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	SHEET	1	2	3	4	5	6	7	8	9	10	11	

PMIC N/A	PREPARED BY <i>Larry T. Gaudin</i>	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	
<b>STANDARDIZED MILITARY DRAWING</b>	CHECKED BY <i>Ray Monnin</i>	MICROCIRCUIT, DIGITAL, BIPOLAR, DUAL LINE DRIVERS, MONOLITHIC SILICON	
	APPROVED BY <i>DA Di Enzo</i>		
	THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE	DRAWING APPROVAL DATE 20 JULY 1988	SIZE <b>A</b>
AMSC N/A	REVISION LEVEL	SHEET 1 OF 11	

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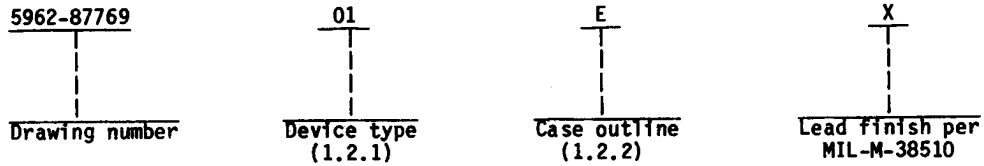
U.S. GOVERNMENT PRINTING OFFICE: 1987 - 748-129/60911  
5962-E663

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

Device type	Generic number	Circuit function
01	55121	Dual line drivers

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.

Supply voltage range	- - - - -	-0.5 V dc minimum to +6.0 V dc maximum
Input voltage range	- - - - -	-1.5 V dc at -12 mA to +6.0 V dc
Storage temperature range	- - - - -	-65°C to +150°C
Maximum power dissipation (P <sub>D</sub> ) 1/-	- - - - -	330 mW
Lead temperature (soldering, 10 seconds)	- - - - -	+300°C
Thermal resistance, junction-to-case (θ <sub>JC</sub> )	- - - - -	See MIL-M-38510, appendix C
Junction temperature (T <sub>J</sub> )	- - - - -	+150°C

1.4 Recommended operating conditions.

Supply voltage range (V <sub>CC</sub> )	- - - - -	+4.75 V dc minimum to +5.25 V dc maximum
Minimum high level input voltage (V <sub>IH</sub> )	- - - - -	2.0 V dc
Maximum low level input voltage (V <sub>IL</sub> )	- - - - -	0.8 V dc
Case operating temperature range (T <sub>C</sub> )	- - - - -	-55°C to +125°C

1/ Maximum power dissipation is defined as V<sub>CC</sub> x I<sub>CC</sub>, and must withstand the added P<sub>D</sub> due to short circuit test, e.g., I<sub>OS</sub>.

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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 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 Waveforms. The 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, the electrical performance characteristics are as specified in table I 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 <sub>C</sub> < +125°C unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Input clamp voltage	V <sub>IC</sub>	V <sub>CC</sub> = 5.0 V I <sub>IN</sub> = -12 mA	1, 2, 3		-1.5	V
Input breakdown voltage	V <sub>IB</sub>	V <sub>CC</sub> = 5.0 V I <sub>IN</sub> = 10 mA	1, 2, 3	5.5		V
High level output voltage	V <sub>OH</sub>	V <sub>IH</sub> = 2.0 V I <sub>OH</sub> = -75 mA 1/	1, 2, 3	2.4		V
High level output current	I <sub>OH</sub>	V <sub>CC</sub> = 5.0 V V <sub>OH</sub> = 2.0 V V <sub>IH</sub> = 4.5 V T <sub>C</sub> = +25°C 1/	1	-100	-250	mA
Low level output current	I <sub>OL</sub>	V <sub>IL</sub> = 0.8 V V <sub>OL</sub> = 0.4 V 1/	1, 2, 3		-800	μA
Output current	I <sub>OZ</sub>	V <sub>CC</sub> = 3.0 V V <sub>OUT</sub> = 3.0 V	1, 2, 3		500	μA
High level input current	I <sub>IH</sub>	V <sub>IN</sub> = 4.5 V	1, 2, 3		40	μA
Low level input current	I <sub>IL</sub>	V <sub>IN</sub> = 0.4 V	1, 2, 3	-0.1	-1.6	mA
Short circuit output current	I <sub>OS</sub>	V <sub>CC</sub> = 5.0 V T <sub>C</sub> = +25°C 2/	1		-30	mA
Supply current	I <sub>CCH</sub>	V <sub>CC</sub> = 5.25 V V <sub>IN</sub> = 2.0 V All outputs are open	1, 2, 3		28	mA
	I <sub>CCL</sub>	V <sub>CC</sub> = 5.25 V V <sub>IN</sub> = 0.8 V All outputs are open	1, 2, 3		60	mA
Functional tests		See 4.3.1c 3/	1, 2, 3			

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Propagation delay time, any input to Y	t <sub>PLH1</sub>	V <sub>CC</sub> = 5.0 V C <sub>L</sub> = 15 pF R <sub>L</sub> = 37Ω See figure 4	9		20	ns
			10, 11		30	
	t <sub>PHL1</sub>		9		20	ns
			10, 11		30	
Propagation delay time, any input to Y	t <sub>PLH2</sub>	V <sub>CC</sub> = 5.0 V C <sub>L</sub> = 1000 pF R <sub>L</sub> = 37Ω See figure 4	9,10,11		50	ns
					50	
	t <sub>PHL2</sub>			50	ns	
				50		

- 1/ The output voltage and current limits are guaranteed for any appropriate combination of high and low inputs specified by the function table for the desired output.
- 2/ Not more than one output will be shorted at one time, and the duration of the short circuit condition should not exceed more than one second.
- 3/ Functional tests shall be carried out in conjunction with the static tests, and shall verify the function of the device.

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.

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Terminal number	Terminal connections	
	Case 2	Case E
1	NC	1A
2	1A	1B
3	1B	1C
4	1C	1D
5	1D	1E
6	NC	1F
7	1E	1Y
8	1F	GND
9	1Y	2Y
10	GND	2A
11	NC	2B
12	2Y	2C
13	2A	2D
14	2B	2E
15	2C	2F
16	NC	VCC
17	2D	---
18	2E	---
19	2F	---
20	VCC	---

FIGURE 1. Terminal connections.

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

H = High level  
 L = Low level  
 X = Irrelevant

FIGURE 2. Truth table.

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( POSITIVE LOGIC )

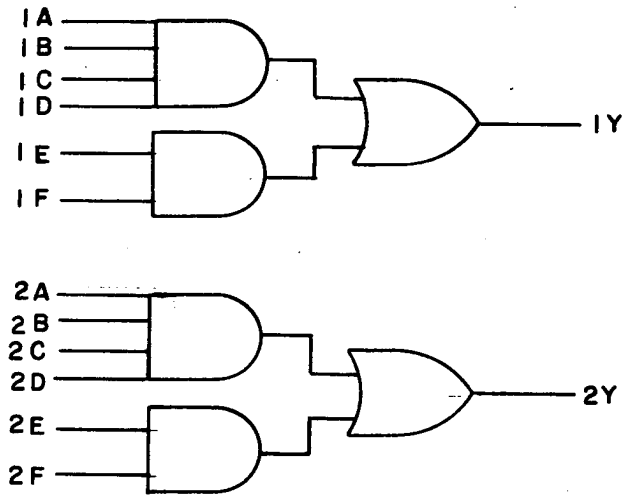
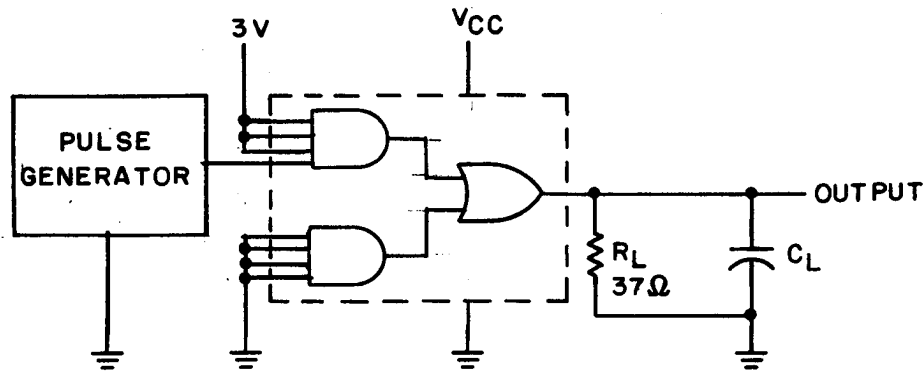


FIGURE 3. Logic diagram.

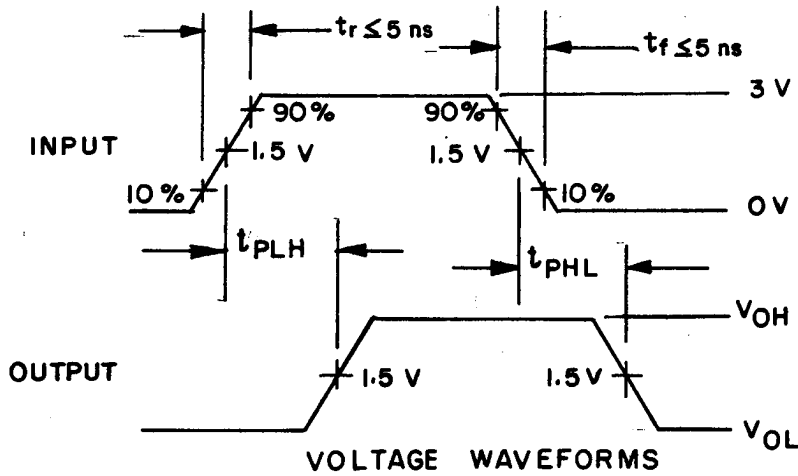
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TEST CIRCUIT



NOTES:

1. The pulse generators have the following characteristics:  $Z_{OUT} \approx 50 \Omega$ ,  $t_W = 200 \text{ ns}$ , duty cycle  $< 50\%$ .
2.  $C_L$  includes probe and jig capacitance.

Figure 4. Waveforms.

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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 B 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, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Functional tests shall be carried out in conjunction with the static tests, subgroups 1, 2, and 3, and shall verify the truth table as 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 B 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, 9
Group A test requirements (method 5005)	1, 2, 3, 9, 10**, 11**
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

\* PDA applies to subgroup 1.  
 \*\* Subgroups 10 and 11, if not tested, shall be  
 guaranteed to the limits specified in table I.

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 <u>1/</u>
5962-8776901EX	01295	SNJ55121J
5962-87769012X	01295	SNJ55121FK

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements this drawing.

Vendor CAGE number

01295

Vendor name and address

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

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