

Quad, SPST Analog Switches

DG308A/DG309

ABSOLUTE MAXIMUM RATINGS

Voltage Referenced to V-

V++44V

GND+25V

Digital Inputs V_S, V_D.....(V- - 2V) to (V+ + 2V) or 20mA, whichever occurs first

Current into Any Terminal (except S or D)30mA

Continuous Current (S or D)20mA

Peak Current (S or D) (pulsed at 1ms, 10% duty cycle max)70mA

Continuous Power Dissipation (T_A = +70°C) (Note 1)

Plastic DIP (derate 10.53mW/°C above +70°C)842mW

Narrow SO (derate 8.70mW/°C above +70°C)696mW

CERDIP (derate 10.00mW/°C above +70°C)800mW

Operating Temperature Ranges

DG308AC_/DG309C_0°C to +70°C

DG308AD_/DG309D_-40°C to +85°C

DG308AAK/DG309AK-55°C to +125°C

Storage Temperature Range-65°C to +150°C

Lead Temperature (soldering, 10sec)+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(V₊ = 15V, V₋ = -15V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	DG30_AK			DG30_C/D			UNITS	
			MIN	TYP	MAX	MIN	TYP	MAX		
SWITCH										
Analog Signal Range	V _{ANALOG}		T _A = +25°C	-15		15	-15		15	V
Drain-Source On-Resistance	r _{DS(ON)}	V _{IN} = 11V (DG308A), V _{IN} = 3.5V (DG309), I _S = 1mA, V _D = 10V or -10V	T _A = +25°C, T _{MIN}		60	100		60	100	Ω
			T _A = T _{MAX}		95	150		80	125	
Source-Off Leakage Current	I _{S(OFF)}	V _{IN} = 3.5V (DG308A), V _{IN} = 11V (DG309), V _S = 14V, V _D = -14V	T _A = +25°C	-1	0.1	1	-5	0.1	5	nA
			T _A = T _{MAX}	-100		100	-100		100	
			T _A = +25°C	-1	-0.1	1	-5	0.1	5	
			T _A = T _{MAX}	-100		100	-100		100	
Drain-Off Leakage Current	I _{D(OFF)}	V _{IN} = 3.5V (DG308A), V _{IN} = 11V (DG309), V _S = 14V, V _D = -14V	T _A = +25°C	-1	0.1	1	-5	0.1	5	nA
			T _A = T _{MAX}	-100		100	-100		100	
			T _A = +25°C	-1	0.1	1	-5	0.1	5	
			T _A = T _{MAX}	-100		100	-100		100	
Drain-On Leakage Current	I _{D(ON)}	V _{IN} = 11V (DG308A), V _{IN} = 3.5V (DG309), V _S = V _D = +14V	T _A = +25°C	-2	0.1	2	-5	0.1	5	nA
			T _A = T _{MAX}	-200		200	-200		200	
			T _A = +25°C	-2	0.1	2	-5	0.1	5	
			T _A = T _{MAX}	-200		200	-200		200	
INPUT										
Input Current with Input Voltage High	I _{INH}	V _{IN} = 15V	T _A = +25°C, T _{MAX}	-1	0.001	1	-1	0.001	1	μA
Input Current with Input Voltage Low	I _{INL}	V _{IN} = 0V	T _A = +25°C, T _{MAX}	-1	-0.001	1	-1	0.001	1	μA

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ELECTRICAL CHARACTERISTICS (continued)

($V_+ = 15V$, $V_- = -15V$, $T_A = T_{MIN}$ to T_{MAX} , unless otherwise noted.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS	DG30_AK			DG30_C/D			UNITS	
			MIN	TYP	MAX	MIN	TYP	MAX		
SUPPLY										
Positive Supply Current	I+	All channels on or off, $V_{IN} = 0V$ or $15V$	$T_A = +25^\circ C$	-10	0.001	10	-100	0.001	100	μA
			$T_A = T_{MAX}$			100		100		
Negative Supply Current	I-	All channels on or off, $V_{IN} = 0V$ or $15V$	$T_A = +25^\circ C$	-10	-0.001	10	-100	-0.001	100	μA
			$T_A = T_{MAX}$	-100			-100			
DYNAMIC										
Turn-On Time	t_{ON}	Figure 1		130	200		130	200	ns	
Turn-Off Time	t_{OFF}	Figure 1		90	150		90	150	ns	
Charge Injection	Q	$C_L = 0.01\mu F$, $V_{GEN} = 0V$, $R_{GEN} = 0\Omega$		-10			-10		pC	
Off Isolation (Note 3)	OIRR	$V_{IN} = 0V$ (DG308A), $V_{IN} = 15V$ (DG309), $Z_L = 75\Omega$, $V_S = 2V_{p-p}$, $f = 500kHz$		78			78		dB	
Source-Off Capacitance	$C_{S(OFF)}$	$V_{IN} = 0V$ (DG308A), $V_{IN} = 15V$ (DG309), $f = 140kHz$, $V_S = 0V$		11			11		pF	
Drain-Off Capacitance	$C_{D(OFF)}$	$V_{IN} = 0V$ (DG308A), $V_{IN} = 15V$ (DG309), $f = 140kHz$, $V_S = 0V$		8			8		pF	
Channel-On Capacitance	$C_{D(ON)} + C_{S(ON)}$	$V_{IN} = 0V$ (DG308A), $V_{IN} = 15V$ (DG309), $V_D = V_S = 0V$		27			27		pF	

Note 1: All leads are soldered or welded to the PC board.

Note 2: The algebraic convention where the most negative value is a minimum and the most positive value a maximum is used in this data sheet.

Note 3: Off isolation = $20\log_{10} V_D/V_S$, V_D = output, V_S = input to off switch.

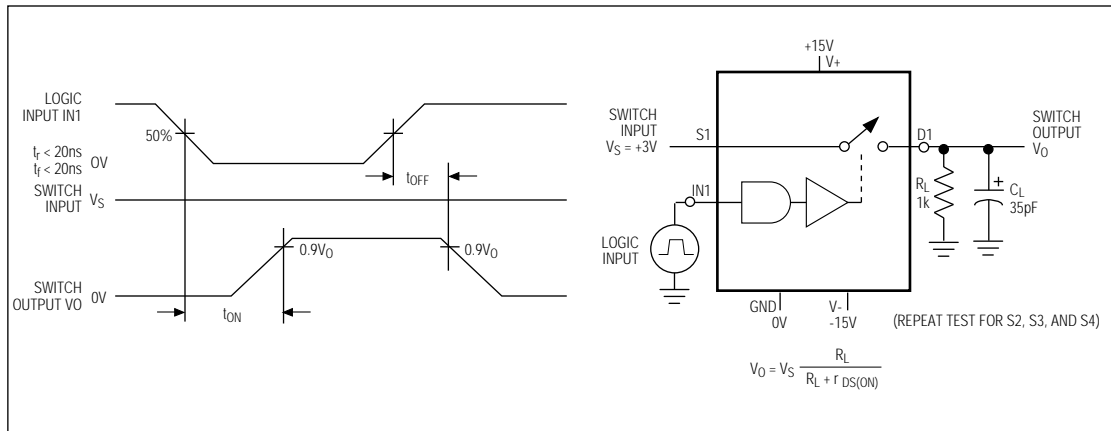
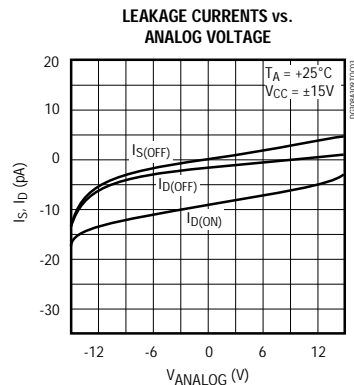
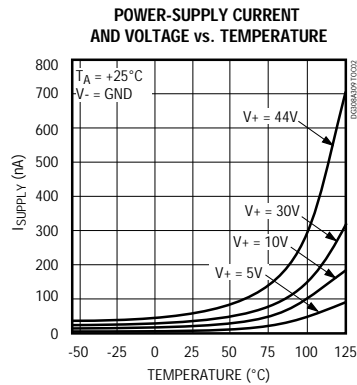
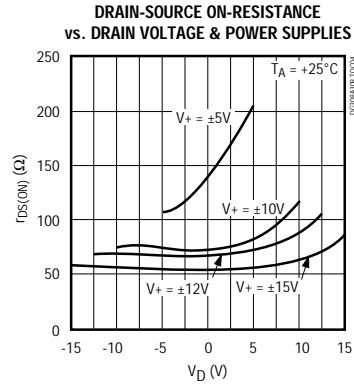
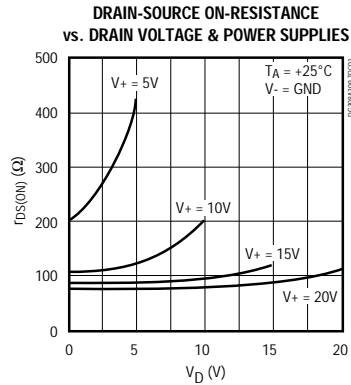


Figure 1. Switching-Time Test Circuit

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Typical Operating Characteristics

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



Pin Description

PIN	NAME	FUNCTION
1, 8, 9, 16	IN1-IN4	Logic Control Inputs
2, 7, 10, 15	D1-D4	Drain Output
3, 6, 11, 14	S1-S4	Source Input
4	V-	Negative Supply Voltage Input
5	GND	Ground
12	N.C.	No Connect. Not internally connected.
13	V+	Positive Supply Voltage Input. Connected to substrate.

Applications Information

The DG308A/DG309 switch positive analog signals while using a single positive supply, allowing use in applications where only one supply is available. The disadvantages of using a single supply are slower switching speed and increased $r_{DS(ON)}$. The *Power-Supply Current and Voltage vs. Temperature* graph shows the typical curve for a single-supply design. As stated in the Absolute Maximum Ratings, the analog voltage should not go above or below the supply voltages, which are $V+$ and 0V in single-supply operation.

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