

REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
D	Add LCC package type. Add 2 new device types. Change $V_{CC}$ for device type 02. Convert to military drawing format.	1986 JULY 23	<i>M.A. Ly</i>
E	Change vendor similar part numbers in 6.4. Changes to table I. Editorial changes throughout.	1987 FEB 06	<i>M.A. Ly</i>
F	Make changes to table II, 1.2.2, 1.3, 4.2a, and 4.3.2b. Make change to figure 4. Make changes to table I.	1988 JUNE 28	<i>M.A. Ly</i>
G	Add device types 05 and 06. for vendor CAGE 34335. Made technical changes in table I. Added test condition A and B in 4.2a step 1 and 4.3.2b step 1. Made changes to figure 3. Editorial changes throughout drawing.	1989 JULY 12	<i>M.A. Ly</i>

### CURRENT CAGE CODE 67268

REV																						
SHEET																						
REV																						
SHEET																						
REV STATUS OF SHEETS	REV	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G						
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15						
PMIC N/A	PREPARED BY <i>Stew Duncan</i>	DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444																				
STANDARDIZED MILITARY DRAWING	CHECKED BY <i>Ray Monnin</i>	MICROCIRCUITS, MEMORY DIGITAL, 64-BIT BIPOLAR RAM, MONOLITHIC SILICON																				
	APPROVED BY <i>M.A. Ly</i>																					
THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE	DRAWING APPROVAL DATE 01 MARCH 1979	SIZE A	CAGE CODE 14933	78015																		
	REVISION LEVEL G	SHEET 1 OF 15																				
AMSC N/A																						

DESC FORM 193-1  
SEP 87

U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60912

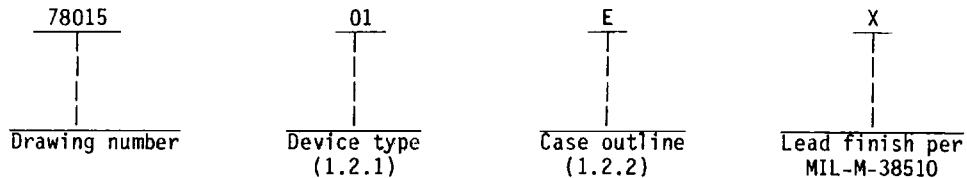
5962-E1321

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:



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

Device type	Circuit	Access time
01	64-bit noninverting RAM, three-state	30 ns
02	64-bit inverting RAM, three-state	50 ns
03	64-bit noninverting RAM, three-state	50 ns
04	64-bit Low power noninverting RAM, three-state	65 ns
05	64-bit noninverting RAM, three-state	20 ns
06	64-bit Low power noninverting RAM, three-state	30 ns

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
E	D-2 (16-lead, 0.840" x 0.310" x 0.200"), dual-in-line package
F	F-5 (16-lead, 0.440" x 0.285" x 0.085"), flat package
2	C-2 (20-terminal, 0.358" x 0.100"), square chip carrier package

1.3 Absolute maximum ratings.

Supply voltage, $V_{CC}$ to GND	-0.5 V dc to +7.0 V dc
Input voltage range	-0.5 V dc to +5.5 V dc
Voltage applied to outputs for high output state	-0.5 V dc to +5.5 V dc
Junction temperature ( $T_J$ )	+175°C
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction-to-case ( $\theta_{JC}$ ):	
Cases E, F, and 2	See MIL-M-38510, appendix C
Output current, into outputs	20 mA
Input current	-30 mA to +5.0 mA
Storage temperature range	-65°C to +150°C

1.4 Recommended operating conditions.

Supply voltage ( $V_{CC}$ ):	
Device types 01, 03, 04, 05, 06	4.5 V dc minimum to 5.5 V dc maximum
Device type 02	4.75 V dc minimum to 5.25 V dc maximum
Minimum high level input voltage ( $V_{IH}$ ):	
Device types 01-06	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

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	78015
	REVISION LEVEL G	SHEET 2

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 Case outlines. The case outlines shall be in accordance with 1.2.2.

3.2.4 Lead material and finish. The lead material and finish shall be in accordance with MIL-M-38510.

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.

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.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		78015
		REVISION LEVEL G	SHEET 3

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ -55°C < T <sub>C</sub> < +125°C unless otherwise specified	Device type	Group A subgroups	Limits		Unit		
					Min	Max			
Output high voltage	V <sub>OH</sub>	V <sub>CC</sub> = min, I <sub>OH</sub> = -2.0 mA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	A11	1, 2, 3	2.4		V		
Output low voltage	V <sub>OL</sub>	V <sub>CC</sub> = min V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 16 mA	01,03, 05	1, 2, 3		0.45	V	
			I <sub>OL</sub> = 8 mA	04,06					
			I <sub>OL</sub> = 20 mA	01,03, 05					0.5
			I <sub>OL</sub> = 10 mA	04,06,					
			I <sub>OL</sub> = 16 mA	02					0.5
Input low current	I <sub>IL</sub>	V <sub>CC</sub> = max WE, D <sub>0</sub> -D <sub>3</sub> A <sub>0</sub> -A <sub>3</sub> , CS	V <sub>IN</sub> = 0.40	01, 03, 04, 05, 06	1, 2, 3		-0.25	mA	
			V <sub>IN</sub> = 0.45	02					
Input high current	I <sub>IH</sub>	V <sub>CC</sub> = max	V <sub>IN</sub> = 2.7 V	01, 03, 04, 05, 06	1, 2, 3		10	μA	
			V <sub>IN</sub> = 5.5 V	02					25
Output short-circuit current	I <sub>OS</sub>	V <sub>CC</sub> = max, V <sub>OUT</sub> = 0.0 V 2/		01, 03, 04, 05, 06	1, 2, 3	-20	-90	mA	
				02					-20
Power supply current	I <sub>CC</sub>	All inputs = GND V <sub>CC</sub> = max		01, 03, 05 04, 06	1, 2, 3		105	mA	
				02					38
Input clamp voltage	V <sub>IC</sub>	V <sub>CC</sub> = min	I <sub>IN</sub> = -18 mA	01, 03, 04, 05 06	1, 2, 3	-1.2		V	
			I <sub>IN</sub> = -12 mA	02					-1.5

See footnotes at end of table.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	78015
	REVISION LEVEL G	SHEET 4

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C < T <sub>C</sub> < +125°C unless otherwise specified	Device type	Group A subgroups	Limits		Unit	
					Min	Max		
Output leakage current	I <sub>OZ</sub>	$\overline{V_{CS}} = V_{IH}$ or $\overline{V_{WE}} = V_{IL}$	$V_{OUT} = 2.4\text{ V}$ $V_{CC} = \text{max}$	01, 03, 04, 05, 06	1, 2, 3		40	μA
			$V_{OUT} = 2.4\text{ V}$ $V_{CC} = \text{max}$	02			50	
		$\overline{V_{CS}} = V_{IH}$ or $\overline{V_{WE}} = V_{IL}$	$V_{OUT} = 0.4\text{ V}$ $V_{CC} = \text{max}$	01, 03, 04, 05, 06			-40	
				02			-50	
Propagation delay, address to output	t <sub>PLH(A)</sub> t <sub>PHL(A)</sub>	<u>3/</u>		01, 06	9, 10, 11		30	ns
				04			65	
				05			20	
				02, 03			50	
Propagation delay, chip select (low) to active output and correct data	t <sub>PZH(<math>\overline{CS}</math>)</sub> t <sub>PZL(<math>\overline{CS}</math>)</sub>	<u>3/ 4/</u>		01, 05, 06	9, 10, 11		20	ns
				04			35	
				02, 03			25	
Propagation delay, write enable (high) to active output and correct data	t <sub>PZH(<math>\overline{WE}</math>)</sub> t <sub>PZL(<math>\overline{WE}</math>)</sub>	<u>3/ 4/ 5/</u>		01	9, 10, 11		25	ns
				04			35	
				05, 06			15	
				02, 03			40	
Setup time address	t <sub>s(A)</sub>	<u>3/</u>	A11	9, 10, 11	0		ns	
Hold time address	t <sub>h(A)</sub>	<u>3/</u>	01, 03, 04, 05, 06	9, 10, 11	0		ns	
			02					10
Setup time data input	t <sub>s(DI)</sub>	<u>3/</u>	01, 03, 04	9, 10, 11			ns	
			05					20
			02, 06					30
Hold time data input	t <sub>h(DI)</sub>	<u>3/</u>	01, 03, 04, 05, 06	9, 10, 11	0		ns	
			02					10
Min write enable pulse width	t <sub>pw(<math>\overline{WE}</math>)</sub>	<u>3/</u>	01, 03	9, 10, 11			ns	
			04					55
			05					20
			02, 06					30

See footnotes at end of table.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	<b>SIZE A</b>	78015
	<b>REVISION LEVEL</b> G	<b>SHEET</b> 5

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ -55°C < T <sub>C</sub> < +125°C unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Propagation delay, chip select (high) to inactive output (HI-Z)	t <sub>PHZ</sub> (CS) t <sub>PLZ</sub> (CS)	3/ 4/	01, 05	9, 10, 11		20	ns
			03, 06			25	
			02			40	
			04			35	
Propagation delay, write enable (low) to inactive output (HI-Z)	t <sub>PLZ</sub> (WE) t <sub>PHZ</sub> (WE)	3/ 4/	01, 06	9, 10, 11		25	ns
			02			50	
			03, 04			35	
			05			20	

1/ For device types 01, 03, 04, 05, and 06 the V<sub>CC</sub> condition is 4.5 V dc ≤ V<sub>CC</sub> ≤ 5.5 V dc, and for device type 02, the V<sub>CC</sub> condition is 4.75 V dc ≤ V<sub>CC</sub> ≤ 5.25 V dc.

2/ Not more than one output shall be grounded at one time.

3/ See figure 3 test load (measured to output = 1.5 V) and figure 4 switching waveforms.

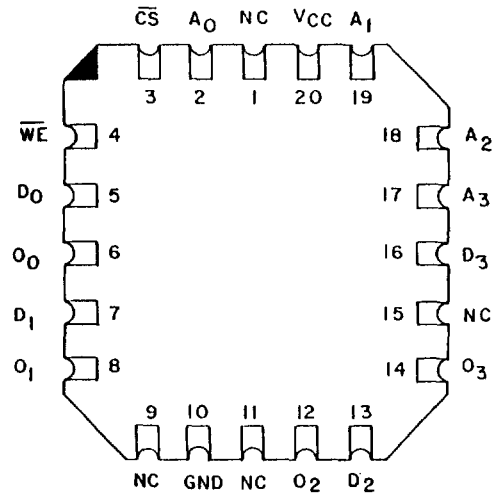
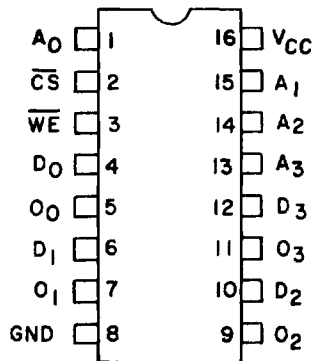
4/ For three-state output t<sub>PZH</sub>(WE) and t<sub>PZH</sub>(CS) are measured with S<sub>1</sub> open, C<sub>L</sub> = 30 pF and with both the input and output timing referenced to 1.5 V. t<sub>PZL</sub>(WE) and t<sub>PZL</sub>(CS) are measured with S<sub>1</sub> closed, C<sub>L</sub> = 30 pF and with both the input and output timing referenced to 1.5 V. t<sub>PHZ</sub>(WE) and t<sub>PHZ</sub>(CS) are measured with S<sub>1</sub> open and C<sub>L</sub> < 5 pF and are measured between the 1.5 V level on the input to the V<sub>OH</sub> -500 mV level on the output. t<sub>PLZ</sub>(WE) and t<sub>PLZ</sub>(CS) are measured with S<sub>1</sub> closed and C<sub>L</sub> < 5 pF and are measured between the 1.5 V level on the input and the V<sub>OL</sub> +500 mV level on the output.

5/ Output is preconditioned to data in (noninverted) during write to insure correct data is on all outputs when write is terminated (no write recovery glitch).

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		78015
		REVISION LEVEL G	SHEET 6

Cases E and F

Case 2



Pin names

D <sub>0</sub> - D <sub>3</sub>	Inputs
O <sub>0</sub> - O <sub>3</sub>	Outputs
$\overline{\text{CS}}$	Chip select
$\overline{\text{WE}}$	Write enable
A <sub>0</sub> - A <sub>3</sub>	Addresses

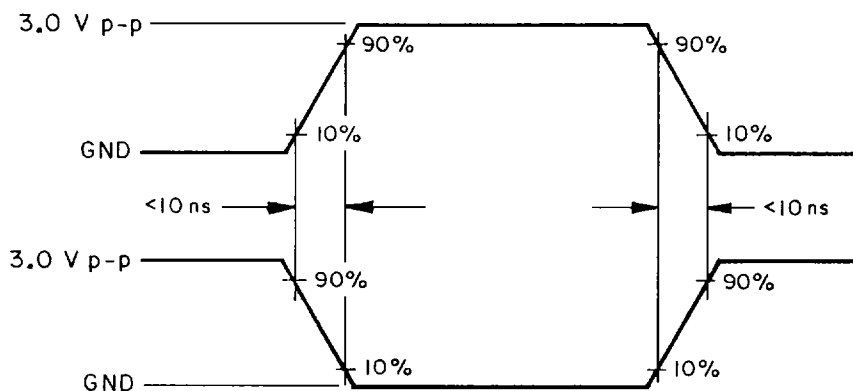
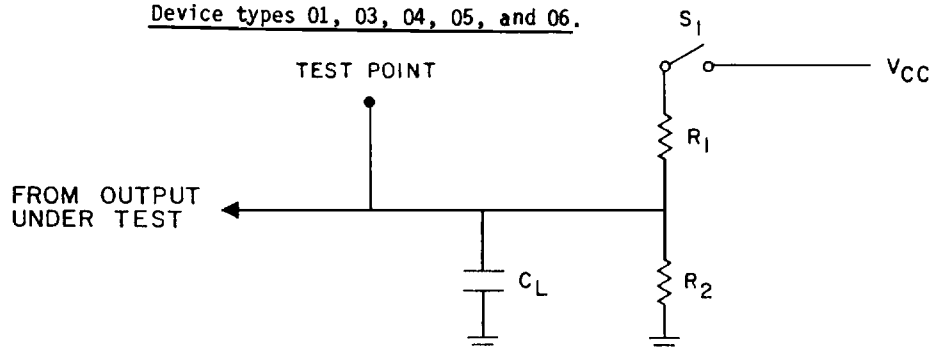
FIGURE 1. Terminal connections (top view).

Input		Function	Data output status
$\overline{\text{CS}}$	$\overline{\text{WE}}$		<sub>0-3</sub>
Low	Low	Write	Output disabled
Low	High	Read	Selected word
High	Don't care	Deselect	Output and write disabled

FIGURE 2. Truth table.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	<b>SIZE</b> <b>A</b>		78015
		<b>REVISION LEVEL</b> G	<b>SHEET</b> 7

Device types 01, 03, 04, 05, and 06.



Device types 01, 03, 04, 05, and 06.

01, 03, 05	04, 06
$R_1 = 300\Omega$	$600\Omega$
$R_2 = 600\Omega$	$1200\Omega$

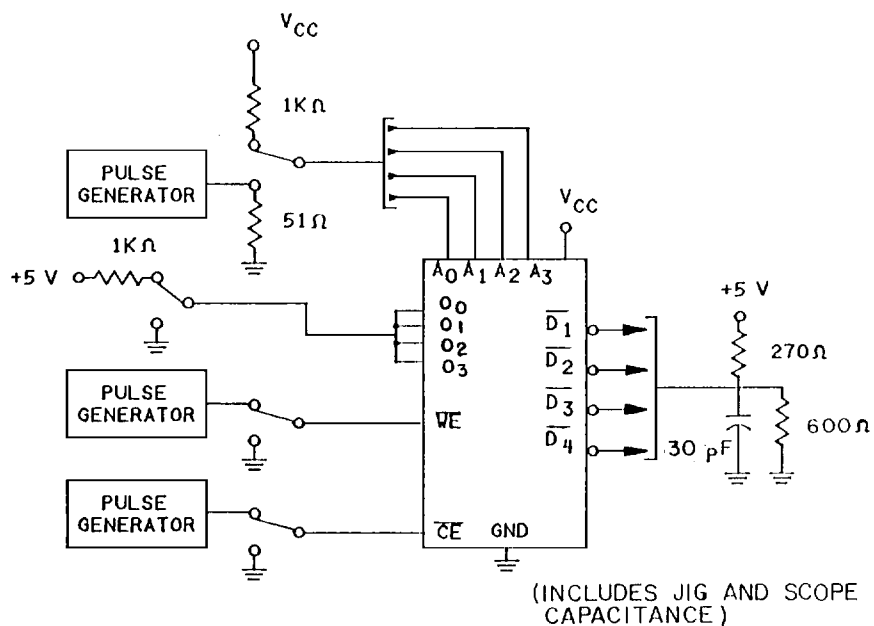
OUTPUT TRANSITION	$C_L$	$S_1$
HL	30 pF	Closed
LH	30 pF	Closed
HZ	<5 pF	Open
LZ	<5 pF	Closed
ZH	30 pF	Open
ZL	30 pF	Closed

FIGURE 3. Test load.

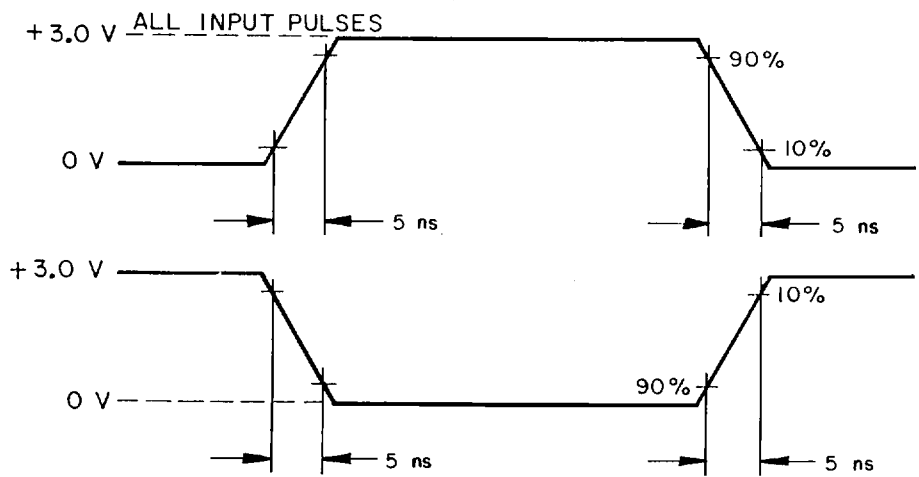
<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	78015	
		REVISION LEVEL G	SHEET 8



Device type 02



INPUT PULSES

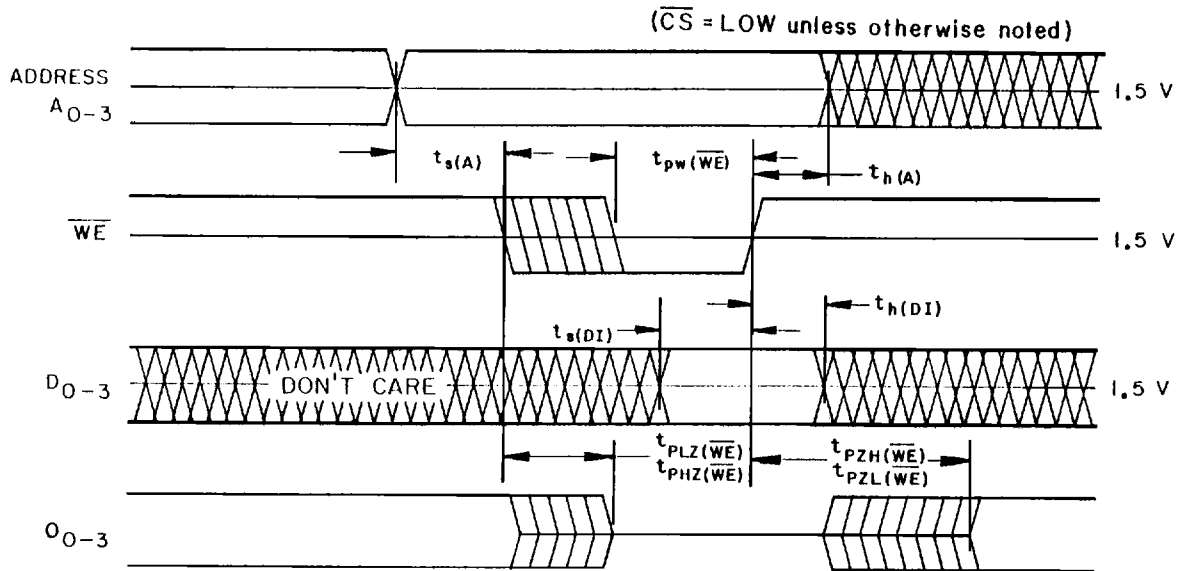


Measurements: All circuit delays are measured at the +1.5 V level of inputs and output.

FIGURE 3. Test load - Continued.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		78015
		REVISION LEVEL G	SHEET 9

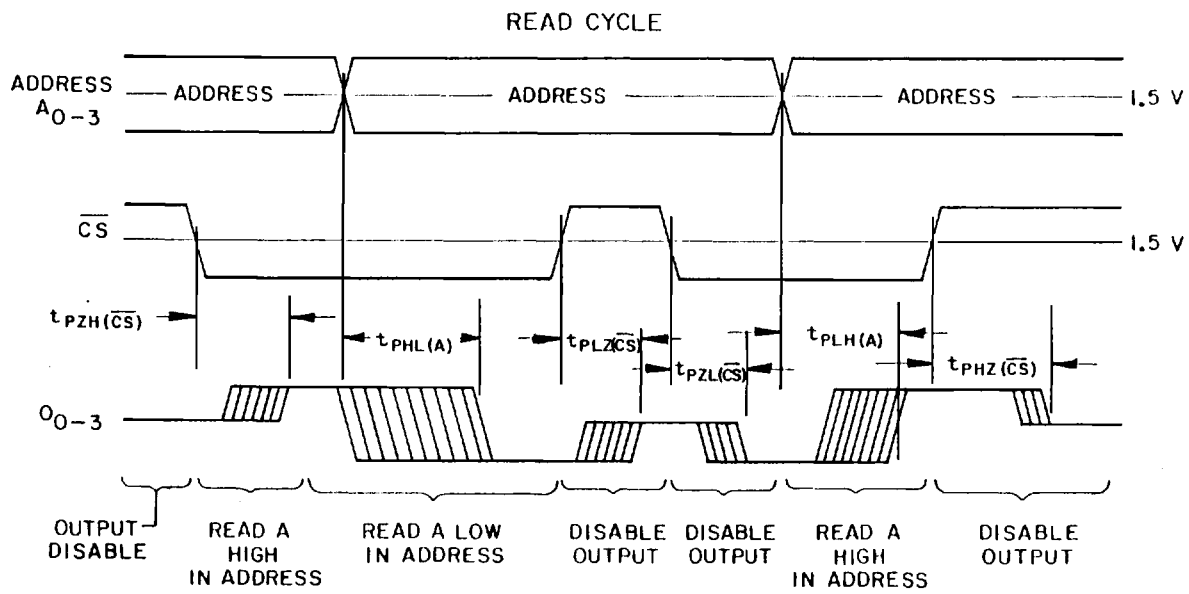
### WRITE CYCLE



Write Cycle Timing. The cycle is initiated by an address change. After  $t_s(A)$  minimum, the write enable may begin. The chip select must also be low for writing. Following the write pulse,  $t_h(A)$  minimum must be allowed before the address may be changed again. The output will be inactive while the write enable is low or the chip select is high. For device type 02, the outputs will be inverted.

FIGURE 4. Switching waveforms.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	78015
	REVISION LEVEL G	SHEET 10



Switching delays from address and chip select inputs to the data output. The disabled output is "OFF", represented by a single center line. For device type 02, the outputs will be inverted.

FIGURE 4. Switching waveforms - Continued.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>	78015
	REVISION LEVEL G	SHEET 11

KEY TO SWITCHING

WAVEFORMS


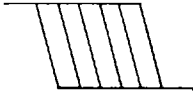
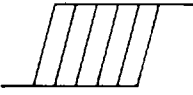
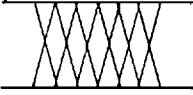

Waveform	Inputs	Outputs
	Must be steady	Will be steady
	May change from H to L	Will be changing from H to L
	May change from L to H	Will be changing from L to H
	Don't care: any change permitted	Changing: state unknown
	Does not apply	Center line is high "OFF" state

FIGURE 4. Switching waveforms - Continued.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		78015
		REVISION LEVEL G	SHEET 12

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, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 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 consist of verifying the truth table specified on figure 2.

##### 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 3.5 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.

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		78015
		REVISION LEVEL <b>G</b>	SHEET 13

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)	2, 3, 7, 8

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

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE <b>A</b>		78015
		REVISION LEVEL G	SHEET 14

6.4 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed to this drawing and a certificate of compliance (see 3.5) has been submitted to DESC-ECS.

Military drawing part number	Vendor CAGE number	Vendor similar part <u>1/</u> number
7801501EX	34335	AM27S07A/BEA
7801501FX	34335	AM27S07A/BFA
78015012X	34335	AM27S07A/B2A
7801502EX	18324	54S189/BEA
7801502FX	18324	54S189/BFA
78015022X	18324	54S189/B2A
7801503EX	34335	AM27S07/BEA
7801503FX	34335	AM27S07/BFA
78015032X	34335	AM27S07/B2A
7801504EX	34335	AM27LS07/BEA
7801504FX	34335	AM27LS07/BFA
78015042X	34335	AM27LS07/B2A
7801505EX	34335	AM27S07-20/BEA
7801505FX	34335	AM27S07-20/BFA
78015052X	34335	AM27S07-20/B2A
7801506EX	34335	AM27LS07-30/BEA
7801506FX	34335	AM27LS07-30/BFA
78015062X	34335	AM27LS07-30/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

34335

Advanced Micro Devices, Incorporated  
901 Thompson Place  
Sunnyvale, CA 94088

18324

Signetics, Incorporated  
4130 S. Market Court  
Sacramento, CA 95834

<b>STANDARDIZED MILITARY DRAWING</b> DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	<b>SIZE</b> A		78015
		<b>REVISION LEVEL</b> G	<b>SHEET</b> 15