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	12		

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
Kirk C. Offner

CHECKED BY
Charles E. Besore

APPROVED BY

DRAWING APPROVAL DATE
92-01-02

REVISION LEVEL

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, ELECTROLUMINESCENT COLUMN DRIVER, MONOLITHIC SILICON

SIZE	CAGE CODE	5962-86055
A	67268	

SHEET 1

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:

5962-86055	01	X	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

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

Device type	Generic number	Circuit function
01	55553	Electroluminescent column driver (see figures 1 and 5)
02	55554	Electroluminescent column driver (see figures 1 and 5)

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
X	C-5 (44-terminal, .662" x .662" x .120"), square chip carrier package
Y	C-J4 (44-terminal, .662" x .662" x .135"), square J-leaded chip carrier package

1.3 Absolute maximum ratings. 1/

Supply voltage 1 (V_{CC1})	18 V dc
Supply voltage 2 (V_{CC2})	70 V dc
Input voltage	-0.3 V dc to V_{CC1} + 0.3 V dc
GND current	70 mA
Storage temperature	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Power dissipation (P_D)	1475 mW 2/
Junction temperature (T_J)	150°C
Thermal resistance, junction-to-case (e_{JC})	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

Supply voltage 1 (V_{CC1})	10.8 V dc to 13.2 V dc
Supply voltage 2 (V_{CC2})	0 V dc to 60 V dc
High level input voltage:	
V_{CC1} = 10.8 V	8.1 V dc minimum
V_{CC1} = 13.2 V	9.9 V dc minimum
Low level input voltage:	
V_{CC1} = 10.8 V	2.7 V dc maximum
V_{CC1} = 13.2 V	3.3 V dc maximum
High level output current (I_{OH})	-15 mA maximum
Low level output current (I_{OL})	15 mA minimum
Output clamp current (I_{OK})	20 mA maximum
Clock frequency (f_{CLK}) (T_A = +25°C)	6.25 MHz
Ambient operating temperature range (T_A)	-55°C to +125°C

1/ All voltages are referenced to GND.
2/ 1475 mW for operation between -55°C to +25°C. For operating above +25°C free-air temperature, derate linearly at 14.6 mW/°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 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 2.

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 ambient 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.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$ V_{CC1} = 12 V, V_{CC2} = 60 V GND = 0 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Supply current from V_{CC1}	I_{CC1}	Outputs open	1,2,3	All		7	mA
Supply current from V_{CC2}	I_{CC2}	Outputs high	1,2,3	All		20	mA
		Outputs low	1,2,3	All		2	mA
Low level input current	I_{IL}	V_I = 0 V 2/	1,2,3	All	-5		µA
High level input current	I_{IH}	V_I = 0 V 2/	1,2,3	All		5	µA
High level output voltage, Q outputs	V_{OHQ}	I_O = -15 mA	1,2,3	All	55		V
Low level output voltage, Q outputs	V_{OLQ}	I_O = 15 mA	1,2,3	All		10	V
High level output voltage, serial output	V_{OHS}	I_O = -100 µA	1,2,3	All	10		V
Low level output voltage, serial output	V_{OLS}	I_O = 100 µA	1,2,3	All		1.5	V

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

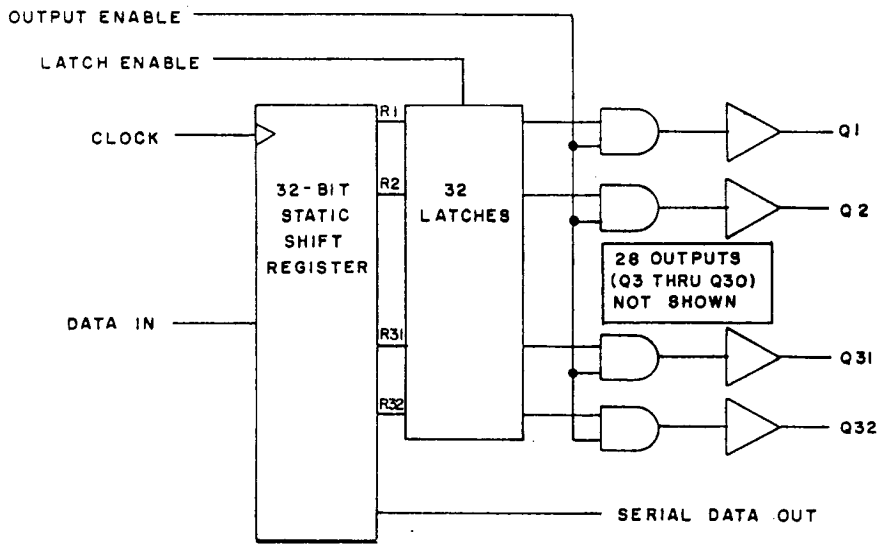
Test	Symbol	Conditions 1/ $-55°C \le T_A \le +125°C$, V_{CC1} = 12 V, V_{CC2} = 60 V, GND = 0 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Functional tests		See 4.3.1c T_A = +25°C	7,8	All			
Clock frequency	f_{CLK}	T_A = +25°C	9	All	6.25		MHz
Propagation delay time, low to high level, Q outputs	t_{PLH}	See figure 3 T_A = +25°C	9	All		1000	ns
Propagation delay time, high to low level, Q outputs	t_{PHL}	See figure 3 T_A = +25°C	9	All		700	ns
Data hold time after rising clock	t_H	T_A = +25°C	9	All	110		ns
Delay time, high to low level, serial output from clock	t_{DHL}	C_L = 45 pF to ground, see figure 3 T_A = +25°C	9	All		200	ns
Delay time, low to high level, serial output from clock	t_{DLH}	C_L = 45 pF to ground, see figure 3 T_A = +25°C	9	All		200	ns
Clock pulse duration, high or low	t_W	See figure 3 T_A = +25°C	9	All	80		ns
Data setup time, before rising clock	t_{SU}	See figure 3 T_A = +25°C	9	All	50		ns

1/ Voltage measured with respect to GND unless otherwise noted.
2/ I_{IL} and I_{IH} parameter performances are independent of V_{CC2} which need not be 60 V for this test.

Device types	01	02
Case outlines	X and Y	X and Y
Terminal number	Terminal symbol	
1	Q17	Q16
2	Q16	Q17
3	Q15	Q18
4	Q14	Q19
5	Q13	Q20
6	Q12	Q21
7	Q11	Q22
8	Q10	Q23
9	Q9	Q24
10	Q8	Q25
11	Q7	Q26
12	Q6	Q27
13	Q5	Q28
14	Q4	Q29
15	Q3	Q30
16	Q2	Q31
17	Q1	Q32
18	DATA OUT	DATA OUT
19	NC	NC
20	NC	NC
21	NC	NC
22	CLOCK	CLOCK
23	GND	GND
24	V_{CC2}	V_{CC2}
25	V_{CC1}	V_{CC1}
26	LATCH ENABLE	LATCH ENABLE
27	DATA IN	DATA IN
28	OUTPUT ENABLE	OUTPUT ENABLE
29	NC	NC
30	Q32	Q1
31	Q31	Q2
32	Q30	Q3
33	Q29	Q4
34	Q28	Q5
35	Q27	Q6
36	Q26	Q7
37	Q25	Q8
38	Q24	Q9
39	Q23	Q10
40	Q22	Q11
41	Q21	Q12
42	Q20	Q13
43	Q19	Q14
44	Q18	Q15

NC = No connection

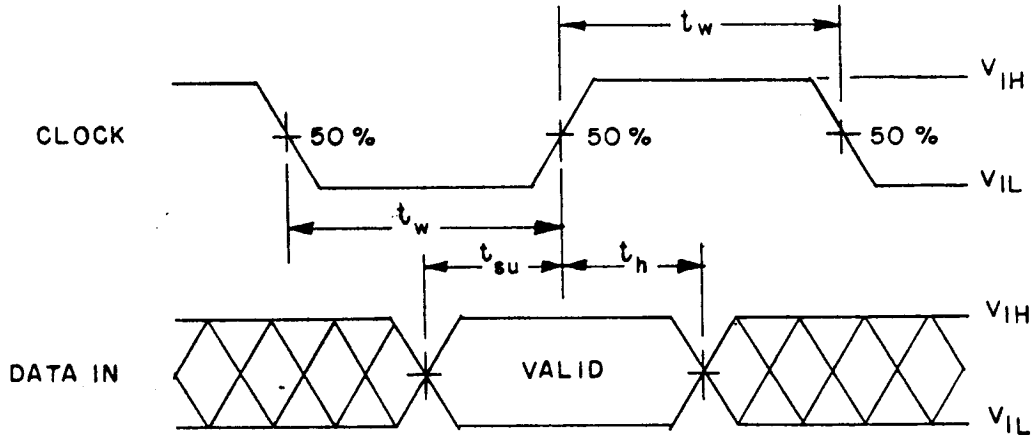
FIGURE 1. Terminal connections.



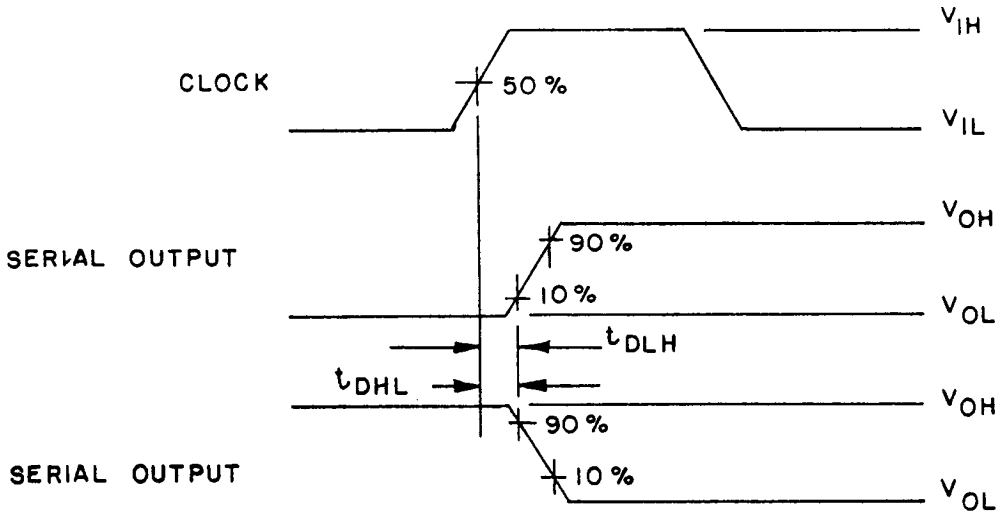
Function	Control inputs: Clock	Control inputs: Latch enable	Control inputs: Output enable	Shift register R1 thru R32	Latches LC1 thru LC32	Outputs: Serial	Outputs: Q1 thru Q32
Load	↑	X	X	Load and shift 1/	Determined by latch enable 2/	R32	Determined by output enable
	No ↑	X	X	No change	Determined by latch enable 2/	R32	Determined by output enable
Latch	X	L	X	As determined above	Stored data	R32	Determined by output enable
	X	H	X	As determined above	New data	R32	Determined by output enable
Output enable	X	X	L	As determined above	Determined by latch enable 2/	R32	All L
	X	X	H	As determined above	Determined by latch enable 2/	R32	LC1 thru LC32, respectively

H = HIGH level, L = LOW level, X = Irrelevant, ↑ = LOW-to-HIGH level transition.
1/ R32 and the serial output take on the state of R31, R31 takes on the state of R30.....R32 takes on the state of R1, and R1 takes on the state of the data input.
2/ New data enter the latches while latch enable is high. These data are stored while latch enable is low.

FIGURE 2. Truth table and logic diagram.

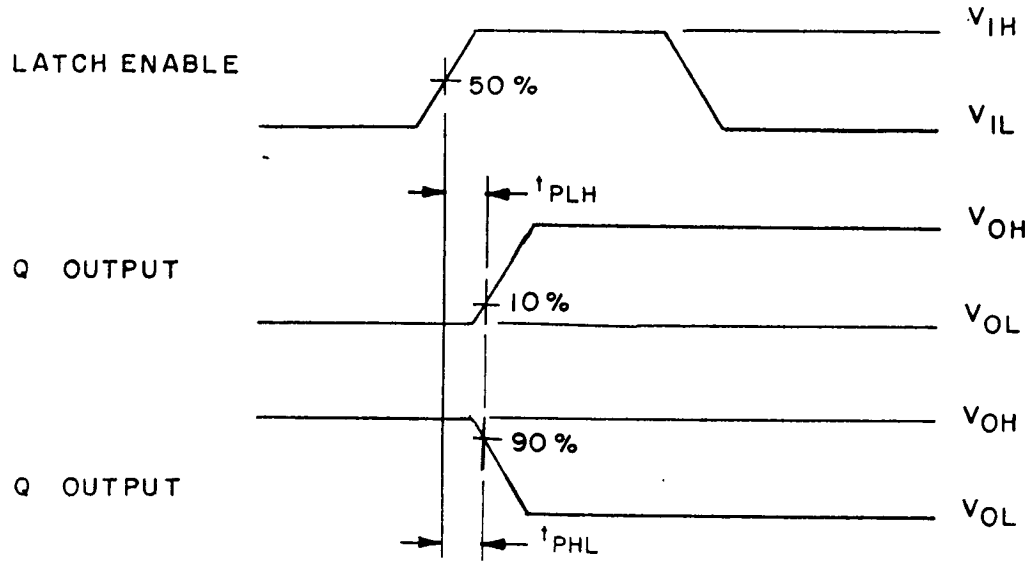


INPUT TIMING WAVEFORMS



WAVEFORMS FOR DELAY AND TRANSITION TIMES,
CLOCK TO SERIAL OUTPUT

FIGURE 3. Waveforms.



WAVEFORMS FOR PROPAGATION DELAY TIMES,
LATCH ENABLE TO Q OUTPUTS

FIGURE 3. Waveforms - Continued.

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-ECS 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-ECS 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°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, 6, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

c. Subgroups 7 and 8 shall include verification of the truth table.

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
Group A test requirements (method 5005)	1, 2, 3, 7, 8, 9
Groups C and D end-point electrical parameters (method 5005)	1, 2, 3

* PDA applies to subgroup 1.

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°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-ECS, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5375.

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-ECS.

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