

REVISIONS

LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Update drawing to current requirements. Editorial changes throughout. - gap	02-05-10	Raymond Monnin
B	Boilerplate update, part of 5 year review. ksr	08-08-13	Robert M. Heber
C	Remove references to device class M. Update drawing to reflect current MIL-PRF-38535 requirements. - llb	17-07-20	Charles F. Saffle



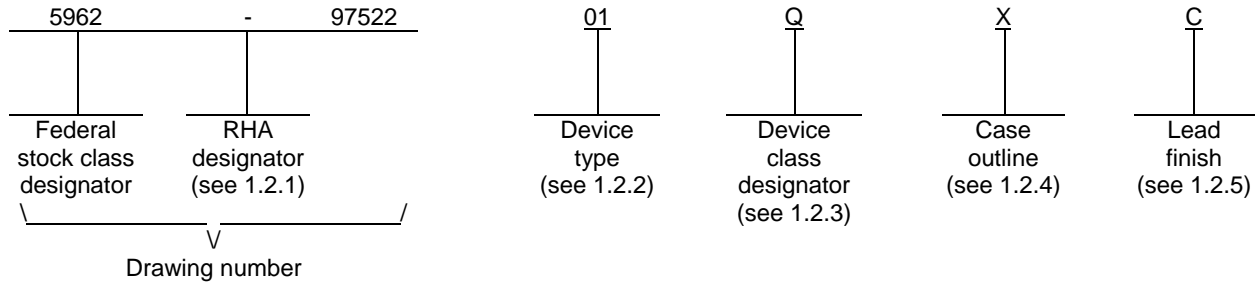
REV	C	C	C	C	C															
SHEET	35	36	37	38	39															
REV	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
SHEET	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
REV STATUS OF SHEETS	REV			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	SHEET			1	2	3	4	5	6	7	8	9	10	11	12	13	14			

PMIC N/A	PREPARED BY Kenneth S. Rice	<p align="center"><b>DLA LAND AND MARITIME</b>  <b>COLUMBUS, OHIO 43218-3990</b>  <a href="http://www.landandmaritime.dla.mil">http://www.landandmaritime.dla.mil</a></p> <p align="center"><b>MICROCIRCUIT, MEMORY, DIGITAL,  CMOS, PROGRAMMABLE LOGIC ARRAY,  MONOLITHIC SILICON</b></p>			
<p align="center"><b>STANDARD  MICROCIRCUIT  DRAWING</b></p> <p>THIS DRAWING IS AVAILABLE  FOR USE BY ALL  DEPARTMENTS  AND AGENCIES OF THE  DEPARTMENT OF DEFENSE</p>	CHECKED BY Jeff Bowling				
	APPROVED BY Raymond Monnin				
	DRAWING APPROVAL DATE 97-06-27				
AMSC N/A	REVISION LEVEL C	<table border="1"> <tr> <td>SIZE A</td> <td>CAGE CODE <b>67268</b></td> <td><b>5962-97522</b></td> </tr> </table>	SIZE A	CAGE CODE <b>67268</b>	<b>5962-97522</b>
SIZE A	CAGE CODE <b>67268</b>	<b>5962-97522</b>			
		SHEET 1 OF 39			

1. SCOPE

1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device class Q) and space application (device class V). A choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of Radiation Hardness Assurance (RHA) levels is reflected in the PIN.

1.2 PIN. The PIN is as shown in the following example:



1.2.1 RHA designator. Device classes Q and V RHA marked devices meet the MIL-PRF-38535 specified RHA levels and are marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

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

<u>Device type</u>	<u>Generic number</u>	<u>Circuit function</u>	<u>Access time</u>
01	4005E-4	5000 gate programmable array	4 ns

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as follows:

<u>Device class</u>	<u>Device requirements documentation</u>
Q or V	Certification and qualification to MIL-PRF-38535

1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
X	CMGA8-P156	156 <u>1/</u>	Pin grid array package
Y	see figure 1	164	Quad flat package
Z	see figure 1	164	Quad flat package

1.2.5 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V.

1/ 156 = actual number of pins used, not maximum listed in MIL-STD-1835.

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1.3 Absolute maximum ratings. 2/

Supply voltage range to ground potential (V <sub>CC</sub> ) .....	-0.5 V dc to +7.0 V dc
DC input voltage range .....	-0.5 V dc to V <sub>CC</sub> +0.5 V dc
Voltage applied to three-state output (V <sub>TS</sub> ) .....	-0.5 V dc to V <sub>CC</sub> +0.5 V dc
Lead temperature (soldering, 10 seconds) .....	+260°C
Power dissipation (P <sub>D</sub> ) .....	2.0 W
Thermal resistance, junction-to-case (θ <sub>JC</sub> ):	
Case outline X .....	See MIL-STD-1835
Case outlines Y and Z .....	20°C/W 3/
Junction temperature (T <sub>J</sub> ) .....	+150°C 4/
Storage temperature range .....	-65°C to +150°C

1.4 Recommended operating conditions. 5/

Case operating temperature range (T <sub>C</sub> ) .....	-55°C to +125°C
Supply voltage relative to ground (V <sub>CC</sub> ) .....	+4.5 V dc minimum to +5.5 V dc maximum
Ground voltage (GND) .....	0 V dc

2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard Microcircuits.  
MIL-STD-1835 - Interface Standard Electronic Component Case Outlines.

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.  
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are the issues of the documents cited in the solicitation.

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JESD 78 - IC Latch-Up Test.

(Copies of these documents are available online at <http://www.jedec.org> or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240-S, Arlington, VA 22201-2107.)

2.3 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 takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

3/ When a thermal resistance for this case is specified in MIL-STD-1835 that value shall supersede the value indicated herein.

4/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions in accordance with method 5004 of MIL-STD-883.

5/ All voltage values in this drawing are with respect to V<sub>SS</sub>.

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### 3. REQUIREMENTS

3.1 Item requirements. The individual item requirements for device classes Q and V shall be in accordance with MIL-PRF-38535 as specified herein, or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V.

3.2.1 Case outlines. The case outlines shall be in accordance with 1.2.4 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Logic block diagram. The logic block diagram shall be as specified on figure 3.

3.3 Electrical performance characteristics and postirradiation parameter limits. Unless otherwise specified herein, the electrical performance characteristics and postirradiation parameter limits 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 IIA. The electrical tests for each subgroup are defined in table I.

3.5 Marking. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device. For RHA product using this option, the RHA designator shall still be marked. Marking for device classes Q and V shall be in accordance with MIL-PRF-38535.

3.5.1 Certification/compliance mark. The certification mark for device classes Q and V shall be a "QML" or "Q" as required in MIL-PRF-38535.

3.6 Certificate of compliance. For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see 6.6.1 herein). The certificate of compliance submitted to DLA Land and Maritime-VA prior to listing as an approved source of supply for this drawing shall affirm that the manufacturer's product meets, for device classes Q and V, the requirements of MIL-PRF-38535 and herein.

3.7 Certificate of conformance. A certificate of conformance as required for device classes Q and V in MIL-PRF-38535 shall be provided with each lot of microcircuits delivered to this drawing.

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TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
High level output voltage	V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -4.0 mA	1, 2, 3	All	2.4		V
Low level output voltage <u>1/</u>	V <sub>OL</sub>	V <sub>CC</sub> = 5.5 V, I <sub>OL</sub> = 12 mA	1, 2, 3	All		0.4	V
Dynamic power consumption <u>2/ 3/</u>		V <sub>CC</sub> = 5.5 V	1, 2, 3	All		<u>2/</u>	mW/ MHz
Quiescent LCA supply current <u>4/</u>	I <sub>CCO</sub>	V <sub>CC</sub> = V <sub>IN</sub> = 5.5 V	1, 2, 3	All		50	mA
Input leakage current	I <sub>IL</sub>	V <sub>IN</sub> = 0 V and 5.5 V, V <sub>CC</sub> = 5.5 V	1, 2, 3	All	-10	+10	μA
Output leakage current	I <sub>OL</sub>	V <sub>IN</sub> = 0 V and 5.5 V, V <sub>CC</sub> = 5.5 V with no load	1, 2, 3	All	-1.0	+1.0	mA
Pad pull-up current (when selected)	I <sub>RIN</sub>	V <sub>IN</sub> = 0 V	1, 2, 3	All	-0.2	-0.25	mA
Horizontal long line pull-up current (when selected)	I <sub>RLL</sub>	At logic low	1, 2, 3	All	0.2	2.5	mA
Input capacitance	C <sub>IN</sub>	See 4.4.1e	4	All		16	pF
Output capacitance	C <sub>OUT</sub>	See 4.4.1e	4	All		16	pF
Functional test	FT	See 4.4.1c	7, 8A, 8B	All			
T <sub>pid</sub> + 14*T <sub>ilo</sub> + Int. + T <sub>ops</sub> + rtd	t <sub>B1</sub>		9, 10, 11	01		75.7	ns
T <sub>pid</sub> + 14*T <sub>hho</sub> + Int. + T <sub>ops</sub> + rtd	t <sub>B2</sub>					89.7	
T <sub>pid</sub> + 14*T <sub>iho</sub> + Int. + T <sub>ops</sub> + rtd	t <sub>B3</sub>					103.7	
T <sub>pid</sub> + 14*T <sub>rio</sub> + Int. + T <sub>ops</sub> + rtd	t <sub>B4</sub>					127.5	
T <sub>cko</sub> + Int. + T <sub>ick</sub>	t <sub>B5</sub>					10.1	
T <sub>cko</sub> + Int. + T <sub>hck</sub>	t <sub>B6</sub>					11.1	
T <sub>cko</sub> + Int. + T <sub>dick</sub>	t <sub>B7</sub>					9.1	
T <sub>cko</sub> + Int. + T <sub>ihck</sub>	t <sub>B8</sub>					12.2	
T <sub>cko</sub> + Int. + T <sub>ecck</sub>	t <sub>B9</sub>					10.1	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
Interconnect + t <sub>pid</sub> + t <sub>ops</sub> + t <sub>opcy</sub> + t <sub>sum</sub> + t <sub>BYP</sub>	t <sub>B10</sub>		9, 10, 11	01		140.7	ns
Interconnect + t <sub>pid</sub> + t <sub>ops</sub> + t <sub>ascy</sub> + t <sub>sum</sub> - t <sub>BYP</sub>	t <sub>B11</sub>					173	
Interconnect + t <sub>pid</sub> + t <sub>ops</sub> + t <sub>incy</sub> + t <sub>sum</sub>	t <sub>B12</sub>					80.1	
Interconnect + t <sub>pid</sub> + t <sub>ops</sub> + t <sub>incy</sub> + t <sub>BYP</sub>	t <sub>B13</sub>					57.5	
<b>WIDE DECODER SWITCHING CHARACTERISTICS</b>							
Full length, both pull-ups inputs from IOB I-pins	T <sub>WAF</sub>	See figures 4 and 5 as applicable. <u>5/</u>	<u>3/</u>	01		9.5	ns
Full length, both pull-ups inputs from internal logic	T <sub>WAF<sub>L</sub></sub>					12.5	
Half length, one pull-up inputs from IOB I-pins	T <sub>WAO</sub>					10.5	
Half length, one pull-up inputs from internal logic	T <sub>WAO<sub>L</sub></sub>					12.5	
<b>CLB SWITCHING CHARACTERISTICS</b>							
Combinatorial delay F/G inputs to X/Y outputs	T <sub>ILO</sub>	See figures 4 and 5, as applicable.	<u>6/</u>	01		3.9	ns
Combinatorial delay F/G inputs via H' to X/Y outputs	T <sub>IHO</sub>					5.9	
Combinatorial delay C inputs via H' to X/Y outputs	T <sub>H<sub>HO</sub></sub>					4.9	
CLB fast carry logic operand inputs (F1, F2, G1, G4) to C <sub>OUT</sub>	T <sub>OPCY</sub>					4.4	
CLB fast carry logic add/ subtract input (F3) to C <sub>OUT</sub>	T <sub>ASCY</sub>					6.8	
CLB fast carry logic initialization inputs (F1, F3) to C <sub>OUT</sub>	T <sub>INCY</sub>					2.9	
CLB fast carry logic C <sub>IN</sub> through function generators to X/Y outputs	T <sub>SUM</sub>					5	
CLB fast carry logic C <sub>IN</sub> to C <sub>OUT</sub> , bypass function generators	T <sub>BYP</sub>					<u>7/</u>	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics. - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
CLB SWITCHING CHARACTERISTICS - Continued.							
Sequential delays clock K to outputs Q	T <sub>CKO</sub>	See figures 4 and 5, as applicable	<u>6/</u>	01		15	ns
Set-up time before clock K, F/G inputs	T <sub>ICK</sub>		<u>6/</u>		4		
Set-up time before clock K, F/G inputs via H'	T <sub>IHK</sub>		<u>6/</u>		6.1		
Set-up time before clock K, C inputs via H1	T <sub>IHCK</sub>		<u>6/</u>		5		
Set-up time before clock K, C inputs via DIN	T <sub>DICK</sub>		<u>6/</u>		3		
Set-up time before clock K, C inputs via EC	T <sub>ECKK</sub>		<u>6/</u>		4		
Set-up time before clock K, C inputs via S/R, going low (inactive)	T <sub>RCK</sub>		<u>3/</u>		4.2		
Hold time after clock K, F/G inputs	T <sub>CKI</sub>		<u>6/</u>		0		
Hold time after clock K, F/G inputs via H'	T <sub>CKIH</sub>		<u>6/</u>		0		
Hold time after clock K, C inputs via H1	T <sub>CKHH</sub>		<u>6/</u>		0		
Hold time after clock K, C inputs via DIN	T <sub>CKDI</sub>		<u>6/</u>		0		
Hold time after clock K, C inputs via EC	T <sub>CKEC</sub>		<u>6/</u>		0		
Hold time after clock K, C inputs via S/R, going low (inactive)	T <sub>CKR</sub>		<u>3/</u>		0		
Clock high time	T <sub>CH</sub>		<u>3/</u>		4.5		
Clock low time	T <sub>CL</sub>		<u>3/</u>		4.5		
Set/Reset direct width (high)	T <sub>RPW</sub>		<u>3/</u>		5.5		
Set/Reset direct delay, from C to Q	T <sub>RIO</sub>		<u>6/</u>			6.5	
Master set/reset width (high or low)	T <sub>MRW</sub>		<u>3/</u>		13		
Master set/reset delay from global set/reset net to Q	T <sub>MRQ</sub>		<u>3/</u>			23	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit	
					Min	Max		
<b>CLB SWITCHING CHARACTERISTICS (RAM OPTION)</b>								
Read operation, address read cycle time (16 X 2)	T <sub>RC</sub>	See figures 3 and 4, as applicable. 7/	4/	01	4.5		ns	
Read operation, address read cycle time (32 X 1)	T <sub>RCT</sub>		4/		6.5			
Read operation data valid after address change (no write enable) (16 X 2)	T <sub>ILO</sub>		4/			3.9		
Read operation data valid after address change (no write enable) (32 X 1)	T <sub>IHO</sub>		4/			5.9		
Read during write, clocking data into flip flop address setup time before clock K (16 X 2)	T <sub>ICK</sub>		4/			4		
Read during write, clocking data into flip flop address setup time before clock K (32 X 1)	T <sub>IHCK</sub>		4/			6.1		
Read during write, data valid after WE going active (16 X 2)	T <sub>WO</sub>		4/					10
Read during write, (DIN stable before WE) (32 X 1)	T <sub>WOT</sub>		4/					12
Read during write, data valid after DIN (16 X 2)	T <sub>DO</sub>		4/					9
Read during write, (DIN change during WE) (32 X 1)	T <sub>DOT</sub>		4/					11
Read during write, clocking data into flip flop, WE setup time before clock K (16 X 2)	T <sub>WCK</sub>		4/			8		
Read during write, clocking data into flip flop, WE setup time before clock K (32 X 1)	T <sub>WCKT</sub>		4/			9.6		

See footnotes at end of table.

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TABLE I. Electrical performance characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
CLB SWITCHING CHARACTERISTICS (RAM OPTION) - Continued.							
Read during write, clocking data into flip flop, data setup time before clock K (16 X 2)	T <sub>DCK</sub>	See figures 3 and 4, as applicable. <u>7/</u>	<u>4/</u>	01	7		ns
Read during write, clocking data into flip flop, data setup time before clock K (32 X 1)	T <sub>DCKT</sub>		<u>4/</u>		8		
Write operation, address write cycle time (16 X 2)	T <sub>WC</sub>		<u>4/</u>		8		
Write operation, address write cycle time (32 X 1)	T <sub>WCT</sub>		<u>4/</u>		8		
Write operation, write enable pulse width (high) (16 X 2)	T <sub>WP</sub>		<u>4/</u>		4		
Write operation, write enable pulse width (high) (32 X 1)	T <sub>WPT</sub>		<u>4/</u>		4		
Write operation, address setup time before beginning of WE (16 X 2)	T <sub>AS</sub>		<u>4/</u>		2		
Write operation, address setup time before beginning of WE (32 X 1)	T <sub>AST</sub>		<u>4/</u>		2		
Write operation, address hold time after end of WE (16 X 2)	T <sub>AH</sub>		<u>4/</u>		2		
Write operation, address hold time after end of WE (32 X 1)	T <sub>AHT</sub>		<u>4/</u>		2		
Write operation, DIN setup time before end of WE (16 X 2)	T <sub>DS</sub>		<u>4/</u>		4		
Write operation, DIN setup time before end of WE (32 X 1)	T <sub>DST</sub>		<u>4/</u>		5		
Write operation, DIN hold time after end of WE	T <sub>DHT</sub>		<u>4/</u>		2		

See footnotes at end of table.

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TABLE I. Electrical Performance Characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit	
					Min	Max		
<b>IOB SWITCHING CHARACTERISTICS</b>								
Input propagation delay, pad to I1, I2	T <sub>PID</sub>	See figures 3 and 4 as applicable. <u>9/ 10/</u>	<u>5/</u>	01		3	ns	
Input propagation delay, pad to I1, I2, via transparent latch (fast)	T <sub>PLI</sub>		<u>4/</u>			6		
Input propagation delay, pad to I1, I2, via transparent latch (with delay)	T <sub>PDLI</sub>		<u>4/</u>			12		
Input propagation delay, clock (IK) to I1, I2, (flip-flop)	T <sub>IKRI</sub>		<u>4/</u>			6.8		
Input propagation delay, clock (IK) to I1, I2, (latch enable)	T <sub>IKLI</sub>		<u>4/</u>			7.3		
Setup time, pad to clock (IK), fast	T <sub>PICK</sub>	See figures 3 and 4 as applicable. <u>10/ 11/ 12/</u>	<u>4/</u>			4		
Setup time, pad to clock (IK), with delay	T <sub>PICKD</sub>		<u>4/</u>			10.9		
Hold time, pad to clock (IK), fast	T <sub>IKPI</sub>		<u>4/</u>			0		
Hold time, pad to clock (IK), with delay	T <sub>IKPID</sub>		<u>4/</u>			0		
Output propagation delay clock (OK) to pad, (fast)	T <sub>OKPOF</sub>	See figures 3 and 4 as applicable. <u>9/ 10/</u>	<u>4/</u>					7.5
Output propagation delay clock (OK) to pad, (slew rate limited)	T <sub>OKPOS</sub>		<u>4/</u>			11.5		
Output propagation delay output (O) to pad (fast)	T <sub>OPF</sub>		<u>4/</u>			8		

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 10

TABLE I. Electrical Performance Characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit
					Min	Max	
IOB SWITCHING CHARACTERISTICS - continued							
Output propagation delay output (O) to pad (slew rate limited)	T <sub>OPS</sub>	See figures 3 and 4 as applicable. <u>9/ 10/</u>	<u>5/</u>	01		12	ns
Output propagation delay 3-state to pad begin hi-Z (fast)	T <sub>TSHZF</sub>		<u>8/</u>			10	
Output propagation delay 3-state to pad active and valid (fast)	T <sub>TSONF</sub>		<u>8/</u>			10	
Output propagation delay 3-state to pad active and valid (slew rate limited)	T <sub>TSONS</sub>		<u>8/</u>			13.7	
Setup time, output (O) to clock (OK)	T <sub>OOK</sub>		<u>4/</u>			5	
Hold time, output (O) to clock (OK)	T <sub>OKO</sub>		<u>4/</u>			0	
Clock high or low time	T <sub>CH/</sub> T <sub>CL</sub>		<u>4/</u>			4.5	
Global set/reset delay from GSR net through Q to I1, I2	T <sub>RR1</sub>		<u>4/</u>			12	
Global set/reset delay from GSR net to pad	T <sub>RP0</sub>		<u>4/</u>			15	
Global set/reset GSR width	T <sub>MRW</sub>		<u>4/</u>			13	

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 11

TABLE I. Electrical Performance Characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit				
					Min	Max					
GUARANTEED INPUT AND OUTPUT PARAMETERS (Pin to Pin, TTL inputs)											
Global clock to output (fast) using OFF	T <sub>ICKOF</sub>	OFF = Output Flip-Flop; IFF = Input Flip-Flop or Latch	11/	01		14	ns				
Global clock to output (slew-limited) using OFF	T <sub>ICKO</sub>					18					
Input setup time, using IFF (no delay)	T <sub>PSUF</sub>				2						
Input hold time, using IFF (no delay)	T <sub>PHF</sub>				4.6						
Input setup time, using IFF (with delay)	T <sub>PSU</sub>				8.5						
Input hold time, using IFF (with delay)	T <sub>PH</sub>				0						
CLB EDGE TRIGGERED (Synchronous) RAM SWITCHING CHARACTERISTICS GUIDELINES											
Address write cycle time (clock K period)	T <sub>WCS</sub>	See figure 5	→ Size of RAM →	16X2	4/ 13/	01	15		ns		
	T <sub>WCTS</sub>						15				
Clock K pulse width (active edge)	T <sub>WPS</sub>						16X2	7.5		1	ms
	T <sub>WPTS</sub>						32X1	7.5		1	ms
Address setup time before clock K	T <sub>ASS</sub>						16X2	2.8			ns
	T <sub>ASTS</sub>						32X1	2.8			
Address hold time after clock K	T <sub>AHS</sub>						16X2	0			
	T <sub>AHTS</sub>						32X1	0			
DIN setup time before clock K	T <sub>DSS</sub>						16X2	3.5			
	T <sub>DSTS</sub>						32X1	2.5			
DIN hold time after clock K	T <sub>DHS</sub>						16X2	0			
	T <sub>DHTS</sub>						32X1	0			

See footnotes at end of table.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 12

TABLE I. Electrical Performance Characteristics - continued.

Test	Symbol	Conditions 4.5 V ≤ V <sub>CC</sub> ≤ 5.5 V -55°C ≤ T <sub>C</sub> ≤ +125°C unless otherwise specified	Group A subgroups	Device types	Limits		Unit	
					Min	Max		
<b>CLB EDGE TRIGGERED (Synchronous) RAM SWITCHING CHARACTERISTICS GUIDELINES -Continued</b>								
WE setup time before clock K	T <sub>WSS</sub>	See figure 5	→ Size of RAM →	16X2	12/ 13/	01	2.2	ns
	T <sub>WSTS</sub>			32X1			2.2	
WE hold time after clock K	T <sub>WHS</sub>			16X2	0	0	10.3	
	T <sub>WHTS</sub>			32X1	0			
Data valid after clock K	T <sub>WOS</sub>			16X2	10.3	11.6		
	T <sub>WOTS</sub>			32X1	11.6			
<b>CLB EDGE TRIGGERED (Synchronous) DUAL-PORT RAM SWITCHING CHARACTERISTICS GUIDELINES</b>								
Address write cycle time (clock K period)	T <sub>WCDS</sub>	See figure 6	→ Size of RAM →	16X1	12/ 13/	01	15	ns
Clock K pulse width (active edge)	T <sub>WPDS</sub>			16X1			7.5	
Address setup time before clock K	T <sub>ASDS</sub>			16X1	2.8	ns		
Address hold time after clock K	T <sub>AHDS</sub>			16X1	0			
DIN setup time before clock K	T <sub>DSDS</sub>			16X1	2.2			
Din hold time after clock K	T <sub>DHDS</sub>			16X1	0			
WE setup time before clock K	T <sub>WSDS</sub>			16X1	2.2			
WE hold time after clock K	T <sub>WHDS</sub>			16X1	0.3			
Data valid after clock K	T <sub>WODS</sub>			16X1	10			

- 1/ With 50 percent of the outputs simultaneously sinking 4 mA.
- 2/ With no output current loads, no active input or long line pull-resistors, all package pins at V<sub>CC</sub> or GND, and the LCA configured with a MakeBits "tie" option.
- 3/ These delays are specified from the decoder input to the decoder output. For pad-to-pad delays, add the input delay (T<sub>PID</sub>) and output delay (T<sub>OPF</sub> or T<sub>OPS</sub>).

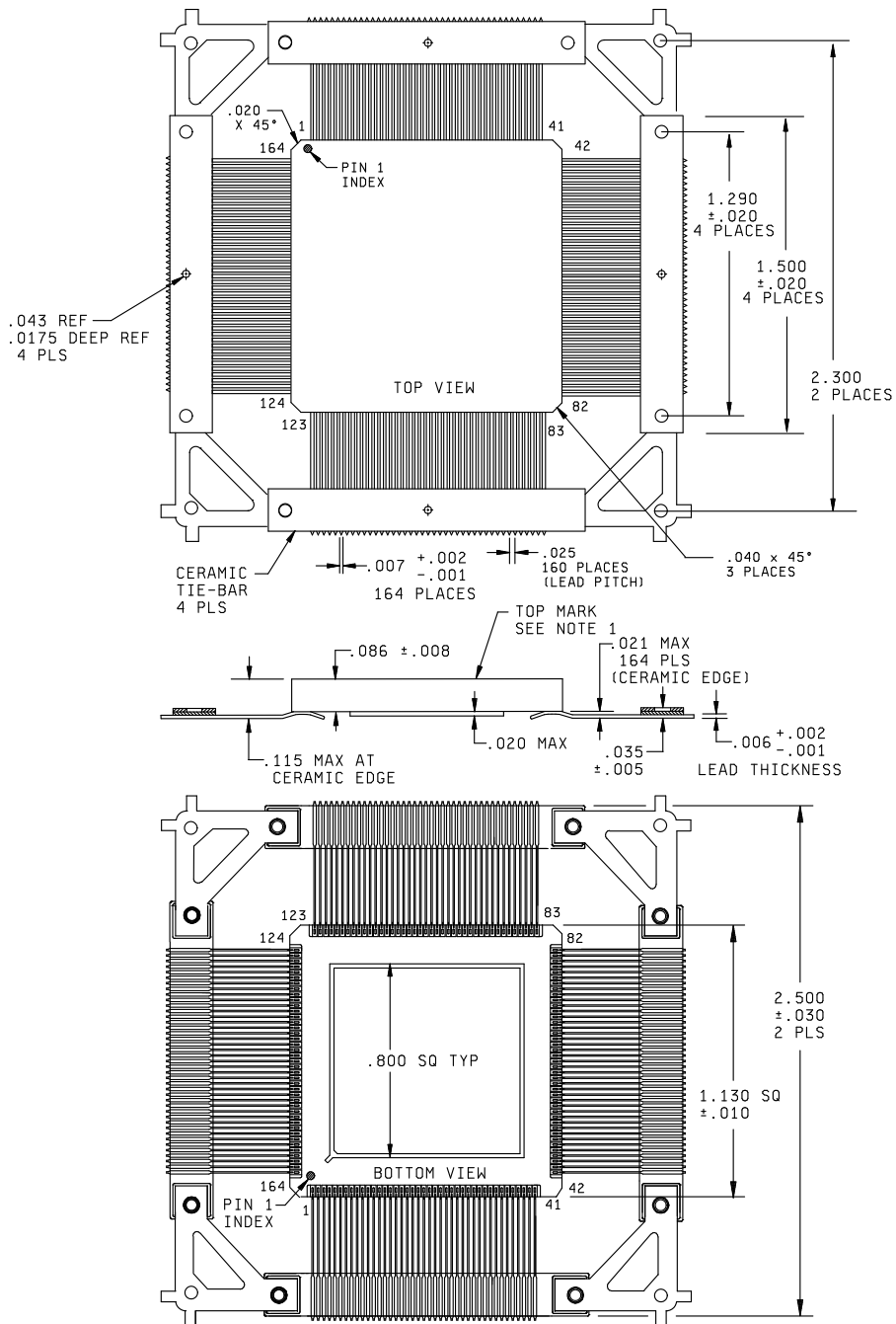
<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 13

TABLE I. Electrical Performance Characteristics - continued.

- 4/ Parameter is not tested but is guaranteed by characterization data which is taken at initial device introduction and prior to the introduction of significant changes.
- 5/ Parameter is not directly tested. Devices are first 100 percent functionality tested. Benchmark patterns (t<sub>B1</sub> - t<sub>B13</sub>) are then used to determine the compliance of this parameter. Characterization data is taken at initial device introduction and prior to the introduction of significant changes.
- 6/ Benchmark patterns (t<sub>B1</sub> - t<sub>B13</sub>) are used to determine compliance to this parameter.
- 7/ Timing for the 16 X 1 RAM option is identical to 16 X 2 RAM timing.
- 8/ Values indicated are guaranteed by characterization data if application note, provided by manufacturer, is followed. If application note is not followed, indicated values are typical only.
- 9/ Timing is measured at pin threshold, with 50 pF external capacitive loads including test fixture. Slew rate limited output rise/fall times are approximately two times longer than fast output rise/fall times. A maximum total external capacitive load for simultaneous fast mode switching in the same direction is 200 pF per power/ground pin pair. For slew rate limited outputs this total is two times larger. Exceeding this maximum capacitive load can result in ground bounce of greater than 1.5 V amplitude, less than 5 ns duration, which might cause problems when the LCA drives clocks and other asynchronous signals.
- 10/ Voltage levels of unused (bonded and un-bonded) pads must be valid logic levels. Each can be configured with the internal pull-up or pull-down resistor or alternatively configured as a driven output or be driven from an external source.
- 11/ Input pad setup times and hold times are specified with respect to the internal clock (IK). To calculate system setup time, subtract clock delay (clock pad to IK) from the specified input pad setup time value, but do not subtract below zero. "Negative" hold time means that the delay in the input data is adequate for the external system hold time to be zero, provided the input clock uses the global signal distribution from pad to IK.
- 12/ Testing of the switching parameters is modeled after testing methods specified by MIL-M-38510/605. All devices are 100% functionally tested. Some internal timing parameters are derived from benchmark timing patterns.
- 13/ Timing for the 16X1 RAM option is identical to 16X2 RAM timing. Applicable Read timing specifications are identical to Level-Sensitive Read timing.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
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Case Y



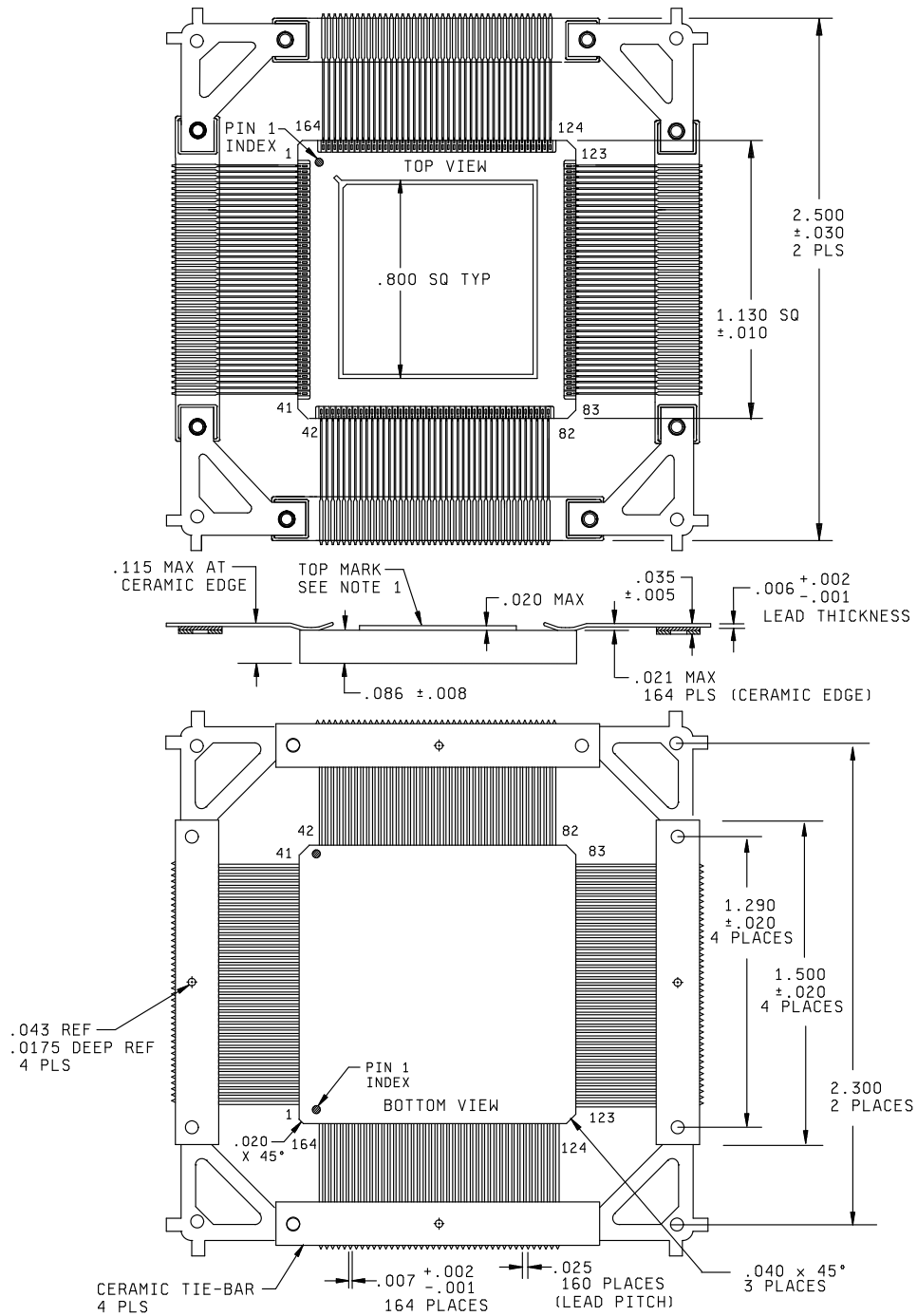
NOTE:

1. Package has top marking on lid side, therefore, pin out goes counterclockwise when device is mounted with lid in up position. (See additional notes on page 18)

FIGURE 1. Case outline.

<p><b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990</p>	<p>SIZE <b>A</b></p>		<p><b>5962-97522</b></p>
		<p>REVISION LEVEL <b>C</b></p>	<p>SHEET 15</p>

Case Z



NOTE:

1. Package has top marking on non-lid side, therefore, pin out goes clockwise when device is mounted with lid in down position. (See additional notes on page 18)

FIGURE 1. Case outline - Continued.

<p><b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990</p>	<p>SIZE <b>A</b></p>		<p><b>5962-97522</b></p>
		<p>REVISION LEVEL <b>C</b></p>	<p>SHEET 16</p>



Case Y and Z - Continued

Inches	mm		Inches	mm
.001	0.02		.035	0.89
.002	0.05		.040	1.02
.005	0.13		.043	1.09
.006	0.15		.086	2.18
.007	0.18		.115	2.92
.008	0.20		.695	17.65
.010	0.25		.800	20.32
.0175	0.44		.845	21.46
.020	0.51		1.130	28.70
.021	0.53		1.290	32.77
.025	0.64		1.500	38.10
.030	0.76		2.300	58.42
			2.500	63.50

NOTES:

The US government preferred system of measurement is the metric SI system. However, this item was originally designed using inch-pound units of measurement. In the event of conflict between the metric and inch-pound units, the inch-pound units shall take precedence.

The leads of this package style shall be protected from mechanical distortion and damage such that dimensions pertaining to relative lead/body "true positions" and lead "coplanarity" are always maintained until the next higher level package attachment process is complete. Package lead protection mechanisms (tie bars) are shown on the drawing for reference only. When microcircuit devices contained in this package style are shipped for use in Government equipment, or shipped directly to the Government as spare parts or mechanical qualification samples, lead "true position" and "coplanarity" protection shall be in place.

FIGURE 1. Case outline - Continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 17

Case outline X

Device type	All	Device type	All	Device type	All
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
A1	I/O (A17)	C1	I/O (A13)	F15	I/O
A2	I/O	C2	I/O	F16	I/O
A3	I/O (TCK)	C3	V <sub>cc</sub>	G1	I/O (A9)
A4	NC	C4	GND	G2	I/O
A5	I/O (TMS)	C5	I/O	G3	I/O
A6	I/O	C6	GND	G14	I/O
A7	I/O	C7	I/O	G15	I/O
A8	I/O	C8	GND	G16	I/O
A9	I/O	C9	I/O	H1	I/O (A8)
A10	I/O	C10	I/O	H2	GND
A11	I/O	C11	GND	H3	V <sub>cc</sub>
A12	NC	C12	I/O	H14	V <sub>cc</sub>
A13	I/O	C13	GND	H15	I/O ( $\overline{\text{ERR}}, \overline{\text{INIT}}$ )
A14	I/O	C14	V <sub>cc</sub>	H16	I/O
A15	M1	C15	I/O	J1	I/O
A16	M0	C16	I/O (LDC)	J2	I/O (A6)
B1	I/O (A14)	D1	NC	J3	I/O (A7)
B2	SGCK1 (A15, I/O)	D2	NC	J14	GND
B3	PGCK1 (A16, I/O)	D3	I/O	J15	I/O
B4	I/O (TDI)	D14	I/O (HDC)	J16	I/O
B5	I/O	D15	I/O		
B6	I/O	D16	NC		
B7	I/O	E1	I/O		
B8	V <sub>cc</sub>	E2	I/O		
B9	I/O	E3	I/O (A12)		
B10	I/O	E14	I/O		
B11	I/O	E15	NC		
B12	I/O	E16	I/O		
B13	I/O	F1	I/O (A10)		
B14	SGCK2 (I/O)	F2	I/O (A11)		
B15	M2	F3	GND		
B16	PGCK2 (I/O)	F14	GND		

NC = NO CONNECT

FIGURE 2. Terminal connections.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 18

Case outline X - Continued.

Device type	All	Device type	All	Device type	All
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
K1	I/O	P11	GND	T13	I/O
K2	I/O (A5)	P12	I/O	T14	I/O (D6)
K3	I/O (A4)	P13	V <sub>cc</sub>	T15	PGCK3 (I/O)
K14	I/O	P14	GND	T16	I/O (D7)
K15	I/O	P15	I/O		
K16	I/O	P16	I/O		
L1	I/O	R1	I/O (A0, $\overline{WS}$ )		
L2	I/O	R2	CCLK		
L3	GND	R3	I/O		
L14	GND	R4	I/O		
L15	I/O	R5	NC		
L16	I/O	R6	I/O		
M1	NC	R7	I/O		
M2	NC	R8	V <sub>cc</sub>		
M3	I/O	R9	I/O (D4)		
M14	I/O	R10	I/O		
M15	NC	R11	I/O		
M16	I/O	R12	NC		
N1	I/O (A3)	R13	I/O		
N2	I/O	R14	$\overline{PROG}$		
N3	GND	R15	DONE		
N14	I/O	R16	SGCK3 (I/O)		
N15	I/O	T1	TD0		
N16	NC	T2	SGCK4 (DOUT, I/O)		
P1	I/O ( $\overline{CS1}$ , A2)	T3	I/O (D1)		
P2	PGCK4 (A1, I/O)	T4	I/O		
P3	V <sub>cc</sub>	T5	I/O		
P4	I/O (D0, DIN)	T6	I/O		
P5	I/O ( $\overline{RCLK}$ - BUSY/RDY)	T7	I/O ( $\overline{RS}$ )		
P6	GND	T8	I/O (D3)		
P7	I/O (D2)	T9	I/O		
P8	GND	T10	I/O (D5)		
P9	I/O	T11	I/O		
P10	I/O ( $\overline{CS0}$ )	T12	NC		

NC = NO CONNECT

FIGURE 2. Terminal connections - Continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 19

Case outline Y and Z

Device type	All	Device type	All	Device type	All
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	GND	29	I/O	57	I/O
2	PGCK1 (A16, I/O)	30	GND	58	I/O
3	I/O (A17)	31	NC	59	I/O
4	I/O	32	I/O	60	I/O
5	I/O	33	I/O	61	I/O ( $\overline{\text{ERR}}$ , $\overline{\text{INIT}}$ )
6	NC	34	I/O	62	V <sub>cc</sub>
7	I/O (TDI)	35	I/O	63	GND
8	I/O (TCK)	36	NC	64	I/O
9	NC	37	I/O	65	I/O
10	GND	38	SGCK2 (I/O)	66	I/O
11	I/O	39	M1	67	I/O
12	I/O	40	GND	68	I/O
13	I/O (TMS)	41	M0	69	I/O
14	I/O	42	V <sub>cc</sub>	70	I/O
15	I/O	43	M2	71	I/O
16	I/O	44	PGCK2 (I/O)	72	GND
17	I/O	45	I/O (HDC)	73	NC
18	I/O	46	I/O	74	NC
19	GND	47	NC	75	I/O
20	V <sub>cc</sub>	48	I/O	76	I/O
21	I/O	49	I/O	77	I/O
22	I/O	50	I/O (LDC)	78	I/O
23	I/O	51	NC	79	I/O
24	I/O	52	NC	80	SGCK3 (I/O)
25	NC	53	GND	81	GND
26	I/O	54	I/O	82	DONE
27	I/O	55	I/O	83	V <sub>cc</sub>
28	I/O	56	I/O	84	$\overline{\text{PROG}}$

NC = NO CONNECT

FIGURE 2. Terminal connections - Continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 20

Case outline Y and Z - Continued.

Device type	All	Device type	All	Device type	All
Terminal number	Terminal symbol	Terminal number	Terminal symbol	Terminal number	Terminal symbol
85	I/O (D7)	112	I/O	139	I/O (A5)
86	PGCK3 (I/O)	113	GND	140	I/O
87	I/O	114	NC	141	I/O
88	NC	115	I/O (D1)	142	I/O (A6)
89	I/O	116	I/O (RCLK - BUSY/RDY)	143	I/O (A7)
90	I/O (D6)	117	I/O	144	GND
91	I/O	118	NC	145	V <sub>cc</sub>
92	NC	119	I/O	146	I/O (A8)
93	NC	120	I/O (D0, DIN)	147	I/O (A9)
94	GND	121	SGCK4 (DOUT, I/O)	148	I/O
95	I/O	122	CCLK	149	I/O
96	I/O	123	V <sub>cc</sub>	150	I/O (A10)
97	I/O (D5)	124	TDO	151	I/O (A11)
98	I/O ( $\overline{CS0}$ )	125	GND	152	I/O
99	I/O	126	I/O (A0, $\overline{WS}$ )	153	I/O
100	I/O	127	PGCK4, (A1, I/O)	154	GND
101	I/O (D4)	128	I/O	155	NC
102	I/O	129	NC	156	NC
103	V <sub>cc</sub>	130	I/O	157	I/O (A12)
104	GND	131	I/O ( $\overline{CS1}$ , A2)	158	I/O (A13)
105	I/O (D3)	132	I/O (A3)	159	NC
106	I/O ( $\overline{RS}$ )	133	NC	160	I/O
107	I/O	134	NC	161	I/O
108	I/O	135	GND	162	I/O (A14)
109	I/O (D2)	136	I/O	163	SGCK1 (A15, I/O)
110	I/O	137	I/O	164	V <sub>cc</sub>
111	I/O	138	I/O (A4)		

NC = NO CONNECT

FIGURE 2. Terminal connections - Continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 21

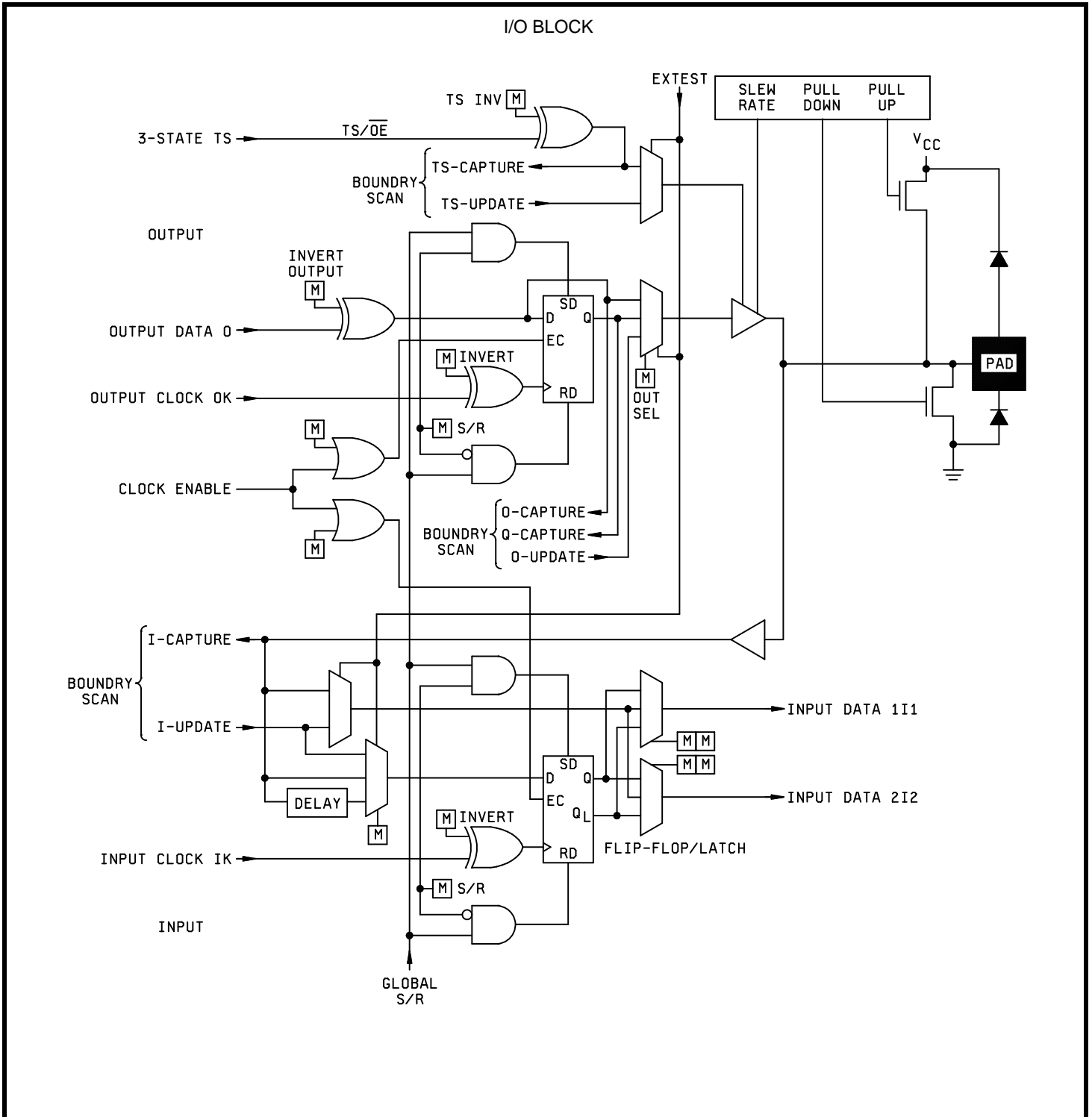
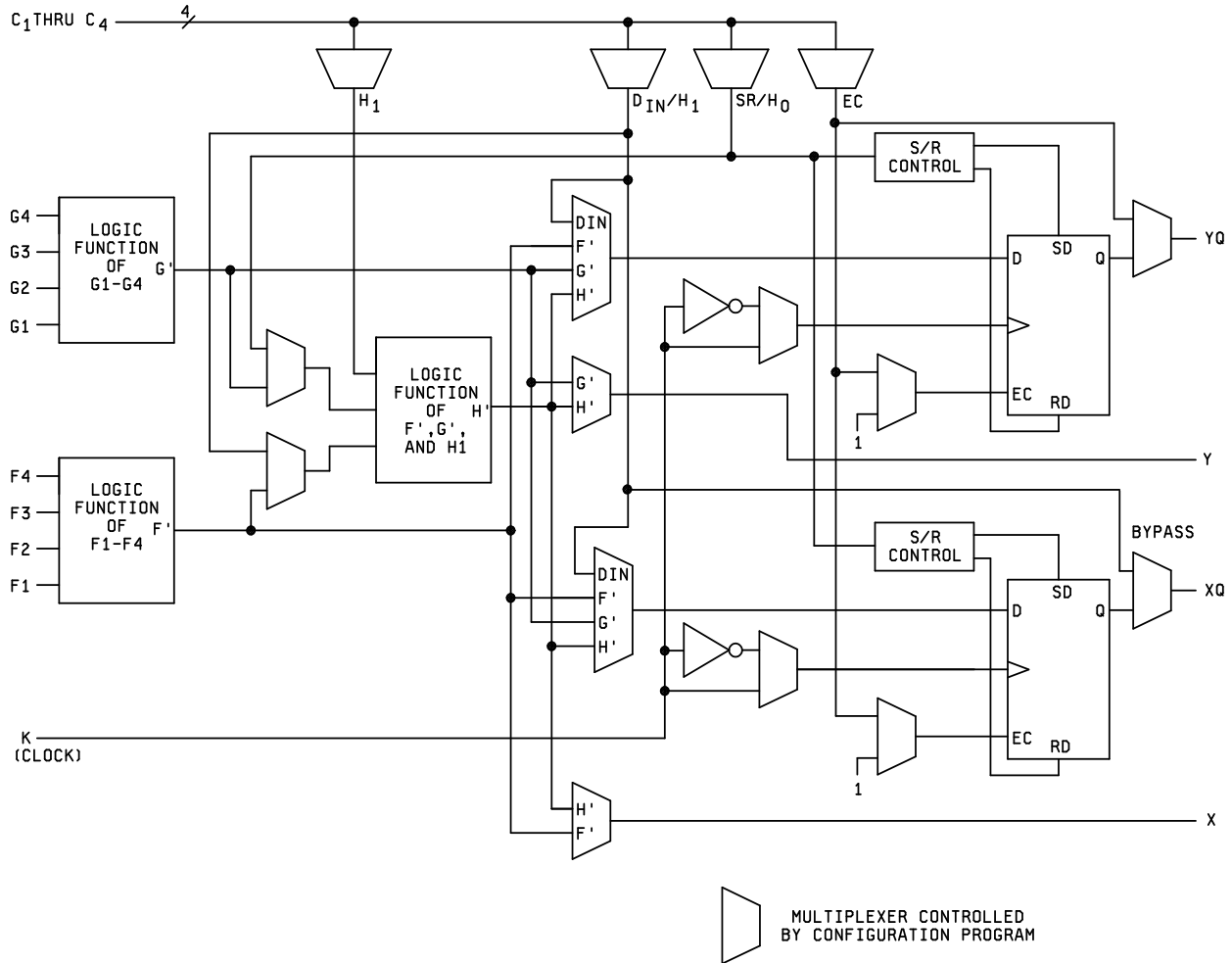


FIGURE 3. Logic block diagrams.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET 22

Simplified block diagram of CLB



(RAM and Carry logic functions not shown)

FIGURE 3. Logic block diagrams - Continued.

<b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE <b>A</b>		<b>5962-97522</b>
		REVISION LEVEL <b>C</b>	SHEET <b>23</b>

CONFIGURABLE LOGIC BLOCK (CLB)

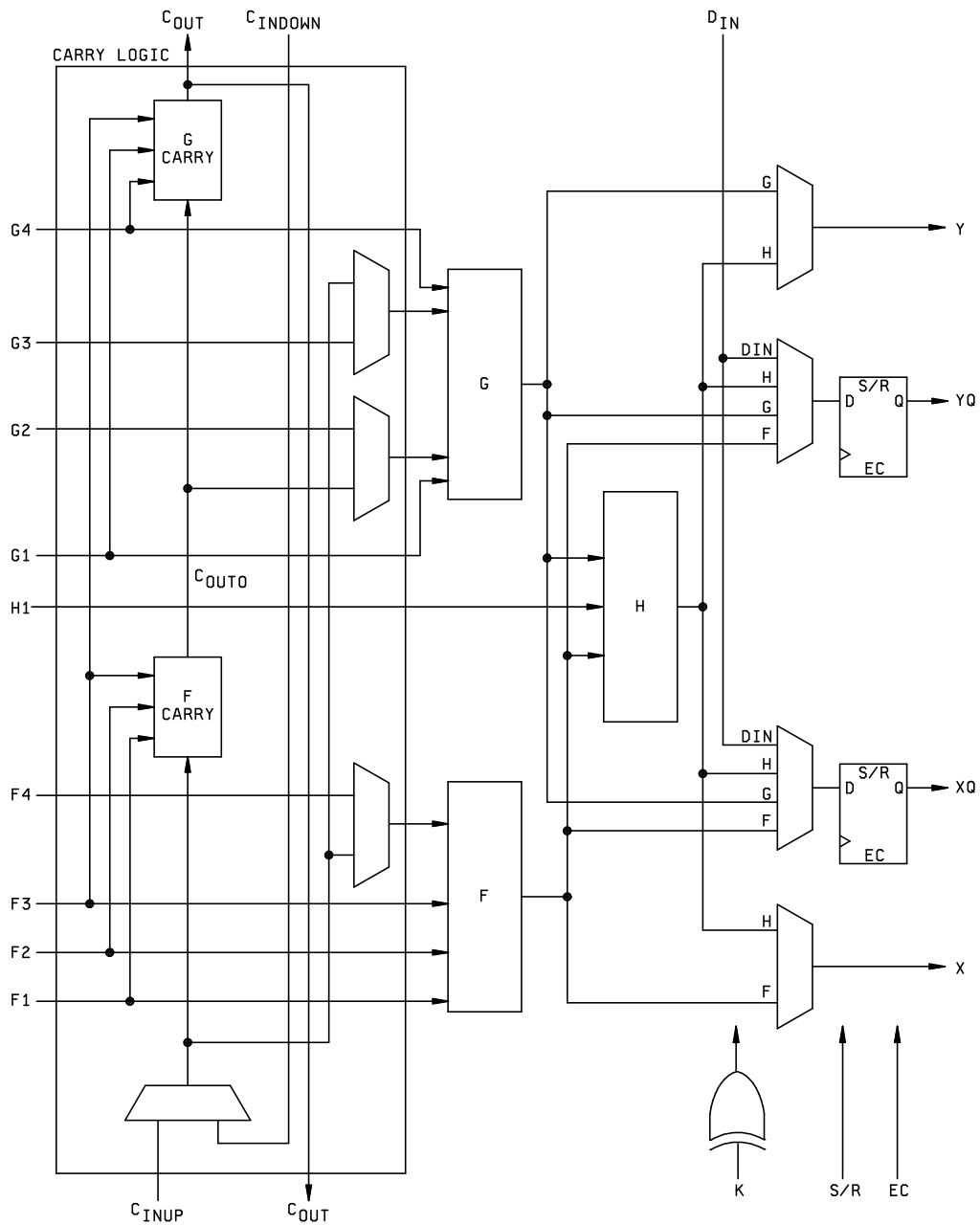


FIGURE 3. Logic block diagrams - Continued.

<p><b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990</p>	<p>SIZE <b>A</b></p>		<p><b>5962-97522</b></p>
		<p>REVISION LEVEL <b>C</b></p>	<p>SHEET 24</p>



Detail of dedicated carry logic

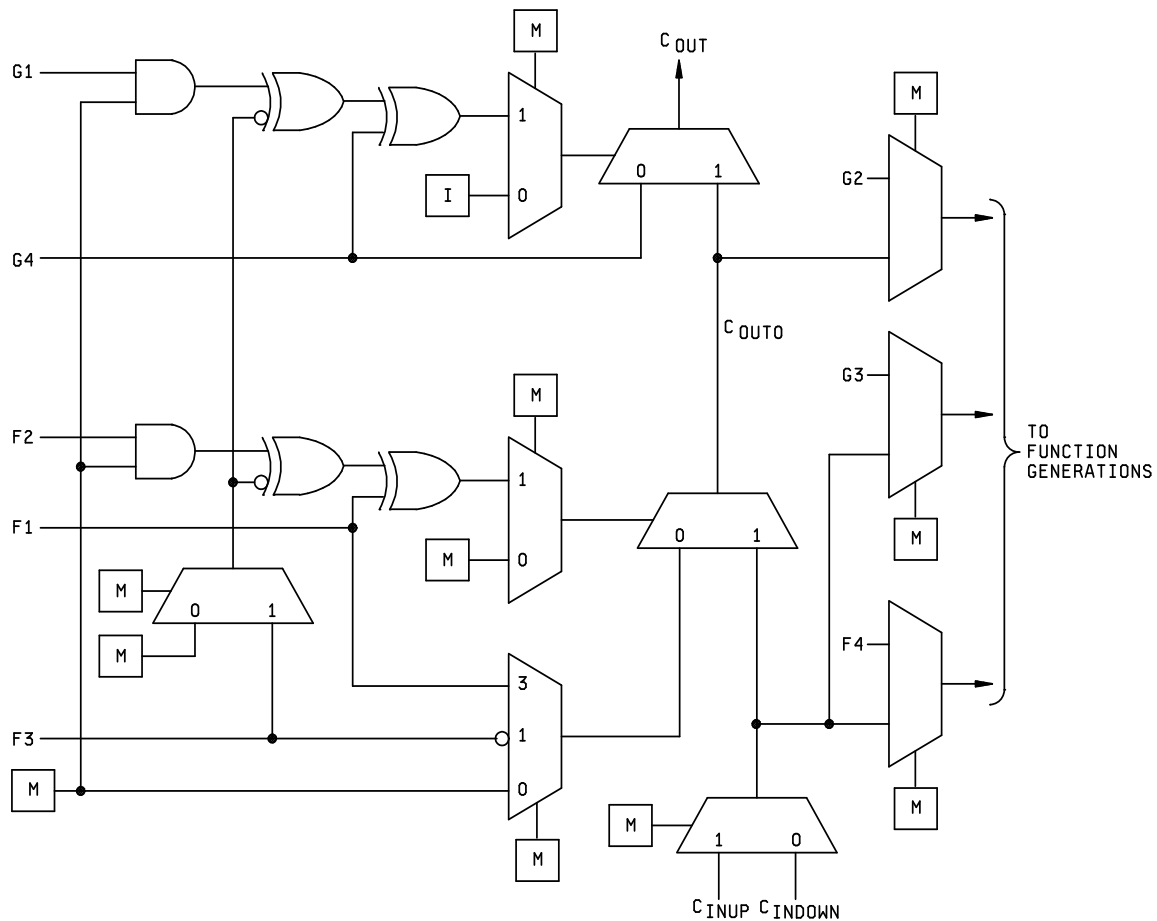


FIGURE 3. Logic block diagrams - Continued.

<p><b>STANDARD MICROCIRCUIT DRAWING</b> DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990</p>	<p>SIZE <b>A</b></p>		<p><b>5962-97522</b></p>
		<p>REVISION LEVEL <b>C</b></p>	<p>SHEET 25</p>

16 X 2 (or 16 X 1) edge-triggered single port RAM

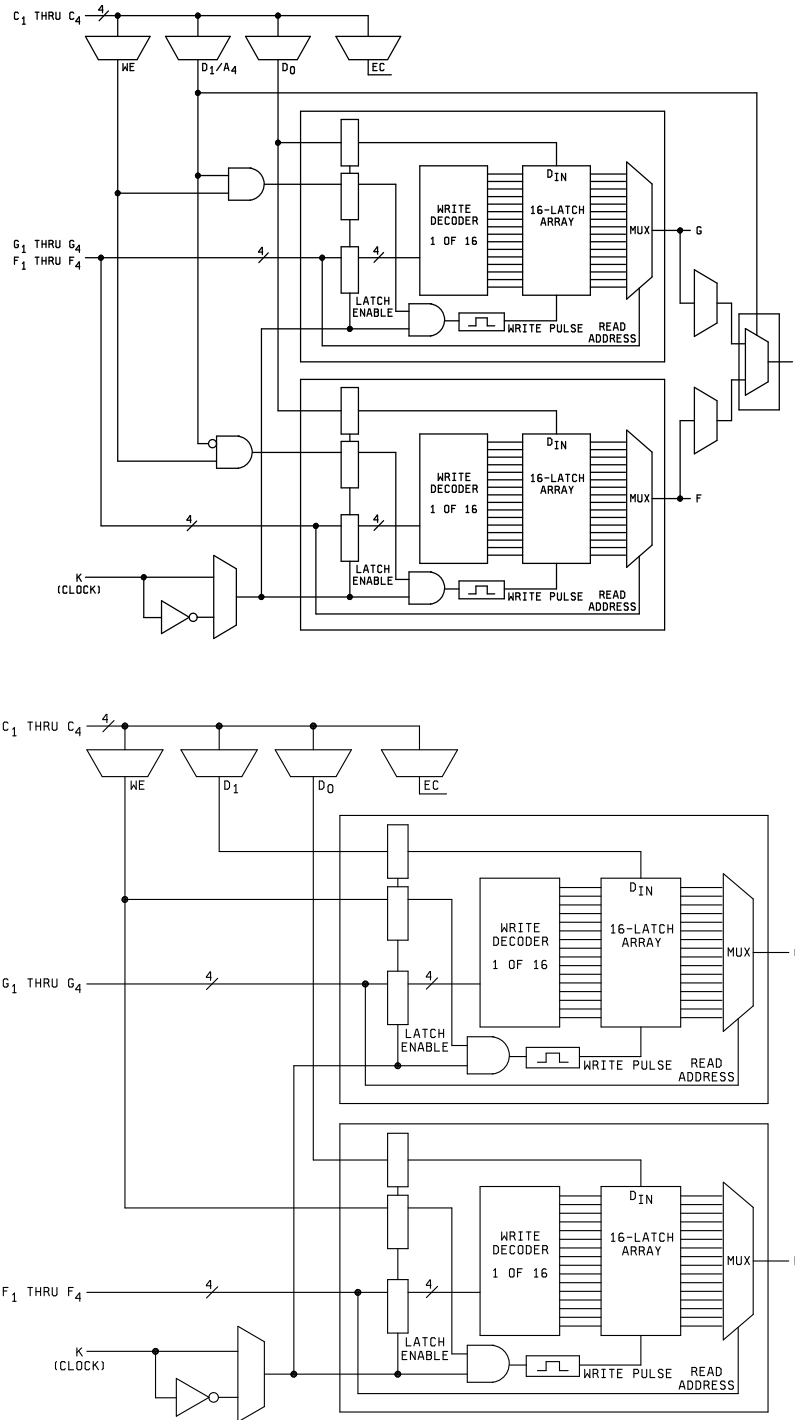


FIGURE 3. Logic block diagrams - Continued.

**STANDARD  
MICROCIRCUIT DRAWING**  
DLA LAND AND MARITIME  
COLUMBUS, OHIO 43218-3990

SIZE  
**A**

**5962-97522**

REVISION LEVEL  
**C**

SHEET  
26

16 X 1 edge-triggered dual-port RAM

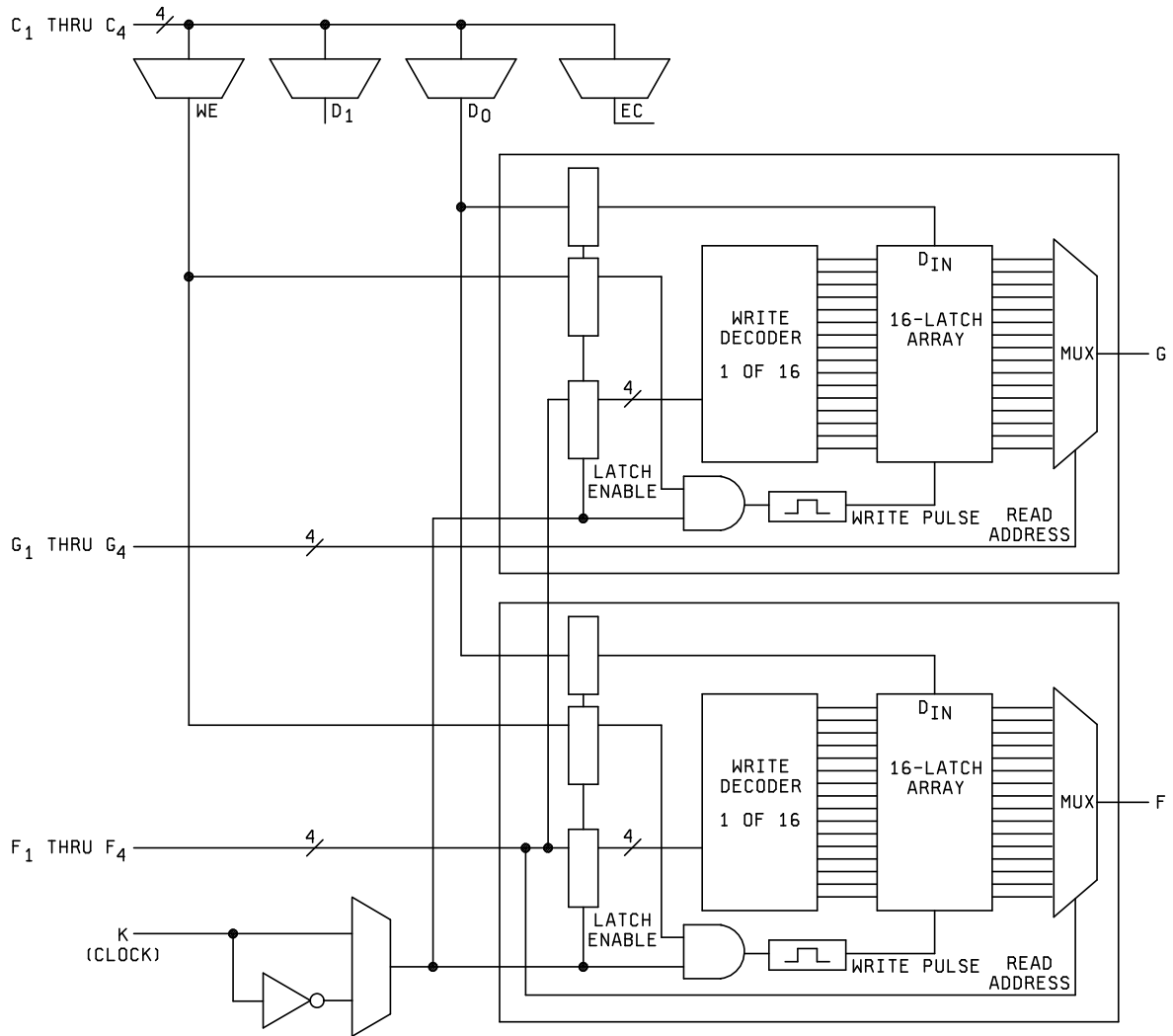


FIGURE 3. Logic block diagrams - Continued.

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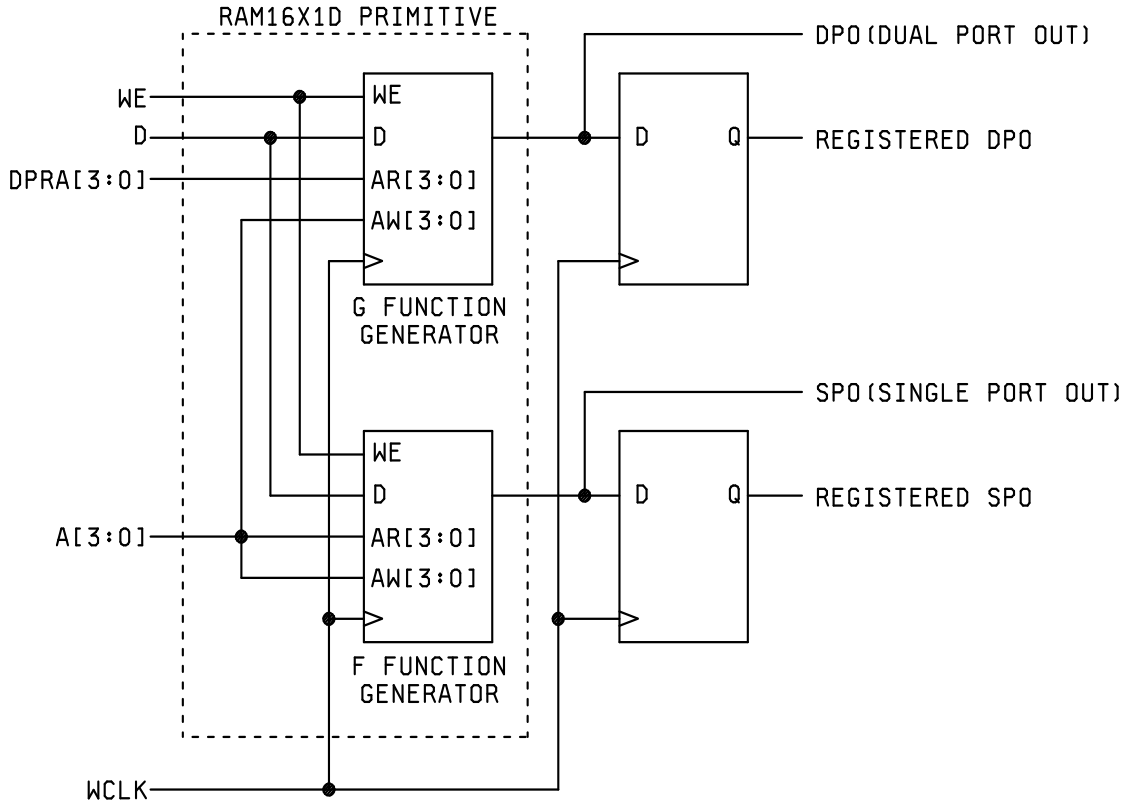


FIGURE 3. Logic block diagrams - Continued.

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# BOUNDARY SCAN LOGIC

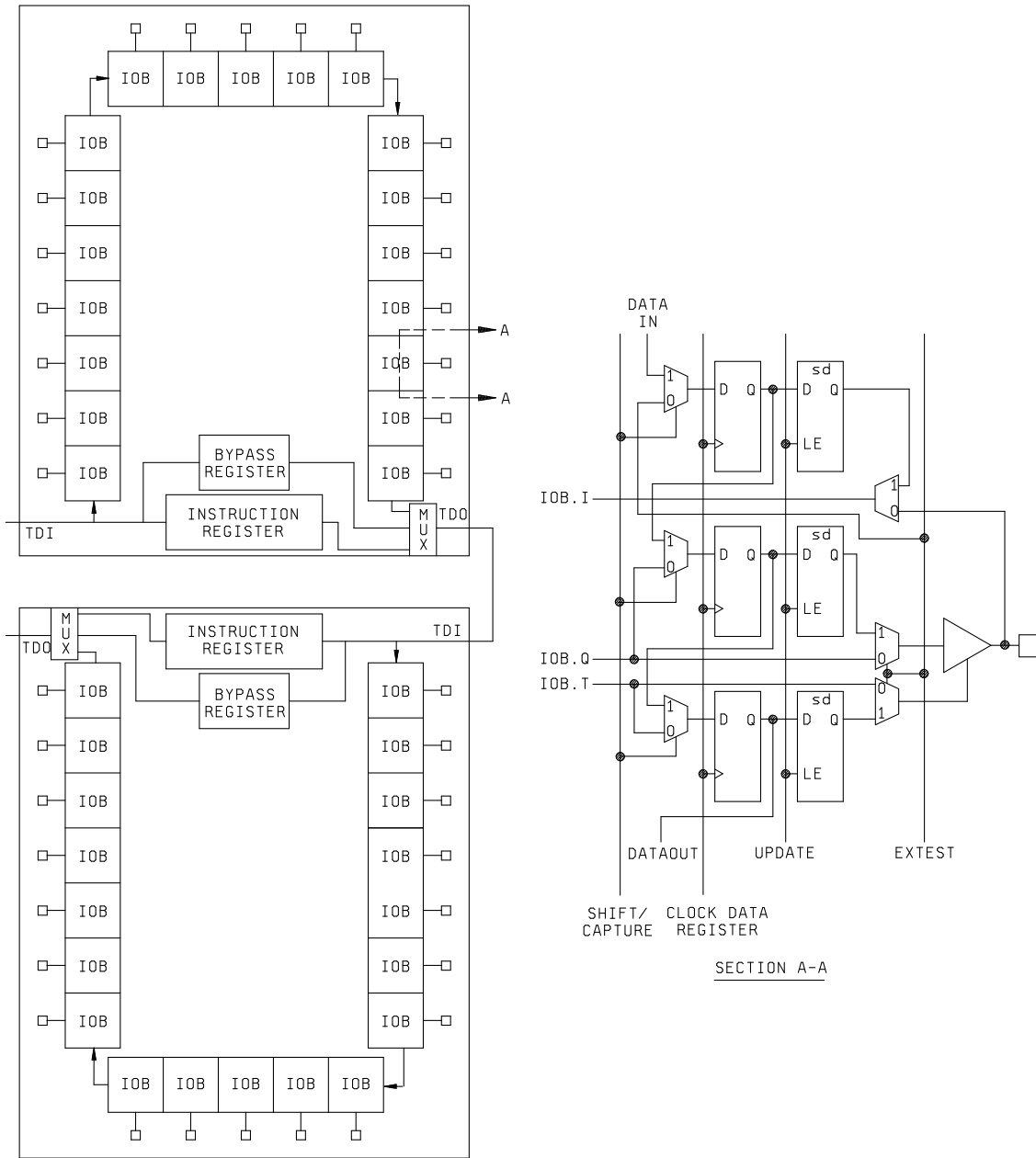


FIGURE 3. Logic block diagrams - Continued.

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GENERAL LOGIC CELL ARRAY (LGA) SWITCHING CHARACTERISTICS

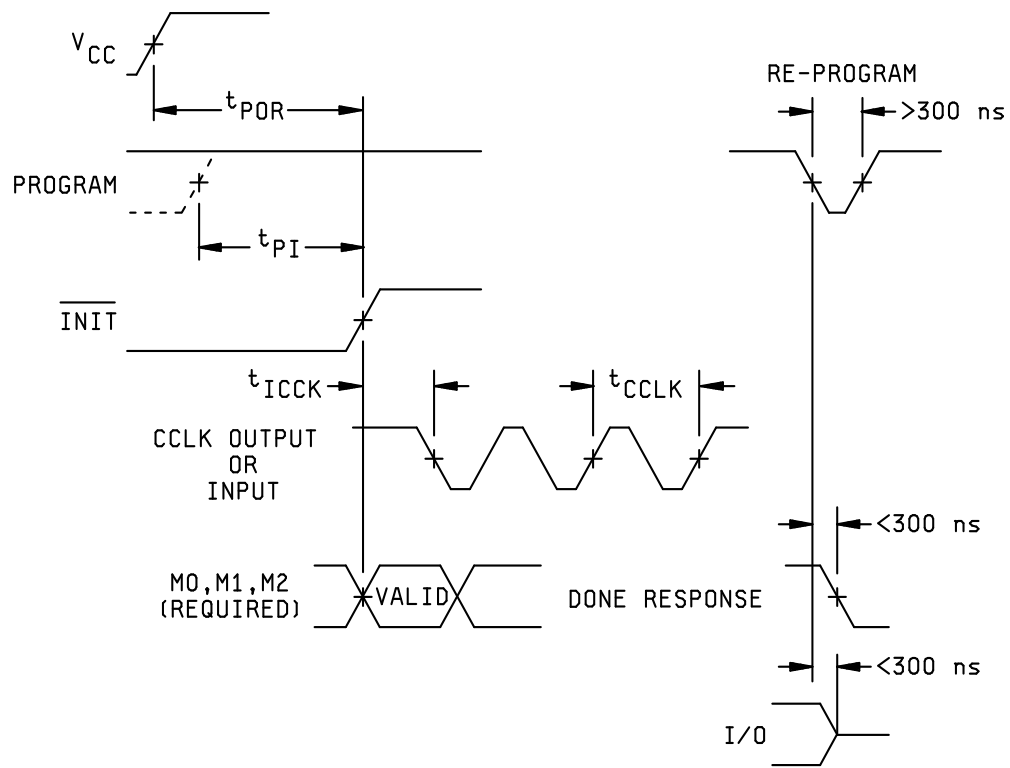


FIGURE 4. Timing diagrams and switching characteristics.

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## CONFIGURABLE LOGIC BLOCK (CLB) SWITCHING CHARACTERISTICS

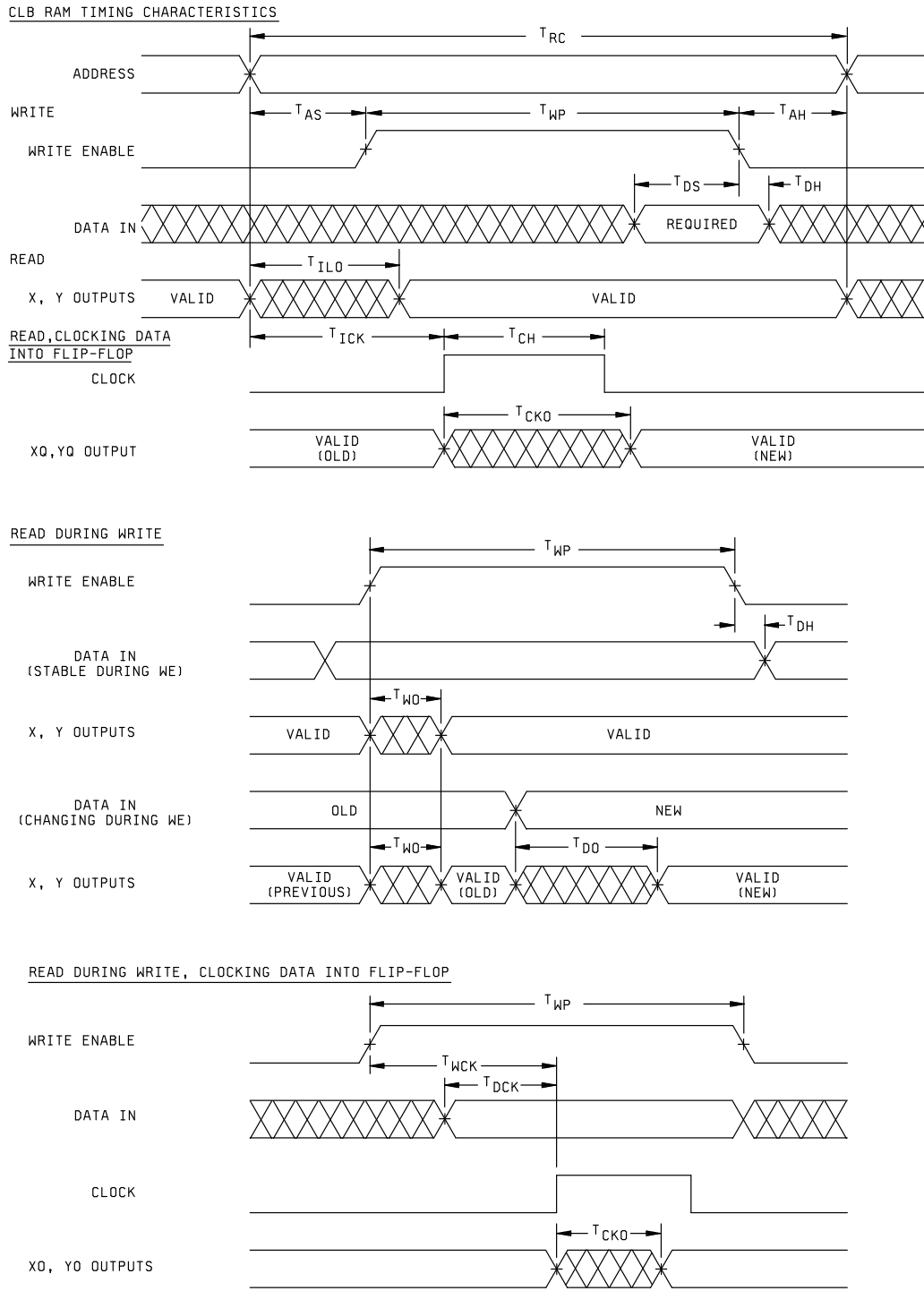


FIGURE 4. Timing diagrams and switching characteristics - Continued.

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I/O BLOCK (IOB) SWITCHING CHARACTERISTICS

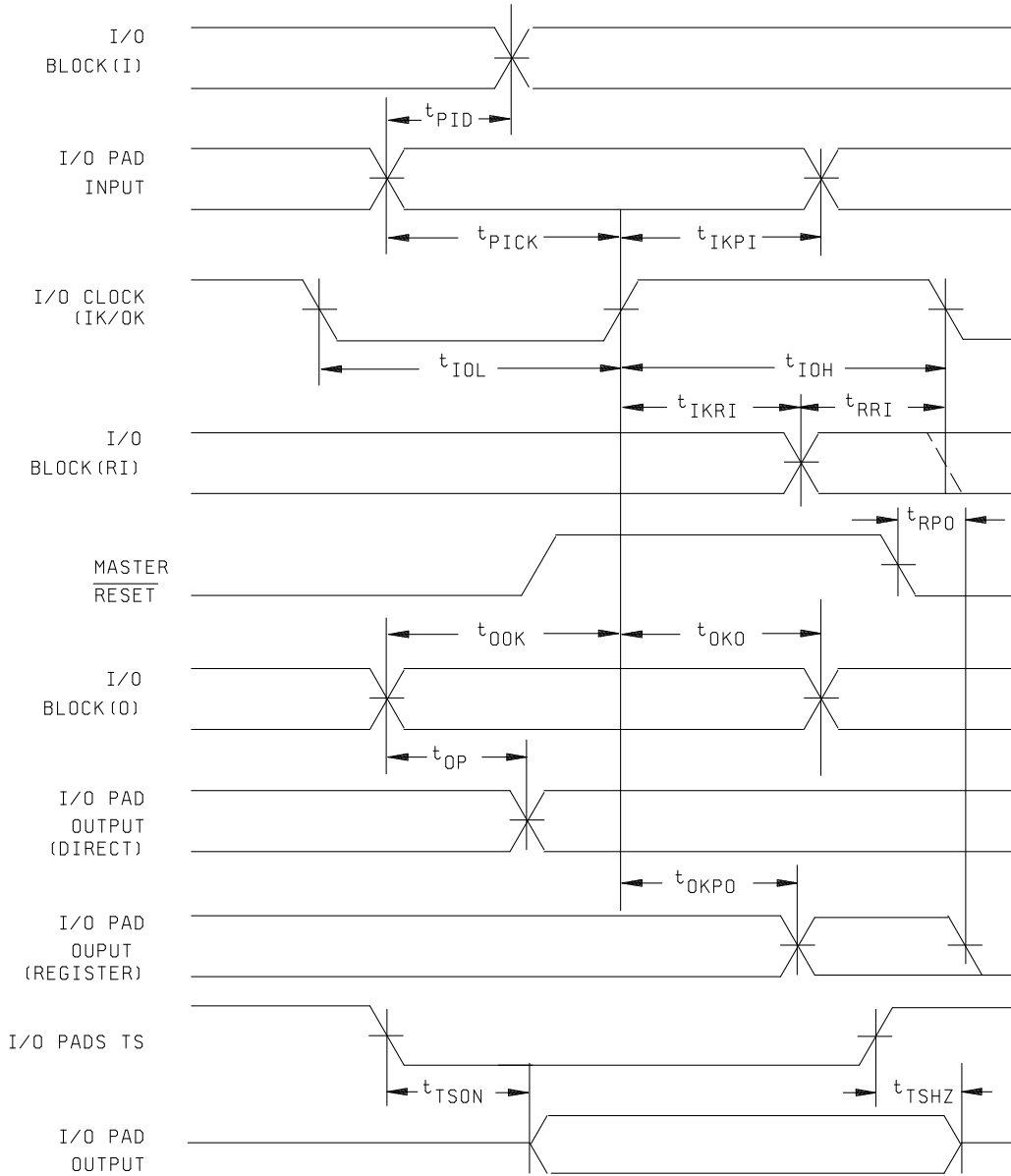


FIGURE 4. Timing diagrams and switching characteristics - Continued.

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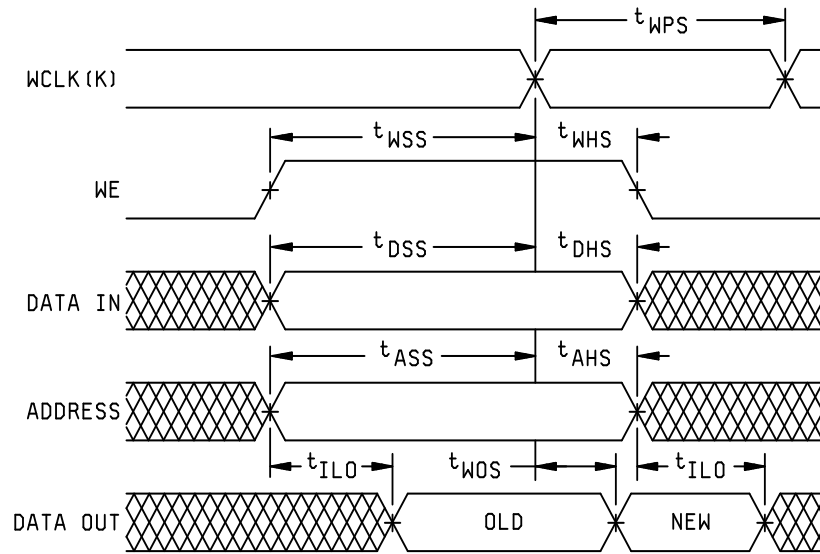
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SYNCHRONOUS DRAM



DUAL PORT RAM

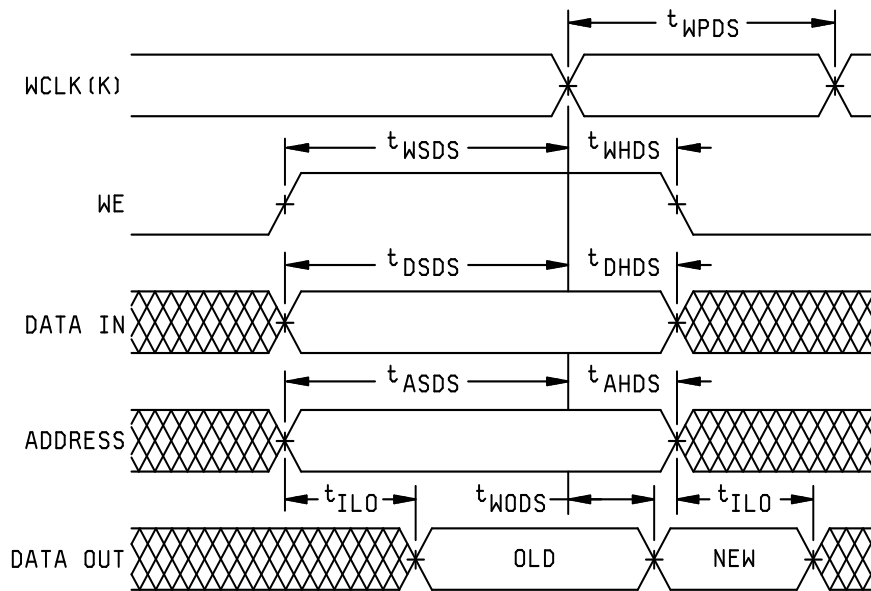


FIGURE 4. Timing diagrams and switching characteristics - Continued.

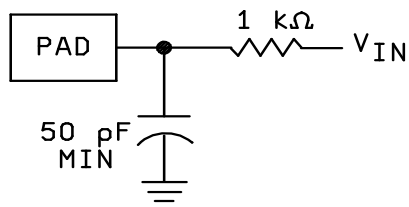
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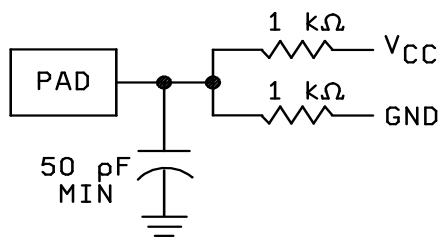
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CIRCUIT A



CIRCUIT B

FIGURE 5. Load circuit.

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4. VERIFICATION

4.1 Sampling and inspection. For device classes Q and V, sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein.

4.2 Screening. For device classes Q and V, screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and technology conformance inspection

4.2.1 Additional criteria for device classes Q and V.

- a. The burn-in test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document revision level control of the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1015 of MIL-STD-883.
- b. Interim and final electrical test parameters shall be as specified in table IIA herein.
- c. Additional screening for device class V beyond the requirements of device class Q shall be as specified in MIL-PRF-38535, appendix B.

4.3 Qualification inspection for device classes Q and V. Qualification inspection for device classes Q and V shall be in accordance with MIL-PRF-38535. Inspections to be performed shall be those specified in MIL-PRF-38535 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4 Conformance inspection. Technology conformance inspection for classes Q and V shall be in accordance with MIL-PRF-38535 including groups A, B, C, D, and E inspections, and as specified herein.

4.4.1 Group A inspection.

- a. Tests shall be as specified in table IIA herein.
- b. Subgroups 5 and 6 of table I of method 5005 of MIL-STD-883 shall be omitted.
- c. For device classes Q and V, subgroups 7 and 8 shall include verifying the functionality of the device.
- d. O/V (latch-up) tests shall be measured only for initial qualification and after any design or process changes which may affect the performance of the device. For device class M, procedures and circuits shall be maintained under document revision level control by the manufacturer and shall be made available to the preparing activity or acquiring activity upon request. For device classes Q and V, the procedures and circuits shall be under the control of the device manufacturer's TRB in accordance with MIL-PRF-38535 and shall be made available to the preparing activity or acquiring activity upon request. Testing shall be on all pins, on five devices with zero failures. Latch-up test shall be considered destructive. Information contained in JESD 78 may be used for reference.
- e. Subgroup 4 (C<sub>IN</sub> and C<sub>OUT</sub> measurements) shall be measured only for initial qualification and after any process or design changes which may affect input capacitance. Capacitance shall be measured between the designated terminal and GND at a frequency of 1 MHz. Sample size is 3 devices with no failures, and all input terminals tested.

4.4.2 Group C inspection. The group C inspection end-point electrical parameters shall be as specified in table II herein.

4.4.2.1 Additional criteria for device classes Q and V. The steady-state life test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The test circuit shall be maintained under document revision level control by the device manufacturer's TRB in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in method 1005 of MIL-STD-883.

4.4.3 Group D inspection. The group D inspection end-point electrical parameters shall be as specified in table II herein.

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TABLE IIA. Electrical test requirements. 1/ 2/ 3/ 4/ 5/ 6/ 7/

Line no.	Test requirements	Subgroups (in accordance with MIL-PRF-38535, table III)	
		Device class Q	Device class V
1	Interim electrical parameters (see 4.2)	1, 7, 9	1, 7, 9
2	Static burn-in (method 1015)	Required	Required
3	Same as line 1		1* Δ
4	Dynamic burn-in (method 1015)	Not Required	Not Required
5	Final electrical parameters (see 4.2)	1*, 2, 3, 7*, 8A, 8B, 9, 10, 11	1*, 2, 3, 7*, 8A, 8B, 9, 10, 11
6	Group A test requirements (see 4.4)	1, 2, 3, 4**, 7, 8A, 8B, 9, 10, 11	1, 2, 3, 4**, 7, 8A, 8B, 9, 10, 11
7	Group C end-point electrical parameters (see 4.4)	1, 2, 3, 7, 8A, 8B	1, 2, 3, 7, 8A, 8B, 9, 10, 11 Δ
8	Group D end-point electrical parameters (see 4.4)	2, 3, 8A, 8B	2, 3, 8A, 8B
9	Group E end-point electrical parameters (see 4.4)	1, 7, 9	1, 7, 9

- 1/ Blank spaces indicate tests are not applicable.
- 2/ Any or all subgroups may be combined when using high-speed testers.
- 3/ Subgroups 7, 8A, and 8B functional tests shall verify the functionality of the device.
- 4/ \* indicates PDA applies to subgroup 1 and 7.
- 5/ \*\* see 4.4.1e.
- 6/ Δ indicates delta limit (see table IIB) shall be required where specified, and the delta values shall be computed with reference to the previous interim electrical parameters (see line 1).
- 7/ See 4.4.1d.

TABLE IIB. Delta limits at +25°C.

Parameter <u>1/</u>	Device types
	All
I <sub>CCO</sub> standby	±1 mA of specified limit in table I.
I <sub>IL</sub>	±1 μA of specified limit in table I.

- 1/ The above parameter shall be recorded before and after the required burn-in and life tests to determine the delta.

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4.4.4 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein).

- a. End-point electrical parameters shall be as specified in table IIA herein.
- b. For device classes Q and V, the devices or test vehicle shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535 for the RHA level being tested. All device classes must meet the postirradiation end-point electrical parameter limits as defined in table I at  $T_A = +25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , after exposure, to the subgroups specified in table IIA herein.

4.5 Delta measurements for device classes Q and V. Delta measurements, as specified in table IIA, shall be made and recorded before and after the required burn-in screens and steady-state life tests to determine delta compliance. The electrical parameters to be measured, with associated delta limits are listed in table IIB. The device manufacturer may, at his option, either perform delta measurements or within 24 hours after burn-in perform final electrical parameter tests, subgroups 1, 7, and 9.

4.6 Programming procedures. The programming procedures shall be as specified by the device manufacturer and shall be made available upon request.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535 for device classes Q and V.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.1.1 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor prepared specification or drawing.

6.2 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 using DD Form 1692, Engineering Change Proposal.

6.3 Record of users. Military and industrial users should inform DLA Land and Maritime when a system application requires configuration control and which SMD's are applicable to that system. DLA Land and Maritime 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 microelectronic devices (FSC 5962) should contact DLA Land and Maritime-VA, telephone (614) 692-8108.

6.4 Comments. Comments on this drawing should be directed to DLA Land and Maritime-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0540.


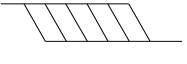

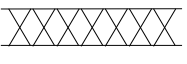
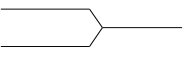
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6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535, MIL-HDBK-1331, and as follows:

V <sub>CC</sub> .....	+5.0 V SUPPLY VOLTAGE
GND .....	GROUND
CCLK .....	CONFIGURATION CLOCK
DONE .....	DONE
PROGRAM .....	PROGRAM
RCLK .....	READ CLOCK
M0 .....	MODE 0
M1 .....	MODE 1
M2 .....	MODE 2
TDO .....	TEST DATA OUTPUT
TDI .....	TEST DATA IN
TCK .....	TEST CLOCK
TMS .....	TEST MODE SELECT
HDC .....	HIGH DURING CONFIGURATION
LDC .....	LOW DURING CONFIGURATION
INIT .....	INIT
PGCK1-PGCK4 .....	PRIMARY GLOBAL INPUTS
RDY/BUSY .....	During peripheral parallel mode configuration, this pin indicates when the chip is ready for another byte of data to be written into it. After configuration is complete, this pin becomes a user programmed I/O pin.
CS0 .....	CHIP SELECT, WRITE
CS1 .....	CHIP SELECT, WRITE
WS .....	WRITE STROBE
RS .....	READ STROBE
A0-A17 .....	ADDRESS
D0-D7 .....	DATA
DIN .....	DATA INPUT
DOUT .....	DATA OUTPUT
I/O .....	INPUT/OUTPUT

6.5.1 Timing limits. The table of timing values shows either a minimum or a maximum limit for each parameter. Input requirements are specified from the external system point of view. Thus, address setup time is shown as a minimum since the system must supply at least that much time (even though most devices do not require it). On the other hand, responses from the memory are specified from the device point of view. Thus, the access time is shown as a maximum since the device never provides data later than that time.

6.5.2 Waveforms.

Waveform symbol	Input	Output
	MUST BE VALID	WILL BE VALID
	CHANGE FROM H TO L	WILL CHANGE FROM H TO L
	CHANGE FROM L TO H	WILL CHANGE FROM L TO H
	DON'T CARE ANY CHANGE PERMITTED	CHANGING STATE UNKNOWN
		HIGH IMPEDANCE

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6.6 Sources of supply.

6.6.1 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in MIL-HDBK-103 and QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DLA Land and Maritime-VA and have agreed to this drawing.

6.7 Additional information.

BUFFER SWITCHING CHARACTERISTICS

Test	Symbol	Conditions -55°C ≤ T <sub>c</sub> ≤ +125°C 4.5 V ≤ V <sub>cc</sub> ≤ 5.5 V unless otherwise specified	Group A subgroups	Device type	Limits		Unit
					Min	Max	
TBUF driving a horizontal Longline (L.L.) I to L.L. while T is low (buffer active)	T <sub>IO1</sub>	See note.	N/A	All		5.0	ns
TBUF driving a horizontal Longline (L.L.) I going low to L.L. going from resistive pull up high to active low, (TBUF configured as open drain)	T <sub>IO2</sub>					6.0	
T going low to L.L. active and valid	T <sub>ON</sub>					7.0	
T to L.L. inactive	T <sub>OFF</sub>					1.8	
T going high to L.L. (inactive) with single pull-up resistor	T <sub>PUS</sub>					23	
T going high to L.L. (inactive) with pair of pull-up resistor	T <sub>PUF</sub>					10	

NOTE: These values are typical. They are not tested, characterized, or guaranteed but are derived from benchmark timing patterns.

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STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 17-07-20

Approved sources of supply for SMD 5962-97522 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 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 DLA Land and Maritime-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DLA Land and Maritime maintains an online database of all current sources of supply at <https://landandmaritimeapps.dla.mil/Programs/Smcr/>.

Standard microcircuit drawing PIN <u>1/</u>	Vendor CAGE number	Vendor similar PIN <u>2/</u>
5962-9752201QXC	<u>3/</u>	XC4005E-4PG156B
5962-9752201QYC	<u>3/</u>	XC4005E-4B164B
5962-9752201QZC	<u>3/</u>	XC4005E-4B164B

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the vendor to determine its availability.
- 2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
- 3/ Not available from an approved source of supply. The last known supplier is listed below.

Vendor CAGE number

68994

Vendor name and address

Xilinx, Incorporated  
2100 Logic Drive  
San Jose, CA 95124

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