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				

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
93-03-22

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCED SCHOTTKY TTL, HEX BUFFER/DRIVER WITH THREE-STATE OUTPUTS, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-89857
A	67268	

SHEET 1 OF 10

DESC FORM 193
JUL 91

5962-E160-93

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 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	54F367	Hex buffer/driver with three-state outputs

1.2.2 Case outline(s). The case outline(s) shall be as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
2	CQCC1-N20	20	Square chip carrier

1.2.3 Lead finish. The lead finish shall be as specified in MIL-M-38510. Finish letter "X" shall not be marked on the microcircuit or its packaging. The "X" designation is for use in specifications when lead finishes A, B, and C are considered acceptable and interchangeable without preference.

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc minimum to +7.0 V dc maximum
Input voltage range	-0.5 V dc minimum to +7.0 V dc maximum
Input current range	-30.0 mA to +5.0 mA
Voltage applied to output in high output state range	-0.5 V to +5.5 V
Current applied to output in low output state	96 mA
Storage temperature range	-65°C to +150°C
Thermal resistance, junction-to-case (Θ_{JC})	See MIL-STD-1835
Junction temperature (T_J)	+175°C
Lead temperature (soldering, 10 seconds)	+300°C
Maximum power dissipation (P_D) 1/	341.0 mW

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
Maximum input clamp current (I_{IK})	-18 mA
Maximum high level output current (I_{OH})	-12 mA
Maximum low level output current (I_{OL})	48 mA
Case operating temperature range (T_C)	-55°C to +125°C

1/ 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_{OS}.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and bulletin. Unless otherwise specified, the following specification, standards, 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.

STANDARDS

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.
MIL-STD-1835 - Microcircuit Case Outlines.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standards, 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 outline(s). The case outline(s) 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 Logic diagram. The logic diagram shall be as specified on figure 3.

3.2.5 Test circuit and switching waveforms. The test circuit and switching waveforms shall be as specified on figure 4.

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-EC 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ $+4.5\ V \le V_{CC} \le +5.5\ V$ unless otherwise specified		Group A Subgroups	Limits		Unit
					Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V V_{IL} = 0.8 V V_{IH} = 2.0 V	I_{OH} = -1 mA	1, 2, 3	2.5		V
			I_{OH} = -3 mA	1, 2, 3	2.4		
			I_{OH} = -12 mA	1, 2, 3	2.0		
Low level output voltage	V_{OL}		I_{OL} = 48 mA	1, 2, 3		0.5	
Input clamp voltage	V_{IK}	V_{CC} = 4.5 V, I_{IN} = -18 mA		1, 2, 3		-1.2	
High level input current	I_{IH1}	V_{CC} = 5.5 V, V_{IN} = 2.7 V		1, 2, 3		20	µA
	I_{IH2}	V_{CC} = 0.0 V, V_{IN} = 7.0 V		1, 2, 3		100	
Low level input current	I_{IL}	V_{CC} = 5.5 V, V_{IN} = 0.5 V		1, 2, 3		-20	
Off-state output current, high level voltage applied	I_{OZH}	V_{CC} = 5.5 V V_{IH} = 2.0 V	V_{OUT} = 2.7 V	1, 2, 3		50	
Off-state output current, low level voltage applied	I_{OZL}		V_{OUT} = 0.5 V	1, 2, 3		-50	
Short circuit output 1/ current	I_{OS}	V_{CC} = 5.5 V, V_{OUT} = 0.0 V		1, 2, 3	-100	-225	mA
Supply current (total)	I_{CCH}	V_{CC} = 5.5 V		1, 2, 3		35	
	I_{CCL}			1, 2, 3		62	
	I_{CCZ}			1, 2, 3		48	
Functional tests		See 4.3.1c, V_{CC} = 4.5 V, 5.5 V		7, 8			
Propagation delay time, I_n to Y_n	t_{PLH}	C_L = 50 pF R_L = 500Ω See figure 4	V_{CC} = 5.0 V	9	3.0	6.5	ns
			V_{CC} = 4.5 V, 5.5 V	10, 11	3.0	8.0	
	t_{PHL}		V_{CC} = 5.0 V	9	3.0	7.0	
			V_{CC} = 4.5 V, 5.5 V	10, 11	3.0	8.0	
Output enable time to high or low level	t_{PZH}		V_{CC} = 5.0 V	9	3.0	7.5	
			V_{CC} = 4.5 V, 5.5 V	10, 11	3.0	9.0	
	t_{PZL}		V_{CC} = 5.0 V	9	3.0	8.5	
			V_{CC} = 4.5 V, 5.5 V	10, 11	3.0	10.0	
Output disable time from high or low level	t_{PHZ}		V_{CC} = 5.0 V	9	2.5	6.5	
			V_{CC} = 4.5 V, 5.5 V	10, 11	2.5	7.5	
	t_{PLZ}		V_{CC} = 5.0 V	9	2.5	6.0	
			V_{CC} = 4.5 V, 5.5 V	10, 11	2.0	7.0	

1/ Not more than one output should be shorted at a time, and the duration of the short-circuit condition shall not exceed 1 second.

Device type	01	
Case outlines	E and F	2
Terminal number	Terminal symbol	
1	$\overline{OE}_1$	NC
2	I_0	$\overline{OE}_1$
3	Y_0	I_0
4	I_1	Y_0
5	Y_1	I_1
6	I_2	NC
7	Y_2	Y_1
8	GND	I_2
9	Y_3	Y_2
10	I_3	GND
11	Y_4	NC
12	I_4	Y_3
13	Y_5	I_3
14	I_5	Y_4
15	$\overline{OE}_2$	I_4
16	V_{CC}	NC
17	---	Y_5
18	---	I_5
19	---	$\overline{OE}_2$
20	---	V_{CC}

NC = No connection

FIGURE 1. Terminal connections.

Inputs		Outputs
$\overline{OE}_n$	I_n	Y_n
L	L	L
L	H	H
H	X	Z

H = High level voltage
L = Low level voltage
X = Don't care
Z = High impedance state

FIGURE 2. Truth table.

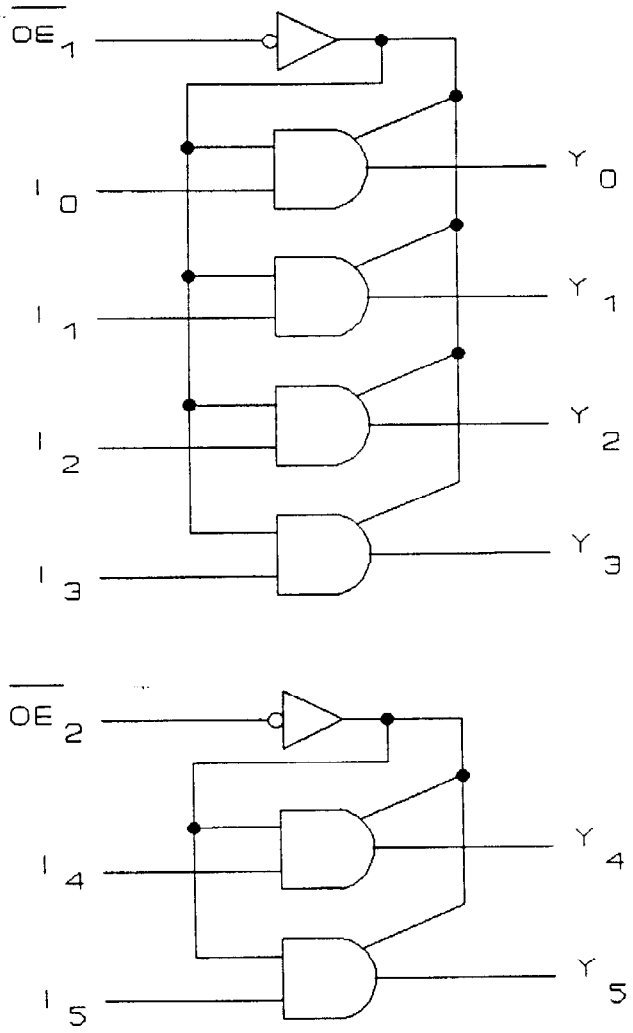
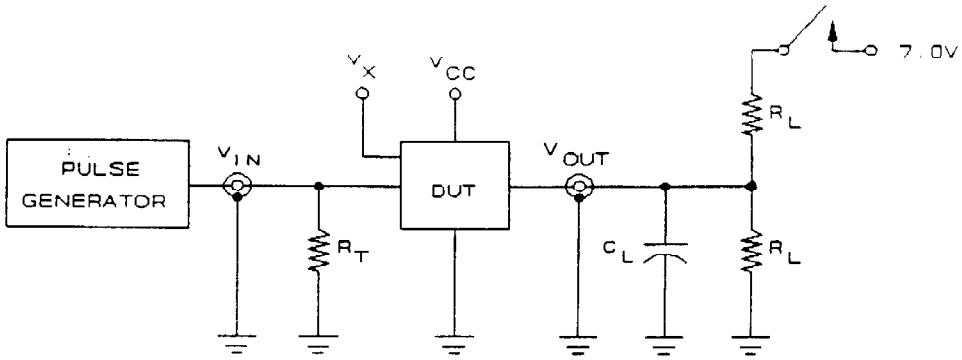
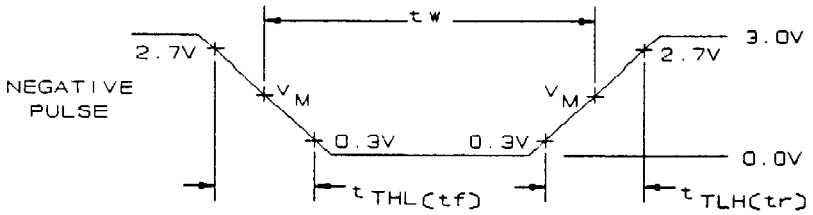


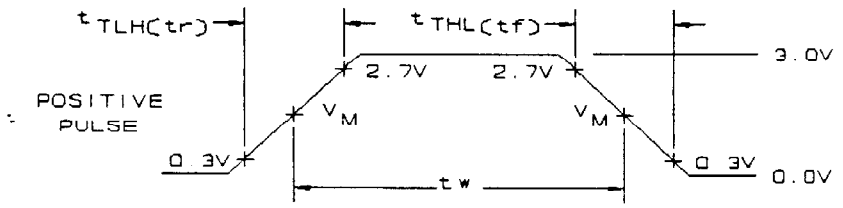
FIGURE 3. Logic diagram.

Test circuit



Input pulse definitions





Propagation delay time

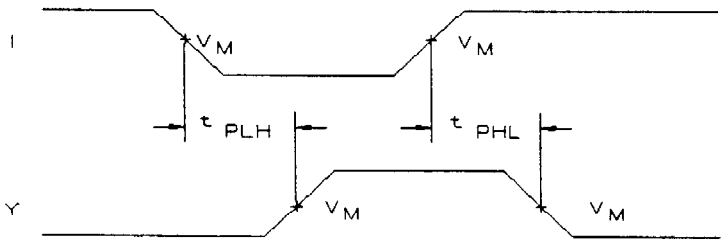


FIGURE 4. Test circuit and switching waveforms.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-89857
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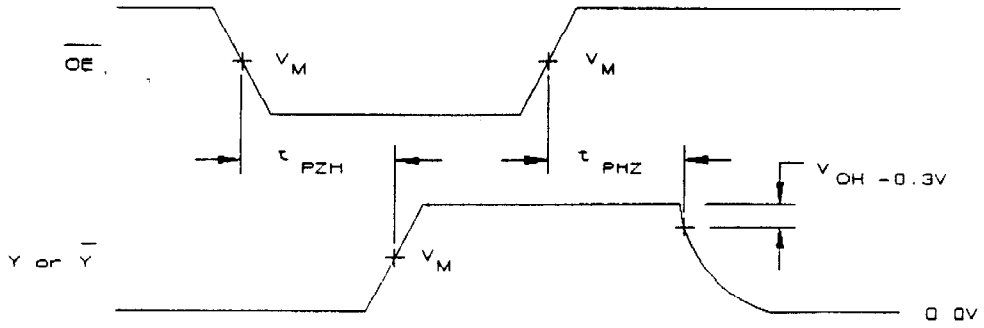
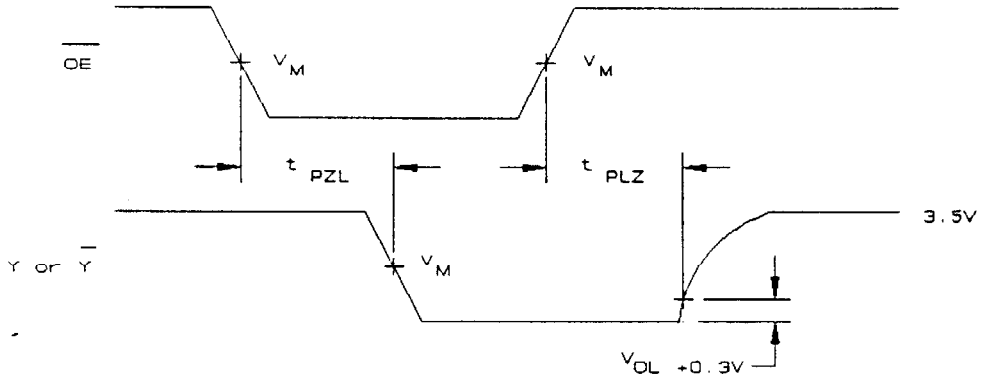
Three-state output enable time to high level
and output disable time from high level



Three-state output enable time to low level
and output disable time from low level



NOTES:
1. For all waveforms, V_M = 1.5 V.
2. R_L = Load resistor; see table I for value.
3. C_L = Load capacitance includes jig and probe capacitance; see table I for value.
4. R_T = Termination resistance should be equal to Z_{OUT} of pulse generator.
5. V_X = Unclocked pins must be held at ≤ 0.8 V, ≥ 2.7 V or open.
6. The switch is closed for t_{PLZ} and t_{PZL} tests and open for all other tests.
7. All input pulses have the following characteristics: PRR = 1 MHz, $t_{TLH} = t_{THL} \leq 2.5$ ns, t_w = 500 ns, duty cycle = 50 percent.

FIGURE 4. Test circuit and switching waveforms - Continued.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (in accordance with method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 7, 8, 9
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.

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-EC 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. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

(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 functionality of the device.

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. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

(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 original equipment manufacturer 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-EC, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-EC, Dayton, Ohio 45444, or telephone (513) 296-5377.

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-EC.

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 93-03-22

Approved sources of supply for SMD 5962-89857 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-EC. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor similar PIN 1/
5962-8985701EX	18324	54F367/BEA
5962-8985701FX	18324	54F367/BFA
5962-89857012X	18324	54F367/B2A

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
18324	Philips Semiconductors 811 East Arques Avenue Sunnyvale, CA 94088-3409

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in this information bulletin.