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	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
Larry T. Gauder

CHECKED BY
Tim H. Noh

APPROVED BY
Monica L. Poelking

DRAWING APPROVAL DATE
92-02-19

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, BIPOLAR, LOW POWER SCHOTTKY, TTL, DUAL CARRY SAVE FULL ADDERS MONOLITHIC SILICON

SIZE	CAGE CODE	5962-90541
A	67268	

SHEET 1

DESC FORM 193
SEP 87

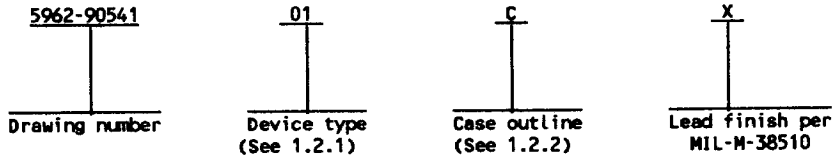
* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E224

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 or Identifying Number (PIN). The complete PIN shall be as shown in the following example:



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

Device type	Generic number	Circuit function
01	54LS183	Dual carry-save full adders

1.2.2 Case outline(s). The case outline(s) 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-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 (V_{CC})	-0.5 V dc to +7.0 V dc
DC input voltage	-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) 1/	94 mW
Lead temperature (soldering, 10 seconds)	+300°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.

Supply voltage range (V_{CC})	+4.5 V dc to +5.5 V dc
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.7 V dc
Maximum high level output current (I_{OH})	-400 µA
Maximum low level output current (I_{OL})	+4 mA
Case operating temperature range (T_C)	-55°C to +125°C

1/ Maximum power dissipation is defined as V_{CC} x I_{CC}, and must withstand the added P_D due to short circuit output test, e.g., I_{OS}.

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 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

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

3.2.4 Test circuit and switching waveforms. The test circuit and switching waveforms shall be as specified on figure 3.

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 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.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN 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 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.

TABLE I. Electrical performance characteristics

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Group A subgroups	Limits		Unit
					Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, I_{OH} = -400 µA, V_{IH} = 2 V, V_{IL} = 0.7 V		1,2,3	2.5		V
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, I_{OL} = 4 mA, V_{IH} = 2.0 V, V_{IL} = 0.7 V		1,2,3		0.4	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_{IN} = -18 mA		1,2,3		-1.5	V
High level input current	I_{IH1}	V_{CC} = 5.5 V	V_{IN} = 7.0 V	1,2,3		300	µA
	I_{IH2}		V_{IN} = 2.7 V			60	
Low level input current	I_{IL}	V_{CC} = 5.5 V,	V_{IN} = 0.4 V	1,2,3		-1.2	mA
Short circuit output current 1/	I_{OS}	V_{CC} = 5.5 V		1,2,3	-20	-100	mA
Supply current 2/	I_{CCH}	V_{CC} = 5.5 V	Outputs high	1,2,3		14	mA
	I_{CCL}		Outputs low			17	
Functional tests		See 4.3.1c V_{CC} = 5.0 V		7,8			

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Propagation delay time from any input to any output	t_{PLH1}	V_{CC} = 5.0 V 3/ C_L = 15 pF, R_L = 2 kΩ, see figure 3	9		15	ns
			10,11		21	
Propagation delay time from any input to any output	t_{PHL1}		9		33	ns
			10,11		47	
Propagation delay time from any input to any output	t_{PLH2}	V_{CC} = 5.0 V 3/ C_L = 50 pF, R_L = 2 kΩ, see figure 3	9		18	ns
			10,11		25	
Propagation delay time from any input to any output	t_{PHL2}		9		36	ns
			10,11		50	

1/ Not more than one output will be tested at one time and duration of the short circuit shall not exceed 1 second.

2/ I_{CCH} is measured with all outputs open and all inputs at 4.5 V. I_{CCL} is measured with all outputs open and all inputs grounded.

3/ Testing may be performed using either C_L = 15 pF or C_L = 50 pF; however, the manufacturer shall certify that the microcircuits meet the switching test limits specified for a 50 pF load.

Device type	01	
Case outlines	C and D	2
Terminal number	Terminal symbol	
1	1A	NC
2	NC	1A
3	1B	NC
4	$1C_n$	1B
5	$1\Sigma^{n+1}$	NC
6	$1C_{n+1}$	$1C_n$
7	GND	NC^n
8	2Σ	$1C_{n+1}$
9	NC	$1\Sigma^{n+1}$
10	$2C_{n+1}$	GND
11	$2C^n$	NC
12	2B	2Σ
13	2A	NC
14	V_{CC}	$2C_{n+1}$
15	---	NC^{n+1}
16	---	$2C_n$
17	---	NC^n
18	---	2B
19	---	2A
20	---	V_{CC}

NC - No internal connection

FIGURE 1. Terminal connections.

Inputs			Outputs	
C_n	B	A	Σ	C_{n+1}
L	L	L	L	L
L	L	H	H	L
L	H	L	H	L
L	H	H	L	H
H	L	L	H	L
H	L	H	L	H
H	H	L	L	H
H	H	H	H	H

H = High voltage level
L = Low voltage level

FIGURE 2. Truth table.

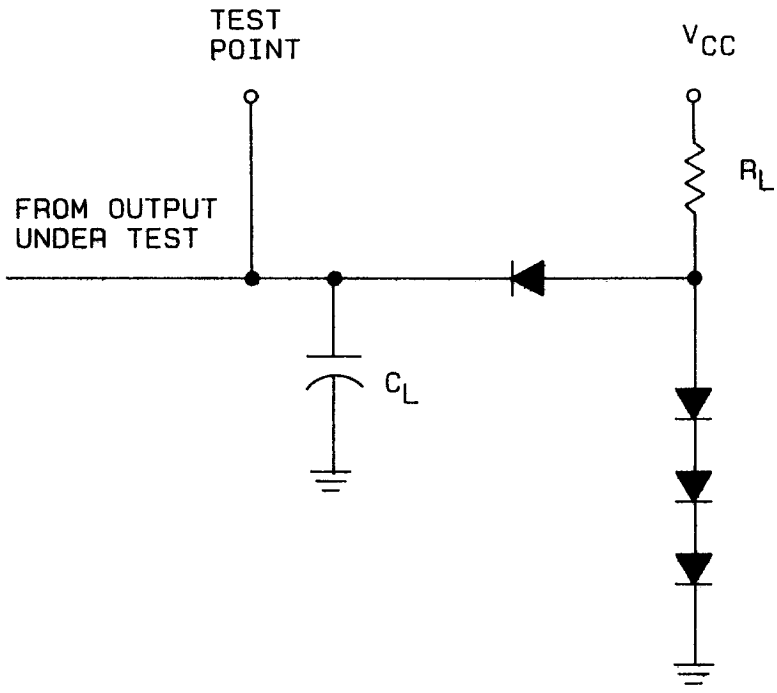
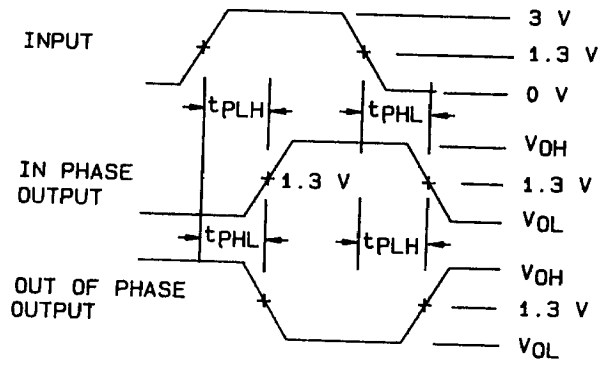


FIGURE 3. Test circuit and switching waveforms.



NOTES:

1. The pulse generator shall have the following characteristics: PRR ≤ 1 MHz, t_r ≤ 15 ns, t_f ≤ 6 ns.
2. C_L includes probe and jig capacitance.
3. All diodes are 1N3064 or equivalent.

FIGURE 3. Test circuit 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)	---
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
Group C and D end-point electrical parameters (method 5005)	1,2,3

*PDA applies to subgroup 1.
** Subgroups 10 and 11 shall be guaranteed but not tested.

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 include verification of 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 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 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. 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.