



Monolithic General-Purpose CMOS Analog Switch

FEATURES

- $\pm 15\text{-V}$ Input Range
- On-Resistance: $< 50\ \Omega$
- Break-Before-Make Switching
- TTL and CMOS Compatible

BENEFITS

- Improved Signal Headroom
- Reduced Switching Errors
- No Shorting of Inputs
- Simple Interfacing

APPLICATIONS

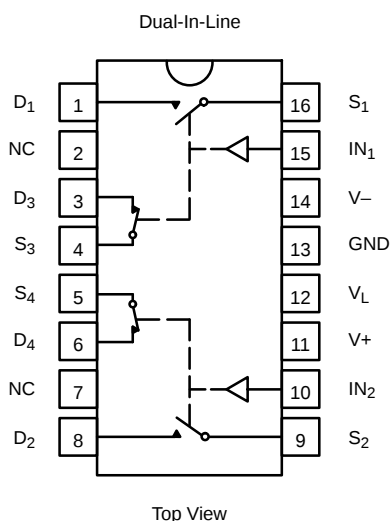
- Audio Switching
- Instrumentation
- Battery Powered Systems

DESCRIPTION

The DG5043 solid state analog switch is recommended for general purpose applications in instrumentation, and process control. Built on the Vishay Siliconix PLUS-40 high voltage CMOS process, this device provides ease-of-use and performance advantages to the system designer. Key performance features of the DG5043 are $1\text{-}\mu\text{s}$ switching, low

power supply requirements, and break-before-make switching. Each switch conducts equally well in either direction, when on, and blocks up to 30 V peak-to-peak when off. Off leakage current is 1-nA maximum. An epitaxial layer prevents latch up. For new designs, DG403 is recommended.

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



TRUTH TABLE

Logic	SW ₁ , SW ₂	SW ₃ , SW ₄
0	OFF	ON
1	ON	OFF

Logic "0" = $\leq 0.8\text{ V}$
Logic "1" = $\geq 2\text{ V}$

ORDERING INFORMATION

Temp Range	Package	Part Number
0 to 70°C	16-Pin Plastic DIP	DG5043CJ

ABSOLUTE MAXIMUM RATINGS

V_{+} to V_{-} 44 V
 GND to V_{-} 25 V
 V_L ($\text{GND} - 0.3\text{ V}$) to 44 V
Digital Inputs^a V_S , V_D (V_{-}) -2 V to (V_{+} plus 2 V)
or 30 mA , whichever occurs first
Current (Any Terminal) Continuous 30 mA
Current, S or D (Pulsed 1 ms 10% duty) 100 mA
Storage Temperature -65 to 125°C

Power Dissipation (Package)^b

16-Pin Plastic DIP^c 470 mW

Notes:

- Signals on S_X , D_X , or IN_X exceeding V_{+} or V_{-} will be clamped by internal diodes. Limit forward diode current to maximum current ratings.
- All leads welded or soldered to PC Board.
- Derate $6\text{ mW}/^{\circ}\text{C}$ above 75°C



SPECIFICATIONS

Parameter	Symbol	Test Conditions Unless Otherwise Specified V+ = 15 V, V− = −15 V VL = 5 V, VIN = 2 V, 0.8 V ^e	Temp ^a	C Suffix 0 to 70°C			Unit
				Min ^c	Typ ^b	Max ^c	
Analog Switch							
Analog Signal Range ^d	VANALOG		Full	−15		15	V
Drain-Source On-Resistance	r _{DS(on)}	IS = −10 mA, VD = ±10 V	Room Full			50 75	Ω
Switch Off Leakage Current	IS(off)	VS = VD = 14 V	Room Full	−1 −100		1 100	nA
		VS = VD = −14 V	Room Full	−1 −100		1 100	
Channel On Leakage Current	ID(on)	VS = VD = 14 V	Room Full			2 200	
		VS = VD = −14 V	Room Full	−2 −200			
Digital Control							
Input Current with VIN Low	IL	VIN Under Test = 0.8 V	Full	−1		1	μA
Input Current with VIN High	I _{IH}	VIN Under Test = 2 V	Full	−1		1	
Dynamic Characteristics							
Turn-On Time	tON	VS = ±10 V, RL = 1 kΩ, CL = 35 pF See Figure 1	Room			1200	ns
Turn-Off Time	tOFF		Room			700	
Charge Injection ^d	Q	CL = 10 nF, Vgen = 0 V, Rgen = 0 Ω	Room		30		pC
Off Isolation ^d	OIRR	RL = 75 Ω, CL = 5 pF, f = 1 MHz	Room		75		dB
Crosstalk (Channel-to-Channel) ^d	XTALK	RL = 75 Ω, VS = 2 Vp-p, f = 1 MHz	Room		89		
Source Off Capacitance	CS(off)	VD = VS = 0 V, f = 1 MHz	Room		15		pF
Drain Off Capacitance ^d	CD(off)		Room		17		
Channel On Capacitance ^d	CD(on)		Room		45		
Power Supplies							
Positive Supply Current	I+	VIN = 0 or 2.4 V	Full			300	μA
Negative Supply Current	I−		Full	−300			
Logic Supply Current	IL	VIN = 0 or 2.4 V	Full			300	
Ground Current	IGND		Full	−300			

Notes:

- Room = 25°C, Full = as determined by the operating temperature suffix.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- Guaranteed by design, not subject to production test.
- V_{IN} = input voltage to perform proper function.

TEST CIRCUITS

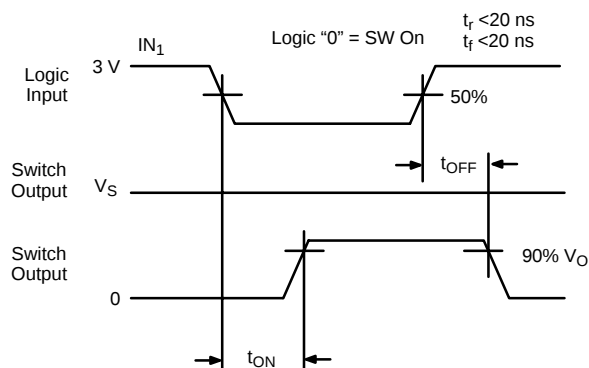
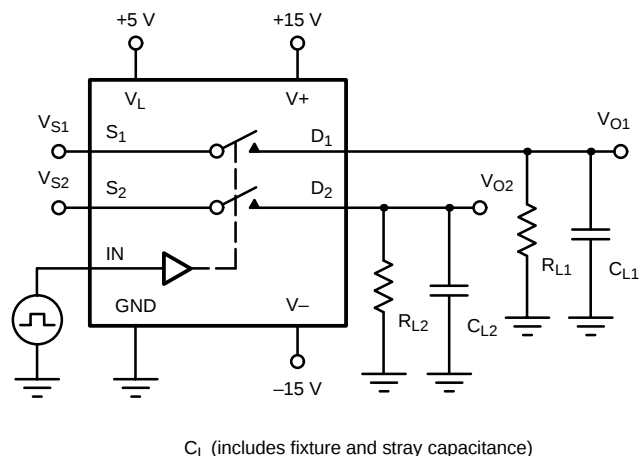


FIGURE 1. Switching Time

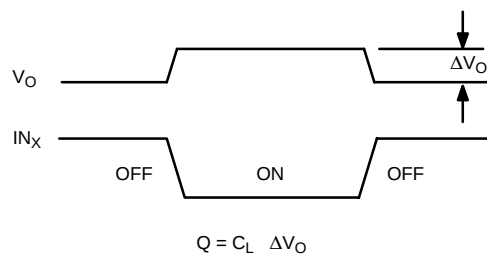
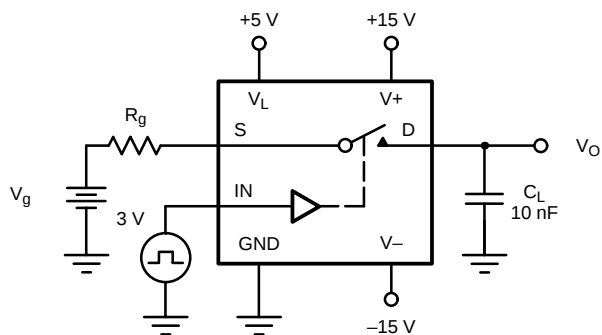


FIGURE 2. Charge Injection