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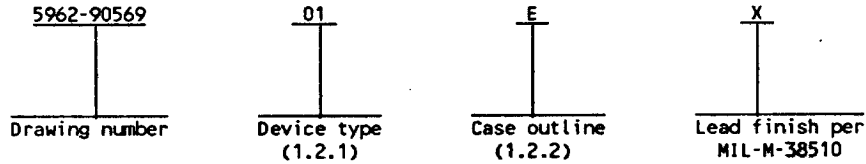
  

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<b>STANDARDIZED MILITARY DRAWING</b>  THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE  AMSC N/A	PREPARED BY	<i>Joseph A. Kerby</i>											DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444								
	CHECKED BY	<i>Ray Monin</i>																			
	APPROVED BY	<i>[Signature]</i>											MICROCIRCUIT, LINEAR, DUAL, SPST ANALOG SWITCH, MONOLITHIC SILICON								
	DRAWING APPROVAL DATE	20 DECEMBER 1989																			
REVISION LEVEL																					
	SIZE																				
	A	CAGE CODE			67268			5962-90569			SHEET 1 OF 8										

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	DG401	Dual, SPST analog switch

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
E	D-2 (16-lead, .840" 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.

V+ to V- - - - -	44 V dc
GND to V- - - - -	25 V dc
V <sub>I</sub> to V- - - - -	(GND - 0.3 V) to 44 V dc
(V <sub>IN</sub> ), (V <sub>S</sub> ), (V <sub>D</sub> ) 1/ - - - - -	-2 V to V+(+ 2 V) or 30 mA, whichever occurs first
Current, continuous (any terminal) - - - - -	30 mA
Current (S or D), pulsed 1 ms, 10 % duty - - - - -	100 mA
Storage temperature range - - - - -	-65°C to +150°C
Power dissipation (P <sub>D</sub> ) 2/:	
Case E - - - - -	900 mW
Case 2 - - - - -	750 mW
Thermal resistance junction-to-case (θ <sub>JC</sub> ) - - - - -	See MIL-M-38510 appendix C
Junction temperature (T <sub>J</sub> ) - - - - -	175°C

1.4 Recommended operating conditions.

Positive supply voltage (V+) - - - - -	+15 V dc
Negative supply voltage (V-) - - - - -	-15 V dc
Logic supply voltage (V <sub>I</sub> ) - - - - -	+5 V dc
Ambient operating temperature range (T <sub>A</sub> ) - - - - -	-55°C to +125°C
Charge injection - - - - -	60 pC
Crosstalk (channel-to-channel) 3/ - - - - -	90 dB

1/ Signals on S<sub>X</sub>, D<sub>X</sub> or I<sub>N</sub> exceeding V+ or V- will be clamped by internal diodes. Limit forward diode current to maximum current ratings.  
 2/ Derate linearly above T<sub>A</sub> = +75°C: for case E, 12 mW/°C; for case 2, 10 mW/°C.  
 3/ Crosstalk performance is improved with case outline 2.

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DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	<b>REVISION LEVEL</b>	<b>SHEET 2</b>

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 outlines. The case outlines 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 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).

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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T <sub>a</sub> ≤ +125°C V <sub>+</sub> = 15 V, V <sub>-</sub> = -15 V, V <sub>L</sub> = 5 V unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Drain-source ON resistance	r <sub>DS(ON)</sub>	I <sub>S</sub> = -10 mA, V <sub>D</sub> = ±10 V V <sub>S+</sub> = +13.5 V, V <sub>S-</sub> = -13.5 V	1		35	Ω
			2,3		45	
Delta drain-source ON resistance	delta r <sub>DS(ON)</sub>	I <sub>S</sub> = -10 mA, V <sub>D</sub> = 5 V, 0 V, -5 V V <sub>S+</sub> = +16.5 V, V <sub>S-</sub> = -16.5 V	1		3	
			2,3		5	
Source OFF leakage current	I <sub>S(OFF)</sub>	V <sub>D</sub> = -15.5 V, V <sub>S</sub> = +15.5 V V <sub>S+</sub> = +16.5 V, V <sub>S-</sub> = -16.5 V	1		±0.25	nA
			2		±20	
		V <sub>D</sub> = +15.5 V, V <sub>S</sub> = -15.5 V V <sub>S+</sub> = +16.5 V, V <sub>S-</sub> = -16.5 V	1		±0.25	
			2		±20	
Drain OFF leakage current	I <sub>D(OFF)</sub>	V <sub>D</sub> = -15.5 V, V <sub>S</sub> = +15.5 V V <sub>S+</sub> = +16.5 V, V <sub>S-</sub> = -16.5 V	1		±0.25	
			2		±20	
		V <sub>D</sub> = +15.5 V, V <sub>S</sub> = -15.5 V V <sub>S+</sub> = +16.5 V, V <sub>S-</sub> = -16.5 V	1		±0.25	
			2		±20	
Channel ON leakage current	I <sub>D(ON)</sub> + I <sub>S(ON)</sub>	V <sub>S</sub> = V <sub>D</sub> = ±15.5 V V <sub>S+</sub> = +16.5 V, V <sub>S-</sub> = -16.5V	1		±0.4	
			2		±40	
Low level input current	I <sub>IL</sub>	V <sub>IN</sub> under test = 0.8 V, all other inputs = 2.4 V	1,2		±1.0	μA
High level input current	I <sub>IH</sub>	V <sub>IN</sub> under test = 2.4 V, all other inputs = 0.8 V	1,2		±1.0	
Turn on time	t <sub>ON</sub>	R <sub>L</sub> = 300Ω, C <sub>L</sub> = 35 pF	9		150	ns
			10,11		275	
Turn off time	t <sub>OFF</sub>	R <sub>L</sub> = 300Ω, C <sub>L</sub> = 35 pF	9		100	
			10		250	
			11		175	

**STANDARDIZED  
MILITARY DRAWING**  
DEFENSE ELECTRONICS SUPPLY CENTER  
DAYTON, OHIO 45444

SIZE  
**A**

5962-90569

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T <sub>A</sub> ≤ +125°C V <sub>+</sub> = 15 V, V <sub>-</sub> = -15 V, V <sub>I</sub> = 5 V unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Positive supply current	I <sub>+</sub>	V <sub>+</sub> = +16.5 V, V <sub>-</sub> = -16.5 V V <sub>IN</sub> = 0 V or 5 V	1		+1.0	μA
			2,3		+5.0	
Negative supply current	I <sub>-</sub>	V <sub>+</sub> = +16.5 V, V <sub>-</sub> = -16.5 V V <sub>IN</sub> = 0 V or 5 V	1		-1.0	
			2,3		-5.0	
Logic supply current	I <sub>L</sub>	V <sub>+</sub> = +16.5 V, V <sub>-</sub> = -16.5 V V <sub>IN</sub> = 0 V or 5 V	1		+1.0	
			2,3		+5.0	
Ground current	I <sub>GND</sub>	V <sub>+</sub> = +16.5 V, V <sub>-</sub> = -16.5 V V <sub>IN</sub> = 0 V or 5 V	1		-1.0	
			2,3		-5.0	

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.

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 or C using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T<sub>A</sub> = +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.

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Device type	01	
Case outlines	E	2
Terminal number	Terminal Symbol	
1	D <sub>1</sub>	NC
2	NC	D <sub>1</sub>
3	NC	NC
4	NC	NC
5	NC	NC
6	NC	NC
7	NC	NC
8	D <sub>2</sub>	NC
9	S <sub>2</sub>	NC
10	IN <sub>2</sub>	D <sub>2</sub>
11	V+	NC
12	V <sub>L</sub>	S <sub>2</sub>
13	GND	IN <sub>2</sub>
14	V-	V+
15	IN <sub>1</sub>	V <sub>L</sub>
16	S <sub>1</sub>	NC
17	- - -	GND
18	- - -	V-
19	- - -	IN <sub>1</sub>
20	- - -	S <sub>1</sub>

FIGURE 1. Terminal connections.

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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)	1
Final electrical test parameters (method 5004)	1*,2,3,9
Group A test requirements (method 5005)	1,2,3,9,10**,11**
Group C and D end-point electrical parameters (method 5005)	1

\* PDA applies to subgroup 1.

\*\* Subgroups 10 and 11 if not tested shall be guaranteed to the limits specified in table I.

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 4, 5, 6, 7, and 8 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 or C 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.

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

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
5962-9056901EX	17856	DG401AK/883
5962-90569012X	17856	DG401AZ/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

17856

Vendor name and address

Siliconix Incorporated.  
2201 Laurelwood Road  
Santa Clara, CA 95054

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