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

REV																									
SHEET																									
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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

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DRAWING APPROVAL DATE: 91-05-08

REVISION LEVEL:

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, BIPOLAR, OCTAL BUS TRANSCEIVER WITH THREE-STATE NONINVERTING OUTPUTS, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-90506
A	67268	

SHEET 1

DESC FORM 193
SEP 87

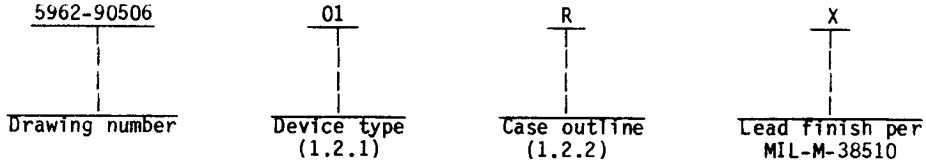
* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

5962-E1777

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	54F623	Octal bus transceiver with three-state noninverting outputs
02	54F621	Octal bus transceiver with open-collector noninverting outputs

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
R	D-8 (20-lead, 1.060" x .310" x .200"), dual-in-line package
S	F-9 (20-lead, .540" x .300" x .100"), flat package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings. 1/

Supply voltage range (V_{CC})	-0.5 V dc to +7.0 V dc
DC input voltage	-1.2 V dc at -18 mA to +7.0 V dc
Voltage applied to a disabled three-state output	-0.5 V dc to +5.5 V dc
Voltage applied to any output in the high state	-0.5 V dc to V_{CC}
Input current range	-30 mA to +5.0 mA
Current into any output in the low state:	
(Any A)	40 mA
(Any B)	96 mA
Storage temperature range	-65°C to +150°C
Maximum power dissipation (P_D) 2/	770 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/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

2/ Maximum power dissipation is defined as V_{CC} * I_{CC}, and must withstand the added P_D due to the short-circuit output test for device 01; e.g., I_{OS}.

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})	0.8 V dc
Maximum input clamp current (I_{IC})	-18 mA
Maximum high level output current (I_{OH}) (Device 01):	
(Any A)	-3 mA
(Any B)	-12 mA
Maximum high level output voltage (V_{OH}):	
(Device 02)	5.5 V
Maximum low level output current (I_{OL}):	
(Any A)	20 mA
(Any B)	48 mA
Case operating temperature range (T_C)	-55°C to +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

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 connection(s). The terminal connection(s) shall be as specified on figure 1.

3.2.2 Truth table(s). The truth table(s) shall be as specified on figure 2.

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

3.2.4 Case outline(s). The case outline(s) 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 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.

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.

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.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Group A sub-groups	Device type	Limits Min	Limits Max	Unit
High level output voltage (any A)	V_{OH}	V_{CC} = 4.5 V, V_{IH} = 2.0 V, V_{IL} = 0.8 V	I_{OH} = -1 mA	1,2,3	01	2.5		V
			I_{OH} = -3 mA			2.4		
High level output voltage (any B)			I_{OH} = -3 mA			2.4		
			I_{OH} = -12 mA			2.0		
High level output current	I_{OH}	V_{CC} = 4.5 V, V_{OH} = 5.5 V		1,2,3	02		0.1	mA
Low level output voltage (any A)	V_{OL}	V_{CC} = 4.5 V, V_{IH} = 2.0 V, V_{IL} = 0.8 V	I_{OL} = 20 mA,	1,2,3	01,02		0.5	V
Low level output voltage (any B)			I_{OL} = 48 mA,				0.55	
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_{IN} = -18 mA		1,2,3	01,02		-1.2	V
High level input current	I_{IH1}	V_{CC} = 5.5 V	V_{IN} = 5.5 V A and B	1,2,3	01,02		1.0	mA
			V_{IN} = 7.0 V GAB or $\overline{GBA}$				0.1	
	I_{IH2}		V_{IN} = 2.7 V A and B 1/				70	µA
			V_{IN} = 2.7 V GAB or $\overline{GBA}$				20	
Low level input 1/ current (A and $\overline{B}$)	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0.5 V		1,2,3	01		-.7	mA
					02		-.65	
Low level input current (GAB or $\overline{GBA}$)					01,02		-.6	
Output current (any A)	I_{OS}	V_{CC} = 5.5 V, V_{OUT} = 0.0 V 2/		1,2,3	01	-60	-150	mA
Output current (any B)						-100	-225	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C < T_C < +125°C$ unless otherwise specified		Group A subgroups	Device type	Limits Min	Limits Max	Unit
Supply current	I_{CCH}	V_{CC} = 5.5 V	$\overline{GBA}$ = GAB = 4.5 V A1-A8 = 4.5 V	1,2,3	01,02		140	mA
	I_{CCL}		$\overline{GBA}$ = GAB = 4.5 V A1-A8 = GND		01,02		140	
	I_{CCZ}		GAB = GND $\overline{GBA}$ = A1-A8 = 4.5 V		01		130	
Functional tests		See 4.3.1c, V_{CC} = 4.5 and 5.5 V		7,8	01,02			
Propagation delay time, A to B	t_{PLH1}	C_L = 50 pF $R_1 = R_2$ = 500Ω See figure 3	V_{CC} = 5.0 V	9	01	1.2	5.5	ns
			V_{CC} = 4.5 and 5.5 V	10,11		1.1	7.0	
	t_{PHL1}		V_{CC} = 5.0 V	9		2.2	7.0	
			V_{CC} = 4.5 and 5.5 V	10,11		1.6	8.0	
Propagation delay time, B to A	t_{PLH2}		V_{CC} = 5.0 V	9		1.2	5.5	
			V_{CC} = 4.5 and 5.5 V	10,11		1.1	7.5	
	t_{PHL2}		V_{CC} = 5.0 V	9		1.7	6.5	
			V_{CC} = 4.5 and 5.5 V	10,11		1.6	8.0	
Output enable time, $\overline{GBA}$ to A	t_{PZH1}		V_{CC} = 5.0 V	9		3.1	10.5	
			V_{CC} = 4.5 and 5.5 V	10,11		2.7	13.5	
	t_{PZL1}		V_{CC} = 5.0 V	9		2.8	9.5	
			V_{CC} = 4.5 and 5.5 V	10,11		2.5	11.0	
Output disable time, $\overline{GBA}$ to A	t_{PHZ1}		V_{CC} = 5.0 V	9		1.7	6.5	
			V_{CC} = 4.5 and 5.5 V	10,11		1.6	10.0	
	t_{PLZ1}		V_{CC} = 5.0 V	9		1.7	6.5	
			V_{CC} = 4.5 and 5.5 V	10,11		1.5	7.5	

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	Device type	Limits		Unit
						Min	Max	
Output enable time, GAB to B	t_{PZH2}	C_L = 50 pF $R_1 = R_2$ = 500Ω, See figure 3	V_{CC} = 5.0 V	9	01	2.8	10.0	ns
			V_{CC} = 4.5 and 5.5 V	10, 11		2.7	12.5	
	t_{PZL2}		V_{CC} = 5.0 V	9		2.8	9.0	
			V_{CC} = 4.5 and 5.5 V	10, 11		2.8	10.0	
Output disable time, GAB to B	t_{PHZ2}		V_{CC} = 5.0 V	9		2.2	8.5	
			V_{CC} = 4.5 and 5.5 V	10, 11		1.9	11.5	
	t_{PLZ2}		V_{CC} = 5.0 V	9		3.2	9.0	
			V_{CC} = 4.5 and 5.5 V	10, 11		3.1	11.0	
Propagation delay time, A to B	t_{PLH1}		V_{CC} = 5.0 V	9	02	6.0	12.0	
			V_{CC} = 4.5 and 5.5 V	10, 11		5.5	13.0	
	t_{PHL1}		V_{CC} = 5.0 V	9		2.5	8.0	
			V_{CC} = 4.5 and 5.5 V	10, 11		2.0	8.5	
Propagation delay time, B to A	t_{PLH2}		V_{CC} = 5.0 V	9		6.0	12.0	
			V_{CC} = 4.5 and 5.5 V	10, 11		5.5	12.5	
	t_{PHL2}		V_{CC} = 5.0 V	9		2.5	7.5	
			V_{CC} = 4.5 and 5.5 V	10, 11		2.0	8.0	
Propagation delay time, $\overline{GBA}$ to A	t_{PLH3}		V_{CC} = 5.0 V	9		6.0	13.5	
			V_{CC} = 4.5 and 5.5 V	10, 11		5.5	14.0	
	t_{PHL3}		V_{CC} = 5.0 V	9		3.5	10.5	
			V_{CC} = 4.5 and 5.5 V	10, 11		2.5	11.0	
Propagation delay time, GAB to A	t_{PLH4}		V_{CC} = 5.0 V	9		7.0	15.0	
			V_{CC} = 4.5 and 5.5 V	10, 11		6.0	17.0	
	t_{PHL4}		V_{CC} = 5.0 V	9		3.5	9.5	
			V_{CC} = 4.5 and 5.5 V	10,11		3.0	10.0	

1/ For I/O ports, the parameters I_{IH2} and I_{IL} include the off-state output current (I_{OZH} and I_{OZL}).
2/ Not more than one output will be tested at one time and duration of the test condition shall not exceed 1 second.

Device types	01 and 02
Case outlines	R, S, and 2
Terminal number	Terminal symbol
1	GAB
2	A1
3	A2
4	A3
5	A4
6	A5
7	A6
8	A7
9	A8
10	GND
11	B8
12	B7
13	B6
14	B5
15	B4
16	B3
17	B2
18	B1
19	$\overline{GBA}$
20	V_{CC}

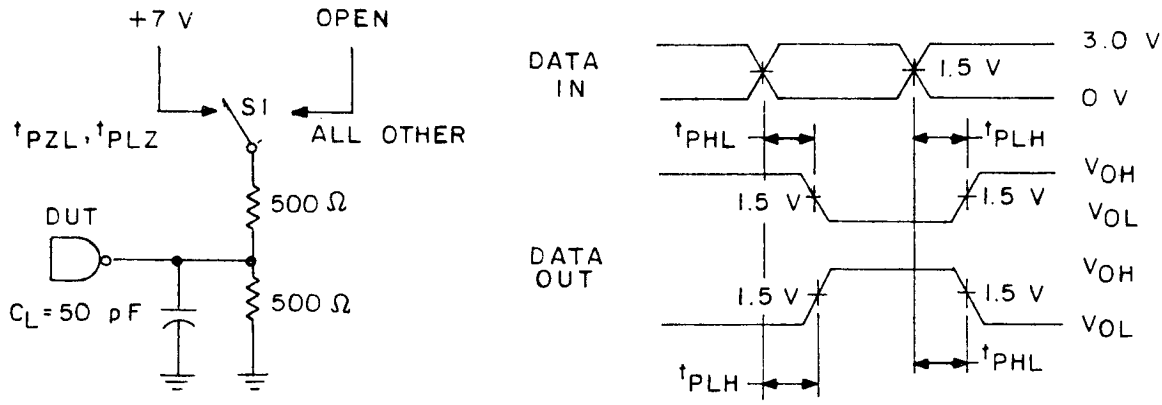
FIGURE 1. Terminal connections.

Devices 01 and 02

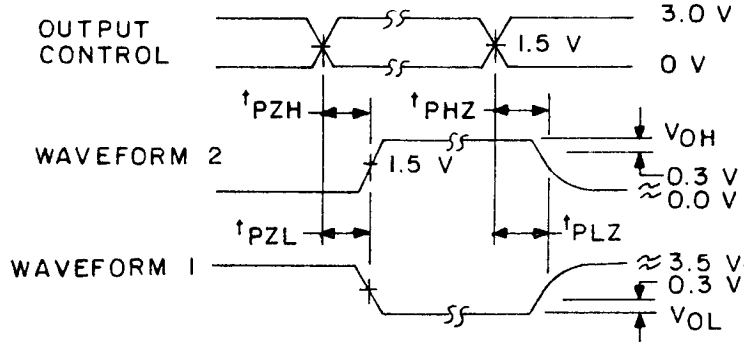
Enable inputs		Operation
$\overline{GBA}$	GAB	
L	L	B data to A bus
H	H	A data to B bus
H	L	Isolation
L	H	B data to A bus, A data to B bus

H = High voltage level
L = Low voltage level

FIGURE 2. Truth table.



Propagation delay time



Three-state output high and
low enable and disable times

NOTES:
1. C_L includes probe and jig capacitance.
2. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
   Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
3. All input pulses have the following characteristics: PRR = 1 MHz, t_r = t_f = 2.5 ns, duty cycle = 50 percent.
4. When measuring propagation delay times of three-state outputs, switch S1 is open.
5. When measuring pulse widths t_r = t_f < 1 ns.
6. The outputs are measured one at a time with one input transition per measurement.

FIGURE 3. Test circuit and switching waveforms.

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.