MIL-M-38510/6D
8 February 2005
SUPERSEDING
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24 June 1976

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, TTL, BINARY FULL ADDERS, MONOLITHIC SILICON

Inactive for new design after 7 September 1995.

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product herein shall consist of this specification sheet and MIL-PRF 38535

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic, silicon, TTL, full adder microcircuits. Two product assurance classes and a choice of case outlines and lead finishes are provided for each type and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.4).

1.2 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-38535 and as specified herein.

1.2.1 Device types. The device types are as follows:

Device type	Circuit
01	2-bit full adder
02	4-bit full adder
03	Dual full adder
04	Gated full adder

1.2.2 Device class. The device class is the product assurance level as defined in MIL-PRF-38535.

1.2.3 Case outlines. The case outlines are as designated in MIL-STD-1835 and as follows:

Outline letter	Descriptive designator	Terminals	Package style
A	GDFP5-F14 or CDFP6-F14	14	Flat pack
B	GDFP4-14		14 Flat pack
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
D	GDFP1-F14 or CDFP2-F14	14	Flat pack
E	GDIP1-T16 or CDIP2-T16		16 Dual-in-line
F	GDFP2-F16 or CDFP3-F16		16 Flat-pack

Comments, suggestions, or questions on this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43218-3990, or emailed to bipolar@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V dc to +7.0 V dc
Input voltage range	-1.5 V dc at -12 mA to +5.5 V dc
Storage temperature range	-65°C to +150°C
Maximum power dissipation per gate, (P_D) 1/	
Device types 01 and 03	275 mW dc
Device type 02	550 mW dc
Device type 04	165 mW dc
Lead temperature (soldering 10 seconds)	300°C
Thermal resistance, junction-to-case (θ_{JC})	(See MIL-STD-1835)
Junction temperature (T_J) 2/	175°C

1.4 Recommended operating conditions.

Supply voltage	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage	2.0 V dc
Maximum low level input voltage	0.8 V dc
Normalized fanout (each output) 3/	10 maximum for sum outputs 5 maximum for carry outputs
Case operating temperature range (T_C)	-55°C to 125°C

2.0 APPLICABLE DOCUMENT

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

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

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

1/ Must withstand the added P_D due to short circuit condition (e.g. I_{OS}) at one output for 5 seconds duration.
2/ Maximum junction temperature should not be exceeded except in accordance with allowable short duration burn-in screening condition in accordance with MIL-PRF-38535.
3/ Device will fanout in both high and low levels to the specified number of inputs of the same device type as that being tested.

3. REQUIREMENTS

3.1 Qualification. Microcircuits furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturers list before contract award (see 4.3 and 6.3).

3.2 Item requirements. The individual item requirements shall be in accordance with MIL-PRF-38535 and 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.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.

3.3.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.3.2 Truth tables. The truth tables shall be as specified on figure 2.

3.3.3 Logic diagrams. The logic diagrams shall be as specified on figure 3.

3.3.4 Schematic circuit. The schematic circuit shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity upon request..

3.3.5 Case outlines. Case outlines shall be as specified in 1.2.3.

3.4 Lead material and finish. Lead material and finish shall be in accordance with MIL-PRF-38535 (see 6.6).

3.5 Electrical performance characteristics. The electrical performance characteristics are as specified in table 1 and apply over the full recommended case operating temperature range, unless otherwise specified.

3.6 Electrical test requirements. The electrical test requirements for each device class shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table III.

3.7 Marking. Marking shall be in accordance with MIL-PRF-38535.

3.8 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 4 (see MIL-PRF-38535, appendix A).

4. VERIFICATION

4.1 Sampling and inspection. 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 effect the form, fit, or function as described herein.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535.

4.2 Screening. Screening shall be in accordance with MIL-PRF-38535 and shall be conducted on all devices prior to qualification and conformance inspection. The following additional criteria shall apply:

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 control by 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 test method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table II, except interim electrical parameters test prior to burn-in is optional at the discretion of the manufacturer.

c. Additional screening for space level product shall be as specified in MIL-PRF-38535.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified		Device type	Limits		
					Min	Max	Unit
High-level output voltage	V_{OH}	V_{CC} = 4.5 V, V_{IN} = 0.8 V or 2.0 V 3/,		All	2.4		V
Low-level output voltage	V_{OL}	V_{CC} = 4.5 V, V_{IN} = 2.0 V or 0.8 V 4/		All		0.4	V
Input clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_{IN} = -12 mA, T_C = 25° C		All		-1.5	V
High-level input current	I_{IH1}	V_{CC} = 5.5 V,	A1, B1, A2, B2, C0	01		160	µA
		V_{IN} = 2.4 V 2/	A1, B1, A3, B3, C0	02		160	
			A2, B2,A4, B4	02		40	
			A2, B2	03		40	
			A1, A2, B1, B2, AC, BC	04		15	
High-level input current	I_{IH2}	V_{CC} = 5.5 V, V_{IN} = 5.5 V 2/		01, 02		400	µA
High-level input current	I_{IH3}	V_{CC} = 5.5 V,	A1, B1, $\overline{A2}$, $\overline{B2}$, C1, $\overline{C2}$	03		160	µA
		V_{IN} = 2.4 V 2/	C_N	04		200	
High-level input current	I_{IH4}	V_{CC} = 5.5 V, V_{IN} = 5.5 V 2/		03		400	µA
				04		1	mA
Low-level input current	I_{IL1}	V_{CC} = 5.5 V,	A1, B1, C0	01	-1.4	-6.4	mA
		V_{IN} = 0.4 V 1/	A1, B1, A3, B3, C0	02	-0.8	-6.4	
			A2, B2	03	-0.4	-1.3	
			A1, A2, B1, B2, AC, BC	04		-1.6	
Low-level input current	I_{IL2}	V_{CC} = 5.5 V,	A2, B2	01	-0.7	-3.2	mA
		V_{IN} = 0.4 V 1/	A2, B2, A4, B4	02	-0.7	-3.2	
			A1, B1, C1	03	-1.2	-5.6	
			A*, B*	04		-2.6	
Low-level input current	I_{IL3}	V_{CC} = 5.5 V,	A2, B2, C2	03	-1.2	-5.6	mA
		V_{IN} = 0.4 V 1/	C_N	04		-8.0	
Short-circuit output current at $\sum$	I_{OS1}	V_{CC} = 5.5 V, V_{IN} = 4.5 V, V_{OUT} = 0 V 5/		01	-20	-70	mA
				02	-20	-55	
				03	-30	-100	
				04	-20	-57	
Short-circuit output current at C	I_{OS2}	V_{CC} = 5.5 V, V_{IN} = 4.5 V, V_{OUT} = 0 V 5/		01, 02, 04	-20	-70	mA
Short-circuit output current at A* or B*	I_{OS3}	V_{CC} = 5.5 V, V_{IN} = 0 V, V_{OUT} = 0 V 5/		04	-0.9	-2.9	mA
Supply current	I_{CC}	V_{CC} = 5.5 V, V_{IN} = 4.5 V		01		50	mA
				02		100	
				03		55	
				04		31	

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time high-to-low level C0 to $\sum 1$	t_{PHL1}	C_L = 50 pF, R_L = 390 Ω	01	3	61	ns
			02	3	51	
Propagation delay time low-to-high level C0 to $\sum 1$	t_{PLH1}		01	3	56	ns
			02	3	39	
Propagation delay time high-to-low level B2 to $\sum 2$	t_{PHL2}		01	3	54	ns
			02	3	40	
Propagation delay time low-to-high level B2 to $\sum 2$	t_{PLH2}		01	3	65	ns
			02	3	45	
Propagation delay time high-to-low level C0 to $\sum 2$	t_{PHL3}		01	3	61	ns
			02	3	54	
Propagation delay time low-to-high level C0 to $\sum 2$	t_{PLH3}		01	3	62	ns
			02	3	51	
Propagation delay time high-to-low level C0 to C2	t_{PHL4}	C_L = 50 pF, R_L = 800 Ω	01	3	43	ns
Propagation delay time low-to-high level C0 to C2	t_{PLH4}		01	3	34	ns
Propagation delay time high-to-low level C0 to $\sum 3$	t_{PHL4}	C_L = 50 pF, R_L = 390 Ω	02	3	77	ns
Propagation delay time low-to-high level C0 to $\sum 3$	t_{PLH4}		02	3	62	ns
Propagation delay time high-to-low level C0 to $\sum 4$	t_{PHL5}		02	3	71	ns
Propagation delay time low-to-high level C0 to $\sum 4$	t_{PLH5}		02	3	72	ns
Propagation delay time high-to-low level C0 to C4	t_{PHL6}	C_L = 50 pF, R_L = 800 Ω	02	3	55	ns
Propagation delay time low-to-high level C0 to C4	t_{PLH6}		02	3	63	ns
Propagation delay time high-to-low level A2 to $\sum 2$	t_{PHL7}	C_L = 50 pF, R_L = 390 Ω	02	3	40	ns
Propagation delay time low-to-high level A2 to $\sum 2$	t_{PLH7}		02	3	45	ns
Propagation delay time high-to-low level A4 to $\sum 4$	t_{PHL8}		02	3	40	ns
Propagation delay time low-to-high level A4 to $\sum 4$	t_{PLH8}		02	3	45	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time high-to-low level B4 to $\sum 4$	t_{PHL9}	C_L = 50 pF, R_L = 390 Ω	02	3	40	ns
Propagation delay time low-to-high level B4 to $\sum 4$	t_{PLH9}		02	3	45	ns
Propagation delay time high-to-low level C1 to $\sum 1$	t_{PHL1}		03	9	59	ns
Propagation delay time low-to-high level C1 to $\sum 1$	t_{PLH1}		03	9	60	ns
Propagation delay time high-to-low level C1 to $\overline{\sum}1$	t_{PHL2}		03	6	39	ns
Propagation delay time low-to-high level C1 to $\overline{\sum}1$	t_{PLH2}		03	6	39	ns
Propagation delay time high-to-low level C1 to $\overline{C}01$	t_{PHL3}	C_L = 50 pF, R_L = 800 Ω	03	3	21	ns
Propagation delay time low-to-high level C1 to $\overline{C}01$	t_{PLH3}		03	3	21	ns
Propagation delay time high-to-low level A2 to $\overline{\sum}2$	t_{PHL4}	C_L = 50 pF, R_L = 390 Ω	03	11	67	ns
Propagation delay time low-to-high level A2 to $\overline{\sum}2$	t_{PLH4}		03	11	69	ns
Propagation delay time high-to-low level A2 to $\sum 2$	t_{PHL5}		03	8	48	ns
Propagation delay time low-to-high level A2 to $\sum 2$	t_{PLH5}		03	8	49	ns
Propagation delay time high-to-low level A2 to $\overline{C}02$	t_{PHL6}	C_L = 50 pF, R_L = 800 Ω	03	5	28	ns
Propagation delay time low-to-high level A2 to $\overline{C}02$	t_{PLH6}		03	5	29	ns
Propagation delay time high-to-low level Cn to $\overline{C}n+1$	t_{PHL1}	C_L = 50 pF, R_L = 780 Ω	04		18	ns
Propagation delay time low-to-high level Cn to $\overline{C}n+1$	t_{PLH1}		04		33	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$ unless otherwise specified	Device type	Limits		Unit
				Min	Max	
Propagation delay time high-to-low level B_C to $\overline{C}n+1$	t_{PHL2}	C_L = 50 pF, R_L = 780 Ω	04		90	ns
Propagation delay time low-to-high level B_C to $\overline{C}n+1$	t_{PLH2}		04		45	ns
Propagation delay time high-to-low level A_C to $\sum$	t_{PHL3}	C_L = 50 pF, R_L = 400 Ω	04		127	ns
Propagation delay time low-to-high level A_C to $\sum$	t_{PLH3}		04		112	ns
Propagation delay time high-to-low level B_C to $\overline{\sum}$	t_{PHL4}		04		120	ns
Propagation delay time low-to-high level B_C to $\overline{\sum}$	t_{PLH4}		04		90	ns
Propagation delay time high-to-low level A1 to A*	t_{PHL5}	C_L = 50 pF	04		45	ns
Propagation delay time low-to-high level A1 to A*	t_{PLH5}		04		105	ns
Propagation delay time high-to-low level B1 to B*	t_{PHL6}		04		45	ns
Propagation delay time low-to-high level B1 to B*	t_{PLH6}		04		105	ns

1/ All unspecified inputs at 5.5 V.
2/ All unspecified inputs grounded.
3/ I_{OH} for each sum output is -0.4 mA (types 01, 02 and 04) and -0.8 mA (type 03) and for each carry output it is -0.2 mA (types 01, 02, and 04) and -0.56 mA (type 03). I_{OH} for A* or B* is -0.12 mA (type 04).
4/ I_{OL} for each sum output is 16 mA and for each carry output it is 8 mA. I_{OL} for A* or B* is 4.8 mA (type 04).
5/ Not more than one output should be shorted at one time.

TABLE II. Electrical test requirements.

MIL-PRF-38535 Test requirement	Subgroups (see table III)	
	Class S Devices	Class B Devices
Interim electrical parameters	1	1
Final electrical test parameters	1*, 2, 3, 7, 9, 10, 11	1*, 2, 3, 7, 9
Group A test requirements	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3, 7 9, 10, 11
Group B electrical test parameters when using the method 5005 QCI option	1, 2, 3	N/A
Groups C end point electrical parameters	1, 2, 3	1, 2, 3
Group D end point electrical parameters	1, 2, 3	1, 2, 3

*PDA applies to subgroup 1 (see 4.3c.).

4.3 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-38535.

4.4 Technology Conformance Inspection (TCI). Technology conformance inspection shall be in accordance with MIL-PRF-38535 and herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4.1 Group A inspection. Group A inspection shall be in accordance with table III of MIL-PRF-38535 and as follows:

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, and 6, shall be omitted.

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of MIL-PRF-38535.

4.4.3 Group C inspection. Group C inspection shall be in accordance with table IV of MIL-PRF-38535 and as follows:

a. End point electrical parameters shall be as specified in table II herein.

b. 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 burn-in test circuit shall be maintained under document control by 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 test method 1005 of MIL-STD-883.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table V of MIL-PRF-38535. End-point electrical parameters shall be as specified in table II herein.

4.5 Methods inspection. Methods of inspection shall be as specified in the appropriate tables and as follows:

4.5.1 Voltage and current. All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional current and positive when flowing into the referenced terminal.

Terminal number	Device type 01	Device type 02	Device type 03	Device type 04	
	Cases A, B, C, D	Cases E and F	Cases E and F	Cases A, B, and D	Case C
1	$\Sigma 1$	A4	$\overline{A}2$	A_C	B*
2	A1	$\Sigma 3$	A1	B1	B_C
3	B1	A3	B1	B2	Cn
4	V_{CC}	B3	C1	V_{CC}	$\overline{C}n+1$
5	C0	V_{CC}	$\overline{C}01$	B*	Σ
6	NC	$\Sigma 2$	$\overline{\Sigma}1$	B_C	$\overline{\Sigma}$
7	NC	B2	$\Sigma 1$	Cn	GND
8	NC	A2	GND	$\overline{C}n+1$	A1
9	NC	$\Sigma 1$	$\overline{\Sigma}2$	Σ	A2
10	C2	A1	$\Sigma 2$	$\overline{\Sigma}$	A*
11	GND	B1	C02	GND	A_C
12	$\Sigma 2$	GND	$\overline{C}2$	A1	B1
13	B2	C0	B2	A2	B2
14	A2	C4	A2	A*	V_{CC}
15		$\Sigma 4$	$\overline{B}2$		
16		B4	V_{CC}		

Figure 1. Terminal connections (top view).

Device type 01

INPUT				OUTPUT					
				When C0 = L			When C0 = H		
A1	B1	A2	B2	$\sum 1$	$\sum 2$	C2	$\sum 1$	$\sum 2$	C2
L	L	L	L	L	L	L	H	L	L
H	L	L	L	H	L	L	L	H	L
L	H	L	L	H	L	L	L	H	L
H	H	L	L	L	H	L	H	H	L
L	L	H	L	L	H	L	H	H	L
H	L	H	L	H	H	L	L	L	H
L	H	H	L	H	H	L	L	L	H
H	H	H	L	L	L	H	H	L	H
L	L	L	H	L	H	L	H	H	L
H	L	L	H	H	H	L	L	L	H
L	H	L	H	H	H	L	L	L	H
H	H	L	H	L	L	H	H	L	H
L	L	H	H	L	L	H	H	L	H
H	L	H	H	H	L	H	L	H	H
L	H	H	H	H	L	H	L	H	H
H	H	H	H	L	H	H	H	H	H

Device type 02

INPUT				OUTPUT					
				When C0 = L			When C0 = H		
						When C2 = L			When C2 = H
A1 / A3	B1 / B3	A2 / A4	B2 / B4	$\sum 1$ / $\sum 3$	$\sum 2$ / $\sum 4$	C2 / C4	$\sum 1$ / $\sum 3$	$\sum 2$ / $\sum 4$	C2 / C4
L	L	L	L	L	L	L	H	L	L
H	L	L	L	H	L	L	L	H	L
L	H	L	L	H	L	L	L	H	L
H	H	L	L	L	H	L	H	H	L
L	L	H	L	L	H	L	H	H	L
H	L	H	L	H	H	L	L	L	H
L	H	H	L	H	H	L	L	L	H
H	H	H	L	L	L	H	H	L	H
L	L	L	H	L	H	L	H	H	L
H	L	L	H	H	H	L	L	L	H
L	H	L	H	H	H	L	L	L	H
H	H	L	H	L	L	H	H	L	H
L	L	H	H	L	L	H	H	L	H
H	L	H	H	H	L	H	L	H	H
L	H	H	H	H	L	H	L	H	H
H	H	H	H	L	H	H	H	H	H

NOTE: Input conditions at A1, A2, B1, B2, and C0 are used to determine outputs $\sum 1$ and $\sum 2$, and the value of the internal carry C2. The values at C2, A3, B3, A4, and B4, are then used to determine outputs $\sum 3$, $\sum 4$, and C4.

Figure 2. Truth tables.

Device type 03

Adder 2							
Inputs					Outputs		
$\overline{C}2$	B2	A2	$\overline{B}2$	$\overline{A}2$	C02	$\Sigma 2$	$\overline{\Sigma}2$
L	L	L	L	L	H	H	L
L	L	L	L	H	H	L	H
L	L	L	H	L	H	L	H
L	L	L	H	H	L	H	L
L	L	H	L	L	H	H	L
L	L	H	L	H	H	H	L
L	L	H	H	L	H	L	H
L	L	H	H	H	H	L	H
L	H	L	L	L	H	H	L
L	H	L	L	H	H	L	H
L	H	L	H	L	H	H	L
L	H	L	H	H	H	L	H
L	H	H	L	L	H	H	L
L	H	H	L	H	H	H	L
L	H	H	H	L	H	H	L
L	H	H	H	H	H	H	L
H	L	L	L	L	H	L	H
H	L	L	L	H	L	H	L
H	L	L	H	L	L	H	L
H	L	L	H	H	L	L	H
H	L	H	L	L	H	L	H
H	L	H	L	H	H	L	H
H	L	H	H	L	L	H	L
H	L	H	H	H	L	H	L
H	H	L	L	L	H	L	H
H	H	L	L	H	L	H	L
H	H	L	H	L	H	L	H
H	H	L	H	H	L	H	L
H	H	H	L	L	H	L	H
H	H	H	L	H	H	L	H
H	H	H	H	L	H	L	H
H	H	H	H	H	H	L	H

Adder 1					
Inputs			Outputs		
C1	B1	A1	$\overline{C}01$	$\overline{\Sigma}1$	$\Sigma 1$
L	L	L	H	H	L
L	L	H	H	L	H
L	H	L	H	L	H
L	H	H	L	H	L
H	L	L	H	L	H
H	L	H	L	H	L
H	H	L	L	H	L
H	H	H	L	L	H

Device type 04

Inputs			Outputs		
Cn	B	A	$\overline{C}n+1$	$\overline{\Sigma}$	Σ
L	L	L	H	H	L
L	L	H	H	L	H
L	H	L	H	L	H
L	H	H	L	H	L
H	L	L	H	L	H
H	L	H	L	H	L
H	H	L	L	H	L
H	H	H	L	L	H

NOTES:

1/ $A = \overline{A}c + \overline{A}* + A1 \times A2$, $B = \overline{B}c + \overline{B}* + B1 \times B2$.

2/ When A* is used as an input, A! or A2 must be low. When B* is used as an input, B1 or B2 must be low.

3/ When A1 and A2 or B1 and B2 are used as inputs, A* or B*, respectively, must be open or used to perform dot-AND logic.

Figure 2. Truth tables – Continued.

DEVICE TYPE 01

CIRCUIT A

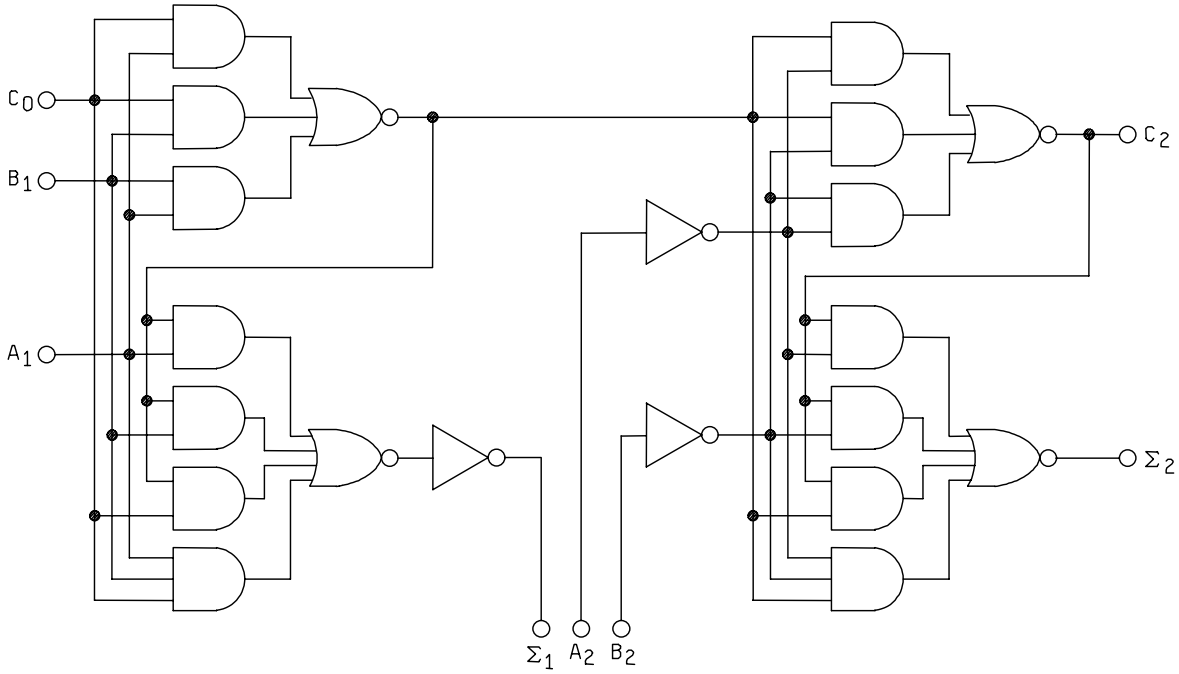


Figure 3. Logic diagrams.

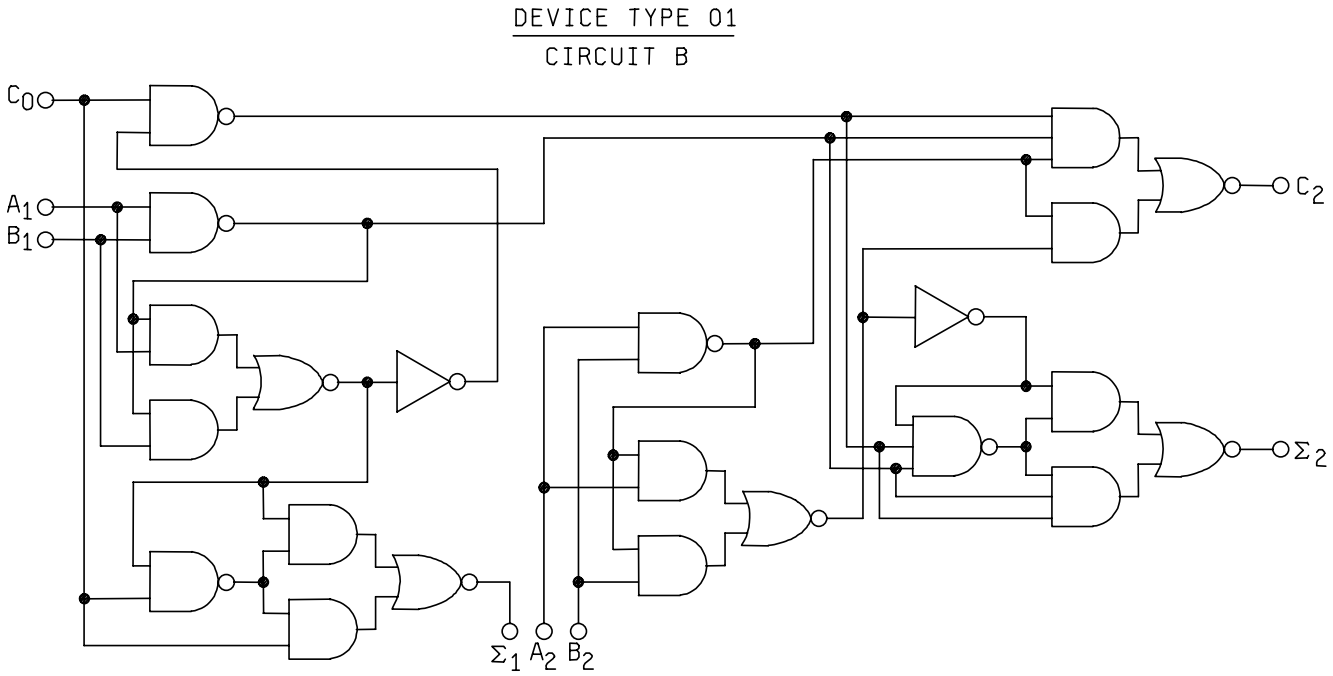


Figure 3. Logic diagrams – Continued.

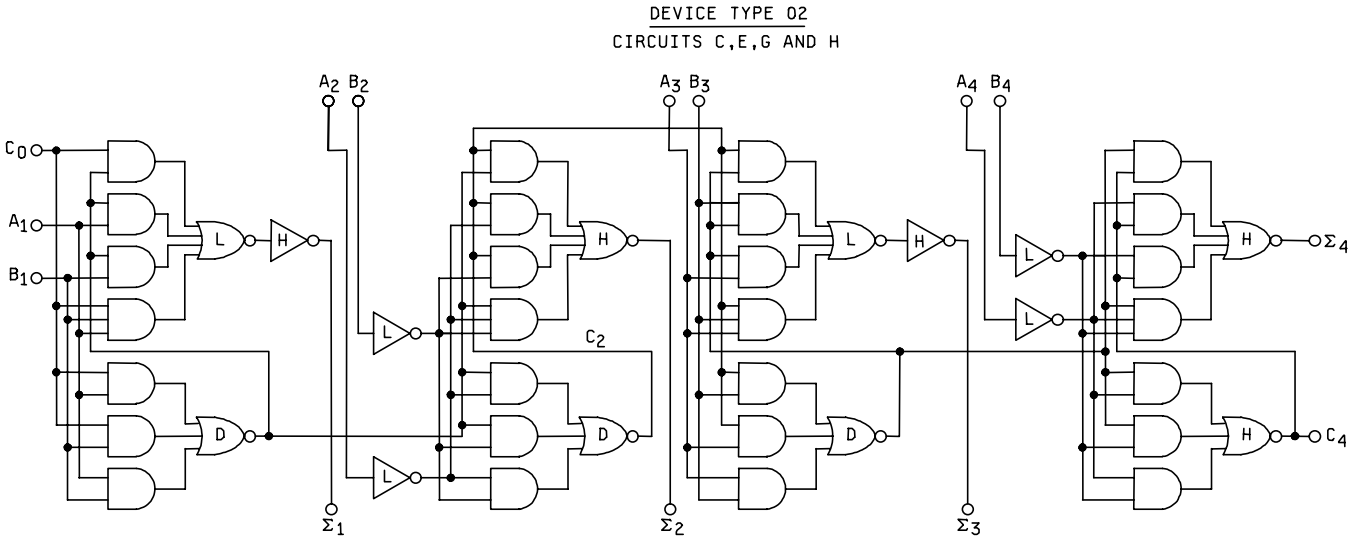


Figure 3. Logic diagrams – Continued.

DEVICE TYPE 02
CIRCUIT D

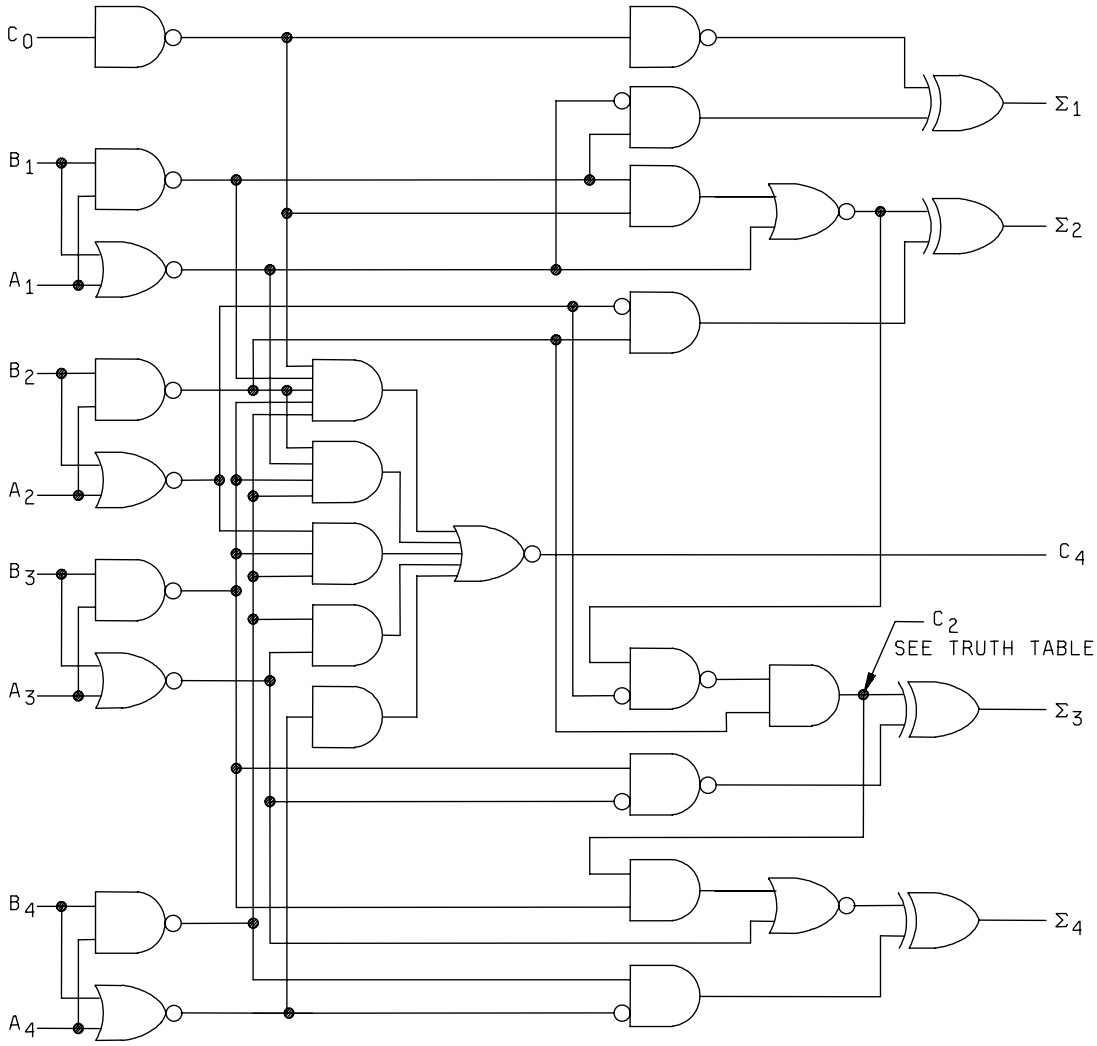


Figure 3. Logic diagrams – Continued.

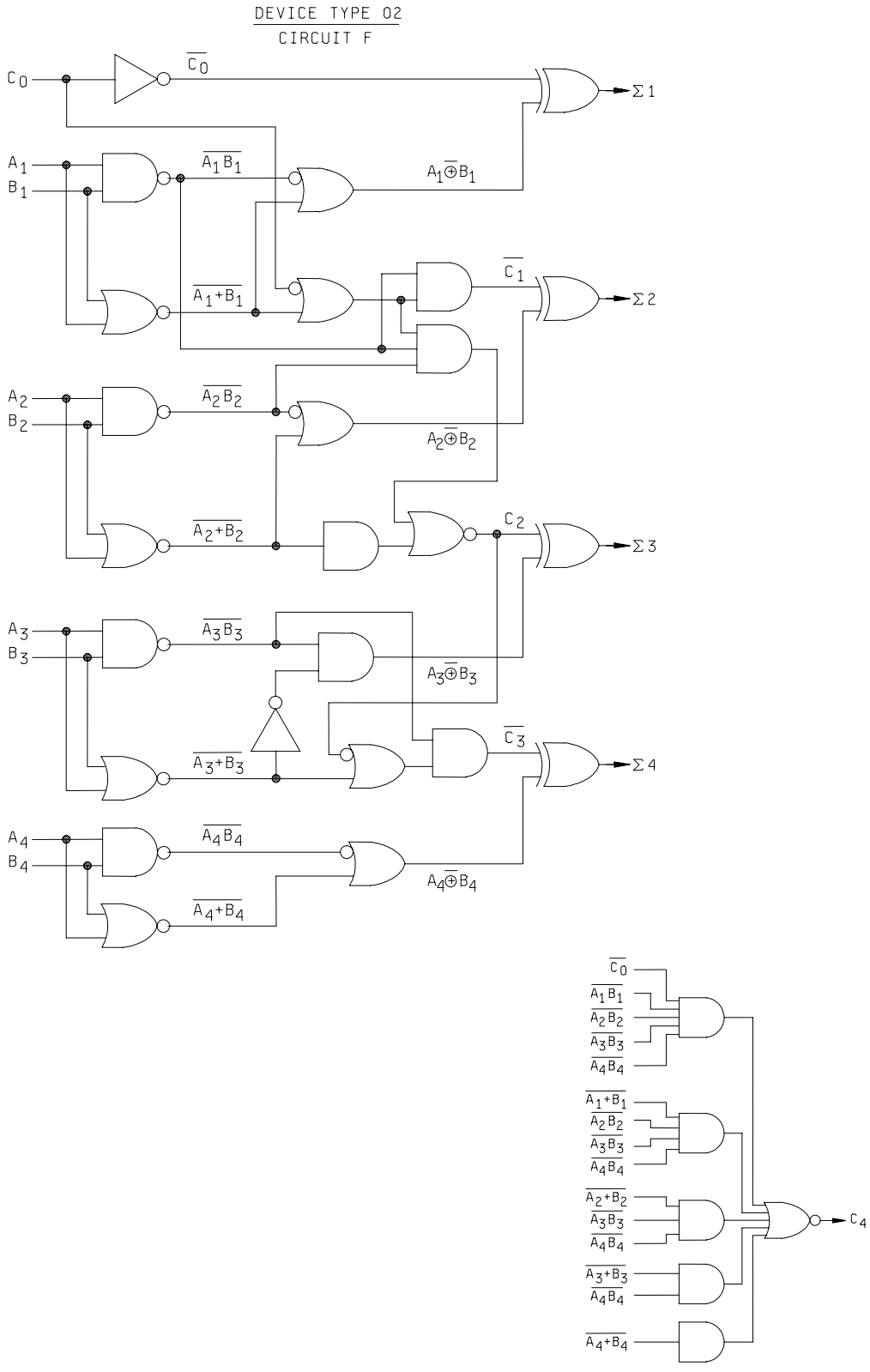


Figure 3. Logic diagrams – Continued.

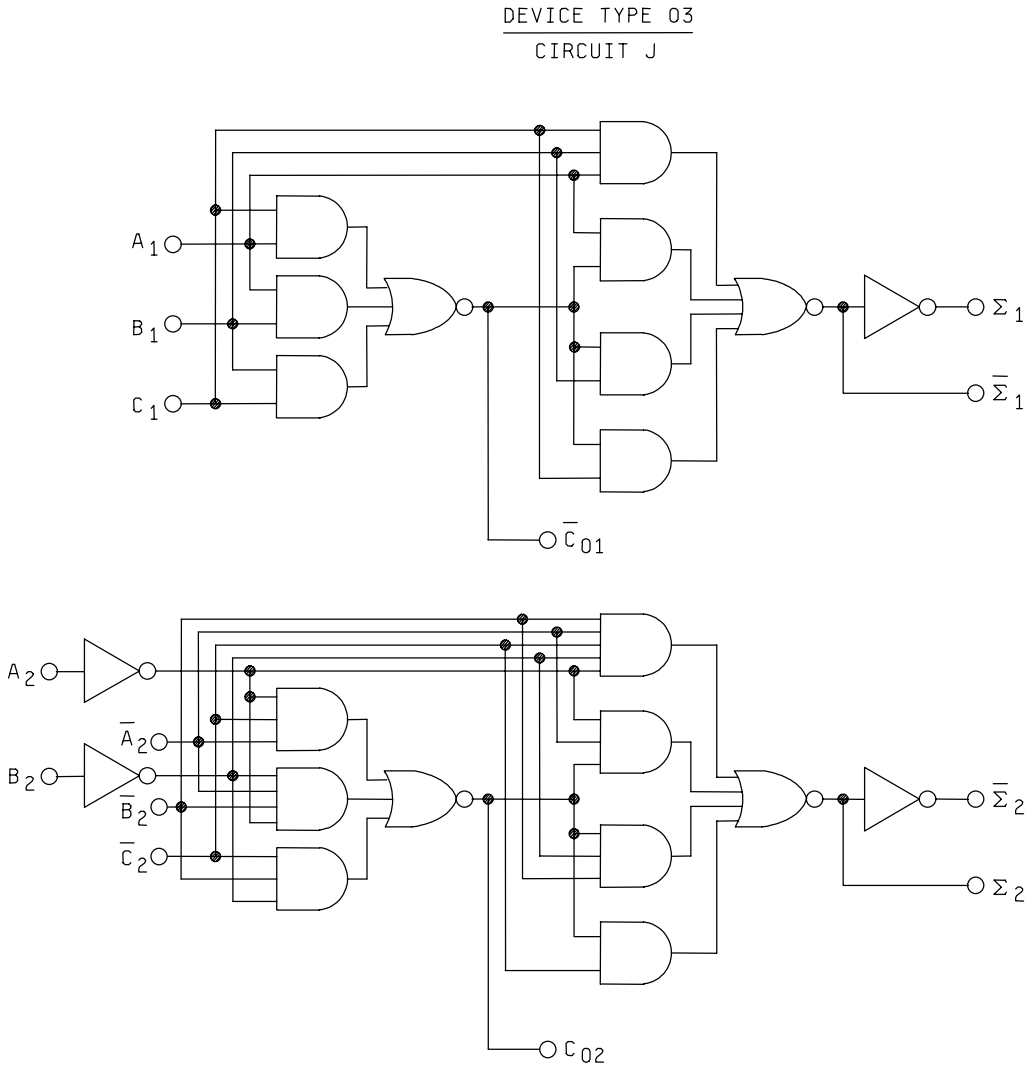


Figure 3. Logic diagrams – Continued.

DEVICE TYPE 04

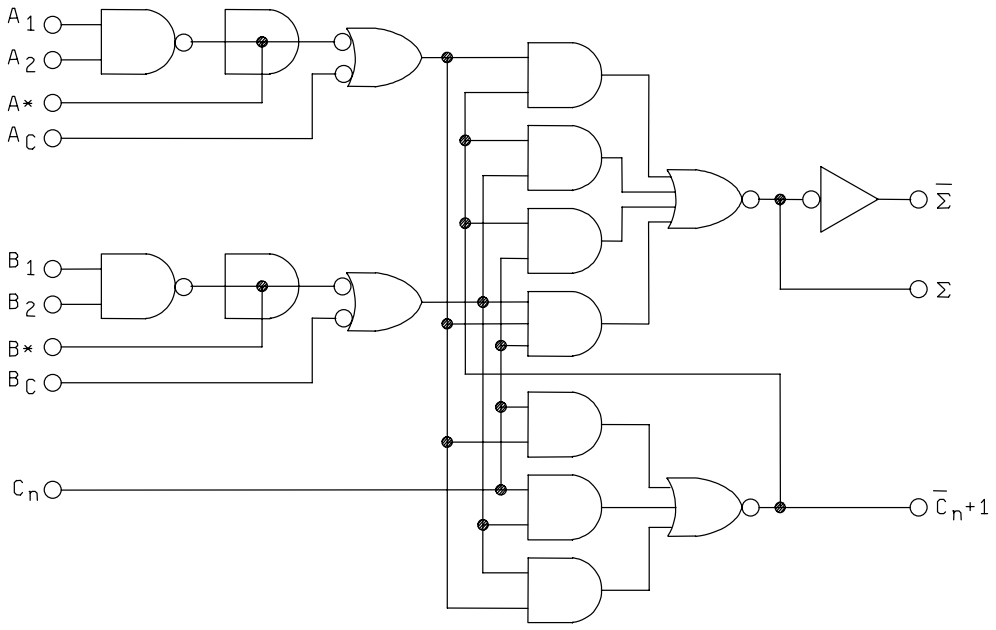
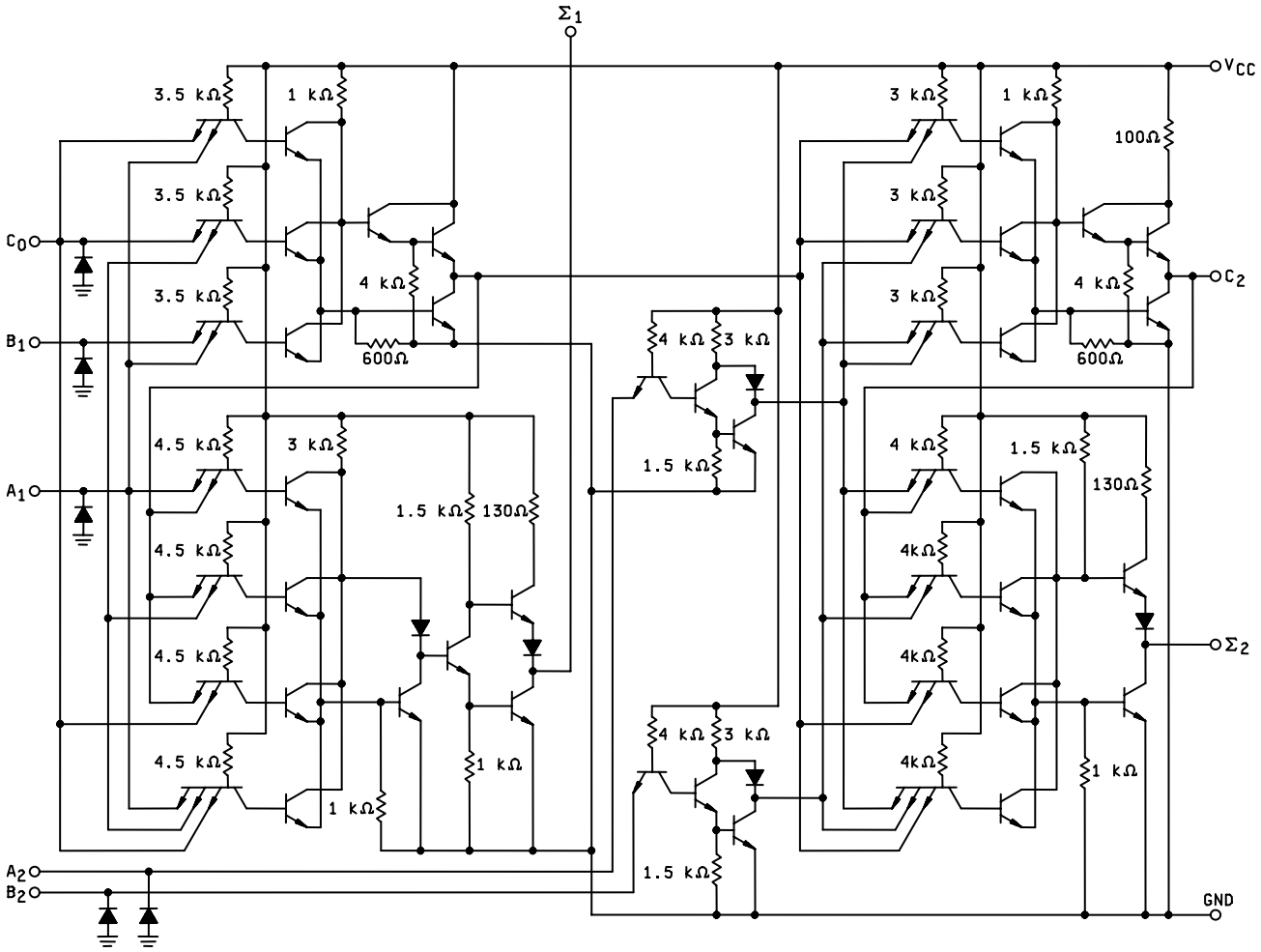


Figure 3. Logic diagrams – Continued.

Device type 01, Circuit A



NOTES:

1. Circuits A and B correspond to logic diagrams A and B respectively. These are the only acceptable circuits and logic diagrams for device type 01.
2. Circuits C, G, and H correspond to logic diagram C and circuits D, E, and F correspond to logic diagrams D, E, and F, respectively. These are the only acceptable circuits and logic diagrams for type 02.
3. Circuits J correspond to logic diagram J. This is the only acceptable circuit and logic diagram for device type 03.
4. Component values shown are nominal and resistor values are in ohms.

FIGURE 4. Schematic circuits.

Device type 01, Circuit B

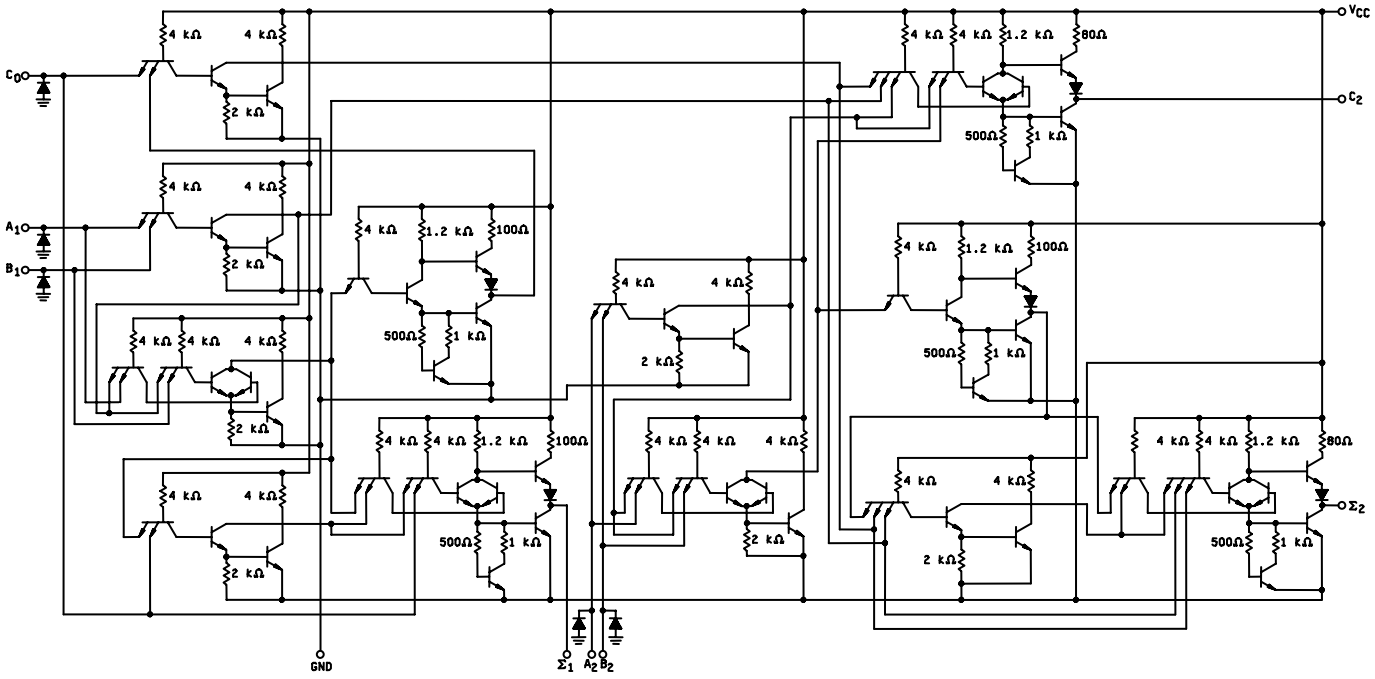


FIGURE 4. Schematic circuits - Continued.

Device type 02 ,Circuit C

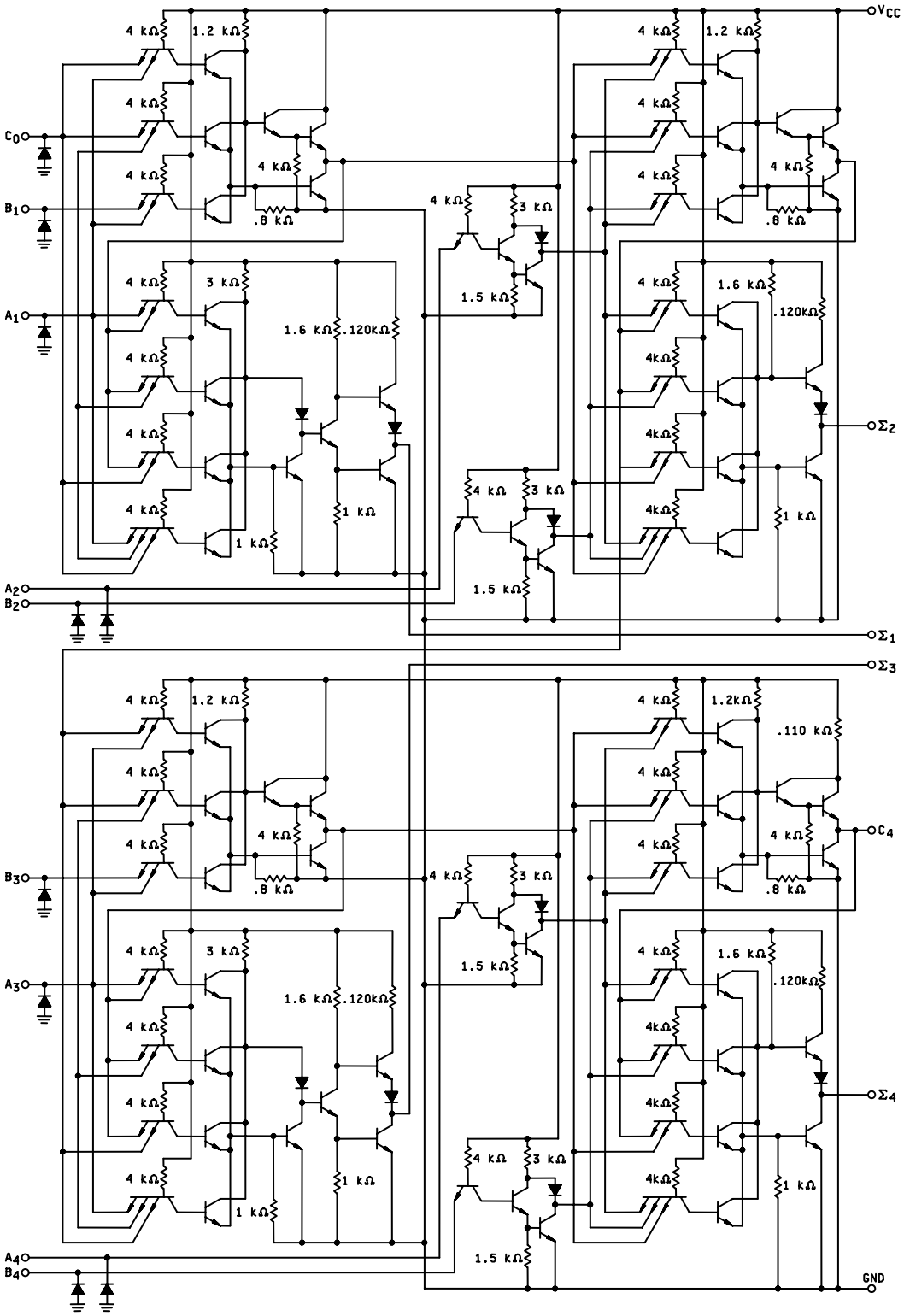


FIGURE 4. Schematic circuits - Continued.

Device type 02, Circuit D

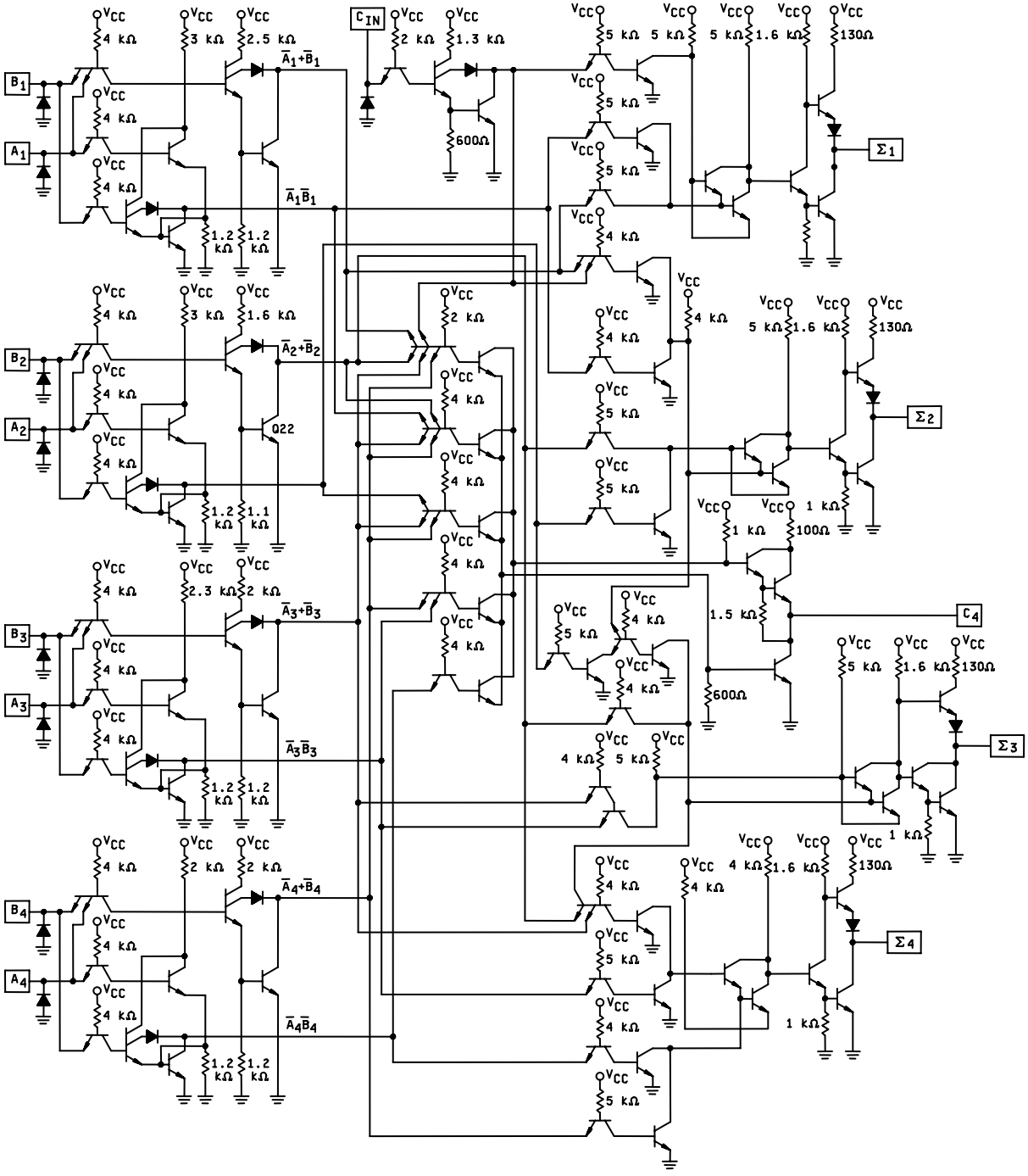


FIGURE 4. Schematic circuits - Continued.

Device type 02, Circuit E

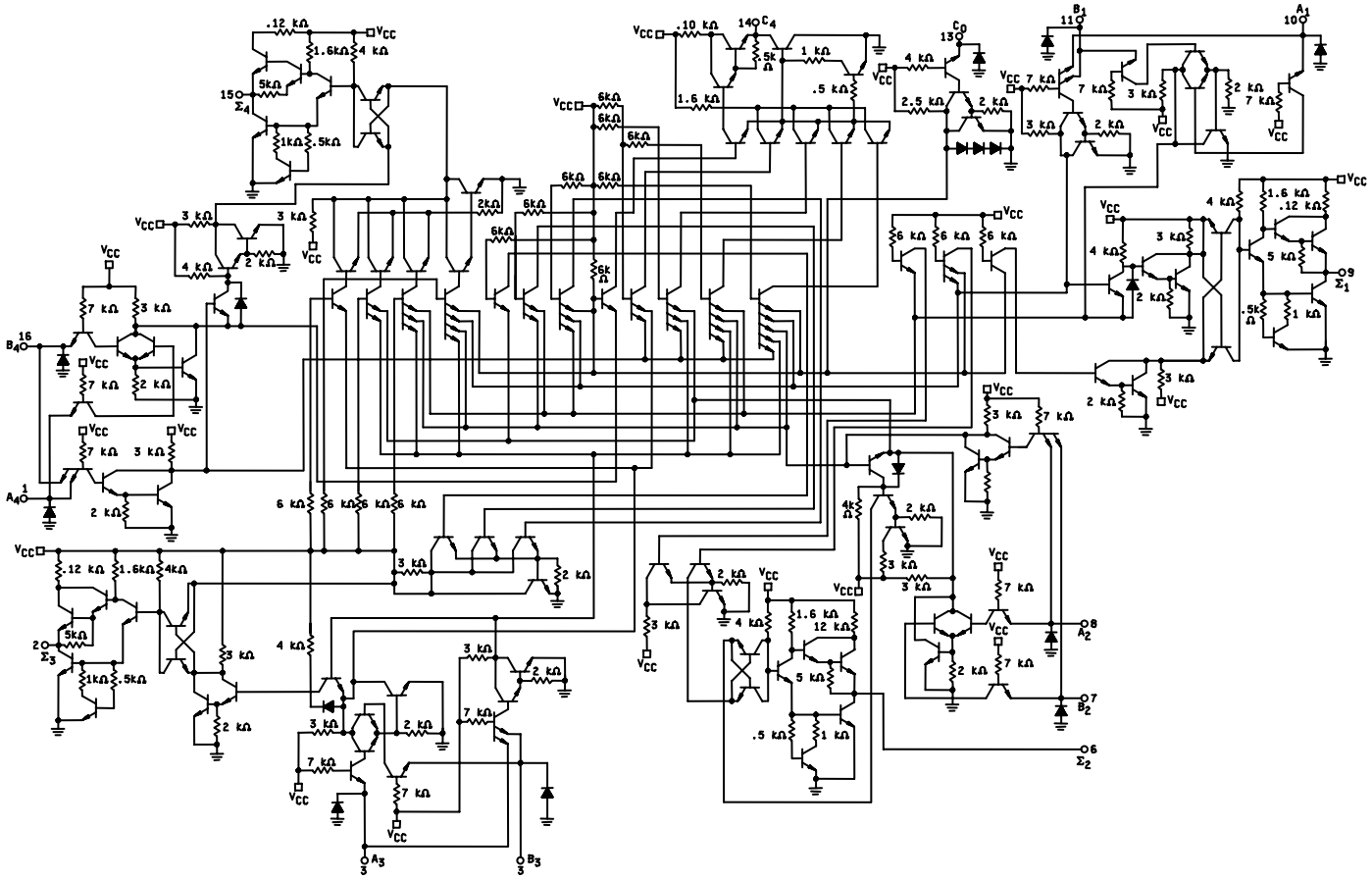


FIGURE 4. Schematic circuits - Continued.

Device type 02 Circuit F

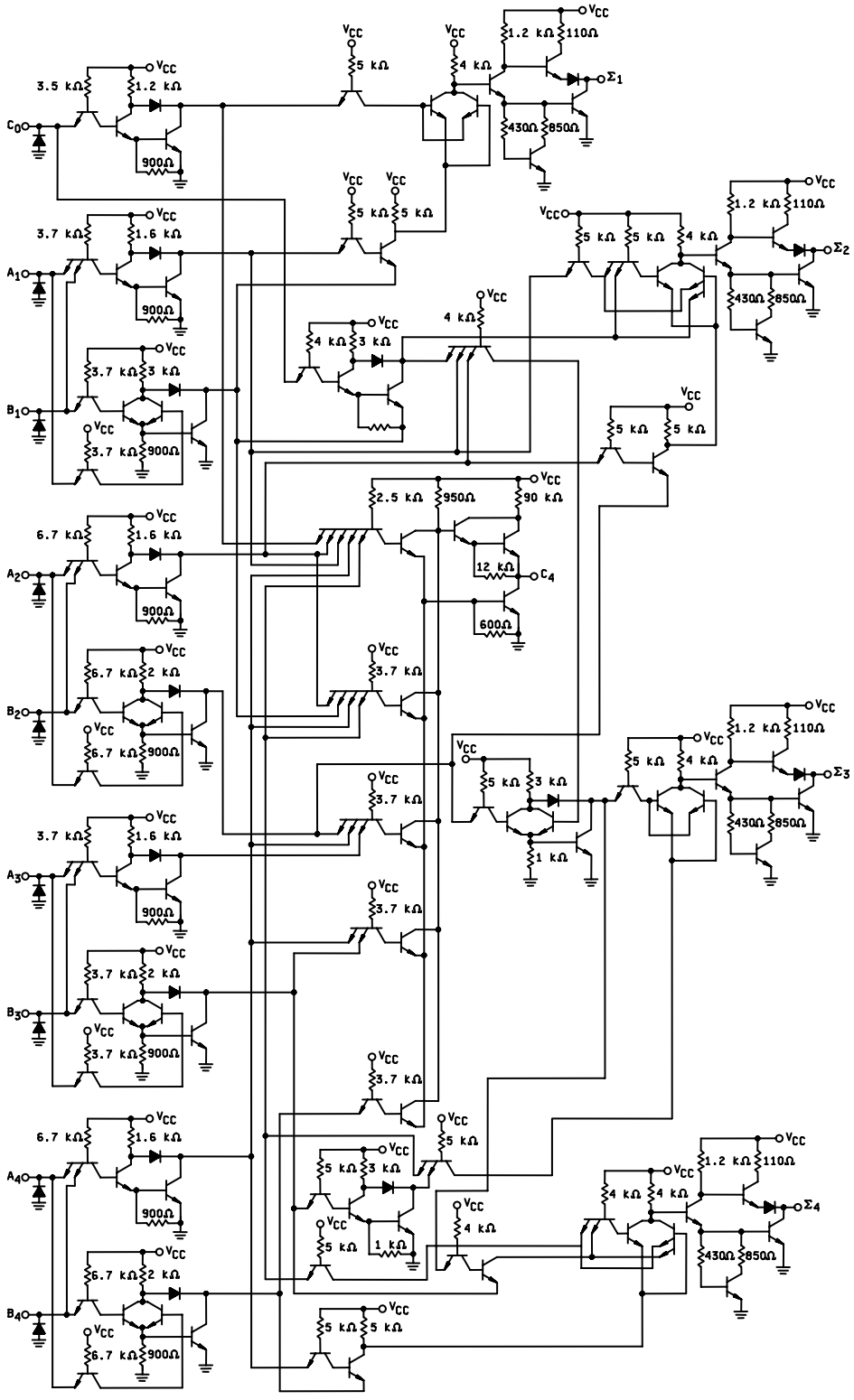


FIGURE 4. Schematic circuits - Continued.

Device type 02, Circuit G

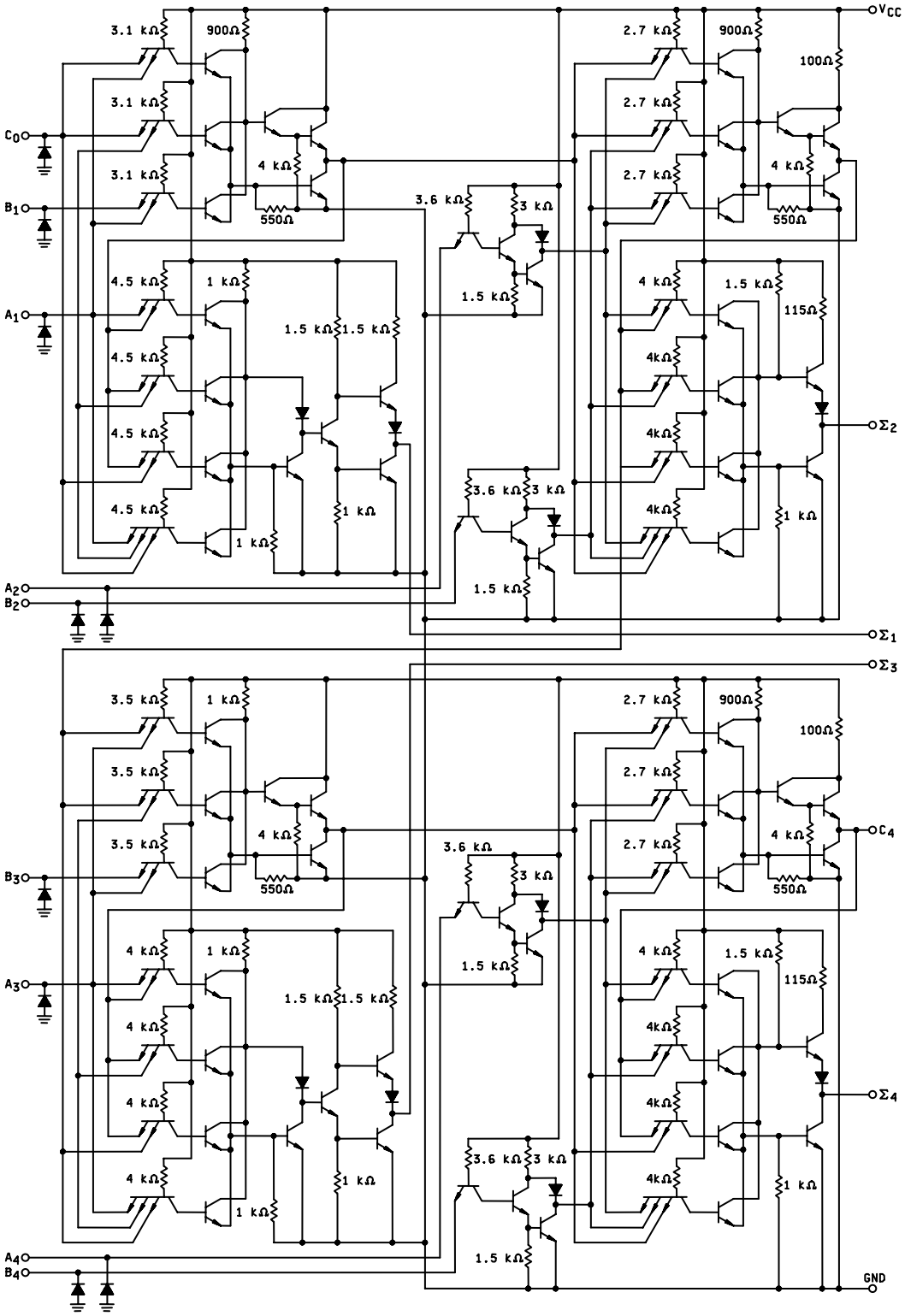


FIGURE 4. Schematic circuits - Continued.

Device type 02, Circuit H

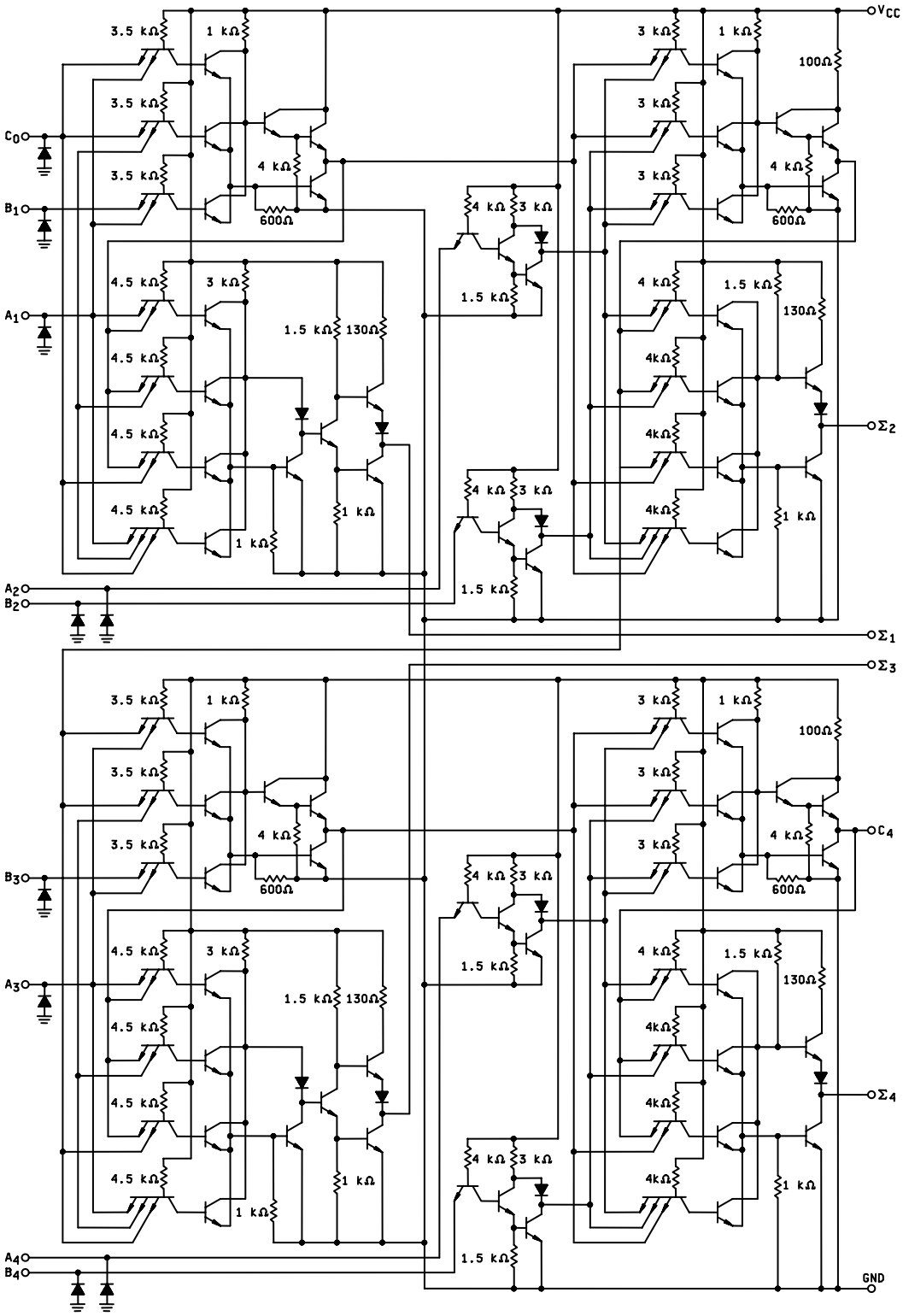


FIGURE 4. Schematic circuits - Continued.

Device type 03, Circuit J

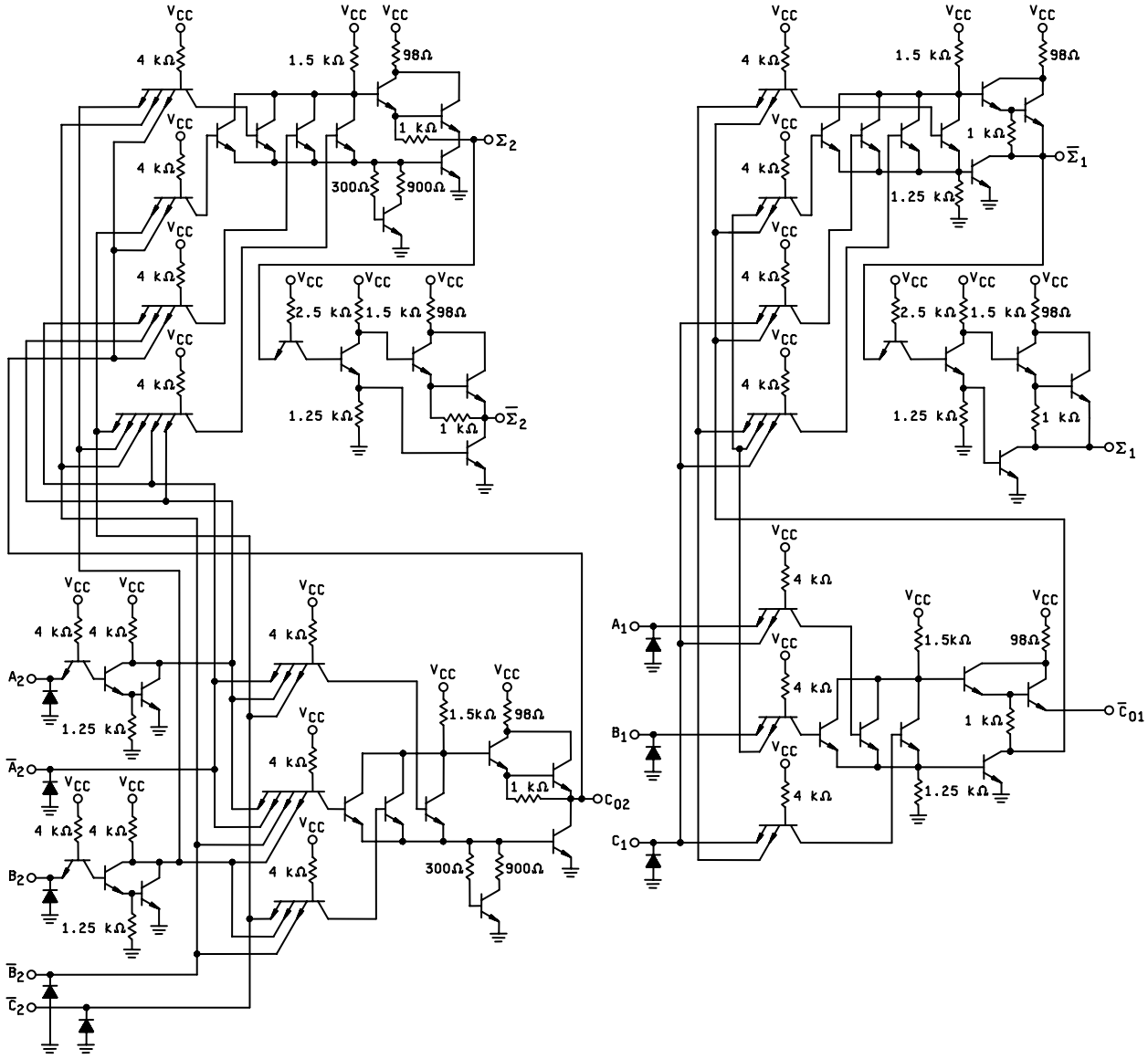


FIGURE 4. Schematic circuits - Continued.

Device type 03, Circuit K

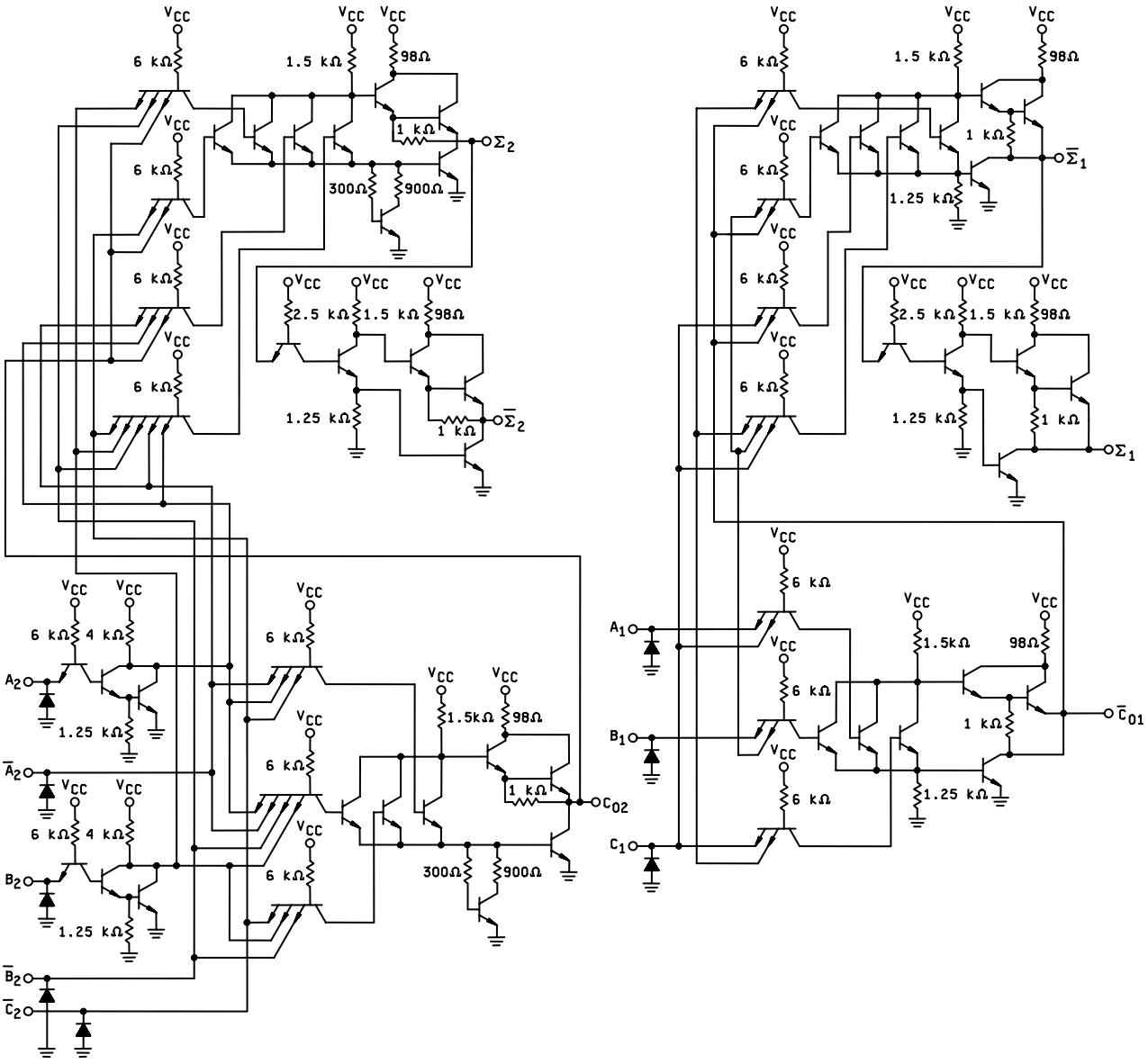
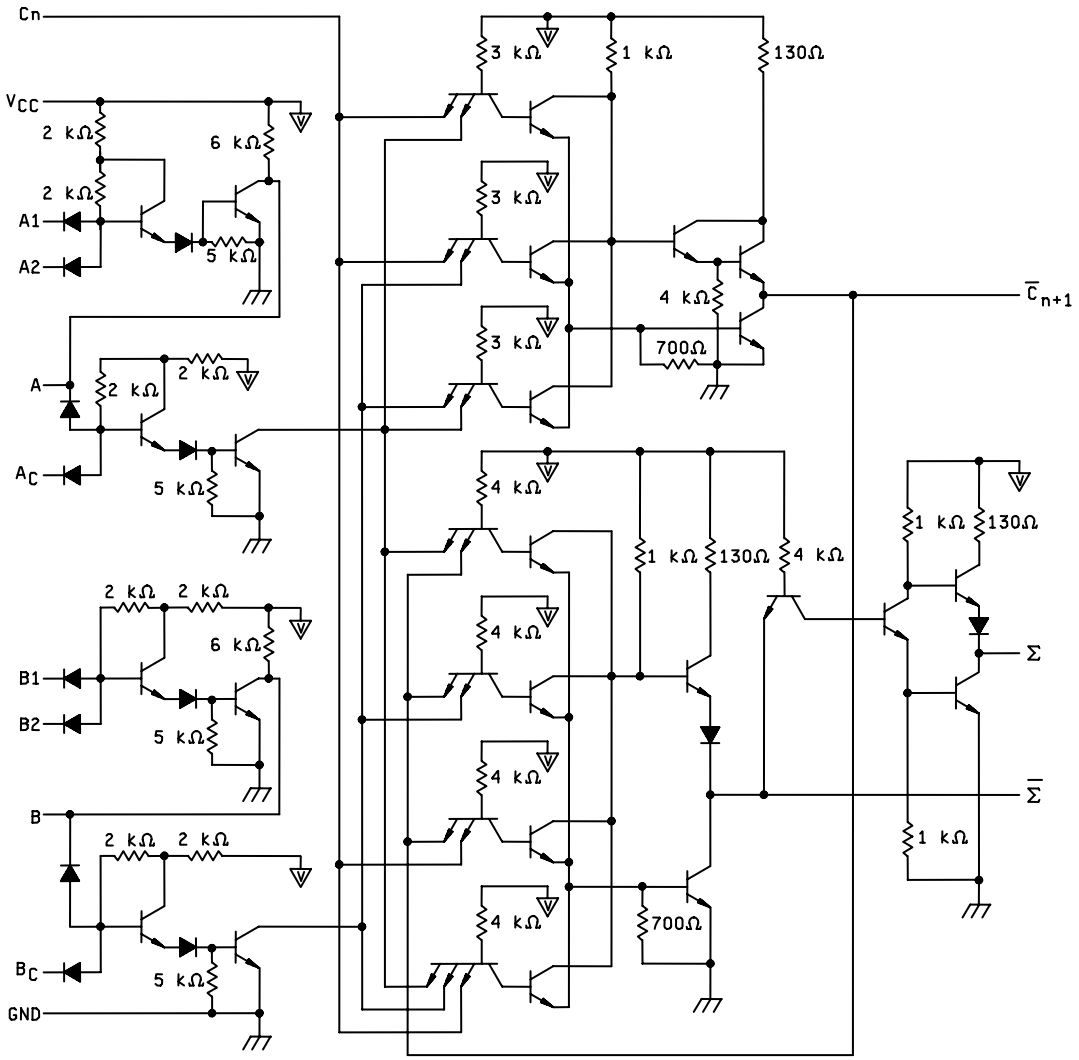


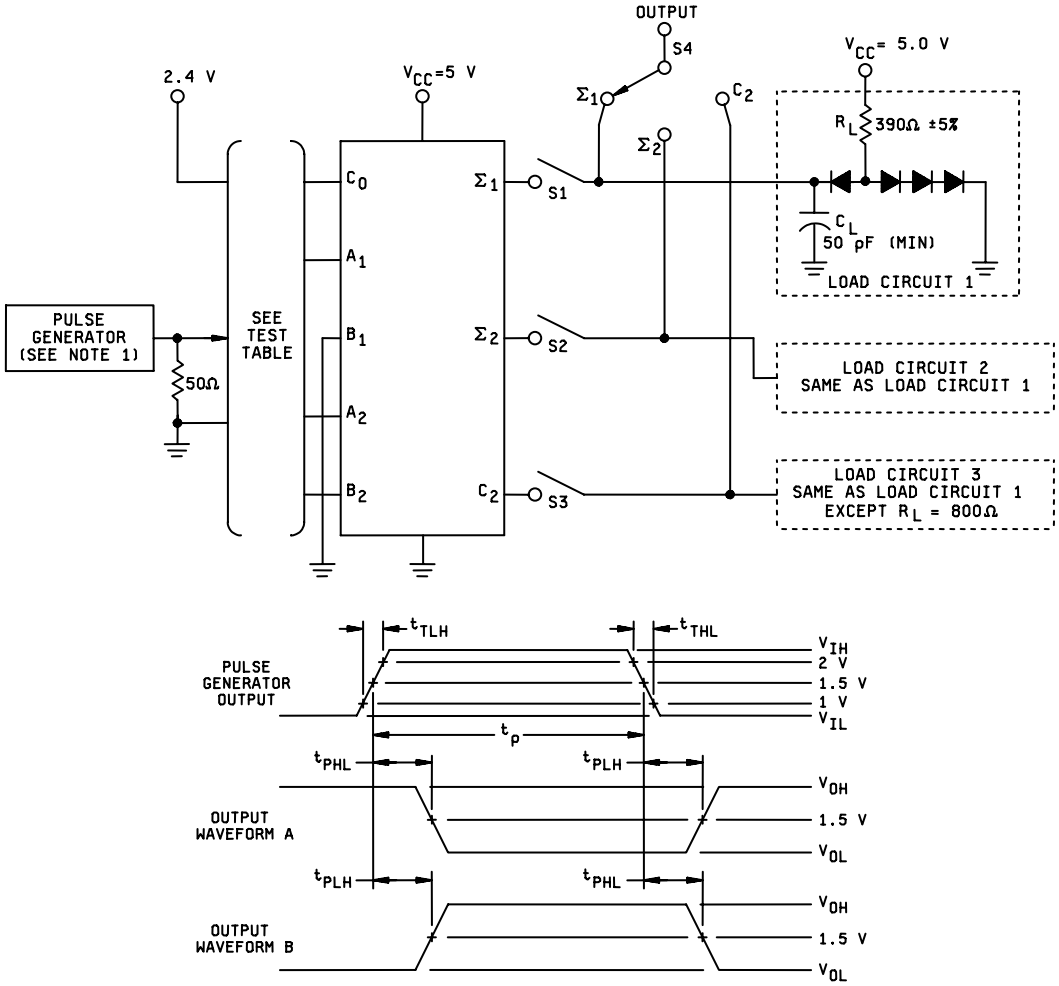
FIGURE 4. Schematic circuits - Continued.

Device type 04



V = V_{CC} bus.
Resistor values shown are nominal and in ohms.

FIGURE 4. Schematic circuits - Continued.



SWITCHING TIMES TEST TABLE (SEE NOTE 7)

PARAMETER	APPLY PULSE GENERATOR OUTPUT TO	OUTPUT UNDER TEST (S4)	APPLY 2.4 V TO	APPLY GND TO	S1	S2	S3
t_{PLH_1} / t_{PHL_1}	C_0	Σ_1 (WAVEFORM A)	A_1	A_2,B_1,B_2	CLOSED	OPEN	OPEN
t_{PLH_2} / t_{PHL_2}	B_2	Σ_2 (WAVEFORM B)	NONE	A_1,B_1,A_2 AND C_0	OPEN	CLOSED	OPEN
t_{PLH_3} / t_{PHL_3}	C_0	Σ_2 (WAVEFORM A)	A_1,A_2	B_1,B_2	OPEN	CLOSED	CLOSED
t_{PLH_4} / t_{PHL_4}	C_0	C_2 (WAVEFORM B)	A_1,A_2	B_1,B_2	OPEN	OPEN	CLOSED

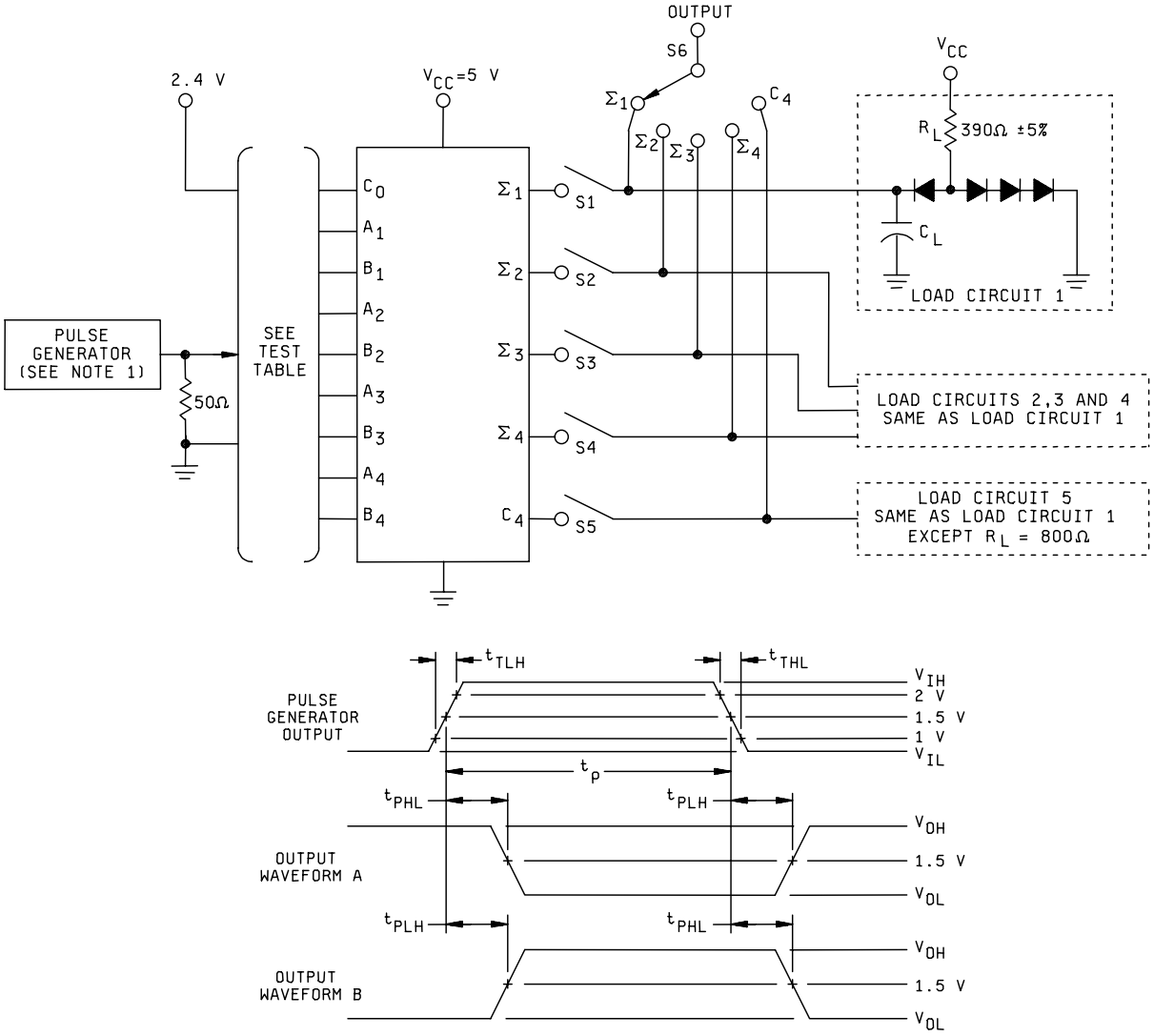
NOTES:
1/ The generator has the following characteristics: $V_{IH} \geq 2.4$ V, $V_{IL} \leq 0.4$ V, t_{TLH} = 8 to 15 ns, t_{THL} = 3 to 5 ns, PRR = 1 MHz, t_P = 200 ns, and $Z_{OUT} \approx 50\ \Omega$.
2/ Perform test in accordance with test table.
3/ Each output is tested separately.
4/ Voltage values are with respect to network ground terminal.
5/ C_L includes probe and jig capacitance.
6/ All diodes are 1N3064 or equivalent.
7/ Inputs and outputs not specified are open.

FIGURE 5. Switching time test circuit for device type 01.

Test Table

Para-meter	Apply pulse generator output to	Output under test (S6)	Apply 2.4 V to	Apply GND to	S1	S2	S3	S4	S5
t_{PLH1} t_{PHL1}	C0	$\sum 1$ (waveform A)	A1	A1, A2, B2	Closed	Open	Open	Open	Open
t_{PLH2} t_{PHL2}	B2	$\sum 2$ (waveform B)	None	A1, B1, A2, and C0	Open	Closed	Open	Open	Open
t_{PLH3} t_{PHL3}	C0	$\sum 2$ (waveform A)	A1, A2	B1, B2	Open	Closed	Open	Open	Open
t_{PLH4} t_{PHL4}	C0	$\sum 3$ (waveform A)	A1, A2, A3	B1, B2, B3	Open	Open	Closed	Open	Open
t_{PLH5} t_{PHL5}	C0	$\sum 4$ (waveform A)	A1, A2, A3, A4	B1, B2, B3, B4	Open	Open	Open	Closed	Closed
t_{PLH6} t_{PHL6}	C0	C4 (waveform B)	A1, A2, A3, A4	B1, B2, B3, B4	Open	Open	Open	Open	Closed
t_{PLH7} t_{PHL7}	A2	$\sum 2$ (waveform B)	None	A1, B1, B2, C0	Open	Closed	Open	Open	Open
t_{PLH8} t_{PHL8}	A4	$\sum 4$ (waveform B)	None	A3, B3, B4	Open	Open	Open	Closed	Open
t_{PLH9} t_{PHL9}	B4	$\sum 4$ (waveform B)	None	A3, B3, A4	Open	Open	Open	Closed	Open

FIGURE 6. Switching time test circuit for device type 02.



NOTES:

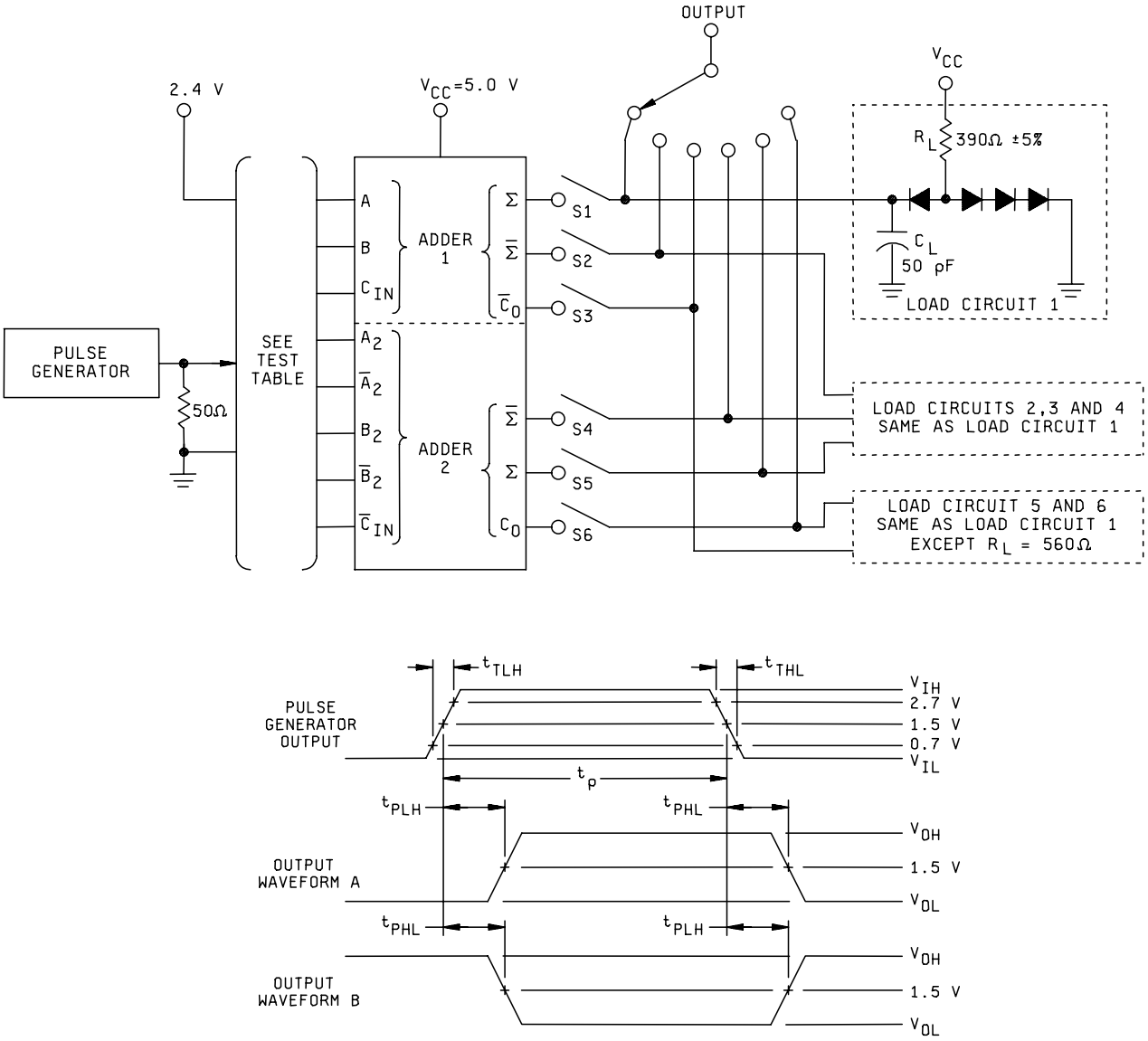
1/ The generator has the following characteristics: $V_{IH} \geq 2.4$ V, $V_{IL} \leq 0.4$ V, t_{TLH} = 8 to 15 ns, t_{THL} = 3 to 5 ns, PRR = 1 MHz, t_P = 200 ns, and $Z_{OUT} \approx 50\ \Omega$.
2/ Perform test in accordance with test table (See sheet 2 of this figure).
3/ Each output is tested separately.
4/ Voltage values are with respect to network ground terminal.
5/ C_L includes probe and jig capacitance.
6/ All diodes are 1N3064 or equivalent.
7/ Inputs and outputs not specified are open.

FIGURE 6. Switching time test circuit for device type 02- Continued.

Switching Time Set Up

Para-meter	Apply pulse generator output to	Output under test	Apply 2.4 V to	Apply GND to	S1	S2	S3	S4	S5	S6
t_{PLH1} / t_{PHL1}	C1	(Adder 1) $\Sigma 1$ (waveform B)	A1	B1	Closed	Closed	Closed	Open	Open	Open
t_{PLH2} / t_{PHL2}	C1	(Adder 1) $\overline{\Sigma} 1$ (waveform A)	A1	B1	Closed	Closed	Closed	Open	Open	Open
t_{PLH3} / t_{PHL3}	C1	(Adder 1) $\overline{C}01$ (waveform B)	A1	B1	Closed	Closed	Closed	Open	Open	Open
t_{PLH4} / t_{PHL4}	A2	(Adder 2) $\overline{\Sigma} 2$ (waveform A)	C2 $\overline{A}2$, $\overline{C}IN2$	B2, $\overline{B}2$	Open	Open	Open	Closed	Closed	Closed
t_{PLH5} / t_{PHL5}	A2	(Adder 2) $\Sigma 2$ (waveform B)	C2 $\overline{A}2$, $\overline{C}IN2$	B2, $\overline{B}2$	Open	Open	Open	Closed	Closed	Closed
t_{PLH6} / t_{PHL6}	A2	(Adder 2) C02 (waveform A)	C2 $\overline{A}2$, $\overline{C}IN2$	B2, $\overline{B}2$	Open	Open	Open	Closed	Closed	Closed

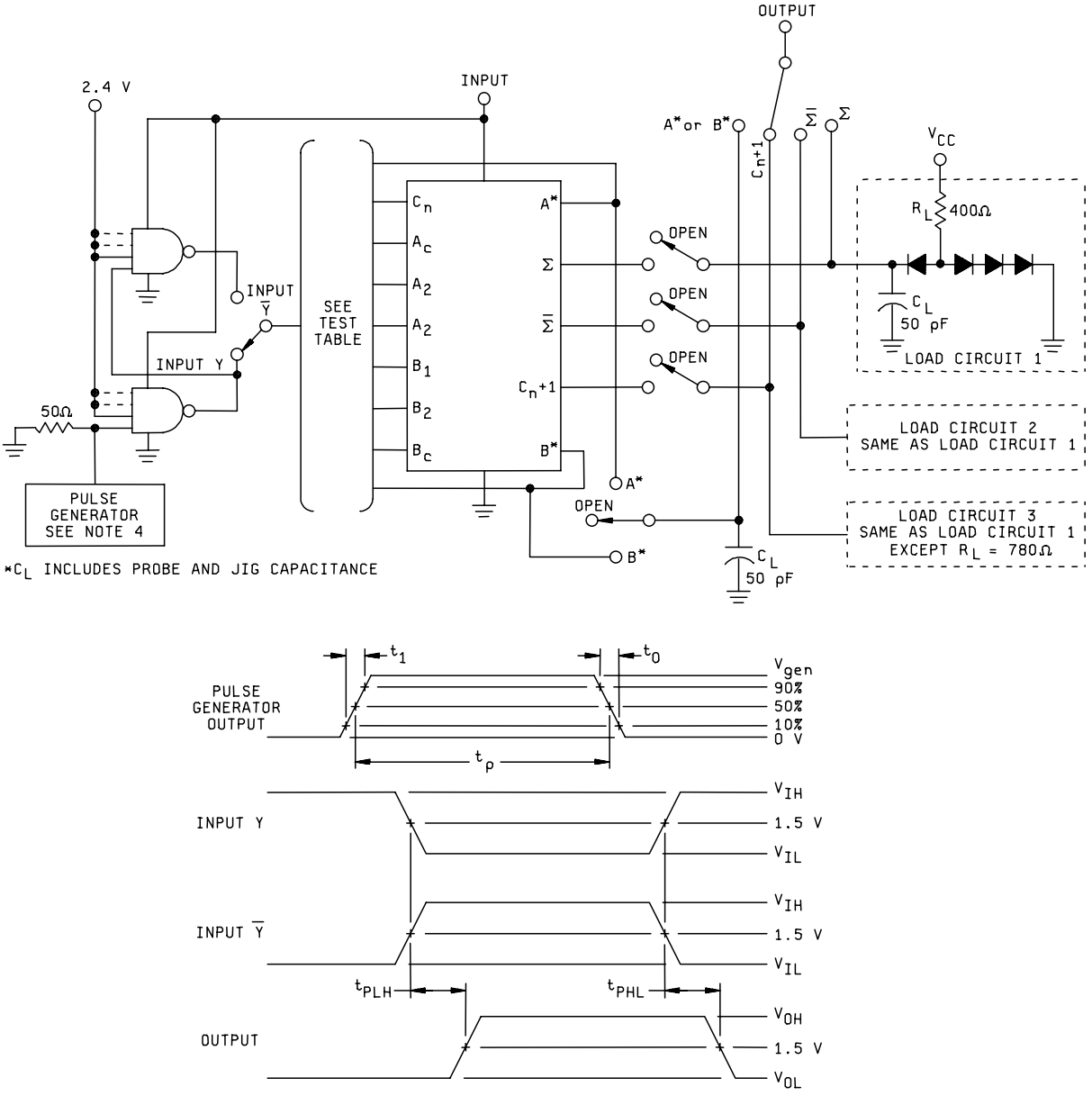
FIGURE 7. Switching time test circuit for device type 03.



NOTES:

1/ The generator has the following characteristics: $V_{IH} \geq 2.4$ V, $V_{IL} \leq 0.4$ V, $t_{TLH} = t_{THL} = \leq 10$ ns, PRR = 1 MHz, t_P = 200 ns, and $Z_{OUT} \approx 50\ \Omega$.
2/ Perform test in accordance with test table (See sheet 2 of this figure).
3/ Each output is tested separately.
4/ Voltage values are with respect to network ground terminal.
5/ C_L includes probe and jig capacitance.
6/ All diodes are 1N3064 or equivalent.
7/ Inputs and outputs not specified are open.

FIGURE 7. Switching time test circuit for device type 03- Continued.



NOTES:

1/ Perform test in accordance with test table.
2/ Each output is tested separately.
3/ Voltage values are with respect to network ground terminal.
4/ The generator has the following characteristics: $V_{GEN} = 3$ V, $t_1 = t_0 = \leq 15$ ns, PRR = 1 MHz, $t_P = 0.5$ µs, and $Z_{OUT} \approx 50\ \Omega$.
5/ Inputs and outputs not specified are open.
6/ C_L includes probe and jig capacitance.
7/ All diodes are 1N3064 or equivalent.

FIGURE 8. Switching time test circuit for device type 04.

Test Table (See Note 5)

Test No.	Symbol	Output under test	Apply input Y to	Apply input Y to	Apply 2.4 V to	Apply GND to	Apply output loading to
64, 76	t_{PHL1}	$\overline{Cn+1}$	None	Cn	None	B1	$\overline{Cn+1}$ (Load circuit 3)
65, 77	t_{PLH1}		None	Cn	None	B1	$\overline{Cn+1}$ (Load circuit 3)
66, 78	t_{PHL2}	$\overline{Cn+1}$	B_C	None	Cn	A1, B1	$\overline{Cn+1}$ (Load circuit 3)
67, 79	t_{PLH2}	$\overline{Cn+1}$	B_C	None	Cn	A1, B1	$\overline{Cn+1}$ (Load circuit 3)
68, 80	t_{PHL3}	Σ	A_C	None	Cn	A1, B1	$\overline{\Sigma}$ (Load circuit 2) Σ (Load circuit 1) $\overline{Cn+1}$ (Load circuit 3)
69, 81	t_{PLH3}	Σ	A_C	None	Cn	A1, B1	Σ (Load circuit 1) $\overline{\Sigma}$ (Load circuit 2) $\overline{Cn+1}$ (Load circuit 3)
70, 82	t_{PHL4}	$\overline{\Sigma}$	B_C	None	Cn	B1	$\overline{\Sigma}$ (Load circuit 2)
71, 83	t_{PLH4}	$\overline{\Sigma}$	B_C	None	Cn	B1	$\overline{\Sigma}$ (Load circuit 2)
72, 84	t_{PHL5}	A*	None	A1	A2	None	A* C_L = 50 pF
73, 85	t_{PLH5}	A*	None	A1	A2	None	A* C_L = 50 pF
74, 86	t_{PHL6}	B*	None	B1	B2	None	B* C_L = 50 pF
75,87	t_{PLH6}	B*	None	B1	B2	None	B* C_L = 50 pF

FIGURE 8. Switching time test circuit for device type 04- Continued.

TABLE III. Group A inspection for device type 01.
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits		
			Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14		Min	Max	Unit
			Test No.	Σ 1	A1	B1	V_{CC}	C0	NC	NC	NC	NC	C2	GND	Σ 2	B2	A2				
1	V_{IC}		1		-12 mA		4.5 V							GND				A1		-1.5	V
T_C = 25°C	"		2			-12 mA	"							"				B1		"	"
"	"		3				"							"			-12mA	A2		"	"
"	"		4				"							"		-12 mA		B2		"	"
"	"		5				"	-12 mA						"				C0		"	"
"	V_{OH}	3006	6	-0.4 mA	2.0 V	2.0 V	"	2.0 V						"		2.0 V	2.0 V	Σ 1	2.4		"
"	"	"	7		"	"	"	"						"	-0.4 mA	"	"	Σ 2	"		"
"	"	"	8		"	"	"	"					-0.2 mA	"		"	"	C2	"		"
"	V_{OL}	3007	9	16 mA	0.8 V	0.8 V	"	0.8 V						"		0.8 V	0.8 V	Σ 1		0.4	"
"	"	"	10		"	"	"	"						"	16 mA	"	"	Σ 2		"	"
"	"	"	11		"	"	"	"					8 mA	"		"	"	C2		"	"
"	I_{IH1}	3010	12		GND	GND	5.5 V	2.4 V						"				C0		160	μA
"	"	"	13		2.4 V	GND	"	GND						"				A1		"	"
"	"	"	14		GND	2.4 V	"	GND						"				B1		"	"
"	"	"	15				"							"			2.4 V	A2		"	"
"	"	"	16				"							"		2.4 V		B2		"	"
"	I_{IH2}	"	17		GND	GND	"	5.5 V						"				C0		400	"
"	"	"	18		5.5 V	GND	"	GND						"				A1		"	"
"	"	"	19		GND	5.5 V	"	GND						"				B1		"	"
"	"	"	20				"							"			5.5 V	A2		"	"
"	"	"	21				"							"		5.5 V		B2		"	"
"	I_{IL1}	3009	22 CKT A		0.4 V	5.5 V	"	5.5 V						"				A1	-2.1	-6.4	mA
"	"	"	22 CKT B		0.4 V	5.5 V	"	"						"				A1	-1.4	-3.2	"
"	"	"	23 CKT A		5.5 V	0.4 V	"	"						"				B1	-2.1	-6.4	"
"	"	"	23 CKT B		"	0.4 V	"	"						"				B1	-1.4	-3.2	"
"	"	"	24 CKT A		"	5.5 V	"	0.4 V						"				C0	-2.1	-6.4	"
"	"	"	24 CKT B		"	5.5 V	"	0.4 V						"				C0	-1.4	-3.2	"
"	I_{IL2}	"	25 CKT A				"							"			0.4 V	A2	-0.7	-1.6	"
"	"	"	25 CKT B				"							"			0.4 V	A2	-1.4	-3.2	"
"	"	"	26 CKT A				"							"		0.4 V		B2	-0.7	-1.6	"
"	"	"	26 CKT B				"							"		0.4 V		B2	-1.4	-3.2	"
"	I_{OS1}	3011	27 CKT A	GND	4.5 V	4.5 V	"	4.5 V						"		4.5 V	4.5 V	Σ 1	-20	-55	"
"	"	"	27 CKT B	GND	"	"	"	"						"		"	"	Σ 1	"	-70	"
"	"	"	28 CKT A		"	"	"	"						"	GND	"	"	Σ 2	"	-55	"
"	"	"	28 CKT B		"	"	"	"						"	GND	"	"	Σ 2	"	-70	"
"	I_{OS2}	"	29		"	"	"	"					GND	"		"	"	C2	-20	-70	"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 01. - Continued
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits		
			Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14		Min	Max	Unit
			Test No.	Σ 1	A1	B1	V_{CC}	C0	NC	NC	NC	NC	C2	GND	Σ 2	B2	A2				
1	I_{CC}	3005	30 CKT A		4.5 V	GND	5.5 V	4.5 V						GND		GND	4.5 V	V_{CC}		50	mA
T_C = 25°C		3005	30 CKT B		4.5 V	GND	5.5 V	4.5 V						GND		GND	4.5 V	V_{CC}		40	mA
2	Same tests, terminal conditions and limits as for subgroup 1, except T_C = 125° C and V_{IC} tests are omitted.																				
3	Same tests, terminal conditions and limits as for subgroup 1, except T_C = -55° C and V_{IC} tests are omitted.																				
7 2/			31	L 1/	0.8 V 3/	0.8 V 3/	4.5 V	0.8 V 3/					L 1/		L 1/	0.8 V 3/	0.8 V 3/	All	H or L		
T_C = 25°C			32	H	2.0 V	0.8 V	"	"					"		L	"	"	outputs	as shown 1/		
"			33	H	0.8 V	2.0 V	"	"					"		L	"	"				
"			34	L	2.0 V	2.0 V	"	"					"		H	"	"				
"			35	L	0.8 V	0.8 V	"	"					"		"	"	2.0 V				
"			36	H	2.0 V	0.8 V	"	"					"		"	"	"				
"			37	H	0.8 V	2.0 V	"	"					"		"	"	"				
"			38	L	2.0 V	2.0 V	"	"					H		L	"	"				
"			39	L	0.8 V	0.8 V	"	"					L		H	2.0 V	0.8 V				
"			40	H	2.0 V	0.8 V	"	"					L		"	"	"				
"			41	H	0.8 V	2.0 V	"	"					L		"	"	"				
"			42	L	2.0 V	2.0 V	"	"					H		L	"	"				
"			43	L	0.8 V	0.8 V	"	"					"		"	"	2.0 V				
"			44	H	2.0 V	0.8 V	"	"					"		"	"	"				
"			45	H	0.8 V	2.0 V	"	"					"		"	"	"				
"			46	L	2.0 V	2.0 V	"	"					"		H	"	"				
"			47	H	0.8 V	0.8 V	"	2.0 V					L		L	0.8 V	0.8 V				
"			48	L	2.0 V	0.8 V	"	"					"		H	"	"				
"			49	L	0.8 V	2.0 V	"	"					"		"	"	"				
"			50	H	2.0 V	2.0 V	"	"					"		"	"	"				
"			51	H	0.8 V	0.8 V	"	"					"		"	"	2.0 V				
"			52	L	2.0 V	0.8 V	"	"					H		L	"	"				
"			53	L	0.8 V	2.0 V	"	"					H		"	"	"				
"			54	H	2.0 V	2.0 V	"	"					H		"	"	"				
"			55	H	0.8 V	0.8 V	"	"					L		H	2.0 V	0.8 V				
"			56	L	2.0 V	0.8 V	"	"					H		L	"	"				
"			57	L	0.8 V	2.0 V	"	"					"		"	"	"				
"			58	H	2.0 V	2.0 V	"	"					"		"	"	"				
"			59	H	0.8 V	0.8 V	"	"					"		"	"	2.0 V				
"			60	L	2.0 V	0.8 V	"	"					"		H	"	"				
"			61	L	0.8 V	2.0 V	"	"					"		"	"	"				
"			62	H	2.0 V	2.0 V	"	"					"		"	"	"				

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 01.
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits		
			Case C	1	2	3	4	5	6	7	8	9	10	11	12	13	14		Min	Max	Unit
			Test No.	Σ 1	A1	B1	V_{CC}	C0	NC	NC	NC	NC	C2	GND	Σ 2	B2	A2				
8 2/	Same tests, terminal conditions and limits as for subgroup 7, except T_C = +125° C and -55° C.																				
9	t_{PLH1}	3003	63	See figure 5.														C0 to Σ 1	3	37	ns
T_C = 25°C	t_{PHL1}	"	64															C0 to Σ 1	"	43	"
"	t_{PLH2}	"	65															B2 to Σ 2	"	43	"
"	t_{PHL2}	"	66															B2 to Σ 2	"	38	"
"	t_{PLH3}		67															C0 to Σ 2		42	
"	t_{PHL2}	"	68															C0 to Σ 2	"	45	"
"	t_{PLH4}	"	69															C0 to C2	"	21	"
"	t_{PHL4}	"	70															C0 to C2	"	30	"
10	t_{PLH1}	"	71	See figure 5.														C0 to Σ 1	3	56	"
T_C = 125°C	t_{PHL1}	"	72															C0 to Σ 1	"	61	"
"	t_{PLH2}	"	73															B2 to Σ 2	"	65	"
"	t_{PHL2}	"	74															B2 to Σ 2	"	54	"
"	t_{PLH3}		75															C0 to Σ 2		62	
"	t_{PHL2}	"	76															C0 to Σ 2	"	61	"
"	t_{PLH4}	"	77															C0 to C2	"	34	"
"	t_{PHL4}	"	78															C0 to C2	"	43	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T_C = -55°C.																				

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02.

Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	A4	Σ 3	A3	B3	V_{CC}	Σ 2	B2	A2	Σ1	A1	B1	GND	C0	C4	Σ 4	B4		Min	Max	Unit
1	V_{OH}	3006	1	2.0 V		2.0 V	2.0 V	4.5 V		2.0 V	2.0 V	-0.4 mA	2.0 V	2.0 V	GND	2.0 V			2.0 V	Σ1	2.4		V
T_C = 25°C	"	"	2	"		"	"	"	-0.4 mA	"	"		"	"	"	"			"	Σ2	"		"
"	"	"	3	"	-0.4 mA	"	"	"		"	"		"	"	"	"			"	Σ 3	"		"
"	"	"	4	"		"	"	"		"	"		"	"	"	"		-0.4 mA	"	Σ 4	"		"
"	"	"	5	"		"	"	"		"	"		"	"	"	"	-0.2 mA		"	C4	"		"
"	V_{OL}	3007	6	0.8 V		0.8 V	0.8 V	"		0.8 V	0.8 V	16 mA	0.8 V	0.8 V	"	0.8 V			0.8 V	Σ1		0.4	"
"	"	"	7	"		"	"	"	16 mA	"	"		"	"	"	"			"	Σ2		"	"
"	"	"	8	"	16 mA	"	"	"		"	"		"	"	"	"			"	Σ 3		"	"
"	"	"	9	"		"	"	"		"	"		"	"	"	"		16 mA	"	Σ 4		"	"
"	"	"	10	"		"	"	"		"	"		"	"	"	"	8 mA		"	C4		"	"
"	V_{IC}		11	-12 mA				"							"					A4		-1.5	"
"	"		12			-12 mA		"							"					A3		"	"
"	"		13				-12 mA	"							"					B3		"	"
"	"		14					"		-12 mA					"					B2		"	"
"	"		15					"			-12 mA				"					A2		"	"
"	"		16					"					-12 mA		"					A1		"	"
"	"		17					"						-12 mA	"					B1		"	"
"	"		18					"							"	-12 mA				C0		"	"
"	"		19					"							"				-12 mA	B4		"	"
"	I_{IH1}	3010	20			2.4 V	GND	5.5 V		GND	GND				"					A3		160	μA
"	"	"	21			GND	2.4 V	"		GND	GND				"					B3		"	"
"	"	"	22					"					2.4 V	GND	"	GND				A1		"	"
"	"	"	23					"					GND	2.4 V	"	GND				B1		"	"
"	"	"	24					"					GND 6/	GND 6/	"	2.4 V				C0		"	"
"	"	"	25	2.4 V				"							"				5/	A4		40	"
"	"	"	26					"		2.4 V	5/				"					B2		"	"
"	"	"	27					"		5/	2.4 V				"					A2		"	"
"	"	"	28	5/				"							"				2.4 V	B4		"	"
"	I_{IH2}	3010	29			5.5 V	GND	"		GND	GND				"					A3		400	"
"	"	"	30			GND	5.5 V	"		GND	GND				"					B3		"	"
"	"	"	31					"					5.5 V	GND	"	GND				A1		"	"
"	"	"	32					"					GND	5.5 V	"	GND				B1		"	"
"	"	"	33					"					GND	GND	"	5.5 V				C0		"	"

See footnote at end of device type 02.

TABLE III. Group A inspection for device type 02. - Continued
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	A4	Σ 3	A3	B3	V_{CC}	Σ 2	B2	A2	Σ 1	A1	B1	GND	C0	C4	Σ 4	B4		Min	Max	Unit
1	I_{IH2}	3010	34	5.5 V				5.5 V							GND				5/	A4		400	μA
T_C = 25°C	"	"	35					"		5.5 V	5/				"					B2		"	"
"	"	"	36					"		5/	5.5 V				"					A2		"	"
	"	"	37	5/				"							"				5.5 V	B4		"	"
"	I_{IL1}	3009	38 CKT C,G,H			0.4 V	0.8 V	"		5.5 V	5.5 V				"					A3	-2.3	-6.4	mA
"	"	"	38 CKT D			0.4 V	5.5 V	"		"	"				"					A3	-1.4	-3.2	"
"	"	"	38 CKT E			0.4 V	5.5 V	"		"	"				"					A3	-0.8	-2.6	"
"	"	"	38 CKT F			0.4 V	5.5 V	"		"	"				"					A3	-1.4	-3.2	"
"	"	"	39 CKT C,G,H			0.8 V	0.4 V	"		"	"				"					B3	-2.3	-6.4	"
"	"	"	39 CKT D			5.5 V	0.4 V	"		"	"				"					B3	-1.4	-3.2	"
"	"	"	39 CKT E			5.5 V	0.4 V	"		"	"				"					B3	-0.8	-2.6	"
"	"	"	39 CKT F			5.5 V	0.4 V	"		"	"				"					B3	-1.4	-3.2	"
"	"	"	40 CKT C,G,H					"					0.4 V	0.8 V	"	5.5 V				A1	-2.3	-6.4	"
"	"	"	40 CKT D					"					0.4 V	5.5 V	"	"				A1	-1.4	-3.2	"
"	"	"	40 CKT E					"					0.4 V	5.5 V	"	"				A1	-0.8	-2.6	"
"	"	"	40 CKT F					"					0.4 V	5.5 V	"	"				A1	-1.4	-3.2	"
"	"	"	41 CKT C,G,H					"					0.8 V	0.4 V	"	"				B1	-2.3	-6.4	"
"	"	"	41 CKT D					"					5.5 V	0.4 V	"	"				B1	-1.4	-3.2	"
"	"	"	41 CKT E					"					5.5 V	0.4 V	"	"				B1	-0.8	-2.6	"
"	"	"	41 CKT F					"					5.5 V	0.4 V	"	"				B1	-1.4	-3.2	"
"	"	"	42 CKT C					"					5.5 V	0.8 V	"	0.4 V				C0	-2.1	-6.4	"
"	"	"	42 CKT D					"					5.5 V	5.5 V	"	0.4 V				C0	-1.4	-3.2	"
"	"	"	42 CKT E					"					5.5 V	5.5 V	"	0.4 V				C0	-0.7	-1.6	"
"	"	"	42 CKT F					"					5.5 V	5.5 V	"	0.4 V				C0	-1.4	-3.2	"
"	"	"	42 CKT G,H					"					5.5 V	5.5 V	"	0.4 V				C0	-2.1	-4.8	
"	I_{IL2}	3009	43 CKT C,G,H	0.4 V				"							"					A4	-0.7	-1.6	"
"	"	"	43 CKT D	0.4 V				"							"				5.5 V	A4	-1.4	-3.2	"
"	"	"	43 CKT E	0.4 V				"							"					A4	-0.8	-2.6	"
"	"	"	43 CKT F	0.4 V				"							"					A4	-0.8	-2.6	"
"	"	"	44 CKT C,G,H					"		0.4 V					"					B2	-0.7	-1.6	"
"	"	"	44 CKT D					"		0.4 V	5.5 V				"					B2	-1.4	-3.2	"
"	"	"	44 CKT E					"		0.4 V					"					B2	-0.8	-2.6	"
"	"	"	44 CKT F					"		0.4 V					"					B2	-0.8	-2.6	"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02. - Continued
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	A4	Σ 3	A3	B3	V_{CC}	Σ 2	B2	A2	Σ1	A1	B1	GND	C0	C4	Σ 4	B4		Min	Max	Unit
1	I_{IL2}	3009	45 CKT C,G,H					5.5 V			0.4 V				GND					A2	-0.7	-1.6	mA
T_C = 25°C	"	"	45 CKT D					"		5.5 V	0.4 V				"					A2	-1.4	-3.2	"
"	"	"	45 CKT E					"			0.4 V				"					A2	-0.8	-2.6	"
"	"	"	45 CKT F					"			0.4 V				"					A2	-0.8	-2.6	"
"	"	"	46 CKT C,G,H					"							"				0.4 V	B4	-0.7	-1.6	"
"	"	"	46 CKT D	5.5 V				"							"				0.4 V	B4	-1.4	-3.2	"
"	"	"	46 CKT E					"							"				0.4 V	B4	-0.8	-2.6	"
"	"	"	46 CKT F					"							"				0.4 V	B4	-0.8	-2.6	"
"	I_{OS1} 4/	3011	47	4.5 V	GND	4.5 V	4.5 V	"		4.5 V	4.5 V		4.5 V	4.5 V	"	4.5 V			4.5 V	Σ 3	-20	-55	"
"	"	"	48	"		"	"	"	GND	"	"		"	"	"	"			"	Σ 2	"	"	"
"	"	"	49	"		"	"	"		"	"	GND	"	"	"	"			"	Σ1	"	"	"
"	"	"	50	"		"	"	"		"	"		"	"	"	"		GND	"	Σ 4	"	"	"
"	I_{OS2}	"	51	4.5 V		"	"	"		"	"		"	"	"	"	GND		"	C4	-20	-70	"
"	I_{CC}	3005	52 CKT C,E,G,H	4.5 V		4.5 V	GND	"		GND	4.5 V		4.5 V	GND	"	4.5 V			GND	V_{CC}		100	mA
"	I_{CC}	3005	52 CKT D,F	4.5 V		4.5 V	GND	"		GND	4.5 V		4.5 V	GND	"	4.5 V			GND	V_{CC}		80	mA
2	Same tests, terminal conditions and limits as for subgroup 1, except T_C = 125°C and V_{IC} tests are omitted.																						
3	Same tests, terminal conditions and limits as for subgroup 1, except T_C = -55°C and V_{IC} tests are omitted.																						
7 2/			53	0.8 V 3/	L 1/	0.8 V 3/	0.8 V 3/	4.5 V	L 1/	0.8 V 3/	0.8 V 3/	L 1/	0.8 V 3/	0.8 V 3/	GND	0.8 V 3/	L 1/	L 1/	0.8 V 3/	All	H or L		
T_C = 25°C			54	"	H	2.0 V	0.8 V	"	L	"	"	H	2.0 V	0.8 V	"	"	"	L	"	outputs	as shown 1/		
"			55	"	H	0.8 V	2.0 V	"	L	"	"	H	0.8 V	2.0 V	"	"	"	L	"	"	"		
"			56	"	L	2.0 V	2.0 V	"	H	"	"	L	2.0 V	2.0 V	"	"	"	H	"	"	"		
"			57	2.0 V	L	0.8 V	0.8 V	"	H	"	2.0 V	L	0.8 V	0.8 V	"	"	"	"	"	"	"		
"			58	"	H	2.0 V	0.8 V	"	H	"	"	H	2.0 V	0.8 V	"	"	"	"	"	"	"		
"			59	"	H	0.8 V	2.0 V	"	H	"	"	H	0.8 V	2.0 V	"	"	"	"	"	"	"		
"			60	"	H	2.0 V	2.0 V	"	L	"	"	L	2.0 V	2.0 V	"	"	H	L	"	"	"		
"			61	0.8 V	L	0.8 V	0.8 V	"	H	2.0 V	0.8 V	L	0.8 V	0.8 V	"	"	L	H	2.0 V	"	"		
"			62	"	H	2.0 V	0.8 V	"	H	"	"	H	2.0 V	0.8 V	"	"	L	H	"	"	"		
"			63	"	H	0.8 V	2.0 V	"	H	"	"	H	0.8 V	2.0 V	"	"	L	H	"	"	"		
"			64	"	H	2.0 V	2.0 V	"	L	"	"	L	2.0 V	2.0 V	"	"	H	L	"	"	"		
"			65	2.0 V	H	0.8 V	0.8 V	"	L	"	2.0 V	L	0.8 V	0.8 V	"	"	"	L	"	"	"		
"			66	"	L	2.0 V	0.8 V	"	L	"	"	H	2.0 V	0.8 V	"	"	"	H	"	"	"		
"			67	"	L	0.8 V	2.0 V	"	L	"	"	H	0.8 V	2.0 V	"	"	"	"	"	"	"		
"			68	"	H	2.0 V	2.0 V	"	H	"	"	L	2.0 V	2.0 V	"	"	"	"	"	"	"		

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02. - Continued
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	A4	Σ 3	A3	B3	V_{CC}	Σ 2	B2	A2	Σ1	A1	B1	GND	C0	C4	Σ 4	B4		Min	Max	Unit
7 2/			69	0.8 V 3/	L 3/	0.8 V 3/	0.8 V 3/	4.5 V	L 1/	0.8 V 3/	0.8 V 3/	H 1/	0.8 V 3/	0.8 V 3/	GND	2.0 V	L 1/	L 1/	0.8 V 3/	All	H or L		
T_C = 25°C			70	0.8 V	H	2.0 V	0.8 V	"	H	0.8 V	0.8 V	L	2.0 V	0.8 V	"	2.0 V	L	L	0.8 V	outputs	as shown 1/		
"			71	0.8 V	H	0.8 V	2.0 V	"	H	0.8 V	0.8 V	L	0.8 V	2.0 V	"	2.0 V 3/	L	L	0.8 V	"	"		
"			72	0.8 V	L	2.0 V	2.0 V	"	H	"	0.8 V	H	2.0 V	2.0 V	"	"	L	H	0.8 V	"	"		
"			73	2.0 V	L	0.8 V	0.8 V	"	H	"	2.0 V	H	0.8 V	0.8 V	"	"	H	L	2.0 V	"	"		
"			74	"	"	2.0 V	0.8 V	"	L	"	"	L	2.0 V	0.8 V	"	"	H	H	"	"	"		
"			75	"	"	0.8 V	2.0 V	"	L	"	"	L	0.8 V	2.0 V	"	"	H	"	"	"	"		
"			76	"	H	2.0 V	2.0 V	"	L	"	"	H	2.0 V	2.0 V	"	"	H	"	"	"	"		
"			77	0.8 V	L	0.8 V	0.8 V	"	H	2.0 V	0.8 V	H	0.8 V	0.8 V	"	"	L	H	"	"	"		
"			78	"	L	2.0 V	0.8 V	"	L	"	"	L	2.0 V	0.8 V	"	"	H	L	"	"	"		
"			79	"	L	0.8 V	2.0 V	"	L	"	"	L	0.8 V	2.0 V	"	"	"	"	"	"	"		
"			80	"	H	2.0 V	2.0 V	"	L	"	"	H	2.0 V	2.0 V	"	"	"	"	"	"	"		
"			81	2.0 V	H	0.8 V	0.8 V	"	L	"	2.0 V	H	0.8 V	0.8 V	"	"	"	"	"	"	"		
"			82	"	L	2.0 V	0.8 V	"	H	"	"	L	2.0 V	0.8 V	"	"	"	H	"	"	"		
"			83	"	L	0.8 V	2.0 V	"	H	"	"	L	0.8 V	2.0 V	"	"	"	H	"	"	"		
"			84	"	H	2.0 V	2.0 V	"	H	"	"	H	2.0 V	2.0 V	"	"	"	H	"	"	"		
8	Same tests, terminal conditions and limits as for subgroup 7, except T_C = 125°C and -55°C.																						
9	t_{PLH1}	3003	85																	C0 to Σ1	3	37	ns
T_C = 25°C	t_{PHL1}	"	86																	C0 to Σ1	"	44	"
	t_{PLH2}	"	87	See figure 6.																B2 to Σ2	"	41	"
	t_{PHL2}	"	88																	B2 to Σ2	"	36	"
	t_{PLH3}	"	89																	C0 to Σ2	"	42	"
	t_{PHL3}	"	90																	C0 to Σ2	"	47	"
	t_{PLH4}	"	91																	C0 to Σ3	"	55	"
	t_{PHL4}	"	92																	C0 to Σ3	"	66	"
	t_{PLH5}	"	93																	C0 to Σ4	"	61	"
	t_{PHL5}	"	94																	C0 to Σ4	"	61	"
	t_{PLH6}	"	95																	C0 to C4	"	54	"
	t_{PHL6}	"	96																	C0 to C4	"	40	"
	t_{PLH7}	"	97																	A2 to Σ2	"	41	"
	t_{PHL7}	"	98																	A2 to Σ2	"	36	"

See footnotes at end of device type 02.

TABLE III. Group A inspection for device type 02. - Continued
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	A4	Σ 3	A3	B3	V_{CC}	Σ 2	B2	A2	Σ1	A1	B1	GND	C0	C4	Σ 4	B4		Min	Max	Unit
9	t_{PLH8}	3003	99	See figure 6.																A4 to Σ 4	3	41	ns
T_C = 25°C	t_{PHL8}	"	100																	A4 to Σ 4	"	36	"
	t_{PLH9}	"	101																	B4 to Σ 4	"	41	"
	t_{PHL9}	"	102																	B4 to Σ 4	"	36	"
10	t_{PLH1}	3003	103	See figure 6.																C0 to Σ1	3	39	ns
T_C = 125°C	t_{PHL1}	"	104																	C0 to Σ1	"	51	"
	t_{PLH2}	"	105																	B2 to Σ 2	"	45	"
	t_{PHL2}	"	106																	B2 to Σ 2	"	40	"
	t_{PLH3}	"	107																	C0 to Σ 2	"	51	"
	t_{PHL3}	"	108																	C0 to Σ 2	"	54	"
	t_{PLH4}	"	109																	C0 to Σ 3	"	62	"
	t_{PHL4}	"	110																	C0 to Σ 3	"	77	"
	t_{PLH5}	"	111																	C0 to Σ 4	"	72	"
	t_{PHL5}	"	112																	C0 to Σ 4	"	71	"
	t_{PLH6}	"	113																	C0 to C4	"	63	"
	t_{PHL6}	"	114																	C0 to C4	"	55	"
	t_{PLH7}	"	115																	A2 to Σ 2	"	45	"
	t_{PHL7}	"	116																	A2 to Σ 2	"	40	"
	t_{PLH8}	"	117																	A4 to Σ 4	"	45	"
	t_{PHL8}	"	118																	A4 to Σ 4	"	40	"
	t_{PLH9}	"	119																	B4 to Σ 4	"	45	"
	t_{PHL9}	"	120																	B4 to Σ 4	"	40	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T_C = -55°C.																						

1/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L < 1.5 V when using a high speed checker single comparator.
2/ Only a summary of attributes data is required.
3/ Input voltages shown are the maximum for V_{IL} and the minimum for V_{IH}.
4/ Circuit B limits for I_{OS} shall be -70 mA, max.
5/ "GND" when testing for circuit D, E, F, G, and H.
6/ Substitute "Open" for circuit F.

TABLE III. Group A inspection for device type 03.

Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	$\overline{A}2$	A1	B1	C1	$\overline{C}01$	$\overline{\Sigma}1$	$\Sigma1$	GND	$\overline{\Sigma}2$	$\Sigma2$	C02	$\overline{C}2$	B2	A2	$\overline{B}2$	V_{CC}		Min	Max	Unit
1	V_{OH}	3006	1		2.0 V	0.8 V	0.8 V	-560 µA			GND								4.5 V	$\overline{C}01$	2.4		V
T_C = 25°C	"	"	2		0.8 V	0.8 V	0.8 V		-800 µA		"								"	$\overline{\Sigma}1$	"		"
"	"	"	3		2.0 V	2.0 V	2.0 V			-800 µA	"								"	$\Sigma1$	"		"
"	"	"	4	0.8 V							"			-560 µA	2.0 V	0.8 V	0.8 V	0.8 V	"	C02	"		"
"	"	"	5	2.0 V							"		-800 µA		0.8 V	2.0 V	2.0 V	2.0 V	"	$\Sigma2$	"		"
"	"	"	6	2.0 V							"	-800 µA			2.0 V	0.8 V	0.8 V	2.0 V	"	$\overline{\Sigma}2$	"		"
"	V_{OL}	3007	7		0.8 V	2.0 V	2.0 V	8 mA			"								"	$\overline{C}01$		0.4	"
"	"	"	8		2.0 V	0.8 V	0.8 V		16 mA		"								"	$\overline{\Sigma}1$		"	"
"	"	"	9		0.8 V	0.8 V	0.8 V			16 mA	"								"	$\Sigma1$		"	"
"	"	"	10	2.0 V							"			8 mA	2.0 V	2.0 V	0.8 V	0.8 V	"	C02		"	"
"	"	"	11	2.0 V							"		16 mA		0.8 V	0.8 V	2.0 V	2.0 V	"	$\Sigma2$		"	"
"	"	"	12	0.8 V							"	16 mA			0.8 V	0.8 V	0.8 V	0.8 V	"	$\overline{\Sigma}2$		"	"
"	I_{IL1}	3009	13								"					0.4 V			5.5 V	B2	-0.4	-1.3	mA
"	I_{IL1}	"	14								"						0.4 V		"	A2	-0.4	-1.3	"
"	I_{IL2}	"	15 CKT J		0.4 V	4.5 V	4.5 V				"								"	A1	-1.2	-5.6	"
"	"	"	15 CKT K		0.4 V	4.5 V	4.5 V				"								"	A1	"	-3.9	"
"	"	"	16 CKT J		4.5 V	0.4 V	4.5 V				"								"	B1	"	-5.6	"
"	"	"	16 CKT K		4.5 V	0.4 V	4.5 V				"								"	B1	"	-3.9	"
"	"	"	17 CKT J		4.5 V	4.5 V	0.4 V				"								"	C1	"	-5.6	"
"	"	"	17 CKT K		4.5 V	4.5 V	0.4 V				"								"	C1	"	-3.9	"
"	I_{IL3}	"	18 CKT J	0.4 V							"				4.5 V	GND	GND	4.5 V	"	$\overline{A}2$	-2.4	-5.6	"
"	"	"	18 CKT K	0.4 V							"				4.5 V	"	"	4.5 V	"	$\overline{A}2$	-1.2	"	"
"	"	"	19 CKT J	4.5 V							"				0.4 V	"	"	4.5 V	"	$\overline{C}2$	-2.4	"	"
"	"	"	19 CKT K	4.5 V							"				0.4 V	"	"	4.5 V	"	$\overline{C}2$	-1.2	"	"
"	"	"	20 CKT J	4.5 V							"				4.5 V	"	"	0.4 V	"	$\overline{B}2$	-2.4	"	"
"	"	"	20 CKT K	4.5 V							"				4.5 V	"	"	0.4 V	"	$\overline{B}2$	-1.2	"	"
"	I_{IH1}	3010	21	GND	GND	GND	GND				"				GND	2.4 V	GND		"	B2		40	µA
"	I_{IH1}	"	22	GND	GND	GND	GND				"				GND	GND	2.4 V		"	A2		40	"
"	I_{IH3}	"	23	2.4 V	GND	GND	GND				"				GND	GND	GND	GND	"	$\overline{A}2$		160	"
"	"	"	24	GND	2.4 V	GND	"				"				"	"	"	"	"	A1		"	"
"	"	"	25	"	GND	2.4 V	"				"				"	"	"	"	"	B1		"	"
"	"	"	26	"	"	GND	2.4 V				"				"	"	"	"	"	C1		"	"
"	"	"	27	"	"	"	GND				"				2.4 V	"	"	"	"	$\overline{C}2$		"	"
"	"	"	28	"	"	"	GND				"				GND	"	"	2.4 V	"	$\overline{B}2$		"	"

See footnote at end of device type 03.

TABLE III. Group A inspection for device type 03.

Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F Test No.	1 $\overline{A}2$	2 A1	3 B1	4 C1	5 $\overline{C}01$	6 $\overline{\Sigma}1$	7 $\Sigma1$	8 GND	9 $\overline{\Sigma}2$	10 $\Sigma2$	11 C02	12 $\overline{C}2$	13 B2	14 A2	15 $\overline{B}2$	16 V_{CC}	Meas. terminal	Test limits Min	Max	Unit
1	I_{IH4}	3010	29	5.5 V	GND	GND	GND				GND				GND	GND	GND	GND	5.5 V	$\overline{A}2$		400	µA
T_C = 25°C	"	"	30	GND	5.5 V	GND	"				"				"	"	"	"	"	A1		"	"
"	"	"	31	"	GND	5.5 V	"				"				"	"	"	"	"	B1		"	"
"	"	"	32	"	"	GND	5.5 V				"				"	"	"	"	"	C1		"	"
"	"	"	33	"	"	"	GND				"				5.5 V	"	"	"	"	$\overline{C}2$		"	"
"	"	"	34	"	"	"	GND				"				GND	"	"	5.5 V	"	$\overline{B}2$		"	"
"	I_{OS}	3011	35	GND	GND	GND	GND	GND			"								"	$\overline{C}01$	-30	-100	mA
	"	"	36	"	GND	"	"		GND		"								"	$\overline{\Sigma}1$	"	"	"
"	"	"	37	"	4.5 V	"	"			GND	"								"	$\Sigma1$	"	"	"
"	"	"	38	"	GND	"	"				"			GND	GND	GND	GND	GND	"	$\overline{C}2$	"	"	"
"	"	"	39	"		"	"				"		GND		"	"	"	GND	"	$\Sigma2$	"	"	"
"			40	"		"	"				"	GND			"	"	"	4.5 V	"	$\overline{\Sigma}2$	"	"	"
"	V_{IC}		41	-12 mA							"								4.5 V	$\overline{A}2$		-1.5	V
"	"		42		-12 mA						"								"	A1		"	"
"	"		43			-12 mA					"								"	B1		"	"
"	"		44				-12 mA				"								"	C1		"	"
"	"		45								"				-12 mA				"	$\overline{C}2$		"	"
"	"		46								"					-12 mA			"	B2		"	"
"	"		47								"						-12 mA		"	A2		"	"
"	"		48								"							-12 mA	"	$\overline{B}2$		"	"
"	I_{CC}	30005	49								"						GND	GND	5.5 V	V_{CC}		55	mA
2	Same tests, terminal conditions and limits as for subgroup 1, except T_C = 125°C and V_{IC} tests are omitted.																						
3	Same tests, terminal conditions and limits as for subgroup 1, except T_C = -55°C and V_{IC} tests are omitted.																						
7			50	0.8 V	0.8 V	0.8 V	0.8 V	H	H	L	GND	L	H	H	0.8 V	08 V	0.8 V	0.8 V	4.5 V	All	H or L		
T_C = 25°C			51	2.0 V	2.0 V	0.8 V	0.8 V	H	L	H	"	H	L	H	"	"	"	0.8 V	"	outputs	as shown		
"			52	0.8 V	0.8 V	2.0 V	0.8 V	H	L	H	"	H	L	H	"	"	"	2.0 V	"	"	"		
"			53	2.0 V	2.0 V	2.0 V	0.8 V	L	H	L	"	L	H	L	"	"	"	2.0 V	"	"	"		
"			54	0.8 V	0.8 V	0.8 V	2.0 V	H	L	H	"	L	H	H	"	"	2.0 V	0.8 V	"	"	"		
"			55	2.0 V	2.0 V	0.8 V	2.0 V	L	H	L	"	L	H	"	"	"	"	0.8 V	"	"	"		
"			56	0.8 V	0.8 V	2.0 V	2.0 V	L	H	L	"	H	L	"	"	"	"	2.0 V	"	"	"		
"			57	2.0 V	2.0 V	2.0 V	2.0 V	L	L	H	"	H	L	"	"	"	"	2.0 V	"	"	"		
"			58	0.8 V							"	L	H			2.0 V	0.8 V	0.8 V	"	"	"		
"			59	2.0 V							"	H	L	"	"	"	"	0.8 V	"	"	"		
"			60	0.8 V							"	L	H	"	"	"	"	2.0 V	"	"	"		

See footnote at end of device type 03.

TABLE III. Group A inspection for device type 03.

Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	$\overline{A}2$	A1	B1	C1	$\overline{C}01$	$\overline{\Sigma}1$	$\Sigma1$	GND	$\overline{\Sigma}2$	$\Sigma2$	C02	$\overline{C}2$	B2	A2	$\overline{B}2$	V_{CC}		Min	Max	Unit
7			61	2.0 V							GND	H	L	H	0.8 V	2.0 V	0.8 V	2.0 V	4.5 V	All	H or L		
T_C = 25°C			62	0.8 V							"	L	H	"	"	"	2.0 V	0.8 V	"	outputs	as shown		
"			63	2.0 V							"	L	H	"	"	"	"	0.8 V	"	"	"		
"			64	0.8 V							"	L	H	"	"	"	"	2.0 V	"	"	"		
"			65	2.0 V							"	L	H	"	"	"	"	2.0 V	"	"	"		
"			66	0.8 V							"	H	L	"	2.0 V	0.8 V	0.8 V	0.8 V	"	"	"		
"			67	2.0 V							"	L	H	L	"	"	"	0.8 V	"	"	"		
"			68	0.8 V							"	L	H	L	"	"	"	2.0 V	"	"	"		
"			69	2.0 V							"	H	L	L	"	"	"	2.0 V	"	"	"		
"			70	0.8 V							"	H	L	H	"	"	2.0 V	0.8 V	"	"	"		
"			71	2.0 V							"	H	L	H	"	"	"	0.8 V	"	"	"		
"			72	0.8 V							"	L	H	L	"	"	"	2.0 V	"	"	"		
"			73	2.0 V							"	L	H	L	"	"	"	2.0 V	"	"	"		
"			74	0.8 V							"	H	L	H	"	2.0 V	0.8 V	0.8 V	"	"	"		
"			75	2.0 V							"	L	H	L	"	"	"	0.8 V	"	"	"		
"			76	0.8 V							"	H	L	H	"	"	"	2.0 V	"	"	"		
"			77	2.0 V							"	L	H	L	"	"	"	2.0 V	"	"	"		
"			78	0.8 V							"	H	L	H	"	"	2.0 V	0.8 V	"	"	"		
"			79	2.0 V							"	H	L	H	"	"	"	0.8 V	"	"	"		
"			80	0.8 V							"	H	L	H	"	"	"	2.0 V	"	"	"		
"			81	2.0 V							"	H	L	H	"	"	"	2.0 V	"	"	"		
8 1/ 2/	Same tests, terminal conditions and limits as for subgroup 7, except T_C = 125°C and -55°C.																						
9	t_{PLH1}	3003	82																	C1 to $\Sigma1$	9	45	ns
T_C = 25°C	t_{PHL1}	"	83																	C1 to $\Sigma1$	9	48	"
"	t_{PLH2}	"	84																	C1 to $\overline{\Sigma}1$	6	31	"
"	t_{PHL2}	"	85																	C1 to $\overline{\Sigma}1$	6	31	"
"	t_{PLH3}	"	86																	C1 to $\overline{C}01$	3	14	"
"	t_{PHL3}	"	87																	C1 to $\overline{C}01$	3	17	"
"	t_{PLH4}	"	88																	A2 to $\overline{\Sigma}2$	11	52	"
"	t_{PHL4}	"	89																	A2 to $\overline{\Sigma}2$	11	55	"
"	t_{PLH5}	"	90																	A2 to $\Sigma2$	8	38	"
"	t_{PHL5}	"	91																	A2 to $\Sigma2$	8	38	"
"	t_{PLH6}	"	92																	A2 to C02	5	21	"
"	t_{PHL6}	"	93																	A2 to C02	5	24	"

Adder 1 (C1 to $\Sigma1$, C1 to $\overline{\Sigma}1$, C1 to $\overline{C}01$, C1 to $\overline{C}01$)

Adder 2 (A2 to $\overline{\Sigma}2$, A2 to $\overline{\Sigma}2$, A2 to $\Sigma2$, A2 to $\Sigma2$, A2 to C02, A2 to C02)

See figure 7.

See footnote at end of device type 03.

TABLE III. Group A inspection for device type 03.

Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases E, F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Meas. terminal	Test limits		
			Test No.	$\overline{A}2$	A1	B1	C1	$\overline{C}01$	$\overline{\Sigma}1$	$\Sigma1$	GND	$\overline{\Sigma}2$	$\Sigma2$	C02	$\overline{C}2$	B2	A2	$\overline{B}2$	V_{CC}		Min	Max	Unit
10	t_{PLH1}	3003	94																	C1 to $\Sigma1$	9	60	ns
T_C = 125°C	t_{PHL1}	"	95																	C1 to $\Sigma1$	9	59	"
"	t_{PLH2}	"	96																	C1 to $\overline{\Sigma}1$	6	39	"
"	t_{PHL2}	"	97																	C1 to $\overline{\Sigma}1$	6	39	"
"	t_{PLH3}	"	98																	C1 to $\overline{C}01$	3	21	"
"	t_{PHL3}	"	99																	C1 to $\overline{C}01$	3	21	"
"	t_{PLH4}	"	100																	A2 to $\overline{\Sigma}2$	11	69	"
"	t_{PHL4}	"	101																	A2 to $\overline{\Sigma}2$	11	67	"
"	t_{PLH5}	"	102																	A2 to $\Sigma2$	8	49	"
"	t_{PHL5}	"	103																	A2 to $\Sigma2$	8	48	"
"	t_{PLH6}	"	104																	A2 to C02	5	29	"
"	t_{PHL6}	"	105																	A2 to C02	5	28	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T_C = -55°C.																						

Adder 1 (pins 1, 2, 5, 6, 7)

Adder 2 (pins 1, 2, 5, 6, 7)

See figure 7. (pins 8, 9, 10, 11, 12, 13, 14, 15, 16)

1/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L < 1.5 V when using a high speed checker single comparator.

2/ Input voltages shown are the maximum for V_{IL} and the minimum for V_{IH}.

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits		
			Case C	11	12	13	14	1	2	3	4	5	6	7	8	9	10		Min	Max	Unit
			Test No.	A_C	B1	B2	V_{CC}	B*	B_C	Cn	$\overline{C}n+1$	Σ	$\overline{\Sigma}$	GND	A1	A2	A*				
1	V_{OH}	3006	1	0.8 V	0.8 V	2.0 V	4.5 V		2.0 V	0.8 V		-.4 mA		GND	0.8 V	0.8 V		Σ	2.4		V
T_C = 25°C	"	"	2	2.0 V	2.0 V	0.8 V	"		2.0 V	0.8 V			-.4 mA	"	2.0 V	0.8 V		$\overline{\Sigma}$	"		"
"	"	"	3	2.0 V	2.0 V	0.8 V	"		2.0 V	0.8 V	-.2 mA			"	2.0 V	0.8 V		$\overline{C}n+1$	"		"
"	"	"	4				"							"	0.8 V	0.8 V	-.12 mA	A*	"		"
"	"	"	5		0.8 V	0.8 V	"	-.12 mA						"				B*	"		"
"	V_{OL}	3007	6	2.0 V	0.8 V	2.0 V	"		2.0 V	0.8 V		16 mA		"	0.8 V	2.0 V		Σ		0.4	"
"	"	"	7	0.8 V	0.8 V	2.0 V	"		2.0 V	0.8 V			16 mA	"	0.8 V	0.8 V		$\overline{\Sigma}$		"	"
"	"	"	8	2.0 V	0.8 V	0.8 V	"		0.8 V	0.8 V	8 mA			"	2.0 V	2.0 V		$\overline{C}n+1$		"	"
"	"	"	9				"							"	2.0 V	2.0 V	4.8 mA	A*		"	"
"	"	"	10		2.0 V	2.0 V	"	4.8 mA										B*		"	"
"	I_{IH1}	3010	11				5.5 V							"	2.4 V	GND		A1		15	µA
"	"	"	12				"							"	GND	2.4 V		A2		"	"
"	"	"	13		2.4 V	GND	"							"				B1		"	"
"	"	"	14		GND	2.4 V	"							"				B2		"	"
"	"	"	15	2.4 V			"							"			GND	A_C		"	"
"	"	"	16				"	GND	2.4 V					"				B_C		"	"
"	I_{IH3}	"	17		GND	GND	"			2.4 V				"	GND	GND		Cn		200	"
"	I_{IH4}	"	18				"							"	5.5 V	GND		A1		1	mA
"	"	"	19				"							"	GND	5.5 V		A2		"	"
"	"	"	20		5.5 V	GND	"							"				B1		"	"
"	"	"	21		GND	5.5 V	"							"				B2		"	"
"	"	"	22	5.5 V			"							"			GND	A_C		"	"
"	"	"	23				"	GND	5.5 V					"				B_C		"	"
"	"	"	24		GND	GND	"			5.5 V				"	GND	GND		Cn		"	"
"	I_{IL1}	3009	25				"							"	0.4 V	5.5 V		A1		-1.6	mA
"	"	"	26				"							"	5.5 V	0.4 V		A2		"	"
"	"	"	27		0.4 V	5.5 V	"							"				B1		"	"
"	"	"	28		5.5 V	0.4 V	"							"				B2		"	"
"	"	"	29	0.4 V			"							"	GND	GND		A_C		"	"
"	"	"	30		GND	GND	"		0.4 V					"				B_C		"	"
"	I_{IL2}	"	31	4.5 V			"							"	GND	GND	0.4 V	A*		-2.6	"
"	I_{IL2}	"	32		GND	GND	"	0.4 V	4.5 V					"			0.4 V	B*		-2.6	"
"	I_{IL3}	"	33				"			0.4 V				"				Cn		-8.0	"

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits		
			Case C	11	12	13	14	1	2	3	4	5	6	7	8	9	10		Min	Max	Unit
			Test No.	A_C	B1	B2	V_{CC}	B*	B_C	Cn	$\overline{C}n+1$	Σ	$\overline{\Sigma}$	GND	A1	A2	A*				
1	I_{OS1}	3011	34		GND	GND	5.5 V			4.5 V		GND		GND	GND	GND		Σ	-20	-57	mA
T_C = 25°C	I_{OS1}	"	35		"	"	"			GND			GND	"	"	"		$\overline{\Sigma}$	-20	-57	"
"	I_{OS2}	"	36		"	"	"				GND			"	"	"		$\overline{C}n+1$	-20	-70	"
"	I_{OS3}	"	37				"							"	"	"	GND	A*	-0.9	-2.9	"
"	I_{OS3}	"	38		GND	GND	"	GND						"				B*	-0.9	-2.9	"
"	I_{CC}	3005	39				"							"				V_{CC}		31	"
"	V_{IC}		40	-12 mA			4.5 V							"				A_C		-1.5	V
"	"		41				"							"	-12 mA			A1		"	"
"	"		42				"							"		-12 mA		A2		"	"
"	"		43				"		-12 mA					"				B_C		"	"
"	"		44		-12 mA		"							"				B1		"	"
"	"		45			-12 mA	"							"				B2		"	"
"	"		46				"			-12 mA				"				Cn		"	"
2	Same tests, terminal conditions and limits as for subgroup 1, except T_C = 125°C and V_{IC} tests are omitted.																				
3	Same tests, terminal conditions and limits as for subgroup 1, except T_C = -55°C and V_{IC} tests are omitted.																				
7	Truth	3014	47	A 1/	B 1/	A	4.5 V		A	B	H	L	H	GND	B	A					
T_C = 25°C	table	"	48	A	A	B	"		A	B	H	L	H	"	A	B					
"	tests	"	49	B	B	A	"		A	B	H	H	L	"	B	B		See footnote 2			
"		"	50	A	A	B	"		A	B	H	H	L	"	A	A					
"		"	51	B	B	B	"		B	B	H	H	L	"	B	A					
"		"	52	B	A	A	"		A	B	H	H	L	"	A	B					
"		"	53	A	B	B	"		B	B	L	L	H	"	A	A					
"		"	54	B	A	A	"		A	B	L	L	H	"	B	B					
"		"	55	A	B	A	"		A	A	H	H	L	"	B	A					
"		"	56	A	A	B	"		A	A	H	H	L	"	A	B					
"		"	57	B	B	A	"		A	A	L	L	H	"	B	B					
"		"	58	A	A	B	"		A	A	L	L	H	"	A	A					
"		"	59	B	B	B	"		B	A	L	L	H	"	B	A					
"		"	60	B	A	A	"		A	A	L	L	H	"	A	B					
"		"	61	A	B	B	"		B	A	L	H	L	"	A	A					
"		"	62	B	A	A	"		A	A	L	H	L	"	B	B					
"		"	63	A	B	B	"	B	A	A	L	H	L	"	B	B	B				

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be H ≥ 2.0 V or L ≤ 0.8 V or open).

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Meas. terminal	Test limits		
			Case C	11	12	13	14	1	2	3	4	5	6	7	8	9	10		Min	Max	Unit
			Test No.	A_C	B1	B2	V_{CC}	B*	B_C	Cn	$\overline{C}n+1$	Σ	$\overline{\Sigma}$	GND	A1	A2	A*				
8	Same tests, terminal conditions and limits as for subgroup 7, except T_C = 125°C and -55°C.																				
9	t_{PHL1}	3003	64															Cn to $\overline{C}n+1$		12	ns
T_C = 25°C	t_{PLH1}	(Fig 7)	65															Cn to $\overline{C}n+1$		22	"
"	t_{PHL2}	"	66															B_C to $\overline{C}n+1$		60	"
"	t_{PLH2}	"	67		See figure 8													B_C to $\overline{C}n+1$		30	"
"	t_{PHL3}	"	68															A_C to Σ		85	"
"	t_{PLH3}	"	69															A_C to Σ		75	"
"	t_{PHL4}	"	70															B_C to $\overline{\Sigma}$		80	"
"	t_{PLH4}	"	71															B_C to $\overline{\Sigma}$		60	"
"	t_{PHL5}	"	72															A1 to A*		30	"
"	t_{PLH5}	"	73															A1 to A*		70	"
"	t_{PHL6}	"	74															B1 to B*		30	"
"	t_{PLH6}	"	75															B1 to B*		70	"
10	t_{PHL1}	3003	76															Cn to $\overline{C}n+1$		18	ns
T_C =125°C	t_{PLH1}	(Fig 7)	77															Cn to $\overline{C}n+1$		33	"
"	t_{PHL2}	"	78															B_C to $\overline{C}n+1$		90	"
"	t_{PLH2}	"	79		See figure 8													B_C to $\overline{C}n+1$		45	"
"	t_{PHL3}	"	80															A_C to Σ		127	"
"	t_{PLH3}	"	81															A_C to Σ		112	"
"	t_{PHL4}	"	82															B_C to $\overline{\Sigma}$		120	"
"	t_{PLH4}	"	83															B_C to $\overline{\Sigma}$		90	"
"	t_{PHL5}	"	84															A1 to A*		45	"
"	t_{PLH5}	"	85															A1 to A*		105	"
"	t_{PHL6}	"	86															B1 to B*		45	"
"	t_{PLH6}	"	87															B1 to B*		105	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T_C = -55°C.																				

1/ A = 2.0 V and B = 0.8 V.
2/ Output voltages shall be either: (a) H = 2.4 V, minimum and L = 0.4 V, maximum when using a high speed checker double comparator; or (b) H ≥ 1.5 V and L < 1.5 V when using a high speed checker single comparator.

5. PACKAGING

5.1 Packaging requirements. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but it not mandatory)

6.1 Intended use. Microcircuits conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.
b. PIN and compliance identifier, if applicable (see 1.2).
c. Requirements for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
d. Requirement for certificate of compliance, if applicable.
e. Requirements for notification of change of product or process to acquiring activity in addition to notification to the qualifying activity, if applicable.
f. Requirements for failure analysis (including required test condition of method 5003), corrective action and reporting of results, if applicable.
g. Requirements for product assurance options.
h. Requirements for carriers, special lead lengths or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.
i. Requirements for "JAN" marking.
j. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43123-1199.

6.4 Superseding information. The requirements of MIL-M-38510 have been superseded to take advantage of the available Qualified Manufacturer Listing (QML) system provided by MIL-PRF-38535. Previous references to MIL-M-38510 in this document have been replaced by appropriate references to MIL-PRF-38535. All technical requirements now consist of this specification and MIL-PRF-38535. The MIL-M-38510 specification sheet number and PIN have been retained to avoid adversely impacting existing government logistics systems and contractor's parts lists.

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

GND ..... Electrical ground (common terminal)
V_{IN} ..... Voltage level at an input terminal
V_{IC} ..... Input clamp voltage
I_{IN} ..... Current-flowing into an input terminal

6.6 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), lead material and finish A (see 3.4). Longer lead lengths and lead forming shall not affect the part number.

6.7 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic-industry type. Generic-industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-35810 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

Device type	Commercial type
01	5482, 7482, 9382
02	5483, 7483, 9383
03	9304
04	5480, 7480, 9380

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5962-2076)

Review activities:
Army - MI, SM
Navy - AS, CG, MC, SH, TD
Air Force - 03, 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.