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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 <i>Monica L. Poelking</i> CHECKED BY <i>Ray Monnin</i> APPROVED BY DRAWING APPROVAL DATE 21 NOVEMBER 1988 REVISION LEVEL	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444 MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCED SCHÖTTKY, TTL, DUAL AND-OR-INVERT GATE, MONOLITHIC SILICON <table style="width: 100%; border: none;"> <tr> <td style="border: none;">SIZE</td> <td style="border: none;">CAGE CODE</td> <td style="border: none;"></td> </tr> <tr> <td style="border: none;">A</td> <td style="border: none;">67268</td> <td style="border: none;">5962-88774</td> </tr> </table>	SIZE	CAGE CODE		A	67268	5962-88774
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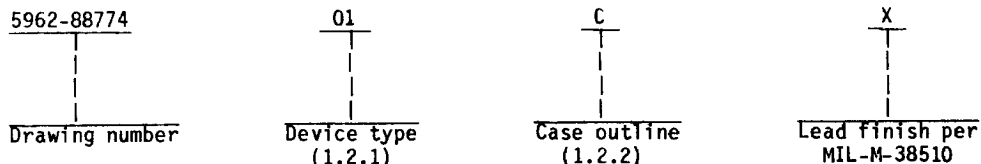
5962-E1154

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	54F51	Dual 2-wide 2-input, 2-wide 3-input AND-OR-invert gate

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
C	D-1 (14-lead, .785" x .310" x .200"), dual-in-line package
D	F-2 (14-lead, .390" x .260" x .085"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
Input voltage range	-0.5 V dc to +7.0 V dc
Input current range	-30 mA to +5.0 mA
Voltage range applied to output in high output state	-0.5 V to +V _{CC}
Current applied to output in low output state	40 mA
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P _D)	16.5 mW ^{1/}
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ _{JC})	See MIL-M-38510, appendix C
Junction temperature (T _J)	+175°C

1.4 Recommended operating conditions.

Supply voltage (V _{CC})	4.5 V dc minimum to 5.5 V dc maximum
High level input voltage (V _{IH})	2.0 V dc
Low level input voltage (V _{IL})	0.8 V dc
Input clamp current	-18 mA
High level output current (I _{OH})	-1.0 mA
Low level output current (I _{OL})	20 mA
Case operating temperature range (T _C)	-55°C to +125°C

1/ Must withstand the added P_D due to short circuit test; e.g., I_{OS}.

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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 Truth tables. The truth tables shall be as specified on figure 2.

3.2.3 Test circuit and switching waveforms. The test circuit and switching waveforms shall be as specified on figure 3.

3.2.4 Case outlines. The case outlines 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 1 and apply over the full case 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 -55°C < T _C < +125°C unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
High level output voltage	V _{OH}	V _{CC} = 4.5 V, I _{OH} = -1.0 mA V _{IL} = 0.8 V, V _{IH} = 2.0 V	1, 2, 3	2.5		V
Low level output voltage	V _{OL}	V _{CC} = 4.5 V, I _{OL} = 20 mA V _{IL} = 0.8 V, V _{IH} = 2.0 V	1, 2, 3		0.5	V
Input clamp voltage	V _{IK}	V _{CC} = 4.5 V I _{IN} = -18 mA	1, 2, 3		-1.2	V
High level input current	I _{IH1}	V _{CC} = 5.5 V V _{IN} = 2.7 V	1, 2, 3		20	μA
	I _{IH2}	V _{CC} = 5.5 V V _{IN} = 7.0 V	1, 2, 3		100	μA
Low level input current	I _{IL}	V _{CC} = 5.5 V V _{IN} = 0.5 V	1, 2, 3		-0.6	mA
Short circuit output current	I _{OS}	V _{CC} = 5.5 V 1/ V _{OUT} = 0.0 V	1, 2, 3	-60	-150	mA
Supply current	I _{CCH}	V _{CC} = 5.5 V, V _{IN} = 0.0 V	1, 2, 3		3.0	mA
	I _{CCL}	V _{CC} = 5.5 V, V _{IN} ≥ 4.0 V	1, 2, 3		7.5	mA
Functional tests		See 4.3.1c	7, 8			
Propagation delay time, A, B, C, D, E, F to Y	t _{PLH}	V _{CC} = 5.0 V R _L = 500Ω C _L = 50 pF See figure 3	9 10, 11	2.0 1.5	5.5 7.5	ns
	t _{PHL}		9 10, 11	1.0 1.0	4.0 5.0	ns

1/ Not more than one output should be shorted at a time, and the duration of the test condition shall not exceed 1 second. (For testing I_{OS}, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a high output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests.) I_{OS} tests should be performed last.

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Case outlines	C and D	2
Terminal number	Terminal symbol	
1	1A	NC
2	2A	1A
3	2B	2A
4	2C	2B
5	2D	NC
6	2Y	2C
7	GND	NC
8	1Y	2D
9	1D	2Y
10	1E	GND
11	1F	NC
12	1B	1Y
13	1C	1D
14	V _{CC}	1E
15	---	NC
16	---	1F
17	---	NC
18	---	1B
19	---	1C
20	---	V _{CC}

NC = No connection

FIGURE 1. Terminal connections.

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For 3-input gates

Inputs						Output
A	B	C	D	E	F	1Y
H	H	H	X	X	X	L
X	X	X	H	H	H	L
All other combinations						H

For 2-input gates

Inputs				Output
A	B	C	D	2Y
H	H	X	X	L
X	X	H	H	L
All other combinations				H

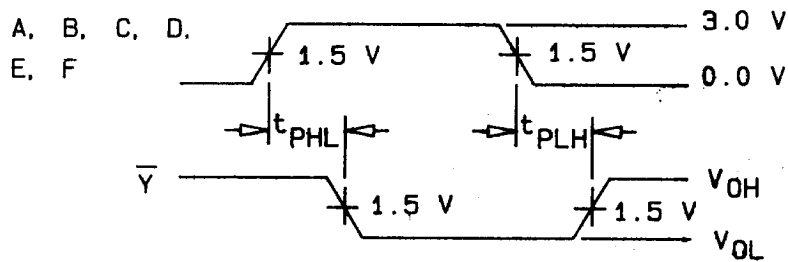
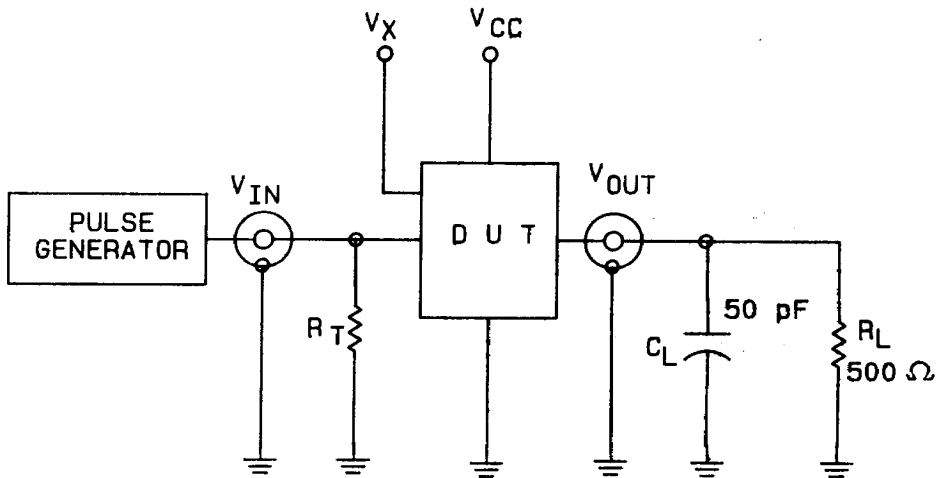
H = High voltage level
 L = Low voltage level
 X = Irrelevant

FIGURE 2. Truth tables.

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NOTES:

1. C_L includes probe and jig capacitance.
2. R_T = termination resistance and should be equal to Z_{OUT} of the pulse generators.
3. V_X = unclocked pins and must be held ≤ 0.8 V; ≥ 2.7 V or open per function table.
4. Input pulse characteristics: PRR = 1 MHz, pulse width = 500 ns, $t_{TLH} = t_{THL} \leq 2.5$ ns, duty cycle = 50%.

FIGURE 3. Test circuit and switching waveforms.

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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.

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, B, C, or D 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.

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, and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroups 7 and 8 tests shall verify the truth tables specified on figure 2.

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, B, C, or D 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, 7, 8, 9, 10, 11
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9, 10, 11
Group C and D end-point electrical parameters (method 5005)	1, 2, 3

* 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 similar part number 1/
5962-8877401CX	18324	54F51/BCA
5962-8877401DX	18324	54F51/BDA
5962-88774012X	18324	54F51/B2A

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

18324

Vendor name and address

Signetics Company
4130 South Market Court
Sacramento, CA 95834

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