

INCH-POUND

MIL-M-38510/310D
3 October 2002
SUPERSEDING
MIL-M-38510/310C
28 April 1982

DETAIL SPECIFICATION

MICROCIRCUITS, DIGITAL, BIPOLAR LOW-POWER SCHOTTKY TTL, AND GATES, 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, positive AND logic gate 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).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 number. The part number shall be in accordance with MIL-PRF-38535, and as specified herein.

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

<u>Device type</u>	<u>Circuit</u>
01	Triple, 3-input AND gate
02	Triple, 3-input AND gate (open collector output)
03	Dual, 4-input AND gate
04	Quad, 2-input AND gate
05	Quad, 2-input AND gate (open collector output)

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

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

<u>Outline letter</u>	<u>Descriptive designator</u>	<u>Terminals</u>	<u>Package style</u>
A <u>1/</u>	GDFP5-F14 or CDFP6-F14	14	Flat pack
B <u>1/</u>	GDFP4-14	14	Flat pack
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
D	GDFP1-F14 or CDFP2-F14	14	Flat pack
X	CQCC2-N20	20	Square leadless chip carrier
2	CQCC1-N20	20	Square leadless chip carrier

1/ Inactive case outline package (see MIL-STD-1835).

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, 3990 East Broad St., 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

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MIL-M-38510/310D

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V to +7.0 V
Input voltage range	-1.5 V at -18 mA to +5.5 V
Storage temperature range	-65° to +150°C
Maximum power dissipation, (P _D) <u>1</u> :	
Device types 01 and 02	36 mW
Device type 03	24.2 mW
Device types 04 and 05	48.4 mW
Lead temperature (soldering, 10 seconds)	300°C
Thermal resistance, junction to case (θ _{JC}):	
Cases A, B, C, D, X and 2.....	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 minimum to 5.5 V maximum
Minimum high level input voltage (V _{IH})	2.0 V
Maximum low level input voltage (V _{IL})	0.7 V
Case operating temperature range (T _C)	-55° 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 Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATION

DEPARTMENT OF DEFENSE

- MIL-M-38510 - Microcircuits, General Specification for.
- MIL-PRF-38535 - Integrated Circuits (Microcircuits) Manufacturing, General Specification for.

STANDARD

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 (T_J) may be increased during the burn-in screening and steady-state life test. However, such temperatures should not be used under normal operating conditions.

3. REQUIREMENTS

3.1 Qualification. Items 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 and logic equations. The truth tables and logic equations shall be as specified on figure 2.

3.3.3 Schematic circuits. The schematic circuits shall be submitted to the preparing activity prior to inclusion of a manufacturer's device in the specification and shall be submitted to the qualifying activity and preparing activity (DSCC-VA) as a prerequisite for qualification. All qualified manufacturers schematics shall be maintained by the preparing activity and will be available upon request.

3.3.4 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 8 (see MIL-PRF-38535, appendix A).

4. VERIFICATION (QUALITY ASSURANCE PROVISIONS)

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 ≤ T _C ≤ +125°C	Device types	Limits		Unit
				Min	Max	
High level output voltage	V _{OH}	V _{CC} = 4.5 V, V _{IH} = 20 V I _{OH} = -400 μA	01, 03, 04	2.5		V
Low level output voltage	V _{OL}	V _{CC} = 4.5 V, I _{OL} = 4 mA V _{IL} = 0.7 V	All		0.4	V
Input clamp voltage	V _{IC}	V _{CC} = 4.5 V, I _{IN} = -18 mA T _C = 25°C	All		-1.5	V
Maximum collector cut-off current	I _{CEX}	V _{CC} = 4.5 V, V _{IH} = 2.0 V V _{OH} = 5.5 V	02, 05		100	μA
High level input current	I _{IH1}	V _{CC} = 5.5 V, V _{IN} = 2.7 V	All		20	μA
High level input current	I _{IH2}	V _{CC} = 5.5 V, V _{IN} = 5.5 V	All		100	μA
Low level input current	I _{IL}	V _{CC} = 5.5 V, V _{IN} = 0.4 V	01, 05	-30	-380	μA
			02, 03, 04	-30	-400	
Short circuit output current	I _{OS}	V _{CC} = 5.5 V <u>1/</u>	01	-15	-100	mA
			03, 04	-15	-110	
High level supply current	I _{CCH}	V _{CC} = 5.5 V, V _{IN} = 5.5 V	01, 02		3.6	mA
			03		2.4	
			04, 05		4.8	
Low level supply current	I _{CCL}	V _{CC} = 5.5 V, V _{IN} = 0 V	01, 02		6.6	mA
			03		4.4	
			04, 05		8.8	
Propagation delay time high-to-low level	t _{PHL}	C _L = 50 pF R _L = 2 kΩ V _{CC} = 5.0 V	01, 03, 04	2	30	ns
			02, 05	2	45	
Propagation delay time low-to-high level	t _{PLH}	C _L = 50 pF R _L = 2 kΩ V _{CC} = 5.0 V	01, 03, 04	2	25	ns
			02, 05	2	50	

1/ Not more than one output should be shorted at a 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, 9, 10, 11	1*, 2, 3, 9
Group A test requirements	1, 2, 3, 9, 10, 11	1, 2, 3, 9, 10, 11
Group C end-point electrical parameters	1, 2, 3, 5 9, 10, 11	1, 2, 3
Group D end-point electrical parameters	1, 2, 3	1, 2, 3

*PDA applies to subgroup 1 (see 4.2c).

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, 6, 7, and 8 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 1015 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.

Pin number		Device type 01		Device type 02		Device type 03		Device type 04		Device type 05	
Cases											
2, X	A, B, C, and D	2, X	A, B, C, and D	2, X	A, B, C, and D	2, X	A, B, C, and D	2, X	A, B, C, and D	2, X	A, B, C, and D
1	1	NC	1A	NC	1A	NC	1A	NC	1A	NC	1A
2	2	1A	1B	1A	1B	1A	1B	1A	1B	1A	1B
3	3	1B	2A	1B	2A	1B	NC	1B	1Y	1B	1Y
4	4	2A	2B	2A	2B	NC	1C	1Y	2A	1Y	2A
5	5	NC	2C	NC	2C	NC	1D	NC	2B	NC	2B
6	6	2B	2Y	2B	2Y	1C	1Y	2A	2Y	2A	2Y
7	7	NC	GND	NC	GND	NC	GND	NC	GND	NC	GND
8	8	2C	3Y	2C	3Y	1D	2Y	2B	3Y	2B	3Y
9	9	2Y	3A	2Y	3A	1Y	2A	2Y	3A	2Y	3A
10	10	GND	3B	GND	3B	GND	2B	GND	3B	GND	3B
11	11	NC	3C	NC	3C	NC	NC	NC	4Y	NC	4Y
12	12	3Y	1Y	3Y	1Y	2Y	2C	3Y	4A	3Y	4A
13	13	3A	1C	3A	1C	2A	2D	3A	4B	3A	4B
14	14	3B	V _{CC}	3B	V _{CC}	2B	V _{CC}	3B	V _{CC}	3B	V _{CC}
15		NC		NC		NC		NC		NC	
16		3C		3C		NC		4Y		4Y	
17		NC		NC		NC		NC		NC	
18		1Y		1Y		2C		4A		4A	
19		1C		1C		2D		4B		4B	
20		V _{CC}		V _{CC}		V _{CC}		V _{CC}		V _{CC}	

FIGURE 1. Terminal connections.

Device types 01 and 02

Truth table (each gate)			
Inputs			Output
A	B	C	Y
L	L	L	L
H	L	L	L
H	H	L	L
H	L	H	L
L	L	H	L
H	H	H	H

Positive logic $Y = ABC$

Device type 03

Truth table (each gate)				
Inputs				Output
A	B	C	D	Y
L	L	L	L	L
H	L	L	L	L
H	H	L	L	L
H	H	H	L	L
H	H	H	H	H

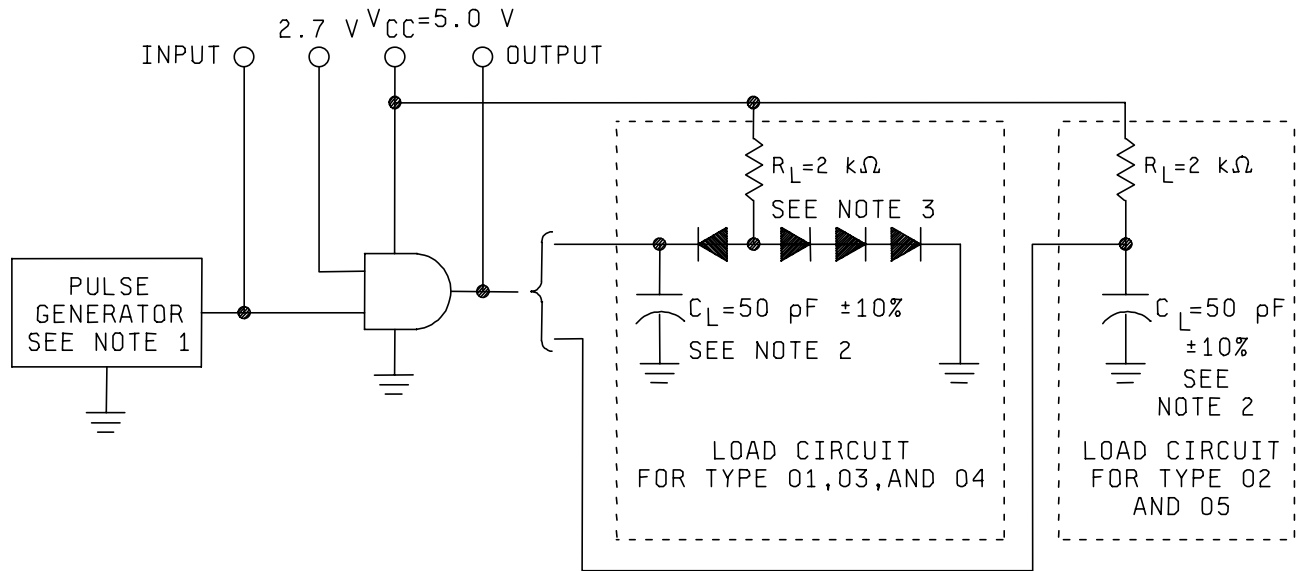
Positive logic $Y = ABCD$

Device types 04 and 05

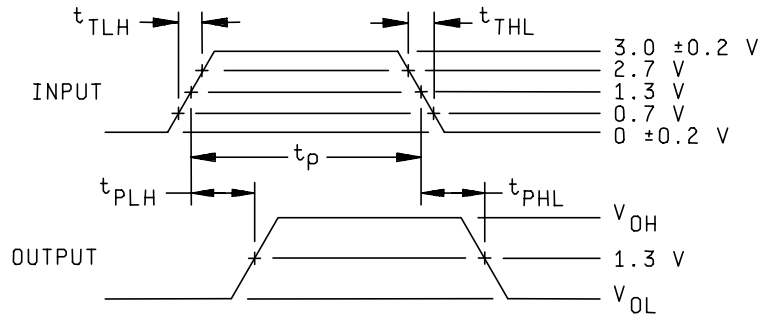
Truth table (each gate)		
Inputs		Output
A	B	Y
L	L	L
H	L	L
L	H	L
H	H	H

Positive logic $Y = AB$

FIGURE 2. Truth table and logic equations.



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES:

1. The generator has the following characteristics: $t_{TLH} \leq 15$ ns, $t_{THL} \leq 6$ ns, $t_p = .5$ μ s, $PRR \leq 1$ MHz, $Z_{OUT} \cong 50\Omega$.
2. C_L includes probe and jig capacitance.
3. All diodes are 1N3064 or equivalent.

FIGURE 3. Switching time test circuit.

TABLE III. Group A inspection for device type 01.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	2A	2B	2C	2Y	GND	3Y	3A	3B	3C	1Y	1C	V _{CC}		Min	Max	
1 T _c = 25°C	V _{OH}	3006	1	2.0 V	2.0 V	5.5 V	5.5 V	5.5 V		GND		5.5 V	5.5 V	5.5 V	-400 μ A	2.0 V	4.5 V	1Y	2.5		V dc
			2	5.5 V	5.5 V	2.0 V	2.0 V	2.0 V	-400 μ A			5.5 V	5.5 V	5.5 V		5.5 V		2Y			
			3	5.5 V		5.5 V	5.5 V	5.5 V			-400 μ A	2.0 V	2.0 V	2.0 V				3Y			
	V _{OL}	3007	4	0.7 V								5.5 V	5.5 V	5.5 V	4 mA			1Y		0.4	
			5	5.5 V	0.7 V													1Y			
			6		5.5 V											0.7 V		1Y			
			7			0.7 V			4 mA							5.5 V		2Y			
			8			5.5 V	0.7 V											2Y			
			9				5.5 V	0.7 V										2Y			
			10					5.5 V			4 mA	0.7 V						3Y			
			11									5.5 V	0.7 V					3Y			
			12									5.5 V	5.5 V	0.7 V				3Y			
	V _{IC}		13	-18 mA														1A		-1.5	
			14		-18 mA													1B			
			15													-18 mA		1C			
			16			-18 mA												2A			
			17				-18 mA											2B			
			18					-18 mA										2C			
			19									-18 mA						3A			
			20										-18 mA					3B			
			21											-18 mA				3C			
	I _{IH1}	3010	22	2.7 V	GND	GND	GND	GND				GND	GND	GND		GND	5.5 V	1A		20	μ A
			23	GND	2.7 V											GND		1B			
			24		GND											2.7 V		1C			
			25			2.7 V										GND		2A			
			26			GND	2.7 V											2B			
			27				GND	2.7 V										2C			
			28					GND				2.7 V						3A			
			29									GND	2.7 V					3B			
			30										GND	2.7 V				3C			
	I _{IH2}		31	5.5 V										GND				1A		100	
			32	GND	5.5 V													1B			
			33		GND											5.5 V		1C			
			34			5.5 V										GND		2A			
			35			GND	5.5 V											2B			
			36				GND	5.5 V										2C			
			37					GND				5.5 V						3A			
			38					GND				GND	5.5 V					3B			
			39					GND				GND	GND	5.5 V				3C			
	I _{IL}	3009	40	0.4 V	5.5 V	5.5 V	5.5 V	5.5 V				5.5 V	5.5 V			5.5 V		1A	1/	1/	
			41	5.5 V	0.4 V											5.5 V		1B			
			42		5.5 V											0.4 V		1C			
			43			0.4 V										5.5 V		2A			
			44			5.5 V	0.4 V											2B			
			45				5.5 V	0.4 V										2C			
			46					5.5 V				0.4 V						3A			
			47					5.5 V				5.5 V	0.4 V					3B			
			48					5.5 V				5.5 V	5.5 V	0.4 V				3C			

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 or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit			
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20							
			Test no.	1A	1B	2A	2B	2C	2Y	GND	3Y	3A	3B	3C	1Y	1C	V _{CC}		Min	Max				
1 T _C = 25°C	I _{OS}	3011	49	5.5 V	5.5 V					GND					GND	5.5 V	5.5 V	1Y	-15	-100	mA			
			50			5.5 V	5.5 V	5.5 V	GND	"						"	2Y	-15	-100	"				
			51							"	GND	5.5 V	5.5 V	5.5 V			"	3Y	-15	-100	"			
	I _{CC H}	3005	52	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	"	V _{CC}		3.6	"			
	I _{CC L}	3005	53	GND	GND	GND	GND	GND		"		GND	GND	GND		GND	"	V _{CC}		6.6	"			
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.																								
9 T _C = 25°C	t _{PHL}	3003 Fig. 3	54	IN	2.7 V					GND					OUT	2.7 V	5.0 V	1A to 1Y	2	20	ns			
			55	2.7 V	IN						"					OUT	2.7 V	"	1B to 1Y	"	"	"		
			56	2.7 V	2.7 V						"					OUT	IN	"	1C to 1Y	"	"	"		
			57			IN	2.7 V	2.7 V	OUT	"								"	2A to 2Y	"	"	"		
			58			2.7 V	IN	2.7 V	OUT	"							"	2B to 2Y	"	"	"			
			59			2.7 V	2.7 V	IN	OUT	"							"	2C to 2Y	"	"	"			
			60								"	OUT	IN	2.7 V	2.7 V			"	3A to 3Y	"	"	"		
			61								"	OUT	2.7 V	IN	2.7 V			"	3B to 3Y	"	"	"		
			62								"	OUT	2.7 V	2.7 V	IN			"	3C to 3Y	"	"	"		
			t _{PLH}		63	IN	2.7 V					"					OUT	2.7 V	"	1A to 1Y	"	15	"	
					64	2.7 V	IN						"					OUT	2.7 V	"	1B to 1Y	"	"	"
					65	2.7 V	2.7 V						"					OUT	IN	"	1C to 1Y	"	"	"
	66					IN	2.7 V	2.7 V	OUT	"								"	2A to 2Y	"	"	"		
	67					2.7 V	IN	2.7 V	OUT	"							"	2B to 2Y	"	"	"			
	68					2.7 V	2.7 V	IN	OUT	"							"	2C to 2Y	"	"	"			
			69							"	OUT	IN	2.7 V	2.7 V			"	3A to 3Y	"	"	"			
			70								"	OUT	2.7 V	IN	2.7 V			"	3B to 3Y	"	"	"		
			71								"	OUT	2.7 V	2.7 V	IN			"	3C to 3Y	"	"	"		
10 Same tests, terminal conditions and limits as for subgroup 9, except T _C = 125° C, t _{PLH} = 25 ns, and t _{PHL} = 30 ns.																								
11 Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55° C.																								

1/ For cases X and 2, pins not referenced are NC.

2/ I_{IL} limits in μ A are as follows:

Circuit	A	B	C	D	E	F
I _{IL}	-120/-360	-30/-300	-160/-400	-120/-360	-150/-380	-105/-345

TABLE III. Group A inspection for device type 02.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	2A	2B	2C	2Y	GND	3Y	3A	3B	3C	1Y	1C	V _{CC}		Min	Max	
1 T _C = 25°C	V _{OL}	3007	1	0.7 V	5.5 V	5.5 V	5.5 V	5.5 V				5.5 V	5.5 V	5.5 V	4 mA	5.5 V	4.5 V	1Y		0.4	V dc
			2	5.5 V	0.7 V											5.5 V		1Y			
			3		5.5 V											0.7 V		1Y			
			4			0.7 V			4 mA							5.5 V		2Y			
			5			5.5 V	0.7 V											2Y			
			6				5.5 V	0.7 V										2Y			
			7					5.5 V			4 mA	0.7 V						3Y			
			8									5.5 V	0.7 V					3Y			
			9									5.5 V	5.5 V	0.7 V				3Y			
	I _{CEX}		10	2.0 V										5.5 V	5.5 V			1Y	100		μA
			11	5.5 V	2.0 V													1Y			
			12		5.5 V											2.0 V		1Y			
			13			2.0 V			5.5 V							5.5 V		2Y			
			14			5.5 V	2.0 V											2Y			
			15				5.5 V	2.0 V										2Y			
			16					5.5 V			5.5 V	2.0 V						3Y			
			17									5.5 V	2.0 V					3Y			
			18										5.5 V	5.5 V	2.0 V			3Y			
	V _{IC}		19	-18 mA														1A	-1.5		V dc
			20		-18 mA													1B			
			21													-18 mA		1C			
			22			-18 mA												2A			
			23				-18 mA											2B			
			24					-18 mA										2C			
			25									-18 mA						3A			
			26										-18 mA					3B			
			27											-18 mA				3C			
	I _{IH1}	3010	28	2.7 V	GND	GND	GND	GND				GND	GND	GND		GND	5.5 V	1A	20		μA
			29	GND	2.7 V											GND		1B			
			30		GND											2.7 V		1C			
			31			2.7 V										GND		2A			
			32			GND	2.7 V											2B			
			33				GND	2.7 V										2C			
			34					GND				2.7 V						3A			
			35									GND	2.7 V					3B			
			36										GND	2.7 V				3C			
	I _{IH2}		37	5.5 V														1A	100		
			38	GND	5.5 V													1B			
			39		GND											5.5 V		1C			
			40			5.5 V										GND		2A			
			41			GND	5.5 V											2B			
			42				GND	5.5 V										2C			
			43					GND				5.5 V						3A			
			44					GND				GND	5.5 V					3B			
			45					GND				GND	GND	5.5 V				3C			

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 or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit	
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20					
			Test no.	1A	1B	2A	2B	2C	2Y	GND	3Y	3A	3B	3C	1Y	1C	V _{CC}		Min	Max		
1 T _C = 25°C	I _{IL}	3009	46	0.4 V	5.5 V	5.5 V	5.5 V	5.5 V			GND		5.5 V	5.5 V	5.5 V		5.5 V	5.5 V	1A	2/	2/	μA
			47	5.5 V	0.4 V											5.5 V		1B				
			48		5.5 V											0.4 V		1C				
			49			0.4 V										5.5 V		2A				
			50			5.5 V	0.4 V											2B				
			51				5.5 V	0.4 V										2C				
			52					5.5 V				0.4 V						3A				
			53					5.5 V				5.5 V	0.4 V					3B				
	54					5.5 V				5.5 V	5.5 V	0.4 V				3C						
	I _{CC L}	3005	55	GND	GND	GND	GND	GND				GND	GND	GND		GND		V _{CC}		6.6	mA	
I _{CC H}	3005	56	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		V _{CC}		3.6	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.																					
9 T _C = 25°C	t _{PHL}	3003 Fig. 3	57	IN	2.7 V					GND					OUT	2.7 V	5.0 V	1A to 1Y	2	30	ns	
			58	2.7 V	IN										OUT	2.7 V		1B to 1Y				
			59	2.7 V	2.7 V										OUT	IN		1C to 1Y				
			60			IN	2.7 V	2.7 V	OUT									2A to 2Y				
			61			2.7 V	IN	2.7 V	OUT									2B to 2Y				
			62			2.7 V	2.7 V	IN	OUT									2C to 2Y				
			63								OUT	IN	2.7 V	2.7 V				3A to 3Y				
			64								OUT	2.7 V	IN	2.7 V				3B to 3Y				
			65								OUT	2.7 V	2.7 V	IN				3C to 3Y				
	t _{PLH}		66	IN	2.7 V											OUT	2.7 V		1A to 1Y		35	
			67	2.7 V	IN											OUT	2.7 V		1B to 1Y			
			68	2.7 V	2.7 V											OUT	IN		1C to 1Y			
			69			IN	2.7 V	2.7 V	OUT										2A to 2Y			
			70			2.7 V	IN	2.7 V	OUT										2B to 2Y			
			71			2.7 V	2.7 V	IN	OUT										2C to 2Y			
			72									OUT	IN	2.7 V	2.7 V				3A to 3Y			
73									OUT	2.7 V	IN	2.7 V				3B to 3Y						
74									OUT	2.7 V	2.7 V	IN				3C to 3Y						
10	Same tests, terminal conditions and limits as for subgroup 9, except T _C = 125° C, t _{PHL} = 45 ns, maximum and t _{PLH} = 50 ns maximum.																					
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55° C.																					

1/ For cases X and 2, pins not referenced are NC.

2/ I_{IL} limits in μA are as follows:

Circuit	A	B	C	D	E	F
I _{IL}	-120/-360	-30/-300	-160/-400	-120/-360	-150/-380	-105/-345

TABLE III. Group A inspection for device type 03.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	NC	1C	1D	1Y	GND	2Y	2A	2B	NC	2C	2D	V _{CC}		Min	Max	
1 Tc = 25°C	V _{OH}	3006	1	2.0 V	2.0 V		2.0 V	2.0 V	-400 μ A	GND		5.5 V	5.5 V		5.5 V	5.5 V	4.5 V	1Y	2.5		V dc
			2	5.5 V	5.5 V		5.5 V	5.5 V			-400 μ A	2.0 V	2.0 V		2.0 V	2.0 V		2Y	2.5		
	V _{OL}	3007	3	0.7 V	5.5 V				4 mA			5.5 V	5.5 V		5.5 V	5.5 V		1Y		0.4	
			4	5.5 V	0.7 V													1Y			
			5		5.5 V													1Y			
			6				0.7 V											1Y			
			7				5.5 V	0.7 V										1Y			
			8					5.5 V			4 mA	0.7 V						2Y			
			9									5.5 V	0.7 V					2Y			
			10										5.5 V		0.7 V			2Y			
			11	-18 mA														1A	-1.5		
			12		-18 mA													1B			
	V _{IC}		13				-18 mA											1C			
			14					-18 mA										1D			
			15								-18 mA							2A			
			16									-18 mA						2B			
			17												-18 mA			2C			
			18													-18 mA		2D			
	I _{IH1}	3010	19	2.7 V	GND		GND	GND				GND	GND		GND	GND	5.5 V	1A	20		μ A
			20	GND	2.7 V		GND	GND										1B			
			21		GND		2.7 V	GND										1C			
			22				GND	2.7 V										1D			
			23					GND				2.7 V						2A			
			24									GND	2.7 V					2B			
			25										GND		2.7 V			2C			
	I _{IH2}		26												GND	2.7 V		2D			
			27	5.5 V												GND		1A	100		
			28	GND	5.5 V													1B			
			29		GND		5.5 V											1C			
			30				GND	5.5 V										1D			
			31					GND				5.5 V						2A			
			32									GND	5.5 V					2B			
			33									GND	GND		5.5 V			2C			
	I _{IL}	3009	34									GND	GND		GND	5.5 V		2D			
			35	0.4 V	5.5 V		5.5 V	5.5 V				5.5 V	5.5 V		5.5 V			1A	2/	2/	
			36	5.5 V	0.4 V		5.5 V											1B			
			37		5.5 V		0.4 V											1C			
			38				5.5 V	0.4 V										1D			
			39					5.5 V				0.4 V						2A			
			40									5.5 V	0.4 V					2B			
			41									5.5 V	5.5 V		0.4 V			2C			
			42									5.5 V	5.5 V		5.5 V	0.4 V		2D			

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	NC	1C	1D	1Y	GND	2Y	2A	2B	NC	2C	2D	V _{CC}		Min	Max	
1 T _C = 25°C	I _{OS}	3011	43	5.5 V	5.5 V		5.5 V	5.5 V	GND	GND							5.5 V	1Y	-15	-110	mA
			44								GND	5.5 V	5.5 V		5.5 V	5.5 V		2Y	-15	-110	"
	I _{CCH}	3005	45	5.5 V	5.5 V		5.5 V	5.5 V		"		5.5 V	5.5 V		5.5 V	5.5 V	"	V _{CC}		2.4	"
I _{CCL}	3005	46	GND	GND		GND	GND		"		GND	GND		GND	GND	"	V _{CC}		4.4	"	
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.																				
9 T _C = 25°C	t _{PHL}	3003 Fig. 3	47	IN	2.7 V		2.7 V	2.7 V	OUT	GND							5.0 V	1A to 1Y	2	20	ns
			48	2.7 V	IN		2.7 V	2.7 V	OUT	"						"	1B to 1Y	"	"	"	
			49	2.7 V	2.7 V		IN	2.7 V	OUT	"						"	1C to 1Y	"	"	"	
			50	2.7 V	2.7 V		2.7 V	IN	OUT	"						"	1D to 1Y	"	"	"	
			51							"	OUT	IN	2.7 V		2.7 V	2.7 V	"	2A to 2Y	"	"	"
			52							"	OUT	2.7 V	IN		2.7 V	2.7 V	"	2B to 2Y	"	"	"
			53							"	OUT	2.7 V	2.7 V		IN	2.7 V	"	2C to 2Y	"	"	"
			54							"	OUT	2.7 V	2.7 V		2.7 V	IN	"	2D to 2Y	"	"	"
	t _{PLH}		55	IN	2.7 V		2.7 V	2.7 V	OUT	"							"	1A to 1Y	"	15	"
			56	2.7 V	IN		2.7 V	2.7 V	OUT	"							"	1B to 1Y	"	"	"
			57	2.7 V	2.7 V		IN	2.7 V	OUT	"							"	1C to 1Y	"	"	"
			58	2.7 V	2.7 V		2.7 V	IN	OUT	"							"	1D to 1Y	"	"	"
			59							"	OUT	IN	2.7 V		2.7 V	2.7 V	"	2A to 2Y	"	"	"
			60							"	OUT	2.7 V	IN		2.7 V	2.7 V	"	2B to 2Y	"	"	"
61							"	OUT	2.7 V	2.7 V		IN	2.7 V	"	2C to 2Y	"	"	"			
62							"	OUT	2.7 V	2.7 V		2.7 V	IN	"	2D to 2Y	"	"	"			
10	Same tests, terminal conditions and limits as for subgroup 9, except T _C = 125° C, t _{PHL} = 30 ns, and t _{PLH} = 25 ns.																				
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55° C.																				

1/ For cases X and 2, pins not referenced are NC.

2/ I_{IL} limits in μ A are as follows:

Circuit	A	B	C	D	E	F
I _{IL}	-120/-360	-30/-300	-160/-400	-120/-360	-150/-380	-105/-345

TABLE III. Group A inspection for device type 04.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	1Y	2A	2B	2Y	GND	3Y	3A	3B	4Y	4A	4B	V _{CC}		Min	Max	
1 T _c = 25°C	V _{OH}	3006	1	2.0 V	2.0 V	-400 μ A	5.5 V	5.5 V		GND		5.5 V	5.5 V		5.5 V	5.5 V	4.5 V	1Y	2.5		V dc
			2	5.5 V	5.5 V		2.0 V	2.0 V	-400 μ A			5.5 V	5.5 V					2Y			
			3				5.5 V	5.5 V			-400 μ A	2.0 V	2.0 V					3Y			
			4									5.5 V	5.5 V	-400 μ A	2.0 V	2.0 V		4Y			
	V _{OL}	3007	5	0.7 V	5.5 V	4 mA						5.5 V	5.5 V		5.5 V	5.5 V		1Y		0.4	
			6	5.5 V	0.7 V	4 mA												1Y			
			7		5.5 V		0.7 V		4 mA									2Y			
			8				5.5 V	0.7 V	4 mA									2Y			
			9					5.5 V			4 mA	0.7 V						3Y			
			10								4 mA	5.5 V	0.7 V					3Y			
			11										5.5 V	4 mA	0.7 V			4Y			
			12										5.5 V	4 mA	5.5 V	0.7 V		4Y			
			13	-18 mA														1A		-1.5	
			14		-18 mA													1B			
			15				-18 mA											2A			
			16					-18 mA										2B			
	V _{IC}		17									-18 mA						3A			
			18										-18 mA					3B			
			19												-18 mA			4A			
			20													-18 mA		4B			
	I _{IH1}	3010	21	2.7 V	GND		GND	GND				GND	GND		GND	GND	5.5 V	1A		20	μ A
			22	GND	2.7 V		GND	GND										1B			
			23		GND		2.7 V	GND										2A			
			24				GND	2.7 V										2B			
			25					GND					2.7 V					3A			
			26									GND	2.7 V					3B			
			27										GND		2.7 V			4A			
			28												GND	2.7 V		4B			
	I _{IH2}		29	5.5 V												GND		1A		100	
			30	GND	5.5 V													1B			
			31		GND		5.5 V											2A			
			32				GND	5.5 V										2B			
			33					GND				5.5 V						3A			
			34									GND	5.5 V					3B			
			35									GND	GND		5.5 V			4A			
			36									GND	GND		GND	5.5 V		4B			
	I _{IL}	3009	37	0.4 V	5.5 V		5.5 V	5.5 V				5.5 V	5.5 V		5.5 V			1A	2/	2/	
			38	5.5 V	0.4 V		5.5 V											1B			
			39		5.5 V		0.4 V											2A			
			40				5.5 V	0.4 V										2B			
			41					5.5 V				0.4 V						3A			
			42									5.5 V	0.4 V					3B			
			43									5.5 V	5.5 V		0.4 V			4A			
			44									5.5 V	5.5 V		5.5 V	0.4 V		4B			

See footnotes at end of device type 04

TABLE III. Group A inspection for device type 04 – Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	1Y	2A	2B	2Y	GND	3Y	3A	3B	4Y	4A	4B	V _{CC}		Min	Max	
1 T _C = 25°C	I _{OS}	3011	45	5.5 V	5.5 V	GND				GND							5.5 V	1Y	-15	-100	mA
			46				5.5 V	5.5 V	GND	"						"	2Y	"	"	"	
			47							"	GND	5.5 V	5.5 V				"	3Y	"	"	"
			48							"				GND	5.5 V	5.5 V	"	4Y	"	"	"
	I _{CC H}	3005	49	5.5 V	5.5 V		5.5 V	5.5 V		"		5.5 V	5.5 V		5.5 V	5.5 V	"	V _{CC}		4.8	"
	I _{CC L}	3005	50	GND	GND		GND	GND		"		GND	GND		GND	GND	"	V _{CC}		8.8	"
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.																				
9 T _C = 25°C	t _{PHL}	3003 Fig. 3	51	IN	2.7 V	OUT				GND							5.0 V	1A to 1Y	2	20	ns
			52	2.7 V	IN	OUT				"							"	1B to 1Y	"	"	"
			53				IN	2.7 V	OUT	"							"	2A to 2Y	"	"	"
			54				2.7 V	IN	OUT	"							"	2B to 2Y	"	"	"
			55							"	OUT	IN	2.7 V				"	3A to 3Y	"	"	"
			56							"	OUT	2.7 V	IN				"	3B to 3Y	"	"	"
			57							"				OUT	IN	2.7 V	"	4A to 4Y	"	"	"
			58							"				OUT	2.7 V	IN	"	4B to 4Y	"	"	"
	t _{PLH}		59	IN	2.7 V	OUT				"							"	1A to 1Y	"	15	"
			60	2.7 V	IN	OUT				"							"	1B to 1Y	"	"	"
			61				IN	2.7 V	OUT	"							"	2A to 2Y	"	"	"
			62				2.7 V	IN	OUT	"							"	2B to 2Y	"	"	"
			63							"	OUT	IN	2.7 V				"	3A to 3Y	"	"	"
			64							"	OUT	2.7 V	IN				"	3B to 3Y	"	"	"
65							"				OUT	IN	2.7 V	"	4A to 4Y	"	"	"			
66							"				OUT	2.7 V	IN	"	4B to 4Y	"	"	"			
10	Same tests, terminal conditions and limits as for subgroup 9, except T _C = 125° C, t _{PHL} = 30 ns, and t _{PLH} = 25 ns.																				
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55° C.																				

1/ For cases X and 2, pins not referenced are NC.

2/ I_{IL} limits in μ A are as follows:

Circuit	A	B	C	D	E	F
I _{IL}	-120/-360	-30/-300	-150/-380	-160/-400	-150/-380	-105/-345

TABLE III. Group A inspection for device type 05.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	1Y	2A	2B	2Y	GND	3Y	3A	3B	4Y	4A	4B	V _{CC}		Min	Max	
1 T _C = 25°C	V _{OL}	3007	1	0.7 V	5.5 V	4 mA	5.5 V	5.5 V				5.5 V	5.5 V		5.5 V	5.5 V	4.5 V	1Y		0.4	V dc
			2	5.5 V	0.7 V	4 mA	5.5 V	5.5 V										1Y			
			3		5.5 V		0.7 V	5.5 V	4 mA									2Y			
			4				5.5 V	0.7 V	4 mA									2Y			
			5					5.5 V			4 mA	0.7 V						3Y			
			6								4 mA	5.5 V	0.7 V					3Y			
			7									5.5 V	4 mA	0.7 V				4Y			
			8											4 mA	5.5 V	0.7 V		4Y			
	I _{CEX}		9	2.0 V		5.5 V										5.5 V		1Y		100	μA
			10	5.5 V	2.0 V	5.5 V												1Y			
			11		5.5 V		2.0 V		5.5 V									2Y			
			12				5.5 V	2.0 V	5.5 V									2Y			
			13					5.5 V			5.5 V	2.0 V						3Y			
			14								5.5 V	5.5 V	2.0 V					3Y			
			15									5.5 V	5.5 V	5.5 V	2.0 V			4Y			
			16									5.5 V	5.5 V	5.5 V	5.5 V	2.0 V		4Y			
	V _{IC}		17	-18 mA														1A		-1.5	V dc
			18		-18 mA													1B			
			19				-18 mA											2A			
			20					-18 mA										2B			
			21									-18 mA						3A			
			22										-18 mA					3B			
			23												-18 mA			4A			
			24													-18 mA		4B			
	I _{IH1}	3010	25	2.7 V	GND		GND	GND				GND	GND		GND	GND	5.5 V	1A		20	μA
			26	GND	2.7 V		GND	GND										1B			
			27		GND		2.7 V	GND										2A			
			28				GND	2.7 V										2B			
			29					GND				2.7 V						3A			
			30									GND	2.7 V					3B			
			31										GND		2.7 V			4A			
			32												GND	2.7 V		4B			
	I _{IH2}		33	5.5 V														1A		100	
			34	GND	5.5 V													1B			
			35		GND		5.5 V											2A			
			36				GND	5.5 V										2B			
			37					GND				5.5 V						3A			
			38									GND	5.5 V					3B			
			39									GND	GND		5.5 V			4A			
			40									GND	GND		GND	5.5 V		4B			

See footnotes at end of device type 05.

TABLE III. Group A inspection for device type 05 – Continued.
Terminal conditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.7 V or open)

Subgroup	Symbol	MIL-STD-883 method	Cases A,B,C,D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Measured terminal	Limits		Unit
			Cases 2, X, 1/	2	3	4	6	8	9	10	12	13	14	16	18	19	20				
			Test no.	1A	1B	1Y	2A	2B	2Y	GND	3Y	3A	3B	4Y	4A	4B	V _{CC}		Min	Max	
1 T _C = 25°C	I _{IL}	3009	41	0.4 V	5.5 V		5.5 V	5.5 V		GND		5.5 V	5.5 V		5.5 V	5.5 V	4.5 V	1A	2/	2/	"
			42	5.5 V	0.4 V		5.5 V	5.5 V		"		"	"		"	"	"	1B	"	"	"
			43	"	5.5 V		0.4 V	5.5 V		"		"	"		"	"	"	2A	"	"	"
			44	"	"		5.5 V	0.4 V		"		"	"		"	"	"	2B	"	"	"
			45	"	"		"	5.5 V		"		0.4 V	"		"	"	"	3A	"	"	"
			46	"	"		"	"		"		5.5 V	0.4 V		"	"	"	3B	"	"	"
			47	"	"		"	"		"		5.5 V			0.4 V	"	"	4A	"	"	"
			48	"	"		"	"		"		"	"		5.5 V	0.4 V	"	4B	"	"	"
	I _{CC H}	3005	49	5.5 V	5.5 V		5.5 V	5.5 V		"		5.5 V	5.5 V		5.5 V	5.5 V	"	V _{CC}		4.8	mA
I _{CC L}	3005	50	GND	GND		GND	GND		"		5.5 V	5.5 V		5.5 V	5.5 V	"	V _{CC}		8.8	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.																				
9 T _C = 25°C	t _{PHL}	3003 Fig. 3	51	IN	2.7 V	OUT				GND							5.0 V	1A to 1Y	2	30	ns
			52	2.7 V	IN	OUT				"						"	1B to 1Y	"	"	"	
			53				IN	2.7 V	OUT	"						"	2A to 2Y	"	"	"	
			54				2.7 V	IN	OUT	"						"	2B to 2Y	"	"	"	
			55							"	OUT	IN	2.7 V			"	3A to 3Y	"	"	"	
			56							"	OUT	2.7 V	IN			"	3B to 3Y	"	"	"	
			57							"				OUT	IN	2.7 V	"	4A to 4Y	"	"	"
			58							"				OUT	2.7 V	IN	"	4B to 4Y	"	"	"
	t _{PLH}		59	IN	2.7 V	OUT				"						"	1A to 1Y	"	35	"	
			60	2.7 V	IN	OUT				"						"	1B to 1Y	"	"	"	
			61				IN	2.7 V	OUT	"						"	2A to 2Y	"	"	"	
			62				2.7 V	IN	OUT	"						"	2B to 2Y	"	"	"	
			63							"	OUT	IN	2.7 V			"	3A to 3Y	"	"	"	
			64							"	OUT	2.7 V	IN			"	3B to 3Y	"	"	"	
65							"				OUT	IN	2.7 V	"	4A to 4Y	"	"	"			
66							"				OUT	2.7 V	IN	"	4B to 4Y	"	"	"			
10	Same tests, terminal conditions and limits as for subgroup 9, except T _C = 125° C, t _{PHL} = 45 ns, and t _{PLH} = 50 ns.																				
11	Same tests, terminal conditions and limits as for subgroup 10, except T _C = -55° C.																				

1/ For cases X and 2, pins not referenced are NC.

2/ I_{IL} limits in μ A are as follows:

Circuit	A	B	C	D	E	F
I _{IL}		-30/-300			-150/-380	-105/-345

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

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 specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (2.1).
- c. Packaging requirements (see 5.1).
- d. Complete part number (see 1.2).
- e. 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.
- f. Requirements for certificate of compliance, if applicable.
- g. Requirements for notification of change of product or process to contracting activity in addition to notification to the qualifying activity, if applicable.
- h. Requirements for failure analysis (including required test condition of method 5003 of MIL-STD-883), corrective action, and reporting of results, if applicable.
- i. Requirements for product assurance options.
- j. Requirements for special carriers, 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.
- k. 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.

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 43216-5000.

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_{IC}	Input clamp voltage
V_{IN}	Voltage level at 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 C (see 3.3). Longer length leads 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 shall 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-M-38510 or MIL-PRF-38535.

Military device type	Generic-industry type
01	54LS11
02	54LS15
03	54LS21
04	54LS08
05	54LS09

6.8 Manufacturers' designation. Manufacturers' included in this specification are designated as shown in table IV herein.

TABLE IV. Substitutability and manufacturers' designation.

Device type	Manufacturer					
	Circuit A Texas Instruments Inc.	Circuit B Signetics Corporation	Circuit C National Semiconductor Corp	Circuit D Raytheon Company	Circuit E Motorola Inc	Circuit F Fairchild Semiconductor
01	X	X	X	X	X	X
02	X	X	X	X	X	X
03	X	X	X	X	X	X
04	X	X	X	X	X	X
05		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 5962-1931)

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

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1. DOCUMENT NUMBER
MIL-M-38510/310D

2. DOCUMENT DATE (YYYYMMDD)
2002-10-03

3. DOCUMENT TITLE

ELECTRONIC COMPONENT CASE OUTLINES

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 614-692-0535 (2) DSN 850-0535

c. ADDRESS *(Include Zip Code)*
DSCC-VA
P. O. Box 3990
Columbus, Ohio 43216-5000

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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

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WHS/DIOR, Feb 99