REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED

REV																								
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REV STATUS OF SHEETS	REV																							
	SHEET	1	2	3	4	5	6	7	8	9	10	11												

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: Rick C. Office

CHECKED BY: Charles E. Besore

APPROVED BY: [signature]

DRAWING APPROVAL DATE: 16 JANUARY 1990

REVISION LEVEL:

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, LINEAR, DUAL PERIPHERAL DRIVER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	5962-90522

SHEET 1

DESC FORM 193
SEP 87

* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E1605

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:

5962-90522	01	G	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	DS1632	Dual NAND peripheral driver, CMOS compatible open collector

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
G	A-1 (8-lead, .370" x .185"), can package
P	D-4 (8-lead, (.405" x .310" x .200"), dual-in-package

1.3 Absolute maximum ratings.

Supply voltage (V_{CC})	16 V dc
Input voltage range (V_{IN})	-0.3 V dc to V_{CC} +0.3 V dc
Output voltage	56 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation: 1/	
Case G	787 mW
Case P	1133 mW
Lead temperature (soldering, 10 seconds)	+260°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.

Case operating temperature range (T_A)	-55°C to +125°C
Operating supply voltage range (V_{CC})	4.5 V dc to 15 V dc

1/ For case P, derate 7.6 mW/°C above +25°C; for case G, derate 5.2 mW/°C above T_A = +25°C.

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 Test circuits and switching waveforms. The test circuits 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 herein, the electrical performance characteristics are as specified in table I and 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.

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
High level input voltage	V_{IH}	V_{CC} = 5 V See figure 3	1, 2, 3	3.5		V
		V_{CC} = 10 V See figure 3		8.0		
		V_{CC} = 15 V See figure 3		12.5		
Low level input voltage	V_{IL}	V_{CC} = 5 V See figure 3	1, 2, 3		1.5	V
		V_{CC} = 10 V See figure 3			2.0	
		V_{CC} = 15 V See figure 3			2.5	
High level output current	I_{OH}	V_{IN} = 15 V (all inputs) V_{CC} = 15 V, V_{OUT} = 54 V, See figure 3	1, 2, 3		250	µA
Low level output voltage	V_{OL}	V_{IN} = 0 V (all inputs) V_{CC} = 4.5 V, I_{OL} = 100 mA, See figure 3	1, 2, 3		1.1	V
		V_{IN} = 0 V (all inputs) V_{CC} = 4.5 V, I_{OL} = 300 mA, See figure 3			1.4	V
High level input current	I_{IH}	V_{IN} = 15 V, V_{CC} = 15 V, Other input of driver = 0.0 V, See figure 3	1, 2, 3		10	µA
Low level input current	I_{IL}	V_{IN} = 0.4 V, V_{CC} = 15 V, Other input of driver = 15 V, See figure 3	1, 2, 3		-360	µA
		V_{IN} = 0.4 V, V_{CC} = 5 V, Other input of driver = 5 V, See figure 3			-115.5	
High level breakdown voltage	V_{OH}	V_{CC} = 15 V, I_{OH} = 250 µA, See figure 3	1, 2, 3	56		V
Functional tests		See 4.3.1c	7, 8			

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

Test	Symbol	Conditions $-55°C < T_A < +125°C$ unless otherwise specified	Group A subgroups	Limits Min	Limits Max	Unit
Power supply current	I_{CCL}	V_{IN} = 5 V (all inputs), V_{CC} = 5 V, See figure 3	1, 2, 3		12	mA
		V_{IN} = 15 V (all inputs), V_{CC} = 15 V, See figure 3			23	
	I_{CCH}	V_{IN} = 0 V (all inputs), V_{CC} = 5 V, See figure 3			3.5	
		V_{IN} = 0 V (all inputs), V_{CC} = 15 V, See figure 3			14	
Propagation delay time	t_{PHL}	V_{CC} = 5 V, C_L = 15 pF, V_L = 10 V, R_L = 50Ω or equivalent, See figure 3	9	1	1.20	µs
			10, 11	1	1.55	
	t_{PLH}		9	1	1.20	
			10, 11	1	1.50	

1/ Power dissipation must be externally controlled at elevated temperatures (+25°C and +125°C).

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.

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.

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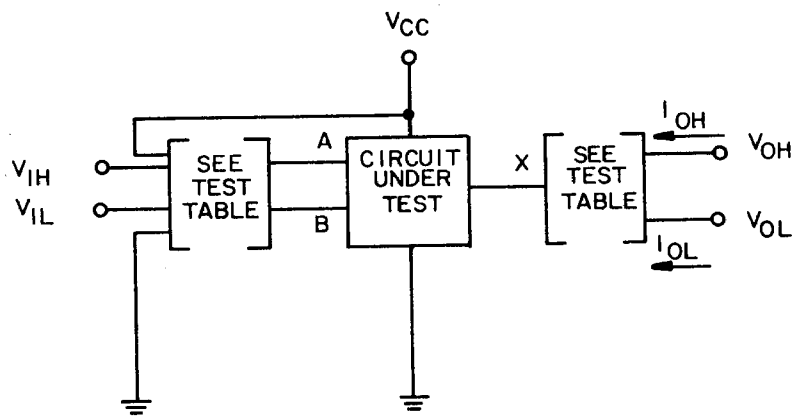
Device type	01
Case outlines	G and P
Terminal number	Terminal symbol
1	A1
2	B1
3	X1
4	GND
5	X2
6	A2
7	B2
8	V_{CC}

FIGURE 1. Terminal connections.

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

H = High
L = Low

FIGURE 2. Truth table.



Test table

Input under test	Other input	Output	
		Apply	Measure
V_{IH} V_{IL}	V_{IH} V_{CC}	I_{OL} I_{OH}	V_{OL} V_{OH}

V_{IH}, V_{IL}, test

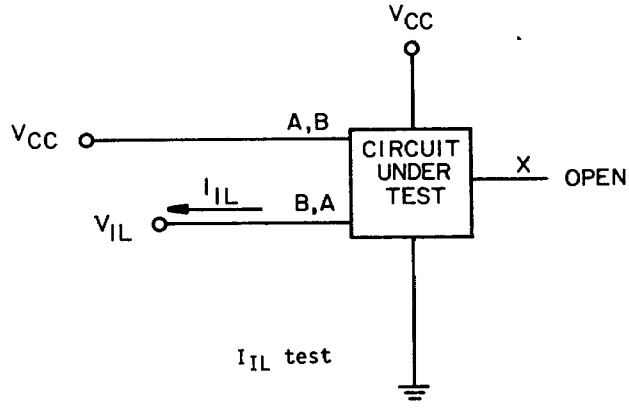
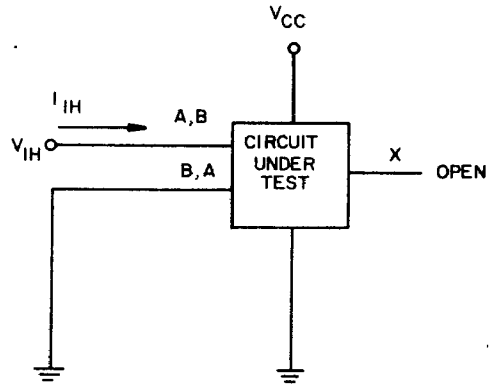
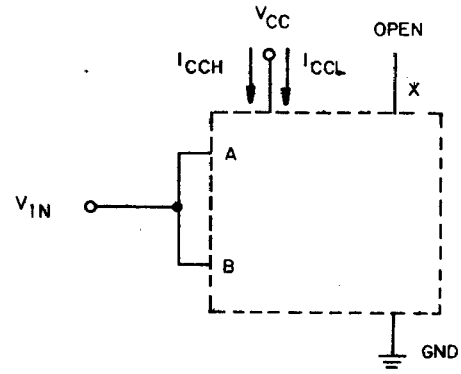


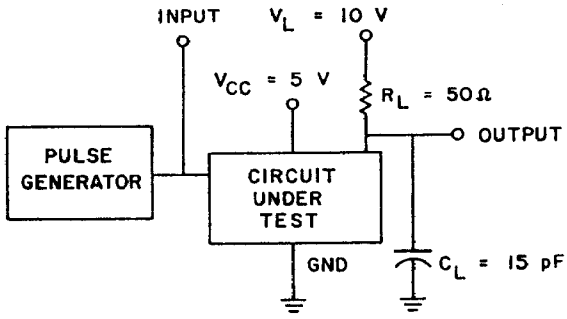
FIGURE 3. Test circuits and switching waveforms.



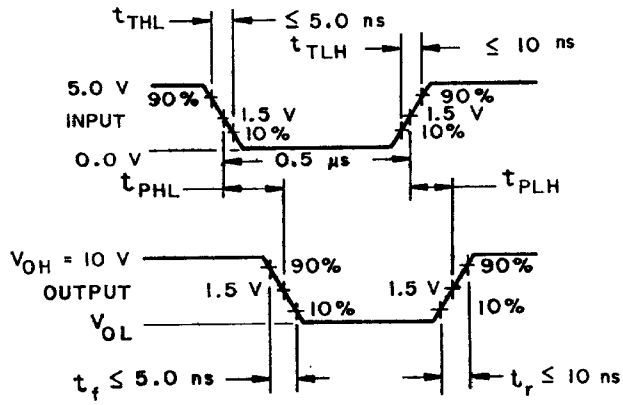
I_{IH} test



I_{CC} test



Switching test circuit



Switching waveforms

NOTES:
1. The pulse generator has the following characteristics: PRR = 500 kHz, Z_{OUT} = 50Ω.
2. C_L includes probe and jig capacitance.
3. I_{IH} and I_{IL} test, each input is tested separately.
4. I_{CC} test, both gates are tested simultaneously.

FIGURE 3. Test circuits and switching waveforms - Continued.

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, 7, 8, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

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 3.6 herein).

(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.

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 shall verify the truth table.

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 3.6 herein).

(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-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 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with th 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 Electronic 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 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/
5962-9052201PX	27014	DS1632J-8/883
5962-9052201GX	27014	DS1632H/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	Vendor name and address
27014	National Semiconductor Corporation 2900 Semiconductor Drive P.O. Box 58090 Santa Clara, CA 95052-8090

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