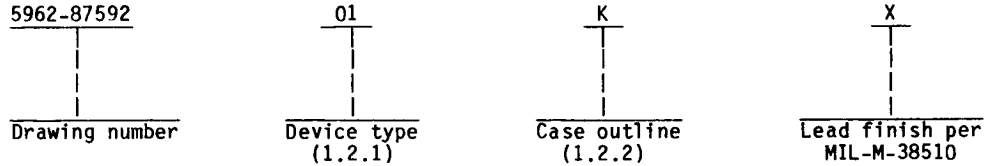


1. SCOPE

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	Generic number	Circuit function	Access time
01	9150-25	1024 x 4 high speed static R/W RAM	25 ns
02	9150-35	1024 x 4 high speed static R/W RAM	35 ns
03	9150-45	1024 x 4 high speed static R/W RAM	45 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
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
X	C-11 (28-terminal, .560" x .358" x .120"), rectangular chip carrier

1.3 Absolute maximum ratings.

Supply voltage range - - - - -	-0.5 V dc to +7.0 V dc
Storage temperature range- - - - -	-65°C to +150°C
Maximum power dissipation (P _D) 1/ - - - - -	1.2 W
Lead temperature (soldering, 10 seconds) - - - - -	+300°C
Thermal resistance, junction-to-case (θ _{JC}):	
Cases K, L, and X- - - - -	See MIL-M-38510, appendix C
Junction temperature (T _J)- - - - -	+175°C
DC output current- - - - -	20 mA
All signal voltages with respect to GND- - - - -	-3.5 V dc to +7.0 V dc

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}) - - - - -	2.2 V dc
Maximum low level input voltage (V _{IL}) - - - - -	0.8 V dc
Case operating temperature range (T _C) - - - - -	-55°C to +125°C

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	5962-87592
	REVISION LEVEL A	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 Logic diagram. The logic diagram 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 1 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		5962-87592
		REVISION LEVEL	SHEET 3

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C +4.5 V dc ≤ V _{CC} ≤ 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output high current	I _{OH}	V _{CC} = 4.5 V V _{OH} = 2.4 V	1, 2, 3	A11	-4		mA
Output low current	I _{OL}	V _{CC} = 4.5 V V _{OL} = .4 V	1, 2, 3	A11	12		mA
Input voltage high	V _{IH}	V _{CC} = 4.5 V to 5.5 V	1, 2, 3	A11	2.2	6.0	V
Input voltage low	V _{IL}	V _{CC} = 4.5 V to 5.5 V	1, 2, 3	A11	-2.5	0.8	V
Input load current high	I _{IX}	GND ≤ V _I ≤ V _{CC}	1, 2, 3	A11	-10	10	μA
Output leakage current	I _{OZL}	GND ≤ V _O ≤ V _{CC} 3/	1, 2, 3	A11	-10	10	μA
Input capacitance	C _I	V _{CC} = 5 V f = 1.0 MHz 4/ All pins at 0V	4	A11		5	pF
Output capacitance	C _O	V _{CC} = 5 V f = 1.0 MHz 4/ All pins at 0V	4	A11		7	pF
Operating current	I _{CC}	Maximum V _{CC} S ≤ V _{IL} Output open	1, 2, 3	A11		180	mA
Output short circuit current	I _{OS}	V _O = GND 4/ 5/	1, 2, 3	A11	-85	-300	mA
Read cycle time 6/	t _{AVAV}	See figures 4 and 5	9,10,11	01 02 03	25 35 45		ns ns ns
Address access time	t _{AVQV}	See figures 4 and 5	9,10,11	01 02 03		25 35 45	ns ns ns
Chip select access time	t _{ELQV}	See figures 4 and 5	9,10,11	01 02 03		15 20 25	ns ns ns

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL A	SHEET 4

DESC FORM 193A
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <u>1/</u> <u>2/</u> -55°C < T _C ≤ +125°C +4.5 V dc < V _{CC} < 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Output enable access time	t _{OLQV}	See figures 4 and 5	9,10,11	01 02 03		15 20 25	ns ns ns
Chip select low to output in low Z <u>4/</u>	t _{ELQX}	See figures 4 and 5 <u>7/</u>	9,10,11	A11	0		ns
Chip select high to output in high Z <u>4/</u>	t _{EHQZ}	See figures 4 and 5 <u>7/</u>	9,10,11	01 02 03	0 0 0	20 25 30	ns ns ns
Output enable low to output in low Z <u>4/</u>	t _{OLQX}	See figures 4 and 5 <u>7/</u>	9,10,11	A11	0		ns
Output enable high to output in high Z <u>4/</u>	t _{OHQZ}	See figures 4 and 5 <u>7/</u>	9,10,11	01 02 03	0 0 0	20 25 30	ns ns ns
Output hold after address change	t _{AXQX}	See figures 4 and 5	9,10,11	A11	1		ns
Write cycle time <u>8/</u>	t _{WC}	See figures 4 and 5	9,10,11	01 02 03	25 35 45		ns ns ns
Chip select low to write enable high	t _{ELWH}	See figures 4 and 5	9,10,11	01 02 03	15 20 30		ns ns ns
Address valid to end of write	t _{AVWH}	See figures 4 and 5	9,10,11	01 02 03	20 30 40		ns ns ns
Address valid to beginning of write	t _{AVWL}	See figures 4 and 5	9,10,11	A11	5		ns
Write pulse width	t _{WLWH}	See figures 4 and 5	9,10,11	01 02 03	15 20 30		ns ns ns
Address hold after end of write	t _{WHAX}	See figures 4 and 5	9,10,11	A11	5		ns

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL A	SHEET 5

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ -55°C < T _C < +125°C +4.5 V dc < V _{CC} < 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Data in valid to write enable high	t _{DVWH}	See figures 4 and 5	9,10,11	01 02 03	15 20 30		ns ns ns
Data hold after end of write	t _{WHDX}	See figures 4 and 5	9,10,11	A11	5		ns
Write enable low to output in high Z <u>4/</u>	t _{WLQZ}	See figures 4 and 5 <u>7/</u>	9,10,11	01 02 03	0 0 0	20 25 30	ns ns ns
Write enable high to output in low Z <u>4/</u>	t _{WHQX}	See figures 4 and 5 <u>7/</u>	9,10,11	A11	0		ns
Reset cycle time	t _{RRC}	See figures 4 and 5	9,10,11	01 02 03	50 70 90		ns ns ns
Address valid to beginning of reset	t _{AVRL}	See figures 4 and 5	9,10,11	A11	0		ns
Write enable high to beginning of reset	t _{WHRL}	See figures 4 and 5	9,10,11	A11	0		ns
Chip select low to beginning of reset	t _{ELRL}	See figures 4 and 5	9,10,11	A11	0		ns
Reset pulse width	t _{RLRH}	See figures 4 and 5	9,10,11	01 02 03	20 30 40		ns ns ns
Chip select hold after end of reset	t _{RHEX}	See figures 4 and 5	9,10,11	A11	0		ns
Write enable hold after end of reset	t _{RHWL}	See figures 4 and 5	9,10,11	01 02 03	30 40 50		ns ns ns
Address hold after end of reset	t _{RHAX}	See figures 4 and 5	9,10,11	01 02 03	30 40 50		ns ns ns

See footnotes at end of table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL A	SHEET 6

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <u>1/</u> <u>2/</u> -55°C < T _C < +125°C +4.5 V dc < V _{CC} < 5.5 V dc unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Reset low to output in high Z <u>4/</u>	t _{RLQZ}	See figures 4 and 5 <u>7/</u>	9,10,11	01	0	20	ns
				02	0	25	ns
				03	0	35	ns
Reset high to output in low Z <u>4/</u>	t _{RHQX}	See figures 4 and 5 <u>7/</u>	9,10,11	A11	0		ns

- 1/ Test conditions assume signal transition times of 10 ns or less, input timing reference levels of 1.5 V, input pulse levels of 0 to 3.0 V and output loading of the specified I_{OL}/I_{OH} and 30 pF load capacitance (see figure 4A). Output timing reference is 1.5 V.
- 2/ The operating case temperature range is guaranteed with transverse air flow of 400 linear feet per minute.
- 3/ Output is in tri-state.
- 4/ Not tested, guaranteed parameter.
- 5/ For test purposes, not more than one output at a time should be shorted. Short circuit test duration should not exceed 30 seconds.
- 6/ \bar{W} and \bar{R} are high for read cycle.
- 7/ Transition is measured ±500 mV from steady state voltage with specified loading in figure 4B.
- 8/ The internal write time of the memory is defined by the overlap of \bar{S} low and \bar{W} low. Both signals must be low to initiate a write and either signal can terminate a write by going high. The data input setup and hold timing is referenced to the rising edge of the signal that terminates the write. \bar{R} must be high.

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 C 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.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL A	SHEET 7

DESC FORM 193A
SEP 87

* U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904

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 5 and 6 in table I, method 5005 of MIL-STD-883 shall be omitted.
- c. Subgroup 4 (C_I and C_O measurements) shall be measured only for the initial test and after process or design changes which may affect capacitance.
- d. Subgroups 7 and 8 sufficient to verify the truth table.

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 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.

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, 4**, 7***, 8***, 9, 10****, 11****
Groups C and D end-point electrical parameters (method 5005)	1, 7, 9

- * PDA applies to subgroups 1 and 7.
- ** See 4.3.1c.
- *** See 4.3.1d.
- **** Subgroups 10 and 11, if not tested, shall be guaranteed to the limits specified in table I.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
		REVISION LEVEL A

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

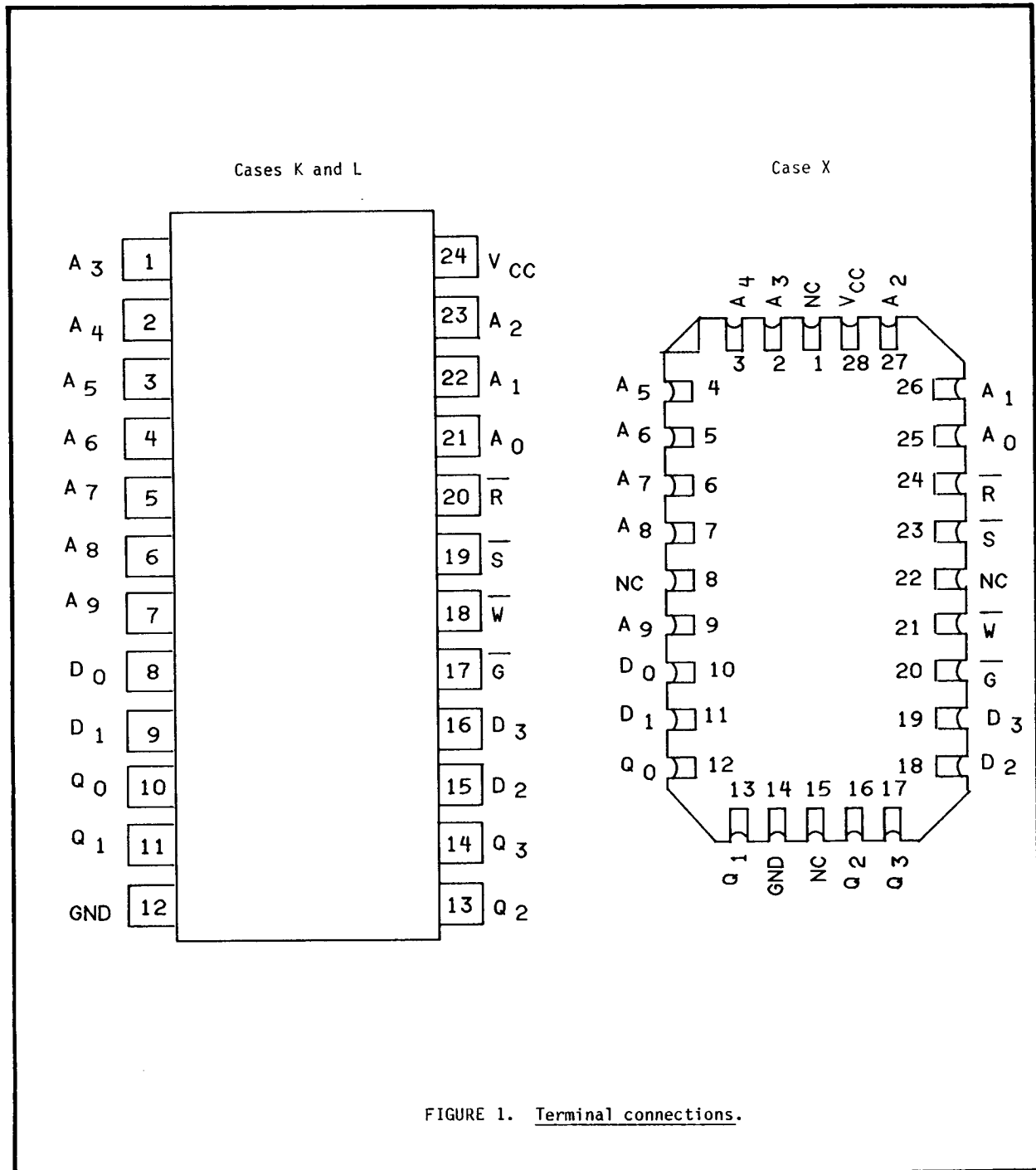


FIGURE 1. Terminal connections.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592	
		REVISION LEVEL A	SHEET 9

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

Inputs				Output	Mode
\bar{S}	\bar{W}	\bar{G}	\bar{R}		
H	X	X	X	High Z	Not selected
L	H	X	L	High Z	Reset*
L	L	X	H	High Z	Write
L	H	L	H	Q ₀ -Q ₃	Read
L	X	H	H	High Z	Output disable

H = High
L = Low
X = Don't care

*See reset cycle description

FIGURE 2. Truth table.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL	SHEET 10

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

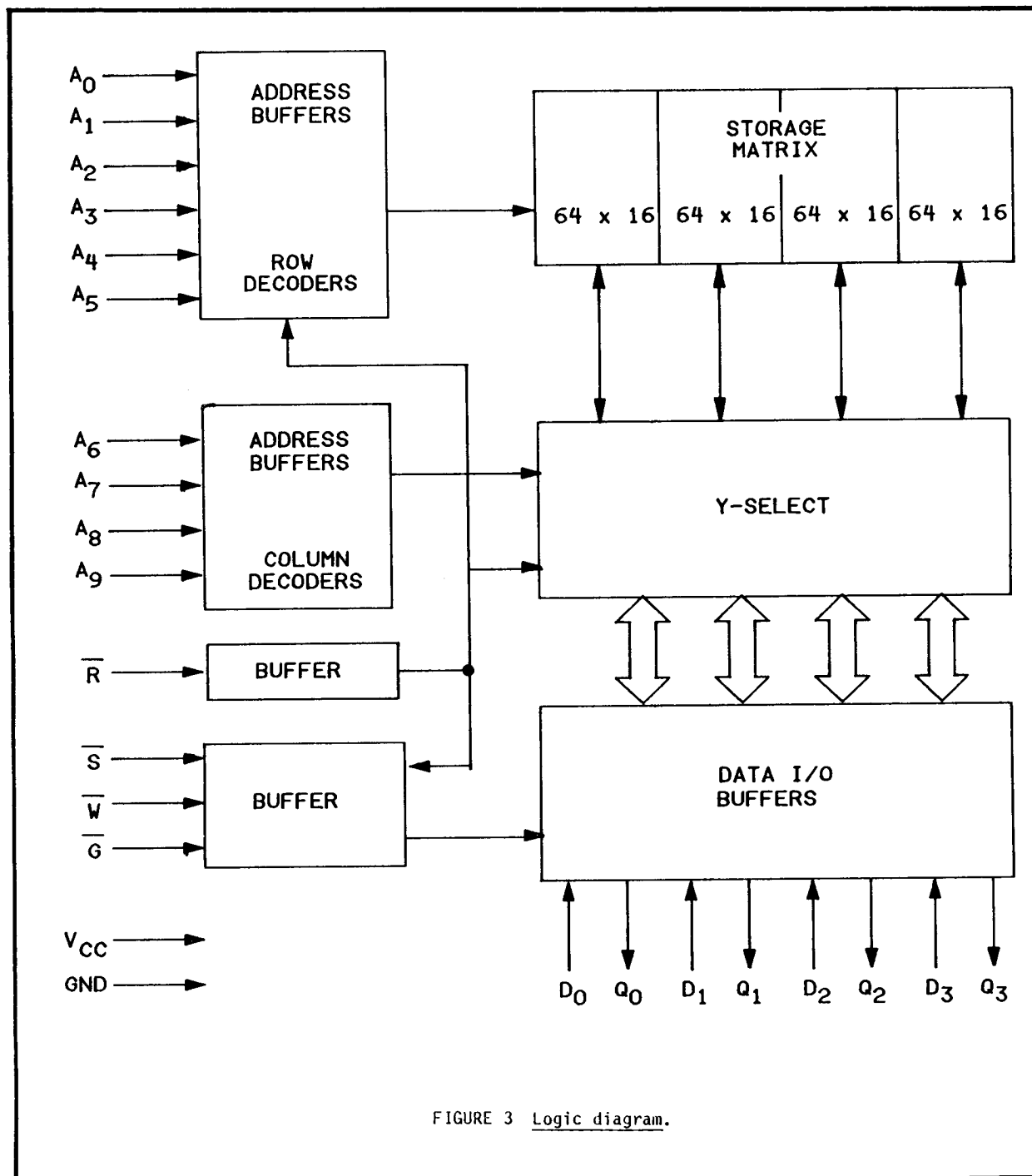


FIGURE 3 Logic diagram.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL	SHEET 11

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

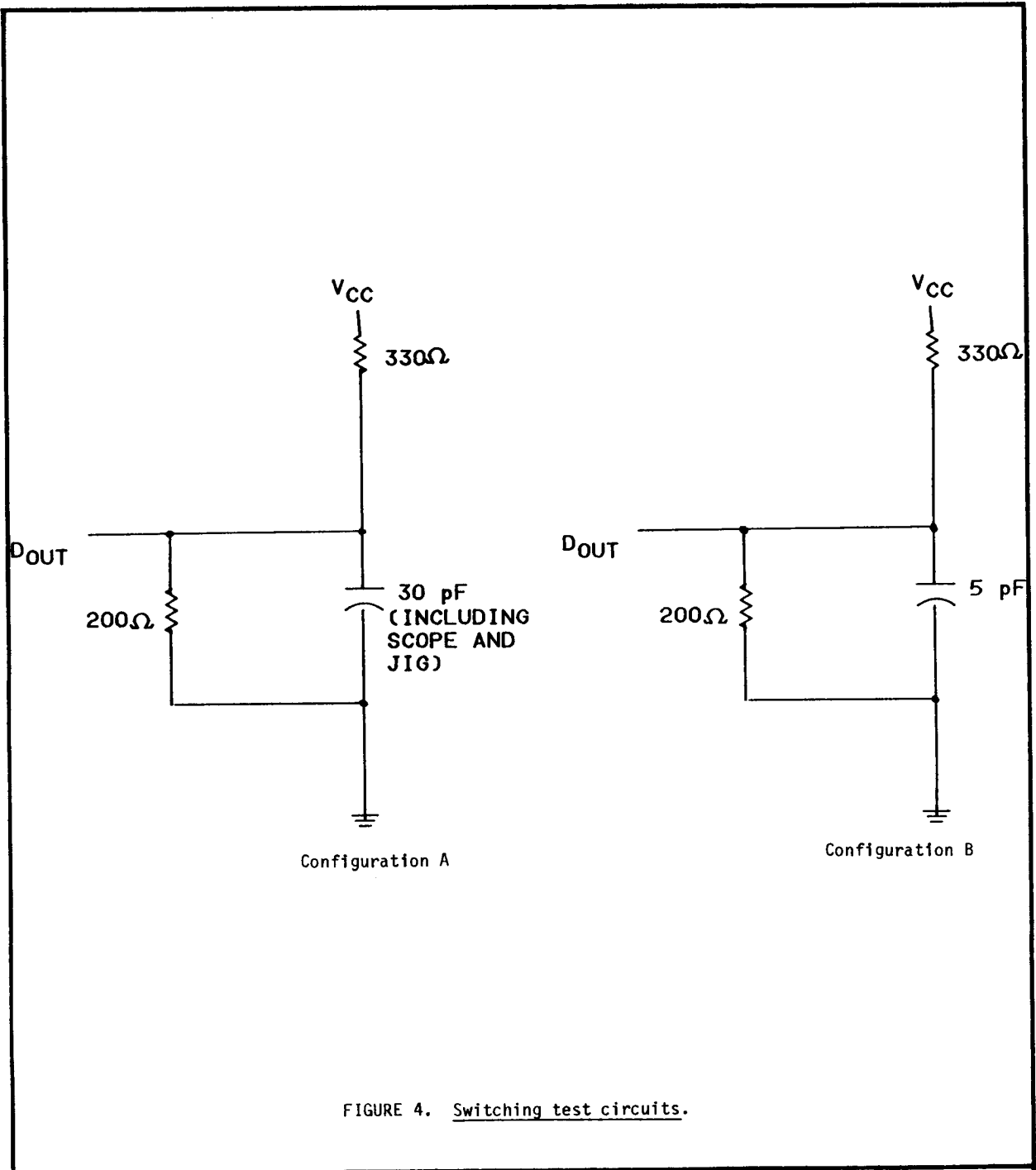


FIGURE 4. Switching test circuits.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592	
		REVISION LEVEL A	SHEET 12

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

TYPICAL I_{CC} AND I_{GND} DURING A RESET CYCLE

$T_A = 25^\circ\text{C}$
 $V_{CC} = 5.5\text{ V}$

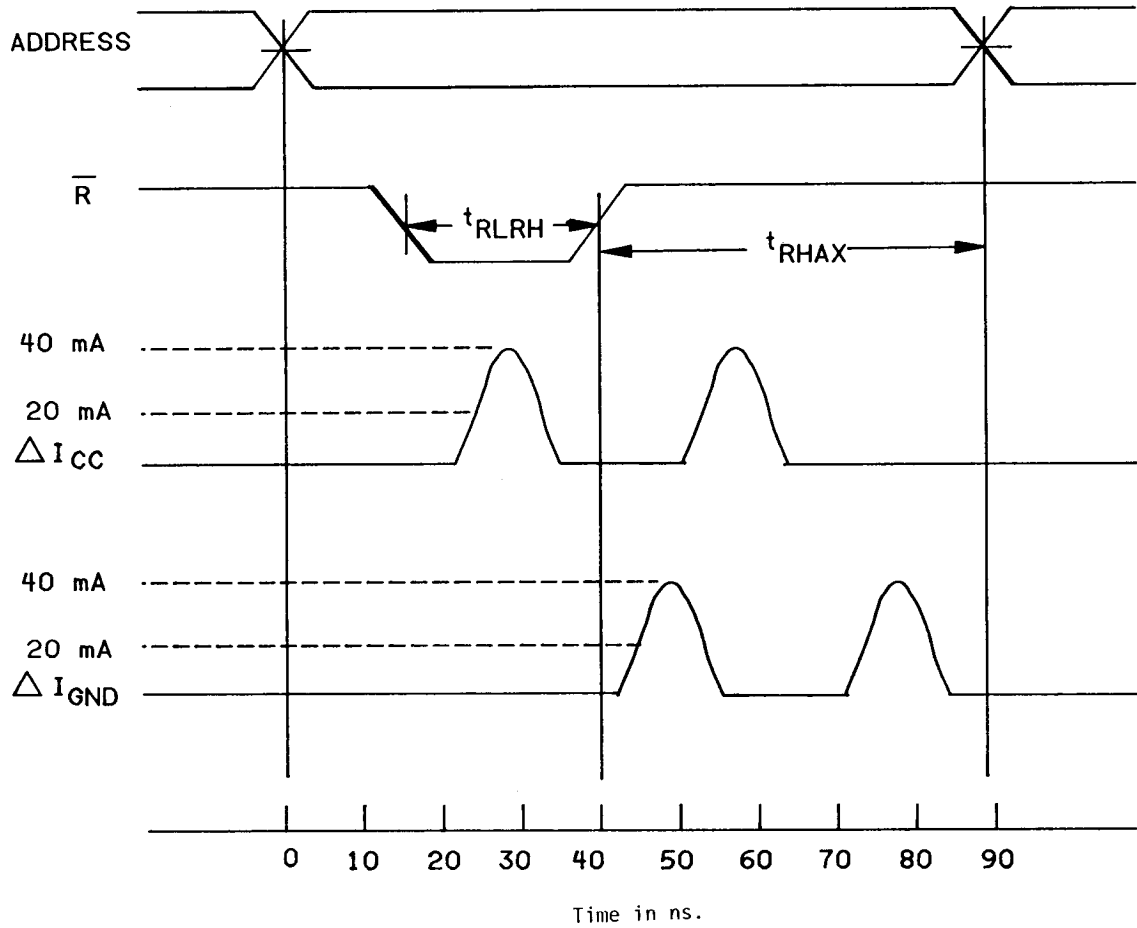


FIGURE 5. Switching waveforms.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592	
		REVISION LEVEL	SHEET 13

DESC FORM 193A
 SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE 1987-549-096

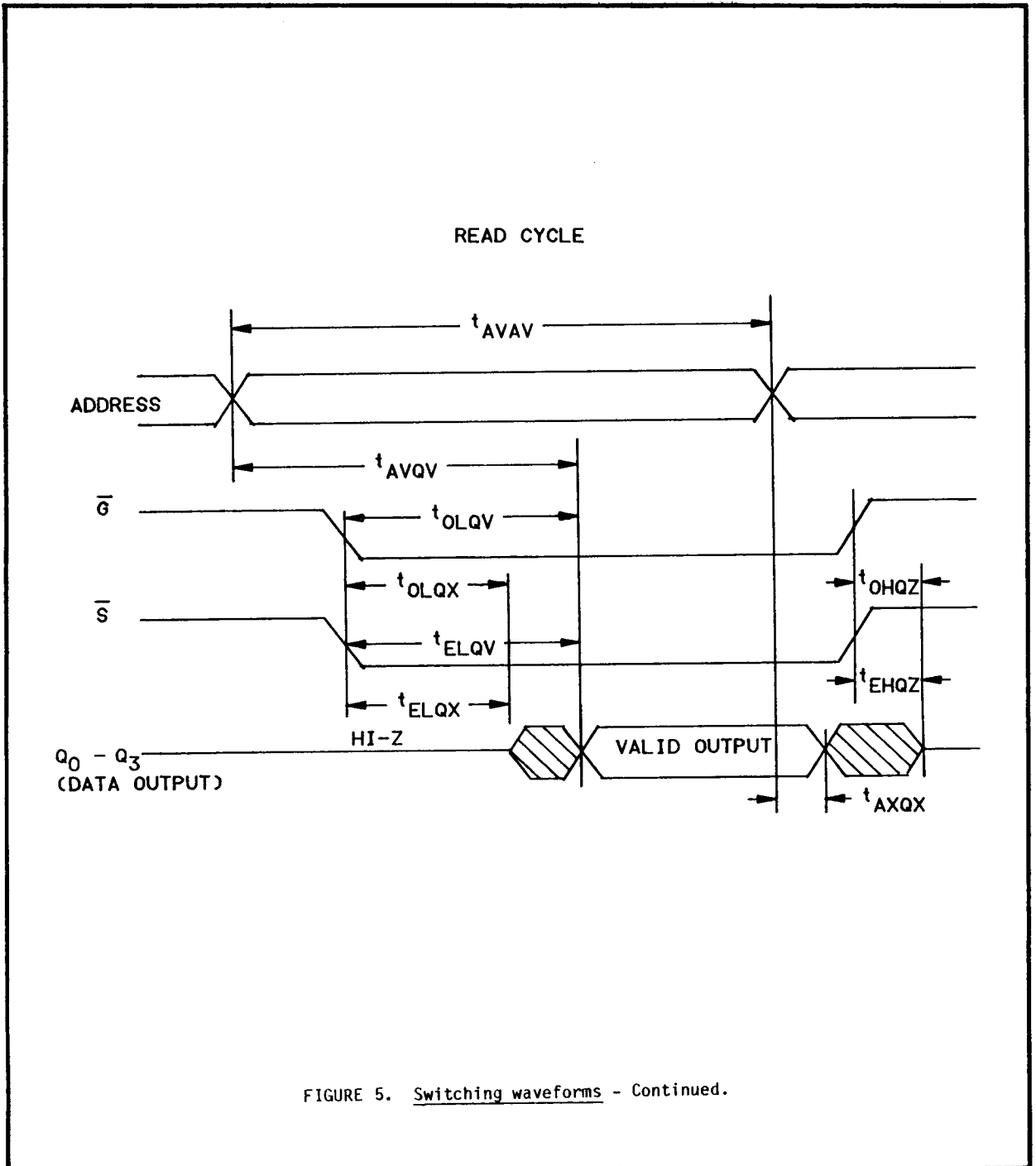


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL	SHEET 14

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE 1987-549-096

WRITE CYCLE

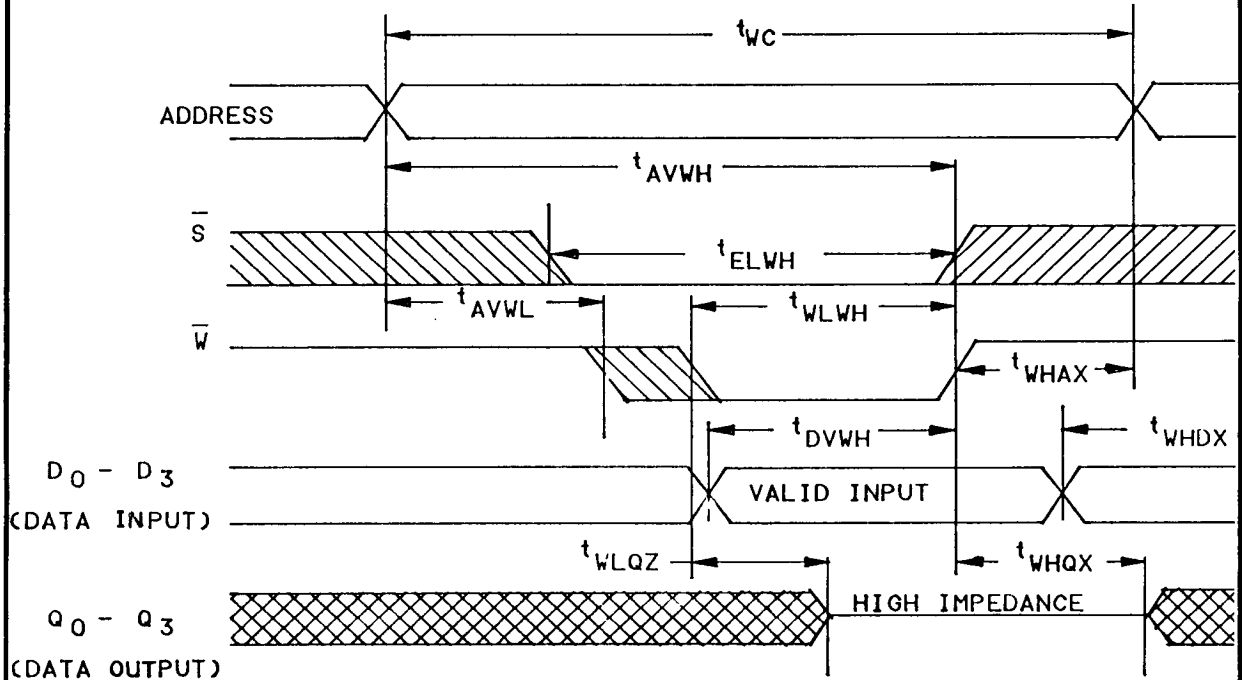


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL	SHEET 15

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

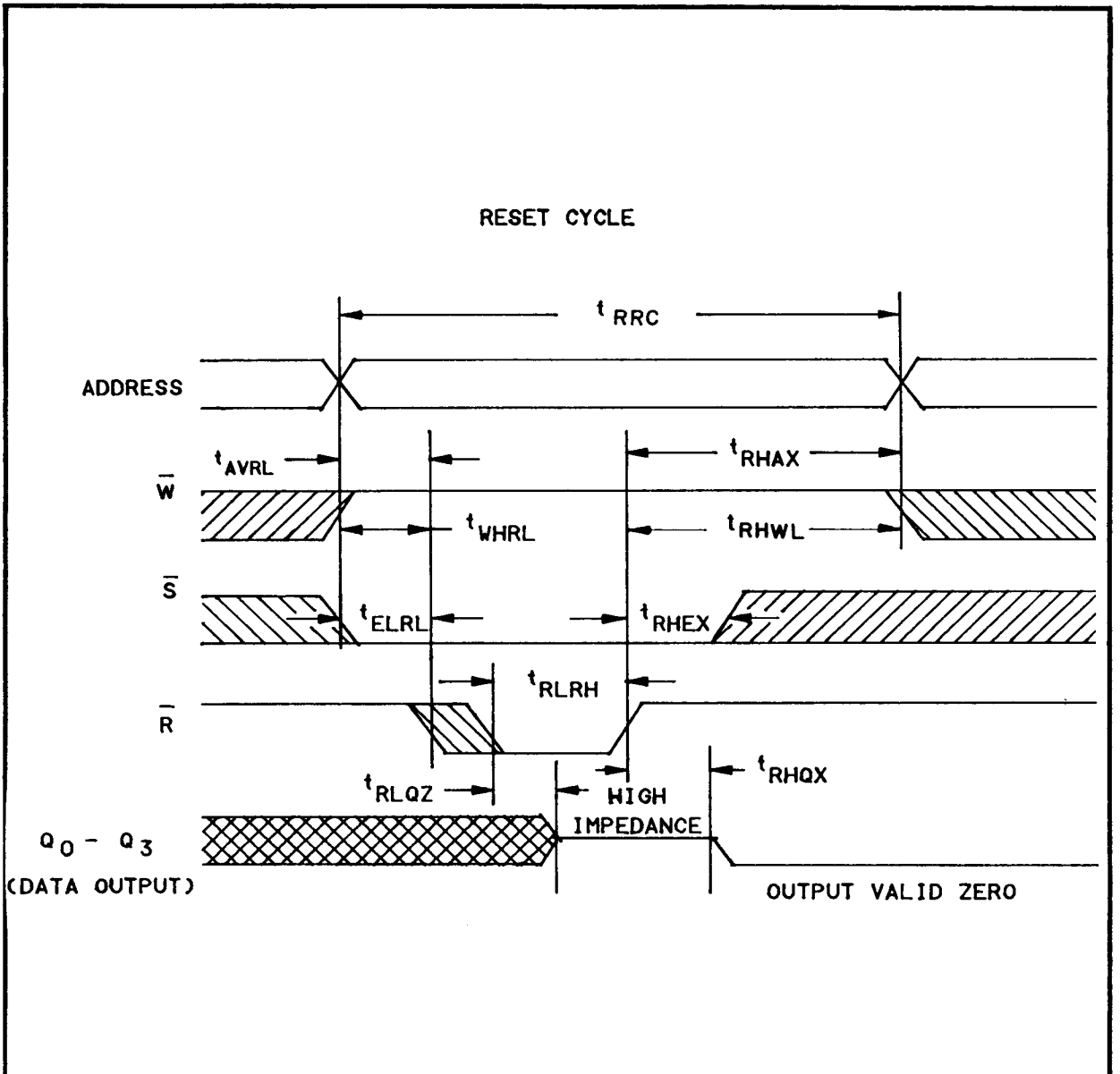


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL	SHEET 16

DESC FORM 193A
SEP 87

☆ U.S. GOVERNMENT PRINTING OFFICE: 1987-549-096

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 <u>1/</u>	Replacement military specification part number
5962-8759201KX	34335	AM9150-25/BKA	
5962-8759201LX	34335	AM9150-25/BLA	
5962-8759201XX	34335	AM9150-25/BUA	
5962-8759202KX	34335	AM9150-35/BKA	
5962-8759202LX	34335	AM9150-35/BLA	
5962-8759202XX	34335	AM9150-35/BUA	
5962-8759203KX	34335	AM9150-45/BKA	
5962-8759203LX	34335	AM9150-45/BLA	
5962-8759203XX	34335	AM9150-45/BUA	

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

34335

Vendor name and address

Advanced Micro Devices, Inc.
905 Thompson Place
P.O. Box 3453
Sunnyvale, CA 94088

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A	5962-87592
	REVISION LEVEL A	SHEET 17