INCH-POUND
MIL-M-38510/103H
18 February 2005
SUPERSEDING
MIL-M-38510/103G
03 November 2004

MILITARY SPECIFICATION

MICROCIRCUITS, LINEAR, VOLTAGE COMPARATORS, MONOLITHIC SILICON

Reactivated after 18 February 2005 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 Scope. This specification covers the detail requirements for monolithic silicon, voltage comparators. Two product assurance classes and a choice of case outlines and lead finish are provided for each type and are reflected in the complete part number. For this product, the requirements of MIL-M-38510 have been superseded by MIL-PRF-38535, (see 6.3).

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

1.2.1 Device types. The device types are as shown in the following:

Device type	Circuit
01	Single differential voltage comparator
02	Dual channel differential voltage comparator
03	Single differential voltage comparator / buffer
04	Precision voltage comparator / buffer
05	Dual precision voltage comparator / buffer [1]
06	Dual precision high speed voltage comparator
07	Dual high precision, high speed voltage comparator

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

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[1] Device type 05 may be monolithic, or it may consist of two separate, independent dice.

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

AMSC N/A FSC 5962

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

Outline letter	Descriptive designator	Terminals	Package style
A 2/	GDFP5-F14 or CDFP6-F14	14	Flat pack
C	GDIP1-T14 or CDIP2-T14	14	Dual-in-line
E	GDIP1-T16 or CDIP2-T16	16	Dual-in-line
F	GDFP2-F16 or CDFP3-F16	16	Flat pack
G	MACY1-X8	8	Can
H	GDFP1-F10 or CDFP2-F10	10	Flat pack
I	MACY1-X10	10	Can
P	GDIP1-T8 or CDIP2-T8	8	Dual-in-line
X	CDFP4-F16	16	Flat pack
Z	GDFP1-G10	10	Flat pack with gull wing leads
2	CQCC1-N20	20	Square leadless chip carrier

1.3 Absolute maximum ratings.

	Device types				
	01	02	03	04 and 05	06 and 07
Positive supply voltage	+14.0 V	+14.0 V	+15.0 V	+30.0 V	+18 V
Negative supply voltage	-7.0 V	-7.0 V	-15.0 V	-30.0 V	-25 V
Total supply voltage	---	---	---	+36.0 V	+36 V
Output voltage	---	---	+24.0 V	---	---
Output to negative supply voltage	---	---	+30.0 V	+50.0 V	+36.0 V
Input voltage range	±7.0 V	±7.0 V	±7.0 V	3/	±15.0 V 4/
Differential input voltage	±5.0 V	±5.0 V	±5.0 V	±30.0 V	±5.0 V
Peak output current	10 mA	50 mA	---	---	25 mA
Sink current	---	---	100 mA	50 mA	---
Output short-circuit duration	10 s	10 s	10 s	10 s	10 s
Strobe voltage	---	6.0 V	6.0 V	---	---
Maximum strobe current	---	---	---	10 mA	---
Storage temperature range	-65°C to +150°C for all device types				
Junction temperature (T_J) 5/	+175°C	+175°C	+175°C	+175°C	+175°C
Lead temperature (soldering, 60 seconds)	+300°C	+300°C	+300°C	+300°C	+300°C

1.4 Recommended operating conditions.

Supply voltage range : 4/

Device types 01 and 02 .... $+V_{CC}$ = +12 V dc, $-V_{CC}$ = -6.0 V dc

Device type 03 .... $+V_{CC}$ = +12 V dc, $-V_{CC}$ = -3.0 to -12.0 V dc

Device types 04, 05, 06, and 07 .... $\pm V_{CC}$ = ±15.0 V dc

Ambient temperature range (T_A) .... -55°C to +125°C

2/ Inactive case outline.

3/ The positive input voltage limit is 30 V above the negative supply. The negative input voltage limit is equal to the negative supply voltage or 30 V below the positive supply, whichever is less negative.

4/ For supply voltages less than ±15.0 V dc, the input voltage rating is equal to the supply voltage.

5/ For short term test (in the specific burn-in and life test configuration when required and up to 168 hours maximum) T_J = +275°C.

1.5 Power and thermal characteristics.

Case outlines	Maximum allowable power dissipation	Maximum θ_{JC}	Maximum θ_{JA}
A	350 mW at T_A = +125°C	60°C/W	140°C/W
C, E, and P	400 mW at T_A = +125°C	35°C/W	120°C/W
G	330 mW at T_A = +125°C	40°C/W	150°C/W
I	350 mW at T_A = +125°C	40°C/W	140°C/W
H	330 mW at T_A = +125°C	60°C/W	150°C/W
F	350 mW at T_A = +125°C	60°C/W	140°C/W
X	200 mW at T_A = +125°C	35°C/W	140°C/W
Z	330 mW at T_A = +125°C	21°C/W	225°C/W still air
			142°C/W 500 LFPM
2	199 mW at T_A = +125°C	55°C/W	121°C/W

2. APPLICABLE DOCUMENTS

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

2.2 Government documents.

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

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

DEPARTMENT OF DEFENSE STANDARDS

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

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

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

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 Schematic circuits. The schematic circuits shall be maintained by the manufacturer and made available to the qualifying activity and the preparing activity (DSCC-VA) upon request.

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

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

3.5 Electrical performance characteristics. Unless otherwise specified, the electrical performance characteristics are as specified in table I and apply over the full operating ambient temperature range of -55°C to +125°C.

3.6 Rebonding. Rebonding shall be in accordance with MIL-PRF-38535.

3.7 Electrical test requirements. 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.

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

3.9 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 50 (see MIL-PRF-38535, appendix A).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Input offset voltage	V_{IO}	V_{OUT} = 1.4 V, R_S = 200 Ω and 50 Ω	T_A = +25°C	01	-2	+2	mV
				02	-3.5	+3.5	
		V_{OUT} = 1.0 V, R_S = 200 Ω and 50 Ω	T_A = +125°C	01	-3	+3	
				02	-4.5	+4.5	
		V_{OUT} = 1.8 V, R_S = 200 Ω and 50 Ω	T_A = -55°C	01	-3	+3	
				02	-4.5	+4.5	
		V_{OUT} = 1.5 V, R_S = 200 Ω and 50 Ω	T_A = +25°C	03	-2	+2	
			-55°C ≤ T_A ≤ +125°C		-3	+3	
		V_{IC} = 0 V, 13 V and 3/ -14.5 V, R_S = 50 Ω,	T_A = +25°C	04,05	-3	+3	
			-55°C ≤ T_A ≤ +125°C		-4	+4	
		±V_{CC} = ±2.5 V, R_S = 50 Ω, V_{IC} = 0 V	T_A = +25°C		-3	+3	
			-55°C ≤ T_A ≤ +125°C		-4	+4	
		V_{IC} = 0 V, +12 V, and 3/ -12 V, R_S = 50 Ω	T_A = +25°C	06	-4	+4	
			T_A = -55°C, +125°C		-7	+7	
			T_A = +25°C	07	-1	+1	
			T_A = -55°C, +125°C		-2	+2	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Input offset voltage	V_{IO}	$+V_{CC}$ = 5 V, $-V_{CC}$ = 0 V R_S = 50 Ω, V_{IC} = 2.5 V	T_A = +25°C	06	-4	+4	mV
			T_A = -55°C, +125°C		-7	+7	
			T_A = +25°C	07	-1	+1	
			T_A = -55°C, +125°C		-2	+2	
Raised input offset voltage 4/	$V_{IO(R)}$	V_{IC} = 0 V, 13 V, and 3/ -14.5 V, R_S = 50 Ω, V_{BAL} = $V_{BAL\,/\,STB}$ = $+V_{CC}$	T_A = +25°C	04,05	-3	+3	mV
			-55°C ≤ T_A ≤ +125°C		-4.5	+4.5	
Input offset voltage temperature coefficient	ΔV_{IO} / ΔT	R_S = 50 Ω	-55°C ≤ T_A ≤ +125°C	01,02, 03	-10	+10	µV/°C
				04,05	-25	+25	
Input offset current	I_{IO}	V_{OUT} = 1.4 V	T_A = +25°C	01	-3	+3	µA
				02	-10	+10	
		V_{OUT} = 1.0 V	T_A = +125°C	01	-3	+3	
				02	-10	+10	
		V_{OUT} = 1.8 V	T_A = -55°C	01	-7	+7	
				02	-20	+20	
		V_{OUT} = 1.5 V	T_A = +25°C, +125°C	03	-3	+3	
			T_A = -55°C		-7	+7	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Input offset current	I_{IO}	V_{IC} = 0 V, 13 V, and 3/ –14.5 V, R_S = 50 kΩ	$+25°C \le T_A \le +125°C$	04,05	-10	+10	nA
			T_A = -55°C		-20	+20	
		V_{IC} = 0 V, +12 V, and 3/ –12 V,	T_A = +25°C, +125°C	06	-75	+75	
				07	-40	+40	
			T_A = -55°C	06	-100	+100	
				07	-75	+75	
Raised input offset 4/ current	$I_{IO(R)}$	V_{IC} = 0 V, R_S = 50 kΩ, $V_{BAL} = V_{BAL\ /\ STB} = +V_{CC}$	$+25°C \le T_A \le +125°C$	04,05	-25	+25	nA
			T_A = -55°C		-50	+50	
Input offset current temperature coefficient	ΔI_{IO} / ΔT		T_A = +125°C	01,02, 03	-25	+25	nA/°C
		R_S = 50 kΩ		04,05	-100	+100	pA/°C
			T_A = -55°C	01,02, 03	-75	+75	nA/°C
		R_S = 50 k		04,05	-200	+200	pA/°C
Input bias current	$+I_{IB}$		T_A = +25°C, +125°C	01,03	-0.1	+20	µA
				02	-0.1	+75	
			T_A = -55°C	01,03	-0.1	+45	
				02	-0.1	+150	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Input bias current	$+I_{IB}$	V_{IC} = 0 V, R_S = 50 kΩ	+25°C ≤ T_A ≤ +125°C	04,05	-100	+0.1	nA
			T_A = -55°C		-150	+0.1	
		V_{IC} = 13 V and –14.5 V, R_S = 50 kΩ	+25°C ≤ T_A ≤ +125°C		-150	+0.1	
			T_A = -55°C		-200	+0.1	
		V_{IC} = 0 V	T_A = +25°C, +125°C	06,07	-0.1	+500	
			T_A = -55°C		-0.1	1000	
		V_{IC} = +12 V and –12 V	T_A = +25°C, +125°C		-0.1	+750	
			T_A = -55°C		-0.1	+1000	
	$-I_{IB}$	V_{IC} = 0 V, R_S = 50 kΩ	+25°C ≤ T_A ≤ +125°C	04,05	-100	+0.1	
			T_A = -55°C		-150	+0.1	
		V_{IC} = 13 V and –14.5 V, R_S = 50 kΩ	+25°C ≤ T_A ≤ +125°C		-150	+0.1	
			T_A = -55°C		-200	+0.1	
		V_{IC} = 0 V	T_A = +25°C, +125°C	06,07	-0.1	+500	
			T_A = -55°C		-0.1	+1000	
		V_{IC} = +12 V and –12 V	T_A = +25°C, +125°C		-0.1	+750	
			T_A = -55°C		-0.1	+1000	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Strobe current	I_{STROBE}	V_{STROBE} = 100 mV, V_{ID} = +10 mV	-55°C ≤ T_A ≤ +125°C	02	-2.5	-0.1	mA
		V_{STROBE} = 400 mV, V_{ID} = -5 mV		03	-3.3	-0.1	
Strobed output level	V_O (strobed)	V_{STROBE} = 0.3 V, 5/ V_{ID} = +10 mV	-55°C ≤ T_A ≤ +125°C	02	-1.0	0	V
		V_{STROBE} = 0.9 V, V_{ID} = -5 mV		03	+2.5	+5.5	
		V_{STROBE} = 2.5 V, V_{ID} = -5 mV, I_{OL} = 16 mA				+0.4	
Collector output voltage (strobed)	$V_{O(STB)}$	I_{STB} = -3.0 mA R_S = 50 Ω	-55°C ≤ T_A ≤ +125°C	04,05	+14		V
Input voltage common mode rejection	CMR	$-V_{CC}$ = -7.0 V, R_S = 200 Ω, -5 V ≤ V_{IN} ≤ +5 V	-55°C ≤ T_A ≤ +125°C	01,02, 03	+80		dB
Common mode rejection ratio	CMRR	V_{IC} = 13 V and –14.5 V, R_S = 50 Ω	-55°C ≤ T_A ≤ +125°C	04,05	+80		dB
		V_{IC} = +12 V and -12 V, R_S = 50 Ω		06,07	90		
High level output voltage	V_{OH}	V_{ID} = +5 mV, I_{OH} = 0 mA	-55°C ≤ T_A ≤ +125°C	01	+2.5	+5.0	V
		V_{ID} = +10 mV, I_{OH} = 0 mA		02	+2.5	+5.0	
		V_{ID} = +5 mV, I_{OH} = -5 mA		01	+2.5	+5.0	
		V_{ID} = +10 mV, I_{OH} = -5 mA		02	+2.5	+5.0	
		V_{ID} = +5 mV, I_{OH} = -400 µA		03	+2.5	+5.5	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Low level output voltage	V_{OL}	V_{ID} = -5 mV, I_{OL} = 0 mA	-55°C ≤ T_A ≤ +125°C	01	-1.0	0	V
		V_{ID} = -10 mV, I_{OL} = 0 mA		02	-1.0	0	
		V_{ID} = -5 mV, I_{OL} = 100 mA	T_A = +25°C	03		+1.5	
		V_{ID} = -5 mV, I_{OL} = 16 mA	T_A = +125°C			+0.4	
		V_{ID} = -5 mV, I_{OL} = 50 mA	T_A = -55°C			+1.0	
	V_{OL1} V_{OL2}	$+V_{CC}$ = +4.5 V, $-V_{CC}$ = 0 V, V_{IC} = -1.75 V, +0.75 V, V_{ID} = -6.0 mV, I_O = 8 mA	-55°C ≤ T_A ≤ +125°C	04,05		+0.4	
	V_{OL3} V_{OL4}	$\pm V_{CC}$ = ±15 V, V_{IC} = 13 V, -14 V, V_{ID} = -5.0 mV, I_O = 50 mA				+1.5	
	V_{OL1} V_{OL2}	$+V_{CC}$ = +4.5 V, $-V_{CC}$ = 0 V, V_{IC} = +2.25 V, +1.0 V, V_{ID} = 7.0 mV, I_O = 3.2 mA	T_A = +25°C, +125°C	06,07		+0.4	
			T_A = -55°C			+0.6	
	V_{OL3} V_{OL4}	V_{IC} = ±12 V, V_{ID} = -7.0 mV, I_O = 25 mA	-55°C ≤ T_A ≤ +125°C			+1.5	
Output sink current	I_{OL}	V_{ID} = -5.0 mV, V_{OL} = 0 V	T_A = +25°C	01	+2.0		mA
		V_{ID} = -10 mV, V_{OL} = 0 V		02	+0.5		
		V_{ID} = -5.0 mV, V_{OL} = 0 V	T_A = +125°C	01	+0.5		
		V_{ID} = -10 mV, V_{OL} = 0 V		02	+0.12		

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Output sink current	I_{OL}	V_{ID} = -5.0 mV, V_{OL} = 0 V	T_A = -55°C	01	+1.0		mA
		V_{ID} = -10 mV, V_{OL} = 0 V		02	+0.25		
Output leakage current	I_{CEX}	V_{OUT} = 24 V, V_{ID} = +5 mV	T_A = +25°C	03	-0.1	+1.0	µA
			T_A = +125°C, -55°C		-0.5	+100	
		±V_{CC} = ±18 V,	T_A = +25°C	04,05	-1	+10	nA
		V_{OUT} = 32 V	T_A = +125°C		-1	+500	
		±V_{CC} = ±18 V,	T_A = +25°C	06,07	-1	+2.0	µA
		V_O = 18 V	T_A = +125°C		-1	+10.0	
Input leakage current	I_{I1}	±V_{CC} = ±18 V, V_{ID} = +29 V	-55°C ≤ T_A ≤ +125°C	04,05	-5	+500	nA
	I_{I2}	±V_{CC} = ±18 V, V_{ID} = -29 V			-5	+500	
Positive supply current	$+I_{CC}$	V_{ID} = -5 mV, V_{OUT} = V_{OL}	-55°C ≤ T_A ≤ +125°C	01	+0.5	+9.0	mA
		V_{ID} = -10 mV, V_{OUT} = V_{OL}		02	+0.5	+13.5	
		V_{ID} = -5 mV		03	+0.5	+10	
		Limit is for one comparator of device type 05	T_A = +25°C, +125°C	04,05		+6.0	
			T_A = -55°C			+7.0	
			T_A = +25°C, +125°C	06,07		+10.0	
			T_A = -55°C			+11.5	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T_A ≤ +125°C unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Negative supply current	$-I_{CC}$	V_{ID} = -5 mV, $V_{OUT} = V_{OL}$, no load	-55°C ≤ T_A ≤ +125°C	01	-7.0	-0.5	mA
		V_{ID} = -10 mV, $V_{OUT} = V_{OL}$, no load		02	-6.2	-0.5	
		V_{ID} = -5 mV		03	-3.6	-0.5	
		Limit is for one comparator of device type 05	T_A = +25°C, +125°C	04,05	-5.0		
			T_A = -55°C		-6.0		
			T_A = +25°C	06,07	-5.0		
			T_A = +125°C		-4.5		
			T_A = -55°C		-6.0		
Output short-circuit current	I_{OS}	10 ms maximum test duration	T_A = +25°C	04,05		+200	mA
			T_A = +125°C			+150	
			T_A = -55°C			+250	
Adjustment for input offset voltage	$V_{IO(ADJ)+}$	R_S = 50 Ω	T_A = +25°C	04,05	+5.0		mV
	$V_{IO(ADJ)-}$					-5.0	
Voltage gain	$A_V(\pm)$	$\Delta V_{OUT} = \pm 0.5$ V, V_{OUT} = 1.4 V	T_A = +25°C	01	+1,250		V/V
				02	+750		
		$\Delta V_{OUT} = \pm 0.5$ V, V_{OUT} = 1.0 V	T_A = +125°C	01	+1,000		
				02	+500		

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Voltage gain	$A_V(\pm)$	$\Delta V_{OUT} = \pm 0.5$ V, $V_{OUT} = 1.8$ V	$T_A = -55°C$	01	+1,000		V/V
				02	+500		
Voltage gain	A_V+	$\Delta V_{OUT} = 3.0$ V, $V_{OUT} = 1.5$ V	$T_A = +25°C$	03	+30		V/mV
			$T_A = +125°C$		+10		
			$T_A = -55°C$		+50		
Voltage gain	A_V-	$\Delta V_{OUT} = -1.0$ V, $V_{OUT} = 1.5$ V	$T_A = +25°C$	03	+30		V/mV
			$T_A = +125°C$		+10		
			$T_A = -55°C$		+50		
Voltage gain (emitter follower output)	$\pm A_{VE}$	$R_L = 600\ \Omega$	$T_A = +25°C$	04,05	+10		V/mV
			$-55°C \le T_A \le +125°C$		+8		
Voltage gain (collector)	A_V		$T_A = +25°C$	06	+10		V/mV
				07	+20		
			$T_A = +125°C$, $-55°C$	06	+5		
				07	+10		
Response time, output saturated high level to threshold level	t_{HTHR}	See figure 3, $C_L = 5$ pF, 100 mV step, 5 mV overdrive	$T_A = +25°C$	01,03		60	ns
				02		90	

See footnotes at end of table.

TABLE I. Electrical performance characteristics – Continued.

Test	Symbol	Conditions 1/ 2/ $-55°C \le T_A \le +125°C$ unless otherwise specified	Temperature	Device type	Limits		Unit
					Min	Max	
Response time, output saturated low level to threshold level	t_{LTHR}	See figure 3, C_L = 5 pF, 100 mV step, 5 mV overdrive	T_A = +25°C	01,02, 03		60	ns
Strobe release time	t_{STRL}	See figure 4, T_A = +25°C, C_L = 5 pF, V_{ID} = +10 mV	T_A = +25°C	02,03		15	ns
Response time, low-to-high level collector output	t_{RLHC}	V_{OD} (overdrive) = -5 V, C_L = 50 pF, V_{IN} = 100 mV	$-55°C \le T_A \le +25°C$	04,05		300	ns
			T_A = +125°C			640	
		V_{OD} (overdrive) = -5 V, C_L = 50 pF minimum, V_{IN} = 100 mV	T_A = +25°C, -55°C	06,07		125	
			T_A = +125°C			160	
Response time, high-to-low level collector output	t_{RHLC}	V_{OD} (overdrive) = +5 V, C_L = 50 pF, V_{IN} = 100 mV	$-55°C \le T_A \le +25°C$	04,05		300	ns
			T_A = +125°C			500	
		V_{OD} (overdrive) = +5 V, C_L = 50 pF minimum, V_{IN} = 100 mV	T_A = +25°C, +125°C, -55°C	06,07		160	

1/ For device types 01, 02, and 03, unless otherwise specified, $+V_{CC}$ = +12 V dc and $-V_{CC}$ = -6 V. Unless otherwise specified, for device type 02, strobe on device not being tested is connected to ground; strobe on device being tested is left open. Unless otherwise specified, for device type 03, strobes are at a high level for all tests.

2/ For device types 04, 05, 06, and 07, unless otherwise specified, V_{IC} = 0 V, $\pm V_{CC}$ = ±15 V and $-55°C \le T_A \le +125°C$. Limits apply to each half of device types 05, 06, and 07 except as noted for $+I_{CC}$ and $-I_{CC}$.

3/ V_{IC} is achieved by algebraically subtracting the common mode voltage from each V_{CC} (power supplies) and algebraically adding it to V_{IN}. V_{IC} can be calculated by using the following formula:

$V_{IC} = -[((+V_{CC}) + (-V_{CC})) / 2] + V_{IN}$

4/ Subscript (R) indicates tests which are performed with input stage current raised by connecting BAL and BAL / STB terminals to $+V_{CC}$.

5/ The output voltage follows the strobe voltage, staying one diode drop (0.7 V) below.

Device type	01			
Case outlines	C	G	H	2
Terminal number	Terminal symbol			
1	NC	GND	GND	NC
2	GND	INPUT+	INPUT+	GND
3	INPUT+	INPUT-	INPUT-	NC
4	INPUT-	V_{CC-}	NC	NC
5	NC	NC	V_{CC-}	INPUT+
6	V_{CC-}	NC	OUTPUT	NC
7	NC	OUTPUT	NC	INPUT-
8	NC	V_{CC+}	V_{CC+}	NC
9	OUTPUT	---	NC	NC
10	NC	---	NC	V_{CC-}
11	V_{CC+}	---	---	NC
12	NC	---	---	NC
13	NC	---	---	NC
14	NC	---	---	NC
15	---	---	---	NC
16	---	---	---	NC
17	---	---	---	OUTPUT
18	---	---	---	NC
19	---	---	---	NC
20	---	---	---	V_{CC+}

NC = No connection

FIGURE 1. Terminal connections.

Device type	02			
Case outlines	C	H	I	2
Terminal number	Terminal symbol			
1	NC	INPUT- 1	GND	NC
2	INPUT- 1	INPUT+ 1	STROBE 1	NC
3	INPUT+ 1	V_{CC-}	INPUT – 1	INPUT- 1
4	V_{CC-}	INPUT+ 2	INPUT+ 1	INPUT+ 1
5	INPUT+ 2	INPUT- 2	V_{CC-}	NC
6	INPUT- 2	STROBE 2	INPUT+ 2	V_{CC-}
7	NC	OUTPUT	INPUT- 2	NC
8	NC	V_{CC+}	STROBE 2	INPUT+ 2
9	STROBE 2	GND	OUTPUT	INPUT- 2
10	OUTPUT	STROBE 1	V_{CC+}	NC
11	V_{CC+}	---	---	NC
12	GND	---	---	NC
13	STROBE 1	---	---	STROBE 2
14	NC	---	---	OUTPUT
15	---	---	---	NC
16	---	---	---	V_{CC+}
17	---	---	---	NC
18	---	---	---	GND
19	---	---	---	STROBE 1
20	---	---	---	NC

NC = No connection

FIGURE 1. Terminal connections – Continued.

Device types	03		04		
Case outlines	A	G	C	G	H and Z
Terminal number	Terminal symbol				
1	NC	GND	NC	GND	GND
2	GND	INPUT+	GND	INPUT+	INPUT+ 1
3	INPUT+	INPUT-	INPUT+	INPUT-	INPUT- 1
4	INPUT-	V_{CC-}	INPUT-	V_{CC-}	NC
5	NC	STROBE 1	NC	BAL	V_{CC-}
6	V_{CC-}	STROBE 2	V_{CC-}	BAL/STB	BAL
7	STROBE 1	OUTPUT	BAL	OUTPUT	BAL/STB
8	STROBE 2	V_{CC+}	BAL/STB	V_{CC+}	NC
9	OUTPUT	---	OUTPUT	---	OUTPUT
10	NC	---	NC	---	V_{CC+}
11	V_{CC+}	---	V_{CC+}	---	---
12	NC	---	NC	---	---
13	NC	---	NC	---	---
14	NC	---	NC	---	---
15	---	---	---	---	---
16	---	---	---	---	---
17	---	---	---	---	---
18	---	---	---	---	---
19	---	---	---	---	---
20	---	---	---	---	---

NC = No connection
BAL = Balance
BAL / STB = Balance / Strobe

FIGURE 1. Terminal connections – Continued.

Device types	04		05
Case outlines	P	2	E, F, and X
Terminal number	Terminal symbol		
1	GND	NC	V_{CC+} A
2	INPUT+ 1	GND	GND A
3	INPUT- 1	NC	INPUT+ A
4	V_{CC-}	NC	INPUT- A
5	BAL	INPUT+	V_{CC-}
6	BAL/STB	NC	BAL B
7	OUTPUT	INPUT-	BAL/STB B
8	V_{CC+}	NC	COLLECTOR OUTPUT B
9	---	NC	V_{CC+} B
10	---	V_{CC-}	GND B
11	---	NC	INPUT+ B
12	---	BAL	INPUT- B
13	---	NC	BAL A
14	---	NC	BAL/STB A
15	---	BAL/STB	COLLECTOR OUTPUT A
16	---	NC	NC
17	---	OUTPUT	---
18	---	NC	---
19	---	NC	---
20	---	V_{CC+}	---

NC = No connection
BAL = Balance
BAL / STB = Balance / Strobe

FIGURE 1. Terminal connections – Continued.

Device types	06 and 07		
Case outlines	C	H	I
Terminal number	Terminal symbol		
1	NC	OUTPUT 1	OUTPUT 1
2	NC	GND 1	GND 1
3	GND 1	INPUT+ 1	INPUT+ 1
4	INPUT+ 1	INPUT- 1	INPUT- 1
5	INPUT- 1	V_{CC-}	V_{CC-}
6	V_{CC-}	OUTPUT 2	OUTPUT 2
7	OUTPUT 2	GND 2	GND 2
8	GND 2	INPUT+ 2	INPUT+ 2
9	INPUT+ 2	INPUT- 2	INPUT- 2
10	INPUT- 2	V_{CC+}	V_{CC+}
11	V_{CC+}	---	---
12	OUTPUT 1	---	---
13	NC	---	---
14	NC	---	---

NC = No connection

FIGURE 1. Terminal connections – Continued.

DEVICE TYPES 01 AND 02

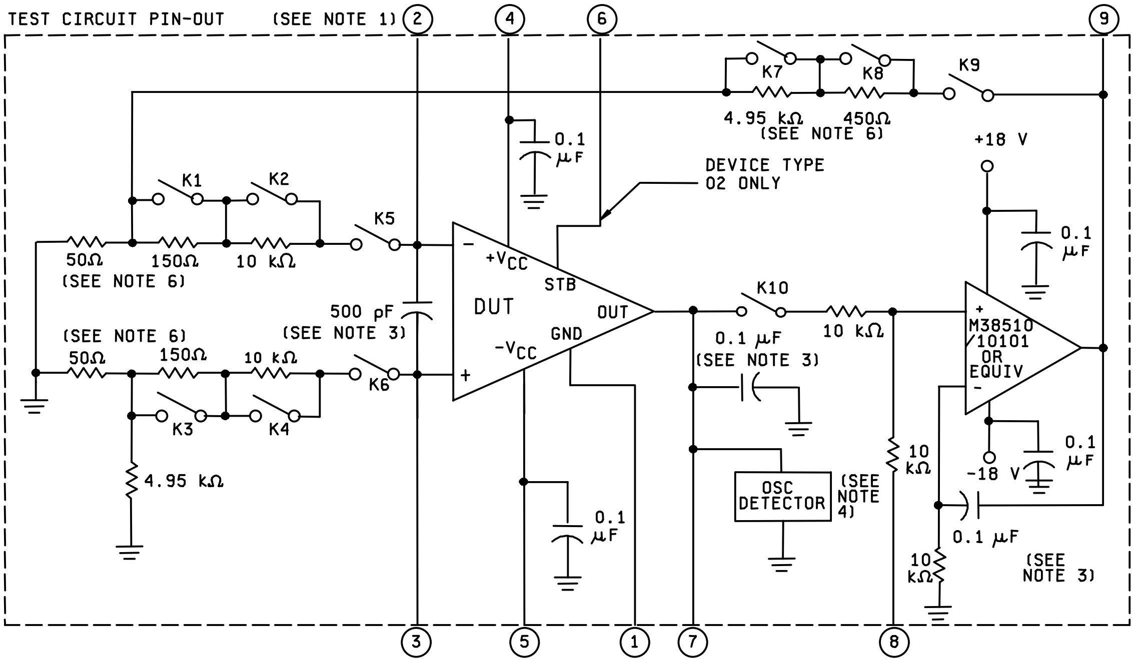


FIGURE 2. Test circuit for static and dynamic tests.

DEVICE TYPE 03

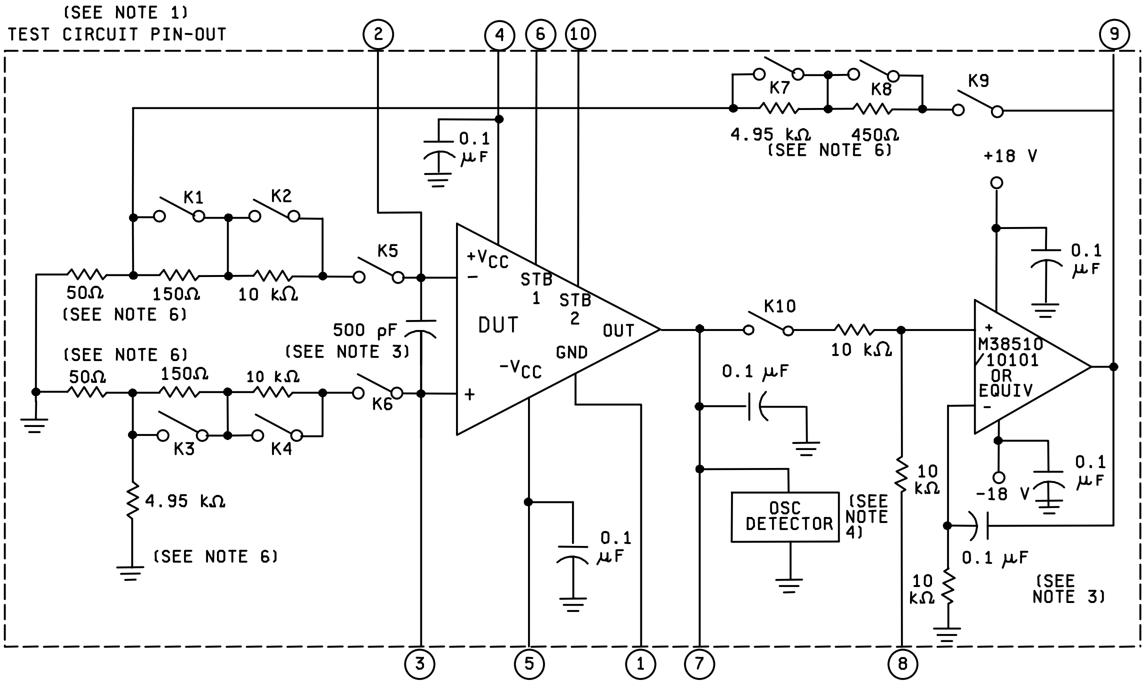


FIGURE 2. Test circuit for static and dynamic tests – continued.

DEVICE TYPES 04 AND 05

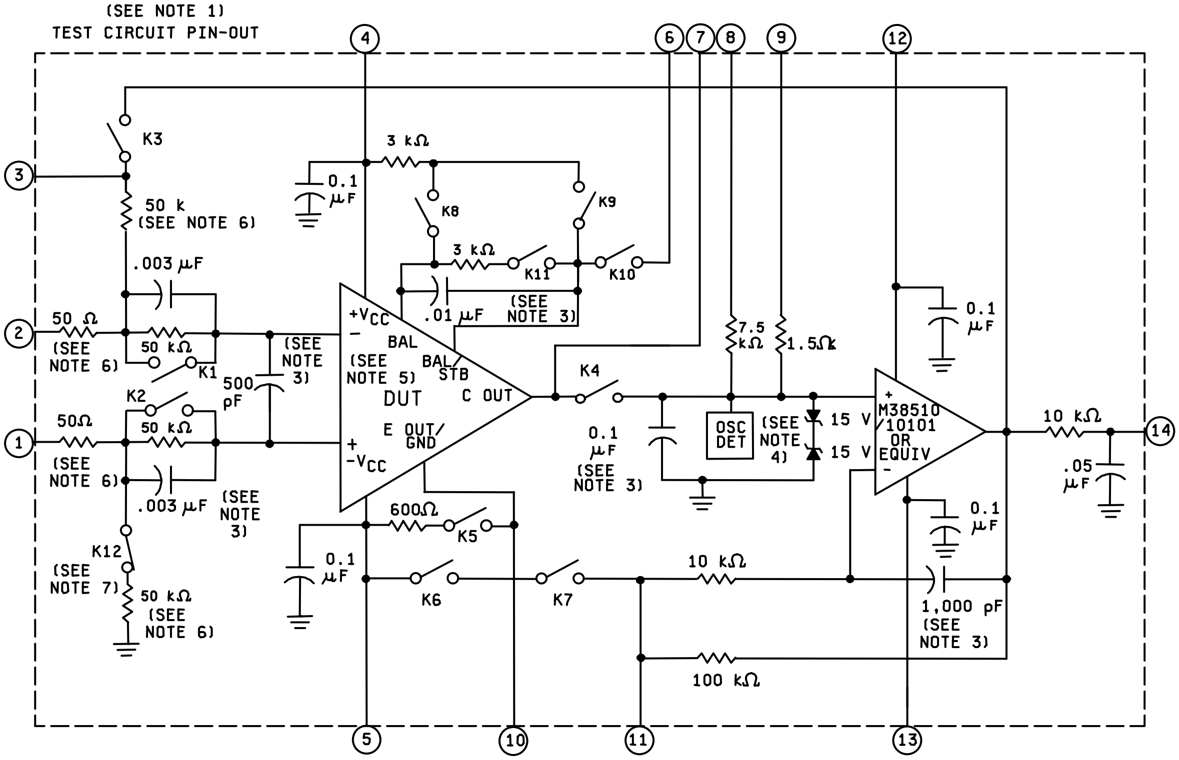


FIGURE 2. Test circuit for static and dynamic tests – continued.

DEVICE TYPES 06 AND 07

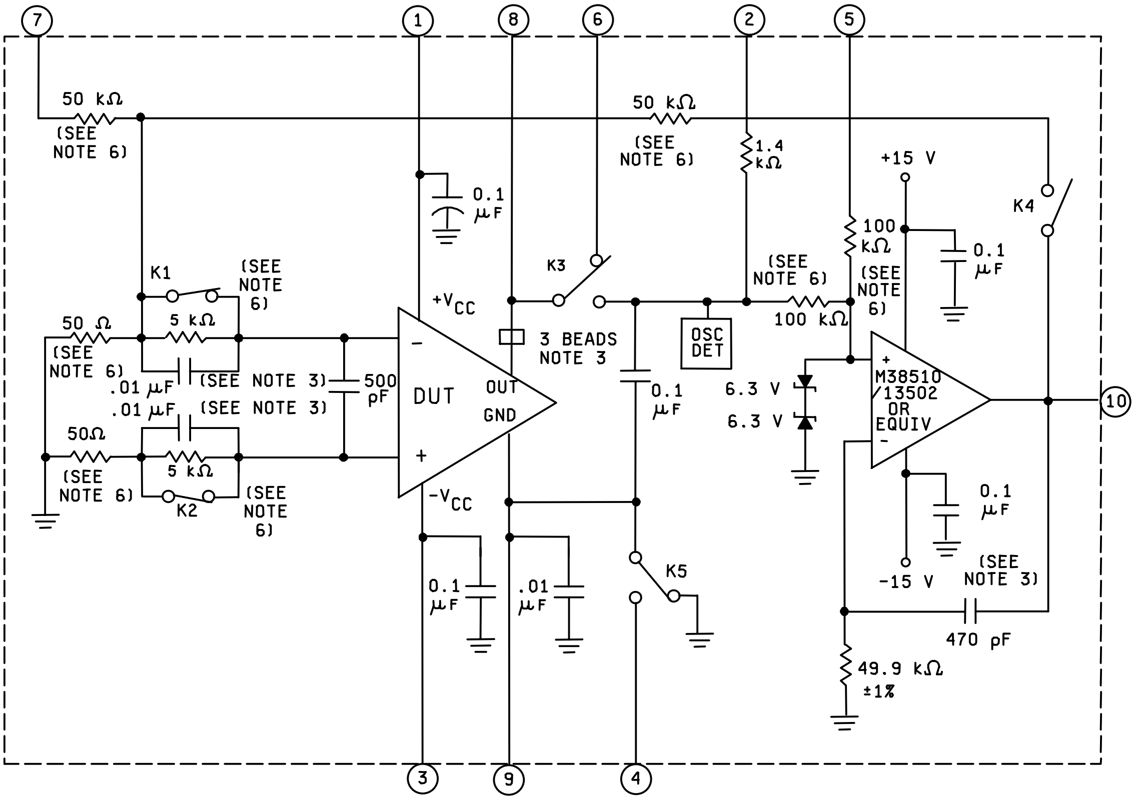


FIGURE 2. Test circuit for static and dynamic tests – continued.

NOTES:

1. Test circuit pin conditions and test temperatures shall be as specified in table III.
2. Precautions shall be taken to prevent damage to the device under test (DUT) during insertion into socket and change of relay switch positions (for example, disable voltage-current supplies, current limit ±V_{CC}, etc.).
3. As required to prevent oscillations. Also, proper wiring procedures shall be followed to prevent oscillations. Loop response and settling time shall be consistent with test rate such that any value has settled to within 5 percent of its final value before value is measured. Suggested values shown may not ensure loop stability for all layouts. Actual compensation used shall be approved by the preparing activity prior to use.
4. Any oscillation greater than 300 mV(p-p) shall be cause for device failure.
5. For dual devices, both halves shall be tested. The output of the idle half shall be driven to the off state by using either a differential input voltage or a strobe input, or the idle half may be biased the same as the tested half if oscillations can be avoided.
6. These resistors are ±0.1 percent tolerance matched to ±0.01 percent. All other resistors are ±1 percent tolerance and capacitors are 10 percent tolerance.
7. All relays are shown in the normal deenergized state.

FIGURE 2. Test circuit for static and dynamic tests – continued.

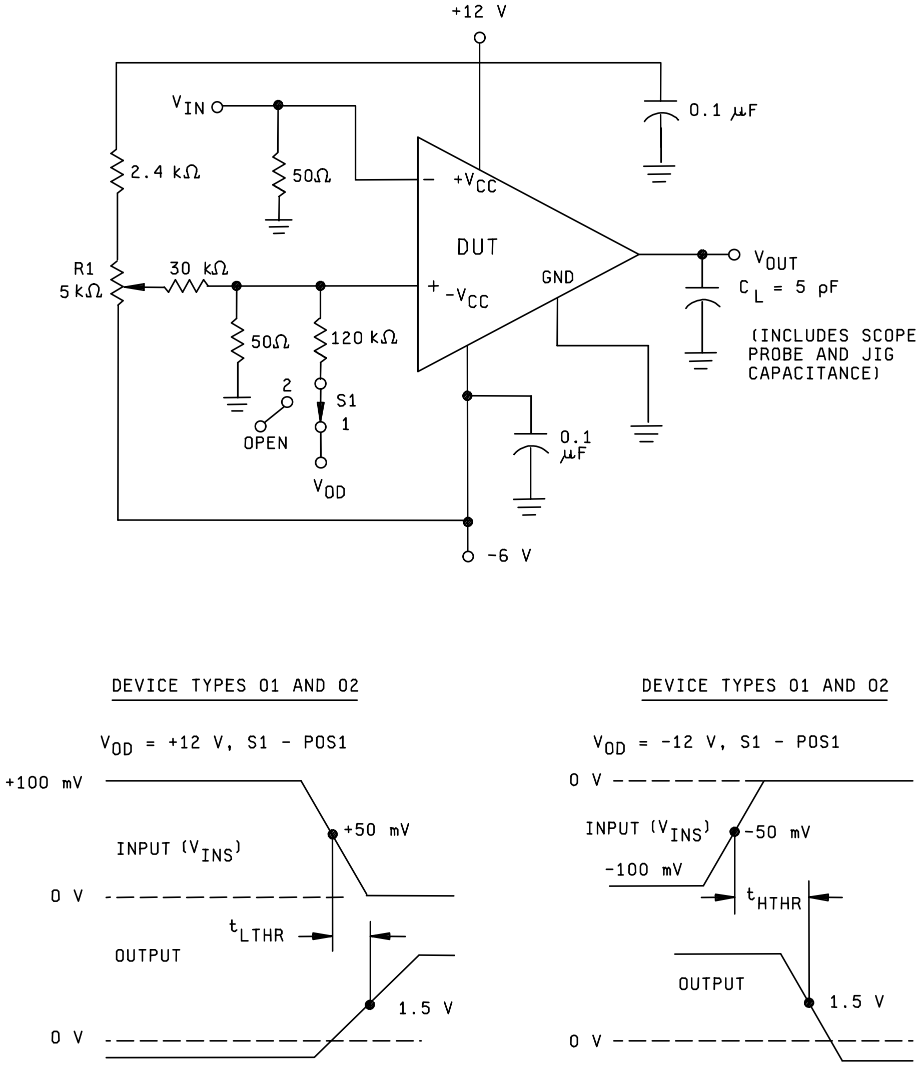
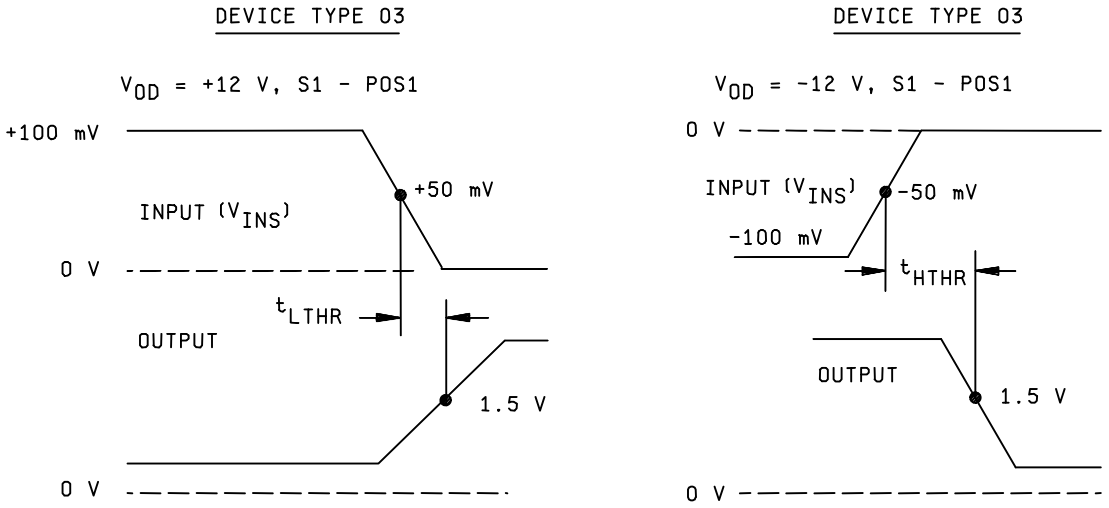


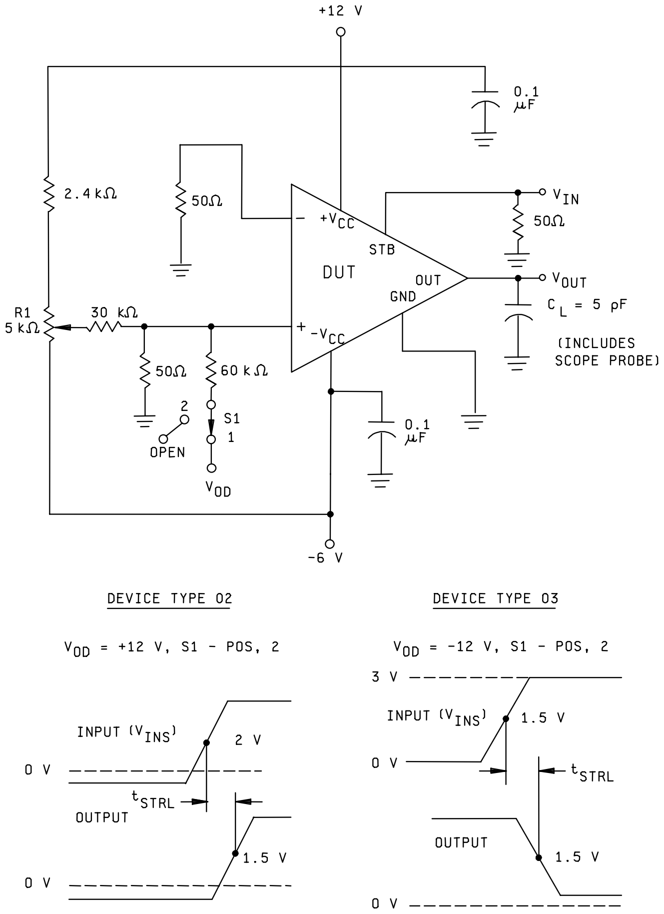
FIGURE 3. Response time test circuit and waveforms for device types 01, 02, and 03.



NOTES:

1. V_{IN} = 100 ns pulse width, 100 kHz repetition rate, t_r and $t_f \leq 5$ ns (see waveforms).
2. Setup procedure: With S1 open and V_{IN} = 0 adjust R1 for V_{OUT} = 1.5 V. Apply V_{OD} (see note 5) and close S1, then apply V_{IN}. (R1 voltage divider may be replaced with a variable power supply.)
3. All resistor tolerances are ±1 percent and all capacitor tolerances are ±10 percent .
4. For device type 02, ground strobe on idle side. For device type 03, strobe is left open.
5. See waveforms for V_{OD} values.
6. When V_{OD} = 12 V, overdrive applied to device under test (DUT) = 5 mV.

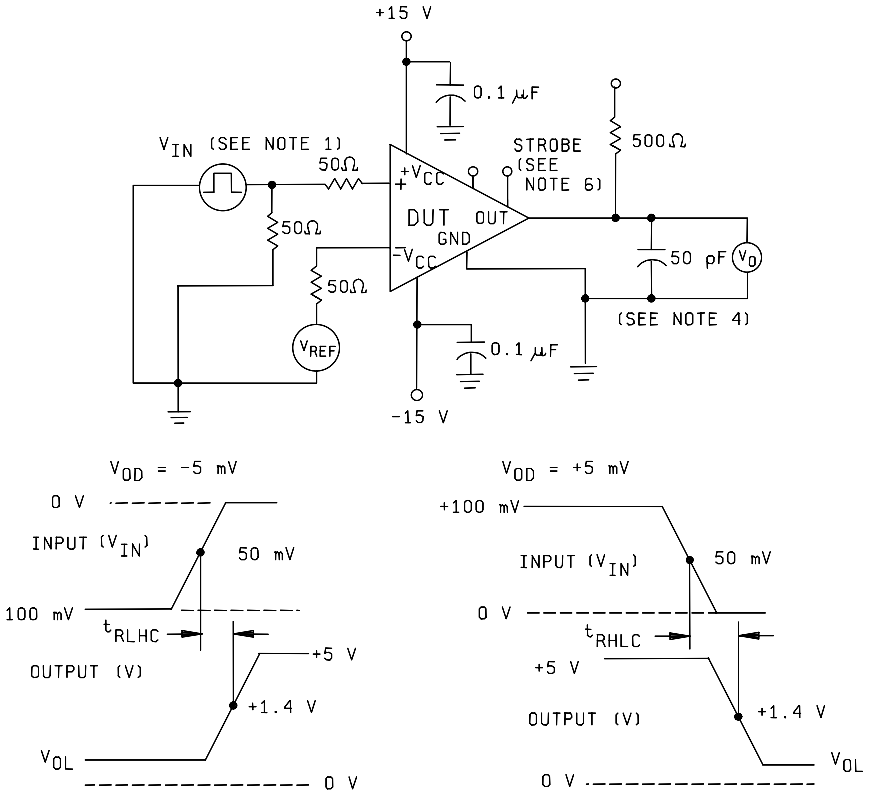
FIGURE 3. Response time test circuit and waveforms for device types 01, 02, and 03 – continued.



NOTES:

1. V_{IN} = 100 ns pulse width, 100 kHz repetition rate, t_r and $t_f \leq$ 5 ns (see waveforms).
2. Setup procedure: With S1 open and V_{IN} = 3 V (device type 02), and V_{IN} = 0 V (device type 03) adjust R1 for V_{OUT} = 1.5 V. Apply V_{OD} (see note 5) and close S1, then apply V_{IN}. (R1 voltage divider may be replaced with a variable power supply.)
3. All resistor tolerances are ±1 percent and all capacitor tolerance are ±10 percent .
4. For device type 02, ground strobe on idle side. For device type 03, unused strobe is left open.
5. See waveform for V_{OD} values.
6. When V_{OD} = 12 V, overdrive applied to device under test (DUT) = 10 mV.

FIGURE 4. Strobe release time test circuit and waveforms for device types 02 and 03.



NOTES:

1. V_{IN} = 10 µs pulse width at 50 kHz, t_{TLH} and $t_{THL} \leq 10$ ns, and $Z_O = 50\ \Omega$.
2. Setup procedure:
   a. With V_{IN} = 0 V, step V_{REF} from –3.0 mV to +3.0 mV in 0.1 mV steps for subgroup 7, -4.0 mV to +4.0 mV for subgroup 8, and stop when output switches from high to low.
   b. Change V_{REF} from the reference value obtained above by the required V_{OD} (overdrive).
   c. Apply V_{IN} and measure response time.
3. All resistor tolerances are ±1 percent and all capacitor tolerances are ±10 percent.
4. C_L includes scope, probe, and jig capacitance.
5. T_A = +25°C for subgroup 7. For subgroup 8, the tests shall be performed twice, at T_A = +125°C and T_A = -55°C.
6. In an environment with excessive noise, a 0.01 µF capacitor may be placed between balance and balance/strobe pins.

FIGURE 5. <u>Response time test circuit and waveforms for collector output for device types 04 and 05</u>.

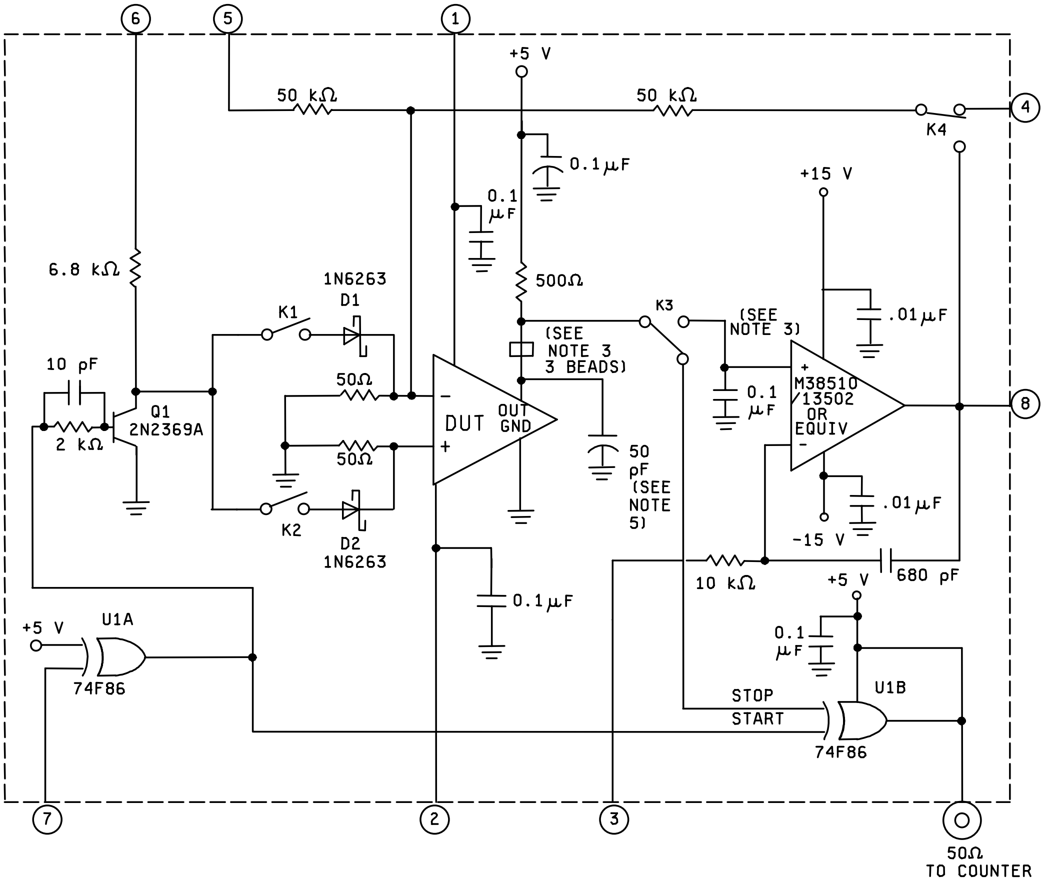


FIGURE 6. Response time test circuit for device types 06 and 07.

NOTES:

1. This circuit is designed especially to be used with a computer-controlled automatic tester, although it can also be implemented as a bench test setup. The test table for subgroups 9, 10, and 11 lists in detail the steps in a typical test sequence, which goes as follows:
   a. Measure V_{IO}: Device under test (DUT) is in a conventional servo loop (K3 and K4 energized) with output served to TTL logic threshold. (1.4 V on adapter pin 3). Measure V_{IO} x 1000 adapter pin 8.
   b. Null V_{IO}: Release K3 and K4, apply voltage measured in step 1 to adapter pin 4. This is particularly easy to do on computer-controlled automatic test equipment.
   c. Apply 5 mV overdrive (OD): The overdrive is developed at the inverting input of the device under test (DUT) via a 1000:1 divider from adapter pin 5.
   d. Apply initial 100 mV: Close K1, apply 2 mA at adapter pin 6. Since Q1 is off, this current flows through Schottky diode D1 and the 50 Ω source resistor, giving 100 mV. If a current source is not available, 15 V at pin 6 will give about 2 mA current.
   e. Measure t_{RLHC}: Pull adapter pin 7 low. U1A output goes high, starting the timer via U1B and turning on Q1, which turns off D1. The 100 mV drive disappears abruptly, leaving just the 5 mV overdrive. After the response time, the device under test (DUT) output crosses TTL logic threshold and stops the timer via U1B. On a bench setup, the pulse at 1UB output can be measured with a scope.
   f. Measure t_{RHLC}: Reset pin 7, change pin 5 from –5 V to +5 V, open K1, close K2, pull pin 7 low, measure pulse width at U1B output.

2. The following delay times are of possible concern in the LM119 (device types 06 and 07) response time test circuit:
   a. U1A: This device merely inverts and squares up the start signal from the tester. Its gate delay does not affect the tests.
   b. Q1: This is the major uncompensated delay, since the timer starts when Q1 base goes high, not when Q1 collector goes low. This delay is minimized by using a fast switching transistor with an R-C speedup network driving the base. Measured Q1 delays are well under 10 ns.
   c. D1 and D2: These Schottky devices have negligible switching times ($<$ 1 ns).
   d. U1B: The gate delays here are not important as long as the delays from the two inputs are well matched. (Matched delays merely offset the output pulse in time.) To minimize gate delay effects even further, we use one of the “fast” series 74F86 gates; with delays around 5 ns from each input, the mismatch should be no more than 1 or 2 ns.
   e. Q2: This driver is required only if the time measurement systems has a 50 Ω input. Since it operates as an emitter follower rather than a saturating switch, there are no delays associated with it.

3. As required to prevent oscillations. Also, proper wiring procedures shall be followed to prevent oscillations. Loop response and settling time shall be consistent with test rate such that any value has settled to within 5 percent of its final value before value is measured. Suggested values shown may not ensure loop stability for all layouts. Actual compensation used shall be approved by preparing activity prior to use.

4. All resistor tolerances are ±1 percent and all capacitor tolerances are ±10 percent.

5. C_L includes scope, probe, and jig capacitance.

FIGURE 6. Response time test circuit for device types 06 and 07 – continued.

TABLE II. Electrical test requirements.

MIL-PRF-38535 test requirements	Subgroups (see table III) 2/ 3/	
	Class S devices	Class B devices
Interim electrical parameters	1	1
Final electrical test parameters 1/	1,2,3,4	1,2,3,4
Group A test requirements	1,2,3,4,5,6, 7,8,9,10,11	1,2,3,4,5,6,7,8,9
Group B electrical test parameters when using the methods 5005 QCI option	1,2,3, and table IV delta limits	N/A
Group C electrical parameters	1,2,3, and table IV delta limits	1 and table IV delta limits
Group D end point electrical parameters	1,2,3	1

1/ PDA applies to subgroup 1.
2/ Subgroup 8 applies to device types 04 and 05 only.
3/ Subgroups 9, 10, and 11 apply to device types 06 and 07.

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.

TABLE III. Group A inspection for device types 01 and 02. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers									Relays closed
				1	2	3	4	5	6	7	8	9	
1 T_A = +25°C (figure 2)	V_{IO1}	4001	1	GND			+12.0 V	-6.0 V			-1.4 V		1,2,3,4,5,6,8,9,10
	V_{IO2}	“	2	“			“	“			“		2,4,5,6,8,9,10
	I_{IO}	“	3	“			“	“			“		1,3,5,6,8,9,10
	$+I_{IB}$	“	4	“			“	“			“		1,2,3,5,6,7,9,10
	$-I_{IB}$	“	5	“			“	“			“		1,3,4,5,6,7,9,10
	CMR	4003	6	+5.0 V			+17.0 V	-2.0 V			-6.4 V		2,4,5,6,8,9,10
	CMR	4003	7	-5.0 V			+7.0 V	-12.0 V			+3.6 V		2,4,5,6,8,9,10
	$+I_{CC}$	3005	8	GND		2/	+12.0 V	-6.0 V					1,2,5
	$-I_{CC}$	3005	9	“		“	“	“					1,2,5
	V_{OL}	3007	10	“		“	“	“					1,2,5
	I_{OL}	3009	11	“		“	“	“					1,2,5
	V_{OH1}	3006	12	“	2/		“	“		-5 mA			3,4,6
	V_{OH2}	3006	13	“	“		“	“					3,4,6
	$V_{O(STB)}$ 3/	3007	14	“	“		“	“	300 mV				3,4,6
	$I_{O(STB)}$ 3/	3009	15	“	“		“	“	100 mV				3,4,6
2 T_A = +125°C (figure 2)	V_{IO1}	4001	16	“			“	“			-1.0 V		1,2,3,4,5,6,8,9,10
	V_{IO2}	4001	17	“			“	“			-1.0 V		2,4,5,6,8,9,10
	$\Delta V_{IO}/\Delta T$ 4/		18	Calculation: $\Delta V_{IO} / \Delta T = [V_{IO}$ (test 16) – V_{IO} (test 1)] x 10^3 / 100°C									
	I_{IO}	4001	19	GND			+12.0 V	-6.0 V			-1.0 V		1,3,5,6,8,9,10
	$\Delta I_{IO}/\Delta T$ 4/		20	Calculation: $\Delta I_{IO} / \Delta T = [I_{IO}$ (test 19) – I_{IO} (test 3)] x 10^3 / 100°C									

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Pin measured			Equation	Limits					
								Device type 01			Device type 02		
				No.	Value	Unit		Min	Max	Unit	Min	Max	Unit
1	V_{IO1}	4001	1	9	E_1	V	$V_{IO} = 10E_1$	-2	+2	mV	-3.5	+3.5	mV
T_A = +25°C	V_{IO2}	“	2	“	E_2	“	$V_{IO} = 10E_2$	-2	+2	mV	-3.5	+3.5	mV
	I_{IO}	“	3	“	E_3	“	$I_{IO} = E_1 – E_3$	-3	+3	µA	-10	+10	µA
	$+I_{IB}$	“	4	“	E_4	“	$+I_{IB} = E_1 – 10E_4$	-0.1	+20	µA	-0.1	+75	µA
(figure 2)	$-I_{IB}$	“	5	“	E_5	“	$-I_{IB} = 10E_5 – E_1$		+20	µA	-0.1	+75	µA
	CMR	4003	6	9	E_6	“	$CMR = 20 \log [10^3 / (E_6 – E_7)]$	+80		dB	+80		dB
	CMR	4003	7	9	E_7	“							
	$+I_{CC}$	3005	8	4	$+I_{CC}$	mA		+0.5	+9.0	mA	+0.5	+13.5	mA
	$-I_{CC}$	3005	9	5	$-I_{CC}$	mA		-7.0	-0.5	mA	-6.2	-0.5	mA
	V_{OL}	3007	10	7	V_{OL}	V		-1.0		V	-1.0		V
	I_{OL}	3009	11	“	I_{OL}	mA		+2.0		mA	+0.5		mA
	V_{OH1}	3006	12	“	V_{OH1}	V		+2.5	+5.0	V	+2.5	+5.0	V
	V_{OH2}	3006	13	“	V_{OH2}	V		+2.5	+5.0	V	+2.5	+5.0	V
	$V_{O(STB)}$ 3/	3007	14	“	$V_{O(STB)}$	V					-1.0		V
	$I_{O(STB)}$ 3/	3009	15	6	$I_{O(STB)}$	mA					-2.5	-0.1	mA
2	V_{IO1}	4001	16	9	E_8	V	$V_{IO} = 10E_8$	-3	+3	mV	-4.5	+4.5	mV
T_A = +125°C	V_{IO2}	4001	17	9	E_9	V	$V_{IO} = 10E_9$	-3	+3	mV	-4.5	+4.5	mV
	$\Delta V_{IO}/\Delta T$ 4/		18					-10	+10	µV/°C	-10	+10	µV/°C
	I_{IO}	4001	19	9	E_{10}	V	$I_{IO} = E_8 – E_{10}$	-3	+3	µA	-10	+10	µA
(figure 2)	$\Delta I_{IO}/\Delta T$ 4/		20					-25	+25	nA/°C	-25	+25	nA/°C

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers									Relays closed
				1	2	3	4	5	6	7	8	9	
2	$+I_{IB}$	4001	21	GND			+12.0 V	-6.0 V			-1.0 V		1,2,3,5,6,7,9,10
T_A = +125°C	$-I_{IB}$	4001	22	GND			+12.0 V	-6.0 V			-1.0 V		1,3,4,5,6,7,9,10
	CMR	4003	23	+5.0 V			+17.0 V	-2.0 V			-6.0 V		2,4,5,6,8,9,10
	CMR	4003	24	-5.0 V			+7.0 V	-12.0 V			+4.0 V		2,4,5,6,8,9,10
(figure 2)	$+I_{CC}$	3005	25	GND		2/	+12.0 V	-6.0 V					1,2,5
	$-I_{CC}$	3005	26	“		“	“	“					1,2,5
	V_{OL}	3007	27	“		“	“	“					1,2,5
	I_{OL}	3009	28	“		“	“	“					1,2,5
	V_{OH1}	3006	29	“	2/		“	“		-5 mA			3,4,6
	V_{OH2}	3006	30	“	“		“	“					3,4,6
	$V_{O(STB)}$ 3/	3007	31	“	“		“	“	300 mV				3,4,6
	$I_{O(STB)}$ 3/	3009	32	“	“		“	“	100 mV				3,4,6
3	V_{IO1}	4001	33	“			“	“			-1.8 V		1,2,3,4,5,6,8,9,10
T_A = -55°C	V_{IO2}	“	34	“			“	“			-1.8 V		2,4,5,6,8,9,10
	$\Delta V_{IO}/\Delta T$ 4/	“	35	Calculation: $\Delta V_{IO} / \Delta T = [V_{IO}$ (test 33) – V_{IO} (test 1)] x 10^3 / 80°C									
	I_{IO}	“	36	GND			+12.0 V	-6.0 V			-1.8 V		1,3,5,6,8,9,10
(figure 2)	$\Delta I_{IO}/\Delta T$ 4/	“	37	Calculation: $\Delta I_{IO} / \Delta T = [I_{IO}$ (test 36) – I_{IO} (test 3)] x 10^3 / 80°C									

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Pin measured			Equation	Limits					
								Device type 01			Device type 02		
				No.	Value	Unit		Min	Max	Unit	Min	Max	Unit
2	$+I_{IB}$	4001	21	9	E_{11}	V	$+I_{IB} = E_8 – 10E_{11}$	-0.1	+20	µA	-0.1	+75	µA
T_A = +125°C	$-I_{IB}$	4001	22	“	E_{12}	“	$-I_{IB} = 10E_{12} – E_8$	-0.1	+20	µA	-0.1	+75	µA
	CMR	4003	23	“	E_{13}	“	$\text{CMR} = 20 \log [10^3 / (E_{13} – E_{14})]$	+80		dB	+80		dB
	CMR	4003	24	“	E_{14}	“							
(figure 2)	$+I_{CC}$	3005	25	4	$+I_{CC}$	mA		+0.5	+9.0	mA	+0.5	+13.5	mA
	$-I_{CC}$	3005	26	5	$-I_{CC}$	mA		-7.0	-0.5	mA	-6.2	-0.5	mA
	V_{OL}	3007	27	7	V_{OL}	V		-1.0		V	-1.0		V
	I_{OL}	3009	28	“	I_{OL}	mA		+0.5		mA	+0.12		mA
	V_{OH1}	3006	29	“	V_{OH1}	V		+2.5	+5.0	V	+2.5	+5.0	V
	V_{OH2}	3006	30	“	V_{OH2}	V		+2.5	+5.0	V	+2.5	+5.0	V
	$V_{O(STB)}$ 3/	3007	31	“	$V_{O(STB)}$	V					-1.0		V
	$I_{O(STB)}$ 3/	3009	32	6	$I_{O(STB)}$	mA					-2.5	-0.1	mA
3	V_{IO1}	4001	33	9	E_{15}	V	$V_{IO} = 10E_{15}$	-3	+3	mV	-4.5	+4.5	mV
T_A = -55°C	V_{IO2}	“	34	9	E_{16}	V	$V_{IO} = 10E_{16}$	-3	+3	mV	-4.5	+4.5	mV
	$\Delta V_{IO}/\Delta T$ 4/	“	35					-10	+10	µV/°C	-10	+10	µV/°C
	I_{IO}	“	36	9	E_{17}	V	$I_{IO} = E_{15} – E_{17}$	-7	+7	µA	-20	+20	µA
(figure 2)	$\Delta I_{IO}/\Delta T$ 4/	“	37					-75	+75	nA/°C	-75	+75	nA/°C

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers									Relays closed
				1	2	3	4	5	6	7	8	9	
3 T_A = -55°C (figure 2)	$+I_{IB}$	4001	38	GND			+12.0 V	-6.0 V			-1.8 V		1,2,3,5,6,7,9,10
	$-I_{IB}$	4001	39	GND			+12.0 V	-6.0 V			-1.8 V		1,3,4,6,7,9,10
	CMR	4003	40	+5.0 V			+17.0 V	-2.0 V			-6.8 V		2,4,5,6,8,9,10
	CMR	4003	41	-5.0 V			+7.0 V	-12.0 V			+3.2 V		2,4,5,6,8,9,10
	$+I_{CC}$	3005	42	GND		2/	+12.0 V	-6.0 V					1,2,5
	$-I_{CC}$	3005	43	“		“	“	“					1,2,5
	V_{OL}	3007	44	“		“	“	“					1,2,5
	I_{OL}	3009	45	“		“	“	“					1,2,5
	V_{OH1}	3006	46	“	2/		“	“		-5 mA			3,4,6
	V_{OH2}	3006	47	“	“		“	“					3,4,6
	$V_{O(STB)}$ 3/	3007	48	“	“		“	“	300 mV				3,4,6
	$I_{O(STB)}$ 3/	3009	49	“	“		“	“	100 mV				3,4,6
4 T_A = +25°C (see figure 2)	A_V+	4004	50	“			“	“			-1.9 V		1,2,3,4,5,6,8,9,10
	A_V-	“	51	“			“	“			-0.9 V		1,2,3,4,5,6,8,9,10
5 T_A = +125°C (see figure 2)	A_V+	“	52	“			“	“			-1.5 V		1,2,3,4,5,6,8,9,10
	A_V-	“	53	“			“	“			-0.5 V		1,2,3,4,5,6,8,9,10

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Pin measured			Equation	Limits					
								Device type 01			Device type 02		
				No.	Value	Unit		Min	Max	Unit	Min	Max	Unit
3 T_A = -55°C (figure 2)	$+I_{IB}$	4001	38	9	E_{18}	V	$+I_{IB} = E_{15} - 10E_{18}$	-0.1	+45	µA	-0.1	+150	µA
	$-I_{IB}$	4001	39	“	E_{19}	“	$-I_{IB} = 10E_{19} - E_{15}$	-0.1	+45	µA	-0.1	+150	µA
	CMR	4003	40	“	E_{20}	“	CMR = 20 log $[10^3 / (E_{20} - E_{21})]$	+80		dB	+80		dB
	CMR	4003	41	“	E_{21}	“							
	$+I_{CC}$	3005	42	4	$+I_{CC}$	mA		+0.5	+9.0	mA	+0.5	+13.5	mA
	$-I_{CC}$	3005	43	5	$-I_{CC}$	mA		-7.0	-0.5	mA	-6.2	-0.5	mA
	V_{OL}	3007	44	7	V_{OL}	V		-1.0		V	-1.0		V
	I_{OL}	3009	45	“	I_{OL}	mA		+1.0		mA	+0.25		mA
	V_{OH1}	3006	46	“	V_{OH1}	V		+2.5	+5.0	V	+2.5	+5.0	V
	V_{OH2}	3006	47	“	V_{OH2}	V		+2.5	+5.0	V	+2.5	+5.0	V
	$V_{O(STB)}$ 3/	3007	48	“	$V_{O(STB)}$	V					-1.0		V
	$I_{O(STB)}$ 3/	3009	49	6	$I_{O(STB)}$	mA					-2.5	-0.1	mA
4 T_A = +25°C (figure 2)	A_V+	4004	50	9	E_{22}	V	$A_V+ = 50 / (E_1 - E_{22})$	+1,250		V/V	+750		V/V
	A_V-	“	51	9	E_{23}	“	$A_V- = 50 / (E_1 - E_{23})$	+1,250		“	+750		“
5 T_A = +125°C (figure 2)	A_V+	“	52	9	E_{24}	“	$A_V+ = 50 / (E_8 - E_{24})$	+1,000		“	+500		“
	A_V-	“	53	9	E_{25}	“	$A_V- = 50 / (E_8 - E_{25})$	+1,000		“	+500		“

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD-883 method	Test no.	Adapter PIN numbers									Relays closed
				1	2	3	4	5	6	7	8	9	
6	A_{V+}	4004	54	GND			+12.0 V	-6.0 V			-2.3 V		1,2,3,4,5,6,8,9,10
T_A = -55°C (figure 2)	A_{V-}	"	55	GND			+12.0 V	-6.0 V			-1.3 V		1,2,3,4,5,6,8,9,10
7	t_{LTHR}		56	These tests shall be performed using test conditions and procedures listed on figure 3.									
T_A = +25°C	t_{HTHR}		57										
	t_{STRL} 3/		58	These tests shall be performed using test conditions and procedures listed on figure 4.									

See footnotes at end of device types 01 and 02.

TABLE III. Group A inspection for device types 01 and 02 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Pin measured			Equation	Limits					
								Device type 01			Device type 02		
				No.	Value	Unit		Min	Max	Unit	Min	Max	Unit
6	A_V+	4004	54	9	E_{26}	V	$A_V+ = 50 / (E_{15} – E_{26})$	+1,000		V/V	+500		V/V
T_A = -55°C (figure 2)	A_V-	“	55	“	E_{27}	“	$A_V- = 50 / (E_{15} – E_{27})$	+1,000		“	+500		“
7	t_{LTHR}	“	56						60	ns		60	ns
T_A = +25°C	t_{HTHR}	“	57						60	ns		90	ns
	t_{STRL} 3/	“	58									15	ns

1/ For devices marked with the “Q” certification mark, the parameters listed herein may be guaranteed if not tested to the limits specified herein in accordance with the manufacturer’s QM plan.

2/ For device type 01, use –5 mV; for device type 02, use –10 mV.

3/ Device type 02 only.

4/ Test numbers 18, 20, 35, and 37, which require read and record measurements plus a calculation, may be omitted except when subgroups 2 and 3 are being performed for group A sampling inspections and group C end points.

Δ Represents delta.

TABLE III. Group A inspection for device type 03. 1/

Subgroup	Symbol	MIL-STD-883 method	Test no.	Adapter PIN numbers 1	2	3	4	5	6	7	8	9	10
1	V_{IO1}	4001	1	GND			+12.0 V	-6.0 V			-1.5 V		
T_A = +25°C	V_{IO2}	“	2	“			“	“			“		
	I_{IO}	“	3	“			“	“			“		
	$+I_{IB}$	“	4	“			“	“			“		
(figure 4)	$-I_{IB}$	“	5	“			“	“			“		
	CMRR	4003	6	+5.0 V			+17.0 V	-2.0 V			-6.5 V		
	CMRR	4003	7	-5.0 V			+7.0 V	-12.0 V			+3.5 V		
	$+I_{CC}$	3005	8	GND		-5 mV	+12.0 V	-6.0 V					
	$-I_{CC}$	3005	9	“		“	“	“					
	V_{OL}	3007	10	“		“	“	“		+100 mA			
	V_{OH}	3006	11	“	-5 mV		“	“		-0.4 mA			
	I_{CEX}		12	“	-5 mV		“	“		+24 V			
	$V_{O(STL)1}$		13	“		-5 mV	“	“	+0.9 V				
	$V_{O(STL)2}$		14	“		“	“	“					+0.9 V
	$V_{O(STH)1}$		15	“		“	“	“	+2.5 V	+16 mA			
	$V_{O(STH)2}$		16	“		“	“	“		+16 mA			+2.5 V
	$I_{STB}1$		17	“		“	“	“	+0.4 V				
	$I_{STB}2$		18	“		“	“	“					+0.4 V
2	$V_{IO}1$	4001	19	“			“	“			-1.5 V		
T_A = +125°C	$V_{IO}2$	“	20	“			“	“			-1.5 V		
	$\Delta V_{IO}/\Delta T$ 2/	“	21	Calculation: $\Delta V_{IO} / \Delta T = [V_{IO}$ (test 19) – V_{IO} (test 1)] x 10^3 / 100°C									
	I_{IO}	4001	22	GND			+12.0 V	-6.0 V			-1.5 V		
(figure 4)	$\Delta I_{IO}/\Delta T$ 2/	“	23	Calculation: $\Delta I_{IO} / \Delta T = [I_{IO}$ (test 22) – I_{IO} (test 3)] x 10^3 / 100°C									

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Relays energized	Pin measured			Equation	Limits		
					No.	Value	Unit		Min	Max	Unit
1 T_A = +25°C (figure 4)	V_{IO1}	4001	1	1,2,3,4,5,6,8,9,10	9	E_1	V	$V_{IO} = 10E_1$	-2.0	+2.0	mV
	V_{IO2}	“	2	2,4,5,6,8,9,10	“	E_2	“	$V_{IO} = 10E_2$	-2.0	+2.0	mV
	I_{IO}	“	3	1,3,5,6,8,9,10	“	E_3	“	$I_{IO} = E_1 – E_3$	-3.0	+3.0	µA
	$+I_{IB}$	“	4	1,2,3,5,6,7,9,10	“	E_4	“	$+I_{IB} = E_1 – 10E_4$	-0.1	+20	µA
	$-I_{IB}$	“	5	1,3,4,5,6,7,9,10	“	E_5	“	$-I_{IB} = 10E_5 – E_1$	-0.1	+20	µA
	CMRR	4003	6	2,4,5,6,8,9,10	“	E_6	“	CMR = 20 log $[10^3 / (E_6 – E_7)]$	+80		dB
	CMRR	4003	7	2,4,5,6,8,9,10	“	E_7	“				
	$+I_{CC}$	3005	8	1,2,5	4	$+I_{CC}$	mA		+0.5	+10	mA
	$-I_{CC}$	3005	9	1,2,5	5	$-I_{CC}$	mA		-3.6	-0.5	mA
	V_{OL}	3007	10	1,2,5	7	V_{OL}	V			+1.5	V
	V_{OH}	3006	11	3,4,6	“	V_{OH}	V		+2.5	+5.5	V
	I_{CEX}		12	3,4,6	“	I_{CEX}	µA		-.01	+1	µA
	$V_{O(STL)1}$		13	1,2,5	“	$V_{O(STL)1}$	V		+2.5	+5.5	V
	$V_{O(STL)2}$		14	1,2,5	“	$V_{O(STL)2}$	“		+2.5	+5.5	“
	$V_{O(STH)1}$		15	1,2,5	“	$V_{O(STH)1}$	“			+0.4	“
	$V_{O(STH)2}$		16	1,2,5	“	$V_{O(STH)2}$	“			+0.4	“
	$I_{STB}1$		17	1,2,5	6	$I_{STB}1$	mA		-3.3	-0.1	mA
	$I_{STB}2$		18	1,2,5	10	$I_{STB}2$	mA		-3.3	-0.1	mA
2 T_A = +125°C (figure 4)	$V_{IO}1$	4001	19	1,2,3,4,5,6,8,9,10	9	E_8	V	$V_{IO} = 10E_8$	-3.0	+3.0	mV
	$V_{IO}2$	“	20	2,4,5,6,8,9,10	9	E_9	V	$V_{IO} = 10E_9$	-3.0	+3.0	mV
	$\Delta V_{IO}/\Delta T$ 2/	“	21						-10	+10	µV/°C
	I_{IO}	“	22	1,3,5,6,8,9,10	9	E_{10}	V	$I_{IO} = E_8 – E_{10}$	-3.0	+3.0	µA
	$\Delta I_{IO}/\Delta T$ 2/	“	23						-25	+25	nA/°C

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers									
				1	2	3	4	5	6	7	8	9	10
1	$+I_{IB}$	4001	24	GND			+12.0 V	-6.0 V			-1.5 V		
T_A = +25°C	$-I_{IB}$	“	25	GND			+12.0 V	-6.0 V			-1.5 V		
	CMRR	4003	26	+5.0 V			+17.0 V	-2.0 V			-6.5 V		
	CMRR	4003	27	-5.0 V			+7.0 V	-12.0 V			+3.5 V		
(figure 4)	$+I_{CC}$	3005	28	GND		-5 mV	+12.0 V	-6.0 V					
	$-I_{CC}$	3005	29	“		“	“	“					
	V_{OL}	3007	30	“		“	“	“		+16 mA			
	V_{OH}	3006	31	“	-5 mV		“	“		-0.4 mA			
	I_{CEX}		32	“	-5 mV		“	“		+24 V			
	$V_{O(STL)1}$		33	“		-5 mV	“	“	+0.9 V				
	$V_{O(STL)2}$		34	“		“	“	“					+0.9 V
	$V_{O(STH)1}$		35	“		“	“	“	+2.5 V	+16 mA			
	$V_{O(STH)2}$		36	“		“	“	“		+16 mA			+2.5 V
2	$I_{STB}1$		37	“		“	“	“	+0.4 V				
T_A = +125°C (figure 2)	$I_{STB}2$		38	“		“	“	“					+0.4 V

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Relays energized	Pin measured			Equation	Limits		
					No.	Value	Unit		Min	Max	Unit
2 T_A = +125°C (figure 4)	$+I_{IB}$	4001	24	1,2,3,5,6,7,9,10	9	E_{11}	V	$+I_{IB} = E_8 - 10E_{11}$		+20	µA
	$-I_{IB}$	"	25	1,3,4,5,6,7,9,10	"	E_{12}	"	$-I_{IB} = 10E_{12} - E_8$		+20	µA
	CMRR	4003	26	2,4,5,6,8,9,10	"	E_{13}	"	CMR = 20 log $[10^3 / (E_{13} - E_{14})]$	+80		dB
	CMRR	4003	27	2,4,5,6,8,9,10	"	E_{14}	"				
	$+I_{CC}$	3005	28	1,2,5	4	$+I_{CC}$	mA		+0.5	+10	mA
	$-I_{CC}$	3005	29	1,2,5	5	$-I_{CC}$	mA		-3.6	-0.5	mA
	V_{OL}	3007	30	1,2,5	7	V_{OL}	V			+0.4	V
	V_{OH}	3006	31	3,4,6	"	V_{OH}	V		+2.5	+5.5	V
	I_{CEX}		32	3,4,6	"	I_{CEX}	µA		-0.5	+100	µA
	$V_{O(STL)1}$		33	1,2,5	"	$V_{O(STL)1}$	V		+2.5	+5.5	V
	$V_{O(STL)2}$		34	1,2,5	"	$V_{O(STL)2}$	"		+2.5	+5.5	"
	$V_{O(STH)1}$		35	1,2,5	"	$V_{O(STH)1}$	"			+0.4	"
	$V_{O(STH)2}$		36	1,2,5	"	$V_{O(STH)2}$	"			+0.4	"
2 T_A = +125°C (figure 2)	$I_{STB}1$		37	1,2,5	6	$I_{STB}1$	mA		-3.3	-0.1	mA
	$I_{STB}2$		38	1,2,5	10	$I_{STB}2$	mA		-3.3	-0.1	mA

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers									
				1	2	3	4	5	6	7	8	9	10
3 T_A = -55°C (figure 2)	$V_{IO}1$	4001	39	GND			+12.0 V	-6.0 V					
	$V_{IO}2$	“	40	GND			+12.0 V	-6.0 V					
	$\Delta V_{IO}/\Delta T$ 2/	“	41	Calculation: $\Delta V_{IO} / \Delta T = [V_{IO}$ (test 39) – V_{IO} (test 1)] x 10^3 / 80°C									
	I_{IO}	“	42	GND			+12.0 V	-6.0 V					
	$\Delta I_{IO}/\Delta T$ 2/	“	43	Calculation: $\Delta I_{IO} / \Delta T = [I_{IO}$ (test 42) – I_{IO} (test 3)] x 10^3 / 80°C									
	$+I_{IB}$	“	44	GND			+12.0 V	-6.0 V					
	$-I_{IB}$	“	45	GND			+12.0 V	-6.0 V					
	CMRR	4003	46	+5.0 V			+17.0 V	-2.0 V					
	CMRR	4003	47	-5.0 V			+7.0 V	-12.0 V					
	$+I_{CC}$	3005	48	GND		-5 mV	+12.0 V	-6.0 V					
	$-I_{CC}$	3005	49	“		“	“	“					
	V_{OL}	3007	50	“		“	“	“		+50 mA			
	V_{OH}	3006	51	“	-5 mV		“	“		-0.4 mA			
	I_{CEX}		52	“	-5 mV		“	“		+24 V			
	$V_{O(STL)}1$		53	“		-5 mV	“	“	+0.9 V				
	$V_{O(STL)}2$		54	“		“	“	“					+0.9 V
	$V_{O(STH)}1$		55	“		“	“	“	+2.5 V	+16 mA			
	$V_{O(STH)}2$		56	“		“	“	“		+16 mA			+2.5 V
	$I_{STB}1$		57	“		“	“	“	+0.4 V				
	$I_{STB}2$		58	“		“	“	“					+0.4 V

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Relays energized	Pin measured			Equation	Limits		
					No.	Value	Unit		Min	Max	Unit
3 T_A = -55°C (figure 2)	$V_{IO}1$	4001	39	1,2,3,4,5,6,8,9,10	9	E_{15}	V	$V_{IO} = 10E_{15}$	-3	+3	mV
	$V_{IO}2$	“	40	2,4,5,6,8,9,10	9	E_{16}	V	$V_{IO} = 10E_{16}$	-3	+3	mV
	$\Delta V_{IO}/\Delta T$ 2/	“	41						-10	+10	µV/°C
	I_{IO}	“	42	1,3,5,6,8,9,10	9	E_{17}	V	$I_{IO} = E_{15} - E_{17}$	-7	+7	µA
	$\Delta I_{IO}/\Delta T$ 2/	“	43						-75	+75	nA/°C
	$+I_{IB}$	“	44	1,2,3,5,6,7,9,10	9	E_{18}	V	$+I_{IB} = E_{15} - 10E_{18}$		+45	µA
	$-I_{IB}$	“	45	1,3,4,5,6,7,9,10	“	E_{19}	“	$-I_{IB} = 10E_{19} - E_{15}$		+45	µA
	CMRR	4003	46	2,4,5,6,8,9,10	“	E_{20}	“	CMRR = 20 log $[10^3 / (E_{20} - E_{21})]$	+80		dB
	CMRR	4003	47	2,4,5,6,8,9,10	“	E_{21}	“				
	$+I_{CC}$	3005	48	1,2,5	4	$+I_{CC}$	mA		+0.5	+10	mA
	$-I_{CC}$	3005	49	1,2,5	5	$-I_{CC}$	mA		-3.6	-0.5	mA
	V_{OL}	3007	50	1,2,5	7	V_{OL}	V			+1.0	V
	V_{OH}	3006	51	3,4,6	“	V_{OH}	V		+2.5	+5.5	V
	I_{CEX}		52	3,4,6	“	I_{CEX}	µA		-0.5	+100	µA
	$V_{O(STL)}1$		53	1,2,5	“	$V_{O(STL)}1$	V		+2.5	+5.5	V
	$V_{O(STL)}2$		54	1,2,5	“	$V_{O(STL)}2$	“		+2.5	+5.5	“
	$V_{O(STH)}1$		55	1,2,5	“	$V_{O(STH)}1$	“			+0.4	“
	$V_{O(STH)}2$		56	1,2,5	“	$V_{O(STH)}2$	“			+0.4	“
	$I_{STB}1$		57	1,2,5	6	$I_{STB}1$	mA		-3.3	-0.1	mA
	$I_{STB}2$		58	1,2,5	10	$I_{STB}2$	mA		-3.3	-0.1	mA

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers									
				1	2	3	4	5	6	7	8	9	10
4	A_V+	4004	59	GND			+12.0 V	-6.0 V			-4.5 V		
T_A = +25°C (figure 2)	A_V-	4004	60	“			“	“			-0.5 V		
5	A_V+	4004	61	“			“	“			-4.5 V		
T_A = +125°C (figure 2)	A_V-	4004	62	“			“	“			-0.5 V		
6	A_V+	4004	63	“			“	“			-4.5 V		
T_A = -55°C (figure 2)	A_V-	4004	64	“			“	“			-0.5 V		
7	t_{LTHR}		65	These tests shall be performed using test conditions and procedures listed on figure 3.									
T_A = +25°C	t_{HTHR}		66										
	t_{STRL1}		67	These tests shall be performed using test conditions and procedures listed on figure 4.									
	t_{STRL2}		68										

See footnotes at end of device type 03.

TABLE III. Group A inspection for device type 03 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Relays energized	Pin measured			Equation	Limits		
					No.	Value	Unit		Min	Max	Unit
4	A_V+	4004	59	1,2,3,4,5,6,8,9,10	9	E_{22}	V	$A_V+ = 300 / (E_1 – E_{22})$	+30		V/V
T_A = +25°C (figure 2)	A_V-	“	60	1,2,3,4,5,6,8,9,10	“	E_{23}	“	$A_V- = 100 / (E_{23} – E_1)$	+30		“
5	A_V+	“	61	1,2,3,4,5,6,8,9,10	“	E_{24}	“	$A_V+ = 300 / (E_8 – E_{24})$	+10		“
T_A = +125°C (figure 2)	A_V-	“	62	1,2,3,4,5,6,8,9,10	“	E_{25}	“	$A_V- = 100 / (E_{25} – E_8)$	+10		“
6	A_V+	“	63	1,2,3,4,5,6,8,9,10	“	E_{26}	“	$A_V+ = 300 / (E_{15} – E_{26})$	+50		“
T_A = -55°C (figure 2)	A_V-	“	64	1,2,3,4,5,6,8,9,10	“	E_{27}	“	$A_V- = 100 / (E_{27} – E_{15})$	+50		“
7	t_{LTHR}		65							60	ns
T_A = +25°C	t_{HTHR}		66							60	“
	t_{STRL1}		67							15	“
	t_{STRL2}		68							15	“

1/ For devices marked with the “Q” certification mark, the parameters listed herein may be guaranteed if not tested to the limits specified herein in accordance with the manufacturer’s QM plan.

2/ Test numbers 21, 23, 41, and 43, which require read and record measurements plus a calculation, may be omitted except when subgroups 2 and 3 are being performed for group A sampling inspections and group C end points.

Δ Represents delta.

TABLE III. Group A inspection for device types 04 and 05 . 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers											
				1	2	3	4	5	6	7	8	9	10	11	12
1 T_A = +25°C (figure 2)	V_{IO}	4001	1	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
		“	2	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	3	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
		“	4	“	“		+2.5 V	-2.5 V			+2.5 V			GND	“
	$V_{IO(R)}$	“	5	“	“		+15.0 V	-15.0 V	+15.0 V		+15.0 V			GND	“
		“	6	“	“		+29.5 V	-0.5 V	+29.5 V		+29.5 V			+14.5 V	“
		“	7	“	“		+2.0 V	-28.0 V	+2.0 V		+2.0 V			-13.0 V	“
	I_{IO}	“	8	“	“		+15.0 V	-15.0 V			+15.0 V			GND	“
		“	9	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	10	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$I_{IO(R)}$	“	11	“	“		+15.0 V	-15.0 V	+15.0 V		+15.0 V			GND	“
	$+I_{IB}$	“	12	“	“		+15.0 V	-15.0 V			+15.0 V			GND	“
		“	13	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	14	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$-I_{IB}$	“	15	“	“		+15.0 V	-15.0 V			+15.0 V			GND	“
		“	16	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	17	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$V_{O(STB)}$	“	18	“	+15.0 V		+15.0 V	-15.0 V	-3 mA		+15.0 V				
	$V_{IO(ADJ)+}$	“	19	“	GND		“	“			“			GND	+20.0 V
	$V_{IO(ADJ)-}$	“	20	“	GND		“	“			“			GND	+20.0 V

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup	Symbol	MIL-STD-883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
1 T_A = +25°C (figure 2)	V_{IO}	4001	1	-20.0 V		1,2,3,4,5	14	E_1	V	$V_{IO} = E_1$	-3	+3	mV
		“	2	“		1,2,3,4,5	“	E_2	“	$V_{IO} = E_2$	“	“	“
		“	3	“		1,2,3,4,5	“	E_3	“	$V_{IO} = E_3$	“	“	“
		“	4	“		1,2,3,4,5	“	E_4	“	$V_{IO} = E_4$	“	“	“
	$V_{IO(R)}$	“	5	“		1,2,3,4,5,8,9,10	“	E_5	“	$V_{IO(R)} = E_5$	“	“	“
		“	6	“		1,2,3,4,5,8,9,10	“	E_6	“	$V_{IO(R)} = E_6$	“	“	“
		“	7	“		1,2,3,4,5,8,9,10	“	E_7	“	$V_{IO(R)} = E_7$	“	“	“
	I_{IO}	“	8	“		3,4,5	“	E_8	“	$I_{IO} = 20 (E_1 – E_8)$	-10.0	+10.0	nA
		“	9	“		3,4,5	“	E_9	“	$I_{IO} = 20 (E_2 – E_9)$	“	“	“
		“	10	“		3,4,5	“	E_{10}	“	$I_{IO} = 20 (E_3 – E_{10})$	“	“	“
	$I_{IO(R)}$	“	11	“		3,4,5,8,9,10	“	E_{11}	“	$I_{IO} = 20 (E_5 – E_{11})$	-25.0	+25.0	“
	$+I_{IB}$	“	12	“		1,3,4,5	“	E_{12}	“	$+I_{IB} = 20 (E_1 – E_{12})$	-100	+0.1	“
		“	13	“		1,3,4,5	“	E_{13}	“	$+I_{IB} = 20 (E_2 – E_{13})$	-150	“	“
		“	14	“		1,3,4,5	“	E_{14}	“	$+I_{IB} = 20 (E_3 – E_{14})$	-150	“	“
	$-I_{IB}$	“	15	“		2,3,4,5	“	E_{15}	“	$-I_{IB} = 20 (E_{15} – E_1)$	-100	“	“
		“	16	“		2,3,4,5	“	E_{16}	“	$-I_{IB} = 20 (E_{16} – E_2)$	-150	“	“
		“	17	“		2,3,4,5	“	E_{17}	“	$-I_{IB} = 20 (E_{17} – E_3)$	-150	“	“
	$V_{O(STB)}$	“	18			1,2,4,5,10	7	E_{18}	“	$V_{O(STB)} = E_{18}$	+14.0		V
	$V_{IO(ADJ)+}$	“	19	-20.0 V		1,2,3,4,5,8,11	14	E_{19}	“	$V_{IO(ADJ)+} = E_1 – E_{19}$	+5.0		mV
	$V_{IO(ADJ)-}$	“	20	-20.0 V		1,2,3,4,5,9,11	14	E_{20}	“	$V_{IO(ADJ)-} = E_1 – E_{20}$		-5.0	mV

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 - continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers											
				1	2	3	4	5	6	7	8	9	10	11	12
1	CMRR	4003	21	Calculation = 20 log [27.5 x 10^3 / (E_3 – E_2)]											
T_A = +25°C	V_{OL1} 2/	3007	22	+0.5 V	+0.5 V	+6.5 V	+4.5 V	GND		8 mA	GND		GND		
(figure 2)	V_{OL2} 2/	“	23	+3.0 V	+3.0 V	+9.0 V	+4.5 V	GND		8 mA	“		“		
	V_{OL3} 2/	“	24	+13.0 V	+13.0 V	+18.0 v	+15.0	-15.0 V		50 mA	“		“		
	V_{OL4} 2/	“	25	-14.0 V	-14.0 V	-9.0 V	+15.0	-15.0 V		50 mA	“		“		
	I_{CEX}	3009	26	GND	GND	-5 V	+18.0 V	-18.0 V		+32.0 V	“		“		
	I_{I1}	4001	27	+12.0 V	-17.0 V		“	“			“		“		
	I_{I2}	4001	28	-17.0 V	+12.0 V		“	“			“		“		
	$+I_{CC}$	3005	29	GND	GND	+10.0 V	+15.0 V	-15.0 V			“		“		
	$-I_{CC}$	3005	30	“	GND	+10.0 V	“	“			“		“		
	IOS 3/	3011	31	“	+0.1 V		“	“		5.0 V	“		“		

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
1 T_A = +25°C (figure 2)	CMRR	4003	21								+80		dB
	V_{OL1} 2/	3007	22			1,2,12	7	E_{22}	V	$V_{OL1} = E_{22}$		+0.4	V
	V_{OL2} 2/	“	23			1,2,12	“	E_{23}	“	$V_{OL2} = E_{23}$		+0.4	“
	V_{OL3} 2/	“	24			1,2,12	“	E_{24}	“	$V_{OL3} = E_{24}$		+1.5	“
	V_{OL4} 2/	“	25			1,2,12	“	E_{25}	“	$V_{OL4} = E_{25}$		+1.5	“
	I_{CEX}	3009	26			1,2,12	7	I_{26}	nA	$I_{CEX} = I_{26}$	-1	+10	nA
	I_{I1}	4001	27			1,2,12	1	I_{27}	“	$I_{I1} = I_{27}$	-5	+500	“
	I_{I2}	4001	28			1,2,12	2	I_{28}	“	$I_{I2} = I_{28}$	-5	+500	“
	$+I_{CC}$	3005	29			1,2	4	I_{29}	mA	$+I_{CC} = I_{29}$		+6.0	mA
	$-I_{CC}$	3005	30			1,2	5	I_{30}	“	$-I_{CC} = I_{30}$	-5.0		“
	I_{OS} 3/	3011	31			1,2	7	I_{31}	“	$I_{OS} = I_{31}$		+200	“

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 - continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers 1	2	3	4	5	6	7	8	9	10	11	12
2	V_{IO}	4001	32	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
T_A = +125°C		“	33	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
(figure 2)		“	34	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
		“	35	“	“		+2.5 V	-2.5 V			+2.5 V			GND	“
	$V_{IO(R)}$	“	36	“	“		+15.0 V	-15.0 V	+15.0 V		+15.0 V			GND	“
		“	37	“	“		+29.5 V	-0.5 V	+29.5 V		+29.5 V			+14.5 V	“
		“	38	“	“		+2.0 V	-28.0 V	+2.0 V		+2.0 V			-13.0 V	“
	$\Delta V_{IO}/\Delta T$	“	39	Calculation = [V_{IO} (E_{32}) – V_{IO}(E_1)] / 100°C 4/											
	I_{IO}	“	40	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
		“	41	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	42	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$I_{IO(R)}$	“	43	“	“		+15.0 V	-15.0 V	+15.0 V		+15.0 V			GND	“
	$\Delta I_{IO}/\Delta T$	“	44	Calculation = [I_{IO}(test 40) – I_{IO}(test 8)] / 100°C 4/											
	$+I_{IB}$	“	45	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
		“	46	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	47	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$-I_{IB}$	“	48	“	“		+15.0 V	-15.0 V			+15.0 V			GND	“
		“	49	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	50	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
2 T_A = +125°C (figure 2)	V_{IO}	4001	32	-20.0 V		1,2,3,4,5	14	E_{32}	V	$V_{IO} = E_{32}$	-4	+4	mV
		“	33	“		1,2,3,4,5	“	E_{33}	“	$V_{IO} = E_{33}$	“	“	“
		“	34	“		1,2,3,4,5	“	E_{34}	“	$V_{IO} = E_{34}$	“	“	“
		“	35	“		1,2,3,4,5	“	E_{35}	“	$V_{IO} = E_{35}$	“	“	“
	$V_{IO(R)}$	“	36	“		1,2,3,4,5,8,9,10	“	E_{36}	“	$V_{IO(R)} = E_{36}$	-4.5	+4.5	“
		“	37	“		1,2,3,4,5,8,9,10	“	E_{37}	“	$V_{IO(R)} = E_{37}$	“	“	“
		“	38	“		1,2,3,4,5,8,9,10	“	E_{38}	“	$V_{IO(R)} = E_{38}$	“	“	“
	$\Delta V_{IO}/\Delta T$ 4/	“	39								-25.0	+25.0	µV/°C
	I_{IO}	“	40	-20.0 V		3,4,5	14	E_{40}	V	$I_{IO} = 20\ (E_{40} - E_{32})$	-10.0	+10.0	nA
		“	41	“		3,4,5	“	E_{41}	“	$I_{IO} = 20\ (E_{41} - E_{33})$	“	“	“
		“	42	“		3,4,5	“	E_{42}	“	$I_{IO} = 20\ (E_{42} - E_{34})$	“	“	“
	$I_{IO(R)}$	“	43	“		3,4,5,8,9,10	“	E_{43}	“	$I_{IO(R)} = 20(E_{43} - E_{35})$	-25.0	+25.0	“
	$\Delta I_{IO}/\Delta T$ 4/	“	44								-100	+100	pA/°C
	$+I_{IB}$	“	45	-20.0V		1,3,4,5	14	E_{45}	V	$+I_{IB} = 20\ (E_{32} - E_{45})$	-100	+0.1	nA
		“	46	“		1,3,4,5	“	E_{46}	“	$+I_{IB} = 20\ (E_{33} - E_{46})$	-150	“	“
		“	47	“		1,3,4,5	“	E_{47}	“	$+I_{IB} = 20\ (E_{34} - E_{47})$	-150	“	“
	$-I_{IB}$	“	48	“		2,3,4,5	“	E_{48}	“	$-I_{IB} = 20\ (E_{48} - E_{32})$	-100	“	“
		“	49	“		2,3,4,5		E_{49}	“	$-I_{IB} = 20\ (E_{49} - E_{33})$	-150	“	“
		“	50	“		2,3,4,5		E_{50}	“	$-I_{IB} = 20\ (E_{50} - E_{34})$	-150	“	“

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 - continued. 1/

Subgroup	Symbol	MIL-STD-883 method	Test no.	Adapter PIN numbers											
				1	2	3	4	5	6	7	8	9	10	11	12
2	$V_{O(STB)}$	4001	51	GND	+15.0 V		+15.0 V	-15.0 V	-3 mA		+15.0 V				
T_A = +125°C	CMRR	4003	52	Calculation = 20 log [27.5 x 10^3 / (E_{34} – E_{33})]											
(figure 2)	V_{OL1} 2/	3007	53	+0.5 V	+0.5 V	+6.5 V	+4.5 V	GND		8 mA	GND		GND		
	V_{OL2} 2/	"	54	+3.0 V	+3.0 V	+9.0 V	+4.5 V	GND		8 mA	"		"		
	V_{OL3} 2/	"	55	+13.0 V	+13.0 V	+18.0 V	+15.0 V	-15.0 V		50 mA	"		"		
	V_{OL4} 2/	"	56	-14.0 V	-14.0 V	-9.0 V	+15.0 V	-15.0 V		50 mA	"		"		
	I_{CEX}	3009	57	GND	GND	-5 V	+18.0 V	-18.0 V		+32.0 V	"		"		
	I_{I1}	4001	58	+12.O V	-17.0 V		"	"			"		"		
	I_{I2}	4001	59	-17.0 V	+12.0 V		"	"			"		"		
	$+I_{CC}$	3005	60	GND	GND	+10.0 V	+15.0 V	-15.0 V			"		"		
	$-I_{CC}$	3005	61	"	GND	+10.0 V	"	"			"		"		
	I_{OS} 3/	3011	62	"	+0.1 V		"	"		+5.0 V	"		"		

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
2 T_A = +125°C (figure 2)	$V_{O(STB)}$	4001	51			1,2,4,5,10	7	E_{51}	V	$V_{O(STB)} = E_{51}$	+14		V
	CMRR	4003	52								+80		dB
	V_{OL1} 2/	3007	53			1,2,12	7	E_{53}	V	$V_{OL1} = E_{53}$		+0.4	V
	V_{OL2} 2/	“	54			1,2,12	“	E_{54}	“	$V_{OL2} = E_{54}$		+0.4	“
	V_{OL3} 2/	“	55			1,2,12	“	E_{55}	“	$V_{OL3} = E_{55}$		+1.5	“
	V_{OL4} 2/	“	56			1,2,12	“	E_{56}	“	$V_{OL4} = E_{56}$		+1.5	“
	I_{CEX}	3009	57			1,2	7	I_{57}	nA	$I_{CEX} = I_{57}$	-1	+500	nA
	I_{I1}	4001	58			1,2,12	1	I_{58}	“	$I_{I1} = I_{58}$	-5	“	“
	I_{I2}	4001	59			1,2,12	2	I_{59}	“	$I_{I2} = I_{59}$	-5	“	“
	$+I_{CC}$	3005	60			1,2	4	I_{60}	mA	$+I_{CC} = I_{60}$		+6.0	mA
	$-I_{CC}$	3005	61			1,2	5	I_{61}	“	$-I_{CC} = I_{61}$	-5.0		“
	I_{OS} 3/	3011	62			1,2	7	I_{62}	“	$I_{OS} = I_{62}$		+150	“

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 - continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers											
				1	2	3	4	5	6	7	8	9	10	11	12
3 T_A = -55°C (figure 2)	V_{IO}	4001	63	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
		“	64	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	65	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
		“	66	“	“		+2.5 V	-2.5 V			+2.5 V			GND	“
	$V_{IO(R)}$	“	67	“	“		+15.0 V	-15.0 V	+15.0 V		+15.0 V			GND	“
		“	68	“	“		+29.5 V	-0.5 V	+29.5 V		+29.5 V			+14.5 V	“
		“	69	“	“		+2.0 V	-28.0 V	+2.0 V		+2.0 V			-13.0 V	“
	$\Delta V_{IO}/\Delta T$	“	70	Calculation = [V_{IO} (E_{63}) – VI_O(E_1)] / 80°C 4/											
	I_{IO}	“	71	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
		“	72	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	73	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$I_{IO(R)}$	“	74	“	“		+15.0 V	-15.0 V	+15.0 V		+15.0 V			GND	“
	$\Delta I_{IO}/\Delta T$	“	75	Calculation = [I_{IO}(test 71) – I_{IO}(test 8)] / 80°C 4/											
	$+I_{IB}$	“	76	GND	GND		+15.0 V	-15.0 V			+15.0 V			GND	+20.0 V
		“	77	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	78	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“
	$-I_{IB}$	“	79	“	“		+15.0 V	-15.0 V			+15.0 V			GND	“
		“	80	“	“		+29.5 V	-0.5 V			+29.5 V			+14.5 V	“
		“	81	“	“		+2.0 V	-28.0 V			+2.0 V			-13.0 V	“

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
3 T_A = -55°C (figure 2)	V_{IO}	4001	63	-20.0 V		1,2,3,4,5	14	E_{63}	V	$V_{IO} = E_{63}$	-4	+4	mV
		"	64	"		1,2,3,4,5	"	E_{64}	"	$V_{IO} = E_{64}$	"	"	"
		"	65	"		1,2,3,4,5	"	E_{65}	"	$V_{IO} = E_{65}$	"	"	"
		"	66	"		1,2,3,4,5	"	E_{66}	"	$V_{IO} = E_{66}$	"	"	"
	$V_{IO(R)}$	"	67	"		1,2,3,4,5,8,9,10	"	E_{67}	"	$V_{IO(R)} = E_{67}$	-4.5	+4.5	"
		"	68	"		1,2,3,4,5,8,9,10	"	E_{68}	"	$V_{IO(R)} = E_{68}$	"	"	"
		"	69	"		1,2,3,4,5,8,9,10	"	E_{69}	"	$V_{IO(R)} = E_{69}$	"	"	"
	$\Delta V_{IO}/\Delta T$ 4/	"	70								-25.0	+25.0	µV/°C
	I_{IO}	"	71	-20.0 V		3,4,5	14	E_{71}	V	$I_{IO} = 20\ (E_{71} - E_{63})$	-20.0	+20.0	nA
		"	72	"		3,4,5	"	E_{72}	"	$I_{IO} = 20\ (E_{72} - E_{64})$	"	"	"
		"	73	"		3,4,5	"	E_{73}	"	$I_{IO} = 20\ (E_{73} - E_{65})$	"	"	"
		"	74	"		3,4,5,8,9,10	"	E_{74}	"	$I_{IO(R)} = 20(E_{74} - E_{67})$	-50.0	+50.0	"
	$\Delta I_{IO}/\Delta T$ 4/	"	75								-200	+200	pA/°C
	$+I_{IB}$	"	76	-20.0V		1,3,4,5	14	E_{76}	V	$+I_{IB} = 20\ (E_{63} - E_{76})$	-150	+0.1	nA
		"	77	"		1,3,4,5	"	E_{77}	"	$+I_{IB} = 20\ (E_{64} - E_{77})$	-200	"	"
		"	78	"		1,3,4,5	"	E_{78}	"	$+I_{IB} = 20\ (E_{65} - E_{78})$	-200	"	"
	$-I_{IB}$	"	79	"		2,3,4,5	"	E_{79}	"	$-I_{IB} = 20\ (E_{79} - E_{63})$	-150	"	"
		"	80	"		2,3,4,5		E_{80}	"	$-I_{IB} = 20\ (E_{80} - E_{64})$	-200	"	"
		"	81	"		2,3,4,5		E_{81}	"	$-I_{IB} = 20\ (E_{81} - E_{65})$	-200	"	"

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 - continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers											
				1	2	3	4	5	6	7	8	9	10	11	12
3 T_A = -55°C (figure 2)	$V_{O(STB)}$	4001	82	GND	+15.0 V		+15.0 V	-15.0 V	-2 mA		+15.0 V				
	CMRR	4003	83	Calculation = 20 log [27.5 x 10^3 / (E_{65} – E_{64})]											
	V_{OL1} 2/	3007	84	+0.5 V	+0.5 V	+6.5 V	+4.5 V	GND		8 mA	GND		GND		
	V_{OL2} 2/	“	85	+3.0 V	+3.0 V	+9.0 V	+4.5 V	GND		8 mA	“		“		
	V_{OL3} 2/	“	86	+13.0 V	+13.0 V	+18.0 V	+15.0 V	-15.0 V		50 mA	“		“		
	V_{OL4} 2/	“	87	-14.0 V	-14.0 V	-9.0 V	+15.0 V	-15.0 V		50 mA	“		“		
	I_{I1}	4001	88	+12.O V	-17.0 V		+18.0 V	-18.0 V			“		“		
	I_{I2}	4001	89	-17.0 V	+12.0 V		+18.0 V	-18.0 V			“		“		
	$+I_{CC}$	3005	90	GND	GND	+10.0 V	+15.0 V	-15.0 V			“		“		
	$-I_{CC}$	3005	91	“	GND	+10.0 V	“	“			“		“		
	I_{OS} 3/	3011	92	“	+0.1 V		“	“		+5.0 V	“		“		

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup	Symbol	MIL-STD-883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
3 T_A = -55°C (figure 2)	$V_{O(STB)}$	4001	82			1,2,4,5,10	7	E_{82}	V	$V_{O(STB)} = E_{82}$	+14		V
	CMRR	4003	83								+80		dB
	V_{OL1} 2/	3007	84			1,2,12	7	E_{84}	V	$V_{OL1} = E_{84}$		+0.4	V
	V_{OL2} 2/	“	85			1,2,12	“	E_{85}	“	$V_{OL2} = E_{85}$		+0.4	“
	V_{OL3} 2/	“	86			1,2,12	“	E_{86}	“	$V_{OL3} = E_{86}$		+1.5	“
	V_{OL4} 2/	“	87			1,2,12	“	E_{87}	“	$V_{OL4} = E_{87}$		+1.5	“
	I_{I1}	4001	88			1,2,12	1	I_{88}	nA	$I_{I1} = I_{88}$	-5	+500	nA
	I_{I2}	4001	89			1,2,12	2	I_{89}	nA	$I_{I2} = I_{89}$	-5	+500	nA
	$+I_{CC}$	3005	90			1,2	4	I_{90}	mA	$+I_{CC} = I_{90}$		+7.0	mA
	$-I_{CC}$	3005	91			1,2	5	I_{91}	“	$-I_{CC} = I_{91}$	-6.0		“
	I_{OS} 3/	3011	92			1,2	7	I_{92}	“	$I_{OS} = I_{92}$		+250	“

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 - continued. 1/

Subgroup	Symbol	MIL-STD -883 method	Test no.	Adapter PIN numbers											
				1	2	3	4	5	6	7	8	9	10	11	12
4	$A_{VE(REF)}$	4004	93	GND	GND		+15.0 V	-15.0 V		+15.0 V		GND			+20.0 V
T_A = +25°C	A_{VE+}	“	94	“	“		“	“		“		+10.0 V			“
(figure 2)	A_{VE-}	“	95	“	“		“	“		“		-10.0 V			“
5	$A_{VE(REF)}$	“	96	“	“		“	“		“		GND			“
T_A = +125°C	A_{VE+}	“	97	“	“		“	“		“		+10.0 V			“
(figure 2)	A_{VE-}	“	98	“	“		“	“		“		-10.0 V			“
6	(Tests 99 – 101) Same tests, terminal conditions, equations, and limits as subgroup 5 except T_A = -55°C.														
7	t_{RHLC}		102	These tests shall be performed using test conditions and procedures listed on figure 5.											
T_A = +25°C	t_{RLHC}		103												
8	t_{RHLC}		104	These tests shall be performed using test conditions and procedures listed on figure 5.											
T_A = +125°C	t_{RLHC}		105												
8	t_{RHLC}		106	These tests shall be performed using test conditions and procedures listed on figure 5.											
T_A = -55°C	t_{RLHC}		107												

See footnotes at end of device types 04 and 05.

TABLE III. Group A inspection for device types 04 and 05 – continued. 1/

Subgroup		MIL-STD-883 method	Test no.	Adapter pin numbers		Relays energized	Pin measured			Equation	Limits		
				13	14		No.	Value	Unit		Min	Max	Unit
4	$A_{VE(REF)}$	4004	93	-20.0 V		1,2,3,5,7	14	E_{93}	V				
T_A = +25°C	$A_{VE}+$	"	94	"		1,2,3,5,7	"	E_{94}	"	$A_{VE}+ = 10/(E_{94} – E_{93})$	+10.0		V/mV
(figure 2)	$A_{VE}-$	"	95	"		1,2,3,5,7	"	E_{95}	"	$A_{VE}- = 10/(E_{93} – E_{95})$	+10.0		"
5	$A_{VE(REF)}$	"	96	"		1,2,3,5,7	"	E_{96}	"				
T_A = +125°C	$A_{VE}+$	"	97	"		1,2,3,5,7	"	E_{97}	"	$A_{VE}+ = 10/(E_{97} – E_{96})$	+8.0		"
(figure 2)	$A_{VE}-$	"	98	"		1,2,3,5,7	"	E_{98}	"	$A_{VE}- = 10/(E_{96} – E_{98})$	+8.0		"
6	(Tests 99 – 101) Same tests, terminal conditions, equations, and limits as subgroup 5 except T_A = -55°C												
7	t_{RHLC}		102									300	ns
T_A = +25°C	t_{RLHC}		103									300	"
8	t_{RHLC}		104									500	"
T_A = +125°C	t_{RLHC}		105									640	"
8	t_{RHLC}		106									300	"
T_A = -55°C	t_{RLHC}		107									300	"

1/ For devices marked with the "Q" certification mark, the parameters listed herein may be guaranteed if not tested to the limits specified herein in accordance with the manufacturer's QM plan.

2/ V_{OL1} and V_{OL2} use V_{ID} = -6 mV; V_{OL3}, V_{OL4} use V_{ID} = -5 mV.

3/ Maximum test duration shall be 10 ms.

4/ Test numbers 39, 44, 70, and 75, which require read and record measurements plus a calculation, may be omitted except when subgroups 2 and 3 are being performed for group A sampling inspections and group C and D end points.

Δ Represents delta.

TABLE III. Group A inspection for device types 06 and 07 . 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limit 06			Limit 07		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit	Min	Max	Unit
1 T_A = +25°C (figure 2)	V_{IO}	1	15 V	15 V	-15 V	0 V	-1.4 V			3,4,5	10	E_1	V	$V_{IO} = E_1$	-4.0	+4.0	mV	-1	+1	mV
		2	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_2	“	$V_{IO} = E_2$	“	“	“	“	“	“
		3	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_3	“	$V_{IO} = E_3$	“	“	“	“	“	“
		4	2.5 V	2.5 V	-2.5 V	-2.5 V	1.1 V			“	“	E_4	“	$V_{IO} = E_4$	“	“	“	“	“	“
	I_{IO}	5	15 V	15 V	-15 V	0 V	-1.4 V			1,2,3,4,5	“	E_5	“	$I_{IO} = 20 (E_5 – E_1)$	-75	+75	nA	-40	+40	nA
		6	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_6	“	$I_{IO} = 20 (E_6 – E_2)$	“	“	“	“	“	“
		7	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_7	“	$I_{IO} = 20 (E_7 – E_3)$	“	“	“	“	“	“
	$+I_{IB}$	8	15 V	15 V	-15 V	0 V	-1.4 V			2,3,4,5	“	E_8	“	$+I_{IB} = 20 (E_1 – E_8)$	-0.1	+500	“	-0.1	+500	“
		9	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_9	“	$+I_{IB} = 20 (E_2 – E_9)$	“	+750	“	“	+750	“
		10	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{10}	“	$+I_{IB} = 20 (E_3 – E_{10})$	“	+750	“	“	+750	“
	$-I_{IB}$	11	15 V	15 V	-15 V	0 V	-1.4 V			1,3,4,5	“	E_{11}	“	$-I_{IB} = 20 (E_{11} – E_1)$	“	+500	“	“	+500	“
		12	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{12}	“	$-I_{IB} = 20 (E_{12} – E_2)$	“	+750	“	“	+750	“
		13	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{13}	“	$-I_{IB} = 20 (E_{13} – E_3)$	“	+750	“	“	+750	“
	CMRR	14	Calculation = $20 \log [24 \times 10^3 / \lvert E_3 - E_2 \rvert]$												90		dB	90		dB
	V_{OL1}	15	3.5 V		-1 V	-1 V		3.2 mA	7 V	5	8 to 9	E_{14}	V	$V_{OL1} = E_{14}$		+0.4	V		+0.4	V
	V_{OL2}	16	2.25 V		-2.25 V	-2.25 V		3.2 mA	“	“	“	E_{15}	“	$V_{OL2} = E_{15}$		+0.4	“		+0.4	“
	V_{OL3}	17	27 V		-3 V	12 V		25 mA	“	“	“	E_{16}	“	$V_{OL3} = E_{16}$		+1.5	“		+1.5	“
	V_{OL4}	18	3 V		-27 V	-12 V		25 mA	“	“	“	E_{17}	“	$V_{OL4} = E_{17}$		+1.5	“		+1.5	“
	I_{CEX}	19	18 V		-18 V			18 V	-7 V		6	I_1	µA	$I_{CEX} = I_1$	-1.0	+2.0	µA	-1.0	+2.0	µA
	$+I_{CC}$	20	15 V		-15 V				7 V		1	I_2	mA	$+I_{CC} = I_2$		+10.0	mA		+10.0	mA
	$-I_{CC}$	21	15 V		-15 V				“		3	I_3	mA	$-I_{CC} = I_3$	-5.0		mA	-5.0		mA

TABLE III. Group A inspection for device types 06 and 07 – continued. 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limit 06			Limit 07		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit	Min	Max	Unit
2 T_A = +125°C (figure 2)	V_{IO}	22	15 V	15 V	-15 V	0 V	-1.4 V			3,4,5	10	E_{18}	V	$V_{IO} = E_{18}$	-7.0	+7.0	mV	-2.0	+2.0	mV
		23	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{19}	“	$V_{IO} = E_{19}$	“	“	“	“	“	“
		24	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{20}	“	$V_{IO} = E_{20}$	“	“	“	“	“	“
		25	2.5 V	2.5 V	-2.5 V	-2.5 V	1.1 V			“	“	E_{21}	“	$V_{IO} = E_{21}$	“	“	“	“	“	“
	I_{IO}	26	15 V	15 V	-15 V	0 V	-1.4 V			1,2,3,4,5	“	E_{22}	“	$I_{IO} = 20\ (E_{22} – E_{18})$	-75	+75	nA	-40	+40	nA
		27	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{23}	“	$I_{IO} = 20\ (E_{23} – E_{19})$	“	“	“	“	“	“
		28	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{24}	“	$I_{IO} = 20\ (E_{24} – E_{20})$	“	“	“	“	“	“
	$+I_{IB}$	29	15 V	15 V	-15 V	0 V	-1.4 V			2,3,4,5	“	E_{25}	“	$+I_{IB} = 20\ (E_{18} – E_{25})$	-0.1	+500	“	-0.1	+500	“
		30	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{26}	“	$+I_{IB} = 20\ (E_{19} – E_{26})$	“	+750	“	“	+750	“
		31	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{27}	“	$+I_{IB} = 20\ (E_{20} – E_{27})$	“	+750	“	“	+750	“
	$-I_{IB}$	32	15 V	15 V	-15 V	0 V	-1.4 V			1,3,4,5	“	E_{28}	“	$-I_{IB} = 20\ (E_{28} – E_{18})$	“	+500	“	“	+500	“
		33	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{29}	“	$-I_{IB} = 20\ (E_{29} – E_{19})$	“	+750	“	“	+750	“
		34	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{30}	“	$-I_{IB} = 20\ (E_{30} – E_{20})$	“	+750	“	“	+750	“
	CMRR	35	Calculation = 20 log [24 x 10^3 / $\lvert E_{24} – E_{23}\rvert$]												90		dB	90		dB
	V_{OL1}	36	3.5 V		-1 V	-1 V		3.2 mA	7 V	5	8 to 9	E_{31}	V	$V_{OL1} = E_{31}$		+0.4	V		+0.4	V
	V_{OL2}	37	2.25 V		-2.25 V	-2.25 V		3.2 mA	“	“	“	E_{32}	“	$V_{OL2} = E_{32}$		+0.4	“		+0.4	“
	V_{OL3}	38	27 V		-3 V	12 V		25 mA	“	“	“	E_{33}	“	$V_{OL3} = E_{33}$		+1.5	“		+1.5	“
	V_{OL4}	39	3 V		-27 V	-12 V		25 mA	“	“	“	E_{34}	“	$V_{OL4} = E_{34}$		+1.5	“		+1.5	“
	I_{CEX}	40	18 V		-18 V			18 V	-7 V		6	I_4	µA	$I_{CEX} = I_4$	-1.0	+10.0	µA	-1.0	+10.0	µA
	$+I_{CC}$	41	15 V		-15 V				7 V		1	I_5	mA	$+I_{CC} = I_5$		+10.0	mA		+10.0	mA
	$-I_{CC}$	42	15 V		-15 V				“		3	I_6	mA	$-I_{CC} = I_6$	-4.5		mA	-4.5		mA

TABLE III. Group A inspection for device types 06 and 07 – continued. 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limit 06			Limit 07		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit	Min	Max	Unit
3 T_A = -55°C (figure 3)	V_{IO}	43	15 V	15 V	-15 V	0 V	-1.4 V		7 V	3,4,5	10	E_{35}	V	$V_{IO} = E_{35}$	-7.0	+7.0	mV	-2.0	+2.0	mV
		44	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{36}	“	$V_{IO} = E_{36}$	“	“	“	“	“	“
		45	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{37}	“	$V_{IO} = E_{37}$	“	“	“	“	“	“
		46	2.5 V	2.5 V	-2.5 V	-2.5 V	1.1 V			“	“	E_{38}	“	$V_{IO} = E_{38}$	“	“	“	“	“	“
	I_{IO}	47	15 V	15 V	-15 V	0 V	-1.4 V			1,2,3,4,5	“	E_{39}	“	$I_{IO} = 20 (E_{39} – E_{35})$	-100	+100	nA	-75	+75	nA
		48	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{40}	“	$I_{IO} = 20 (E_{40} – E_{36})$	“	“	“	“	“	“
		49	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{41}	“	$I_{IO} = 20 (E_{41} – E_{37})$	“	“	“	“	“	“
	$+I_{IB}$	50	15 V	15 V	-15 V	0 V	-1.4 V			2,3,4,5	“	E_{42}	“	$+I_{IB} = 20 (E_{35} – E_{42})$	-0.1	+1000	“	-0.1	+1000	“
		51	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{43}	“	$+I_{IB} = 20 (E_{36} – E_{43})$	“	“	“	“	“	“
		52	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{44}	“	$+I_{IB} = 20 (E_{37} – E_{44})$	“	“	“	“	“	“
	$-I_{IB}$	53	15 V	15 V	-15 V	0 V	-1.4 V			1,3,4,5	“	E_{45}	“	$-I_{IB} = 20 (E_{45} – E_{35})$	“	“	“	“	“	“
		54	27 V	27 V	-3 V	12 V	-13.4 V			“	“	E_{46}	“	$-I_{IB} = 20 (E_{46} – E_{36})$	“	“	“	“	“	“
		55	3 V	3 V	-27 V	-12 V	10.6 V			“	“	E_{47}	“	$-I_{IB} = 20 (E_{47} – E_{37})$	“	“	“	“	“	“
	CMRR	56	Calculation = 20 log [24 x 10^3 / $\lvert E_{37} – E_{36}\rvert$]												90		dB	90		dB
	V_{OL1}	57	3.5 V		-1 V	-1 V		3.2 mA	7 V	5	8 to 9	E_{48}	V	$V_{OL1} = E_{48}$		+0.6	V		+0.6	V
	V_{OL2}	58	2.25 V		-2.25 V	-2.25 V		3.2 mA	“	“	“	E_{49}	“	$V_{OL2} = E_{49}$		+0.6	“		+0.6	“
	V_{OL3}	59	27 V		-3 V	12 V		25 mA	“	“	“	E_{50}	“	$V_{OL3} = E_{50}$		+1.5	“		+1.5	“
	V_{OL4}	60	3 V		-27 V	-12 V		25 mA	“	“	“	E_{51}	“	$V_{OL4} = E_{51}$		+1.5	“		+1.5	“
	$+I_{CC}$	61	15 V		-15 V				“		1	I_7	mA	$+I_{CC} = I_7$		+11.5	mA		+11.5	mA
	$-I_{CC}$	62	15 V		-15 V				“		3	I_8	mA	$-I_{CC} = I_8$	-6.0		mA	-6.0		mA

TABLE III. Group A inspection for device types 06 and 07 – continued. 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limit 06			Limit 07		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit	Min	Max	Unit
4 T_A = +25°C (figure 2)	A_V	63	15 V	15 V	-15 V		-1.5 V			3,4	10	E_A	V							
			15 V	15 V	-15 V		-11.5 V			“	“	E_{52}	“	$A_V = 10 / (E_A – E_{52})$	+10		V/mV	+20		V/mV
5 T_A = +125°C (figure 2)		64	15 V	15 V	-15 V		-1.5 V			3,4	“	E_B	“							
			15 V	15 V	-15 V		-11.5 V			“	“	E_{53}	“	$A_V = 10 / (E_B – E_{53})$	+5		V/mV	+10		V/mV
6 T_A = -55°C (figure 2)		65	15 V	15 V	-15 V		-1.5 V			3,4	“	E_C	“							
			15 V	15 V	-15 V		-11.5 V			“	“	E_{54}	“	$A_V = 10 / (E_C – E_{54})$	+5		V/mV	+10		V/mV

TABLE III. Group A inspection for device types 06 and 07 – continued. 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limits		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit
9	V_{IO}		15 V	-15 V	1.4 V		0 V	0 V	5 V	3,4	8	E_0	V				
T_A = +25°C	Release k31, k4		“	“	“		“	“	“								
(figure 6)	Null V_{IO}		“	“	“	E0	“	“	“								
	Apply 5 mV OD		“	“	“	“	-5 V	“	“								
	Close k1		“	“	“	“	“	“	“	1							
	Apply 100 mV		“	“	“	“	“	2 mA	5 V	1							
	t_{RLHC}	66	“	“	“	“	“	2 mA	0 V	1	Counter pulse width	t_1	ns	$t_1 = t_{RLHC}$		125	ns
	Reset		“	“	“	“	“	0 V	5 V	1							
	Change 5 mV OD		“	“	“	“	5 V	“	“	1							
	Open k1 Close k2		“	“	“	“	“	“	“	2							
	Apply 100 mV		“	“	“	“	“	2 mA	“	2							
	t_{RHLC}	67	“	“	“	“	“	2 mA	0 V	2	Counter pulse width	t_2	ns	$t_2 = t_{RHLC}$		160	ns

TABLE III. Group A inspection for device types 06 and 07 – continued. 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limits		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit
10	V_{IO}		15 V	-15 V	1.4 V	E0	0 V	0 V	5 V	3,4	8	E_0	V				
T_A = +125°C	Release k3, k4		“	“	“		“	“	“								
(figure 6)	Null V_{IO}		“	“	“	E0	“	“	“								
	Apply 5 mV OD		“	15 V	“	“	-5 V	“	“								
	Close k1		“	“	“	“	“	“	“	1							
	Apply 100 mV		“	“	“	“	“	2 mA	“	1							
	t_{RLHC}	68	“	-15 V	“	“	“	2 mA	0 V	1	Counter pulse width	t_3	ns	$t_3 = t_{RLHC}$		160	ns
	Reset		“	“	“	“	“	0 V	5 V	1							
	Change 5 mV OD		“	“	“	“	5 V	“	“	1							
	Open k1 Close k2		“	“	“	“	“	“	“	2							
	Apply 100 mV		“	“	“	“	“	2 mA	“	2							
	t_{RHLC}	69	“	“	“	“	“	2 mA	0 V	2	Counter pulse width	t_4	ns	$t_4 = t_{RHLC}$		160	ns

TABLE III. Group A inspection for device types 06 and 07 – continued. 1/

Subgroup	Symbol	Test	Adapter PIN numbers							Relays	Measurement			Equation	Limits		
		No.	1	2	3	4	5	6	7	energized	Pin	Value	Unit		Min	Max	Unit
11	V_{IO}		15 V	-15 V	1.4 V		0 V	0 V	5 V	3,4	8	E_0	V				
T_A = -55°C	Release k3, k4		“	“	“		“	“	“								
(figure 6)	Null V_{IO}		“	“	“	E0	“	“	“								
	Apply 5 mV OD		“	“	“	“	-5 V	“	“								
	Close k1		“	“	“	“	“	“	“	1							
	Apply 100 mV	70	“	“	“	“	“	2 mA	“	1							
	t_{RLHC}		“	“	“	“	“	2 mA	0 V	1	Counter pulse width	t_5	ns	$t_5 = t_{RLHC}$		125	ns
	Reset		“	“	“	“	“	0 V	5 V	1							
	Change 5 mV OD		“	“	“	“	5 V	“	“	1							
	Open k1 Close k2		“	“	“	“	“	“	“	2							
	Apply 100 mV		“	“	“	“	“	2 mA	“	2							
	t_{RHLC}	71	“	“	“	“	“	2 mA	0 V	2	Counter pulse width	t_6	ns	$t_6 = t_{RHLC}$		160	ns

1/ For devices marked with the “Q” certification mark, the parameters listed herein may be guaranteed if not tested to the limits specified herein in accordance with the manufacturer's QM plan.

TABLE IV. Group C end-point electrical parameters. (T_A = +25°C) 1/ 2/ 3/

Test	Device types 01 and 03 $+V_{CC}$ = +12 V, $-V_{CC}$ = -6 V			Device type 02 $+V_{CC}$ = +12 V, $-V_{CC}$ = -6 V			Device types 04 and 05 $+V_{CC}$ = +15 V, $-V_{CC}$ = -15 V			Device type 06 $\pm V_{CC}$ = ±15 V			Device type 07 $\pm V_{CC}$ = ±15 V		
	Limits		Delta	Limits		Delta	Limits		Delta	Limits		Delta	Limits		Delta
	Min	Max		Min	Max		Min	Max		Min	Max		Min	Max	
V_{IO}	-2 mV	+2 mV	±0.5 mV	-3.5 mV	+3.5 mV	±0.5 mV	-3 mV	+3 mV	±0.5 mV	-4 mA	+4 mA	±1 mV	-1 mV	+1 mV	±0.5 mV
$+I_{IB}$	0 µA	20 µA	±2 µA	0 µA	75 µA	±7.5 µA	-100 nA	±0.1 nA	±12.5 nA	-0.1 nA	500 nA	±50 nA	-0.1 nA	+500 nA	±50 nA
$-I_{IB}$	0 µA	20 µA	±2 µA	0 µA	75 µA	±7.5 µA	-100 nA	±0.1 nA	±12.5 nA	-0.1 nA	500 nA	±50 nA	-0.1 nA	+500 nA	±50 nA
I_{CEX} 4/	---	---	---	---	---	---	-1	10 nA	±5 nA	---	---	---	---	---	---

1/ For device types 01, 02, and 03, V_{IO} deltas and limits apply to tests 1 and 2 in table III. For device types 04 and 05, V_{IO} deltas and limits apply to tests 1, 2, and 3 in table III. For device types 06 and 07, V_{IO} deltas and limits apply to tests 1, 2, and 3 in table III.

2/ For device types 01, 02, and 03, $+I_{IB}$ deltas and limits apply to test 4 in table III. For device types 04 and 05, $+I_{IB}$ deltas and limits apply to tests 12, 13, and 14 in table III. For device types 06 and 07, $+I_{IB}$ deltas and limits apply to tests 8, 9, and 10 in table III.

3/ For device types 01, 02, and 03, $-I_{IB}$ deltas and limits apply to test 5 in table III. For device types 04 and 05, $-I_{IB}$ deltas and limits apply to tests 15, 16, and 17 in table III. For device types 06 and 07, $-I_{IB}$ deltas and limits apply to tests 11, 12, and 13 in table III.

4/ I_{CEX} deltas and limits apply to test 26 in table III.

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.

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

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

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

b. The steady-state life test duration, test condition, and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document control by the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

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

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

4.5.1 Voltage and current. All voltage values given, except the input offset voltage (or differential voltage) are referenced to the external zero reference level of the supply voltage. Currents given are conventional current and positive when flowing into the referenced terminal.

4.5.2 Burn-in and life test cooldown procedure. When devices are measured at +25°C following application of the steady state life or burn-in condition, they shall be cooled to within 10°C of their power stable condition at room temperature prior to removal of the bias.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of material 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 or Defense Agency, or within the Military Department’s System Command. Packaging data retrieval is available from the managing Military Department’s or Defense Agency’s automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.

b. PIN and compliance identifier, if applicable (see 1.2).

c. Requirements for delivery of one copy of the conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.

d. Requirements for certificate of compliance, if applicable.

e. Requirements for notification of change of product or process to acquiring activity in addition to notification of the qualifying activity, if applicable.

f. Requirements for failure analysis (including required test condition of MIL-STD-883, method 5003), 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. Unless otherwise specified, these requirements will not apply to direct purchase by or direct shipment to the Government.

i. Requirements for "JAN" marking.

j. Packaging requirements (see 5.1).

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

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML-38535 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DSCC-VQ, 3990 E. Broad Street, Columbus, Ohio 43128-3990.

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

6.5.1 Logic threshold voltage. The approximate voltage at the output of the comparator at which the loading logic circuitry changes its digital state.

6.5.2 Voltage gain. The ratio of the change in output voltage to the change in voltage between the input terminals producing it with the dc output level in the vicinity of the logic threshold voltage (A_V).

6.5.3 Response time. The interval between the application of an input step function and the time when the output crosses the logic threshold voltage. The input step drives the comparator from some initial, saturated input voltage to an input level just barely in excess of that required to bring the output from saturation to the logic threshold voltage. This excess is referred to as the voltage overdrive.

6.5.4 Positive output level. The dc output voltage in the positive direction with the input voltage equal to or greater than a minimum specified amount.

6.5.5 Negative output level. The dc output voltage in the negative direction with the input voltage equal to or greater than a minimum specified amount.

6.5.6 Output sink current. The maximum negative current that can be delivered by the comparator (I_{OL}).

6.5.7 Peak output current. The maximum current that may flow into the output load without causing damage to the comparator.

6.5.8 Differential input voltage. The difference between the two voltages applied to the input terminals of an amplifier. The difference is considered positive when the noninverting input is positive with respect to the inverting input and negative when the inverting input is positive with respect to the noninverting input (V_{ID}).

6.5.9 Strobe current. The current into the strobe terminal of an amplifier (I_{STB}).

6.5.10 Output leakage current. The current into the output of an amplifier with the output at high level (I_O).

6.5.11 Ground leakage current. The current into the ground terminal of an amplifier with the output at high level (I_G).

6.5.12 Input leakage current. The current into the input terminal of an amplifier with the output at a specified voltage (I_I).

6.6 Logistic support. Lead materials and finishes (see 3.4) are interchangeable. Unless otherwise specified, microcircuits acquired to Government logistic support should be acquired to device class B (see 1.2.2), and 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	710
02	711
03	LM106
04	LM111
05	LH2111
06	LM119
07	LT119A

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

Custodians:
Army – CR
Navy – EC
Air Force – 11
NASA – NA
DLA – CC

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

Preparing activity:
DLA - CC

Project 5962-2102

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