...ICATION

MICROCIRCUITS, LINEAR, CMOS, HIGH LEVEL
ANALOG SWITCH WITH DRIVER,
MONOLITHIC SILICON

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

1. SCOPE

1.1 Scope. This specification covers the detail requirements for silicon, CMOS monolithic, analog switches. Three product assurance classes and a choice of case outline and lead finish are provided for each type and are reflected in the complete part number.

1.2 Part number. The part number shall be in accordance with MIL-M-38510.

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

Device type	Circuit
01	One-channel, 75 ohm, SPST switch
02	Two-channel, 75 ohm, SPST switch
03	One-channel, 75 ohm, SPDT switch
04	Two-channel, 75 ohm, SPDT switch
05	One-channel, 75 ohm, DPST switch
06	Two-channel, 75 ohm, DPST switch
07	One-channel, 75 ohm, DPDT switch
08	One-channel, 75 ohm, 4PST switch

NOTE: A channel is defined as a driver with associated switches.

1.2.2 Device class. The device class shall be the product assurance level as defined in MIL-M-38510.

1.2.3 Case outline. The case outline shall be designated as follows:

Outline letter	MIL-M-38510, appendix C case outline
A	F-1 (14-lead, 1/4" x 1/4", flat package)
E	D-2 (16-lead, 1/4" x 7/8", dual-in-line)
I	A-2 (10-lead can)

1.3 Absolute maximum ratings:

$V^+ - V^-$ - - - - - - - - - - - - - - - - - - 33 Vdc
$V^+ - V_D$ - - - - - - - - - - - - - - - - - - 30 Vdc
$V_D - V^-$ - - - - - - - - - - - - - - - - - - 30 Vdc
$V_D - V_S$ - - - - - - - - - - - - - - - - - - $\pm$22 Vdc
$V_L - V^-$ - - - - - - - - - - - - - - - - - - 33 Vdc
$V_L - V_{IN}$ - - - - - - - - - - - - - - - - - - 30 Vdc
$V_L - V_R$ - - - - - - - - - - - - - - - - - - 20 Vdc
$V_{IN} - V_R$ - - - - - - - - - - - - - - - - - - 20 Vdc
$V_R - V^-$ - - - - - - - - - - - - - - - - - - 33 Vdc
$V_R - V_{IN}$ - - - - - - - - - - - - - - - - - - 2 Vdc
Current (any terminal except S or D) - - - 30 mA
Storage temperature range - - - - - - - - - -65 to 150°C
Lead temperature (soldering, 60 seconds) - 300°C
Junction temperature - - - - - - - - - - - - T_J = 175°C

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Rome Air Development Center, RBE-2, Griffiss AFB, NY 13441, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

1.4 Recommended operating conditions:

$+V_{CC}$	+15 Vdc
$-V_{CC}$	-15 Vdc
V_R	0 Vdc
V_L	5 Vdc
Case operating temperature range	-55 to 125°C

1.5 Power and thermal characteristics.

Package	Case Outline	Maximum allowable power dissipation 1/	Maximum θJ-C 2/	Maximum θJ-A
14-lead FP	A	350 mW @ T_C = 125°C	60°C/W	140°C/W
16-lead DIP	E	400 mW @ T_C = 125°C	35°C/W	120°C/W
10-lead can	I	350 mW @ T_C = 125°C	40°C/W	140°C/W

NOTES:
1. All leads welded or soldered to PC board
2. Applies only when $T_C \geq 75°C$.

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Detail specifications. The individual item requirements shall be in accordance with MIL-M-38510, and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and 1.2.3 herein.

3.2.1 Circuit diagram and terminal connections. The circuit diagram and terminal connections shall be as specified on figure 1.

3.2.2 Schematic circuit. The schematic circuits shall be as specified on figure 2.

3.3 Lead material and finish. The lead material and finish shall be in accordance with MIL-M-38510 (see 6.5).

3.4 Electrical performance characteristics. The electrical performance characteristics in table I apply over the full case ambient temperature range of -55° to 125°C and for supply voltages as indicated in 1.4, unless otherwise specified.

TABLE I. Electrical performance characteristics.

Characteristic	Symbol	Conditions V_{CC} = ±15V unless otherwise specified		Temperature	Device type	Limits Min	Limits Max	Units
Drain - Source "ON" resistance	R_{DS}	(See figure 3)	V_D = -10 V, I_S = 10 mA	T_C = -55°C, 25°C	All	---	75	Ω 1/
				T_C = 125°C	All	---	150	
			V_D = 10 V, I_S = -10 mA	T_C = -55°C, 25°C	All	---	75	
				T_C = 125°C	All	---	150	
		V_{CC} = ±10 V (See figure 3)	V_D = -7.5 V, I_S = 10 MA	T_C = 55°C, 25°C	All	---	75	
				T_C = 125°C	All	---	150	
			V_D = 7.5 V, I_S = -10 mA	T_C = -55°C, 25°C	All	---	75	
				T_C = 125°C	All	---	150	
Channel "ON" leakage current	$I_{D(ON)}$	(See figure 4) (See 3.4.1 for V_{IN})	V_S=V_D=10 V	T_C = -55°C, 125°C	All	-200	200	nA
				T_C = 25°C	All	-2	2	
			V_S=V_D= -10 V	T_C = -55°C, 125°C	All	-200	200	
				T_C = 25°C	All	-2	2	
Drain "OFF" leakage current	$I_{D(OFF)}$	(See figure 5) (See 3.4.1 for V_{IN})	V_S = -10 V, V_D = 10 V	T_C = -55°C, 125°C	All	-100	100	
				T_C = 25°C	All	-1	1	
			V_S = 10 V, V_D = -10 V	T_C = -55°C, 125°C	All	-100	100	
				T_C = 25°C	All	-1	1	
Source "OFF" leakage current	$I_{S(OFF)}$	(See figure 6) (See 3.4.1 for V_{IN})	V_S = 10 V, V_D = -10 V	T_C = -55°C, 125°C	All	-100	100	
				T_C = 25°C	All	-1	1	
			V_S = -10 V, V_D = 10 V	T_C = -55°C, 125°C	All	-100	100	
				T_C = 25°C	All	-1	1	
Input current, input voltage low	I_{IL}	V_{IN} = 0 V	(See figure 7)	T_C = -55°C, 25°C	All	-1	0	µA
				T_C = 125°C	All	-10	0	
Input current, input voltage high	I_{IH}	V_{IN} = 2.4 V, 5 V	(See figure 7)	T_C = -55°C, 25°C	All	0	1	
				T_C = 125°C	All	0	10	
Positive supply current	$+I_{CC}$	V_{IN} = 0 V, 5 V	(See figure 8)	T_C = -55°C, 25°C	All	---	10	
				T_C = 125°C	All	---	100	
Negative supply current	$-I_{CC}$	V_{IN} = 0 V, 5 V	(See figure 8)	T_C = -55°C, 25°C	All	-10	---	
				T_C = 125°C	All	-100	---	
Logic supply current	$+I_L$	V_{IN} = 0 V, 5 V	(See figure 8)	T_C = -55°C, 25°C	All	---	10	
				T_C = 125°C	All	---	100	

See note at end of table.

TABLE I. Electrical performance characteristics - Continued.

Characteristic	Symbol	Conditions V_{CC} = ±15V unless otherwise specified	Temperature	Device type	Limits Min	Limits Max	Units
Reference supply current	$+I_R$	V_{IN} = 0 V, 5 V (See figure 8)	T_C = -55°C, 25°C T_C = 125°C	All	-10 -100	--- ---	µA
Turn on time	t_{on}	(See figure 9)	T_C = -55°C T_C = 25°C T_C = 125°C		--- --- ---	375 450 550	ns
Turn off time	t_{off}	(See figure 9)	T_C = -55°C T_C = 25°C T_C = 125°C		--- --- ---	190 250 400	
Single channel isolation	V_{ISO}	(See figure 10) f = 1 MHz V_{GEN} = 1 Vp-p	T_C = 25°C		50	---	dB
Crosstalk between channels	V_{CT}	(See figure 11) f = 1 MHz V_{GEN} = 1 Vp-p	T_C = 25°C		50	---	
Charge transfer error	V_{CTE}	(See figure 12) V_S = GND	T_C = 25°C		---	15	mV
Break-before-make time delay	t_D	(See figure 13)	-55°C ≤ T_C ≤ 125°C	03,04, 07	20	---	ns
Driver input capacitance	C_A	V_{IN} = 0 V (See 4.4.1d)	T_C = 25°C	All	---	6	pF
Switch input capacitance	C_{IS}	(See 4.4.1d) (switch off)	T_C = 25°C		---	10	
Switch output capacitance	C_{OS}	(See 4.4.1d) (switch off)	T_C = 25°C		---	10	
Input test voltage	V_{ZAP}	C_1 = 100 pF (See 4.5.3) R_2 = 1.5 kΩ	T_C = 25°C		400	---	V

NOTE:

1. The listed resistance limits correspond to the following voltage values:

   75Ω · ±9.25 V, ±6.75 V
   See table III.
   150Ω · ±8.50 V, ±6.0 V

3.4.1 Switch operation. The analog switches listed below are guaranteed to turn "on" with either a "low" input ($V_R \leq V_{IL} \leq 0.8$ V) or "high" input ($2.4 \text{ V} \leq V_{IH} \leq V_{IL}$) as specified below (see figure 1).

Device types	V_{IN}	Channels ON	Channels OFF
01	2.4 Vdc	1	
	0.8 Vdc		1
02, 05	2.4 Vdc	1,2	
	0.8 Vdc		1,2
03	2.4 Vdc	1	2
	0.8 Vdc	2	1
04	2.4 Vdc	1,2	3,4
	0.8 Vdc	3,4	1,2
07	2.4 Vdc	2,3	1,4
	0.8 Vdc	1,4	2,3
06, 08	2.4 Vdc	1,2,3,4	
	0.8 Vdc		1,2,3,4

3.5 Electrical test requirements. The electrical test requirements shall be as specified in table II. The subgroups of table III which constitute the minimum electrical test requirements for screening, qualification, and quality conformance by device class are specified in table II.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirement	Subgroups (see table III) Class S devices	Class B devices	Class C devices
Interim electrical parameters (pre-burn-in) (method 5004)	1	1	None
Final electrical test parameters (method 5004)	1*, 2,3,9	1*,2,3,9	1
Group A test requirements (method 5005)	1,2,3,9,10,11, 12***,13,14	1,2,3,9,10,11, 12***,13,14	1,2,3,9
Group C end point and group B class S electrical parameters (method 5005)	1,2,3 and table IV delta limits	1 and table IV delta limits	1 and table IV delta limits
Additional electrical sub-groups for group C periodic inspections	Not applicable	None	10,11,12, 13,14
Group D end point electrical parameters (method 5005)	1,2,3	1	1
Additional electrical sub-groups for group D periodic inspections	(4,7)**	(4,7)**	(4,7)**

* PDA applies to subgroup 1 (see 4.2d).
** See 4.4.4b
*** See 4.4.1d

3.6 Marking. Marking shall be in accordance with MIL-M-38510. At the option of the manufacturer, marking of the country of origin may be omitted from the body of the microcircuit, but shall be retained on the initial container.

3.7 Microcircuit group assignment. The devices covered by this specification shall be in microcircuit group number 57 (see MIL-M-38510, appendix E).

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with MIL-M-38510 and methods 5005 and 5007, as applicable, of MIL-STD-883, except as modified herein.

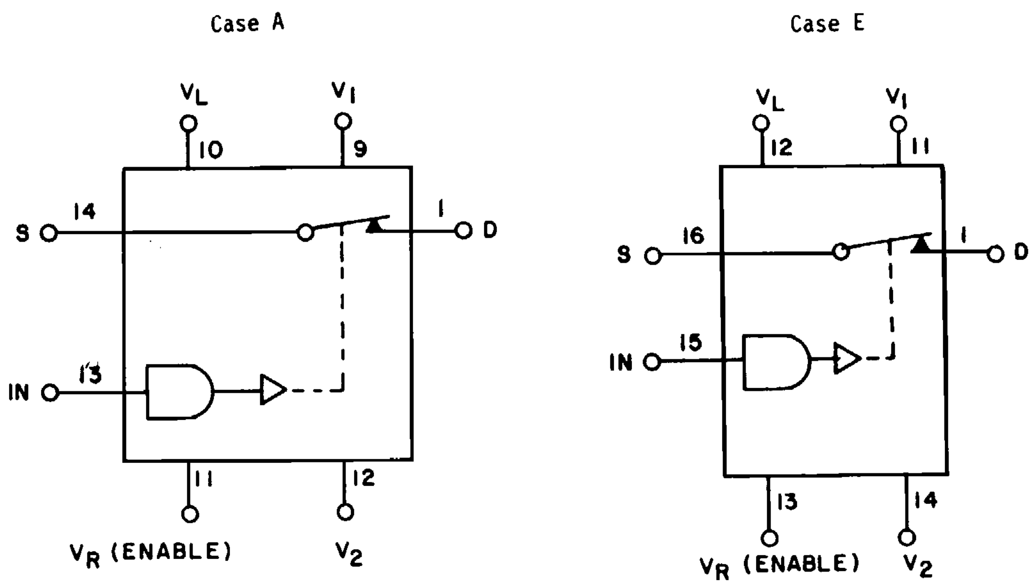
4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to qualification and quality conformance inspection. The following additional criteria shall apply:

a. Burn-in (method 1015 of MIL-STD-883).
   1. Static test (test condition A) using the circuit shown on figure 14, or equivalent. Ambient temperature (T_A) shall be 125°C minimum. Duration for each static test shall be 24 hours minimum for class S devices and 160 hours minimum for class B devices.
   2. Dynamic test (for class S only) (test condition D or E) using the circuit shown on figure 15.
      NOTE: If accelerated high-temperature test conditions are used, the device manufacturer shall ensure that at least 85 percent of the applied voltage is dropped across the device at temperature. The device is not considered functional under accelerated test conditions.
b. Reverse bias burn-in (method 1015 of MIL-STD-883). Required for classes S and B devices using the circuit shown on figure 14. Ambient temperature (T_A) shall be 125°C minimum. Duration for each reverse bias test shall be 24 hours minimum for class S devices and 160 hours minimum for class B devices.
c. Interim and final electrical parameters shall be as specified in table II herein.
d. For class S devices, post-dynamic burn-in, or class B devices, post-static burn-in, electrical parameter measurements may, at the manufacturer's option, be performed separately or included in the final electrical parameter measurements.
e. Percent defective allowable (PDA) - The PDA for class S devices shall be as specified in MIL-M-38510. The PDA is specified as 10 percent for class B devices based on failures from group A, subgroup 1 test after cooldown as final electrical test in accordance with 5004 of MIL-STD-883, and with no intervening electrical measurements. If interim electrical parameter tests are performed prior to burn-in, failures resulting from preburn-in screening may be excluded from the PDA. If interim electrical parameter tests prior to burn-in are omitted, then all screening failures shall be included in the PDA. The verified failures of group A, subgroup 1 after burn-in divided by the total number of devices submitted for burn-in in that lot shall be used to determine the percent defective for that lot, and the lot shall be accepted or rejected based on the PDA for the applicable device class. Those devices whose measured characteristics after burn-in exceed specified electrical parameter limits are defective and shall be removed from the lot.

4.3 Qualification inspection. Qualification inspection shall be in accordance with MIL-M-38510. Inspections to be performed shall be those specified herein for groups A, B, C, and D inspections (see 4.4.1 through 4.4.4).

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-M-38510. Inspections to be performed shall be those specified in method 5005 of MIL-STD-883 and herein for group A, B, C, and D inspections (see 4.4.1 through 4.4.4).

Device type 01



Device type 02

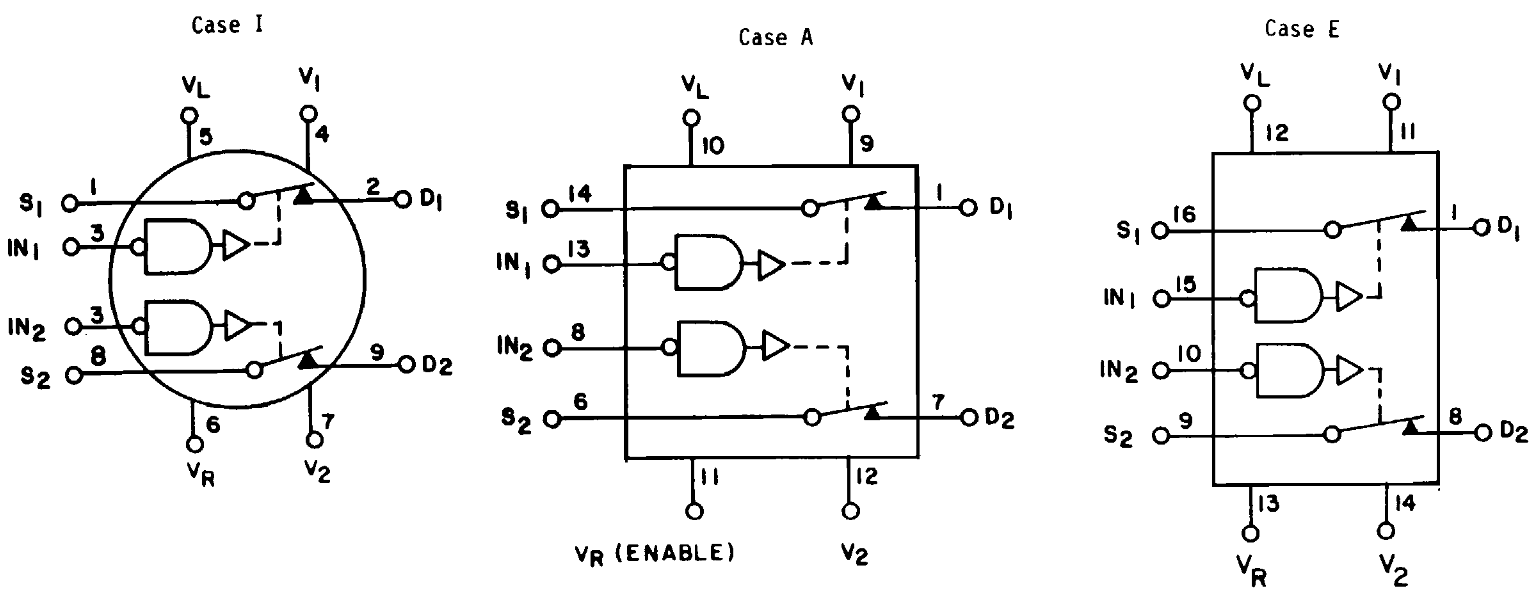


FIGURE 1. Terminal connections (see 3.4.1).

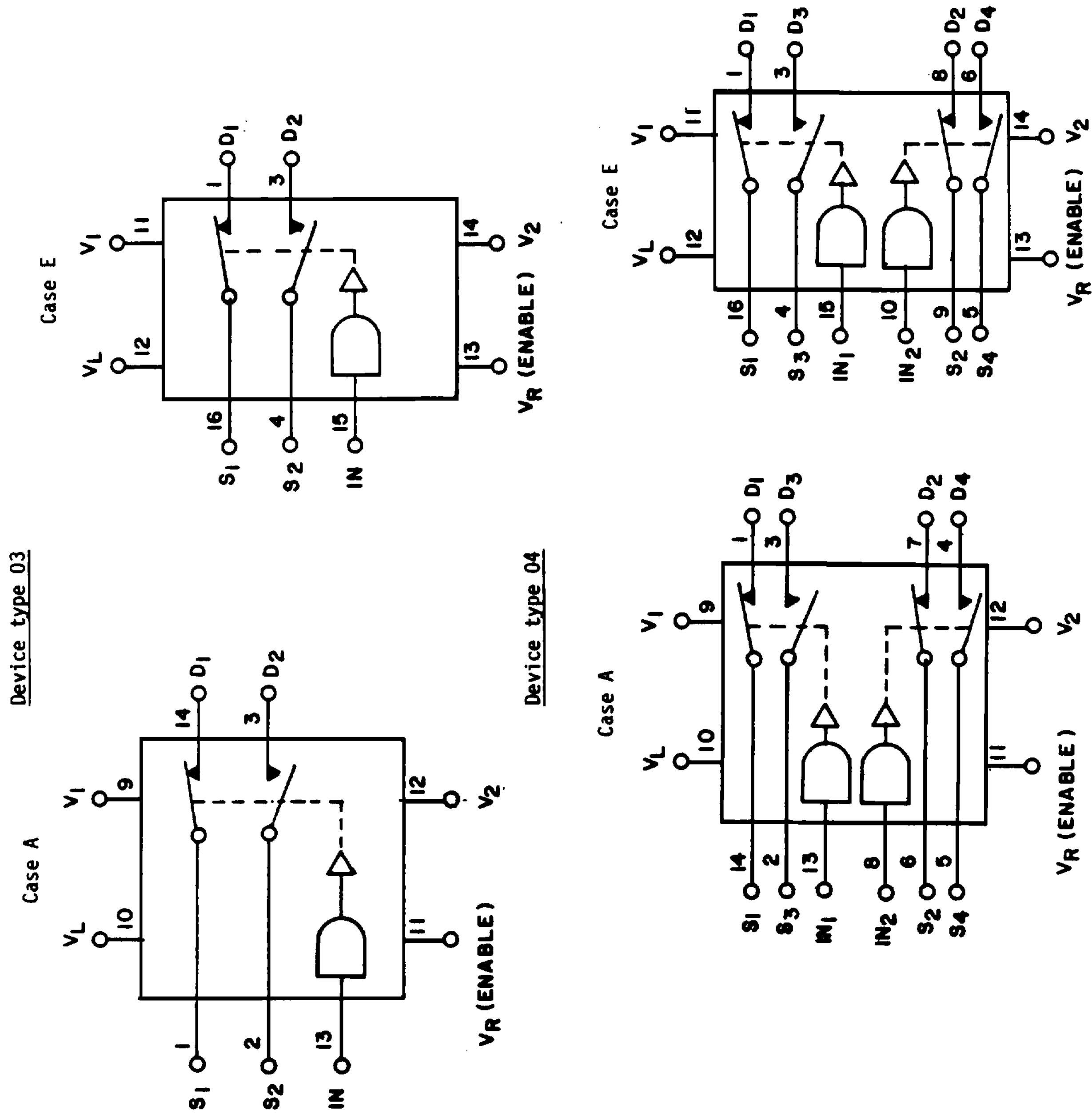


FIGURE 1. Terminal connections (see 3.4.1) - Continued.

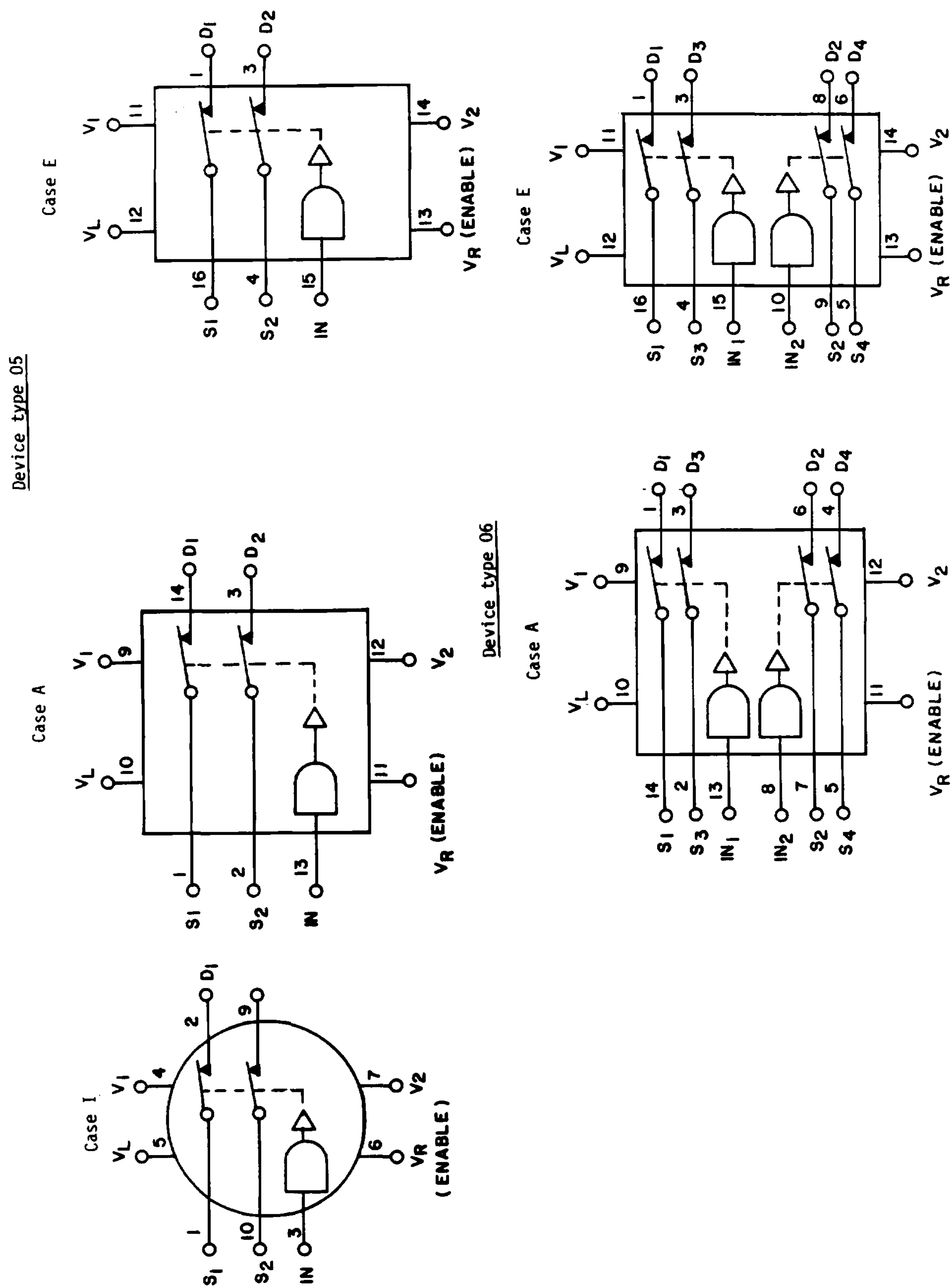
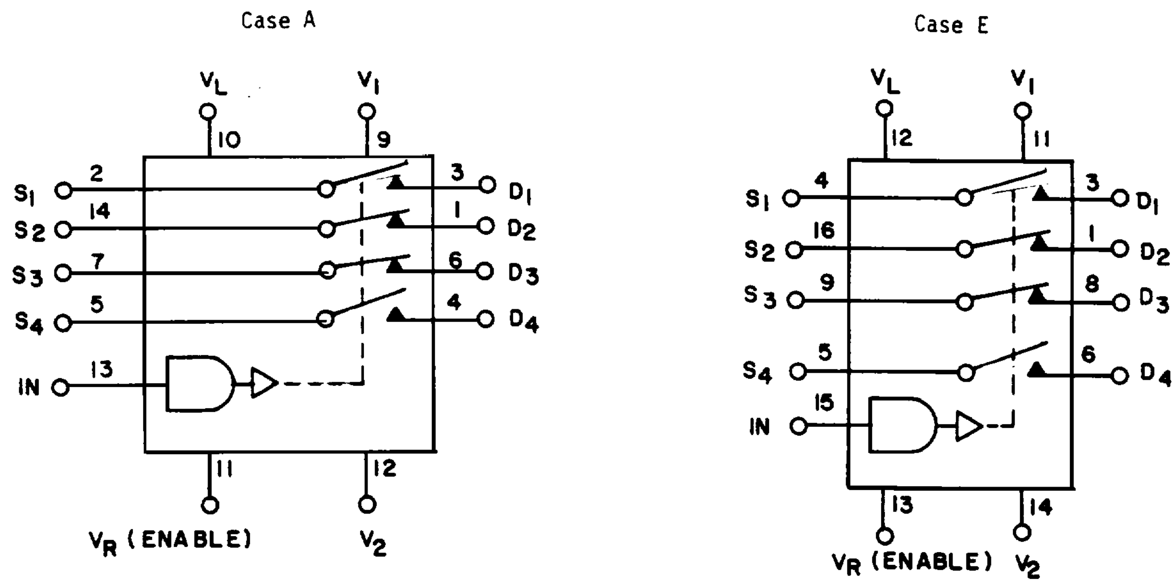


FIGURE 1. Terminal connections (see 3.4.1) - Continued.

Device type 07



Device type 08

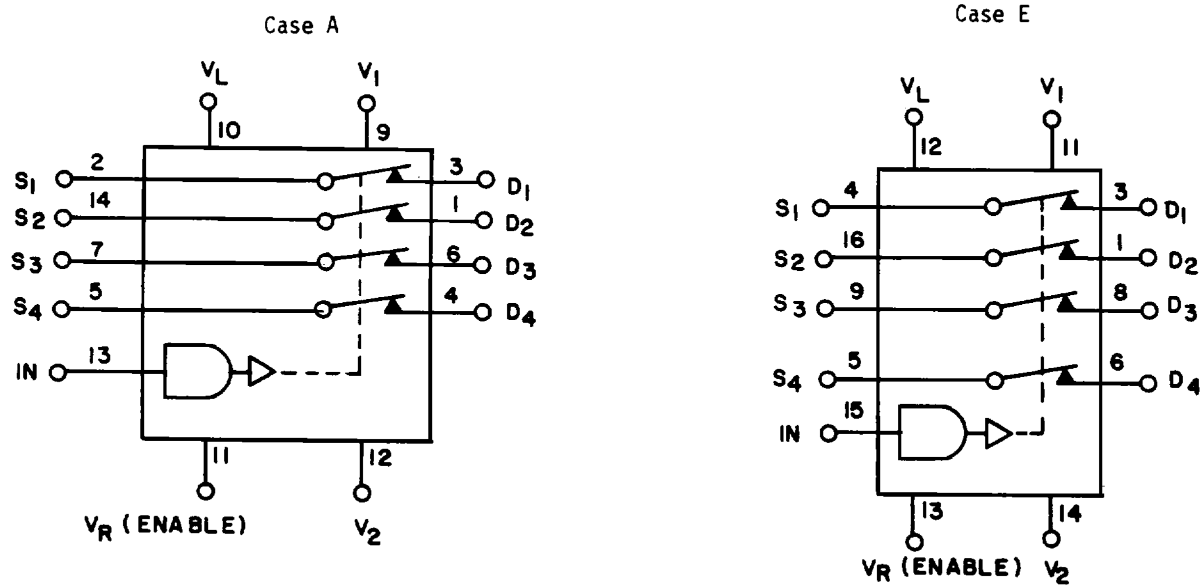


FIGURE 1. Terminal connections (see 3.4.1) - Continued.

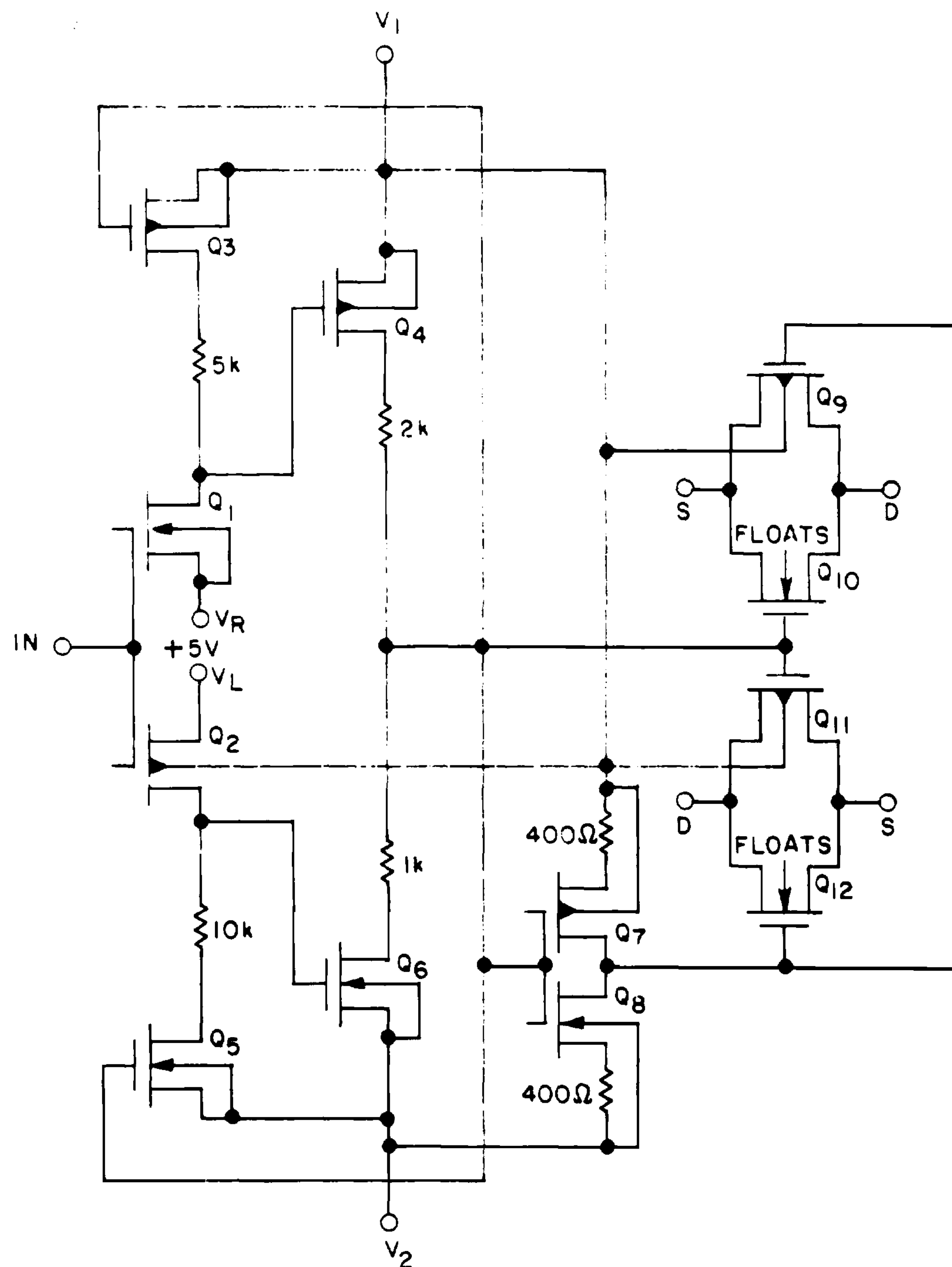
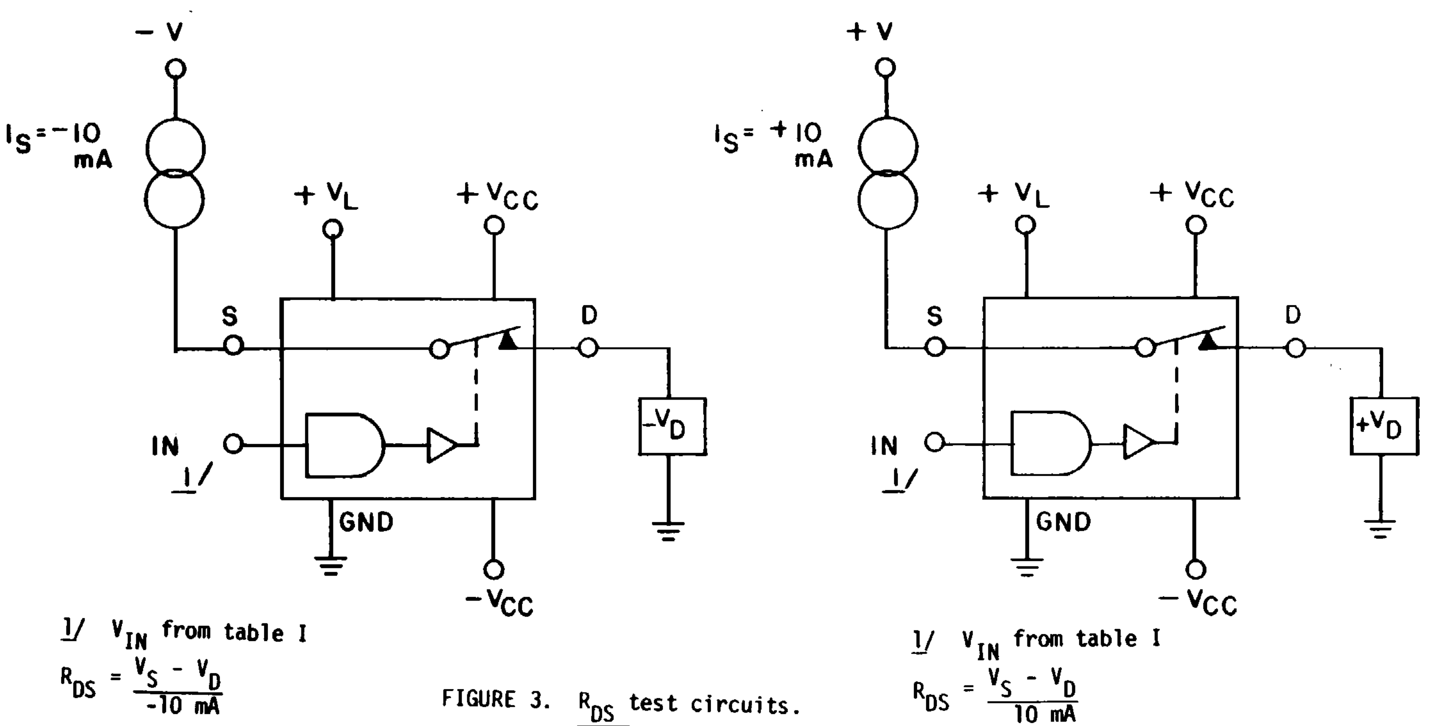


FIGURE 2. Schematic circuits.



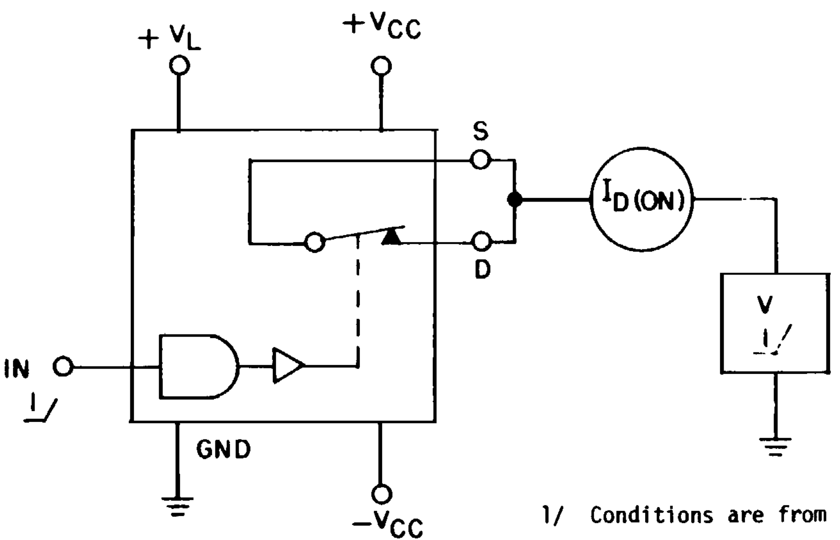
1/ V_{IN} from table I

$R_{DS} = \frac{V_S - V_D}{-10\ mA}$

1/ V_{IN} from table I

$R_{DS} = \frac{V_S - V_D}{10\ mA}$

FIGURE 3. R_{DS} test circuits.



1/ Conditions are from table I.

FIGURE 4. $I_{D(on)}$ test circuit.

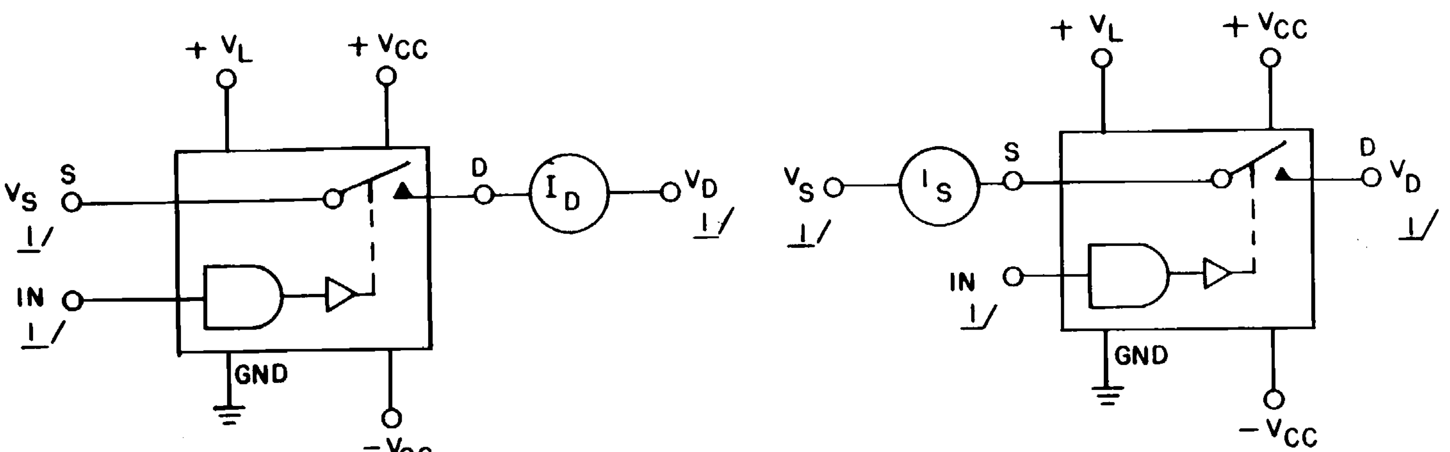


FIGURE 5. $I_{D(off)}$ test circuit.

1/ Test conditions are from table I.

FIGURE 6. $I_{S(off)}$ test circuit.

+ VL
+ VCC
S
D
VIN
1/
I IN
GND
- VCC

1/ Test conditions are from table I.

FIGURE 7. I_{IL}, I_{IH} test circuit.

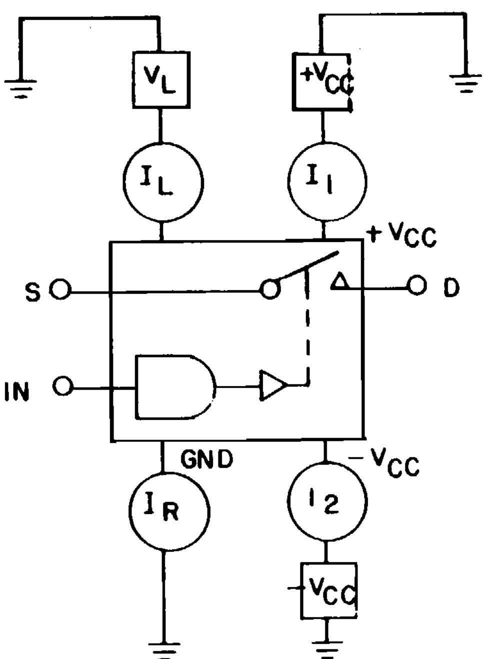
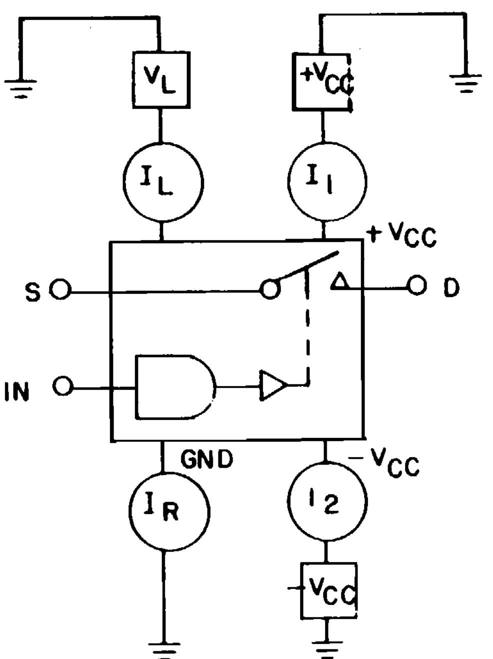
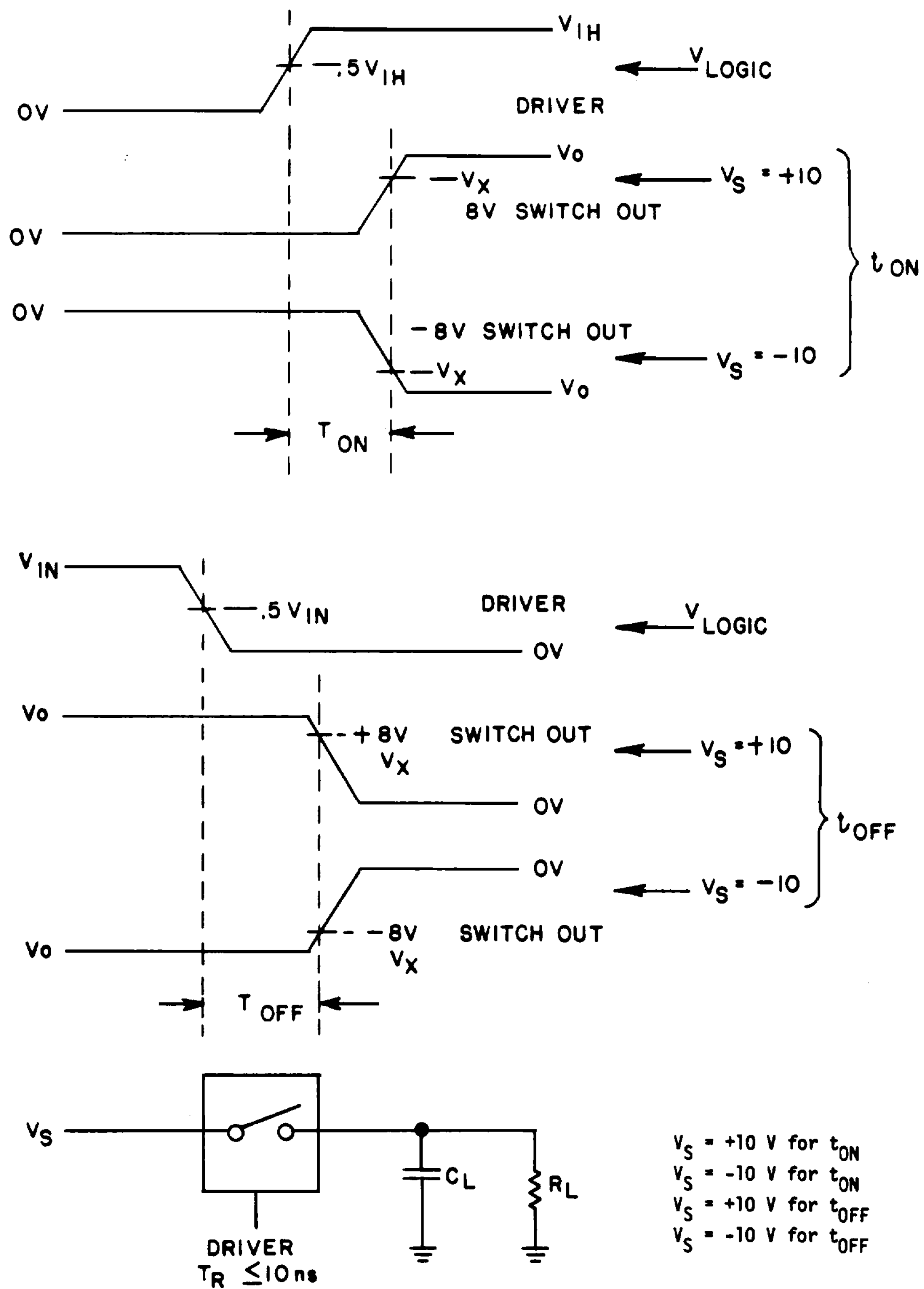



FIGURE 8. I^{+}, I^{-} test circuit.



R_L = 1 kΩ ±5%.
C_L = 100 pF ±5% (includes test and jig capacitance.)

FIGURE 9. Input-output waveforms for time delay tests.

NOTES:
1. The logic driver shall have the following characteristics:

   a. V_{LOGIC} = 0 V to +3 V for device types 01 through 08.
   b. Rise time (0.3 V to 2.7 V) $\leq$ 10 ns for device types 01 through 08.
      Fall time (2.7 V to 0.3 V) $\leq$ 10 ns for device types 01 through 08.

2. See 3.4.1 for appropriate switching conditions.
3. V_{SOURCE} (V_S) = +10 V and -10 V for t_{ON}.
   V_{SOURCE} (V_S) = +10 V and -10 V for t_{OFF}.
4. V_x = +8 V for +10 V condition in (3), above.
   V_x = -8 V for -10 V condition in (3), above.

FIGURE 9. Input-output waveforms for time delay tests - Continued.

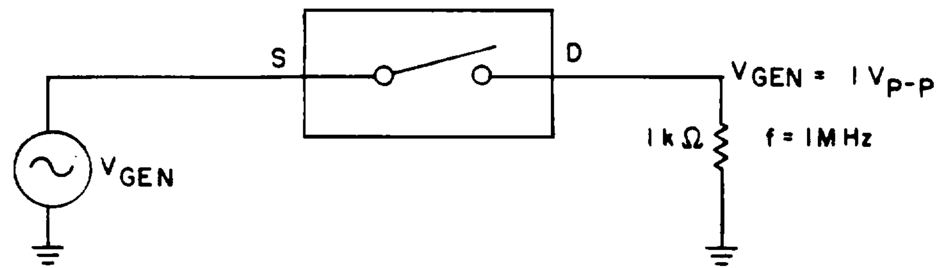


FIGURE 10. Isolation test circuit.

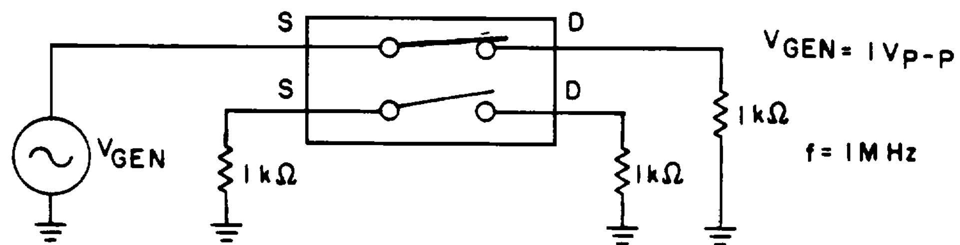


FIGURE 11. Crosstalk test circuit.

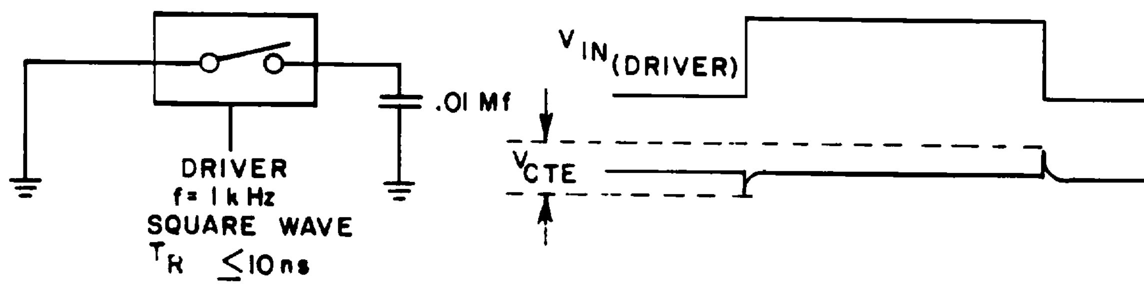
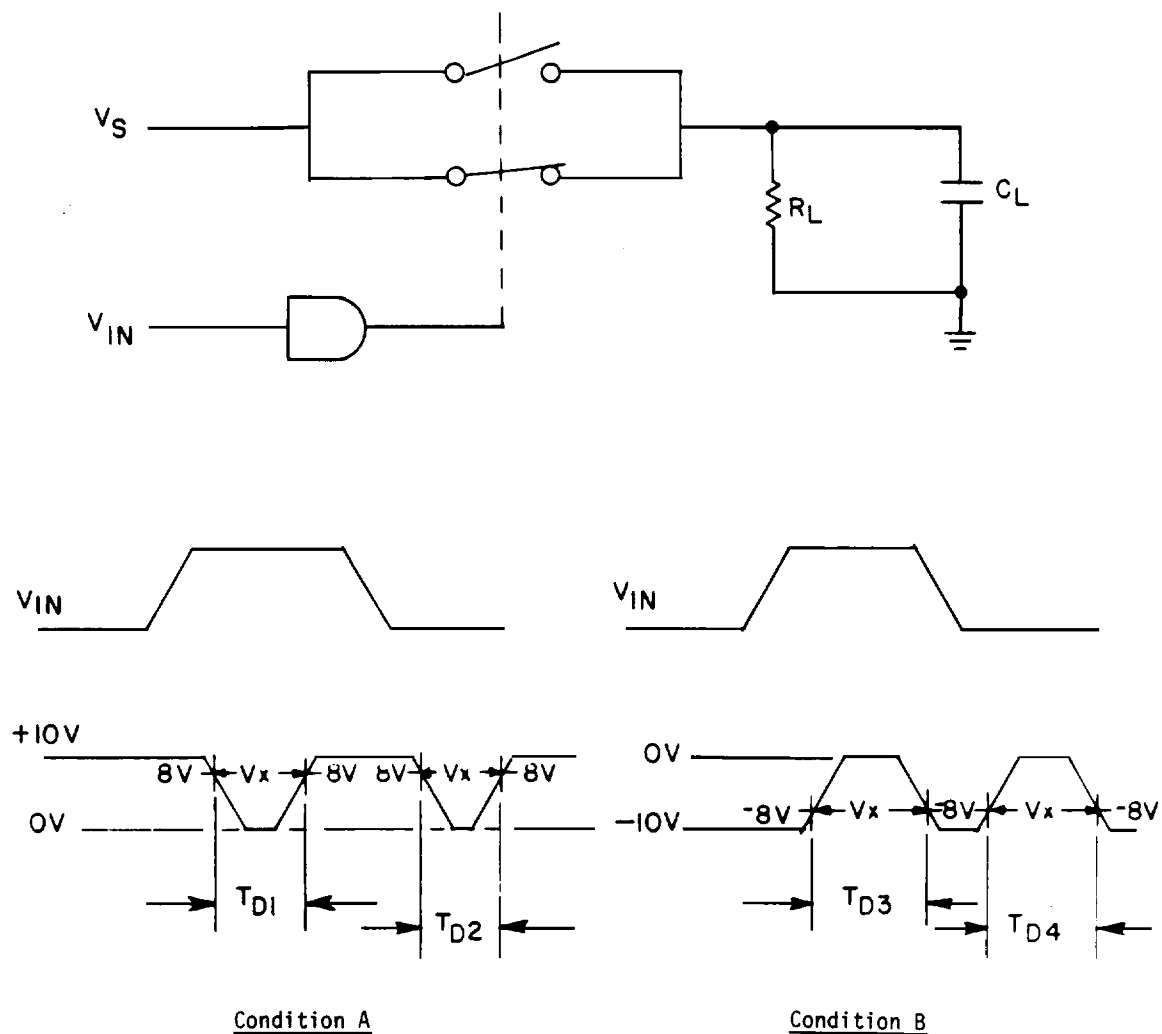


FIGURE 12. Charge transfer error test circuit.



NOTES:

1. R_L = 1 kΩ ±5%, C_L = 100 pF ±5%.
2. t_{D1}, t_{D2}, t_{D3}, and t_{D4} shall all be measured. These measurements shall apply only to device types 03, 04, and 07 (see 3.4.1 for switch conditions).
3. V_{SOURCE} (V_S) = +10 V for condition A (all device types).
   V_{SOURCE} (V_S) = -10 V for condition B (all device types).
4. V_x = +8 V for condition A (all device types).
   V_x = -8 V for condition B (all device types).
5. The logic driver shall have the following characteristics:

   a. V_{LOGIC} = 0 V to 3 V for device types 01 through 08.
   b. Rise time (0.3 V to 2.7 V) ≤ 10 ns for device types 01 through 08.
      Fall time (2.7 to 0.3 V) ≤ 10 ns for device types 01 through 08.

FIGURE 13. Break-before-make test circuit.

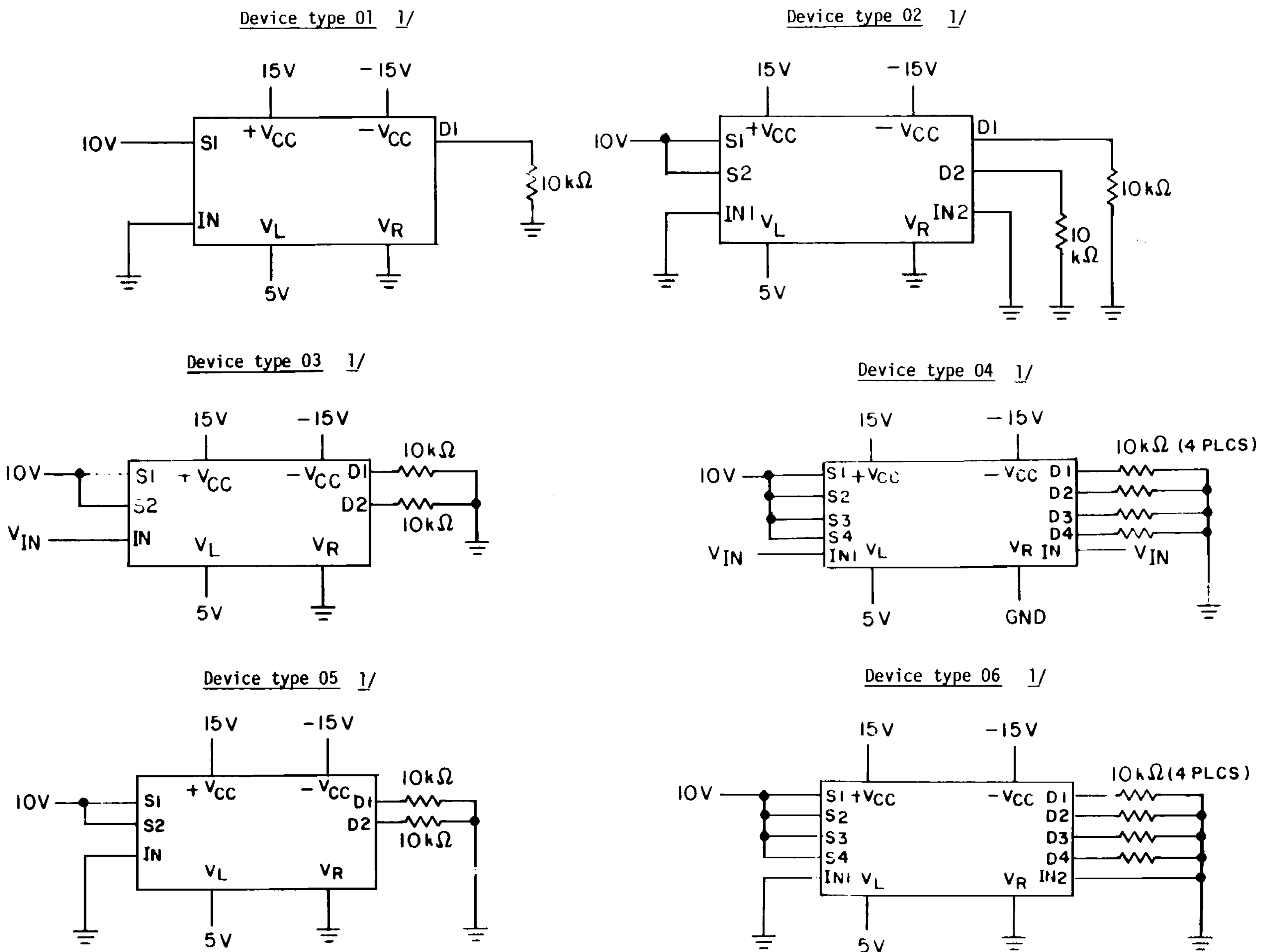
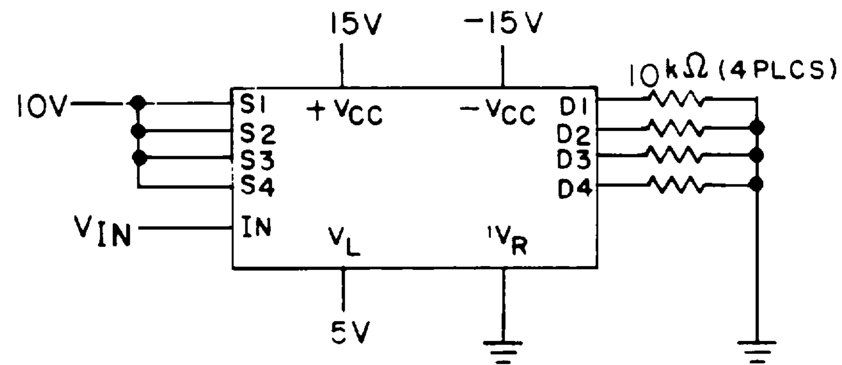
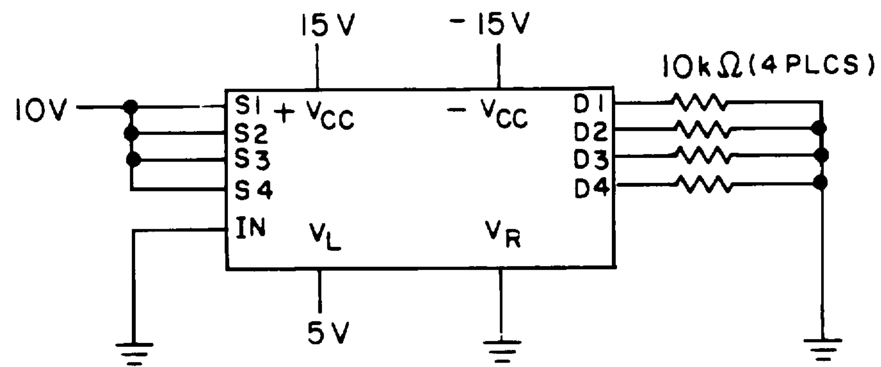


FIGURE 14. Test circuit, static burn-in and operating life test.

Device type 07 1/



Device type 08 1/



NOTE: See 4.3b for
V_{IN} = 0 V.
V_{IN} = 15 V.

FIGURE 14. Test circuit, static burn-in and operating life test - Continued.

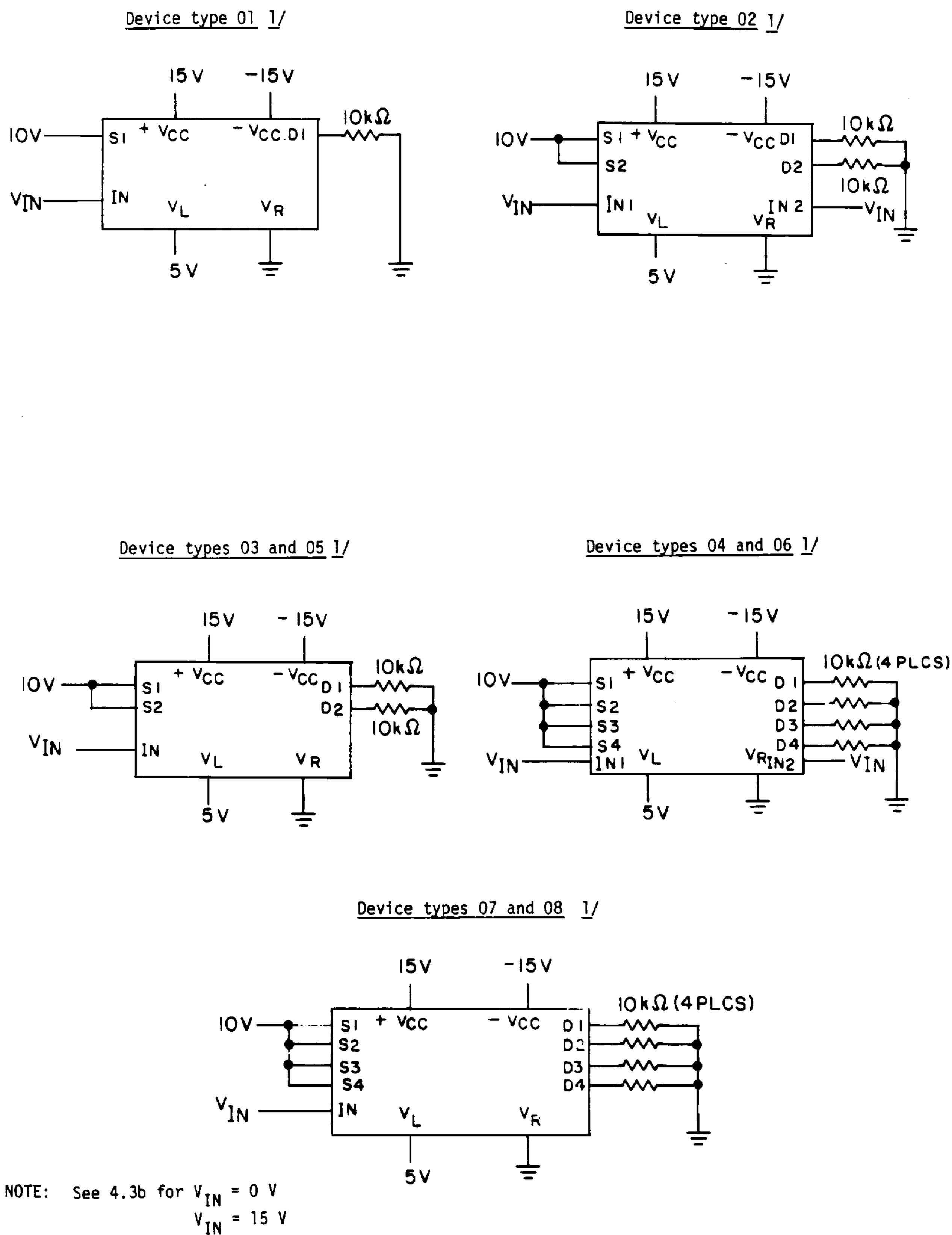


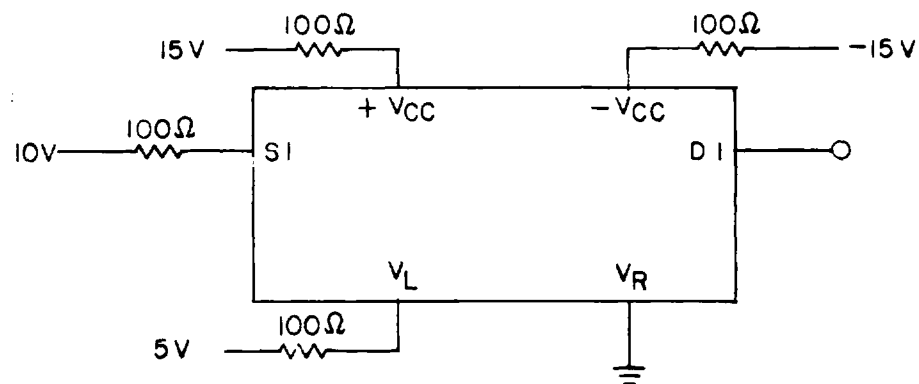
FIGURE 15. Test circuit, dynamic burn-in and operating life test.

NOTE: The pulse generator shall have the following characteristics:

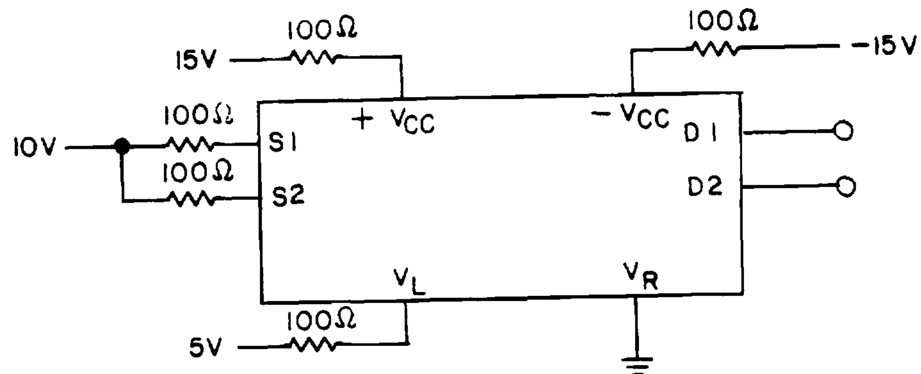
V_{GEN} = 0 V to 5 V.
Rise time ≤ 10 ns.
Fall time ≤ 10 ns.
PRR = 1 kHz at 50% duty cycle.

FIGURE 15. Test circuit, dynamic burn-in and operating life test - Continued.

Device type 01



Device types 02, 03, and 05



Device types 04, 06, 07, and 08

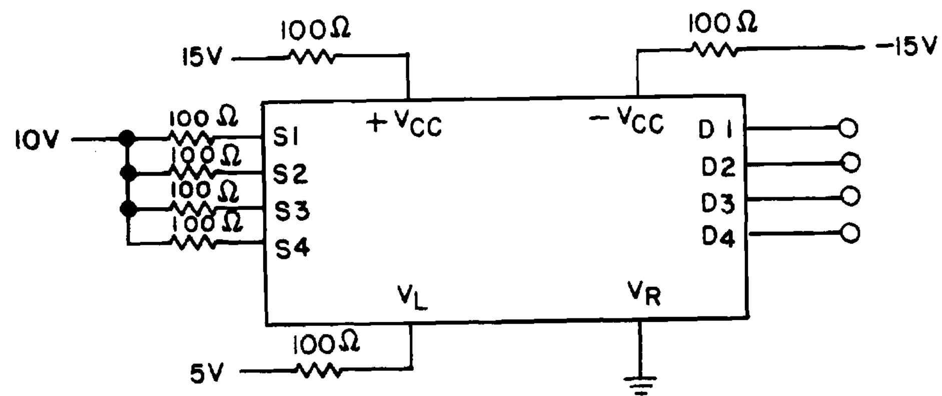


FIGURE 16. Test circuit, accelerated burn-in and operating life test.

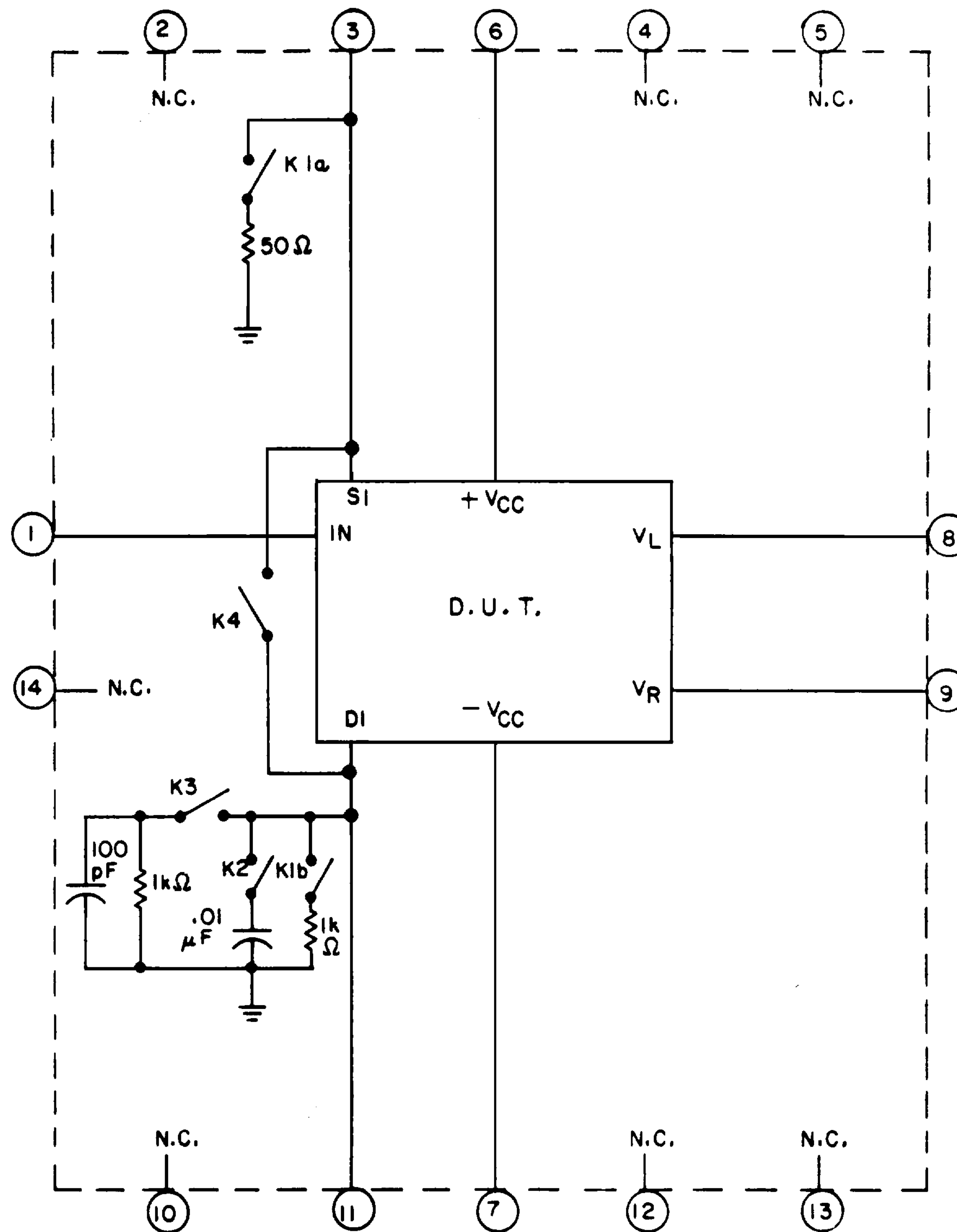


FIGURE 17. Test circuit (static and dynamic tests) for device type 01.

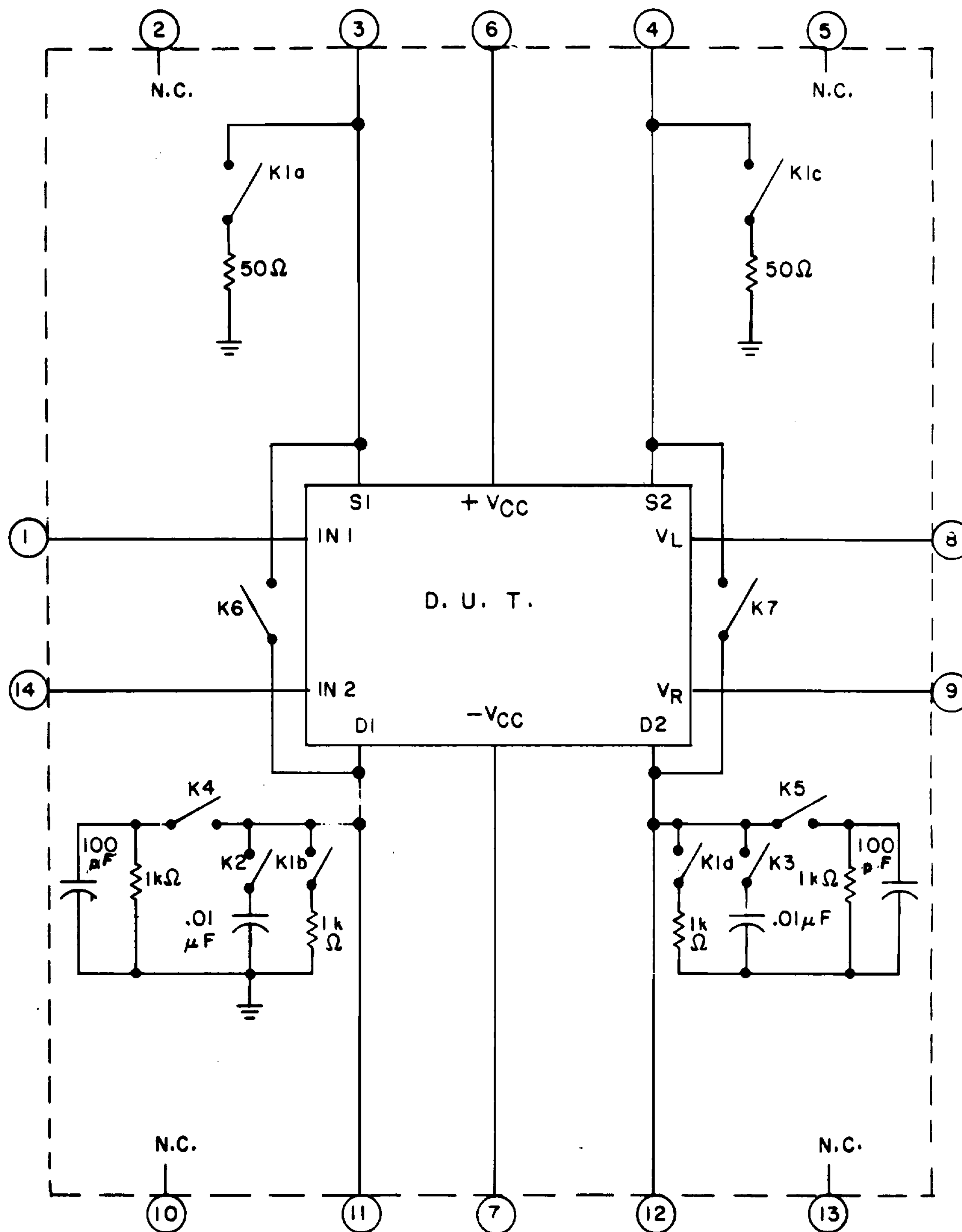


FIGURE 18. Test circuit (static and dynamic tests) for device type 02.

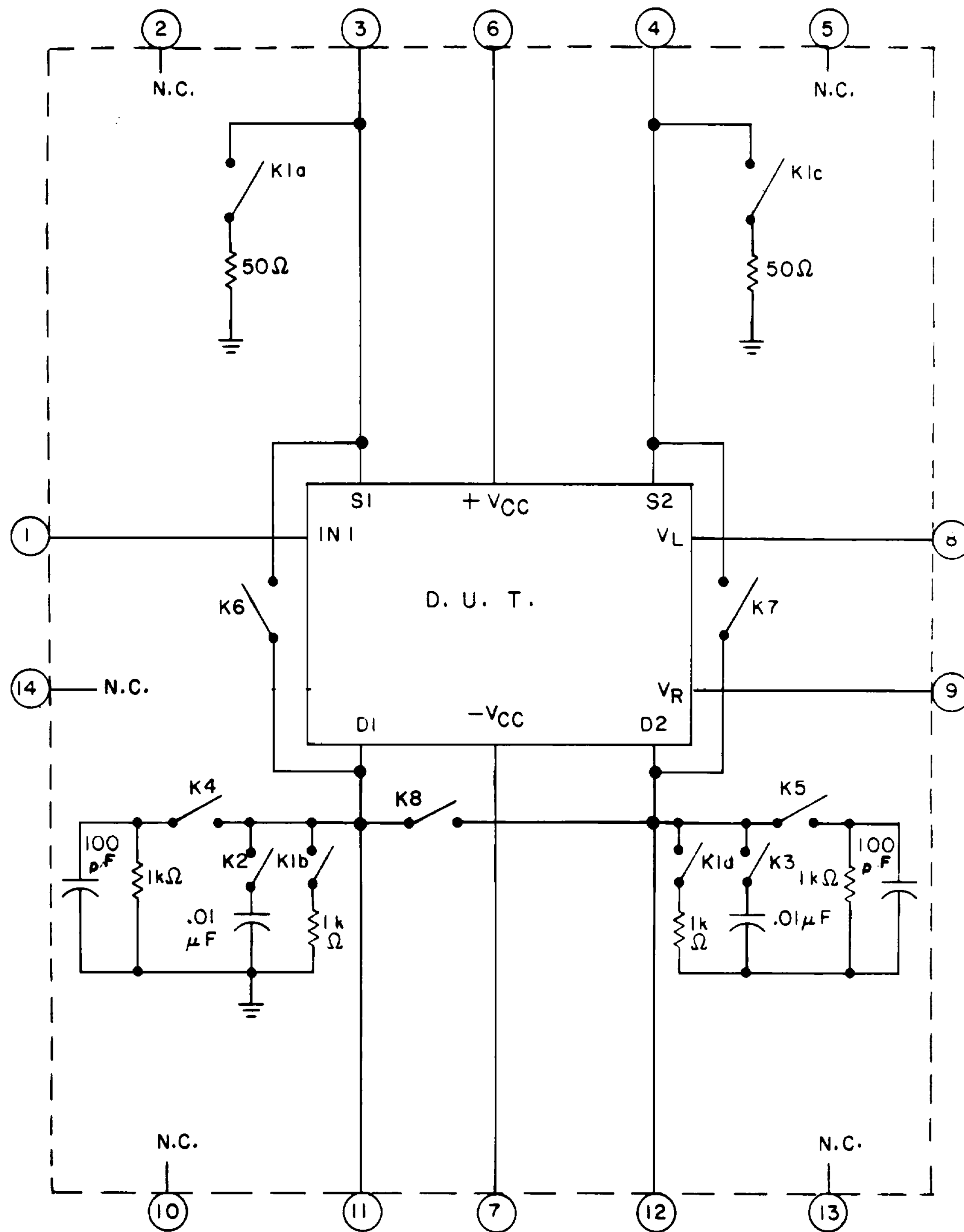


FIGURE 19. Test circuit (static and dynamic tests) for device types 03 and 05.

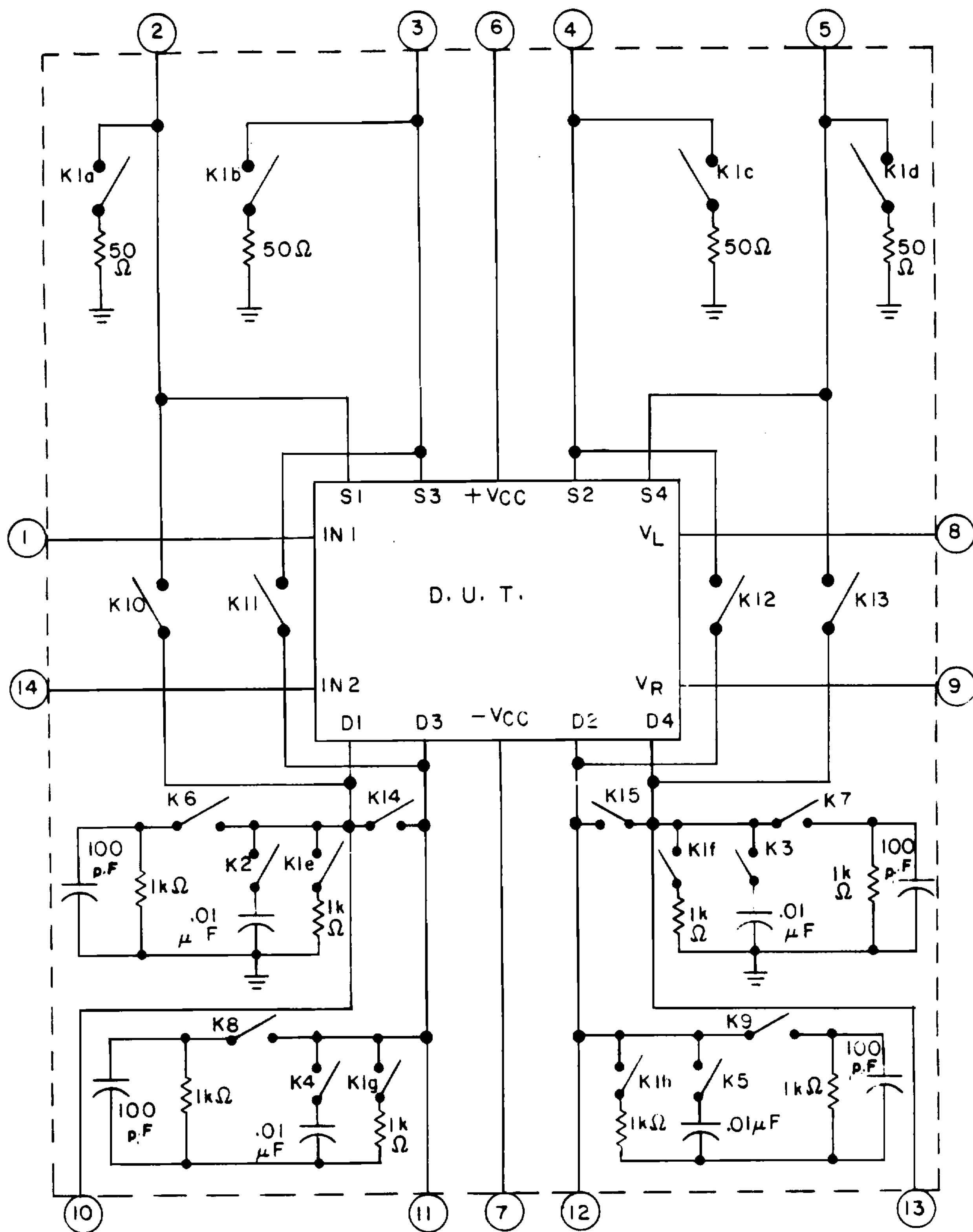


FIGURE 20. Test circuit (static and dynamic tests) for device types 04 and 06.

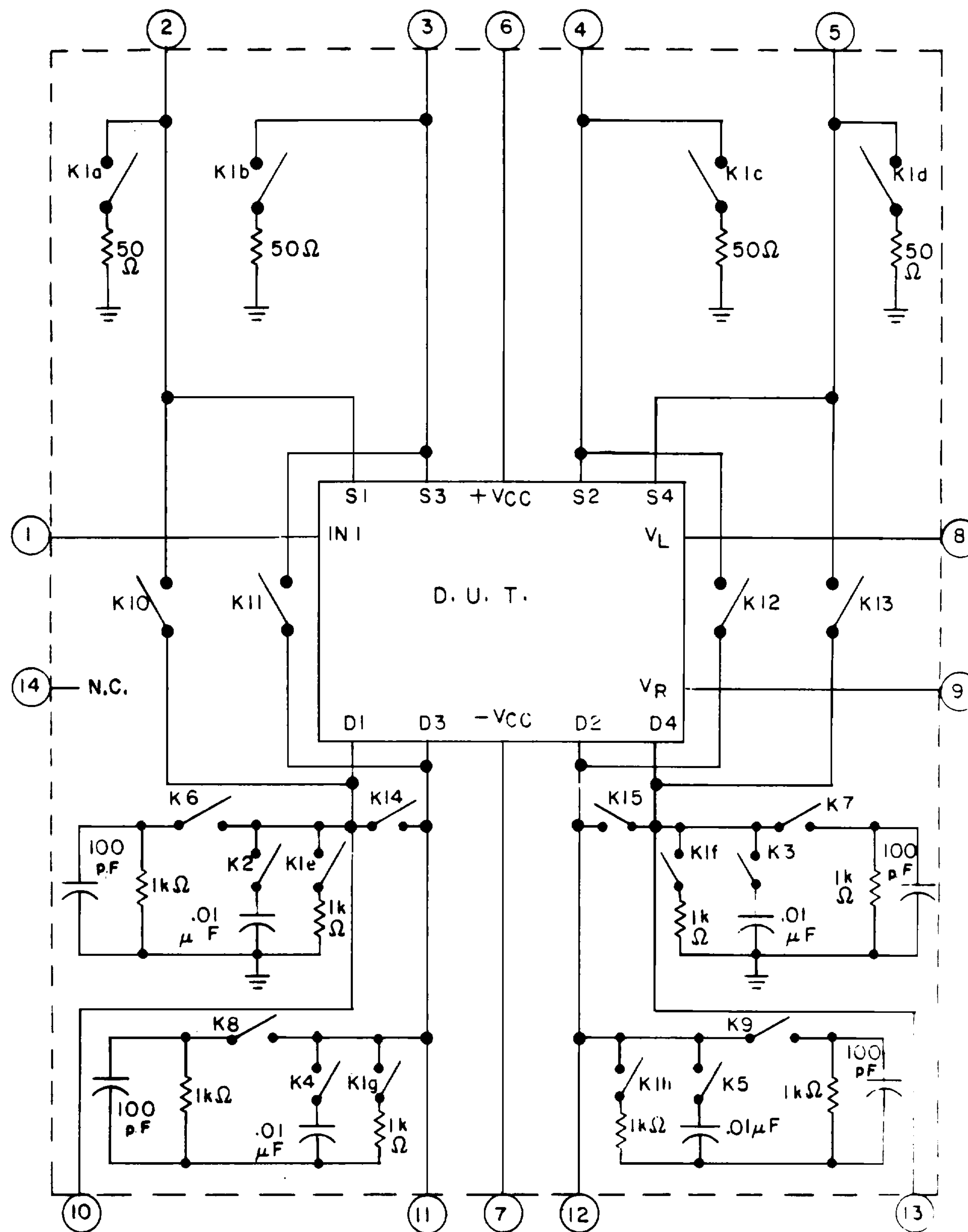


FIGURE 21. Test circuit (static and dynamic tests) for device types 07 and 08.

TABLE III. Group A inspection for device type 01.

Symbol	Test number	IN (1)	N.C. (2)	S_1 (3)	N.C. (4)	N.C. (5)	$+V_{CC}$ (6)	$-V_{CC}$ (7)	V_L (8)	V_R (9)	N.C. (10)	D_1 (11)	N.C. (12)	N.C. (13)	N.C. (14)	Relays energized	Measured pin number	Subgroup 1 T_C = 25°C Min	Subgroup 1 Max	Subgroup 2 T_C = 125°C Min	Subgroup 2 Max	Subgroup 3 T_C = -55°C Min	Subgroup 3 Max	Unit
		Adapter pin number 1/																						
R_{DS}	1	2.4 V		10.0 mA			15.0 V	-15.0 V	+5.0 V	GND		-10.0 V				None	3		-9.25		-8.50		-9.25	V 2/
	2			-10.0 mA			15.0 V	-15.0 V				10.0 V					3	9.25		8.50		9.25		
	3			10.0 mA			10.0 V	-10.0 V				-7.5 V					3		-6.75		-6.0		-6.75	
	4			-10.0 mA			10.0 V	-10.0 V				7.5 V					3	6.75		6.0		6.75		
$I_{D(ON)}$	5			10.0 V			15.0 V	-15.0 V				10.0 V				K4	3	-2	2	-200	200	-200	200	nA
	6			-10.0 V								-10.0 V				K4	3	-2	2	-200	200	-200	200	
$I_{D(OFF)}$	7	0.8 V		-10.0 V								10.0 V				None	11	-1	1	-100	100	-100	100	
	8			10.0 V								-10.0 V					11			-100	100	-100	100	
$I_{S(OFF)}$	9			-10.0 V								10.0 V					3			-100	100	-100	100	
	10			10.0 V								-10.0 V					3			-100	100	-100	100	
I_{IL}	11	0.0 V															1	-1	0	-10	0	-1	0	µA
I_{IH}	12	2.4 V															1	0	1	0	10	0	1	
	13	5.0 V															1	0	1	0	10	0	1	
$+I_{CC}$	14	0.0 V															6	---	10	---	100	---	10	
	15	5.0 V															6	---	10	---	100	---	10	
$-I_{CC}$	16	0.0 V															7	-10	---	-100	---	-10	---	
	17	5.0 V															7	-10	---	-100	---	-10	---	
$+I_L$	18	0.0 V															8	---	10	---	100	---	10	
	19	5.0 V															8	---	10	---	100	---	10	
$+I_R$	20	0.0 V															9	-10	---	-100	---	-10	---	
	21	5.0 V															9	-10	---	-100	---	-10	---	
																		Subgroup 4 T_C = 25°C Min	Max	Subgroup 7 T_C = 25°C Min	Max	Subgroup 9 T_C = 25°C Min	Max	
V_{CTE}	22	IN 3/					15.0 V	-15.0 V	+5.0 V	GND						K2	11	---	15					mV
V_{CT}	23	0.8 V		IN 4/	$dB_{CT} = -20 \log (V_{OUT}/V_{IN})$		15.0 V	-15.0 V	+5.0 V	GND						K1	11			50	3.16			mVp-p dB
V_{ISO}	24	2.4 V		IN 4/	$dB_{ISO} = -20 \log (V_{OUT}/V_{IN})$		15.0 V	-15.0 V	+5.0 V	GND						K1	11			50	3.16			mVp-p dB
t_{ON}	25	IN		IN			15.0 V	-15.0 V	+5.0 V	GND		OUT				K3	1 to 11						450	ns
t_{OFF}	26	IN		IN								OUT				K3	1 to 11						250	ns
																		Subgroup 10 T_C = 125°C Min	Max	Subgroup 11 T_C = -55°C Min	Max	Subgroup 12 T_C = 25°C Min	Max	
t_{ON}	27	IN		IN			15.0 V	-15.0 V	+5.0 V	GND		OUT				K3	1 to 11		550					ns
t_{OFF}	28	IN		IN								OUT							400					
t_{ON}	29	IN		IN								OUT									375			
t_{OFF}	30	IN		IN								OUT					1				190			
C_A	31	0.0 V														None	1						6	pF
C_{TS}	32																3						10	
C_{OS}	33																11						10	

See notes at end of table.

TABLE III. Group A inspection for device type 02.

Symbol	Test number	Adapter pin number 1/ IN1	N.C.	S_1	S_2	N.C.	$+V_{CC}$	$-V_{CC}$	V_L	V_R	N.C.	D_1	D_2	N.C.	IN2	Relays energized	Measured pin number	Test limits Subgroup 1 T_C = 25°C Min	Max	Subgroup 2 T_C = 125°C Min	Max	Subgroup 3 T_C = -55°C Min	Max	Unit
		1	2	3	4	5	6	7	8	9	10	11	12	13	14									
R_{DS}	1	2.4 V		10.0 mA			15.0 V	-15.0 V	+5.0 V	GND		-10.0 V				None	3		-9.25		-8.50		-9.25	V 2/
	2				10.0 mA								-10.0 V		2.4 V		4		-9.25		-8.50		-9.25	
	3	2.4 V		-10.0 mA								10.0 V					3	9.25		8.50		9.25		
	4				-10.0 mA								10.0 V		2.4 V		4	9.25		8.50		9.25		
	5	2.4 V		10.0 mA			10.0 V	-10.0 V				-7.5 V					3		-6.75		-6.0		-6.75	
	6				10.0 mA								-7.5 V		2.4 V		4		-6.75		-6.0		-6.75	
	7	2.4 V		-10.0 mA								7.5 V					3	6.75		6.0		6.75		
	8				-10.0 mA								7.5 V		2.4 V		4	6.75		6.0		6.75		
$I_{D(ON)}$	9	2.4 V		10.0 V			15.0 V	-15.0 V				10.0 V				K6	3	-2	2	-200	200	-200	200	nA
	10				10.0 V								10.0 V		2.4 V	K7	4							
	11	2.4 V		-10.0 V								-10.0 V				K6	3							
	12				-10.0 V								-10.0 V		2.4 V	K7	4							
$I_{D(OFF)}$	13	0.8 V		-10.0 V								10.0 V				None	11	-1	1	-100	100	-100	100	
	14				-10.0 V								10.0 V		0.8 V		12							
	15	0.8 V		10.0 V								-10.0 V					11							
	16				10.0 V								-10.0 V		0.8 V		12							
$I_{S(OFF)}$	17	0.8 V		-10.0 V								10.0 V					3							
	18				-10.0 V								10.0 V		0.8 V		4							
	19	0.8 V		10.0 V								-10.0 V					3							
	20				10.0 V								-10.0 V		0.8 V		4							
I_{IL}	21	0.0 V															1	-1	0	-10	0	-1	0	μA
	22														0.0 V		14	-1	0	-10	0	-1	0	
I_{IH}	23	2.4 V															1	0	1	0	10	0	1	
	24														2.4 V		14	0	1					
	25	5.0 V															1	0	1					
	26														5.0 V		14	0	1					
$+I_{CC}$	27	0.0 V													0.0 V		6	---	10	---	100	---	10	
	28	5.0 V													5.0 V		6	---	10	---	100	---	10	
$-I_{CC}$	29	0.0 V													0.0 V		7	-10	---	-100	---	-10	---	
	30	5.0 V													5.0 V		7	-10	---	-100	---	-10	---	
$+I_L$	31	0.0 V													0.0 V		8	---	10	---	100	---	10	
	32	5.0 V													5.0 V		8	---	10	---	100	---	10	
$-I_R$	33	0.0 V													0.0 V		9	-10	---	-100	---	-10	---	
	34	5.0 V													5.0 V		9	-10	---	-100	---	-10	---	
																		Subgroup 4 T_C = 25°C Min	Max	Subgroup 7 T_C = 25°C Min	Max	Subgroup 9 T_C = 25°C Min	Max	
V_{CTE}	35	IN 3/					15.0 V	-15.0 V	+5.0 V	GND						K2	11	---	15					mV
	36														IN 3/	K3	12	---	15					
V_{CT}	37	0.8 V													2.4 V	K1	12				3.16			mVp-p
				$dB_{CT} = -20 \log (V_{OUT}/V_{IN})$																50				dB
V_{ISO}	38	2.4 V		IN 4/			15.0 V	-15.0 V	+5.0 V	GND						K1	11				3.16			mVp-p
	39				IN 4/		15.0 V	-15.0 V	+5.0 V	GND					2.4 V	K1	12				3.16			
				$dB_{ISO} = -20 \log (V_{OUT}/V_{IN})$																50				dB
t_{ON}	40	IN		IN								OUT				K4	1 to 11						450	ns
	41				IN								OUT		IN	K5	14 to 12						450	
t_{OFF}	42	IN		IN								OUT				K4	1 to 11						250	
	43				IN								OUT		IN	K5	14 to 12						250	

See notes at end of table.

TABLE III. Group A inspection for device type 02 - Continued.

Symbol	Test number	IN1	N.C.	S_1	S_2	N.C.	$+V_{CC}$	$-V_{CC}$	V_L	V_R	N.C.	D_1	D_2	N.C.	IN2	Relays energized	Measured pin number	Subgroup 10 T_C = 125°C Min	Subgroup 10 T_C = 125°C Max	Subgroup 11 T_C = -55°C Min	Subgroup 11 T_C = -55°C Max	Subgroup 12 T_C = 25°C Min	Subgroup 12 T_C = 25°C Max	Unit
		1	2	3	4	5	6	7	8	9	10	11	12	13	14									
t_{ON}	44	IN		IN			15.0 V	-15.0 V	+5.0 V	GND		OUT				K4	1 to 11	---	550					ns
	45				IN								OUT		IN	K5	14 to 12	---	550					
t_{OFF}	46	IN		IN								OUT				K4	1 to 11	---	400					
	47				IN								OUT		IN	K5	14 to 12	---	400					
t_{ON}	48	IN		IN								OUT				K4	1 to 11			---	375			
	49				IN								OUT		IN	K5	14 to 12			---	375			
t_{OFF}	50	IN		IN								OUT				K4	1 to 11			---	190			
	51				IN								OUT		IN	K5	14 to 12			---	190			
C_A	52	0.0 V														None	1					---	6	pF
	53														0.0 V		14					---	6	
C_{IS}	54																3					---	10	
	55																4					---	10	
C_{DS}	56																11					---	10	
	57																12					---	10	

Adapter pin number 1/

See notes at end of table.

TABLE III. Group A inspection for device type 03, 05.

Symbol	Test number	Adapter pin number 1/ IN	IN	N.C.	S_1	S_2	N.C.	$+V_{CC}$	$-V_{CC}$	V_L	V_R	N.C.	D_1	D_2	N.C.	N.C.	Relays energized	Measured pin number	Test limits Subgroup 1 T_C = 25°C Min	Max	Subgroup 2 T_C = 125°C Min	Max	Subgroup 3 T_C = -55°C Min	Max	Unit
		1 6/	1 7/	2	3	4	5	6	7	8	9	10	11	12	13	14									
R_{DS}	1	0.8 V	2.4 V			10.0 mA		15.0 V	-15.0 V	+5.0 V	GND			-10.0 V			None	4		-9.25		-8.50		-9.25	V 2/
↓	2	2.4 V	↓		10.0 mA			↓	↓	↓	↓		-10.0 V				↓	3		-9.25		-8.50		-9.25	↓
	3	0.8 V				-10.0 mA								10.0 V				4	9.25		8.50		9.25		
	4	2.4 V			-10.0 mA								10.0 V					3	9.25		8.50		9.25		
	5	0.8 V				10.0 mA		10.0 V	-10.0 V					-7.5 V				4		-6.75		-6.0		-6.75	
	6	2.4 V			10.0 mA			↓	↓				-7.5 V					3		-6.75		-6.0		-6.75	
	7	0.8 V				-10.0 mA								7.5 V				4	6.75		6.0		6.75		
	8	2.4 V			-10.0 mA								7.5 V					3	6.75		6.0		6.75		
$I_{D(ON)}$	9	0.8 V				10.0 V		15.0 V	-15.0 V					10.0 V			K7	4	-2	2	-200	200	-200	200	mA
↓	10	2.4 V			10.0 V			↓	↓				10.0 V				K6	3	↓	↓	↓	↓	↓	↓	↓
	11	0.8 V				-10.0 V								-10.0 V			K7	4							
	12	2.4 V	↓		-10.0 V								-10.0 V				K6	3							
$I_{D(OFF)}$	13	0.8 V	0.8 V		-10.0 V								10.0 V				None	11	-1	1	-100	100	-100	100	
↓	14	2.4 V	↓			-10.0 V								10.0 V			↓	12	↓	↓	↓	↓	↓	↓	
	15	0.8 V			10.0 V								-10.0 V					11							
	16	2.4 V				10.0 V								-10.0 V				12							
$I_{S(OFF)}$	17	0.8 V			-10.0 V								10.0 V					3							
↓	18	2.4 V				-10.0 V								10.0 V				4							
	19	0.8 V			10.0 V								-10.0 V					3							
	20	2.4 V	↓			10.0 V								-10.0 V				4							
I_{IL}	21	0.0 V	0.0 V															1	-1	0	-10	0	-1	0	µA
I_{IH}	22	2.4 V	2.4 V															1	0	1	0	10	0	1	↓
	23	5.0 V	5.0 V															1	0	1	0	10	0	1	
$+I_{CC}$	24	0.0 V	0.0 V															6	---	10	---	100	---	10	
	25	5.0 V	5.0 V															6	---	10	---	100	---	10	
$-I_{CC}$	26	0.0 V	0.0 V															7	-10	---	-100	---	-10	---	
	27	5.0 V	5.0 V															7	-10	---	-100	---	-10	---	
$+I_L$	28	0.0 V	0.0 V															8	---	10	---	100	---	10	
	29	5.0 V	5.0 V															8	---	10	---	100	---	10	
$+I_R$	30	0.0 V	0.0 V					↓	↓	↓	↓						↓	9	-10	---	-100	---	-10	---	
	31	5.0 V	5.0 V															9	-10	---	-100	---	-10	---	↓

See notes at end of table.

TABLE III. Group A inspection for device type 03, 05 - Continued.

Symbol	Test number	IN	N.C.	S_1	S_2	N.C.	$+V_{CC}$	$-V_{CC}$	V_L	V_R	N.C.	D_1	D_2	N.C.	N.C.	Relays energized	Measured pin number	Subgroup 4 T_C = 25°C		Subgroup 7 T_C = 25°C		Subgroup 9 T_C = 25°C		Unit
		Adapter pin number 1/																Test limits						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14			Min	Max	Min	Max	Min	Max	
V_{CTE}	32	IN 3/		GND	GND		15.0 V	-15.0 V	+5.0 V	GND						K2	11	---	15					mV
	33	IN 3/					↓	↓	↓	↓						K3	12	---	15					
V_{CT}	34	2.4 V		IN 4/	dB_{ot} = 20 log (V_{OUT}/V_{IN})											K1	12			50	3.16			mVp-p dB
V_{ISO}	35	2.4 V			IN 4/		15.0 V	-15.0 V	+5.0 V	GND						K1	12				3.16			mVp-p
	36	0.8 V		IN 4/			15.0 V	-15.0 V	+5.0 V	GND						K1	11				3.16			mVp-p
				dB_{ISO} = -20 log (V_{OUT}/V_{IN})																50				dB
t_{ON}	37	IN		IN			15.0 V	-15.0 V	+5.0 V	GND		OUT				K4	11						450	ns
	38	↓			IN		↓	↓	↓	↓			OUT			K5	12						450	↓
t_{OFF}	39	↓		IN			↓	↓	↓	↓		OUT				K4	11						250	↓
	40	↓			IN		↓	↓	↓	↓			OUT			K5	12						250	↓
																		Subgroup 10 T_C = 125°C		Subgroup 11 T_C = -55°C		Subgroup 12 T_C = 25°C		
																		Min	Max	Min	Max	Min	Max	
t_{ON}	41	IN		IN			15.0 V	-15.0 V	+5.0 V	GND		OUT				K4	11		550					ns
	42	↓			IN		↓	↓	↓	↓			OUT			K5	12		550					↓
t_{OFF}	43	↓		IN			↓	↓	↓	↓		OUT				K4	11		400					↓
	44	↓			IN		↓	↓	↓	↓			OUT			K5	12		400					↓
t_{ON}	45	↓		IN			↓	↓	↓	↓		OUT				K4	11				375			↓
	46	↓			IN		↓	↓	↓	↓			OUT			K5	12				375			↓
t_{OFF}	47	↓		IN			↓	↓	↓	↓		OUT				K4	11				190			↓
	48	↓			IN		↓	↓	↓	↓			OUT			K5	12				190			↓
C_A	49	0.0 V					↓	↓	↓	↓						None	1						6	pF
C_{IS}	50						↓	↓	↓	↓						↓	3						10	↓
	51						↓	↓	↓	↓						↓	4						10	↓
C_{OS}	52						↓	↓	↓	↓						↓	11						10	↓
	53						↓	↓	↓	↓						↓	12						10	↓
																		Subgroup 13 T_C = 25°C		Subgroup 14 T_C = 125°C		Subgroup 14 T_C = -55°C		
																		Min	Max	Min	Max	Min	Max	
t_D 5/	54	IN		IN	IN		15.0 V	-15.0 V	+5.0 V	GND						K4, K8	11	20	---					ns
	55	↓		↓	↓		↓	↓	↓	↓						↓	12	20	---					↓
t_D 5/	56	↓		↓	↓		↓	↓	↓	↓						↓	11			20	---			↓
	57	↓		↓	↓		↓	↓	↓	↓						↓	12			20	---			↓
t_D 5/	58	↓		↓	↓		↓	↓	↓	↓						↓	11					20	---	↓
	59	↓		↓	↓		↓	↓	↓	↓						↓	12					20	---	↓

See notes at end of table.

TABLE III. Group A inspection for device type 04, 06.

Symbol	Test number	Adapter pin number 1/																Relays energized	Measured pin number	Test limits						Unit
		IN1	IN1	S_1	S_3	S_2	S_4	$+V_{CC}$	$-V_{CC}$	V_L	V_R	D_1	D_3	D_2	D_4	IN2	IN2			Subgroup 1 T_C = 25°C		Subgroup 2 T_C = 125°C		Subgroup 3 T_C = -55°C		
		1 8/	1 9/	2	3	4	5	6	7	8	9	10	11	12	13	14 8/	14 9/			Min	Max	Min	Max	Min	Max	
R_{DS}	1	2.4 V	2.4 V	10.0 mA				15.0 V	-15.0 V	+5.0 V	GND	-10.0 V						None	2		-9.25		-8.50		-9.25	V 2/
	2	2.4 V	0.8 V		10.0 mA								-10.0 V						3		-9.25		-8.50		-9.25	
	3					10.0 mA								-10.0 V		2.4 V	2.4 V		4		-9.25		-8.50		-9.25	
	4						10.0 mA								-10.0 V	2.4 V	0.8 V		5		-9.25		-8.50		-9.25	
	5	2.4 V	2.4 V	-10.0 mA								10.0 V							2	9.25		8.50		9.25		
	6	2.4 V	0.8 V		-10.0 mA								10.0 V						3	9.25		8.50		9.25		
	7					-10.0 mA								10.0 V		2.4 V	2.4 V		4	9.25		8.50		9.25		
	8						-10.0 mA								10.0 V	2.4 V	0.8 V		5	9.25		8.50		9.25		
	9	2.4 V	2.4 V	10.0 mA				10.0 V	-10.0 V			-7.5 V							2		-6.75		-6.0		-6.75	
	10	2.4 V	0.8 V		10.0 mA								-7.5 V						3		-6.75		-6.0		-6.75	
	11					10.0 mA								-7.5 V		2.4 V	2.4 V		4		-6.75		-6.0		-6.75	
	12						10.0 mA								-7.5 V	2.4 V	0.8 V		5		-6.75		-6.0		-6.75	
	13	2.4 V	2.4 V	-10.0 mA								7.5 V							2	6.75		6.0		6.75		
	14	2.4 V	0.8 V		-10.0 mA								7.5 V						3	6.75		6.0		6.75		
	15					-10.0 mA								7.5 V		2.4 V	2.4 V		4	6.75		6.0		6.75		
	16						-10.0 mA								7.5 V	2.4 V	0.8 V		5	6.75		6.0		6.75		
$I_{D(ON)}$	17	2.4 V	2.4 V	10.0 V				15.0 V	-15.0 V			10.0 V						K10	2	-2	2	-200	200	-200	200	nA
	18	2.4 V	0.8 V		10.0 V								10.0 V					K11	3							
	19					10.0 V								10.0 V		2.4 V	2.4 V	K12	4							
	20						10.0 V								10.0 V	2.4 V	0.8 V	K13	5							
	21	2.4 V	2.4 V	-10.0 V								-10.0 V						K10	2							
	22	2.4 V	0.8 V		-10.0 V								-10.0 V					K11	3							
	23					-10.0 V								-10.0 V		2.4 V	2.4 V	K12	4							
	24						-10.0 V								-10.0 V	2.4 V	0.8 V	K13	5							
$I_{D(OFF)}$	25	0.8 V	0.8 V	-10.0 V								10.0 V						None	10	-1	1	-100	100	-100	100	
	26	0.8 V	2.4 V		-10.0 V								10.0 V						11							
	27					-10.0 V								10.0 V		0.8 V	0.8 V		12							
	28						-10.0 V								10.0 V	0.8 V	2.4 V		13							
	29	0.8 V	0.8 V	10.0 V								-10.0 V							10							
	30	0.8 V	2.4 V		10.0 V								-10.0 V						11							
	31					10.0 V								-10.0 V		0.8 V	0.8 V		12							
	32						10.0 V								-10.0 V	0.8 V	2.4 V		13							
$I_{S(OFF)}$	33	0.8 V	0.8 V	-10.0 V				15.0 V	-15.0 V	+5.0 V	GND	10.0 V							2							
	34	0.8 V	2.4 V		-10.0 V								10.0 V						3							
	35					-10.0 V								10.0 V		0.8 V	0.8 V		4							
	36						-10.0 V								10.0 V	0.8 V	2.4 V		5							
	37	0.8 V	0.8 V	10.0 V								-10.0 V							2							
	38	0.8 V	2.4 V		10.0 V								-10.0 V						3							
	39					10.0 V								-10.0 V		0.8 V	0.8 V		4							
	40						10.0 V								-10.0 V	0.8 V	2.4 V		5							
I_{IL}	41	0.0 V	0.0 V																1	-1	0	-10	0	-1	0	µA
	42															0.0 V	0.0 V		14	-1	0	-10	0	-1	0	
I_{IH}	43	2.4 V	2.4 V																1	0	1	0	10	0	1	
	44															2.4 V	2.4 V		14	0	1	0	10	0	1	
	45	5.0 V	5.0 V																1	0	1	0	10	0	1	
	46															5.0 V	5.0 V		14	0	1	0	10	0	1	
$+I_{CC}$	47	0.0 V	0.0 V													0.0 V	0.0 V		6	---	10	---	100	---	10	
	48	5.0 V	5.0 V													5.0 V	5.0 V		6	---	10	---	100	---	10	
$-I_{CC}$	49	0.0 V	0.0 V													0.0 V	0.0 V		7	-10	---	-100	---	-10	---	
	50	5.0 V	5.0 V													5.0 V	5.0 V		7	-10	---	-100	---	-10	---	
$+I_L$	51	0.0 V	0.0 V													0.0 V	0.0 V		8	---	10	---	100	---	10	
	52	5.0 V	5.0 V													5.0 V	5.0 V		8	---	10	---	100	---	10	
$+I_R$	53	0.0 V	0.0 V													0.0 V	0.0 V		9	-10	---	-100	---	-10	---	
	54	5.0 V	5.0 V													5.0 V	5.0 V		9	-10	---	-100	---	-10	---	

See notes at end of table.

TABLE III. Group A inspection for device type 04, 06 - Continued.

Symbol	Test number	Adapter pin number 1/ IN1	S1	S3	S2	S4	+VCC	-VCC	VL	VR	D1	D3	D2	D4	IN2	Relays energized	Measured pin number	Test limits Subgroup 4 T_C = 25°C Min	Max					Unit
		1	2	3	4	5	6	7	8	9	10	11	12	13	14			Min	Max					
V_{CTE}	55	IN 3/	GND				15.0 V	-15.0 V	+5.0 V	GND						K2	10		15					mV
	56	IN 3/		GND												K4	11							
	57				GND										IN 3/	K5	12							
	58					GND									IN 3/	K3	13							
																		Subgroup 7 T_C = 25°C Min	Max	Subgroup 9 T_C = 25°C Min	Max	Subgroup 10 T_C = 125°C Min	Max	
V_{CT}	59	2.4 V	IN 4/				15.0 V	-15.0 V	+5.0 V	GND						K1	12		3.16					mVp-p
	60			dB_{ot} = -20 log (V_{OUT}/V_{IN})	IN 4/				+5.0 V	GND					2.4 V	K1	10	50	3.16					mVp-p dB
V_{ISO}	61	0.8 V	IN 4/				15.0 V	-15.0 V	+5.0 V	GND						K1	10		3.16					mVp-p
	62	0.8 V		IN 4/												K1	11							
	63				IN 4/										0.8 V	K1	12							
	64			dB_{ISO} = -20 log (V_{OUT}/V_{IN})		IN 4/									0.8 V	K1	13	50						dB
t_{ON}	65	IN	IN				15.0 V	-15.0 V	+5.0 V	GND	OUT					K6	2 to 10				450			ns
	66	IN		IN								OUT				K8	3 to 11							
	67				IN								OUT		IN	K9	4 to 12							
	68					IN								OUT	IN	K7	5 to 13							
t_{OFF}	69	IN	IN								OUT					K6	2 to 10				250			
	70	IN		IN								OUT				K8	3 to 11							
	71				IN								OUT		IN	K9	4 to 12							
	72					IN								OUT	IN	K7	5 to 13							
t_{ON}	73	IN	IN								OUT					K6	2 to 10						550	
	74	IN		IN								OUT				K8	3 to 11							
	75				IN								OUT		IN	K9	4 to 12							
	76					IN								OUT	IN	K7	5 to 13							
t_{OFF}	77	IN	IN								OUT					K6	2 to 10						400	
	78	IN		IN								OUT				K8	3 to 11							
	79				IN								OUT		IN	K9	4 to 12							
	80					IN								OUT	IN	K7	5 to 13							
																		Subgroup 11 T_C = -55°C Min	Max	Subgroup 12 T_C = 25°C Min	Max	Subgroup 13 T_C = 25°C Min	Max	
t_{ON}	81	IN	IN				15.0 V	-15.0 V	15.0 V	GND	OUT					K6	2 to 10	---	375					ns
	82	IN		IN								OUT				K8	3 to 11	---						
	83				IN								OUT		IN	K9	4 to 12	---						
	84					IN								OUT	IN	K7	5 to 13	---						
t_{OFF}	85	IN	IN								OUT					K6	2 to 10	---	190					
	86	IN		IN								OUT				K8	3 to 11	---						
	87				IN								OUT		IN	K9	4 to 12	---						
	88					IN								OUT	IN	K7	5 to 13	---						
C_A	89	0.0 V													0.0 V	None	1			---	6			pF
	90																14			---	6			
C_{IS}	91																2			---	10			
	92																3			---				
	93																4			---				
	94																5			---				
C_{OS}	95																10			---				
	96																11			---				
	97																12			---				
	98																13			---				
t_D 2/	99	IN	IN	IN												K6, K14	10					20	---	ns
	100	IN	IN	IN												K6, K14	11						---	
	101				IN	IN									IN	K7, K15	12						---	
	102				IN	IN									IN	K7, K15	13						---	

See notes at end of table.

TABLE III. Group A inspection for device type 04, 06 - Continued.

Symbol	Test number	Adapter pin number 1/														Relays energized	Measured pin number	Test limits						Unit
		IN1	S_1	S_3	S_2	S_4	$+V_{CC}$	$-V_{CC}$	V_L	V_R	D_1	D_3	D_2	D_4	IN2			Subgroup 14 T_C = 125°C		Subgroup 14 T_C = - 55°C				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14			Min	Max	Min	Max			
t_B 5/	103	IN	IN	IN			15.0 V	-15.0 V	+5.0 V	GND						K6, K14	10	20	---					ns
	104	IN	IN	IN												K6, K14	11		---					
	105				IN	IN									IN	K7, K15	12		---					
	106				IN	IN									IN	K7, K15	13		---					
t_D 5/	107	IN	IN	IN												K6, K14	10			20	---			
	108	IN	IN	IN												K6, K14	11				---			
	109				IN	IN									IN	K7, K15	12				---			
	110				IN	IN									IN	K7, K15	13				---			

See notes at end of table.

TABLE III. Group A inspection for device type 07, 08.

Symbol	Test number	IN	IN	S_1	S_3	S_2	S_4	$+V_{CC}$	$-V_{CC}$	V_L	V_R	D_1	D_3	D_2	D_4	N.C.	Relays energized	Measured pin number	Subgroup 1 T_C = 25°C Min	Subgroup 1 Max	Subgroup 2 T_C = 125°C Min	Subgroup 2 Max	Subgroup 3 T_C = -55°C Min	Subgroup 3 Max	Unit
	Adapter pin number 1/	1 10/	1 11/	2	3	4	5	6	7	8	9	10	11	12	13	14									
R_{DS}	1	2.4 V	0.8 V	10.0 mA				15.0 V	-15.0 V	+5.0 V	GND	-10.0 V					None	2		-9.25		-8.50		-9.25	V 2/
	2		2.4 V		10.0 mA								-10.0 V					3							
	3		2.4 V			10.0 mA								-10.0 V				4							
	4		0.8 V				10.0 mA								-10.0 V			5							
	5		0.8 V	-10.0 mA								10.0 V						2	9.25		8.50		9.25		
	6		2.4 V		-10.0 mA								10.0 V					3							
	7		2.4 V			-10.0 mA								10.0 V				4							
	8		0.8 V				-10.0 mA								10.0 V			5							
	9		0.8 V	10.0 mA				10.0 V	-10.0 V			-7.5 V						2		-6.75		-6.0		-6.75	
	10		2.4 V		10.0 mA								-7.5 V					3							
	11		2.4 V			10.0 mA								-7.5 V				4							
	12		0.8 V				10.0 mA								-7.5 V			5							
	13		0.8 V	-10.0 mA								7.5 V						2	6.75		6.0		6.75		
	14		2.4 V		-10.0 mA								7.5 V					3							
	15		2.4 V			-10.0 mA								7.5 V				4							
	16		0.8 V				-10.0 mA								7.5 V			5							
$I_{D(ON)}$	17		0.8 V	10.0 V				15.0 V	-15.0 V			10.0 V					K10	2	-2	2	-200	200	-200	200	nA
	18		2.4 V		10.0 V								10.0 V				K11	3							
	19		2.4 V			10.0 V								10.0 V			K12	4							
	20		0.8 V				10.0 V								10.0 V		K13	5							
	21		0.8 V	-10.0 V								10.0 V					K10	2							
	22		2.4 V		-10.0 V								-10.0 V				K11	3							
	23		2.4 V			-10.0 V								-10.0 V			K12	4							
	24		0.8 V				-10.0 V								-10.0 V		K13	5							
$I_{D(OFF)}$	25	0.8 V	2.4 V	-10.0 V								10.0 V					None	10	-1	1	-100	100	-100	100	
	26		0.8 V		-10.0 V								10.0 V					11							
	27		0.8 V			-10.0 V								10.0 V				12							
	28		2.4 V				-10.0 V								10.0 V			13							
	29		2.4 V	10.0 V								-10.0 V						10							
	30		0.8 V		10.0 V								-10.0 V					11							
	31		0.8 V			10.0 V								-10.0 V				12							
	32		2.4 V				10.0 V								-10.0 V			13							
$I_{S(OFF)}$	33		2.4 V	-10.0 V								10.0 V						2							
	34		0.8 V		-10.0 V								10.0 V					3							
	35		0.8 V			-10.0 V								10.0 V				4							
	36		2.4 V				-10.0 V								10.0 V			5							
	37		2.4 V	10.0 V								-10.0 V						2							
	38		0.8 V		10.0 V								-10.0 V					3							
	39		0.8 V			10.0 V								-10.0 V				4							
	40		2.4 V				10.0 V								-10.0 V			5							
I_{IL}	41	0.0 V	0.0 V															1	-1	0	-10	0	-1	0	µA
I_{IH}	42	2.4 V	2.4 V															1	0	1	0	10	0	1	
	43	5.0 V	5.0 V															1	0	1	0	10	0	1	
$+I_{CC}$	44	0.0 V	0.0 V															6	---	10	---	100	---	10	
	45	5.0 V	5.0 V															6	---	10	---	100	---	10	
$-I_{CC}$	46	0.0 V	0.0 V															7	-10	---	-100	---	-10	---	
	47	5.0 V	5.0 V															7	-10	---	-100	---	-10	---	
$+I_L$	48	0.0 V	0.0 V															8	---	10	---	100	---	10	
	49	5.0 V	5.0 V															8	---	10	---	100	---	10	
$+I_R$	50	0.0 V	0.0 V															9	-10	---	-100	---	-10	---	
	51	5.0 V	5.0 V															9	-10	---	-100	---	-10	---	

See notes at end of table.

TABLE III. Group A inspection for device type 07, 08 - Continued.

Symbol	Test number	Adapter pin number 1/ IN	S₁	S₃	S₂	S₄	+V_{CC}	-V_{CC}	V_L	V_R	D_1	D_3	D_2	D_4	N.C.	Relays energized	Measured pin number	Test limits: Subgroup 4 T_C = 25°C Min	Max					Unit
		1	2	3	4	5	6	7	8	9	10	11	12	13	14									
V_{CTE}	52	IN 3/					15.0 V	-15.0 V	+5.0 V	GND						K2	10		15					mV
	53	↓					↓	↓	↓	↓						K4	11		↓					↓
	54	↓					↓	↓	↓	↓						K5	12		↓					↓
	55	↓					↓	↓	↓	↓						K3	13		↓					↓
																		Subgroup 7 T_C = 25°C Min	Max	Subgroup 9 T_C = 25°C Min	Max	Subgroup 10 T_C = 125°C Min	Max	
V_{CT}	56	2.4 V	IN 4/				15.0 V	-15.0 V	+5.0 V	GND						K1	12		3.16					mVp-p
				dB_{ct} = -20 log (V_{OUT}/V_{IN})														50						dB
	57	2.4 V			IN 4/		15.0 V	-15.0 V	+5.0 V	GND						K1	10		3.16					mVp-p
V_{ISO}	58	0.8 V					↓	↓	↓	↓						K1	10		↓					mVp-p
	59	↓					↓	↓	↓	↓						K1	11		↓					↓
	60	↓					↓	↓	↓	↓						K1	12		↓					↓
	61	↓					↓	↓	↓	↓						K1	13		↓					↓
				dB_{ISO} = -20 log (V_{OUT}/V_{IN})														50						dB
t_{ON}	62	IN	IN				15.0 V	-15.0 V	+5.0 V	GND	OUT					K6	2 to 10				450			ns
	63	↓		IN			↓	↓	↓	↓		OUT				K8	3 to 11				↓			↓
	64	↓			IN		↓	↓	↓	↓			OUT			K9	4 to 12				↓			↓
	65	↓				IN	↓	↓	↓	↓				OUT		K7	5 to 13				↓			↓
t_{OFF}	66	↓	IN				↓	↓	↓	↓	OUT					K6	2 to 10				250			↓
	67	↓		IN			↓	↓	↓	↓		OUT				K8	3 to 11				↓			↓
	68	↓			IN		↓	↓	↓	↓			OUT			K9	4 to 12				↓			↓
	69	↓				IN	↓	↓	↓	↓				OUT		K7	5 to 13				↓			↓
t_{ON}	70	↓	IN				↓	↓	↓	↓	OUT					K6	2 to 10						550	↓
	71	↓		IN			↓	↓	↓	↓		OUT				K8	3 to 11						↓	↓
	72	↓			IN		↓	↓	↓	↓			OUT			K9	4 to 12						↓	↓
	73	↓				IN	↓	↓	↓	↓				OUT		K7	5 to 13						↓	↓
t_{OFF}	74	↓	IN				↓	↓	↓	↓	OUT					K6	2 to 10						400	↓
	75	↓		IN			↓	↓	↓	↓		OUT				K8	3 to 11						↓	↓
	76	↓			IN		↓	↓	↓	↓			OUT			K9	4 to 12						↓	↓
	77	↓				IN	↓	↓	↓	↓				OUT		K7	5 to 13						↓	↓
																		Subgroup 11 T_C = -55°C Min	Max	Subgroup 12 T_C = 25°C Min	Max	Subgroup 13 T_C = 25°C Min	Max	
t_{ON}	78	IN	IN				15.0 V	-15.0 V	+5.0 V	GND	OUT					K6	2 to 10		375					ns
	79	↓		IN			↓	↓	↓	↓		OUT				K8	3 to 11		↓					↓
	80	↓			IN		↓	↓	↓	↓			OUT			K9	4 to 12		↓					↓
	81	↓				IN	↓	↓	↓	↓				OUT		K7	5 to 13		↓					↓
t_{OFF}	82	↓	IN				↓	↓	↓	↓	OUT					K6	2 to 10		190					↓
	83	↓		IN			↓	↓	↓	↓		OUT				K8	3 to 11		↓					↓
	84	↓			IN		↓	↓	↓	↓			OUT			K9	4 to 12		↓					↓
	85	↓				IN	↓	↓	↓	↓				OUT		K7	5 to 13		↓					↓
C_A	86	0.0 V					↓	↓	↓	↓						None	1				6			pF
C_{IS}	87						↓	↓	↓	↓						↓	2				10			↓
	88						↓	↓	↓	↓						↓	3				↓			↓
	89						↓	↓	↓	↓						↓	4				↓			↓
	90						↓	↓	↓	↓						↓	5				↓			↓
C_{OS}	91						↓	↓	↓	↓						↓	10				↓			↓
	92						↓	↓	↓	↓						↓	11				↓			↓
	93						↓	↓	↓	↓						↓	12				↓			↓
	94						↓	↓	↓	↓						↓	13				↓			↓
t_D 5/	95	IN	IN	IN			↓	↓	↓	↓						K6, K14	10					20		ns
	96	↓	IN	IN			↓	↓	↓	↓						K6, K14	11					↓		↓
	97	↓			IN	IN	↓	↓	↓	↓						K7, K15	12					↓		↓
	98	↓			IN	IN	↓	↓	↓	↓						K7, K15	13					↓		↓

See notes at end of table.

TABLE III. Group A inspection for device type 07, 08 - Continued.

Symbol	Test number	Adapter pin number 1/														Relays energized	Measured pin number	Test limits						Unit
		IN	S_1	S_3	S_2	S_4	$+V_{CC}$	$-V_{CC}$	V_L	V_R	D_1	D_3	D_2	D_4	N.C.			Subgroup 14 T_C = 125°C		Subgroup 14 T_C = -55°C				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14			Min	Max	Min	Max			
t_D 5/	99	IN	IN	IN			15.0 V	-15.0 V	+5.0 V	GND						K6, K14	10	20						ns
	100		IN	IN												K6, K14	11							
	101				IN	IN										K7, K15	12							
	102				IN	IN										K7, K15	13							
t_D 5/	103		IN	IN												K6, K14	10			20				
	104		IN	IN												K6, K14	11							
	105				IN	IN										K7, K15	12							
	106				IN	IN										K7, K15	13							

NOTES:
1. The test circuits used with table III are shown in figures 17, 18, 19, 20 and 21. The waveforms of figure 9 apply to all device types as specified in table III (see tests for t_{ON} and t_{OFF}). The waveforms of figure 13 apply to devices 03, 04, and 07 only as specified in table III.
2. R_{DS} may be measured differentially with respect to V_A. In case of differentially measured voltages, the table III limits representing voltage drop across the tested switch must be maintained.
3. The input pulse generator shall have the following characteristics: V_{GEN} = 0-3V for all device types; rise time/fall time ≤ 10 ns; PRR = 1 MHz @ 50 percent duty cycle.
4. The input generator shall have the following characteristics: V_{GEN} = 1 Vp-p at 1 MHz.
5. Break-before-make test applies to devices 03, 04, and 07 only.
6. Conditions for device type 03 only.
7. Conditions for device type 05 only.
8. Conditions for device type 06 only.
9. Conditions for device type 04 only.
10. Conditions for device type 08 only.
11. Conditions for device type 07 only.

4.4.1 Group A inspection. Group A inspection shall be in accordance with table I of method 5005 of MIL-STD-883 and as follows:

a. Subgroups 5, 6, and 8 shall be omitted.
b. Tests shall be as specified in table II.
c. Special subgroups shall be added to group A inspection and shall consist of group A subgroups 12, 13, and 14 as specified in table III herein. The LTPD for subgroup 12 shall be 5 for all classes; the LTPD for subgroup 13 shall be 5 for all classes; the LTPD for subgroup 14 shall be 5 for all classes.
d. C_X measurements shall be made only for initial qualification and after process or design changes which may effect capacitance measurements. Capacitance shall be measured between the designated terminal and ground at a frequency of 1 MHz (see method 3012.1 of MIL-STD-883). C_{IS} and C_{OS} tests shall be measured with the switch off (see 3.4.1).

4.4.2 Group B inspection. Group B inspection shall be in accordance with table II of method 5005 of MIL-STD-883 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.
b. Life test for class S shall be performed as specified in subgroup 5 of table IIa of method 5005 of MIL-STD-883 using the circuit shown on figure 16. If the alternate burn-in conditions are used, the circuit shown on figure 15 shall be used.
c. A special subgroup shall be added using an LTPD of 15 for all classes. This subgroup shall consist of a high voltage test of the input protection circuits, V_{ZAP} (see 4.5.3).

4.4.3 Group C inspection. Group C inspection shall be in accordance with table III of method 5005 of MIL-STD-883 and as follows:

a. End-point electrical parameters shall be as specified in table IV. Delta limits shall apply only to subgroup I of group C inspection for classes B and C devices.
b. Life tests for classes B and C (method 1005 of MIL-STD-883): Test condition C using the circuit shown on figure 15, or test condition D using the circuit shown on figure 14, or test condition F using the circuit shown on figure 16.

4.4.4 Group D inspection. Group D inspection shall be in accordance with table IV of method 5005 of MIL-STD-883 and as follows:

a. End-point electrical parameters shall be as specified in table II herein.
b. A special subgroup shall be added to group D inspection and it shall consist of the group A subgroups 4 and 7 as specified in table III herein.
c. During the initial qualification, subgroup 6 shall be performed on one device for each device type to be qualified from those listed in 1.2.1 herein. After initial qualification, subgroup 6 shall be performed periodically on a single device selected from the device types previously qualified. When more than one device type was initially qualified, the single device selected shall be a different device type for each subsequent periodic inspection until all qualified device types have been inspected. The sequence of single device types shall be repeated to fulfill the periodic inspection requirement.

TABLE IV. Group C end-point electrical parameters.
(T_C = 25°C, $\pm V_{CC}$ = $\pm$15 V)

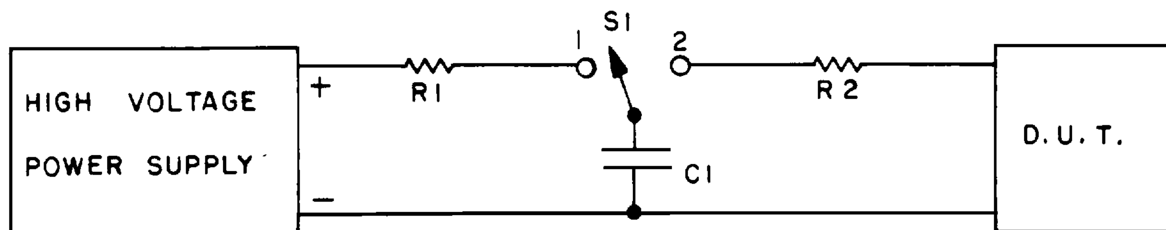
Test	Device types 01 - 08		
	Limits		Delta
	Minimum	Maximum	
R_{DS}	9.25 V	10.00 V	50 mV
R_{DS}	-10.00 V	-9.25 V	50 mV
$I_{S(OFF)}$	-1 nA	1 nA	$\pm$0.5 nA
$I_{D(OFF)}$	-1 nA	1 nA	$\pm$0.5 nA

4.5 Methods of inspection Methods of inspection shall be as specified in the appropriate tables. Electrical test circuits as prescribed herein or in the referenced test methods of MIL-STD-883 shall be acceptable. Other test circuits shall require the approval of the qualifying activity.

4.5.1 Voltage and current. All voltage values given, except differential voltages, 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 Life test cooldown procedure. When devices are measured at 25°C following application of the operating life or burn-in test condition, they shall be cooled to room temperature prior to removal of the bias.

4.5.3 High voltage (V_{ZAP}) test of input protection circuits. Unless otherwise specified, all input terminals of the device under test (DUT) shall be subjected to a voltage pulse from a high voltage source. This destructive test shall be conducted as follows using the test circuit shown below.



V_{ZAP} = 400 V charge on C1.
10 MΩ ≤ R1 ≤ 50 MΩ.
R2 = 1.5 kΩ.
C1 = 100 pF.
S1 = Hg-wetted "bounceless" relay.

a. Measure I_{IL} and I_{IH} at the inputs selected at 25°C. The test limit for each input tested shall be +1 µA for I_{IH} and -1 µA for I_{IL} at V (supply) = ±15 V.
b. V_{ZAP} is applied to the DUT in the following two modes (see table V) by charging C1 to V_{ZAP} with S1 in position 1 and then switching to position 2.

TABLE V. Modes for high voltage testing.

Mode	+ Terminal	- Terminal
1	+ V_{CC}	Input
2	Input	- V_{CC}

c. Within 24 hours, repeat I_{IL} and I_{IH} measurements (see a. above) in accordance with table III. If a DUT exhibits values in excess of the specified limits after the V_{ZAP} test, it shall be classified as a failure.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Notes. The notes specified in MIL-M-38510 are applicable to this specification.

6.2 Intended use. Microcircuits conforming to this specification are intended for use for Government microcircuit applications (original equipment) and logistic purposes.

6.3 Ordering data. Procurement documents should specify the following:

a. Complete part number (see 1.2).
b. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the device inspection lot to be supplied with each shipment by the device manufacturer, if applicable.
c. Requirement for certificate of compliance, if applicable.
d. Requirements for notification of change of product or process to procuring activity in addition to notification to the qualifying activity, if applicable.
e. Requirements for failure analysis (including required test condition of method 5003), corrective action and reporting of results, if applicable.
f. Requirements for quality assurance options.
g. Requirements for carriers, special lead lengths or lead forming, if applicable. These requirements shall not affect the part number. Unless otherwise specified, these requirements shall not apply to direct purchase by or direct shipment to the Government.

6.4 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-STD-1331, MIL-M-38510, and as follows:

$+V_{CC}$ - - - - - - Positive supply voltage.
$-V_{CC}$ - - - - - - Negative supply voltage.
$+I_{CC}$ - - - - - - Positive supply current.
$-I_{CC}$ - - - - - - Negative supply current.
V_L - - - - - - - Logic supply voltage.
I_L - - - - - - - Logic supply current.
R_{DS} - - - - - - - Resistance of an "ON" switch.
V_D - - - - - - - Drain voltage.
V_S - - - - - - - Source voltage.
$I_{D(ON)}$ - - - - - Leakage current from an "ON" driver into the switch.
$I_{D(OFF)}$ - - - - - Leakage current into the drain terminal of an "OFF" switch.
$I_{S(OFF)}$ - - - - - Leakage current into the source terminal of an "OFF" switch.
t_{ON} - - - - - - - Switching time as defined on figure 9.
t_{OFF} - - - - - - Switching time as defined on figure 9.
V_{CTE} - - - - - - Charge transfer error.
V_{CT} - - - - - - - Crosstalk between switches.
V_{ISO} - - - - - - Isolation from source to drain of a closed switch.

6.5 Logistic support. Lead materials and finishes (see 3.3) are interchangeable. Unless otherwise specified, microcircuits procured for Government logistic support will be procured to device class B (see 1.2.2), lead material and finish C (see 3.3). Longer length leads and lead forming shall not affect the part number.

6.6 Substitutability. The cross-reference information below is presented for the convenience of users. Microcircuits covered by this specification shall 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 shall not be deemed as permitting substitution of generic-industry types for MIL-M-38510 types or as a waiver of any of the provisions of MIL-M-38510.

Military device type	Generic-industry type
01	5040
02	5041
03	5042
04	5043
05	5044
06	5045
07	5046
08	5047

Custodians:
Army - ER
Navy - EC
Air Force - 17

Review activities:
Army - ER, MI
Navy - EC, SH
Air Force - 11, 85, 99
NASA - NA

User activities:
Army - AR, SM
Navy - AS, CG, MC, OS
Air Force - 19

Preparing activity:
Air Force - 17

Agent:
DLA - ES

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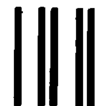

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