REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Add vendor CAGE 34333. Editorial changes throughout.	1987 NOV 25	M. A. Frye
B	Add a F-2 package. Make changes to 1.2.2, figure 1, and editorial changes throughout. Remove vendor CAGE 34333.	1990 MAY 25	M. A. Frye

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SHEET																								
REV STATUS OF SHEETS	REV	B	B	B	B	B	B	B	B	B	B	B	B											
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12											

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

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DRAWING APPROVAL DATE: 31 JULY 1987

REVISION LEVEL: B

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, QUAD LINE DRIVER, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	5962-86889

SHEET 1

DESC FORM 193
SEP 87

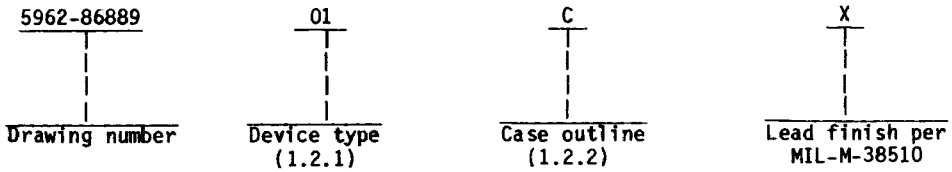
* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E1662

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	1488, 55188	Quad line driver

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letters	Case outlines
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 (V_{CC})	15.0 V
Supply voltage (V_{EE})	-15.0 V
Input voltage range	-15.0 V to +7.0 V
Storage temperature range	-65°C to +150°C
Power dissipation (P_D)	1000 mW 1/ 2/
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C
Junction temperature (T_J)	+150°C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	7.5 V to 15.0 V 3/
Supply voltage range (V_{EE})	-7.5 V to -15.0 V 3/
Minimum high level input voltage (V_{IH})	1.9 V
Maximum low level input voltage (V_{IL})	0.8 V
Ambient operating temperature range (T_A)	-55°C to +125°C

1/ Must withstand the added P_D due to short circuit test (e.g., I_{OS}).
2/ Derate linearly above T_A = +25°C at the rate of 6.7 mW/°C.
3/ Derate supply voltage linearly from ±15 V at 30°C to ±9 V at +125°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

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 Typical circuit. A typical circuit schematic is shown 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 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$, $V_{CC} = +9\ V$, $V_{EE} = -9\ V$ unless otherwise specified			Group A subgroups	Limits		Unit
						Min	Max	
Output high voltage	V_{OH}	$V_{IL} = 0.8\ V$ $R_L = 3\ k\Omega$		$V_{CC} = 9\ V$ $V_{EE} = -9\ V$	1,2,3	6		V
				$V_{CC} = 13.2\ V$ $V_{EE} = -13.2\ V$		9		
Output low voltage	V_{OL}	$V_{IH} = 1.9\ V$ $R_L = 3\ k\Omega$		$V_{CC} = 9\ V$ $V_{EE} = -9\ V$	1,2,3	-6		V
				$V_{CC} = 13.2\ V$ $V_{EE} = -13.2\ V$		-9		
Input high current	I_{IH}	$V_I = 5\ V$			1,2,3		10	µA
Input low current	I_{IL}	$V_I = 0\ V$			1,2,3		-1.6	mA
Output short-circuit current high level 2/	$I_{OS(H)}$	$V_I = 0.8\ V$,	$V_O = 0\ V$		1,2,3	-4.6	-13.5	mA
Output short-circuit current low level 2/	$I_{OS(L)}$	$V_I = 1.9\ V$,	$V_O = 0\ V$		1,2,3	4.6	13.5	mA
Output resistance, power off	R_O	$V_{CC} = 0\ V$, $-2\ V \le V_O \le +2\ V$	$V_{EE} = 0\ V$		1,2,3	300		Ω

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$, $V_{CC} = +9$ V, $V_{EE} = -9$ V unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
Supply current from V_{CC}	I_{CC}	V_{CC} = 9 V	All V_I = 1.9 V	1,2,3		20	mA
		Outputs open	All V_I = 0.8 V			6	
		V_{CC} = 12 V	All V_I = 1.9 V	1,2,3		25	mA
		Outputs open	All V_I = 0.8 V			7	
		V_{CC} = 15 V	All V_I = 1.9 V	1		34	mA
		Outputs open T_A = +25°C	All V_I = 0.8 V			12	
Supply current from V_{EE}	I_{EE}	V_{EE} = -9 V	All V_I = 1.9 V	1,2,3		-17	mA
		Outputs open	All V_I = 0.8 V			-0.5	
		V_{EE} = -12 V	All V_I = 1.9 V	1,2,3		-23	mA
		Outputs open	All V_I = 0.8 V			-0.5	
		V_{EE} = -15 V	All V_I = 1.9 V	1		-34	mA
		Outputs open T_A = +25°C	All V_I = 0.8 V			-2.5	
Propagation delay input to output	t_{PLH}	See figures 4 and 5		9, 10,11		350 525	ns
	t_{PHL}	R_L = 3.0 kΩ		9, 10,11		175 262	
Transition time	t_{TLH}	C_L = 15 pF		9, 10,11		100 150	ns
	t_{THL}			9, 10,11		75 112	

1/ All voltage values are with respect to network ground terminal.
2/ Test each pin one at a time.

Device type	01	
Case outlines	C and D	2
Terminal number	Terminal symbol	
1	V_{EE}	NC
2	1A	V_{EE}
3	1Y	1A
4	2A	1Y
5	2B	NC
6	2Y	2A
7	GND	NC
8	3Y	2B
9	3A	2Y
10	3B	GND
11	4Y	NC
12	4A	3Y
13	4B	3A
14	V_{CC}	3B
15	---	NC
16	---	4Y
17	---	NC
18	---	4A
19	---	4B
20	---	V_{CC}

NC = No connection

FIGURE 1. Terminal connections.

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

NOTE: X = Don't care
L = Low level
H = High level

FIGURE 2. Truth table.

(1/4 of circuit shown)

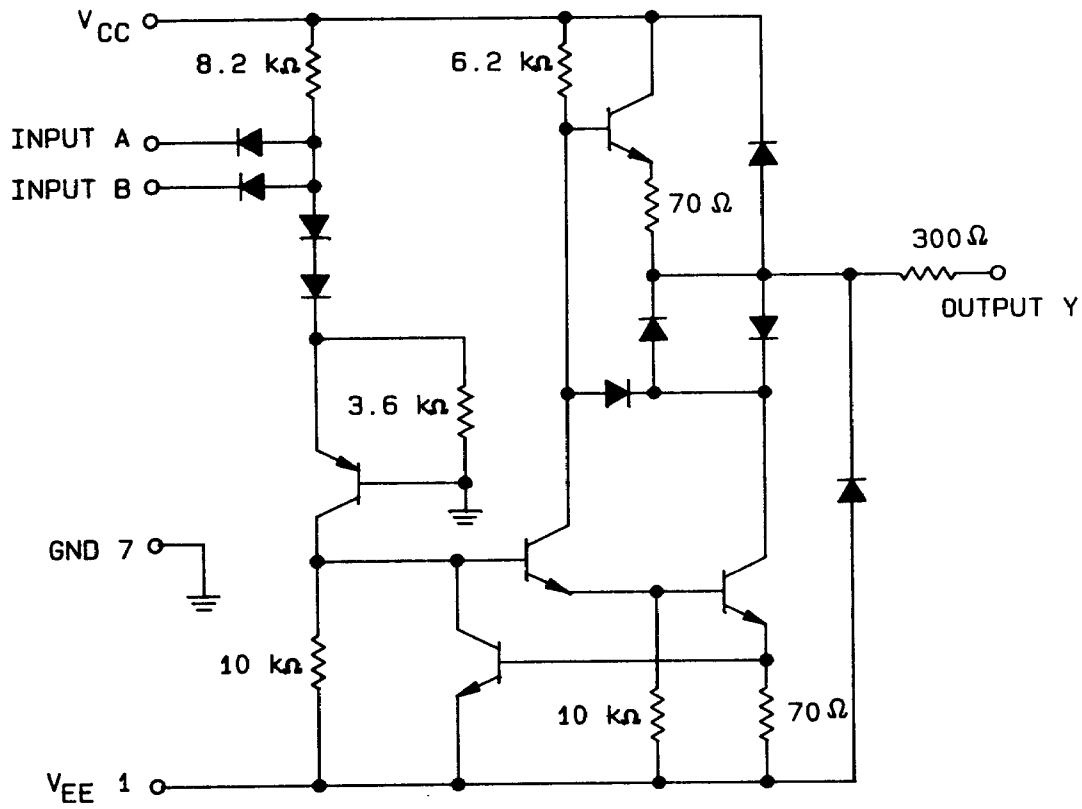
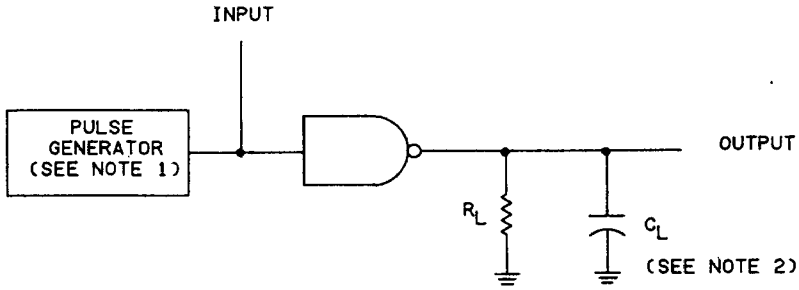


FIGURE 3. Typical circuit.



NOTES:
1. The pulse generator has the following characteristics: t_W = 0.5 µs, PRR = 1 MHz, Z_O = 50Ω.
2. C_L includes probe and jig capacitance.
3. AC switching characteristics are measured using single pulse techniques (PRR = 0).

FIGURE 4. Test load circuit.

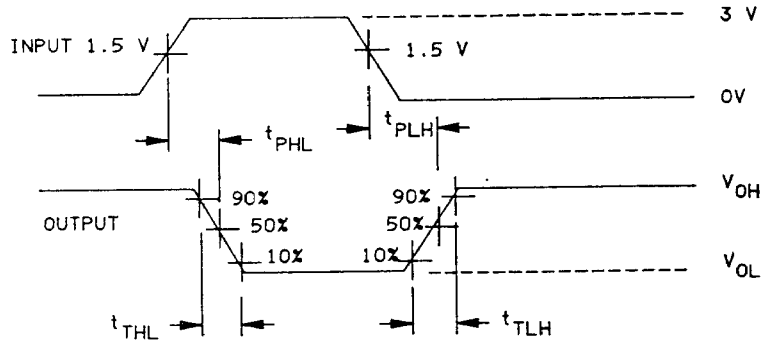


FIGURE 5. Voltage waveform.

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 (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.

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, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

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.

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 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 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 used 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 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-ECS. 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/
5962-8688901CX	01295	SNJ55188J
5962-8688901DX	01295	SNJ55188W
5962-86889012X	01295	SNJ55188FK

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
01295	Texas Instruments, Incorporated 13500 N. Central Expressway P.O. Box 655303 Dallas, TX 75265 Point of contact: I-20 at FM 1788 Midland, TX 79711-3486