REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Drawing updated to reflect current requirements. - ro	01-07-05	R. MONNIN

THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.

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

PMIC N/A

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STANDARD MICROCIRCUIT DRAWING

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

AMSC N/A

CHECKED BY
RAY MONNIN

APPROVED BY
MICHAEL A. FRYE

DRAWING APPROVAL DATE
89-12-20

MICROCIRCUIT, LINEAR, DUAL, SPST ANALOG SWITCH, MONOLITHIC SILICON

REVISION LEVEL
A

SIZE	CAGE CODE	
A	**67268**	**5962-90569**

SHEET 1 OF 9

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

1. SCOPE

1.1 Scope. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN is as shown in the following example:

5962-90569	01	E	X
Drawing number	Device type (see 1.2.1)	Case outline (see 1.2.2)	Lead finish (see 1.2.3)

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

Device type	Generic number	Circuit function
01	DG401	Dual, SPST analog switch

1.2.2 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
2	CQCC1-N20	20	Square leadless chip carrier

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535, appendix A.

1.3 Absolute maximum ratings.

+V to –V ..... 44 V dc
GND to –V ..... 25 V dc
V_L to –V ..... (GND – 0.3 V) to 44 V dc
V_{IN}, V_S, V_D ..... -2 V to +V (+ 2 V) or 30 mA, whichever occurs first 1/
Current, continuous (any terminal) ..... 30 mA
Current (S or D), pulsed 1 ms, 10 % duty ..... 100 mA
Power dissipation (P_D):
Case E ..... 900 mW 2/
Case 2 ..... 750 mW 2/
Storage temperature range ..... -65°C to +150°C
Junction temperature (T_J) ..... +175°C
Thermal resistance, junction-to-case (θ_{JC}) ..... See MIL-STD-1835

1/ Signals on S_X, D_X or IN_X exceeding +V or –V will be clamped by internal diodes. Limit forward diode current to maximum current ratings.

2/ Derate linearly above T_A = +75°C; for case E, 12 mW/°C; for case 2, 10 mW/°C.

1.4 Recommended operating conditions.

Positive supply voltage (+V) ..... +15 V dc
Negative supply voltage (-V) ..... -15 V dc
Logic supply voltage (V_L) ..... +5 V dc
Charge injection ..... 60 pC
Crosstalk (channel-to-channel) ..... 90 dB 3/
Ambient operating temperature range (T_A) ..... -55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-38535 -- Integrated Circuits, Manufacturing, General Specification for.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard Microcircuits.
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-103 -- List of Standard Microcircuit Drawings.
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Unless otherwise indicated, copies of the specification, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein. Product built to this drawing that is produced by a Qualified Manufacturer Listing (QML) certified and qualified manufacturer or a manufacturer who has been granted transitional certification to MIL-PRF-38535 may be processed as QML product in accordance with the manufacturers approved program plan and qualifying activity approval in accordance with MIL-PRF-38535. This QML flow as documented in the Quality Management (QM) plan may make modifications to the requirements herein. These modifications shall not affect form, fit, or function of the device. These modifications shall not affect the PIN as described herein. A "Q" or "QML" certification mark in accordance with MIL-PRF-38535 is required to identify when the QML flow option is used.

3/ Crosstalk performance is improved with case outline 2.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535, appendix A and herein.

3.2.1 Case outline(s). The case outline(s) shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

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-PRF-38535, appendix A. 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-HDBK-103 (see 6.6 herein). For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device.

3.5.1 Certification/compliance mark. A compliance indicator “C” shall be marked on all non-JAN devices built in compliance to MIL-PRF-38535, appendix A. The compliance indicator “C” shall be replaced with a "Q" or "QML" certification mark in accordance with MIL-PRF-38535 to identify when the QML flow option is used.

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-HDBK-103 (see 6.6 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-PRF-38535, appendix A and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DSCC-VA shall be required in accordance with MIL-PRF-38535, appendix A.

3.9 Verification and review. DSCC, DSCC'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 MIL-PRF-38535, appendix A.

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. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Drain-source ON resistance	r_{DS} (ON)	I_S = -10 mA, V_D = ±10 V, +V = +13.5 V, -V = -13.5 V	1	01		35	Ω
			2,3			45	
Delta drain-source ON resistance	Δr_{DS} (ON)	I_S = -10 mA, V_D = 5 V, 0 V, -5 V, +V = +16.5 V, -V = -16.5 V	1	01		3	Ω
			2,3			5	
Source OFF leakage current	I_S (OFF)	V_D = -15.5 V, V_S = +15.5 V, +V = +16.5 V, -V = -16.5 V	1	01		±0.25	nA
			2			±20	
		V_D = +15.5 V, V_S = -15.5 V, +V = +16.5 V, -V = -16.5 V	1			±0.25	
			2			±20	
Drain OFF leakage current	I_D (OFF)	V_D = -15.5 V, V_S = +15.5 V, +V = +16.5 V, -V = -16.5 V	1	01		±0.25	nA
			2			±20	
		V_D = +15.5 V, V_S = -15.5 V, +V = +16.5 V, -V = -16.5 V	1			±0.25	
			2			±20	
Channel ON leakage current	I_D(ON) + I_S(ON)	V_S = V_D = ±15.5 V, +V = +16.5 V, -V = -16.5 V	1	01		±0.4	nA
			2			±40	
Low level input current	I_{IL}	V_{IN} under test = 0.8 V, all other inputs = 2.4 V	1,2	01		±1.0	µA
High level input current	I_{IH}	V_{IN} under test = 2.4 V, all other inputs = 0.8 V	1,2	01		±1.0	µA
Turn on time	t_{ON}	R_L = 300 Ω, C_L = 35 pF	9	01		150	ns
			10,11			275	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Turn off time	t_{OFF}	R_L = 300 Ω, C_L = 35 pF	9	01		100	ns
			10			250	
			11			175	
Positive supply current	+I	V+ = +16.5 V, -V = -16.5 V,	1	01		+1.0	µA
		V_{IN} = 0 V or 5 V	2,3			+5.0	
Negative supply current	-I	V+ = +16.5 V, -V = -16.5 V,	1	01		-1.0	µA
		V_{IN} = 0 V or 5 V	2,3			-5.0	
Logic supply current	I_L	V+ = +16.5 V, -V = -16.5 V,	1	01		+1.0	µA
		V_{IN} = 0 V or 5 V	2,3			+5.0	
Ground current	I_{GND}	V+ = +16.5 V, -V = -16.5 V,	1	01		-1.0	µA
		V_{IN} = 0 V or 5 V	2,3			-5.0	

1/ Unless otherwise specified, +V = 15 V, -V = -15 V, and V_L = 5 V.

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.

Device type	01	
Case outlines	E	2
Terminal number	Terminal symbol	
1	D_1	NC
2	NC	D_1
3	NC	NC
4	NC	NC
5	NC	NC
6	NC	NC
7	NC	NC
8	D_2	NC
9	S_2	NC
10	IN_2	D_2
11	+V	NC
12	V_L	S_2
13	GND	IN_2
14	-V	+V
15	IN_1	V_L
16	S_1	NC
17	---	GND
18	---	-V
19	---	IN_1
20	---	S_1

NC = No connection

FIGURE 1. Terminal connections.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with MIL-STD-883, 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**
Groups 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.

4.3.2 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. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

(2) T_A = +125°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-PRF-38535, appendix A.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

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 using DD Form 1692, Engineering Change Proposal.

6.4 Record of users. Military and industrial users shall inform Defense Supply Center Columbus when a system application requires configuration control and the applicable SMD. DSCC 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 DSCC-VA, telephone (614) 692-0544.

6.5 Comments. Comments on this drawing should be directed to DSCC-VA, Columbus, Ohio 43216-5000, or telephone (614) 692-0547.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 01-07-05

Approved sources of supply for SMD 5962-90569 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535.

Standard microcircuit drawing PIN 1/	Vendor CAGE number	Vendor similar PIN 2/
5962-9056901EA	17856	DG401AK/883
	34371	DG401AK/883
5962-90569012A	17856	DG401AZ/883

1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the vendor to determine its availability.

2/ 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
17856	Siliconix, Incorporated 2201 Laurelwood Road Santa Clara, CA 95054-1516
34371	Intersil Corporation P.O. Box 883 Melbourne, FL 32902-0883

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in the information bulletin.