INCH-POUND
MIL-M-38510/340D
22 September 2003
SUPERSEDING
MIL-M-38510/340C
11 January 1988

MILITARY SPECIFICATION

MICROCIRCUITS, DIGITAL, BIPOLAR ADVANCED SCHOTTKY TTL, AND GATES, MONOLITHIC SILICON

Reactivated after 22 September 2003 and may be used for either new or existing design acquisition.

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 <u>Scope.</u> This specification covers the detail requirements for monolithic silicon, Advanced 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 For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).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 or Identifying Number (PIN). The PIN should be in accordance with MIL-PRF-38535, and as specified herein.
 - 1.2.1 <u>Device types.</u> The device types should be as follows:

Device type	<u>Circuit</u>
01	Quadruple, 2-input positive AND gate
02	Triple, 3-input positive AND gate

- 1.2.2 <u>Device class</u>. The device class should be the product assurance level as defined in MIL-PRF-38535.
- 1.2.3 <u>Case outlines.</u> The case outlines should be as designated in MIL-STD-1835 and as follows:

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

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 43216-5000, or emailed to bipolar@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at www.dodssp.daps.mil.

AMSC N/A FSC 5962

1.3 Absolute maximum ratings.

Supply voltage range	-0.5 V to +7.0 V
Input voltage range	-1.2 V at -18 mA to +7.0 V
Storage temperature range	-65° to +150°C
Maximum power dissipation, (P _D) 1/	
Device type 01	71 mW
Device type 02	53 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) <u>2</u> /	175°C

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})	
Normalized fanout (each output) 3/	
Low logic level	33 maximum
High logic level	50 maximum
Case operating temperature range (T _C)	-55° to +125°C

2. APPLICABLE DOCUMENTS

2.1 <u>General.</u> 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 <u>Specifications and Standards</u>. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-883 - Test Method Standard for Microelectronics.

MIL-STD-1835 - Interface Standard Electronic Component Case Outlines

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

 $[\]underline{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 in accordance with allowable short duration burn-in screening condition in accordance with MIL-PRF-38535.

^{3/} Device will fanout in both high and low levels to the specified number of data inputs on the same device type as that being tested.

2.3 <u>Order of precedence.</u> 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.

3. REQUIREMENTS

- 3.1 <u>Qualification</u>. 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 <u>Item requirements</u>. 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 <u>Design, construction, and physical dimensions.</u> The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein.
- 3.3.1 <u>Terminal connections and logic diagrams</u>. The terminal connections and logic diagrams 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 <u>Schematic circuits</u>. The schematic circuits shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity 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 <u>Electrical performance characteristics</u>. 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 <u>Electrical test requirements</u>. 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 <u>Microcircuit group assignment.</u> The devices covered by this specification shall be in microcircuit group number 8 (see MIL-PRF-38535, appendix A).

4. VERIFICATION

- 4.1 <u>Sampling and inspection.</u> 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 <u>Screening.</u> 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.

TABLE I. <u>Electrical performance characteristics</u>.

Test	Symbol	Conditions	Device	Li	mits	Unit
		-55°C ≤ T _C ≤ +125°C	types	Min	Max	
High level output voltage	V _{OH}	V _{CC} = 4.5 V, V _{IH} = 2.0 V,	All	2.5		V
		I _{OH} = -1.0 mA				
Low level output voltage	V _{OL}	$V_{CC} = 4.5 \text{ V}, I_{OL} = 20 \text{ mA},$	All		0.5	V
		$V_{IL} = 0.8 \text{ V}, V_{IH} = 2.0 \text{ V}$				
Input clamp voltage	V _{IC}	$V_{CC} = 4.5 \text{ V}, I_{IN} = -18 \text{ mA},$	All		-1.2	V
		T _C = +25°C				
High level input current	I _{IH1}	$V_{CC} = 5.5 \text{ V}, V_{IN} = 2.7 \text{ V}$	All		20	μΑ
	I _{IH2}	$V_{CC} = 5.5 \text{ V}, V_{IN} = 7.0 \text{ V}$	All		100	μΑ
Low level input current	I _{IL1}	$V_{CC} = 5.5 \text{ V}, V_{IN} = 0.5 \text{ V}$	All	0.0	60	mA
Short circuit output	los	V _{CC} = +5.5 V	All	-60	-150	mA
current <u>1</u> /		$V_0 = 0.0 \text{ V}$				
Output drive	I _{OD}	$V_{CC} = 4.5 \text{ V}, V_{IN} = 0.0 \text{ V},$	All	60		mA
		V _{OUT} = 2.5 V				
High level supply current	I _{CCH}	$V_{CC} = 5.5 \text{ V}, V_{IN} = 5.5 \text{ V}$	01		8.3	mA
			02		6.2	
Low level supply current	I _{CCL}	$V_{CC} = 5.5 \text{ V}, V_{IN} = 0.0 \text{ V}$	01		12.9	mA
			02		9.7	
Propagation delay time,	t _{PHL}	$V_{CC} = 5.0 \text{ V}, C_L = 50 \text{ pF} \pm 10\%,$	All	2.0	7.5	ns
high-to-low level		$R_L = 500\Omega \pm 5\%$				
Propagation delay time	t _{PLH}	$V_{CC} = 5.0 \text{ V}, C_L = 50 \text{ pF} \pm 10\%,$	All	2.5	7.5	ns
low-to-high level		$R_L = 500\Omega \pm 5\%$				

 $[\]underline{1}/$ Not more than one output should be shorted at a time.

TABLE II. Electrical test requirements.

	Subgroups	(see table III)
MIL-PRF-38535	Class S	Class B
test requirements	devices	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 B electrical test parameters when using the method 5005 QCI option	1, 2, 3, 9, 10, 11	N/A
Group C end-point electrical parameters	1, 2, 3, 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 <u>Technology Conformance inspection (TCI)</u>. 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 <u>Group A inspection.</u> 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, 6, 7, and 8 shall be omitted.
 - 4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of MIL-PRF-38535.
- 4.4.3 <u>Group C inspection.</u> 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 <u>Group D inspection.</u> 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 <u>Voltage and current.</u> All voltages given are referenced to the microcircuit ground terminal. Currents given are conventional and positive when flowing into the referenced terminal.

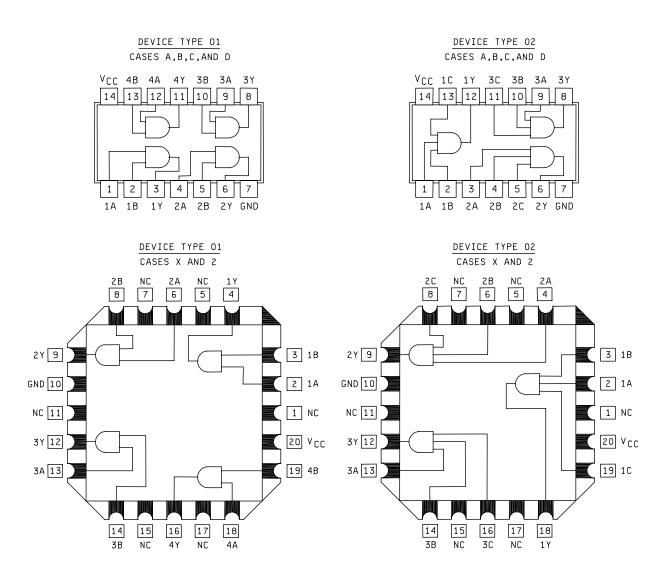


FIGURE 1. Terminal connections and logic diagrams.

Device type 01

Truth	table (each	n gate)
In	outs	Output
Α	В	Υ
L	L	L
Н	L	L
L	Н	L
Н	Н	Н

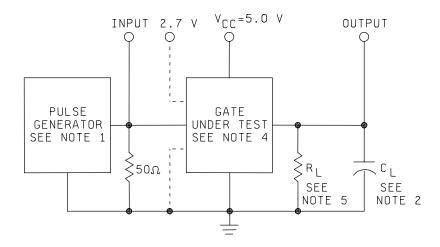
Positive logic: Y = AB

Device type 02

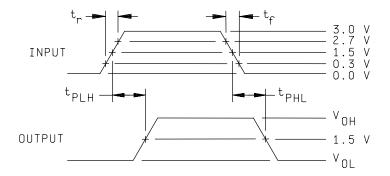
Т	ruth table	e (each gat	e)
	Inputs		Output
Α	В	С	Υ
L	L	L	L
L	L	Н	Ш
L	Н	L	Ш
L	Н	Н	Ш
Н	L	L	Ш
Н	L	Н	Ш
Н	Н	Ĺ	L
Н	Н	Н	Н

Positive logic: Y = ABC

FIGURE 2. Truth tables and logic equations.



TEST CIRCUIT



NOTES:

- 1. The pulse generator has the following characteristics: $t_r = t_f \leq 2.5 \text{ ns, PRR} \leq 1 \text{ MHz, and } Z_{OUT} \;\cong\; 50\Omega.$
- 2. C_L = 50 pF ±10%, including scope probe, wiring, and stray capacitance, without package in test fixture.
- 3. Voltage measurements are to be made with respect to network ground terminal.
- 4. Inputs not under test are at 2.7 V or GND as specified in table III.
- 5. $R_L = 500\Omega \pm 5$ percent.

FIGURE 3. Switching time test circuit and waveforms for device types 01 and 02.

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

										_																	_			_										_								
		Unit		^	= =	=	=	н		=	=	= :	.	.	: :	: =	=	=	=	:		٠:	<u> </u>	=	=	=	=	=	=	=	=	=	=	н			н	mA	=	=		ı	н	н	=	= :	: =	=
•		ts	Max	0.5		=	=							,	-1.2			=	=	:		ç	Q =	=	=	=	=	=	=	100	=			н		н		2/	=					н	=	-150	: =	=
		Limits	Min								2.5	= :		:																								2/	=	=	"	u				09-	: =	=
-		Measured terminal		17	7 %	27	37	37	47	47	7	2Υ	34	4٨,	4 i	1B	4 A	28 20	5 6	35	44 40	t 0 <	ς ά	96	2A 2B	2 6	38	44	4B	1 4	18	2A	2B	3A	3B	4A	4B	1A	1B	2A	2B	3A	3B	4A	4B	7	7.7 2.7	47
•		20	1	4.5 V	= =	=	=	ш	н	=		= :			.	: =	=	=	=			/ 4	> =	=	=	=	=	=	=	=	=	=	=	н			ш	н	=	=			ш	н		= :	: =	=
•	13	19	4B						2.0 V	0.8 V				2.0 \							40	<u> </u>						UNU	27.0	>						GND	7.0 V							5.5 V	7.5 V			5.5 V
(ر	12	18	4A							2.0 V			+	2.0 V							-18 mA							╁	GND	-							GND								5.5 V			5.5 V
or oper	11	16	47						20 mA 0.	_			-	-1 mA 2							7							0	1 6							7	9							0	2			0.0 V 5
≤ 0.8 V					-		^		20	20		-	+	-					<	пA	1					_	> ב							D	۸							^	^				>	+
or low	10	14	3B				7 2.0 V					_	2.0 V					<	+	-I8 mA	1					CIND.		╁							7.0 V							7 5.5 V					/ 22	+
≥ 2.0 \	6	13	3A				_						2.0 V					10	0							777	SND GND	5						7.0 V	GND							0.5 V	5.5 \				7	5
be high	80	12	37				20 mA	20 mA					-1 mA																																		700	2
ed may	7	10	GND	GND	3 3	¥	u	n	11	n	=	3	: :	: 3	: :	: 3	n	,	n	:	3 3	n	n	n	"	"	n	n	n	n	u	n	n	n	ŋ	n	"	n	"	n	"	"	n	11	"	3 3	: 3	n
lesignat	9	6	2Y		20 m 4	20 mA						-1 mA																																			0.0 v	
Terminal conditions (pins not designated may be high $\geq 2.0 \text{ V}$ or low $\leq 0.8 \text{ V}$ or open).	5	80	2B		700	T					-	2.0 V					4	-IØ IIIA						CIND	27.0	i						GND	7.0 V							5.5 V	0.5 V						2.5 V	
tions (p	4	9	2A		۸ ۵ ۵	2.0 \	-					2.0 V				•	-18 mA							+	GND	╁						7.0 V							_	0.5 V							2.5 \	
al cond	3	4	17	20 mA	_						-1 mA																													_	,					0.0 V		$\frac{1}{1}$
Termin	2	3	18		0.8 V					_	2.0 V -1				•	-18 mA							27.7							GND	7.0 V							5.5 V	2 \							5.5 \ 0		
-					-								-	•		P					1	+	+	╁														H	+									+
	1	7	1A		2.0 V						2.0 V			,	-18 mA						1	7.4.0	N.Y.	5						7.0 V	GND							0.5 V	5.5							5.5 V		\perp
	Cases A,B,C,D	Case <u>1/</u> X. 2	Test no.	1	7 %	4	2	9	7	8	6	10	11	17	13	4 ,	2	0 7	- 07	2	19	2 6	20	2 2	24	25	26	22	286	23	30	31	32	33	34	32	36	37	38	39	40	41	42	43	44	45	40	4,
•	MIL-STD-	883 method	 	3007		=	=	=	=	=	3006	= :	: :	:				_ !				2040	5 =	=	=	=	=	=	=	3010	=	=	=		=	=		3009	=	=	=	=	=	=	=	3011	: =	u
		Symbol		Vol							Λон				o Vic							-	Ξ							- FE	!							111								sol		
•		ubgroup		-	c = 25°C																	_1_								<u> </u>																		

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 $\ge 2.0~\rm V$ or low $\le 0.8~\rm V$ or open).

		Unit		mA				=	=			ns	3	=	=		=			п	-	=			=	=	з	=		=	
-		s	Мах					8.3	12.9			5.3	"		=	-	=			9.9		=		н		=	=	7.5		7.5	=
		Limits	Min	09		=	"					2.5	n		-		н			3.0		=				=	n n	2.0		2.5	=
-		Measured terminal		17	2Y	37	47	Vcc	Vcc			1A to 1Y	1B to 1Y	2A to 2Y	2B to 2Y	3A to 3Y	3B to 3Y	4A to 4Y	4B to 4Y	1A to 1Y	1B to 1Y	2A to 2Y	2B to 2Y	3A to 3Y	3B to 3Y	4A to 4Y	4B to 4Y				-
	4	20	Vcc	4.5 V	=	=	н	5.5 V	5.5 V			5.0 V	=	=	=	=	=	=	н		=	=	н	н	=	=	=				
-	5	19	4B					5.5 V	GND									2.7 V	Z							2.7 V	Z				
./.	12	18	4A				GND	5.5 V	GND									Z	2.7 V							Z	2.7 V				
2.0 v oi 10w = 0.0 v oi opoii)	-	16	47				2.5 V	4)										OUT	OUT :							OUT					
0.5							2.	^	Q							^.	7	0	0					Λ.	7	0	0				
2	10	14	3B			٥		V 5.5 V	O GND							2.7 V	N							2.7 V	<u>N</u> ^						
	<u>ი</u>	13	3A			dn5 /		5.5 V	GND							∠	2.7 V							<u>Z</u>	2.7 V						
y 25 -	∞	12	37			2.5 V				omitted	mitted.					OUT	OUT							OUT	OUT				: +125°C		
מבו הסור	7	10	GND	GND	n	n	я	n	n	tests are	sts are o	GND	n		=	=		н		n		=				=	3		cept T _c =		
gicon	9	6	2Y		2.5 V					and V _{IC}	nd V _{IC} te			OUT	OUT							OUT	OUT						onb 9, ex		c i
2011	2	8	2B					5.5 V	GND	= +125°(= 55°C a			2.7 V	N							2.7 V	IN						or subgro		= -55° (
	4	9	2A		GND			5.5 V	GND	xcept T _c	xcept T _c			Z	2.7 V							Z	2.7 V						Same tests and terminal conditions as for subgroup 9, except T _C = +125°C		except T
5	m	4	17	2.5 V						Iroup 1, e	roup 1, e	OUT	OUT							OUT	OUT								nal condi		oup 10,
	7	3	1B					5.5 V	GND	for subc	for subg	2.7 V	Z							2.7 V	Z								and termi		for subg
-	-	2	1A	GND				5.5 V	GND	d limits as	d limits as	Z	2.7 V							N N	2.7 V								ne tests		limits as
-	es C,D	9. <u>1</u> / 2			-		٥.		1	itions and	itions and	10			~	•	•		٥.	3			9		~	•		82	Sal		tions and
-	Cases - A,B,C,D	Case <u>1/</u> X, 2	Test no.	49	20	51	52	23	24	nal cond	nal cond	22	26	22	28	29	09	61	62	63	64	92	99	29	89	69	70	71-78		79-86	ial condi
	MIL-STD-	883 method						3002	3002	Same tests, terminal conditions and limits as for subgroup 1, except T _C = +125°C and V _{IC} tests are omitted.	Same tests, terminal conditions and limits as for subgroup 1, except $T_c = 55$ °C and V_{IC} tests are omitted	3003	Fig. 3	=	=	=	=	=	=	=	=	=	=	=	=	=	=	3003	Fig. 3		Same tests, terminal conditions and limits as for subgroup 10, except $T_{\rm C}$ = -55° C.
		Symbol		αο _l				lосн	Jool	Same te	Same te	t _{PH} L								фгн								THH1		фгн	Same tes
		Subgroup		-	$Tc = 25^{\circ}C$					2	3	6	$Tc = 25^{\circ}C$															10			11

 $\underline{1}/$ Pins not referenced (i.e., 1, 5, 7, 11, 15, and 17) are NC. $\underline{2}/$ I_{IL} limits shall be as follows:

	2	//Iin/Max limits	Min/Max limits in mA for circuit	suit
Parameters	А	В	Э	D
111	25/60	09'-/80'-	03/60	00/0.0

TABLE III. Group A inspection for device type 02.

		Unit		>=	я	n	n	я :	: =	33	=	11	з :	=	3 3	n	n	n	=	11	=	γη"	n	n	n	n	я	п	3 3	33	n	n	п	n	=	3 3	4	¥,	n	n	n	=	n	3 :	=
		Limits	Max	0.5	=	=			: =	=				-1.2	3 3	n	n	n	и	n	=	70	n	n	n	n	n	и	3 E	3 4	n	n	n	n	=	= =	ò	/7	n	9	n	=	"	3 3	3
		Lin	Min								2.5	=	=																								à	77	n	n	"	=	=	- :	=
		Measured terminal		۲,	- >	27	2Y	7 <u>7</u>	37	3	17	2Υ	37	1A	1B	2B	5C	3A	3B	3C	5	4 4	10	2A	2B	2C	3A	38	30	¥ 4	10	2A	2B	2C	3A	3B	ນ ໂ	<u>τ</u> π	<u>5</u> 5	2A	2B	2C	3A	3B	ဒင
	14	20	Vcc	4.5 V	"	u	и	n	. "	п	"	п	я :	ш	п п	n	ш	n	11	11	"	5.5 V	ш	ш	n	ш	п	п	я	11	п	11	n	ш		п	"	п	ш	n	п		п	я :	4
	13	19	10	2.0 V	2.0 V 0.8 V						2.0 V										-18 mA	GND	2.7 V							GND	V 0.7						/ 1 1	5.5 V	0.5 V						
en).	12	18	\	20 mA	=						-1 mA																																		
iditions (pins not designated may be high ≥ 2.0 V or low ≤ 0.8 V or open).	1	16	30						2.0 V	2.0.4			2.0 V							-18 mA							GND	GND	2.7 V						GND	GND	۸۰۰/	T	İ				5.5 V	5.5 V	0.5 V
ow ≤ 0.	10	14	3B						2.0 V	20.0	·		2.0 V						-18 mA								GND	2.7 V	GND						GND	7.0 \	פואם						5.5 V	0.5 V	5.5 V
2.0 V or	6	13	3A						0.8 \	20.7			2.0 V					-18 mA									2.7 V	GND	GND						7.0 V	GND	GIND	Ť					0.5 V	5.5 V	5.5 V
e high ≥	8	12	37						20 mA	=			-1 mA					ľ																					T					1	
designated may be high $\geq 2.0 \text{ V}$ or lo	7	10	GND	GND "	я	n	и		: 3	33	=			ņ	3 3	n	n	n	"	n	n	3 3	n	n	n	и	n	п	3 3	33	я	n	n	n	=	3 3	ņ	n n	n	n	я	п	n	з :	,
esignate	9	6	27			20 mA	н					-1 mA																										t	t	1				1	_
s (pins not d	2	8	2C			1	2.0 V	0.8 V				2.0 V					-18 mA							GND	GND	2.7 V						GND	GND	7.0 V					-	2.5 \	5.5 V	0.5 V		1	
tions (pi	4	9	2B				0.8 V	+				2.0 V				-18 mA	+							GND	-								7.0 V					t	t	╁	0.5 V		H	1	
al condi	က	4	2A			-	2.0 V (\dashv				2.0 V			-18 mA	+								-	GND	H							GND 7					t	ł	┢	5.5 V (1	
Terminal con	2	3	9	2.0 V	20.0	-	2	2			2.0 V	2			-18 mA							GND	GND	+		0			2	2 >	GND			0			, ,	5.5 \	2 \	-	Ω (2)	2		1	
			+	0.8 V		<u> </u>					2.0 V 2			-18 mA	7							_	GND	+						-	GND						-	0.5 \ 5.5 \ 0.0	+	-				+	_
			_	0.6	2.6						2.(5.5					1	_
	Cases A.B.C.D	Case <u>1/</u> X, 2	Test no.	← (v (c.	4	2	9 1	<u> </u>	o	10	1	12	13	<u>4</u> 4	16	17	18	19	20	21	22	24	25	26	27	28	29	30	s &	33	34	32	36	37	88	8	4 4	45	43	4	45	46	47	48
	MIL-STD-	883 method		3007	=	=	=		: =	=	3006	=	=									3010	=	=	=	=	=	=	- 00	0 =	=	=	=	=	=		0000	3008 "	=	=	=	=	=	= :	=
		Symbol		Vol							V _{он}			ر د								- H 1							-	H 2							-	111							
		Subgroup		۲ - در	ე.cz = 31								•								•								•								•								

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 $\geq 2.0 \, \text{V}$ or $1 \, \text{ow} \leq 0.8 \, \text{V}$ or open).

		Unit		mA	"	n		11	ш		=			su	"	n n	n	п	ш	ш	п	ш	п	ш	ш	n	n	n	ш	"	ш	=		=					
		ο	Max	-150	n	n				6.2	9.7			5.5	n	n	n	n	п	п	"	п	5.6	п	п	и	п	и	и	"	п	7.5		7.5					
		Limits	Min	09-		=	09	"						2.5	3	n	n	n	n	n		n	3.0	n	n	n	n	n	n		n	2.0		2.5					
		Measured terminal		17	27	37	17	2Y	37	Vcc	Vcc			1A to 1Y	1B to 1Y	1C to 1Y	2A to 2Y	2B to 2Y	2C to 2Y	3A to 3Y	3B to 3Y	3C to 3Y	1A to 1Y	1B to 1Y	1C to 1Y	2A to 2Y	2B to 2Y	2C to 2Y	3A to 3Y	3B to 3Y	3C to 3Y		,						
	4	20	V _{cc}	5.5 V	n	n	4.5 V	,,,	n	5.5 V	5.5 V			5.0 V	3	n	n	п	п	а		а		а	n	щ	n	щ	и		n								
	13	19		5.5 V			7				GND			2.7 V	2.7 V	N							2.7 V	2.7 V	Z														
	12	80					Λ:			5	0				2									2															
r open)	-	18	17	0.0 V			2.5 V				_			OUT	-					,	,		OUT	-	=					,									
0.8 V o	7	16	3C			5.5 V				5.5 V	GND									2.7 V	2.7 V	Z							2.7 V	2.7 V	Z								
r low ≤	10	14	ЯE			5.5 V				5.5 V	GND									2.7 V	NI	2.7 V							2.7 V	NI	2.7 V								
Terminal conditions (pins not designated may be high $\geq 2.0 \text{ V}$ or low $\leq 0.8 \text{ V}$ or open).	6	13	3A			5.5 V			GND	5.5 V	GND													IN	2.7 V	2.7 V							N	2.7 V	2.7 V				
> high ≥	ω	12	37			0.0 V			2.5 V			xcept T_C = 125 $^{\circ}$ C, and V $_{1C}$ tests are omitted.	itted.	itted.							OUT		н							OUT				2°C					
may be		10	GND	GND	n	n	,,	,,	,	=			and V Ic tests are omitted.	s are omi	s are omi	s are omit	are omit	GND	3	u	u	u	u	a		a	GND	a	n.	ű	n.	ű	n		u		$T_c = 12!$		
gnated								^:				VIC tests	V IC test	0			٦.						9			٦							, except						
not desi	9	6	2Υ		V 0.0 V			2.5 V		>	0	C, and \	C, and				V OUT	. ^	-							V OUT		-					ogroup 9		-55° C.				
s (pins r	Ω	8	2C		5.5 V						GND	$c = 125^{\circ}$	$c = -55^{\circ} C$,				2.7 V	2.7 V	Z							2.7 V	2.7 V	Z					as for sub		$T_{\rm c} = -55$				
ndition	4	9	2B		5.5 V					5.5 V	GND		except T _c =				2.7 V	N	2.7 V							2.7 V	Z	2.7 V					ditions a		, except T _c =				
ninal cc	က	4	2A		5.5 V			GND		5.5 V	GND	group 1,	froup 1,				Z	2.7 V	2.7 V							Z	2.7 V	2.7 V					ninal cor		roup 10				
Terr	2	3	1B	5.5 V						5.5 V	GND	for subç	for subç	2.7 V	Z	2.7 V							2.7 V	N	2.7 V								and terr		for subç				
	-	2	14	5.5 V			GND			5.5 V	GND	limits as	limits as	Z	2.7 V	2.7 V							N	2.7 V	2.7 V								Same tests and terminal conditions as for subgroup 9, except $T_{\rm c}$ = 125°C		limits as				
	es C,D	1/			0			3				ions and	ions and				(-	3	1	2	9			6	(3	1	83		95	ions and				
	Cases A,B,C,D	Case <u>1/</u>	Test no.	46	20	51	25	53	54	22	26	al conditi	al conditi	25	28	26	09	61	62	63	64	65	99	29	99	69	70	71	72	73	74	75-83		84-92	al conditi				
	MIL-STD-	883 method		3011	=	=				3002	3005	Same tests, terminal conditions and limits as for subgroup 1, e	Same tests, terminal conditions and limits as for subgroup 1, e	3003	Fig. 3	=	=	=	=	=	=		=	=	=	=	=	=	=	=		3003	Fig. 3		Same tests, terminal conditions and limits as for subgroup 10,				
		Symbol		sol			aol			Іссн	Iccı	Same te	Same te	t _{PHL}									н⊓а									TH d₁		фн	Same te				
		Subgroup Symbol		-	$Tc = 25^{\circ}C$							2	3	6	$Tc = 25^{\circ}C$																	10			11				

 $\underline{1}'$ Pins not referenced (i.e., 1, 5, 7, 11, 15, and 17) are NC. $\underline{2}'$ I_{I_L} limits shall be as follows:

	N	/lin/Max limits	Min/Max limits in mA for circuit	suit
Parameters	Α	В	S	Q
11.1	25/60	03/60	03/60	06/0.0

5. PACKAGING

5.1 <u>Packaging requirements.</u> 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 or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Service or Defense Agency, or within the military service's system command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

- 6.1 <u>Intended use.</u> 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 <u>Superseding information</u>. 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 <u>Qualification</u>. 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 <u>Abbreviations, symbols, and definitions</u>. 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 <u>Logistic support.</u> Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits acquired for Government logistic support will be acquired to device class B (see 1.2.2), lead material and finish A (see 3.3). Longer length leads and lead forming should not affect the part number.
- 6.7 <u>Substitutability.</u> The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification will functionally replace the listed generic-industry type. Generic-industry microcircuit types may not have equivalent operational performance characteristics across military temperature ranges or reliability factors equivalent to MIL-M-35810 device types and may have slight physical variations in relation to case size. The presence of this information should not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-PRF-38535.

Military device	Generic-industry
type	type
01	54F08
02	54F11

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

TABLE IV. Manufacturers' designations.

		Manufacture	r's designatio	on
Device	Circuit A	Circuit B	Circuit C	Circuit D
type	National	Motorola	Signetics	Texas
	Semi/			Instruments
	Fairchild			
01	X	X	Χ	X
02	X	X	Х	X

6.9 <u>Changes from previous issue.</u> Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians: Preparing activity: Army - CR DLA - CC

Navy - EC Air Force - 11 (Project 5962-1949)

DLA - CC

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 www.dodssp.daps.mil.