3	2.0		V
Input voltage (low)	V <sub>IL</sub>		A11	1,2,3		0.8	
Input current (high)	I <sub>IH</sub>	4/	A11	1,2,3	-100	+100	μA
Input current (low)	I <sub>IL</sub>	4/	A11	1,2,3	-100	+100	
Output voltage (low)	V <sub>OL</sub>	DATA READY, DBO - DB9, I <sub>OL</sub> = +3.2 mA	01	1,2,3		0.4	V
		DATA READY, DBO - DB7, I <sub>OL</sub> = +3.2 mA	02	1,2,3		0.4	
Output voltage (high)	V <sub>OH</sub>	DBO - DB9, I <sub>OH</sub> = -0.5 mA	01	1,2,3	2.4		
		DBO - DB7, I <sub>OH</sub> = -0.5 mA	02	1,2,3	2.4		
Input resistance	R <sub>IN</sub>		A11	4,5,6	3	7	KΩ
Conversion time	t <sub>C</sub>	See figure 2 T <sub>A</sub> = +25°C	A11	9	10	30	μs
Convert pulse width	t <sub>CS</sub>		A11	9	500		ns

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions, 1/ -55°C ≤ T <sub>A</sub> ≤ +125°C unless otherwise specified	Device types	Group A subgroups	Limits		Unit
					Min	Max	
DATA READY delay convert	t <sub>DSC</sub>	See figure 2 T <sub>A</sub> = +25°C	A11	9		1.5	μs
Data valid after HBE or LBE high	t <sub>HD</sub>	See figure 2 T <sub>A</sub> = +25°C	01	9	50		ns
Data valid after DATA ENABLE high			02		50		
Output float delay	t <sub>HL</sub>	See figure 2 T <sub>A</sub> = +25°C	A11	9		200	
Data access time	t <sub>DD</sub>		A11	9		250	

- 1/ V<sub>CC</sub> = +5 V, V<sub>EE</sub> = -15 V, analog input through 15Ω resistor to pin 13, unipolar configuration. Unipolar configuration pin 16 (bipolar offset control) is grounded. Bipolar configuration pin 16 is not connected.
- 2/ Minimum resolution for which no missing codes are guaranteed: For 01 (10-bit resolution device), 0.098% of full scale = 1 LSB. For 02 (8-bit resolution device), 0.391% of full scale = 1 LSB.
- 3/ Device 01 full scale error guaranteed trimmable with a 200Ω potentiometer. Device 02 full scale error guaranteed trimmable with a 50Ω potentiometer.
- 4/ Conditions for device 01 are CONVERT, LBE, and HBE. Conditions for device 02 are CONVERT and DATA ENABLE.
- 5/ Guaranteed, if not tested.

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).

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.

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		Terminal symbol	
Device		01	02
Case		R	R
Terminal number			
1	DB0	LSB	NC*
2	DB1		NC*
3	DB2		DB0 LSB
4	DB3		DB1
5	DB4		DB2
6	DB5		DB3
7	DB6		DB4
8	DB7		DB5
9	DB8		DB6
10	DB9	MSB	DB7 MSB
11	V <sub>CC</sub>		V <sub>CC</sub>
12	CONVERT		CONVERT
13	V <sub>EE</sub>		V <sub>EE</sub>
14	ANALOG IN		ANALOG IN
15	ANALOG COMMON		ANALOG COMMON
16	BIPOLAR OFF		BIPOLAR OFF
17	DIG COMMON		DIG COMMON
18	DATA READY		DATA READY
19	LBE		NC
20	HBE		DATA ENABLE

\* Pins 1 and 2 are internally connected to test points and should be left floating.

FIGURE 1. Terminal connections.

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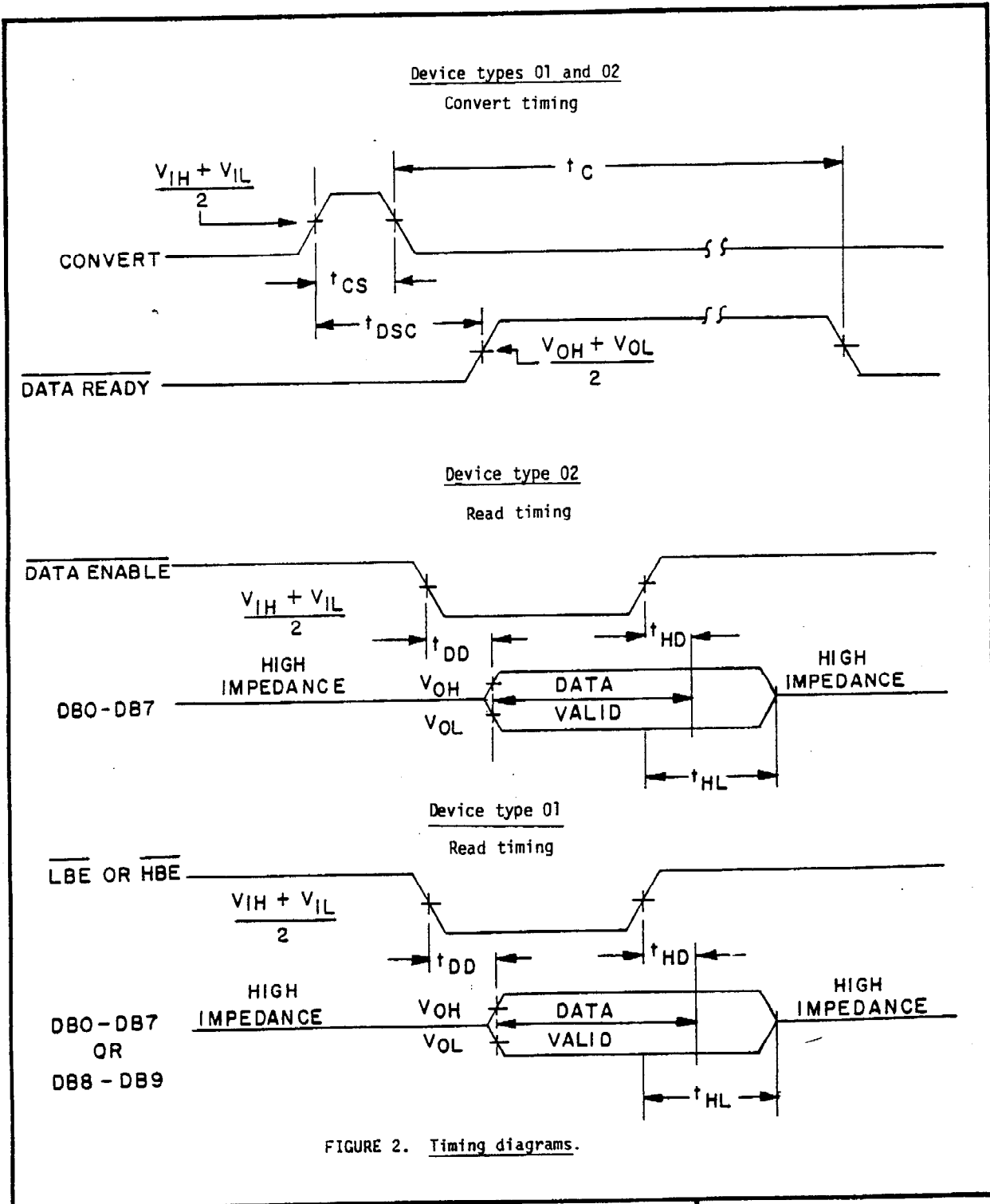


FIGURE 2. Timing diagrams.

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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 using the circuit submitted with the certificate of compliance (see 3.5 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.
- c. Optional subgroup 12 is used for grading and part selection at  $25^{\circ}\text{C}$ , and is not included in PDA.

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, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Optional subgroup 12 is used for grading and part selection at  $25^{\circ}\text{C}$ .

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 using the circuit submitted with the certificate of compliance (see 3.5 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 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 4, 9, 12
Group A test requirements (method 5005)	1, 2, 3, 4, 5, 6, 9, 12
Groups C and D end-point electrical parameters (method 5005)	1

\* 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.

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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 3.5 herein) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor 1/ similar part number
5962-8850501RX	51640	AD573SD/883
5962-8850502RX	51640	AD673SD/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

51640

Vendor name and address

Analog Devices, Incorporated  
Semiconductor Division  
804 Woburn Street  
Wilmington, MA 01887

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