INCH-POUND

MIL-M-38510/312C
6 May 2003
SUPERSEDING
MIL-M-38510/312B
18 August 1983

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, LOW-POWER SCHOTTKY TTL, 4-BIT BINARY FULL ADDERS WITH FAST CARRY, MONOLITHIC SILICON

Inactive for new design after 18 April 1997.

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

1. SCOPE

1.1 Scope. This specification covers the detail requirements for monolithic silicon, low-power Schottky TTL, 4-bit binary full adders with fast carry. 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).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 number. The part number should be in accordance with MIL-PRF-38535, and as specified herein.

1.2.1 Device types. The device types should be as follows:

Device type	Circuit
01	4 - bit binary full adders with fast carry
02	4 - bit binary full adders with fast carry

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

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

Outline letter	Descriptive designator	Terminals	Package style
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
2	CQCC1-N20	20	Square leadless chip carrier

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAS, P. O. Box 3990, Columbus, OH 43216-5000, by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5962

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 -18 mA to 5.5 V dc
Storage temperature range	-65° to +150°C
Maximum power dissipation (P_D) 1/	214 mW dc
Lead temperature (soldering, 10 seconds)	300°C
Thermal resistance, junction to case (θ_{JC}):	
Cases E, F, and 2	(See MIL-STD-1835)
Junction temperature (T_J) 2/	+175°C

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})	0.7 V dc
Normalized fanout (each output):	
Logical low level	10 maximum
Logical high level	20 maximum
Case operating temperature range (T_C)	-55°C to +125°C

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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 shall be those listed in the issue of the Departments of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

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

STANDARDS

DEPARTMENT OF DEFENSE

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

(Unless otherwise indicated, copies of the above specifications and standards are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 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 table. The truth table 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 11 (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, appendix B.

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$	Limits		Unit
			Min	Max	
High level output voltage	V_{OH}	V_{CC} = 4.5 V, V_{IH} = 2.0 V V_{IL} = 0.7 V, I_{OH} = -400 µA	2.5		V
Low level output voltage	V_{OL}	V_{CC} = 4.5 V, V_{IH} = 2.0 V V_{IL} = 0.7 V, I_{OL} = 4 mA 1/		0.4	V
Input diode clamp voltage	V_{IC}	V_{CC} = 4.5 V, I_{IN} = -18 mA, T_C = +25°C		-1.5	V
Low level input current at any A or B input	I_{IL1}	V_{CC} = 5.5 V, V_{IN} = 0.4 V	-0.24	-0.8	mA
Low level input current at C_0 input	I_{IL2}	V_{CC} = 5.5 V, V_{IN} = 0.4 V	-0.12	-0.4	mA
High level input current at any A or B input	I_{IH1}	V_{CC} = 5.5 V, V_{IN} = 2.7 V		40	µA
High level input current at C_0 input	I_{IH2}	V_{CC} = 5.5 V, V_{IN} = 2.7 V		20	µA
High level input current at any A or B input	I_{IH3}	V_{CC} = 5.5 V, V_{IN} = 5.5 V		200	µA
High level input current at C_0 input	I_{IH4}	V_{CC} = 5.5 V, V_{IN} = 5.5 V		100	µA
Short circuit output current	I_{OS}	V_{CC} = 5.5 V, all inputs = 5.5 V 1/	-15	-100	mA
Supply current	I_{CC1}	All inputs = Ground, V_{CC} = 5.5 V		39	mA
	I_{CC2}	All B inputs = Ground, all other inputs = 5.5 V, V_{CC} = 5.5 V		34	mA
	I_{CC3}	All inputs = 5.5 V, V_{CC} = 5.5 V		34	mA
Propagation delay time, high-to-low level, C_0 to $\sum_1$	t_{PHL1}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, C_0 to $\sum_1$	t_{PLH1}	C_L = 50 pF, R_L = 2 kΩ	5	39	ns
Propagation delay time, high-to-low level, C_0 to $\sum_2$	t_{PHL2}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, C_0 to $\sum_2$	t_{PLH2}	C_L = 50 pF, R_L = 2 kΩ	5	39	ns
Propagation delay time, high-to-low level, C_0 to $\sum_3$	t_{PHL3}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, C_0 to $\sum_3$	t_{PLH3}	C_L = 50 pF, R_L = 2 kΩ	5	39	ns

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions $-55°C \le T_C \le +125°C$	Limits		Unit
			Min	Max	
Propagation delay time, high-to-low level, C_0 to $\sum_4$	t_{PHL4}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, C_0 to $\sum_4$	t_{PLH4}	C_L = 50 pF, R_L = 2 kΩ	5	39	ns
Propagation delay time, high-to-low level, C_0 to C_4	t_{PHL5}	C_L = 50 pF, R_L = 2 kΩ	5	35	ns
Propagation delay time, low-to-high level, C_0 to C_4	t_{PLH5}	C_L = 50 pF, R_L = 2 kΩ	5	32	ns
Propagation delay time, high-to-low level, A_2 to $\sum_2$	t_{PHL6}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, A_2 to $\sum_2$	t_{PLH6}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, high-to-low level, B_2 to $\sum_2$	t_{PHL7}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, B_2 to $\sum_2$	t_{PLH7}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, high-to-low level, A_4 to $\sum_4$	t_{PHL8}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, A_4 to $\sum_4$	t_{PLH8}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, high-to-low level, B_4 to $\sum_4$	t_{PHL9}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns
Propagation delay time, low-to-high level, B_4 to $\sum_4$	t_{PLH9}	C_L = 50 pF, R_L = 2 kΩ	5	40	ns

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

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, 8, 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.

4.3 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.

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.

Terminal number	Terminal symbol device type 01		Terminal symbol device type 02	
	Case E, F	Case 2	Case E, F	Case 2
1	A_4	NC	Σ_2	NC
2	Σ_3	A_4	B_2	Σ_2
3	A_3	Σ_3	A_2	B_2
4	B_3	A_3	Σ_1	A_2
5	V_{CC}	B_3	A_1	Σ_1
6	Σ_2	NC	B_1	NC
7	B_2	V_{CC}	C_0	A_1
8	A_2	Σ_2	GND	B_1
9	Σ_1	B_2	C_4	C_0
10	A_1	A_2	Σ_4	GND
11	B_1	NC	B_4	NC
12	GND	Σ_1	A_4	C_4
13	C_0	A_1	Σ_3	Σ_4
14	C_4	B_1	A_3	B_4
15	Σ_4	GND	B_3	A_4
16	B_4	NC	V_{CC}	NC
17		C_0		Σ_3
18		C_4		A_3
19		Σ_4		B_3
20		B_4		V_{CC}

FIGURE 1. Terminal connections.

Device type 01 and 02

INPUT				OUTPUT					
				When C_0 = L			When C_0 = H		
				When C_2 = L			When C_2 = H		
A_1 / A_3	B_1 / B_3	A_2 / A_4	B_2 / B_4	Σ_1 / Σ_3	Σ_2 / Σ_4	C_2 / C_4	Σ_1 / Σ_3	Σ_2 / Σ_4	C_2 / C_4
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 A_1, B_1, A_2, B_2, and C_0 are used to determine outputs Σ_1 and Σ_2 and the value of the internal carry C_2. The values at C_2, A_3, B_3, A_4, and B_4 are then used to determine outputs Σ_3, Σ_4, and C_4.

FIGURE 2. Truth table.

DEVICE TYPES 01 AND 02

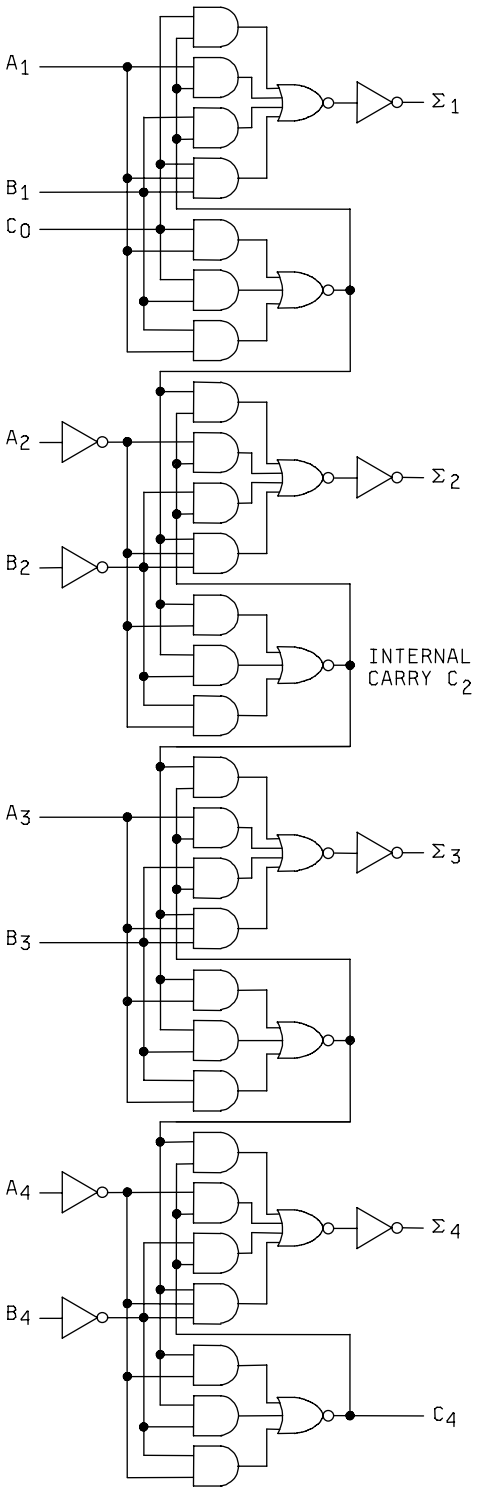


FIGURE 3. Logic diagram.

DEVICE TYPES 01 AND 02

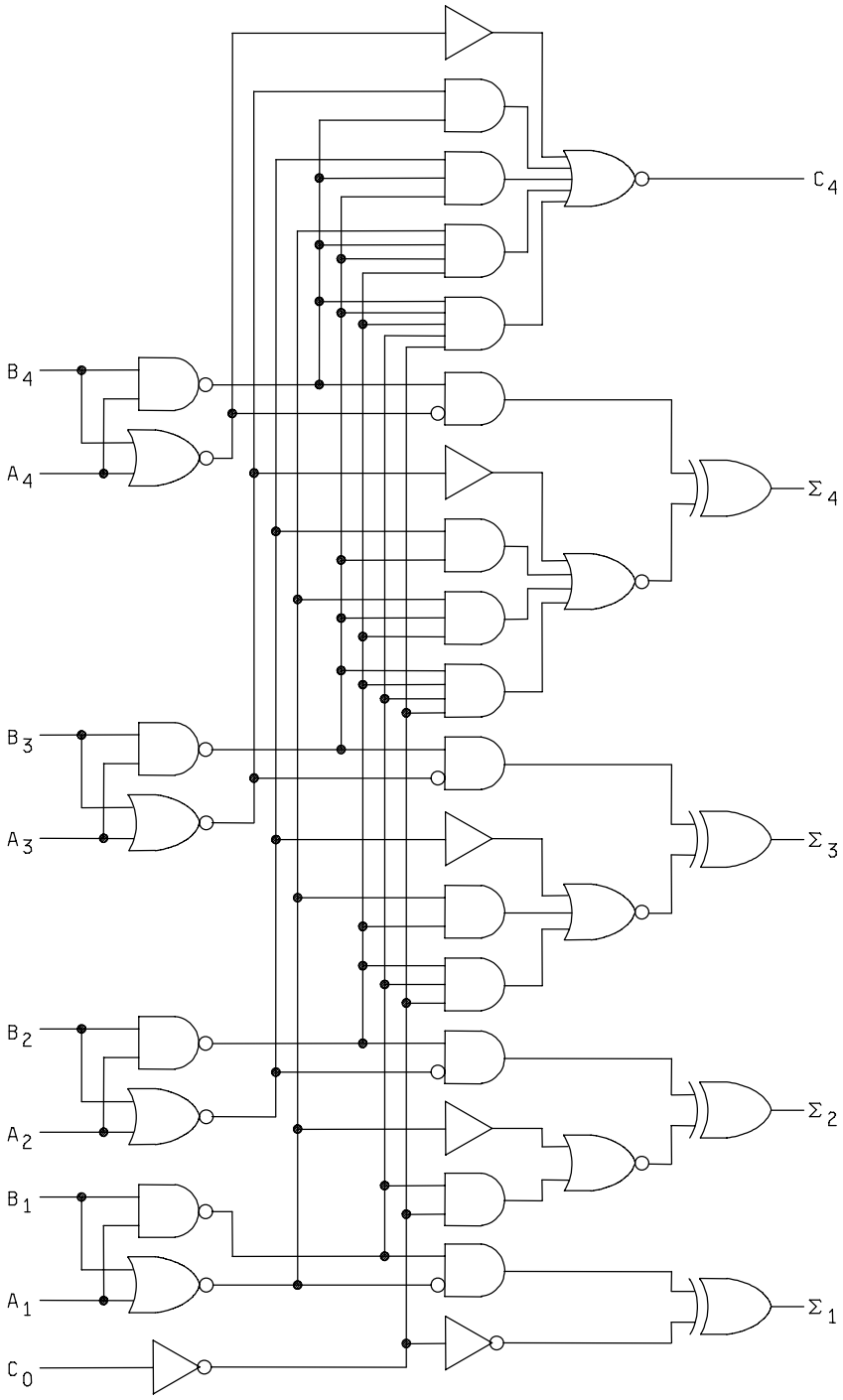
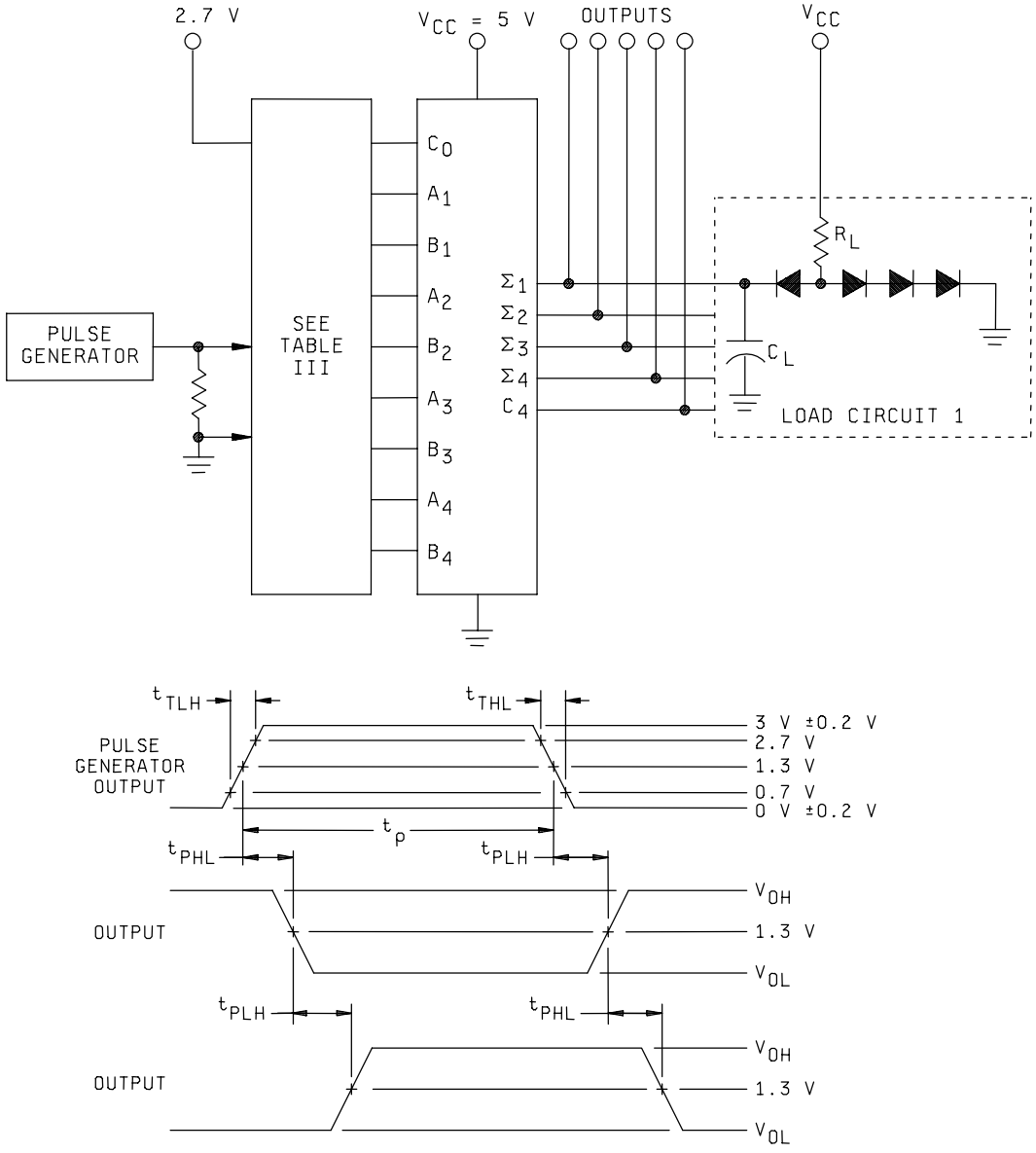


FIGURE 3. Logic diagram - Continued.



NOTES:

1. The pulse generator has the following characteristics: PRR ≤ 1.0 MHz, t_{TLH} ≤ 15 ns, t_{THL} ≤ 6 ns, t_P = 200 ns and Z_{OUT} ≅ 50Ω.
2. C_L = 50 pF ±10% including scope probe, wiring, and stray capacitance without package in test fixture.
3. All diodes are 1N3064 or equivalent.
4. R_L = 2.0 kΩ ±5%.
5. Load circuit on a given output are only required when specified by "OUT" on the specific test in table III. Load circuits may otherwise be omitted.

FIGURE 4. Switching time test circuit.

TABLE III. Group A inspection for device type 01.

Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.7 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	Measured terminal	Limits		Unit
			Case 1/ 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max	
			Test no.	A4	Σ 3	A3	B3	V_{CC}	Σ 2	B2	A2	Σ 1	A1	B1	GND	C0	C4	Σ 4	B4				
1	V_{OH}	3006	1	2.0 V		2.0 V	2.0 V	4.5 V		2.0 V	2.0 V	-.4 mA	2.0 V	2.0 V	GND	2.0 V			2.0 V	Σ 1	2.5		V
Tc = 25°C		"	2	"		"	"	"	-.4 mA	"	"		"	"	"	"			"	Σ 2	"		"
		"	3	"	-.4 mA	"	"	"		"	"		"	"	"	"			"	Σ 3	"		"
		"	4	"		"	"	"		"	"		"	"	"	"		-.4 mA	"	Σ 4	"		"
		"	5	"		"	"	"		"	"		"	"	"	"	-.4 mA		"	C4	"		"
	V_{OL}	3007	6	0.7 V		0.7 V	0.7 V	"		0.7 V	0.7 V	4 mA	0.7 V	0.7 V	"	0.7 V			0.7 V	Σ 1		0.4	"
		"	7	"		"	"	"	4 mA	"	"		"	"	"	"			"	Σ 2		"	"
		"	8	"	4 mA	"	"	"		"	"		"	"	"	"			"	Σ 3		"	"
		"	9	"		"	"	"		"	"		"	"	"	"		4 mA	"	Σ 4		"	"
		"	10	"		"	"	"		"	"		"	"	"	"	4 mA		"	C4		"	"
	V_{IC}		11	-18 mA				"							"					A4		-1.5	"
			12			-18 mA		"							"					A3		"	"
			13				-18 mA	"							"					B3		"	"
			14					"		-18 mA					"					B2		"	"
			15					"			-18 mA				"					A2		"	"
			16					"					-18 mA		"					A1		"	"
			17					"						-18 mA	"					B1		"	"
			18					"							"	-18 mA				C0		"	"
			19					"							"				-18 mA	B4		"	"
	I_{IH1}	3010	20			2.7 V	GND	5.5 V							"					A3		40	µA
		"	21			GND	2.7 V	"							"					B3		"	"
		"	22					"					2.7 V	GND	"					A1		"	"
		"	23					"					GND	2.7 V	"					B1		"	"
		"	24	2.7 V				"							"				GND	A4		"	"
		"	25					"		2.7 V	GND				"					B2		"	"
		"	26					"		GND	2.7 V				"					A2		"	"
		"	27	GND				"							"				2.7 V	B4		"	"
	I_{IH2}	"	28					"							"	2.7 V				C0		20	"
	I_{IH3}	"	29			5.5 V	GND	"							"					A3		200	"
		"	30			GND	5.5 V	"							"					B3		"	"
		"	31					"					5.5 V	GND	"					A1		"	"
		"	32					"					GND	5.5 V	"					B1		"	"
		"	33	5.5 V				"							"				GND	A4		"	"
		"	34					"		5.5 V	GND				"					B2		"	"
		"	35					"		GND	5.5 V				"					A2		"	"
		"	36	GND				"							"				5.5 V	B4		"	"
	I_{IH4}	"	37					"							"	5.5 V				C0		100	"
	I_{IL1}	3009	38			0.4 V	5.5 V	"							"					A3	2/	2/	mA
		"	39			5.5 V	0.4 V	"							"					B3	"	"	"
		"	40					"					0.4 V	5.5 V	"					A1	"	"	"
		"	41					"					5.5 V	0.4 V	"					B1	"	"	"
		"	42	0.4 V				"							"				5.5 V	A4	"	"	"
		"	43					"		0.4 V	5.5 V				"					B2	"	"	"
		"	44					"		5.5 V	0.4 V				"					A2	"	"	"
		"	45	5.5 V				"							"				0.4 V	B4	"	"	"
	I_{IL2}	"	46					"							"	0.4 V				C0	"	"	"
	I_{OS} 3/	3011	47	5.5 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	Σ 3	-15	-100	"
		"	48	"		"	"	"	GND	"	"		"	"	"	"			"	Σ 2	"	"	"
		"	49	"		"	"	"		"	"	GND	"	"	"	"			"	Σ 1	"	"	"
		"	50	"		"	"	"		"	"		"	"	"	"		GND	"	Σ 4	"	"	"
		"	51	"		"	"	"		"	"		"	"	"	"	GND		"	C4	"	"	"

See footnotes at end of device type 01.

TABLE III. Group A inspection for device type 01 - Continued.

Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.7 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	Measured terminal	Limits		Unit
			Case 1/ 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20				
			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	
1	I_{CC1}	3005	52	GND		GND	GND	5.5 V		GND	GND		GND	GND	GND	GND			GND	V_{CC}		39	mA
Tc = 25°C	I_{CC2}	"	53	5.5 V		5.5 V	GND	"		GND	5.5 V		5.5 V	GND	"	5.5 V			GND	"		34	"
	I_{CC3}	"	54	5.5 V		5.5 V	5.5 V	"		5.5 V	5.5 V		5.5 V	5.5 V	"	5.5 V			5.5 V	"		34	"
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	Truth	3014	55	B	L	B	B	5.0 V	L	B	B	L	B	B	GND	B	L	L	B	All outputs	See 5/ and 6/		
Tc = 25°C	table	"	56	A	L	A	A	"	L	"	"	H	B	"	"	A	H	H	A	"			
4/	tests	"	57	"	H	B	A	"	L	"	"	H	A	"	"	B	"	L	"	"			
		"	58	"	H	A	B	"	H	"	"	L	A	"	"	A	"	"	"	"			
		"	59	"	L	B	B	"	L	"	"	H	B	A	"	B	"	"	"	"			
		"	60	B	L	A	A	"	H	"	"	L	B	"	"	A	"	"	"	"			
		"	61	"	H	B	A	"	"	"	"	L	A	"	"	B	L	H	"	"			
		"	62	"	H	A	B	"	"	"	"	H	A	"	"	A	L	H	"	"			
		"	63	"	L	B	B	"	"	"	A	L	B	B	"	B	L	H	"	"			
		"	64	A	L	A	A	"	"	"	"	H	B	"	"	A	H	L	B	"			
		"	65	"	H	B	A	"	"	"	"	H	A	"	"	B	L	H	B	"			
		"	66	"	H	A	A	"	L	"	"	L	A	"	"	A	H	"	A	"			
		"	67	"	H	A	B	"	H	"	"	H	B	A	"	B	L	"	B	"			
		"	68	B	L	B	A	"	L	"	"	L	B	"	"	A	"	"	"	"			
		"	69	B	H	A	A	"	L	"	"	L	A	"	"	B	"	"	"	"			
		"	70	A	H	B	B	"	L	"	"	H	A	"	"	A	"	"	"	"			
		"	71	A	L	B	B	"	H	A	B	L	B	B	"	B	"	"	"	"			
		"	72	B	L	A	A	"	H	"	"	H	B	"	"	A	"	"	"	"			
		"	73	B	H	B	A	"	H	"	"	H	A	"	"	B	"	L	"	"			
		"	74	A	L	A	B	"	L	"	"	L	A	"	"	A	H	"	"	"			
		"	75	B	H	A	B	"	H	"	"	H	B	A	"	B	L	"	"	"			
		"	76	A	L	B	A	"	L	"	"	L	B	"	"	A	H	"	"	"			
		"	77	A	H	A	A	"	"	"	"	L	A	"	"	B	H	"	"	"			
		"	78	B	H	B	B	"	"	"	"	H	A	"	"	A	L	H	A	"			
		"	79	"	L	A	B	"	"	"	A	L	B	B	"	B	H	L	"	"			
		"	80	"	L	B	A	"	"	"	"	H	B	"	"	A	"	"	"	"			
		"	81	"	H	A	A	"	"	"	"	H	A	"	"	B	"	"	"	"			
		"	82	A	H	B	B	"	H	"	"	L	A	"	"	A	"	"	"	"			
		"	83	A	L	A	B	"	L	"	"	H	B	A	"	B	"	H	"	"			
		"	84	A	L	B	A	"	H	"	"	L	B	"	"	A	"	H	"	"			
		"	85	B	L	A	B	"	H	"	"	L	A	"	"	B	L	H	B	"			
		"	86	B	H	B	B	"	H	"	"	H	A	"	"	A	L	L	B	"			
8	Same tests, terminal conditions, and limits as for subgroup 7 tests at T_C = +125°C and T_C = -55°C.																						
9	t_{PLH1}	3003	87					5.0 V		GND	GND	OUT	2.7 V	GND	GND	IN				C0 to Σ 1	5	30	ns
Tc = 25°C	t_{PLH2}	Fig. 4	88					"	OUT	"	2.7 V		"	"	"	"				C0 to Σ 2	"	"	"
	t_{PLH3}	"	89		OUT	2.7 V	GND	"		"	"		"	"	"	"				C0 to Σ 3	"	"	"
	t_{PLH4}	"	90	2.7 V		2.7 V	GND	"		"	"		"	"	"	"			OUT	GND	C0 to Σ 4	"	"	"
	t_{PLH5}	"	91	2.7 V		2.7 V	GND	"		"	"		"	"	"	"	OUT		GND	C0 to C4	"	25	"
	t_{PLH6}	"	92					"	OUT	"	IN		GND	"	"	GND				A2 to Σ 2	"	35	"
	t_{PLH7}	"	93					"	OUT	IN	GND		GND	"	"	GND				B2 to Σ 2	"	"	"
	t_{PLH8}	"	94	IN		GND	GND	"							"			OUT	GND	A4 to Σ 4	"	"	"
	t_{PLH9}	"	95	GND		GND	GND	"							"			OUT	IN	B4 to Σ 4	"	36	"
	t_{PHL1}	"	96					"		GND	GND	OUT	2.7 V	GND	"	IN				C0 to Σ 1	"	"	"
	t_{PHL2}	"	97					"	OUT	"	2.7 V		"	"	"	"				C0 to Σ 2	"	"	"
	t_{PHL3}	"	98		OUT	2.7 V	GND	"		"	"		"	"	"	"				C0 to Σ 3	"	"	"
	t_{PHL4}	"	99	2.7 V		2.7 V	GND	"		"	"		"	"	"	"			OUT	GND	C0 to Σ 4	"	"	"
	t_{PHL5}	"	100	2.7 V		2.7 V	GND	"		"	"		"	"	"	"	OUT			GND	C0 to C4	"	28	"

See footnotes at end of device types 01.

TABLE III. Group A inspection for device type 01 - Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.7 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	Measured terminal	Limits		Unit
			Case 1/ 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20				
			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	
9	t_{PHL6}	3003	101					5.0 V	OUT	GND	IN		GND	GND	GND	GND				A2 to Σ 2	5	35	ns
Tc = 25°C	t_{PHL7}	Fig. 4	102					"	OUT	IN	GND		GND	GND	"	GND				B2 to Σ 2	"	"	"
	t_{PHL8}	"	103	IN		GND	GND	"							"			OUT	GND	A4 to Σ 4	"	"	"
	t_{PHL9}	"	104	GND		GND	GND	"							"			OUT	IN	B4 to Σ 4	"	"	"
10	t_{PLH1}	"	105					"		GND	GND	OUT	2.7 V	GND	"	IN				C0 to Σ 1	"	39	"
Tc = 125°C	t_{PLH2}	"	106					"	OUT	"	2.7 V		"	"	"	"				C0 to Σ 2	"	"	"
	t_{PLH3}	"	107		OUT	2.7 V	GND	"		"	"		"	"	"	"				C0 to Σ 3	"	"	"
	t_{PLH4}	"	108	2.7 V		2.7 V	GND	"		"	"		"	"	"	"		OUT	GND	C0 to Σ 4	"	"	"
	t_{PLH5}	"	109	2.7 V		2.7 V	GND	"		"	"		"	"	"	"	OUT		GND	C0 to C4	"	32	"
	t_{PLH6}	"	110					"	OUT	"	IN		GND	"	"	GND				A2 to Σ 2	"	40	"
	t_{PLH7}	"	111					"	OUT	IN	GND		GND	"	"	GND				B2 to Σ 2	"	"	"
	t_{PLH8}	"	112	IN		GND	GND	"							"			OUT	GND	A4 to Σ 4	"	"	"
	t_{PLH9}	"	113	GND		GND	GND	"							"			OUT	IN	B4 to Σ 4	"	"	"
	t_{PHL1}	"	114					"		GND	GND	OUT	2.7 V	GND	"	IN				C0 to Σ 1	"	"	"
	t_{PHL2}	"	115					"	OUT	"	2.7 V		"	"	"	"				C0 to Σ 2	"	"	"
	t_{PHL3}	"	116		OUT	2.7 V	GND	"		"	"		"	"	"	"				C0 to Σ 3	"	"	"
	t_{PHL4}	"	117	2.7 V		2.7 V	GND	"		"	"		"	"	"	"		OUT	GND	C0 to Σ 4	"	"	"
	t_{PHL5}	"	118	2.7 V		2.7 V	GND	"		"	"		"	"	"	"	OUT		GND	C0 to C4	"	35	"
	t_{PHL6}	"	119					"	OUT	"	IN		GND	"	"	GND				A2 to Σ 2	"	40	"
	t_{PHL7}	"	120					"	OUT	IN	GND		GND	"	"	GND				B2 to Σ 2	"	"	"
	t_{PHL8}	"	121	IN		GND	GND	"							"			OUT	GND	A4 to Σ 4	"	"	"
	t_{PHL9}	"	122	GND		GND	GND	"							"			OUT	IN	B4 to Σ 4	"	"	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T_C = -55°C.																						

1/ Case 2 pins not referenced are NC.

2/ Test limits are as follows:

Symbol	Min/Max limits (mA) for circuit:					
	A	B	C	D	E	F
I_{IL1}	-.32/-.80	-.24/-.72	-.33/-.71	-.32/-.80	-.24/-.72	-.30/-.76
I_{IL2}	-.16/-.40	-.12/-.36	-.15/-.38	-.16/-.40	-.12/-.36	-.15/-.38

3/ Alternate I_{OS} test conditions for I_{OS} test shall be as follows: Tests 47, 48, 49, 50, 51; pins Σ 3, Σ 2, Σ 1, Σ 4, C4 respectively, shall be forced to 0.5 V. Tests 47 through 51, V_{CC} pin shall be 6.0 V..

4/ Test numbers 55 through 86 shall be run in sequence.

5/ A ≥ 2.5 V; B ≤ 0.4 V.

6/ Output voltages shall be either:
a. H ≥ 2.5 V minimum and L ≤ 0.4 V maximum when using a high speed checker double comparator.
b. H ≥ 1.5 V minimum and L ≤ 1.5 V maximum when using a high speed checker single comparator.

TABLE III. Group A inspection for device type 02.

Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.7 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	Measured terminal	Limits		Unit
			Case 1/ 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20		Min	Max	
			Test no.	Σ 2	B2	A2	Σ 1	A1	B1	C0	GND	C4	Σ 4	B4	A4	Σ 3	A3	B3	V_{CC}				
1	V_{OH}	3006	1		2.0 V	2.0 V	-.4 mA	2.0 V	2.0 V	2.0 V	GND			2.0 V	2.0 V		2.0 V	2.0 V	4.5 V	Σ 1	2.5		V
Tc = 25°C		"	2	-.4 mA	"	"		"	"	"	"			"	"		"	"	"	Σ 2	"		"
		"	3		"	"		"	"	"	"			"	"	-.4 mA	"	"	"	Σ 3	"		"
		"	4		"	"		"	"	"	"		-.4 mA	"	"		"	"	"	Σ 4	"		"
		"	5		"	"		"	"	"	"	-.4 mA		"	"		"	"	"	C4	"		"
	V_{OL}	3007	6		0.7 V	0.7 V	4 mA	0.7 V	0.7 V	0.7 V	"			0.7 V	0.7 V		0.7 V	0.7 V	"	Σ 1		0.4	"
		"	7	4 mA	"	"		"	"	"	"			"	"		"	"	"	Σ 2		"	"
		"	8		"	"		"	"	"	"			"	"	4 mA	"	"	"	Σ 3		"	"
		"	9		"	"		"	"	"	"		4 mA	"	"		"	"	"	Σ 4		"	"
		"	10		"	"		"	"	"	"	4 mA		"	"		"	"	"	C4		"	"
	V_{IC}		11		-18 mA						"								"	B2		-1.5	"
			12			-18 mA					"								"	A2		"	"
			13					-18 mA			"								"	A1		"	"
			14						-18 mA		"								"	B1		"	"
			15							-18 mA	"								"	C0		"	"
			16								"			-18 mA					"	B4		"	"
			17								"				-18 mA				"	A4		"	"
			18								"						-18 mA		"	A3		"	"
			19								"							-18 mA	"	B3		"	"
	I_{IH1}	3010	20		GND	2.7 V					"								5.5 V	A2		40	µA
		"	21		2.7 V	GND					"								"	B2		"	"
		"	22					2.7 V	GND		"								"	A1		"	"
		"	23					GND	2.7 V		"								"	B1		"	"
		"	24								"			GND	2.7 V				"	A4		"	"
		"	25								"			2.7 V	GND				"	B4		"	"
		"	26								"						2.7 V	GND	"	A3		"	"
		"	27								"						GND	2.7 V	"	B3		"	"
	I_{IH2}	"	28							2.7 V	"								"	C0		20	"
	I_{IH3}	"	29		GND	5.5 V					"								"	A2		200	"
		"	30		5.5 V	GND					"								"	B2		"	"
		"	31					5.5 V	GND		"								"	A1		"	"
		"	32					GND	5.5 V		"								"	B1		"	"
		"	33								"			GND	5.5 V				"	A4		"	"
		"	34								"			5.5 V	GND				"	B4		"	"
		"	35								"						5.5 V	GND	"	A3		"	"
		"	36								"						GND	5.5 V	"	B3		"	"
	I_{IH4}	"	37							5.5 V	"								"	C0		100	"
	I_{IL1}	3009	38		5.5 V	0.4 V					"								"	A2	2/	2/	mA
		"	39		0.4 V	5.5 V					"								"	B2	"	"	"
		"	40					0.4 V	5.5 V		"								"	A1	"	"	"
		"	41					5.5 V	0.4 V		"								"	B1	"	"	"
		"	42								"			5.5 V	0.4 V				"	A4	"	"	"
		"	43								"			0.4 V	5.5 V				"	B4	"	"	"
		"	44								"						0.4 V	5.5 V	"	A3	"	"	"
		"	45								"						5.5 V	0.4 V	"	B3	"	"	"
	I_{IL2}	"	46							0.4 V	"								"	C0	"	"	"
	I_{OS} 3/	3011	47	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	5.5 V	"	Σ 2	-15	-100	"
		"	48		"	"	GND	"	"	"	"			"	"		"	"	"	Σ 1	"	"	"
		"	49		"	"		"	"	"	"		GND	"	"		"	"	"	Σ 4	"	"	"
		"	50		"	"		"	"	"	"			"	"	GND	"	"	"	Σ 3	"	"	"
		"	51		"	"		"	"	"	"	GND		"	"		"	"	"	C4	"	"	"

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 high ≥ 2.0 V; low ≤ 0.7 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	Measured terminal	Limits		Unit
			Case 1/ 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20				
			Test no.	Σ 2	B2	A2	Σ 1	A1	B1	C0	GND	C4	Σ 4	B4	A4	Σ 3	A3	B3	V_{CC}		Min	Max	
1	I_{CC1}	3005	52		GND	GND		GND	GND	GND	GND			GND	GND		GND	GND	5.5 V	V_{CC}		39	mA
Tc = 25°C	I_{CC2}	"	53		GND	5.5 V		5.5 V	GND	5.5 V	"			GND	5.5 V		5.5 V	GND	"	"		34	"
	I_{CC3}	"	54		5.5 V	5.5 V		5.5 V	5.5 V	5.5 V	"			5.5 V	5.5 V		5.5 V	5.5 V	"	"		34	"
2	Same tests, terminal conditions, and limits as subgroup 1, except T_C = +125°C and $V_{I C}$ tests are omitted.																						
3	Same tests, terminal conditions, and limits as subgroup 1, except T_C = -55°C and $V_{I C}$ tests are omitted.																						
7	Truth	3014	55	L	B	B	L	B	B	B	GND	L	L	B	B	L	B	B	5.0 V	All outputs	See 5/ and 6/		
Tc = 25°C	table	"	56	L	"	"	H	B	"	A	"	H	H	A	A	L	A	A	"	"			
4/	tests	"	57	L	"	"	H	A	"	B	"	"	L	"	"	H	B	A	"	"			
		"	58	H	"	"	L	A	"	A	"	"	"	"	"	H	A	B	"	"			
		"	59	L	"	"	H	B	A	B	"	"	"	"	"	L	B	B	"	"			
		"	60	H	"	"	L	B	"	A	"	"	"	"	B	L	A	A	"	"			
		"	61	"	"	"	L	A	"	B	"	L	H	"	"	H	B	A	"	"			
		"	62	"	"	"	H	A	"	A	"	L	H	"	"	H	A	B	"	"			
		"	63	"	"	A	L	B	B	B	"	L	H	"	"	L	B	B	"	"			
		"	64	"	"	"	H	B	"	A	"	H	L	B	A	L	A	A	"	"			
		"	65	"	"	"	H	A	"	B	"	L	H	B	"	H	B	A	"	"			
		"	66	L	"	"	L	A	"	A	"	H	"	A	"	H	A	A	"	"			
		"	67	H	"	"	H	B	A	B	"	L	"	B	"	H	A	B	"	"			
		"	68	L	"	"	L	B	"	A	"	"	"	"	B	L	B	A	"	"			
		"	69	L	"	"	L	A	"	B	"	"	"	"	B	H	A	A	"	"			
		"	70	L	"	"	H	A	"	A	"	"	"	"	A	H	B	B	"	"			
		"	71	H	A	B	L	B	B	B	"	"	"	"	A	L	B	B	"	"			
		"	72	H	"	"	H	B	"	A	"	"	"	"	B	L	A	A	"	"			
		"	73	H	"	"	H	A	"	B	"	"	L	"	B	H	B	A	"	"			
		"	74	L	"	"	L	A	"	A	"	H	"	"	A	L	A	B	"	"			
		"	75	H	"	"	H	B	A	B	"	L	"	"	B	H	A	B	"	"			
		"	76	L	"	"	L	B	"	A	"	H	"	"	A	L	B	A	"	"			
		"	77	"	"	"	L	A	"	B	"	H	"	"	A	H	A	A	"	"			
		"	78	"	"	"	H	A	"	A	"	L	H	A	B	H	B	B	"	"			
		"	79	"	"	A	L	B	B	B	"	H	L	"	"	L	A	B	"	"			
		"	80	"	"	"	H	B	"	A	"	"	"	"	"	L	B	A	"	"			
		"	81	"	"	"	H	A	"	B	"	"	"	"	"	H	A	A	"	"			
		"	82	H	"	"	L	A	"	A	"	"	"	"	A	H	B	B	"	"			
		"	83	L	"	"	H	B	A	B	"	"	H	"	A	L	A	B	"	"			
		"	84	H	"	"	L	B	"	A	"	"	H	A	A	L	B	A	"	"			
		"	85	H	"	"	L	A	"	B	"	L	H	B	B	L	A	B	"	"			
		"	86	H	"	"	H	A	"	A	"	L	L	B	B	H	B	B	"	"			
8	Same tests, terminal conditions, and limits as for subgroup 7 tests at T_C = +125°C and T_C = -55°C.																						
9	t_{PLH1}	3003	87		GND	GND	OUT	2.7 V	GND	IN	GND								5.0 V	C0 to Σ 1	5	30	ns
Tc = 25°C	t_{PLH2}	Fig. 4	88	OUT	"	2.7 V		"	"	"	"								"	C0 to Σ 2	"	"	"
	t_{PLH3}	"	89		"	"		"	"	"	"					OUT	2.7 V	GND	"	C0 to Σ 3	"	"	"
	t_{PLH4}	"	90		"	"		"	"	"	"		OUT	GND	2.7 V		2.7 V	GND	"	C0 to Σ 4	"	"	"
	t_{PLH5}	"	91		"	"		"	"	"	"	OUT		GND	2.7 V		2.7 V	GND	"	C0 to C4	"	25	"
	t_{PLH6}	"	92	OUT	"	IN		GND	"	GND	"								"	A2 to Σ 2	"	35	"
	t_{PLH7}	"	93	OUT	IN	GND		GND	"	GND	"								"	B2 to Σ 2	"	"	"
	t_{PLH8}	"	94								"		OUT	GND	IN		GND	GND	"	A4 to Σ 4	"	"	"
	t_{PLH9}	"	95								"		OUT	IN	GND		GND	GND	"	B4 to Σ 4	"	"	"
	t_{PHL1}	"	96		GND	GND	OUT	2.7 V	GND	IN	"								"	C0 to Σ 1	"	"	"
	t_{PHL2}	"	97	OUT	"	2.7 V		"	"	"	"								"	C0 to Σ 2	"	"	"
	t_{PHL3}	"	98		"	"		"	"	"	"					OUT	2.7 V	GND	"	C0 to Σ 3	"	"	"
	t_{PHL4}	"	99		"	"		"	"	"	"		OUT	GND	2.7 V		2.7 V	GND	"	C0 to Σ 4	"	"	"
	t_{PHL5}	"	100		"	"		"	"	"	"	OUT		GND	2.7 V		2.7 V	GND	"	C0 to C4	"	28	"

See footnotes at end of device types 02.

TABLE III. Group A inspection for device type 02 - Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V; low ≤ 0.7 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	Measured terminal	Limits		Unit
			Case 1/ 2	2	3	4	5	7	8	9	10	12	13	14	15	17	18	19	20				
			Test no.	Σ 2	B2	A2	Σ 1	A1	B1	C0	GND	C4	Σ 4	B4	A4	Σ 3	A3	B3	V_{CC}		Min	Max	
9	t_{PHL6}	3003	101	OUT	GND	IN		GND	GND	GND	GND								5.0 V	A2 to Σ 2	5	35	ns
Tc = 25°C	t_{PHL7}	Fig. 4	102	OUT	IN	GND		GND	GND	GND	GND								"	B2 to Σ 2	"	"	"
	t_{PHL8}	"	103										OUT	GND	IN		GND	GND	"	A4 to Σ 4	"	"	"
	t_{PHL9}	"	104										OUT	IN	GND		GND	GND	"	B4 to Σ 4	"	"	"
10	t_{PLH1}	"	105		GND	GND	OUT	2.7 V	GND	IN	GND								"	C0 to Σ 1	"	39	"
Tc = 125°C	t_{PLH2}	"	106	OUT	"	2.7 V		"	"	"	"								"	C0 to Σ 2	"	"	"
	t_{PLH3}	"	107		"	"		"	"	"	"					OUT	2.7 V	GND	"	C0 to Σ 3	"	"	"
	t_{PLH4}	"	108		"	"		"	"	"	"		OUT	GND	2.7 V		2.7 V	GND	"	C0 to Σ 4	"	"	"
	t_{PLH5}	"	109		"	"		"	"	"	"	OUT		GND	2.7 V		2.7 V	GND	"	C0 to C4	"	32	"
	t_{PLH6}	"	110	OUT	"	IN		GND	"	GND	"								"	A2 to Σ 2	"	40	"
	t_{PLH7}	"	111	OUT	IN	GND		GND	"	GND	"								"	B2 to Σ 2	"	"	"
	t_{PLH8}	"	112								"		OUT	GND	IN		GND	GND	"	A4 to Σ 4	"	"	"
	t_{PLH9}	"	113								"		OUT	IN	GND		GND	GND	"	B4 to Σ 4	"	"	"
	t_{PHL1}	"	114		GND	GND	OUT	2.7 V	GND	IN	"								"	C0 to Σ 1	"	"	"
	t_{PHL2}	"	115	OUT	"	2.7 V		"	"	"	"								"	C0 to Σ 2	"	"	"
	t_{PHL3}	"	116		"	"		"	"	"	"					OUT	2.7 V	GND	"	C0 to Σ 3	"	"	"
	t_{PHL4}	"	117		"	"		"	"	"	"		OUT	GND	2.7 V		2.7 V	GND	"	C0 to Σ 4	"	"	"
	t_{PHL5}	"	118		"	"		"	"	"	"	OUT		GND	2.7 V		2.7 V	GND	"	C0 to C4	"	35	"
	t_{PHL6}	"	119	OUT	"	IN		GND	"	GND	"								"	A2 to Σ 2	"	40	"
	t_{PHL7}	"	120	OUT	IN	GND		GND	"	GND	"								"	B2 to Σ 2	"	"	"
	t_{PHL8}	"	121						"		"		OUT	GND	IN		GND	GND	"	A4 to Σ 4	"	"	"
	t_{PHL9}	"	122						"		"		OUT	IN	GND		GND	GND	"	B4 to Σ 4	"	"	"
11	Same tests, terminal conditions and limits as for subgroup 10, except T_C = -55°C.																						

1/ Case 2 pins not referenced are NC.

2/ Test limits are as follows:

Symbol	Min/Max limits (mA) for circuit:					
	A	B	C	D	E	F
I_{IL1}	-.32/-.80	-.24/-.72	-.33/-.71	-.32/-.80	-.24/-.72	-.30/-.76
I_{IL2}	-.16/-.40	-.12/-.36	-.15/-.38	-.16/-.40	-.12/-.36	-.15/-.38

3/ Alternate I_{OS} test conditions for I_{OS} test shall be as follows: Tests 47, 48, 49, 50, 51; pins Σ 3, Σ 2, Σ 1, Σ 4, C4 respectively, shall be forced to 0.5 V. Tests 47 through 51, V_{CC} pin shall be 6.0 V..

4/ Test numbers 55 through 86 shall be run in sequence.

5/ A ≥ 2.0 V; B ≤ 0.4 V.

6/ Output voltages shall be either:
a. H ≥ 2.5 V minimum and L ≤ 0.4 V maximum when using a high speed checker double comparator.
b. H ≥ 1.5 V minimum and L ≤ 1.5 V maximum 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 actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite 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 which 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. Complete part number (see 1.2).

c. Requirements for delivery of one copy of the quality 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.

j. Requirements for "JAN" marking.

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 43123-1199.

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	54LS83A
02	54LS283

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.

	Manufacturer					
	Circuit A	Circuit B	Circuit C	Circuit D	Circuit E	Circuit F
Device type	Texas Instruments	Signetics Corp.	National Semconductor	Raytheon Co.	Fairchild Co.	Motorola Inc.
01	X	X	X	X	X	X
02	X	X	X	X	X	X

6.9 Changes from previous issue. Asterisks 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 5962-1961)

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

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-M-38510/312C	2. DOCUMENT DATE *(YYYYMMDD)* 2003-05-06

3. DOCUMENT TITLE
MICROCIRCUITS, DIGITAL, LOW-POWER SCHOTTKY TTL, 4 - BIT BINARY FULL ADDERS WITH FAST CARRY, MONOLITHIC SILICON

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) DSN *(If applicable)*	7. DATE SUBMITTED *(YYYYMMDD)*

8. PREPARING ACTIVITY

a. NAME Defense Supply Center, Columbus	b. TELEPHONE *(Include Area Code* (1) Commercial 614-692-0536 (2) DSN 850-0536
c. ADDRESS *(Include Zip Code)* DSCC-VA P. O. Box 3990 Columbus, Ohio 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703)767-6888 DSN 427-6888