

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Split V <sub>IL</sub> into temperatures. Add footnotes to table I. Change propagation delays. Add I <sub>OH</sub> test. Add figure 4. Change footnote <u>1</u> / in 1.3. Editorial changes throughout.	1988 APR 14	<i>Weekman</i>
B	Add test condition C to 4.2 and 4.3.2, step 1. Add a new vendor (CAGE code 27014) to flat package. Editorial changes throughout.	1989 NOV 3	<i>Weekman</i>

[illegible]

PMIC N/A	PREPARED BY <i>Tim H. Noh</i>	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444		
<b>STANDARDIZED MILITARY DRAWING</b>	CHECKED BY <i>Tim H. Noh</i>	MICROCIRCUITS, DIGITAL, BIPOLAR, ADVANCED LOW POWER SCHOTTKY TTL, QUADRUPLE 2-INPUT POSITIVE NAND BUFFERS, MONOLITHIC SILICON		
	APPROVED BY <i>William Z. Beckman</i>	SIZE	CAGE CODE	
	DRAWING APPROVAL DATE 27 JUNE 1987	A	14933	5962-86871
THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE	REVISION LEVEL B	SHEET OF 1		
AMSC N/A				

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5962-E1474-1

**DISTRIBUTION STATEMENT A.**

## 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:

5962-86871	01	B	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

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

Device type	Generic number	Circuit function
01	54ALS38	Quadruple 2-input positive-NAND buffers with open collector outputs

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
B	F-3 (14-lead, .280" x .200" x .070"), flat package
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 minimum to +7.0 V dc maximum
Input voltage range- - - - -	-1.5 V dc at -18 mA to +7.0 V dc
Storage temperature range - - - - -	-65°C to +150°C
Maximum power dissipation ( $P_D$ ) per device 1/ - - - - -	42.9 mW
Lead temperature (soldering, 10 seconds) - - - - -	+300°C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ) - - - - -	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
Maximum high level output voltage ( $V_{OH}$ ) - - - - -	5.5 V dc
Minimum high level input voltage ( $V_{IH}$ ) - - - - -	2.0 V dc
Maximum low level input voltage ( $V_{IL}$ ):	
$V_{IL} = +125^\circ\text{C}$ - - - - -	0.7 V dc
$V_{IL} = +25^\circ\text{C}$ - - - - -	0.8 V dc
$V_{IL} = -55^\circ\text{C}$ - - - - -	0.8 V dc
Case operating temperature range ( $T_C$ )- - - - -	-55°C to +125°C

1/ Maximum power dissipation is defined as  $V_{CC} \times I_{CC}$ .

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## 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 Truth table. The truth table shall be as specified on figure 2.

3.2.3 Logic diagram. The logic diagram shall be as specified on figure 3.

3.2.4 Test circuit and switching waveforms. The test circuit and switching waveforms shall be as specified on figure 4.

3.2.5 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 apply over the full case 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.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C < T <sub>C</sub> < +125°C 1/ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
High level output current	I <sub>OH</sub>	V <sub>CC</sub> = 4.5 V V <sub>OH</sub> = 5.5 V	1,2,3		0.1	mA
Low level output voltage	V <sub>OL</sub>	V <sub>IH</sub> = 2.0 V V <sub>CC</sub> = 4.5 V I <sub>OL</sub> = 12 mA	2		0.4	V
		2/ V <sub>IL</sub> = 0.8 V	1,3			
Input clamp voltage	V <sub>IC</sub>	V <sub>CC</sub> = 4.5 V I <sub>IN</sub> = -18 mA	1,2,3		-1.5	V
High level input current	I <sub>IH1</sub>	V <sub>CC</sub> = 5.5 V V <sub>IN</sub> = 2.7 V unused inputs = 0.0 V	1,2,3		20	μA
	I <sub>IH2</sub>	V <sub>CC</sub> = 5.5 V V <sub>IN</sub> = 7.0 V unused inputs = 0.0 V	1,2,3		0.1	mA
Low level input current	I <sub>IL</sub>	Unused inputs ≥ 4.5 V V <sub>CC</sub> = 5.5 V V <sub>IN</sub> = 0.4 V	1,2,3		-0.1	mA
Supply current	I <sub>CCH</sub>	V <sub>CC</sub> = 5.5 V V <sub>IN</sub> ≤ 0.4 V	1,2,3		1.6	mA
	I <sub>CCL</sub>	V <sub>CC</sub> = 5.5 V V <sub>IN</sub> ≥ 4.5 V	1,2,3		7.8	mA
Functional tests		See 4.3.1c 3/	7,8			
Propagation delay time, from A, B to Y	t <sub>PLH</sub>	V <sub>CC</sub> = 4.5 V to 5.5 V C <sub>L</sub> = 50 pF R <sub>L</sub> = 500Ω 4/	9,10,11	10	55	ns
	t <sub>PHL</sub>	see figure 4	9,10,11	2	20	

- 1/ Unused inputs that do not directly control the pin under test must be put > 2.5 V or ≤ 0.4 V. The inputs shall not exceed 5.5 V or go less than 0.0 V. No inputs shall be floated.
- 2/ All outputs must be tested. In the case where only one input at V<sub>IL</sub> maximum or V<sub>IH</sub> minimum produces the proper output state, the test must be performed with each input being selected as the V<sub>IL</sub> maximum or the V<sub>IH</sub> minimum input.
- 3/ Functional tests shall be conducted at input test conditions of GND ≤ V<sub>IL</sub> ≤ V<sub>OL</sub> and V<sub>OH</sub> ≤ V<sub>IH</sub> ≤ V<sub>CC</sub>.
- 4/ Propagation delay limits are based on single output switching. Unused outputs = 3.5 V or ≤ 0.3 V.

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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-ECC 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-ECC 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, C, or D using the circuit submitted with the certificate of compliance (see 3.6 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.

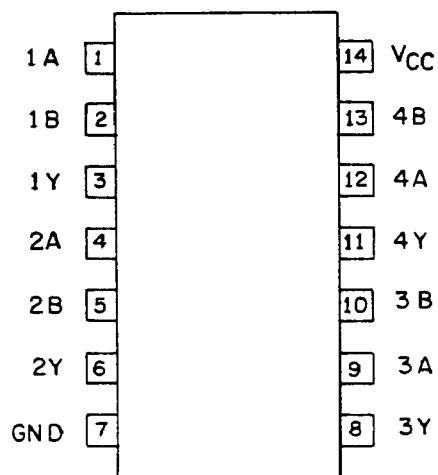
c. Subgroups 7 and 8 tests shall verify the truth table as specified on figure 2.

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Cases B, C, and D



Case 2

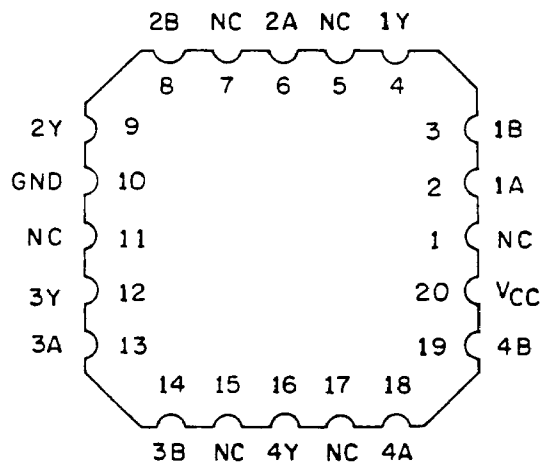


FIGURE 1. Terminal connections.

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Inputs		Output
A	B	Y
H	H	L
L	X	H
X	L	H

H = High voltage level  
L = Low voltage level

FIGURE 2. Truth table (each gate).

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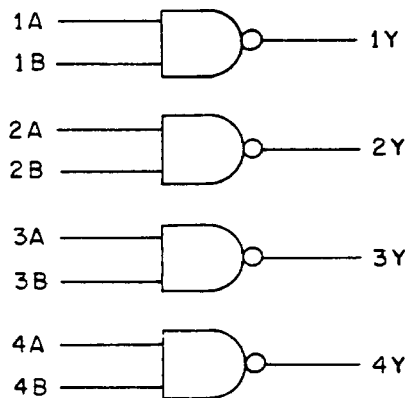


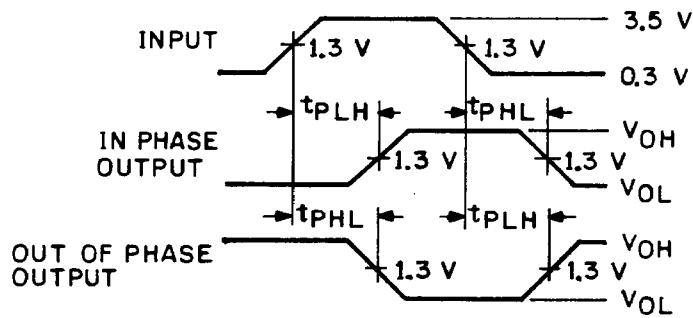
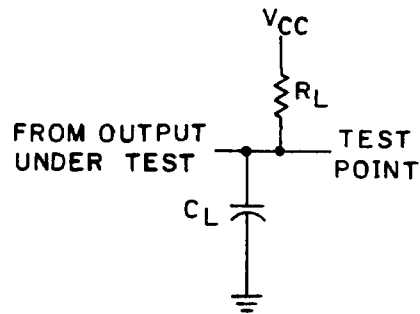
FIGURE 3. Logic diagram.

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NOTES:

1.  $C_L$  includes probe and jig capacitance.
2. All input pulses have the following characteristics:  $PRR \leq 10$  MHz, duty cycle = 50%,  $t_r = t_f = 3$  ns  $\pm 1$  ns.
3. The outputs are measured one at a time with one input transition per measurement.

FIGURE 4. Test circuit and switching waveforms.

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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
Groups C and D end-point electrical parameters (method 5005)	1,2,3

\* PDA applies to subgroup 1.

#### 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, C, or D 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.

6.2 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

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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-ECC, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECC, Dayton, Ohio 45444, or telephone (513) 296-8525.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. Additional sources will be added to MIL-BUL-103 as they become available. 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-ECC. The approved sources of supply listed below are for information purposes only and are current only to the date of the last action of this document.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/
5962-8687101BX	01295	SNJ54ALS38AWA
5962-8687101CX	01295 27014	SNJ54ALS38AJ 54ALS38AJ/883
5962-8687101DX	01295 27014	SNJ54ALS38AW 54ALS38AW/883
5962-86871012X	01295 27014	SN54ALS38AFK 54ALS38AE/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

01295

27014

Vendor name and address

Texas Instruments, Incorporated  
P.O. Box 6448  
Midland, TX 79701

National Semiconductor Corporation  
2900 Semiconductor Drive  
Santa Clara, CA 95051

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