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

REV																									
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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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REVISION LEVEL:

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCED SCHOTTKY, BUS TRANSCEIVERS, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-88687
A	67268	

SHEET 1 OF 11

DESC FORM 193
SEP 87

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

5962-E965

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:

5962-88687	01	K	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

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

Device type	Generic number	Circuit function
01	54AS652	Octal bus transceivers and registers, noninverting, three-state

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
K	F-6 (24-lead, .640" x .420" x .090"), flat package
L	D-9 (24-lead, 1.280" x .310" x .200"), dual-in-line package
3	C-4 (28-terminal, 0.460" x 0.460" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc minimum to +7.0 V dc maximum
Input voltage range:	
Control inputs	-1.2 V at -18 mA to +7.0 V
I/O ports	-1.2 V at -18 mA to +5.5 V
Storage temperature range	-65°C to +150°C
Maximum power dissipation, P_D 1/	1160.5 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 minimum to +5.5 V dc maximum.
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Case operating temperature range (T_C)	-55°C to +125°C
Pulse duration (t_w):	
CBA or CAB high	6.0 ns minimum
CBA or CAB low	7.0 ns minimum
Setup time before CAB rising or CBA rising (t_s)	7.0 ns minimum
Hold time after CAB rising or CBA rising (t_h)	0 ns minimum

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

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 Test circuit and switching waveforms. The test circuit and switching waveforms shall be as specified 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, 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.

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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ unless otherwise specified		Group A subgroups	Limits Min	Limits Max	Unit
High level output voltage	V_{OH}	V_{CC} = 4.5 V, V_{IL} = 0.8 V, V_{IH} = 2.0 V 2/	I_{OH} = -2.0 mA	1, 2, 3	2.5		V
			I_{OH} = -3.0 mA		2.4		
			I_{OH} = -12 mA		2.0		
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, V_{IL} = 0.8 V, V_{IH} = 2.0 V, I_{OL} = 32 mA 2/		1, 2, 3		0.5	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V,	I_{IN} = -18 mA	1, 2, 3		-1.2	V
Low level input current	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0.4 V	Control inputs	1,2,3		-0.5	mA
			A or B ports			-0.75	
		Unused inputs = 4.5 V					
High level input current	I_{IH}	V_{CC} = 5.5 V, V_{IN} = 2.7 V, Unused inputs = 0.0 V	Control inputs	1,2,3		20	µA
			A or B ports			70	
	I_{IH2}	V_{CC} = 5.5 V, Unused inputs = 0.0 V	V_{IN} = 7.0 V Control inputs	1, 2, 3		0.1	mA
			V_{IN} = 5.5 V A or B ports			0.1	
Output current	I_O	V_{CC} = 5.5 V, V_{OUT} = 2.25 V 3/		1, 2, 3	-30	-112	mA
Supply current	I_{CC}	V_{CC} = 5.5 V	Outputs high	1, 2, 3		195	mA
			Outputs low			211	
			Outputs disabled			211	
Functional tests		See 4.3.1c	4/	7, 8			

See footnotes at end of table.

TABLE I. Electrical performance characterisics - Continued.

Test	Symbol	Conditions 1/ $-55°C \le T_C \le +125°C$ unless otherwise specified	Group A subgroups	Limits		Unit
				Min	Max	
Maximum clock frequency 5/	f_{MAX}	V_{CC} = 4.5 V to 5.5 V C_L = 50 pF R_1 = 500Ω R_2 = 500Ω 6/ See figure 3	9, 10, 11	75		MHz
Propagation delay time, from CBA or CAB to A or B	t_{PLH1}		9, 10, 11	2	9.5	ns
	t_{PHL1}		9, 10, 11	2	10	ns
Propagation delay time, from A or B to B or A	t_{PLH2}		9, 10, 11	2	11	ns
	t_{PHL2}		9, 10, 11	1	8	ns
Propagation delay time, from SBA or SAB to A or B 7/	t_{PLH3}		9, 10, 11	2	12	ns
	t_{PHL3}		9, 10, 11	2	10	ns
Output enable time, from $\overline{GBA}$ to A	t_{PZH1}		9, 10, 11	2	11	ns
	t_{PZL1}		9, 10, 11	3	18	ns
Output disable time, from $\overline{GBA}$ to A	t_{PHZ1}		9, 10, 11	2	10	ns
	t_{PLZ1}		9, 10, 11	2	10	ns
Output enable time, from GAB to B	t_{PZH2}		9, 10, 11	3	12	ns
	t_{PZL2}		9, 10, 11	3	20	ns
Output disable time, from GAB to B	t_{PHZ2}		9, 10, 11	2	11	ns
	t_{PLZ2}		9, 10, 11	2	12	ns

See footnotes on next page.

1/ Unused inputs that do not directly control the pin under test must be $\geq$ 2.5 V or $\leq$ 0.4 V, and shall not exceed 5.5 V or go less than 0.0 V. Inputs shall not be floated.

2/ All outputs must be tested. In the case where only one input at V_{IL} maximum or V_{IH} minimum produces the proper output state, the test must be performed with each input being selected as the V_{IL} maximum or V_{IH} minimum input.

3/ The output conditions have been chosen to produce a current that closely approximates one half of the true short circuit output current, I_{OS}. Not more than one output shall be tested at one time and the duration of the test condition shall not exceed one second.

4/ Functional tests shall be conducted at input test conditions of GND $\leq V_{IL} \leq V_{OL}$ and $V_{OH} \leq V_{IH} \leq V_{CC}$.

5/ This parameter shall be, as a minimum, tested initially and after any process or design changes which may affect the parameter, otherwise, it is guaranteed to the specified limits in table I for this device.

6/ Propagation delay limits are based on single output switching. Unused outputs = 3.5 V or $\leq$ 0.3 V.

7/ These parameters are measured with the internal output state of the storage registers opposite to that of the bus input.

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.

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 3.5 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.

Terminal number	Terminal symbol	
	Cases L and K	Case 3
1	CAB	NC
2	SAB	CAB
3	GAB	SAB
4	A1	GAB
5	A2	A1
6	A3	A2
7	A4	A3
8	A5	NC
9	A6	A4
10	A7	A5
11	A8	A6
12	GND	A7
13	B8	A8
14	B7	GND
15	B6	NC
16	B5	B8
17	B4	B7
18	B3	B6
19	B2	B5
20	B1	B4
21	$\overline{GBA}$	B3
22	SBA	NC
23	CBA	B2
24	V_{CC}	B1
25	---	$\overline{GBA}$
26	---	SBA
27	---	CBA
28	---	V_{CC}

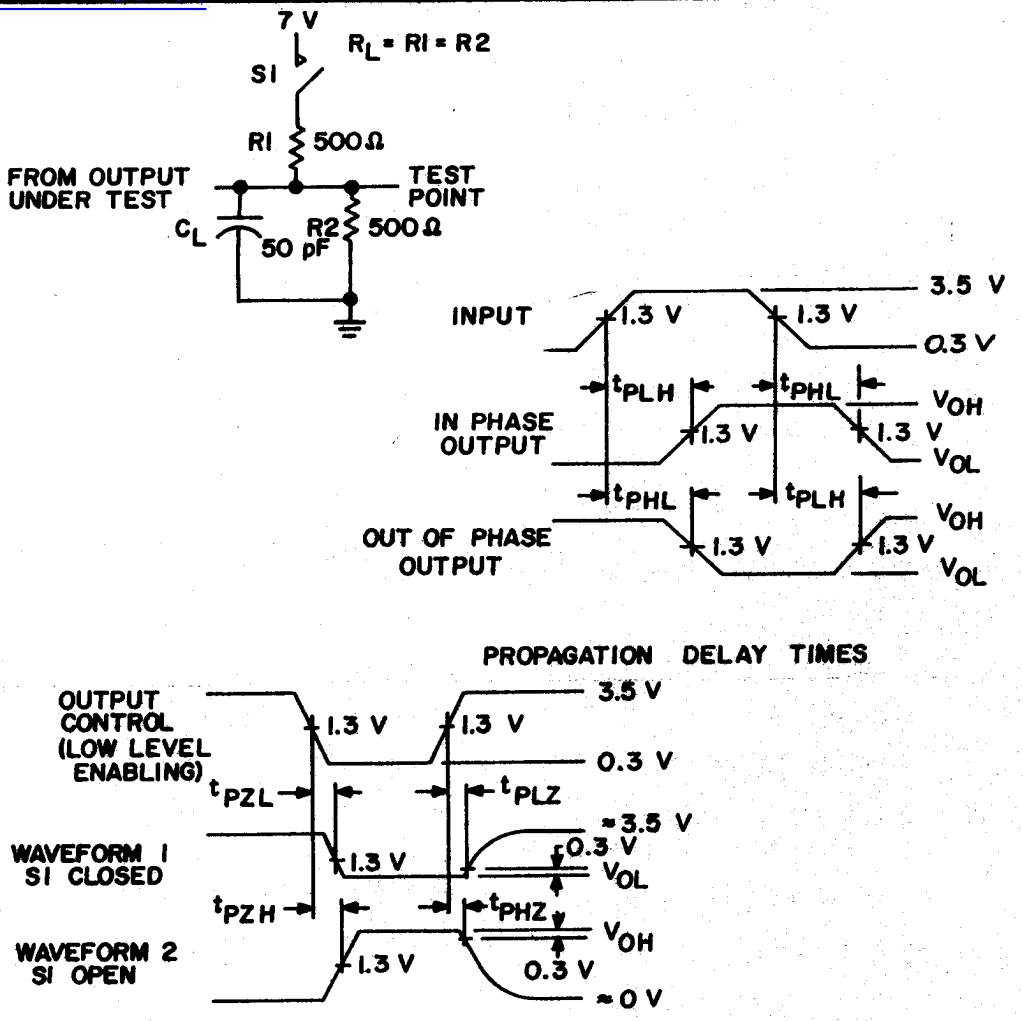
NC = No connection

FIGURE 1. Terminal connections.

Inputs						Data I/O		Operation or function
GAB	$\overline{GBA}$	CAB	CBA	SAB	SBA	A1 thru A8	B1 thru B8	
L	H	H or L	H or L	X	X	Input	Input	Isolation
L	H	↑	↑	X	X			Store A and B data
X	H	↑	H or L	X	X	Input	Unspecified*	Store A, Hold B
H	H	↑	↑	X**	X	Input	Output	Store A in both registers
L	X	H or L	↑	X	X	Unspecified*	Input	Hold A, store B
L	L	↑	↑	X	X**	Output	Input	Store B in both registers
L	L	X	X	X	L	Output	Input	Real-time B data to A bus
L	L	X	H or L	X	H			Stored B data to A bus
H	H	X	X	L	X	Input	Output	Real-time A data to B bus
H	H	H or L	X	H	X			Stored A data to B bus
H	L	H or L	H or L	H	H	Output	Output	Stored A data to B bus and stored B data to A bus

H = High voltage level
L = Low voltage level
X = Irrelevant
↑ = Transition from low to high level
* = The data output functions may be enabled or disabled by various signals at the GAB or $\overline{GBA}$ inputs. Data input functions are always enabled, i.e., data at the bus pins will be stored on every low-to-high transition on the clock inputs.
** = Select control = L; clocks can occur simultaneously.
Select control = H; clocks must be staggered in order to load both registers.

FIGURE 2. Truth table.



PROPAGATION DELAY TIMES

ENABLE AND DISABLE TIMES, THREE STATE OUTPUTS

NOTES:
1. C_L includes probe and jig capacitance.
2. When measuring propagation delay items of three-state outputs, switch S1 is open.
3. 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.
4. All input pulses have the following characteristics: PRR $\leq$ 1 MHz, t_r = t_f = 2 ns, duty cycle = 50 percent.
5. The outputs are measured one at a time with one input transition per measurement.

FIGURE 3. Test circuit and switching waveforms.

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
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

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 verify the truth table as specified on figure 2 herein.

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 3.5 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 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/
5962-8868701KX	01295	SNJ54AS652W
5962-8868701LX	01295	SNJ54AS652JT
5962-88687013X	01295	SNJ54AS652FK

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, Inc. P.O. Box 6448 Midland, TX 79701