

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Corrections on table I. Editorial changes throughout.	92-04-06	<i>[Signature]</i>

REV																				
SHEET																				
REV																				
SHEET																				

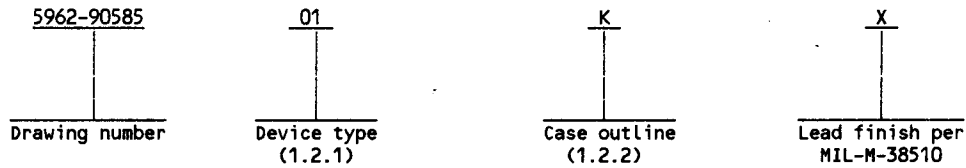
REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13		

PMIC N/A	PREPARED BY <i>Larry T. Pender</i>	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A	CHECKED BY <i>Tim H. Mohr</i>	MICROCIRCUIT, DIGITAL, BIPOLAR, ADVANCE SCHOTTKY TTL, MULTI-MODE BUFFERED LATCH, INV. (THREE-STATE), MONOLITHIC SILICON	
	APPROVED BY William K. Heckman	SIZE A	CAGE CODE 67268
	DRAWING APPROVAL DATE 90-07-11	5962-90585	
	REVISION LEVEL A	SHEET 1	OF 13

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. 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:

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>
01	54F432	Multi-mode buffered latch. INV. (three-state)

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510, and as follows:

<u>Outline letter</u>	<u>Case outline</u>
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, .460" x .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	-----	-0.5 v dc minimum to +7.0 V dc maximum
Input current range	-----	-30 mA to +5.0 mA
Voltage applied to output in high output state range	-----	-0.5 V to +V _{CC}
Current applied to output in low output state	-----	40 mA
Maximum power dissipation (P _D) ^{1/}	-----	385 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
Storage temperature	-----	-65°C to +150°C

1.4 Recommended operating conditions.

Supply voltage (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
Input clamp current	-----	-18 mA
High level output current		
INT	-----	-1.0 mA
Q0 to Q7	-----	-3.0 mA
Low-level output current	-----	20 mA
Case operating temperature range (T _C)	-----	-55°C to +125°C
Minimum setup time, Dn to S0, S1, STB or M:		
T _C = +25°C	-----	0 ns
T _C = -55°C, +125°C	-----	1.0 ns
Minimum hold time, Dn to S0, S1, STB or M: (H)		
T _C = +25°C	-----	9.0 ns
T _C = -55°C, +125°C	-----	9.5 ns
Minimum hold time, Dn to S0, S1, STB or M: (L)		
T _C = +25°C	-----	8.0 ns
T _C = -55°C, +125°C	-----	9.5 ns

^{1/} Must withstand the added P_D due to short circuit test; e.g., I_{OS}.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 2

Recommended operating conditions - Continued.

Minimum pulse width, $\overline{S0}$, S1, or STB:	
$T_C = +25^\circ\text{C}$ - - - - -	8.0 ns
$T_C = -55^\circ\text{C}, +125^\circ\text{C}$ - - - - -	9.0 ns
Minimum pulse width, MR	
$T_C = +25^\circ\text{C}$ - - - - -	8.0 ns
$T_C = -55^\circ\text{C}, +125^\circ\text{C}$ - - - - -	9.0 ns
Minimum recovery time	
$T_C = +25^\circ\text{C}$ - - - - -	0 ns
$T_C = -55^\circ\text{C}, +125^\circ\text{C}$ - - - - -	0 ns

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 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 tables. The truth tables 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. 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 3

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C 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		2.4		V
Low level output voltage	V _{OL}	V _{CC} = 4.5 V, V _{IL} = 0.8 V V _{IH} = 2.0 V, I _{OL} = 20 mA		1,2,3		0.5	V
Input clamp voltage	V _{IK}	V _{CC} = 4.5 V, I _{IK} = -18 mA		1,2,3		-1.2	V
Input current at maximum input voltage	I _{IN}	V _{CC} = 5.5 V, V _{IN} = 7.0 V		1,2,3		100	μA
High level input current	I _{IH}	V _{CC} = 5.5 V, V _{IN} = 2.7 V		1,2,3		20	μA
Low level input current	I _{IL}	V _{CC} = 5.5 V, V _{IN} = 0.5 V		1,2,3		-0.6	mA
Off-state output current, high level voltage applied	I _{OZH}	V _{CC} = 5.5 V, V _O = 2.7 V		1,2,3		50	μA
Off-state output current, low level voltage applied	I _{OZL}	V _{CC} = 5.5 V, V _O = 0.5 V		1,2,3		-50	μA
Short circuit output current 1/	I _{OS}	V _{CC} = 5.5 V, V _O = 0.0 V		1,2,3	-60	-150	mA
Supply current	I _{CCH}	V _{CC} = 5.5 V		1,2,3		55	mA
	I _{CCL}					70	
	I _{CCZ}					65	
Functional tests		See 4.3.1c, V _{CC} = 4.5 V, 5.5 V		7, 8			

See footnote at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-90585

REVISION LEVEL
A

SHEET

4

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Group A subgroups	Limits		Unit	
				Min	Max		
Propagation delay, Dn to Qn	t _{PLH1}	R _L = 500Ω C _L = 50 pF See figure 4	V _{CC} = 5.0 V	9	4.5	10.5	ns
			V _{CC} = 4.5 V and 5.5 V	10,11	4.0	13.0	
	t _{PHL1}		V _{CC} = 5.0 V	9	2.5	7.0	ns
	V _{CC} = 4.5 V and 5.5 V		10,11	2.5	6.0		
Propagation delay, S0, S1, or STB to Qn	t _{PLH2}	V _{CC} = 5.0 V	9	8.5	17.0	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	8.0	24.0		
	t _{PHL2}	V _{CC} = 5.0 V	9	6.0	13.0	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	5.5	14.0		
Propagation delay, S0 or S1 to INT	t _{PLH3}	V _{CC} = 5.0 V	9	3.0	9.5	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	2.5	10.5		
	t _{PHL3}	V _{CC} = 5.0 V	9	3.5	10.0	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	3.0	10.5		
Propagation delay, MR to Qn	t _{PLH4}	V _{CC} = 5.0 V	9	8.0	16.0	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	7.5	18.5		
Propagation delay, STB to INT	t _{PHL4}	V _{CC} = 5.0 V	9	7.0	13.5	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	6.5	14.5		

See footnote at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 5

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Group A subgroups	Limits		Unit	
				Min	Max		
Output enable time to high or low level S0 or S1 to Qn	t _{PZH1}	R _L = 500Ω C _L = 50 pF See figure 4	V _{CC} = 5.0 V	9	6.0	12.5	ns
			V _{CC} = 4.5 V and 5.5 V	10,11	5.5	15.5	
	t _{PZL1}		V _{CC} = 5.0 V	9	6.0	14.0	ns
	V _{CC} = 4.5 V and 5.5 V		10,11	5.5	15.0		
Output disable time from high or low level S0 or S1 to Qn	t _{PHZ2}	V _{CC} = 5.0 V	9	4.0	11.5	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	3.5	12.5		
	t _{PLZ2}	V _{CC} = 5.0 V	9	6.0	15.0	ns	
	V _{CC} = 4.5 V and 5.5 V	10,11	5.5	17.0			
Output enable time to high or low level M to Qn	t _{PZH3}	V _{CC} = 5.0 V	9	5.0	11.0	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	4.5	12.0		
	t _{PZL3}	V _{CC} = 5.0 V	9	6.0	11.5	ns	
	V _{CC} = 4.5 V and 5.5 V	10,11	5.5	13.0			
Output disable time from high or low level M to Qn	t _{PHZ4}	V _{CC} = 5.0 V	9	3.5	9.5	ns	
		V _{CC} = 4.5 V and 5.5 V	10,11	3.0	10.5		
	t _{PLZ4}	V _{CC} = 5.0 V	9	6.0	13.0	ns	
	V _{CC} = 4.5 V and 5.5 V	10,11	5.5	15.0			

1/ Not more than one output should be shorted at a time. For testing I_{OS}, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a HIGH output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-90585

REVISION LEVEL
A

SHEET
6

Case outlines	K and L	3
Terminal number	Terminal connections	
1	<u>S0</u>	<u>NC</u>
2	M	<u>S0</u>
3	<u>D0</u>	M
4	<u>Q0</u>	<u>D0</u>
5	<u>D1</u>	<u>Q0</u>
6	<u>Q1</u>	<u>D1</u>
7	<u>D2</u>	<u>Q1</u>
8	<u>Q2</u>	<u>NC</u>
9	<u>D3</u>	<u>D2</u>
10	<u>Q3</u>	<u>Q2</u>
11	STB	<u>D3</u>
12	GND	<u>Q3</u>
13	<u>S1</u>	STB
14	<u>MR</u>	GND
15	<u>Q4</u>	<u>NC</u>
16	<u>D4</u>	<u>S1</u>
17	<u>Q5</u>	<u>MR</u>
18	<u>D5</u>	<u>Q4</u>
19	<u>Q6</u>	<u>D4</u>
20	<u>D6</u>	<u>Q5</u>
21	<u>Q7</u>	<u>D5</u>
22	<u>D7</u>	<u>NC</u>
23	INT	<u>Q6</u>
24	<u>V_{CC}</u>	<u>D6</u>
25	---	<u>Q7</u>
26	---	<u>D7</u>
27	---	INT
28	---	<u>V_{CC}</u>

FIGURE 1. Terminal connections.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 7

Data latches function table.

Inputs					Data	Data	Operating
\overline{MR}	M	\overline{SO}	S1	STB	In	Out	Mode
L	H	H	X	X	X	H	Clear
L	L	L	H	L	X	H	
X	L	X	L	X	X	Z	De-select
X	L	H	X	X	X	Z	
H	H	H	X	X	X	\overline{QO}	Hold
H	L	L	H	L	X	QO	
H	H	L	H	X	L	H	Data Bus
H	H	L	H	X	H	L	
H	L	L	H	H	L	H	Data Bus
H	L	L	H	H	H	L	

H = High voltage level
 L = Low voltage level
 X = Irrelevant
 Z = High impedance

Status flip-flop function table

Inputs				Output
\overline{MR}	\overline{SO}	S1	STB	\overline{INT}
L	H	X	X	H
L	X	L	X	H
H	X	X	↓	L
H	L	H	X	L

H = High voltage level
 L = Low voltage level
 X = Irrelevant
 ↓ = High-to-Low clock transition

FIGURE 2. Truth tables.

STANDARDIZED
 MILITARY DRAWING
 DEFENSE ELECTRONICS SUPPLY CENTER
 DAYTON, OHIO 45444

SIZE
 A

5962-90585

REVISION LEVEL
 A

SHEET
 8

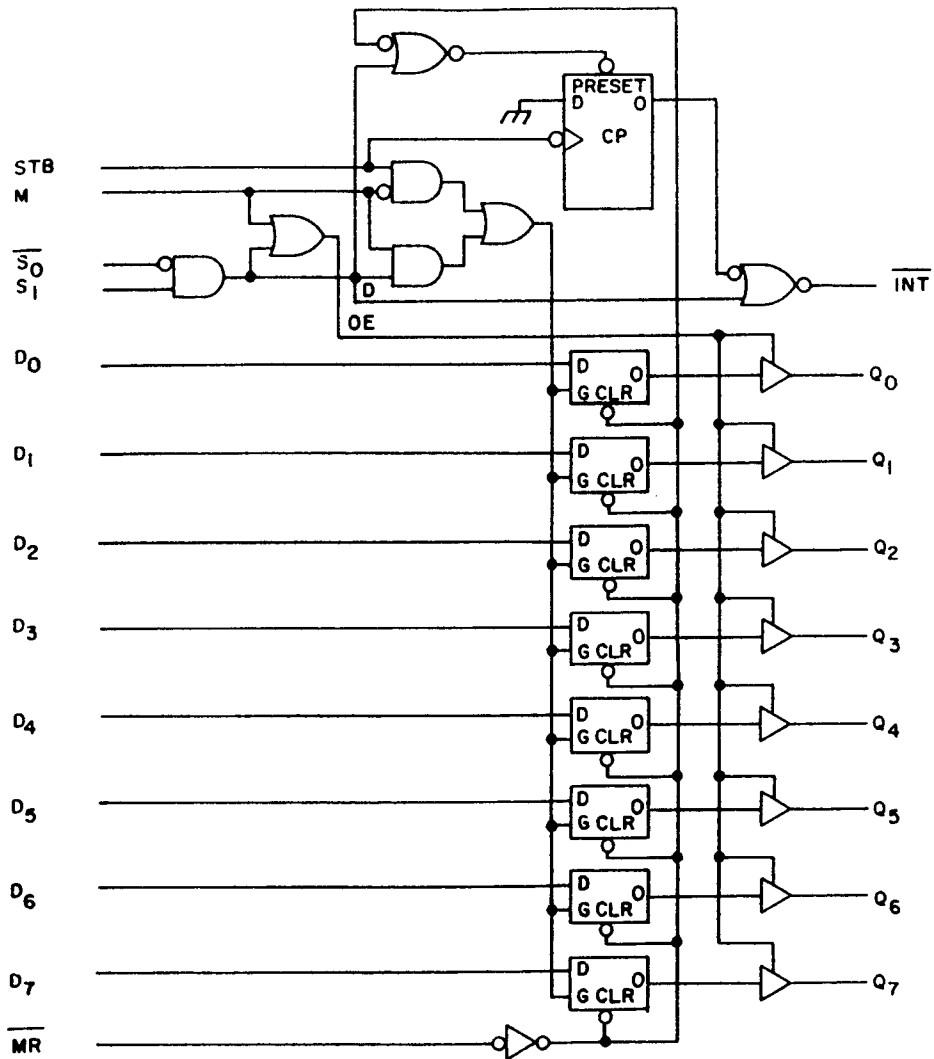
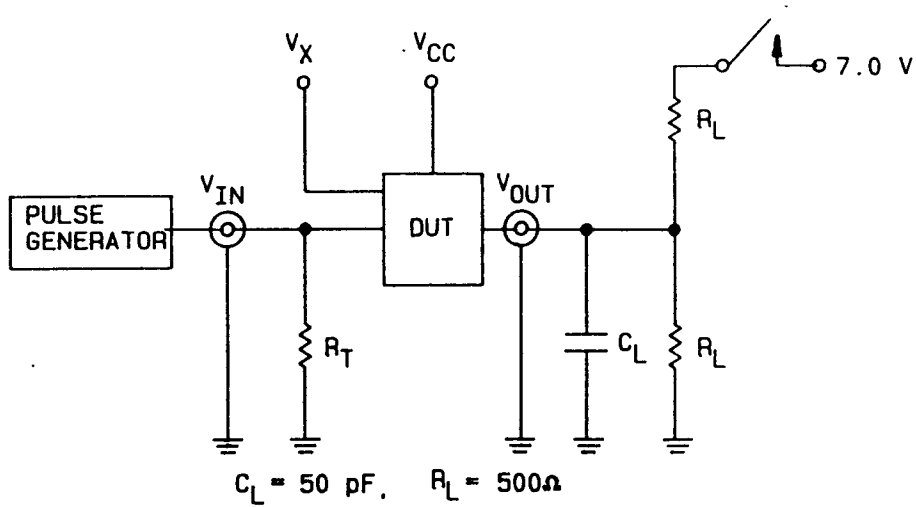


FIGURE 3. Logic diagram.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 9



SWITCH POSITION

TEST	SWITCH
t_{PLZ}	CLOSED
t_{PZL}	CLOSED
ALL OTHERS	OPEN

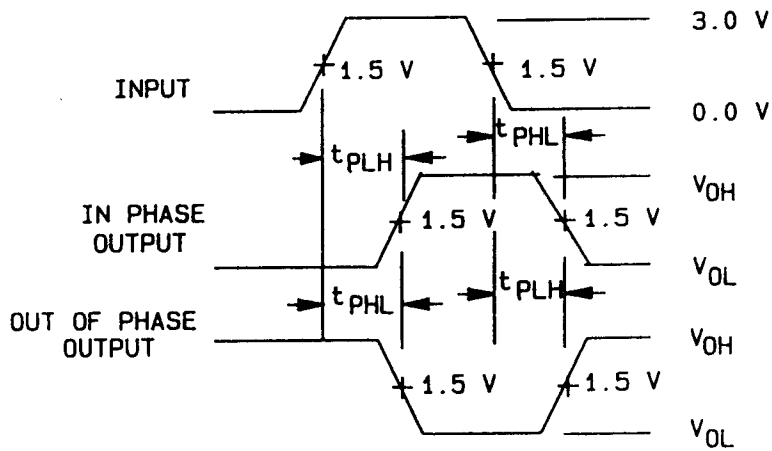


FIGURE 4. Test circuit and switching waveforms.

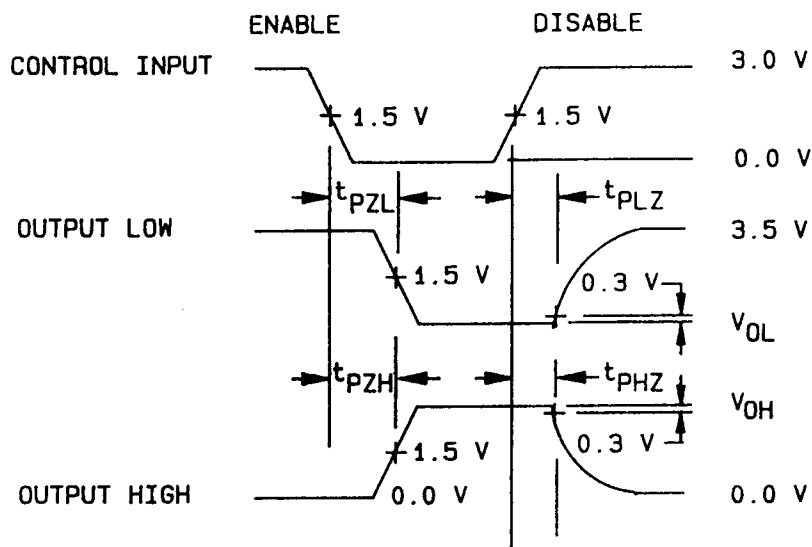
STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-90585

REVISION LEVEL
A

SHEET
10



NOTES:

1. C_L includes probe and jig capacitance.
2. R_T = Termination resistance should be equal to Z_{OUT} of pulse generator.
3. V_X = Unclocked pins must be held at ≤ 0.8 V, ≥ 2.7 V or open.
4. All input pulses have the following characteristics: PRR = 1 MHz, $t_r = t_f = 2.5$ ns, duty cycle = 50 percent.
5. The outputs are measured one at a time with one input transition per measurement.

FIGURE 4. Test circuit and switching waveforms - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 11

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, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) $T_A = +125^\circ\text{C}$, 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 tables.

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 3.6 herein).

(2) $T_A = +125^\circ\text{C}$, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

5962-90585

REVISION LEVEL
A

SHEET
12

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 5005)	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.

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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-90585
		REVISION LEVEL A	SHEET 13