



# Quad, SPST, CMOS, TTL-Compatible Analog Switches

DG308A/DG309/883B

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## 1.0 SCOPE

1.1 This specification covers the detail requirements for two quad, SPST, CMOS switches. These circuits are processed in accordance with MIL-STD-883 and are fully compliant to paragraph 1.2.1.

It is highly recommended that this data sheet be used as a baseline for new military or aerospace source control drawings.

For typical applications and operating characteristics, consult Maxim's data books.

## 1.2 Part Numbers

Device	Part Number
-1	DG308AA(X)/883B
-2	DG309A(X)/883B

## 1.3 Package

(X)	Package	Description
K	K-16	16-Pin Ceramic Dual-In-Line Package (CERDIP)

**Note:** See *Package Information* section for package drawing and dimensions.

## 1.4 Absolute Maximum Ratings

( $T_A = +25^\circ\text{C}$ , unless otherwise noted.)

V+ to V-	44V
V+ to GND	25V
Digital Input Overvoltage Range	(V- - 2V) to (V+ + 2V) or 20mA (whichever comes first)
Current (any terminal except S or D)	30mA
Continuous Current (S or D)	20mA
(pulsed at 1ms, 10% duty cycle max)	70mA
Power Dissipation ( $T_j = +150^\circ\text{C}$ )	
up to $+70^\circ\text{C}$	800mW
derate above $+70^\circ\text{C}$	10mW/ $^\circ\text{C}$
Operating Temperature Range	$-55^\circ\text{C}$ to $+125^\circ\text{C}$
Storage Temperature Range	$-65^\circ\text{C}$ to $+150^\circ\text{C}$
Lead Temperature (soldering, 10 sec)	$+300^\circ\text{C}$

1.5 Thermal Resistance  $\Theta_{JC} = 50^\circ\text{C/W}$   
 $\Theta_{JA} = 100^\circ\text{C/W}$



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## 2.0 REQUIREMENTS

2.1 Electrical performance characteristics are specified in Table 1 and apply over the full ambient operating temperature range, unless otherwise specified.

**TABLE 1. ELECTRICAL PERFORMANCE CHARACTERISTICS (Note 1)**

CHARACTERISTICS	SYMBOL	CONDITIONS		DEVICE TYPES	GROUP A SUB-GROUPS	LIMITS		UNITS
						MIN	MAX	
Analog-Signal Range	$V_{ANALOG}$	$V_S = \pm 15V$		All	1, 2, 3	-15	15	V
Drain-Source On Resistance	$r_{DS(ON)}$	$I_S = 1mA, V_D = \pm 10V, V_{IN} = 11V$ (DG308A), $V_{IN} = 3.5V$ (DG309)		All	1, 3	100		$\Omega$
					2	150		
Source-Off Leakage Current	$I_{S(OFF)}$	$V_{IN} = 3.5V$ (DG308A), $V_{IN} = 11V$ (DG309)	$V_S = 14V, V_D = -14V$	All	1	-1	1	nA
			$V_S = -14V, V_D = 14V$		2	-100	100	
		$V_S = 14V, V_D = -14V$	1		-1	1		
			2		-100	100		
Drain-Off Leakage Current	$I_{D(OFF)}$	$V_{IN} = 3.5V$ (DG308A), $V_{IN} = 11V$ (DG309)	$V_S = 14V, V_D = -14V$	All	1	-1	1	nA
			$V_S = -14V, V_D = 14V$		2	-100	100	
		$V_S = 14V, V_D = -14V$	1		-1	1		
			2		-100	100		
Drain-On Leakage Current	$I_{D(ON)}$	$V_{IN} = 11V$ (DG308A), $V_{IN} = 3.5V$ (DG309)	$V_S = V_D = 14V$	All	1	-1	1	nA
			$V_S = V_D = -14V$		2	-100	100	
		$V_S = V_D = 14V$	1		-1	1		
			2		-100	100		
Input Current with Voltage High	$I_{INH}$	$V_{IN} = 15V$		All	1, 2	1		$\mu A$
Input Current with Voltage Low	$I_{INL}$	$V_{IN} = 0V$		All	1, 2	-1		$\mu A$
Positive Supply Current	$I_+$	All channels on or off, $V_{IN} = 0V$ or $15V$		All	1, 3	10		$\mu A$
					2	100		
Negative Supply Current	$I_-$	All channels on or off, $V_{IN} = 0V$ or $15V$		All	1, 3	-10		$\mu A$
					2	-100		
<b>DYNAMIC</b>								
Turn-On Time	$t_{ON}$	Figure 1		All	9	200		ns
					10, 11	400		
Turn-Off Time	$t_{OFF}$	Figure 1		All	9	150		ns
					10, 11	350		

**Note 1:**  $V_+ = 15V, V_- = -15V, GND = 0V, V_{INH} = 11V, V_{INL} = 3.5V$ , unless otherwise noted.

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## 3.0 QUALITY ASSURANCE

- 3.1** Sampling and inspection procedures shall be in accordance with MIL-M-38510 and, to the extent specified, with MIL-STD-883.
- 3.2** Screening shall be in accordance with Method 5004 of MIL-STD-883. Burn-in test (Method 1015):
- (1) Test condition A, B, C, or D.
  - (2)  $T_A = +125^\circ\text{C}$ , minimum.
  - (3) Interim and final electrical test requirements shall be as specified in Table 2.
- 3.3** Quality conformance inspection shall be in accordance with Method 5005 of MIL-STD-883 including Groups A, B, C, and D inspection.
- Group A inspection:
- (1) Tests as specified in Table 2.
  - (2) Selected subgroups in Table 1, Method 5005 of MIL-STD-883 shall be omitted.
- 3.4** Groups C and D inspections:
- a. End-point electrical parameters shall be specified in Table 1.
  - b. Steady-state life test (Method 1005 of MIL-STD-883):
    - (1) Test condition A, B, C, or D.
    - (2)  $T_A = +125^\circ\text{C}$ , minimum.
    - (3) Test duration, 1000 hours, except as permitted by Method 1005 of MIL-STD-883.

**TABLE 2. ELECTRICAL TEST REQUIREMENTS**

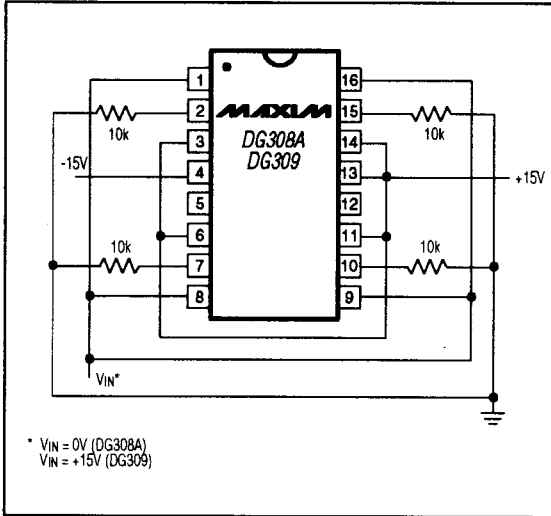
MIL-STD-883 Test Requirements	Subgroups (per Method 5005, Table 1)
Interim Electrical Parameters (Method 5004)	1
Final Electrical Parameters (Method 5004)	1,* 2, 3, 9
Group A Test Requirements (Method 5005)	1, 2, 3, 9, 10,** 11**
Groups C and D End-Point Electrical Parameters (Method 5005)	1

\* PDA applies to Subgroup 1 only.

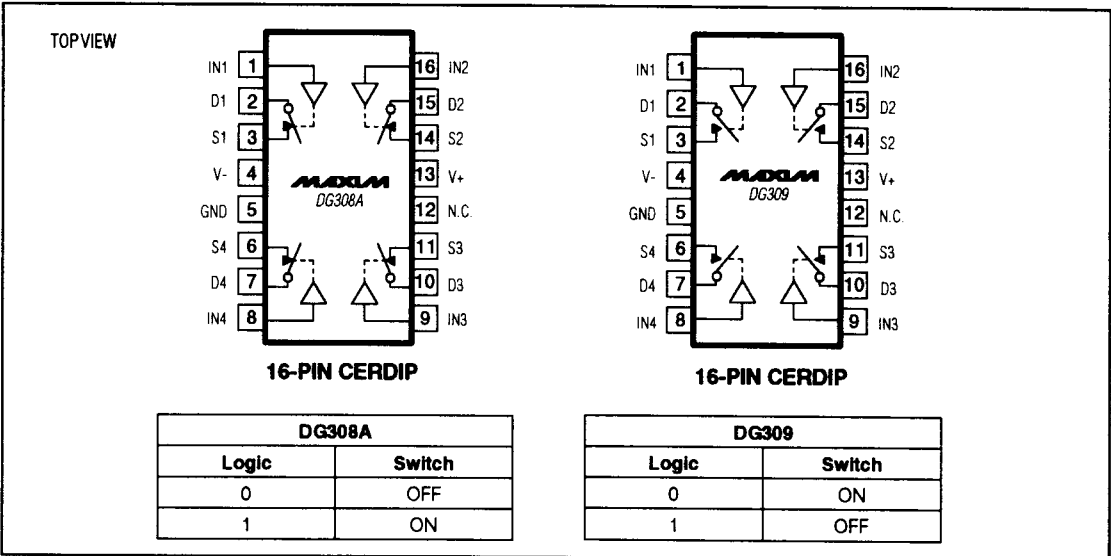
\*\* Subgroups 10 and 11, if not tested, shall be guaranteed to the limits in Table 1.

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## 4.0 Life Test/Burn-In Circuit



## 4.1 Pin Configurations/Functional Diagrams



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## 4.3 Timing Diagram/Test Circuit

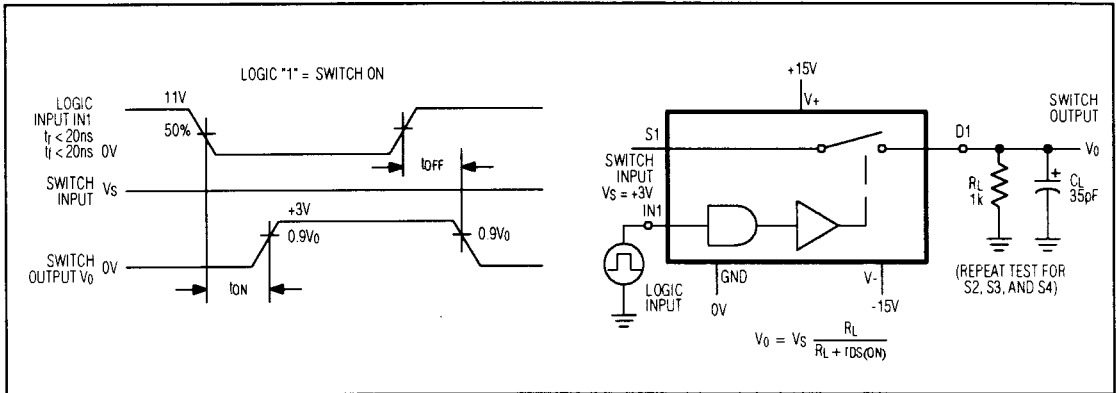


Figure 1. Switching-Time Test Circuit