

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, BIPOLAR, TTL,
MAGNITUDE COMPARATORS, MONOLITHIC SILICON

Inactive for new design after 8 July 1997.
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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, Advanced Low Power Scottky TTL, magnitude comparator 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).

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:

<u>Device type</u>	<u>Circuit</u>
01	4-bit comparator
02	5-bit comparator

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:

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
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, 3990 East Broad St., Columbus, OH 43218-3990, or emailed to bipolar@dsccl.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 .
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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 (P_D):	
Device types 01 and 02	485 mW <u>1/</u>
Lead temperature (soldering, 10 seconds)	+300°C
Thermal resistance, junction to case (θ_{JC}):	
Cases E and F	See MIL-STD-1835
Junction temperature (T_J)	+175°C <u>2/</u>

1.4 Recommended operating conditions.

Supply voltage (V_{CC})	4.5 V dc minimum to 5.5 V dc maximum
Minimum high level input voltage (V_{IH})	2.0 V dc
Maximum low level input voltage (V_{IL})	0.8 V dc
Normalized fanout (each output)	10 maximum
Case operating temperature range (T_C)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

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, standards, and handbooks. 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 SPECIFICATION

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 test (e.g., I_{OS}).

2/ Maximum junction temperature shall not be exceeded except for allowable short duration burn-in screening conditions in accordance with MIL-PRF-38535.

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 6.4).

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 specified on figure 3.

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

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

3.4 Lead material and finish. The 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 I, 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 5 (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 Screening. Screening shall be in accordance with, MIL-PRF-38535 and shall be conducted on all devices prior to qualification and quality 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.

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

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$	Device type	Limits		Unit
				Min	Max	
High level output voltage	V_{OH}	$V_{CC} = 4.5\text{ V}$, $V_{IH} = 2.0\text{ V}$, $V_{IL} = 0.8\text{ V}$, $I_{OH} = -400\text{ }\mu\text{A}$	01	2.4		V
		$V_{CC} = 4.5\text{ V}$, $V_{IH} = 2.0\text{ V}$, $V_{IL} = 0.8\text{ V}$, $I_{OH} = -800\text{ }\mu\text{A}$	02	2.4		
Low level output voltage	V_{OL}	$V_{CC} = 4.5\text{ V}$, $V_{IH} = 2.0\text{ V}$, $V_{IL} = 0.8\text{ V}$, $I_{OL} = 16\text{ mA}$	All		0.4	V
Input clamp voltage	V_{IC}	$V_{CC} = 4.5\text{ V}$, $I_{IN} = -12\text{ mA}$, $T_C = +25^{\circ}\text{C}$	All		-1.5	V
High level input current (All inputs except A < B or A > B inputs)	I_{IH1}	$V_{CC} = 5.5\text{ V}$, $V_{IN} = 2.4\text{ V}$	01	0	120	μA
			02	0	80	
High level input current (all other inputs)	I_{IH2}	$V_{CC} = 5.5\text{ V}$, $V_{IN} = 5.5\text{ V}$	01	0	300	μA
			02	0	200	
High level input current (A < B, A > B inputs)	I_{IH3}	$V_{CC} = 5.5\text{ V}$, $V_{IN} = 2.4\text{ V}$	01	0	40	μA
Low level input current (all other inputs)	I_{IL1}	$V_{CC} = 5.5\text{ V}$, $V_{IN} = 0.4\text{ V}$	01	-2.0	-4.3	mA
			02	-1.4	-3.2	
Low level input current (A < B, A > B inputs)	I_{IL2}	$V_{CC} = 5.5\text{ V}$, $V_{IN} = 0.4\text{ V}$	01	-0.7	-1.6	mA
Short circuit output current	I_{OS}	$V_{CC} = 5.5\text{ V}$ <u>1/</u>	01	-20	-55	mA
			02	-20	-70	
Supply current	I_{CC}	$V_{CC} = 5.5\text{ V}$ <u>2/</u>	01		88	mA
		$V_{CC} = 5.5\text{ V}$	02		81	
Propagation delay from any A or B input to A < B or A > B outputs	t_{PLH1}	$C_L = 50\text{ pF}$, <u>3/ 4/</u> 3 gate levels, $R_L = 400\text{ }\Omega$	01	2	38	ns
Propagation delay from any A or B input to A > B output	t_{PLH2}	$C_L = 50\text{ pF}$, <u>3/ 4/</u> 3 gate levels, $R_L = 400\text{ }\Omega$	01	2	49	ns
Propagation delay from A < B or A = B input to A > B output	t_{PLH3}	$C_L = 50\text{ pF}$, <u>3/ 4/</u> 2 gate levels, $R_L = 400\text{ }\Omega$	01	2	19	ns
Propagation delay from A = B input to A = B output	t_{PLH4}	$C_L = 50\text{ pF}$, <u>3/ 4/</u> 1 gate level, $R_L = 400\text{ }\Omega$	01	2	30	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C	Device type	Limits		Unit
				Min	Max	
Propagation delay from A > B or A = B input to A < B output	t _{PLH5}	C _L = 50 pF, <u>3/ 4/</u> 2 gate levels, R _L = 400 Ω	01	2	19	ns
Propagation delay from any A or B input to A > B or A < B output	t _{PHL1}	C _L = 50 pF, <u>3/ 4/</u> 3 gate levels, R _L = 400 Ω	01	2	43	ns
Propagation delay from any A or B input to A = B output	t _{PHL2}	C _L = 50 pF, <u>3/ 4/</u> 3 gate levels, R _L = 400 Ω	01	2	43	ns
Propagation delay from A < B or A = B inputs to A > B output	t _{PHL3}	C _L = 50 pF, <u>3/ 4/</u> 2 gate levels, R _L = 400 Ω	01	2	26	ns
Propagation delay from A = B input to A = B output	t _{PHL4}	C _L = 50 pF, <u>3/ 4/</u> 1 gate levels, R _L = 400 Ω	01	2	26	ns
Propagation delay from A > B or A = B input to A < B output	t _{PHL5}	C _L = 50 pF, <u>3/ 4/</u> 2 gate levels, R _L = 400 Ω	01	2	26	ns
Propagation delay from E to A = B	t _{PLH1}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	3	22	ns
Propagation delay from E to A < B	t _{PLH2}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	3	25	ns
Propagation delay from E to A > B	t _{PLH3}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	3	25	ns
Propagation delay from A to A = B	t _{PLH4}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	9	55	ns
Propagation delay from B to A = B	t _{PLH5}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	9	55	ns
Propagation delay from A to A < B	t _{PLH6}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	6	39	ns
Propagation delay from B to A < B	t _{PLH7}	V _{CC} = 5.0 V, R _L = 390 Ω, C _L = 50 pF	02	3	30	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55^{\circ}\text{C} \leq T_C \leq +125^{\circ}\text{C}$	Device type	Limits		Unit
				Min	Max	
Propagation delay from A to A > B	t _{PLH8}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	3	30	ns
Propagation delay from B to A > B	t _{PLH9}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	6	39	ns
Propagation delay from E to A = B	t _{PHL1}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	3	19	ns
Propagation delay from E to A < B	t _{PHL2}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	3	21	ns
Propagation delay from E to A > B	t _{PHL3}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	3	21	ns
Propagation delay from A to A = B	t _{PHL4}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	9	55	ns
Propagation delay from B to A = B	t _{PHL5}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	9	55	ns
Propagation delay time from A to A < B	t _{PHL6}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	6	32	ns
Propagation delay time from B to A < B	t _{PHL7}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	3	26	ns
Propagation delay time from A to A > B	t _{PHL8}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	3	25	ns
Propagation delay time from B to A > B	t _{PHL9}	V _{CC} = 5.0 V, R _L = 390 Ω , C _L = 50 pF	02	6	35	ns

1/ Not more than one output should be shorted at one time.

2/ I_{CC} is measured with outputs open, A = B grounded, and all other inputs at 4.5 V.

3/ The longest gate level propagation delay paths are not tested (5 gate levels); however, they can be calculated:
t = t_{p1} maximum + t_{p2} maximum - t_{p4} minimum.

4/ Gate level references are made with respect to the logic diagram.

TABLE II. Electrical test requirements.

MIL-PRF-38535 test requirements	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 method 5005 QCI option	1, 2, 3, 7, 8, 9, 10, 11	N/A
Group C end-point electrical parameters	1, 2, 3, 7, 8, 9, 10, 11	1, 2, 3
Group D end-point electrical parameters	1, 2, 3	1, 2, 3

* PDA applies to subgroup 1.

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 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 of inspection. Methods of inspection shall be specified and as follows:

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

Device type	01		02	
Case outlines	E and F		E and F	
Terminal number	Terminal symbol		Terminal symbol	
1	B ₃	DATA INPUT	$\overline{E}$	
2	A < B	CASCADING INPUTS	A < B	OUTPUT
3	A = B		B ₀	DATA INPUTS
4	A > B		B ₁	
5	A > B	OUTPUTS	B ₂	
6	A = B		B ₃	
7	A < B		B ₄	
8	GND		GND	
9	B ₀	DATA INPUTS	A ₄	DATA INPUTS
10	A ₀		A ₃	
11	B ₁		A ₂	
12	A ₁		A ₁	
13	A ₂		A ₀	
14	B ₂		A = B	OUTPUTS
15	A ₃		A > B	
16	V _{CC}		V _{CC}	

FIGURE 1. Terminal connections.

Device type 01

COMPARING INPUTS				CASCADING INPUTS			OUTPUTS		
A ₃ , B ₃	A ₂ , B ₂	A ₁ , B ₁	A ₀ , B ₀	A > B	A < B	A = B	A > B	A < B	A = B
A ₃ > B ₃	X	X	X	X	X	X	H	L	L
A ₃ < B ₃	X	X	X	X	X	X	L	H	L
A ₃ = B ₃	A ₂ > B ₂	X	X	X	X	X	H	L	L
A ₃ = B ₃	A ₂ < B ₂	X	X	X	X	X	L	H	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ > B ₁	X	X	X	X	H	L	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ < B ₁	X	X	X	X	L	H	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ > B ₀	X	X	X	H	L	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ < B ₀	X	X	X	L	H	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ = B ₀	H	L	L	H	L	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ = B ₀	L	H	L	L	H	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ = B ₀	L	L	H	L	L	H
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ = B ₀	X	X	H	L	L	H
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ = B ₀	H	H	L	L	L	L
A ₃ = B ₃	A ₂ = B ₂	A ₁ = B ₁	A ₀ = B ₀	L	L	L	H	H	L

Device type 02

$\overline{E}$	A _y	B _y	A < B	A > B	A = B
H	X	X	L	L	L
L	Word A = Word B		L	L	H
L	Word A > Word B		L	H	L
L	Word B > Word A		H	L	L

H = High level

L = Low level

X = Irrelevant

FIGURE 2. Truth table.

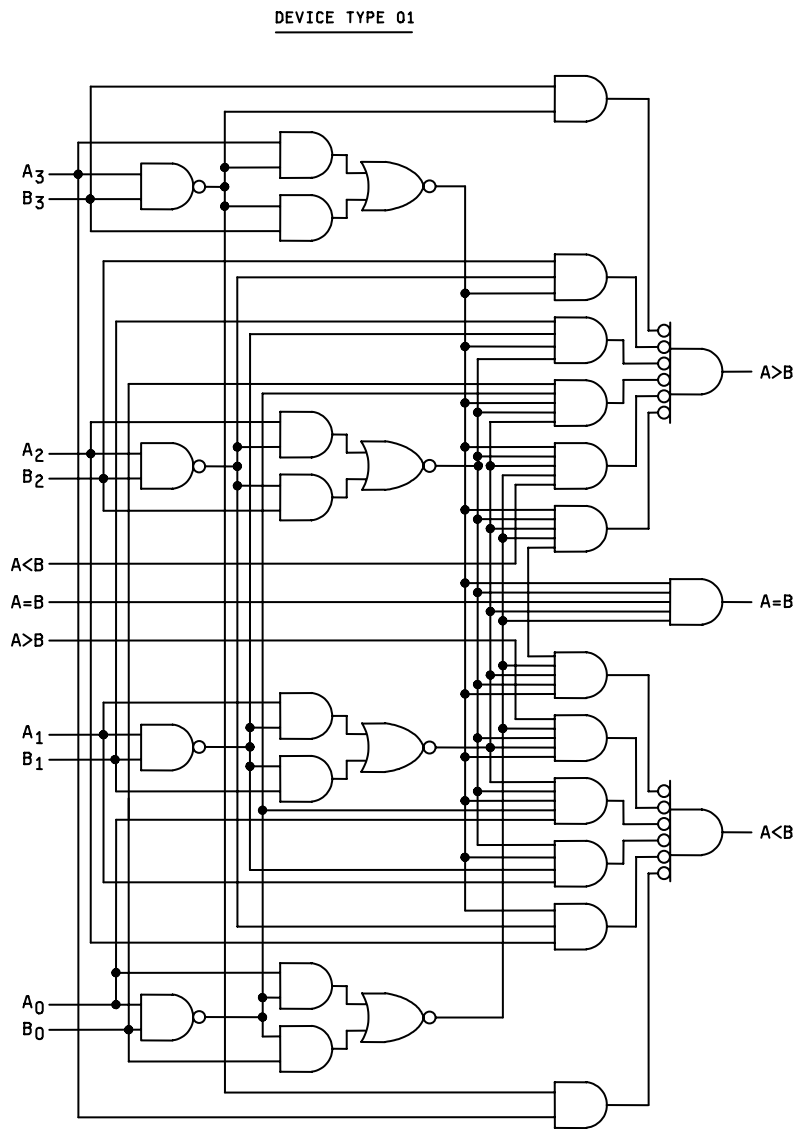


FIGURE 3. Logic diagram.

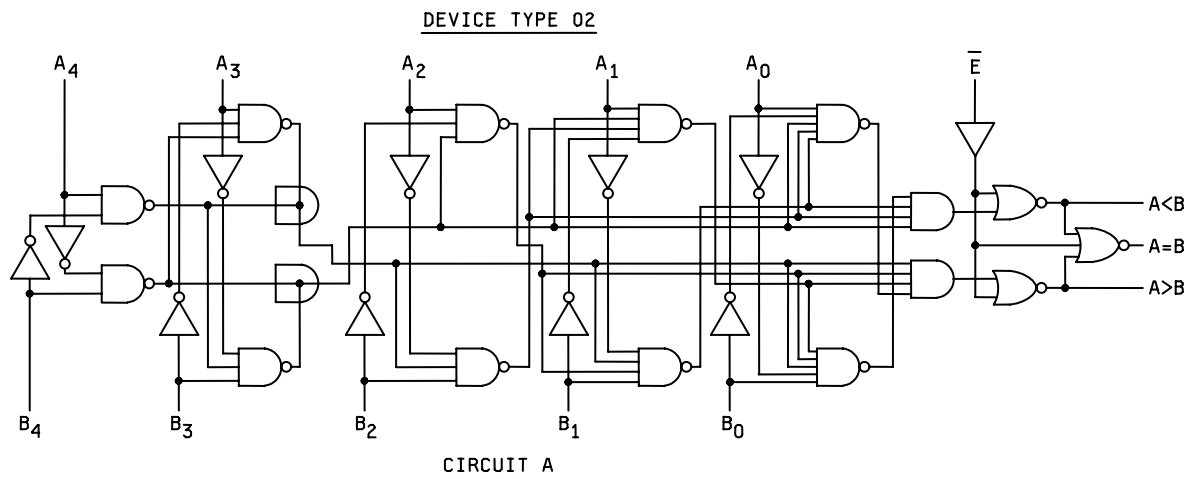


FIGURE 3. Logic diagram – Continued.

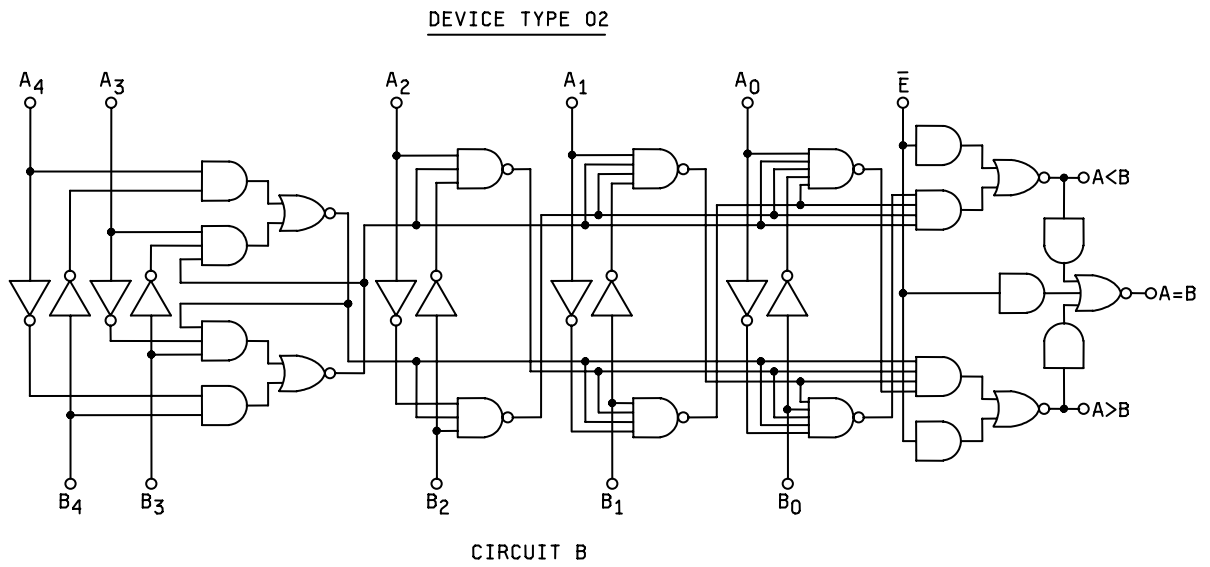
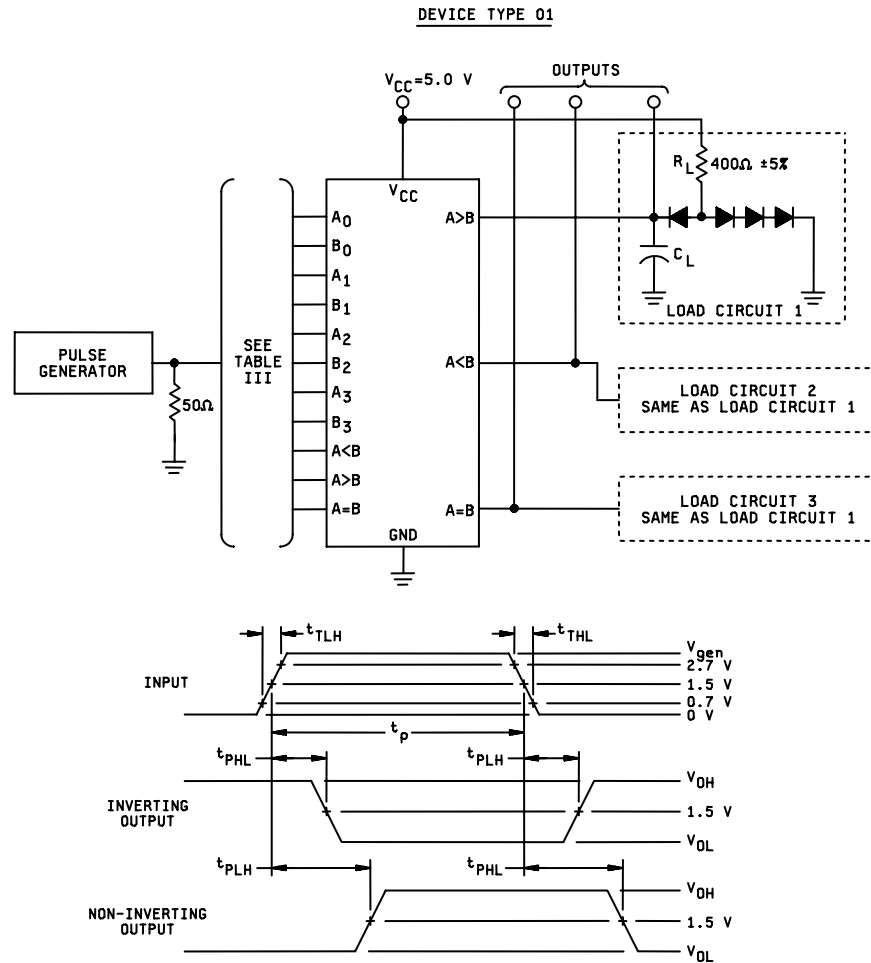


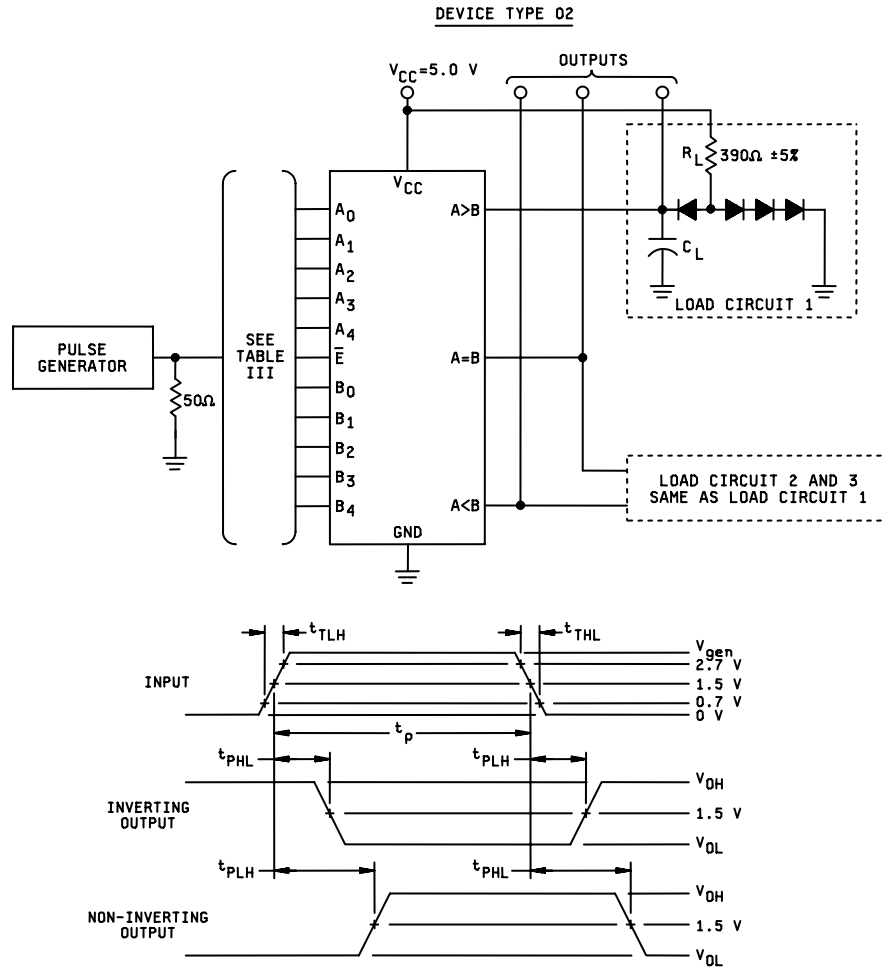
FIGURE 3. Logic diagram – Continued.



NOTES:

1. The pulse generator has the following characteristics: V_{gen} = 3.0 V, t_{T_{HL}} = t_{T_{LH}} ≤ 10 ns, t_p = 500 ns, PRR = 1.0 MHz, and Z_{out} ≈ 50 Ω.
2. C_L = 50 pF and includes probe and jig capacitance.
3. All diodes are 1N3064, or equivalent.

FIGURE 4. Switching time test circuit and waveforms for device type 01.



NOTES:

1. The pulse generator has the following characteristics: V_{gen} = 3.0 V, t_{THL} = t_{TLH} ≤ 10 ns, t_p = 500 ns, PRR = 1.0 MHz, and Z_{out} ≈ 50 Ω.
2. C_L = 50 pF and includes probe and jig capacitance.
3. All diodes are 1N3064, or equivalent.

FIGURE 5. Switching time test circuit and waveform for device type 02.

TABLE III. Group A inspection for device type 01. 1./

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	Measured terminal	Limits		Unit		
			Test no.	B ₃	A < B IN	A = B IN	A > B IN	A > B OUT	A = B OUT	A < B OUT	GND	B ₀	0	1	1	2	2	3	V _{CC}		Min	Max			
1 T _C = 25°C	V _{OH}	3006	1	0.8 V	0.8 V	0.8 V			-400 μA		GND	0.8 V	2.0 V	0.8 V	2.0 V	2.0 V	0.8 V	2.0 V	4.5 V	A > B OUT	2.4		V		
		"	2	0.8 V		2.0 V				-400 μA		"	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	"	A = B OUT	"		"		
		3	2.0 V	2.0 V	0.8 V	0.8 V				-400 μA	"	2.0 V	0.8 V	2.0 V	0.8 V	0.8 V	2.0 V	0.8 V	"	A < B OUT	"		"		
	V _{OL}	3007	4	2.0 V	2.0 V	0.8 V	0.8 V	16 mA				"	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	"	A > B OUT		0.4	V		
		"	5	2.0 V	2.0 V	0.8 V	2.0 V		16 mA			"	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	"	A = B OUT	"		"		
		6	0.8 V		2.0 V	GND				16 mA	"	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	"	A < B OUT	"		"		
	V _{IC}		7	-12 mA								"								"	B ₃		-1.5	V	
			8		-12 mA							"								"	A < B IN	"		"	
			9			-12 mA						"								"	A = B IN	"		"	
			10				-12 mA					"								"	A > B IN	"		"	
			11									"	-12 mA						"	"	B ₀	"		"	
			12									"		-12 mA					"	"	A ₀	"		"	
			13									"			-12 mA				"	"	B ₁	"		"	
			14									"				-12 mA			"	"	A ₁	"		"	
			15									"					-12 mA		"	"	A ₂	"		"	
			16									"						-12 mA	"	"	B ₂	"		"	
			17									"							-12 mA	"	A ₃	"		"	
	I _{IH1}	3010	18	GND		2.4 V						"	GND	5.5 V	GND	5.5 V	5.5 V	GND	5.5 V	5.5 V	A = B IN		120	μA	
		"	19	2.4 V								"								"	B ₃			"	
		"	20	GND								"	2.4 V	5.5 V	GND	5.5 V	5.5 V	GND	5.5 V	"	B ₀			"	
		"	21	"								"	5.5 V	2.4 V	GND	"	"	"	"	"	A ₀	"		"	
		"	22	"								"	GND	5.5 V	2.4 V	"	"	"	"	"	B ₁	"		"	
		"	23	"								"	"	"	5.5 V	2.4 V	"	"	"	"	A ₁	"		"	
		"	24	"								"	"	"	GND	5.5 V	2.4 V	5.5 V	"	"	A ₂	"		"	
		"	25	"								"	"	"	"	GND	5.5 V	5.5 V	2.4 V	"	B ₂	"		"	
		"	26	5.5 V								"							2.4 V	"	A ₃	"		"	
	I _{IH2}	"	27	GND	5.5 V							"	GND	5.5 V	GND	5.5 V	5.5 V	GND	5.5 V	"	A < B IN		100	μA	
		"	28	"				5.5 V				"	"	"	"	"	"	"	"	"	"	A > B IN		100	"
		"	29	"			5.5 V					"	"	"	"	"	"	"	"	"	"	A = B IN		300	"
		"	30	5.5 V								"							"	"	B ₃	"		"	
		"	31	GND								"	5.5 V	5.5 V	GND	5.5 V	5.5 V	GND	"	"	B ₀	"		"	
		"	32	"								"	5.5 V	"	GND	"	"	"	"	"	A ₀	"		"	
		"	33	"								"	GND	"	5.5 V	"	"	"	"	"	B ₁	"		"	
		"	34	"								"	"	"	5.5 V	"	"	"	"	"	A ₁	"		"	
		"	35	"								"	"	"	"	GND	"	"	5.5 V	"	"	A ₂	"		"
		"	36	"								"	"	"	"	GND	"	"	5.5 V	"	"	B ₂	"		"
		"	37	5.5 V								"							"	"	A ₃	"		"	
	I _{IH3}	"	38	GND	2.4 V							"	GND	5.5 V	GND	5.5 V	5.5 V	GND	"	"	A < B IN		40	μA	
		"	39	GND				2.4 V				"	GND	5.5 V	GND	5.5 V	5.5 V	GND	"	"	A > B IN		40	"	
	I _{IL1}	3009	40	0.4 V								"							"	"	B ₃	-2.0	-4.8	mA	
		"	41	5.5 v		0.4 V						"	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	"	"	A = B IN	"		"	
		"	42	"								"	0.4 V	5.5 V	"	"	"	"	"	"	B ₀	"		"	
		"	43	"								"	5.5 V	0.4 V	"	"	"	"	"	"	A ₀	"		"	
		"	44	"								"	"	5.5 V	0.4 V	"	"	"	"	"	B ₁	"		"	
		"	45	"								"	"	"	5.5 V	0.4 V	"	"	"	"	A ₁	"		"	
		"	46	"								"	"	"	"	5.5 V	0.4 V	"	"	"	A ₂	"		"	
		"	47	"								"	"	"	"	"	5.5 V	0.4 V	"	"	B ₂	"		"	
		"	48	"								"	"	"	"	"	"	5.5 V	0.4 V	"	A ₃	"		"	

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 – Continued. 1/

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	Measured terminal	Limits		Unit
			Test no.	B ₃	A < B IN	A = B IN	A > B IN	A > B OUT	A = B OUT	A < B OUT	GND	B ₀	0	1	1	2	2	3	V _{CC}		Min	Max	
1 T _C = 25°C	I _{IL2}	3009	49	5.5 V	0.4 V						GND	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	A < B IN	-0.7	-1.6	mA
		"	50	"			0.4 V				"	" A	" B	" A	" A	" B	" A	5.5 V	"	A > B IN	-0.7	-1.6	"
	I _{OS}	3011	51	GND	GND	GND		GND			GND	GND	GND	GND	GND	GND	GND	GND	5.5 V	A > B OUT	-20	-55	mA
		"	52	GND	GND	2.0 V			GND		"	"	"	"	"	"	"	"	"	"	A = B OUT	"	"
	I _{CC}	3005	53	GND	2.0 V	GND	GND				GND	"	"	"	"	"	"	"	"	"	A < B OUT	"	"
			54	4.5 V	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	"	V _{CC}		88	mA
2	Same tests, terminal conditions and limits as subgroup 1, except T _C = +125°C and V _{IC} tests are omitted.																						
3	Same tests, terminal conditions and limits as subgroup 1, except T _C = -55°C and V _{IC} tests are omitted.																						
7 T _C = 25°C	Truth table tests		55	0.4 V	2.4 V	0.4 V	0.4 V	H	L	L	GND	2.4 V	0.4 V	2.4 V	0.4 V	0.4 V	2.4 V	2.4 V	4.5 V	All outputs	See notes 2/ and 3/		
			56	2.4 V	0.4 V	"	2.4 V	L	"	H	"	0.4 V	2.4 V	0.4 V	2.4 V	2.4 V	0.4 V	0.4 V	"	"			
			57	"	2.4 V	"	0.4 V	H	"	L	"	2.4 V	0.4 V	2.4 V	0.4 V	2.4 V	0.4 V	2.4 V	"	"			
			58	"	0.4 V	"	2.4 V	L	"	H	"	0.4 V	2.4 V	0.4 V	2.4 V	0.4 V	2.4 V	"	"	"			
			59	"	2.4 V	"	0.4 V	H	"	L	"	2.4 V	0.4 V	0.4 V	2.4 V	2.4 V	"	"	"	"			
			60	"	0.4 V	"	2.4 V	L	"	H	"	0.4 V	2.4 V	2.4 V	0.4 V	"	"	"	"	"			
			61	"	2.4 V	"	0.4 V	H	"	L	"	0.4 V	2.4 V	2.4 V	2.4 V	"	"	"	"	"			
			62	"	0.4 V	"	2.4 V	L	"	H	"	2.4 V	0.4 V	"	"	"	"	"	"	"			
			63	"	"	"	2.4 V	H	"	L	"	"	2.4 V	"	"	"	"	"	"	"			
			64	"	"	2.4 V	0.4 V	L	H	"	"	"	"	"	"	"	"	"	"	"			
			65	"	"	2.4 V	2.4 V	"	H	"	"	"	"	"	"	"	"	"	"	"			
			66	"	2.4 V	0.4 V	0.4 V	"	L	H	"	"	"	"	"	"	"	"	"	"			
			67	"	"	0.4 V	2.4 V	"	L	L	"	"	"	"	"	"	"	"	"	"			
			68	"	"	2.4 V	0.4 V	"	H	"	"	"	"	"	"	"	"	"	"	"			
			69	"	"	2.4 V	2.4 V	"	H	"	"	"	"	"	"	"	"	"	"	"			
			70	"	0.4 V	0.4 V	0.4 V	H	L	H	"	"	"	"	"	"	"	"	"	"			
8	Repeat subgroups 7 at T _C = +125°C and T _C = -55°C.																						
9 T _C = 25°C	t _{PLH1}	3003 Fig. 4	71	IN			GND			OUT	GND	GND	GND	GND	GND	GND	GND	2.4 V	5.0 V	B ₃ to A < B	2	29	ns
			72	GND		"	GND			OUT	"	IN	2.4 V	"	"	"	"	GND	"	B ₀ to A < B	"	"	"
			73	"	GND	"		OUT				2.4 V	IN	"	"	"	"	"	"	A ₀ to A > B	"	"	"
			74	"	"	"	GND			OUT	"	GND	GND	IN	2.4 V	"	"	"	"	B ₁ to A < B	"	"	"
			75	"	GND	"		OUT			"	"	"	2.4 V	IN	"	"	"	"	A ₁ to A > B	"	"	"
			76	"	GND	"		OUT			"	"	"	GND	GND	IN	2.4 V	"	"	A ₂ to A > B	"	"	"
			77	"	"	"	GND			OUT	"	"	"	"	"	2.4 V	IN	"	"	B ₂ to A < B	"	"	"
			78	2.4 V	GND	"		OUT			"	"	"	"	"	GND	GND	IN	"	A ₃ to A > B	"	"	"
	t _{PLH2}	"	79	IN		2.4 V			OUT	"	"	GND	"	"	"	"	"	GND	"	B ₃ to A = B	"	39	"
			80	GND		"					"	IN	"	"	"	"	"	"	"	B ₀ to A = B	"	"	"
			81	"		"					"	GND	"	IN	"	"	"	"	"	B ₁ to A = B	"	"	"
			82	"		"					"	"	"	GND	"	IN	"	"	"	A ₂ to A = B	"	"	"
	t _{PLH3}	"	83	"	IN	GND		OUT			"	"	"	"	"	GND	"	"	"	A < B to A > B	"	14	"
			84	"	GND	IN		OUT			"	"	"	"	"	"	"	"	"	A = B to A > B	"	"	"
	t _{PLH5}	"	85	"		IN	GND			OUT	"	"	"	"	"	"	"	"	"	A = B to A < B	"	14	"
			86	"		GND	IN			OUT	"	"	"	"	"	"	"	"	"	A > B to A < B	"	"	"
t _{PLH4}	"	87	"		IN			OUT	"	"	"	"	"	"	"	"	"	"	A = B to A = B	"	23	"	

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 – Continued. 1/

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	Measured terminal	Limits		Unit	
				Test no.	B ₃	A < B IN	A = B IN	A > B IN	A > B OUT	A = B OUT	A < B OUT	GND	B ₀	0	1	1	2	2	3		V _{CC}	Min		Max
9 T _c = 25°C	t _{PHL1}	3003 Fig. 4	88	IN			GND			OUT	GND	GND	GND	GND	GND	GND	GND	2.4 V	5.0 V	B ₃ to A < B	2	34	ns	
			89	GND		"	"	"			"	IN ^A	2.4 V ^B	" ^A	" ^A	" ^B	" ^A	GND	"	B ₀ to A < B	"	"	"	
			90	"	GND	"	"	OUT				2.4 V	IN	"	"	"	"	"	"	A ₁ to A > B	"	"	"	
			91	"		"	GND			OUT	"	GND	GND	IN	2.4 V	"	"	"	"	B ₁ to A < B	"	"	"	
			92	"	GND	"		OUT			"		"	2.4 V	IN	"	"	"	"	A ₁ to A > B	"	"	"	
			93	"	"	"	"	"			"	"	"	GND	GND	IN	2.4 V	"	"	A ₂ to A > B	"	"	"	
			94	"		"	GND			OUT	"	"	"	"	"	2.4 V	IN	"	"	B ₂ to A < B	"	"	"	
			95	2.4 V	GND			OUT			"	"	"	"	"	"	GND	GND	IN	"	A ₃ to A > B	"	"	"
	t _{PHL2}		96	IN		2.4 V			OUT		"	"	"	"	"	"	"	GND	"	B ₃ to A = B	"	"	"	
			97	GND		"					"	IN	"	"	"	"	"	"	"	B ₀ to A = B	"	"	"	
			98	"		"					"	GND	"	IN	"	"	"	"	"	B ₁ to A = B	"	"	"	
			99	"		"					"	"	"	GND	"	IN	"	"	"	A ₂ to A = B	"	"	"	
	t _{PHL3}		100	"	IN	GND		OUT			"	"	"	"	"	GND	"	GND	"	A < B to A > B	"	20	"	
			101	"	GND	IN		"				"	"	"	"	"	"	"	"	A = B to A > B	"	"	"	
	t _{PHL5}		102	"		IN	GND	"		OUT	"	"	"	"	"	"	"	"	"	A = B to A < B	"	20	"	
			103	"		GND	IN				"	"	"	"	"	"	"	"	"	A > B to A < B	"	"	"	
t _{PHL4}		104	"		IN			OUT	"	"	"	"	"	"	"	"	"	"	A = B to A = B	"	20	"		
10 T _c = 125°C	t _{PLH1}	3003 Fig. 4	105	IN		GND	GND			OUT	GND	GND	GND	GND	GND	GND	GND	2.4 V	5.0 V	B ₃ to A < B	2	38	"	
			106	GND		"	GND			OUT	"	IN	2.4 V	"	"	"	"	GND	"	B ₀ to A < B	"	"	"	
			107	"	GND	"		OUT			"	2.4 V	IN	"	"	"	"	"	"	A ₀ to A > B	"	"	"	
			108	"		"	GND			OUT	"	GND	GND	IN	2.4 V	"	"	"	"	B ₁ to A < B	"	"	"	
			109	"	GND	"		OUT			"	"	"	2.4 V	IN	"	"	"	"	A ₁ to A > B	"	"	"	
			110	"	GND	"		OUT			"	"	"	GND	GND	IN	2.4 V	"	"	A ₂ to A > B	"	"	"	
			111	"		"	GND			OUT	"	"	"	"	"	2.4 V	IN	"	"	B ₂ to A < B	"	"	"	
			112	2.4 V	GND	"		OUT			"	"	"	"	"	GND	GND	IN	"	A ₃ to A > B	"	"	"	
	t _{PLH2}		113	IN		2.4 V			OUT		"	GND	"	"	"	"	"	GND	"	B ₃ to A = B	"	49	"	
			114	GND		"					"	IN	"	"	"	"	"	"	"	B ₀ to A = B	"	"	"	
			115	"		"					"	GND	"	IN	"	"	"	"	"	B ₁ to A = B	"	"	"	
			116	"		"					"	"	"	GND	"	IN	"	"	"	A ₂ to A = B	"	"	"	
	t _{PLH3}		117	"	IN	GND		OUT			"	"	"	"	"	GND	"	"	"	A < B to A > B	"	19	"	
			118	"	GND	IN		OUT			"	"	"	"	"	"	"	"	"	A = B to A > B	"	"	"	
	t _{PLH5}		119	"		IN	GND	"		OUT	"	"	"	"	"	"	"	"	"	A = B to A < B	"	19	"	
			120	"		GND	IN			OUT	"	"	"	"	"	"	"	"	"	A > B to A < B	"	"	"	
	t _{PLH4}		121	"		IN			OUT		"	"	"	"	"	"	"	"	"	A = B to A = B	"	30	"	
	t _{PHL1}			122	IN		GND	GND			OUT	GND	GND	GND	GND	GND	GND	GND	2.4 V	5.0 V	B ₃ to A < B	2	43	"
				123	GND		"	"				"	IN	2.4 V	"	"	"	"	GND	"	B ₀ to A < B	"	"	"
				124	"	GND	"		OUT			"	2.4 V	IN	"	"	"	"	"	"	A ₁ to A > B	"	"	"
				125	"		"	GND			OUT	"	GND	GND	IN	2.4 V	"	"	"	"	B ₁ to A < B	"	"	"
				126	"	GND	"		OUT			"	"	"	2.4 V	IN	"	"	"	"	A ₁ to A > B	"	"	"
				127	"		"	"				"	"	"	GND	GND	IN	2.4 V	"	"	A ₂ to A > B	"	"	"
				128	"		"	GND			OUT	"	"	"	"	"	2.4 V	IN	"	"	B ₂ to A < B	"	"	"
				129	2.4 V	GND	"		OUT			"	"	"	"	"	GND	GND	IN	"	A ₃ to A > B	"	"	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 01 – Continued. 1/

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	Measured terminal	Limits		Unit
			Test no.	B ₃	A < B IN	A = B IN	A > B IN	A > B OUT	A = B OUT	A < B OUT	GND	B ₀	0	1	1	2	2	3	V _{cc}		Min	Max	
10 T _c = 125°C	t _{PHL2}	3003 Fig. 4	130	IN		2.4 V			OUT		GND	GND	GND	GND	GND	GND	GND	GND	5.0 V	B ₃ to A = B	2	43	ns
			131	GND		"					"	IN ^A	" ^B	" ^A	" ^A	" ^B	" ^A	"	"	B ₀ to A = B	"	"	"
			132	"		"					"	GND	"	IN	"	"	"	"	"	B ₁ to A = B	"	"	"
			133	"		"					"	"	"	GND	"	IN	"	"	"	A ₂ to A = B	"	"	"
	t _{PHL3}	"	134	"	IN	GND		OUT	"		"	"	"	"	"	GND	"	GND	"	A<B to A>B	"	26	"
			135	"	GND	IN		"			"	"	"	"	"	"	"	"	"	A=B to A>B	"	"	"
	t _{PHL5}	"	136	"		IN	GND	"		OUT	"	"	"	"	"	"	"	"	"	A=B to A<B	"	"	"
			137	"		GND	IN			"	"	"	"	"	"	"	"	"	"	A>B to A<B	"	"	"
	t _{PHL4}	"	138	"		IN			OUT	"	"	"	"	"	"	"	"	"	"	A=B to A=B	"	"	"
11	Same tests, terminal conditions and limits as subgroup 10, except T _C = -55°C.																						

NOTES:

1/ Pins not designated may be "high" level logic, "low" level logic or open.

2/ Tests shall be performed in sequence.

3/ 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 when using a high speed checker single comparator.

TABLE III. Group A inspection for device type 02. 1/

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	Measured terminal	Limits		Unit	
			Test no.	E	A < B	B ₀	1	2	3	4	GND	A ₄	3	2	1	0	A = B	A > B	V _{CC}		Min	Max		
1 T _C = 25°C	V _{OL}	3007	1	GND	16 mA	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	GND	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V			4.5 V	A < B		0.4	V	
		"	2	GND		"	"	"	"	"	"	"	"	"	"	"	"	16 mA	"	A > B		"	"	
		"	3	2.0 V		"	"	"	"	"	"	"	"	"	"	"	"	16 mA	"	A = B		"	"	
		"	4	2.0 V		"	"	"	"	"	"	"	"	"	"	"	2.0 V	"	16 mA	"	A > B		"	"
		"	5	GND		"	"	"	"	"	"	"	"	"	"	"	2.0 V	16 mA	"	A = B		"	"	
		"	6	GND		2.0 V	"	"	"	"	"	"	"	"	"	"	0.8 V	16 mA	"	A = B		"	"	
		"	7	2.0 V	16 mA	"	"	"	"	"	"	"	"	"	"	"	"	"	"	A < B		"	"	
	V _{OH}	3006	8	0.8 V	-800 μA	"	"	"	"	"	"	"	"	"	"	"	"		"	A < B	2.4		V	
		"	9	"	"	0.8 V	2.0 V	"	"	"	"	"	"	"	"	"	"		"	A < B	"		"	
		"	10	"	"	"	0.8 V	2.0 V	"	"	"	"	"	"	"	"	"		"	A < B	"		"	
		"	11	"	"	"	"	0.8 V	2.0 V	"	"	"	"	"	"	"	"		"	A < B	"		"	
		"	12	"	"	"	"	"	0.8 V	2.0 V	"	"	"	"	"	"	"		"	A < B	"		"	
		"	13	"	"	"	"	"	"	2.0 V	2.0 V	"	2.0 V	"	"	"	"	-800 μA	"	A = B	"		"	
		"	14	"	"	"	"	"	"	"	0.8 V	"	2.0 V	"	"	"	"		-800 μA	"	A > B	"		"
		"	15	"	"	"	"	"	"	"	"	0.8 V	2.0 V	"	"	"	"		"	A > B	"		"	
		"	16	"	"	"	"	"	"	"	"	"	0.8 V	2.0 V	"	"	"		"	A > B	"		"	
		"	17	"	"	"	"	"	"	"	"	"	0.8 V	2.0 V	"	"	"		"	A > B	"		"	
		"	18	"	"	"	"	"	"	"	"	"	"	0.8 V	2.0 V	2.0 V	2.0 V		"	A > B	"		"	
	I _{IL1}	3009	19	0.4 V								"	GND	GND	GND	GND	GND			5.5 V	E	-1.4	-3.2	mA
		"	20			0.4 V						"	"	"	"	"	"			"	B ₀	"	"	"
		"	21				0.4 V					"	"	"	"	"	"			"	B ₁	"	"	"
		"	22					0.4 V				"	"	"	"	"	"			"	B ₂	"	"	"
		"	23						0.4 V			"	"	"	"	"	"			"	B ₃	"	"	"
		"	24							0.4 V		"	"	"	"	"	"			"	B ₄	"	"	"
		"	25			GND	GND	GND	GND	GND	"	0.4 V							"	A ₄	"	"	"	
		"	26			"	"	"	"	"	"	"	0.4 V						"	A ₃	"	"	"	
		"	27			"	"	"	"	"	"	"		0.4 V					"	A ₂	"	"	"	
		"	28			"	"	"	"	"	"	"			0.4 V				"	A ₁	"	"	"	
"		29			"	"	"	"	"	"	"				0.4 V			"	A ₀	"	"	"		
V _{IC}			30	-12 mA							"								4.5 V	E		-1.5	V	
			31			-12 mA					"								"	"	B ₀		"	"
			32				-12 mA				"								"	"	B ₁		"	"
			33					-12 mA			"								"	"	B ₂		"	"
			34						-12 mA		"								"	"	B ₃		"	"
			35							-12 mA	"								"	"	B ₄		"	"
			36							"	-12 mA								"	"	A ₄		"	"
			37							"		-12 mA							"	"	A ₃		"	"
			38							"			-12 mA						"	"	A ₂		"	"
			39							"				-12 mA					"	"	A ₁		"	"
			40							"					-12 mA				"	"	A ₀		"	"
I _{OS}	3011	41	GND	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	4.5 V	4.5 V	GND			5.5 V	A < B	-20	-70	mA	
	"	42	"			4.5 V	"	"	"	"	"	"	"	"	"	4.5 V	GND		"	A = B		"	"	
	"	43	"			GND	"	"	"	"	"	"	"	"	"	4.5 V		GND	"	A > B		"	"	
I _{CC}	3012	44																	V _{CC}		81	"		
I _{IH1}	3010	45			2.4 V						"	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V			"	B ₀	0	80	μA	
	"	46				2.4 V					"	"	"	"	"	"			"	B ₁	"	"	"	
	"	47					2.4 V				"	"	"	"	"	"			"	B ₂	"	"	"	
	"	48						2.4 V			"	"	"	"	"	"			"	B ₃	"	"	"	
	"	49							2.4 V		"	"	"	"	"	"			"	B ₄	"	"	"	
	"	50				5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	"	2.4 V						"	"	A ₄	"	"	"	

See footnotes at end of table.

TABLE III. Group A inspection for device type 02 – Continued. 1/

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	Measured terminal	Limits		Unit
			Test no.	E	A < B	B ₀	1	2	3	4	GND	A ₄	3	2	1	0	A = B	A > B	V _{CC}		Min	Max	
1 T _C = 25°C	I _{IH1}	3010	51			5.5 V	5.5 V	5.5 V	5.5 V	5.5 V	"		2.4 V						5.5 V	A ₃	0	80	μA
		"	52			"	"	"	"	"	"	A	A	2.4 V	A				"	A ₂	"	"	"
		"	53			"	"	"	"	"	"				2.4 V				"	A ₁	"	"	"
		"	54			"	"	"	"	"	"					2.4 V			"	A ₀	"	"	"
		"	55	2.4 V							"								"	E	"	"	"
	I _{IH2}	"	56			5.5 V					"	5.5 V	5.5 V	5.5 V	5.5 V	5.5 V			"	B ₀	"	200	"
		"	57				5.5 V				"	"	"	"	"	"	"		"	B ₁	"	"	"
		"	58					5.5 V			"	"	"	"	"	"	"		"	B ₂	"	"	"
		"	59						5.5 V		"	"	"	"	"	"	"		"	B ₃	"	"	"
		"	60							5.5 V	"	"	"	"	"	"	"		"	B ₄	"	"	"
		"	61			5.5 V	5.5 V	5.5 V	5.5 V	"	"	"	5.5 V						"	A ₄	"	"	"
		"	62			"	"	"	"	"	"			5.5 V					"	A ₃	"	"	"
		"	63			"	"	"	"	"	"				5.5 V				"	A ₂	"	"	"
		"	64			"	"	"	"	"	"					5.5 V			"	A ₁	"	"	"
		"	65			"	"	"	"	"	"								"	A ₀	"	"	"
		"	66	5.5 V							"								"	E	"	"	"
2	Same tests, terminal conditions and limits as subgroup 1, except T _C = +125°C and V _{IC} tests are omitted.																						
3	Same tests, terminal conditions and limits as subgroup 1, except T _C = -55°C and V _{IC} tests are omitted.																						
7 T _C = 25°C	Truth table tests	67	0.8 V	H	2.0 V	2.0 V	2.0 V	2.0 V	0.8 V	GND	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	L	L	5.0 V	All Outputs	See notes 2/ and 3/		
		68	"	L	"	"	"	"	2.0 V	"	"	2.0 V	"	"	"	"	"	H	"				
		69	"	"	"	"	"	"	0.8 V	"	"	0.8 V	"	"	"	"	"	"	"				
		70	"	"	"	"	"	"	"	"	"	"	2.0 V	"	"	"	"	"	"				
		71	"	H	"	"	"	0.8 V	"	"	"	"	0.8 V	"	"	"	"	L	"				
		72	"	L	"	"	"	"	"	"	"	"	"	2.0 V	"	"	"	H	"				
		73	"	H	"	"	0.8 V	"	"	"	"	"	"	0.8 V	"	"	"	L	"				
		74	"	L	"	"	"	"	"	"	"	"	"	"	2.0 V	"	"	H	"				
		75	"	"	"	0.8 V	"	"	"	"	"	"	"	"	0.8 V	"	H	L	"				
		76	"	"	"	"	"	"	"	"	"	"	"	"	0.8 V	2.0 V	L	H	"				
		77	"	"	"	"	"	"	"	"	"	"	2.0 V	2.0 V	2.0 V	"	"	H	"				
		78	"	H	"	"	"	"	"	2.0 V	"	"	2.0 V	"	"	"	"	L	"				
		79	"	L	"	"	"	"	"	0.8 V	"	"	0.8 V	"	"	"	"	H	"				
		80	"	H	"	"	"	"	2.0 V	"	"	"	"	"	"	"	"	L	"				
		81	"	L	"	"	"	"	0.8 V	"	"	"	"	0.8 V	"	"	"	H	"				
		82	"	H	"	"	"	2.0 V	"	"	"	"	"	"	"	"	"	L	"				
		83	"	L	"	"	"	0.8 V	"	"	"	"	"	"	0.8 V	"	"	H	"				
		84	"	H	"	"	2.0 V	"	"	"	"	"	"	"	"	"	"	L	"				
		85	"	H	2.0 V	0.8 V	"	"	"	"	"	"	"	"	"	0.8 V	"	"	"				
		86	2.0 V	L	0.8 V	0.8 V	"	"	"	"	"	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	"	"	"				
		87	2.0 V	"	2.0 V	2.0 V	2.0 V	2.0 V	2.0 V	"	"	0.8 V	0.8 V	0.8 V	0.8 V	0.8 V	"	"	"				
		88	0.8 V	"	"	0.8 V	0.8 V	0.8 V	0.8 V	"	"	0.8 V	0.8 V	0.8 V	0.8 V	2.0 V	H	"	"				
		89	2.0 V	"	"	2.0 V	2.0 V	2.0 V	2.0 V	"	"	2.0 V	2.0 V	2.0 V	2.0 V	"	L	"	"				
		90	0.8 V	H	"	"	"	"	"	2.0 V	"	"	0.8 V	"	"	"	"	"	"				
		91	"	L	"	"	"	"	"	0.8 V	"	"	2.0 V	"	"	"	"	H	"				
		92	"	H	"	"	"	"	"	2.0 V	"	"	0.8 V	"	"	"	"	L	"				
		93	"	L	"	"	"	"	0.8 V	"	"	"	2.0 V	"	"	"	"	H	"				
		94	"	H	"	"	"	"	2.0 V	"	"	"	"	0.8 V	"	"	"	L	"				
		95	"	L	"	"	"	0.8 V	"	"	"	"	"	2.0 V	"	"	"	H	"				
		96	"	H	"	"	"	2.0 V	"	"	"	"	"	"	0.8 V	"	"	L	"				
		97	"	L	"	"	0.8 V	2.0 V	"	"	"	"	"	"	"	2.0 V	"	H	"				
8	Repeat subgroup 7 at T _C = +125°C and T _C = -55°C.																						

See footnotes at end of table.

TABLE III. Group A inspection for device type 02 – Continued. 1/

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	Measured terminal	Limits		Unit	
			Test no.	E	A < B	B ₀	1	B ₂	B ₃	4	GND	A ₄	3	2	1	0	A = B	A > B	V _{CC}		Min	Max		
9 T _c = 25°C	t _{PLH1}	3003	98	IN		2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	GND	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	OUT		5.0 V	E to A = B	3	16	ns	
	t _{PHL1}	Fig. 5	99	"		"	"	"	"	"	"	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	OUT		"	E to A = B	"	14	"	
	t _{PLH2}	"	100	"	OUT	"	"	"	"	"	"	GND	GND	GND	GND	GND			"	E to A < B	"	19	"	
	t _{PHL2}	"	101	"	OUT	"	"	"	"	"	"	GND	GND	GND	GND	GND			"	E to A < B	"	17	"	
	t _{PLH3}	"	102	"		GND	GND	GND	GND	GND	"	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V		OUT	"	E to A > B	"	19	"	
	t _{PHL3}	"	103	"		GND	GND	GND	GND	GND	"	"	"	"	"	2.4 V		OUT	"	E to A > B	"	17	"	
	t _{PLH4}	"	104	GND		2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	"	"	"	"	"	IN	OUT		"	A ₀ to A = B	9	42	"	
	"	"	105	"		"	"	"	"	"	"	"	"	"	"	IN	2.4 V		"	A ₁ to A = B	"	"	"	
	"	"	106	"		"	"	"	"	"	"	"	"	"	IN	2.4 V	"		"	A ₂ to A = B	"	"	"	
	"	"	107	"		"	"	"	"	"	"	"	IN	2.4 V	"	"	"		"	A ₃ to A = B	"	"	"	
	"	"	108	"		"	"	"	"	"	"	IN	2.4 V	"	"	"	"		"	A ₄ to A = B	"	"	"	
	t _{PHL4}	"	109	"		"	"	"	"	"	"	"	2.4 V	"	"	"	IN	"		"	A ₀ to A = B	"	"	"
	"	"	110	"		"	"	"	"	"	"	"	"	"	"	IN	2.4 V	"		"	A ₁ to A = B	"	"	"
	"	"	111	"		"	"	"	"	"	"	"	"	"	IN	2.4 V	"	"		"	A ₂ to A = B	"	"	"
	"	"	112	"		"	"	"	"	"	"	"	"	IN	2.4 V	"	"	"		"	A ₃ to A = B	"	"	"
	"	"	113	"		"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"		"	A ₄ to A = B	"	"	"
	t _{PLH5}	"	114	"		IN	"	"	"	"	"	"	2.4 V	"	"	"	"	"		"	B ₀ to A = B	"	"	"
	"	"	115	"		2.4 V	IN	"	"	"	"	"	"	"	"	"	"	"		"	B ₁ to A = B	"	"	"
	"	"	116	"		"	2.4 V	IN	"	"	"	"	"	"	"	"	"	"		"	B ₂ to A = B	"	"	"
	"	"	117	"		"	"	2.4 V	IN	"	"	"	"	"	"	"	"	"		"	B ₃ to A = B	"	"	"
	"	"	118	"		"	"	"	2.4 V	IN	"	"	"	"	"	"	"	"		"	B ₄ to A = B	"	"	"
	t _{PHL5}	"	119	"		IN	"	"	"	"	2.4 V	GND	"	"	"	"	"	"		"	B ₀ to A = B	"	"	"
	"	"	120	"		2.4 V	IN	"	"	"	"	"	"	"	"	"	"	"		"	B ₁ to A = B	"	"	"
	"	"	121	"		"	2.4 V	IN	"	"	"	"	"	"	"	"	"	"		"	B ₂ to A = B	"	"	"
	"	"	122	"		"	"	2.4 V	IN	"	"	"	"	"	"	"	"	"		"	B ₃ to A = B	"	"	"
	t _{PLH5}	"	123	"		"	"	"	"	2.4 V	IN	"	"	"	"	"	"	"		"	B ₄ to A = B	"	"	"
	t _{PLH6}	"	124	"	OUT	"	"	"	"	"	2.4 V	"	"	"	"	"	IN			"	A ₀ to A < B	6	27	"
	t _{PHL6}	"	125	"	"	"	"	"	"	"	2.4 V	"	"	"	"	"	IN			"	A ₀ to A < B	6	25	"
	t _{PLH7}	"	126	"	"	IN	GND	GND	GND	GND	"	GND	GND	GND	GND	GND				"	B ₀ to A < B	3	22	"
	t _{PHL7}	"	127	"	"	IN	"	"	"	"	"	"	"	"	"	"	GND			"	B ₀ to A < B	"	20	"
	t _{PLH8}	"	128	"		GND	"	"	"	"	"	"	"	"	"	"	IN		OUT	"	A ₀ to A > B	"	22	"
	t _{PHL8}	"	129	"		GND	"	"	"	"	"	"	"	"	"	"	IN		OUT	"	A ₀ to A > B	"	20	"
	t _{PLH9}	"	130	"		IN	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	"	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V		OUT	"	B ₀ to A > B	6	27	"
	t _{PHL9}	"	131	"		IN	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	"	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V		OUT	"	B ₀ to A > B	6	25	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 02 – Continued. 1/

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	Measured terminal	Limits		Unit
			Test no.	E	A < B	B ₀	1	2	3	4	GND	A ₄	3	2	1	0	A = B	A > B	V _{CC}		Min	Max	
10 T _c = 125°C	t _{PLH1}	3003	132	IN		2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	GND	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	OUT		5.0 V	E to A = B	3	22	ns
	t _{PHL1}	Fig. 5	133	"		" _B	" _B	" _B	" _B	"	"	2.4 V ^A	2.4 V ^A	2.4 V ^A	2.4 V ^A	2.4 V	OUT		"	E to A = B	"	19	"
	t _{PLH2}	"	134	"	OUT	"	"	"	"	"	"	GND	GND	GND	GND	GND			"	E to A < B	"	25	"
	t _{PHL2}	"	135	"	OUT	"	"	"	"	"	"	GND	GND	GND	GND	GND			"	E to A < B	"	21	"
	t _{PLH3}	"	136	"		GND	GND	GND	GND	GND	"	2.4 V	2.4 V	2.4 V	2.4 V	2.4 V		OUT	"	E to A > B	"	25	"
	t _{PHL3}	"	137	"		GND	GND	GND	GND	GND	"	"	"	"	"	2.4 V		OUT	"	E to A > B	"	21	"
	t _{PLH4}	"	138	GND		2.4 V	2.4 V	2.4 V	2.4 V	2.4 V	"	"	"	"	"	"	IN	OUT	"	A ₀ to A = B	9	55	"
	"	"	139	"		"	"	"	"	"	"	"	"	"	"	IN	2.4 V	"	"	A ₁ to A = B	"	"	"
	"	"	140	"		"	"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"	A ₂ to A = B	"	"	"
	"	"	141	"		"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"	"	A ₃ to A = B	"	"	"
	"	"	142	"		"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"	"	A ₄ to A = B	"	"	"
	t _{PHL4}	"	143	"		"	"	"	"	"	"	2.4 V	"	"	"	"	IN	"	"	A ₀ to A = B	"	"	"
	"	"	144	"		"	"	"	"	"	"	"	"	"	"	IN	2.4 V	"	"	A ₁ to A = B	"	"	"
	"	"	145	"		"	"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"	A ₂ to A = B	"	"	"
	"	"	146	"		"	"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"	A ₃ to A = B	"	"	"
	"	"	147	"		"	"	"	"	"	"	"	IN	2.4 V	"	"	"	"	"	A ₄ to A = B	"	"	"
	t _{PLH5}	"	148	"		IN	"	"	"	"	"	"	2.4 V	"	"	"	"	"	"	B ₀ to A = B	"	"	"
	"	"	149	"		2.4 V	IN	"	"	"	"	"	"	"	"	"	"	"	"	B ₁ to A = B	"	"	"
	"	"	150	"		"	2.4 V	IN	"	"	"	"	"	"	"	"	"	"	"	B ₂ to A = B	"	"	"
	"	"	151	"		"	"	2.4 V	IN	"	"	"	"	"	"	"	"	"	"	B ₃ to A = B	"	"	"
	"	"	152	"		"	"	"	2.4 V	IN	"	"	"	"	"	"	"	"	"	B ₄ to A = B	"	"	"
	t _{PHL5}	"	153	"		IN	"	"	"	2.4 V	"	"	"	"	"	"	"	"	"	B ₀ to A = B	"	"	"
	"	"	154	"		2.4 V	IN	"	"	"	"	"	"	"	"	"	"	"	"	B ₁ to A = B	"	"	"
	"	"	155	"		"	2.4 V	IN	"	"	"	"	"	"	"	"	"	"	"	B ₂ to A = B	"	"	"
	"	"	156	"		"	"	2.4 V	IN	"	"	"	"	"	"	"	"	"	"	B ₃ to A = B	"	"	"
	"	"	157	"		"	"	"	2.4 V	IN	"	"	"	"	"	"	"	"	"	B ₄ to A = B	"	"	"
	t _{PLH6}	"	158	"	OUT	"	"	"	"	2.4 V	"	"	"	"	"	"	IN		"	A ₀ to A < B	6	39	"
	t _{PHL6}	"	159	"	"	"	"	"	"	2.4 V	"	"	"	"	"	"	IN		"	A ₀ to A < B	6	32	"
	t _{PLH7}	"	160	"	"	IN	GND	GND	GND	GND	"	GND	GND	GND	GND	GND			"	B ₀ to A < B	3	30	"
	t _{PHL7}	"	161	"	"	IN	"	"	"	"	"	"	"	"	"	GND			"	B ₀ to A < B	3	26	"

See footnotes at end of table.

TABLE III. Group A inspection for device type 02 – Continued. 1/

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	Measured terminal	Test limits		Unit
			Test no.	E	A<B	B ₀	1	2	3	4	GND	A ₄	3	2	1	0	A = B	A > B	V _{CC}		Min	Max	
10 T _C = +125°C	t _{PLH8}	3003 (Fig.5)	162	GND		GND _B	GND _B	GND _B	GND _B	GND	GND	GND _A	GND _A	GND _A	GND _A	IN		OUT	5.0V	A ₀ to A>B	3	30	ns
	t _{PHL8}	"	163	"		GND	GND	GND	GND	GND	"	GND	GND	GND	GND	IN		"	"	A ₀ to A>B	3	25	"
	t _{PLH9}	"	164	"		IN	2.4V	2.4V	2.4V	2.4V	"	2.4V	2.4V	2.4V	2.4V	2.4V		"	"	B ₀ to A>B	6	39	"
	t _{PHL9}	"	165	"		IN	2.4V	2.4V	2.4V	2.4V	"	2.4V	2.4V	2.4V	2.4V	2.4V		"	"	B ₀ to A>B	6	35	"
11	Same conditions and limits as subgroup 10, except T _C = -55°C.																						

NOTES:

1/ Pins not designated may be "high" level logic, "low" level logic or open.

2/ Tests shall be performed in sequence.

3/ 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 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 Department of Defense Agency, or within the Military Department'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 is 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. Requirements for certificate of compliance, if applicable.
- e. Requirements for notification of change of product or process to contracting activity in addition to notification to the qualifying activity, if applicable.
- f. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action, and reporting of results, if applicable.
- g. Requirements for product assurance options.
- h. Requirements for special carriers, lead lengths, or lead forming, if applicable. These requirements should 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 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.

6.4 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 43128-3990.

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:

GND Ground zero voltage potential.
 I_{IN} Current flowing into an input terminal.
 V_{IN} Voltage level at an input terminal.

6.6 Logistic support. Lead materials and finishes (see 3.4) 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 length leads and lead forming should 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-38510 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.

Military device type	Generic-industry type
01	5485
02	9324

6.8 Manufacturers' designation. Manufacturers' circuits, which form a part of this specification, are designated with an "X" as shown in table IV herein.

TABLE IV. Manufacturer's designator.

Device types	CIRCUITS			
	A	B	C	D
	Fairchild Semiconductor	Motorola	Signetics.	National Semiconductor
01	X	X	X	X
02	X	X		

6.9 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 5962-2094)

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>.