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

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

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
27 OCTOBER 1989

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUITS, LINEAR, QUAD 2-INPUT NOR POWER DRIVER MONOLITHIC SILICON

SIZE	CAGE CODE	
A	67268	5962-89604

SHEET 1 OF 10

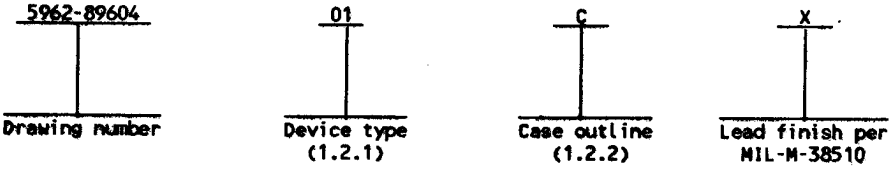
DESC FORM 193
SEP 87

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

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	Output voltage
01	UH-432	Quad 2-input NOR power driver	40 V
02	UH-432-1	Quad 2-input NOR power driver	70 V
03	UH-532	Quad 2-input NOR power driver	100 V

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-2A (14-lead, .390" x .260" x .115"), flat package

1.3 Absolute maximum ratings.

Supply voltage (V_{CC})	7.0 V dc
Input voltage (V_{IN})	5.5 V dc
Output off-state voltage (V_{OFF}):	
Device type 01	40 V
Device type 02	70 V
Device type 03	100 V
Output on-state sink current (I_{ON}):	
One driver	500 mA
Total package	1.0 A
Power dissapation (P_D):	
Device type 01	6 W
Device type 02	10 W
Device type 03	15 W
Suppression diode on-state current (I_F)	500 mA
Storage temperature	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+150°C

Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C
Thermal resistance, junction-to-ambient (θ_{JA}):	
Case C	90°C/W
Case D	140°C/W

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	4.5 V dc to 5.5 V dc
Current into any output (on-state)	250 mA maximum
Ambient operating temperature range (T_A)	-55°C to +125°C
Minimum high level input voltage (V_{IH})	2.0 V
Maximum low level input voltage (V_{IL})	0.8 V
Maximum collector cutoff current (I_{CEX})	250 mA

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 Switching waveforms, test circuit and input pulse characteristics. The switching waveforms, test circuit and input pulse characteristics shall be as specified on figure 2.

3.2.3 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 ambient operating temperature range.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$, unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
Input current high	$I_{IN(1)}$	V_{CC} = 5.5 V, Other input = 0 V	Driven input = 2.4 V	1,2,3		40	µA
			Driven input = 5.5 V	1,2,3		1,000	
Input current low	$I_{IN(0)}$	Driver input = 0.4 V, Other input = 4.5 V, V_{CC} = 5.5 V		1,2,3		-800	µA
Output reverse current	I_{OFF}	Driver input = 0.8 V, Other input = 0.8 V, V_{CC} = 4.5 V 1/		1,2,3		100	µA
Output voltage low	V_{ON}	V_{CC} = 4.5 V, Driver input = 2.0 V, Other input = 0 V	Output = 150 mA	1,3		0.5	V
				2		0.6	
			Output = 250 mA	1,3		0.7	
				2		0.8	
Input voltage	$V_{IN(1)}$	V_{CC} = 4.5 V		1,2,3	2.0		V
	$V_{IN(0)}$	V_{CC} = 4.5 V		1,2,3		0.8	V
Supply current, high level (each gate)	$I_{CC(1)}$	T_A = +25°C, all inputs = 0 V, V_{CC} = 5.5 V		1		7.5	mA
				2, 3		10	
Supply current, low level (each gate)	$I_{CC(0)}$	T_A = +25°C, all inputs = 5.0 V, V_{CC} = 5.5 V		1		26.5	mA
				2, 3		40	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$, unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Input clamp voltage	V_{IC}	Driven input -12 mA	1,2,3		-1.5	V
Propagation delay, "Turn-on" time	tpdON	C_L = 15 pF, V_{CC} = 5.0 V 2/	9,10,11		500	ns
Propagation delay, "Turn-off" time	tpdOFF		9,10,11		750	ns

1/ Off state voltage V_{OFF} = 40 V for device type 01, 70 V for device type 02 and 100 V for device type 03.

2/ For device type 01, V_{OFF} = 40 V, R_L = 265Ω, for device type 02, V_{OFF} = 70 V, R_L = 465Ω, for device type 03, V_{OFF} = 100 V, R_L = 670Ω.

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

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.

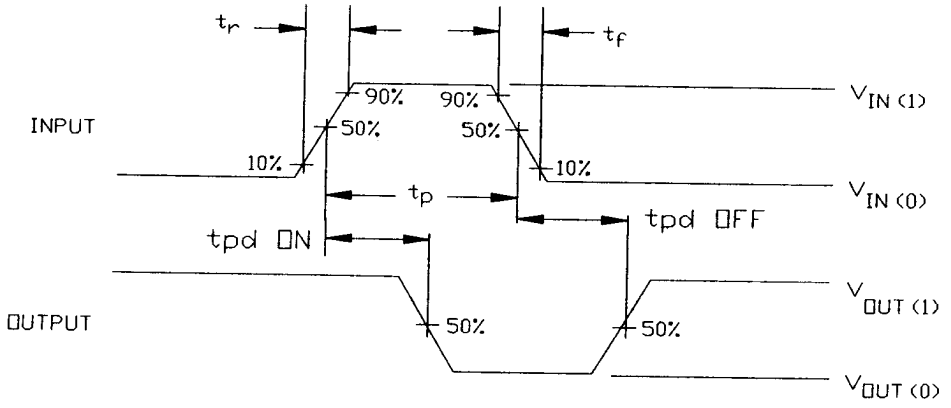
3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

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.

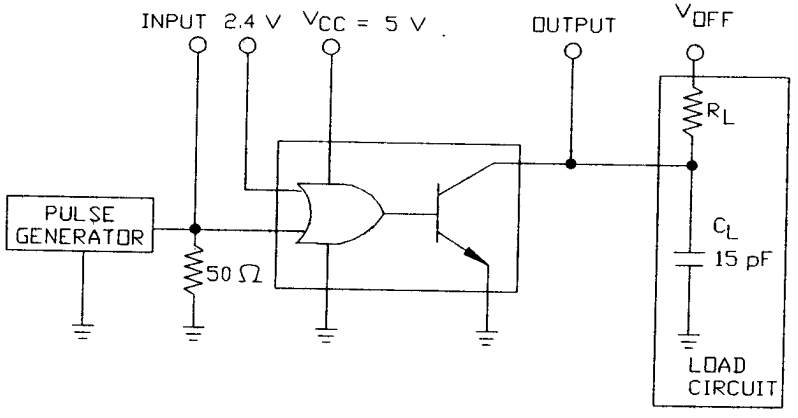
Device types	01, 02 and 03	
Case outline	C	D
Terminal number	Terminal symbol	
1	INPUT 1A	INPUT 1A
2	INPUT 1B	INPUT 1B
3	OUTPUT 1	OUTPUT 1
4	INPUT 2A	V_{CC}
5	INPUT 2B	OUTPUT 2
6	OUTPUT 2	INPUT 2A
7	GND	INPUT 2B
8	OUTPUT 3	OUTPUT 3
9	INPUT 3A	INPUT 3A
10	INPUT 3B	INPUT 3B
11	OUTPUT 4	GND
12	INPUT 4A	INPUT 4A
13	INPUT 4B	INPUT 4B
14	V_{CC}	OUTPUT 4

FIGURE 1. Terminal connections.

WAVEFORMS



TEST CIRCUIT



NOTE: C_L includes probe and test fixture capacitance.

INPUT PULSE CHARACTERISTICS

$V_{IN\ (0)}$ = 0 V	$t_f \leq 7.0$ ns	t_p	= 1.0 µs
$V_{IN\ (1)}$ = 3.5 V	$t_r \leq 14$ ns	PRR	= 500 kHz

FIGURE 2. Switching waveforms, test circuit, and input pulse characteristics.

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°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 3.5 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

* 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.

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/
5962-8960401CX	31019	UHD-432/883C
5962-8960401DX	31019	UHC-432/883C
5962-8960402CX	31019	UHD-432-1/883C
5962-8960402DX	31019	UHC-432-1/883C
5962-8960403CX	31019	UHD-532/883C
5962-8960403DX	31019	UHC-532/883C

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
31019	Sprague Electric Company 115 Northeast Cutoff Worcester, MA 01607