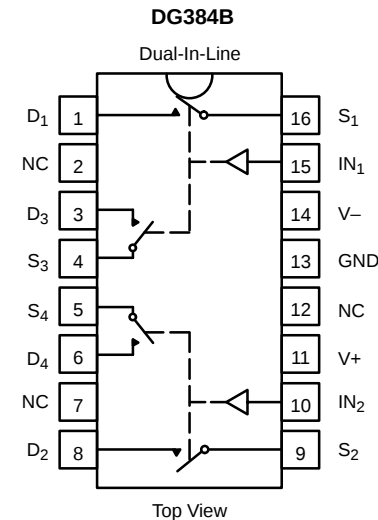


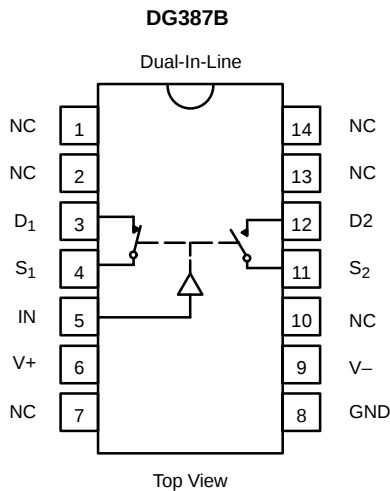


FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



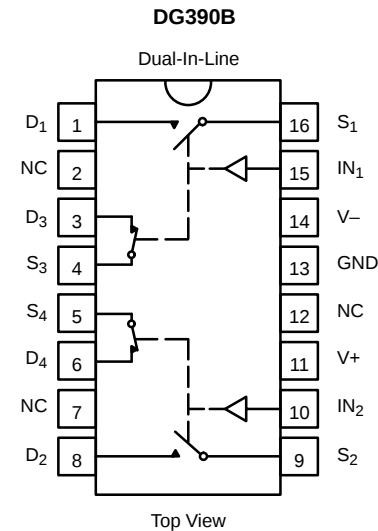
TRUTH TABLE	
Logic	Switch
0	OFF
1	ON

Logic "0" $\leq 0.8\text{ V}$
Logic "1" $\geq 4\text{ V}$



TRUTH TABLE		
Logic	SW ₁	SW ₂
0	ON	OFF
1	OFF	ON

Logic "0" $\leq 0.8\text{ V}$
Logic "1" $\geq 4\text{ V}$



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" $\geq 4\text{ V}$

ORDERING INFORMATION		
Temp Range	Package	Part Number
DG381B		
–40 to 85°C	14-Pin Plastic DIP	DG381BDJ
DG384B		
–40 to 85°C	16-Pin Plastic DIP	DG384BDJ
DG387B		
–40 to 85°C	14-Pin Plastic DIP	DG387BDJ
DG390B		
–40 to 85°C	16-Pin Plastic DIP	DG390BDJ

ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to V–

V+ 44 V

GND 25 V

Digital Inputs^a, V_S, V_D (V–) –2 V to (V+) +2V or
30 mA, whichever occurs first

Current, Any Terminal Except S or D 30 mA

Continuous Current, S or D 30 mA
(Pulsed at 1 ms, 10% duty cycle max) 100 mA

Storage Temperature –65 to 150°C

Power Dissipation^b

14-Pin Plastic DIP^d 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 11 mW/°C above 75°C
- Derate 6.5 mW/°C above 25°C

SCHEMATIC DIAGRAM (TYPICAL CHANNEL)

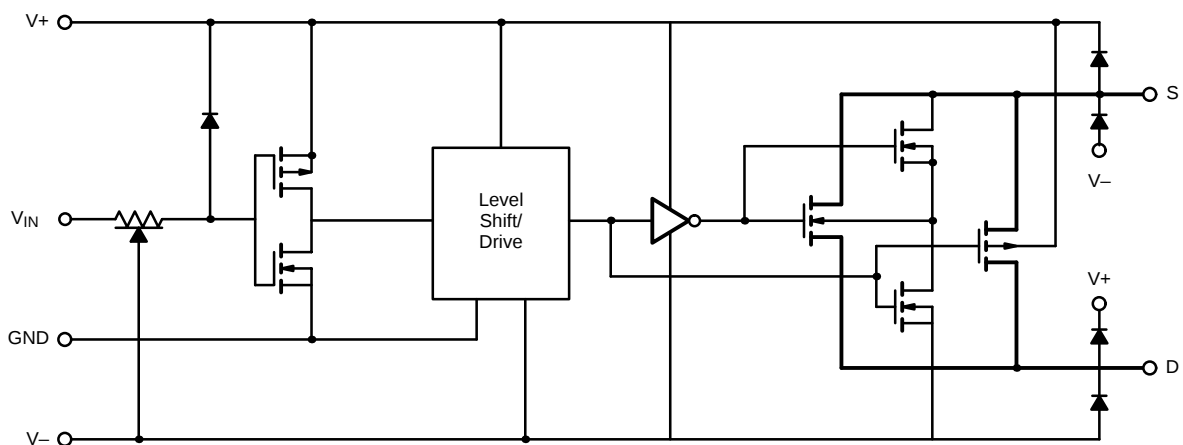
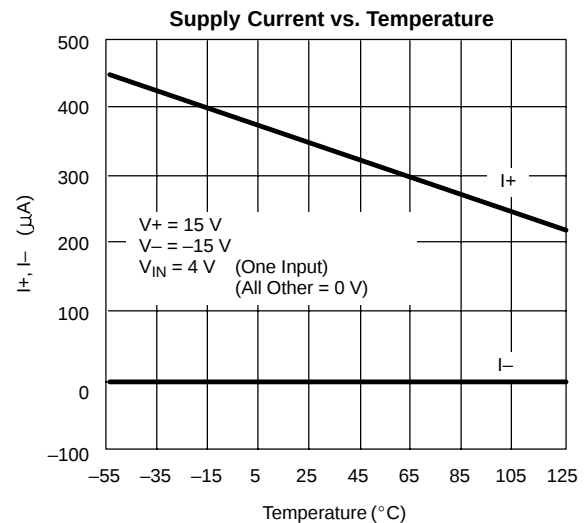
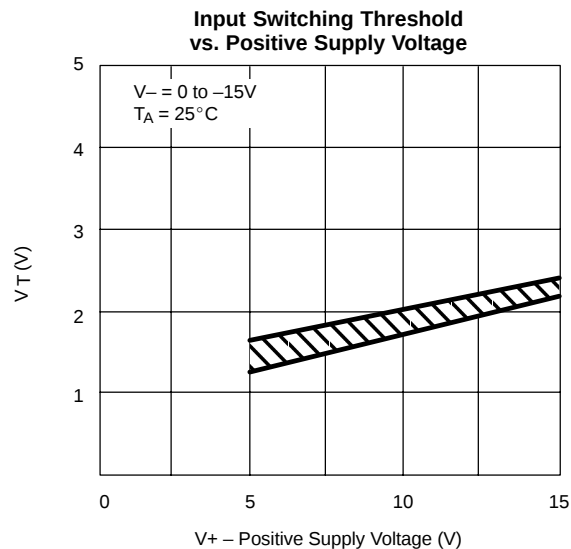
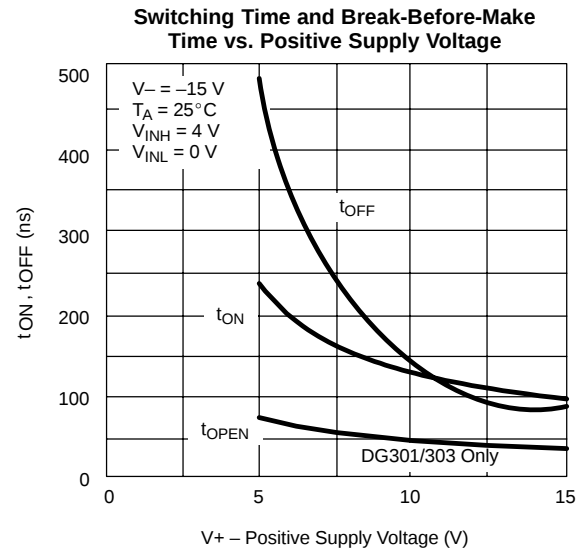
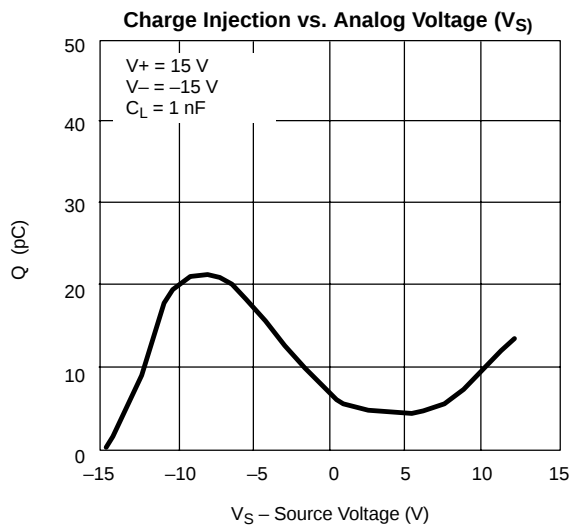
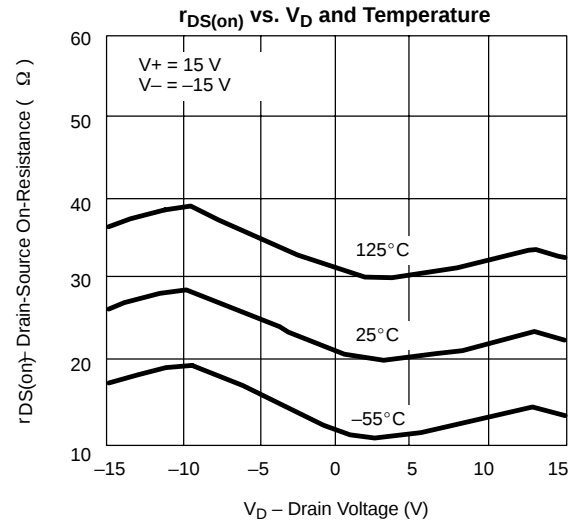
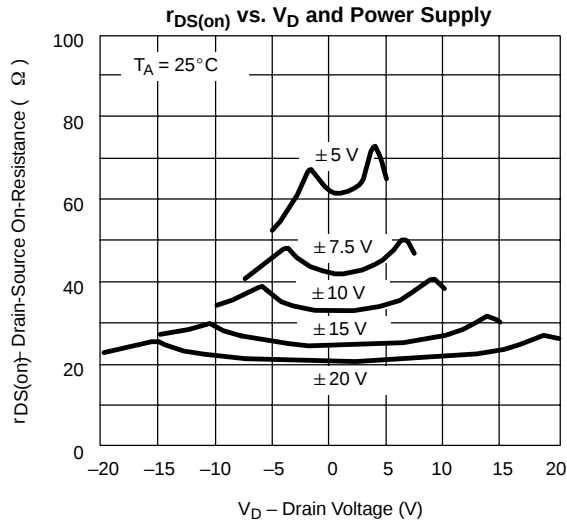


FIGURE 1.

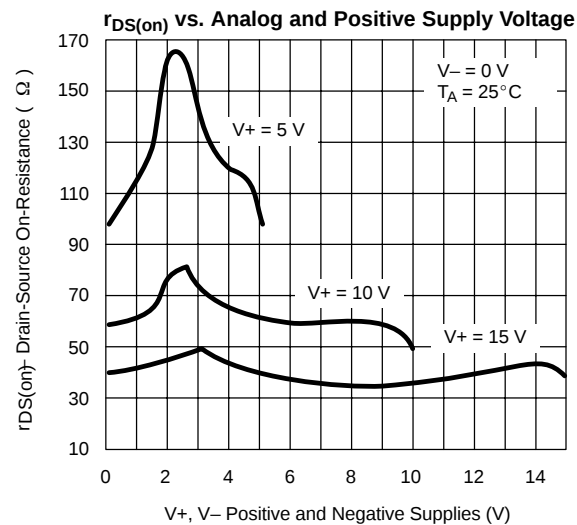
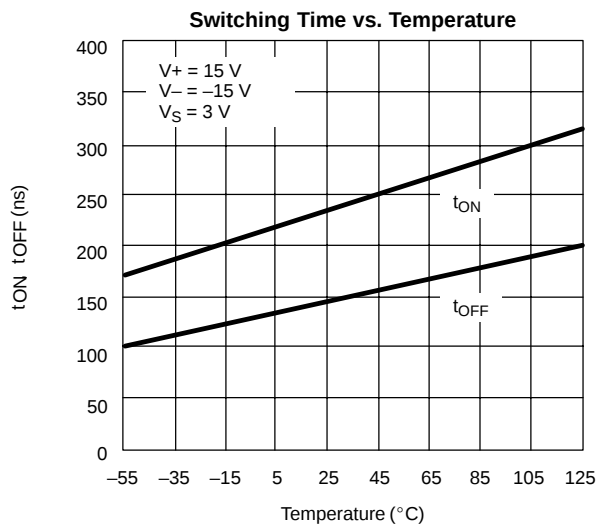
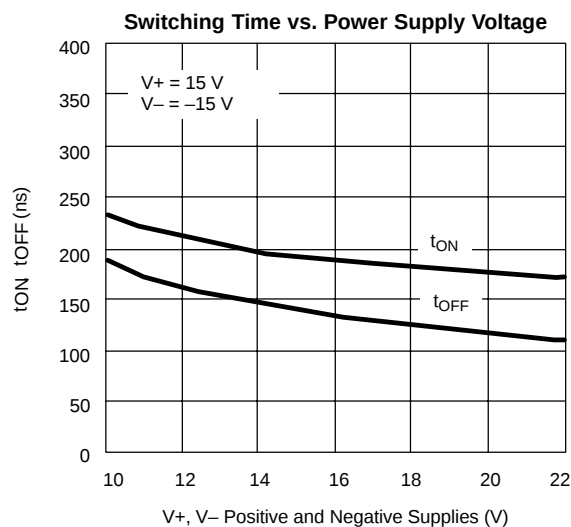
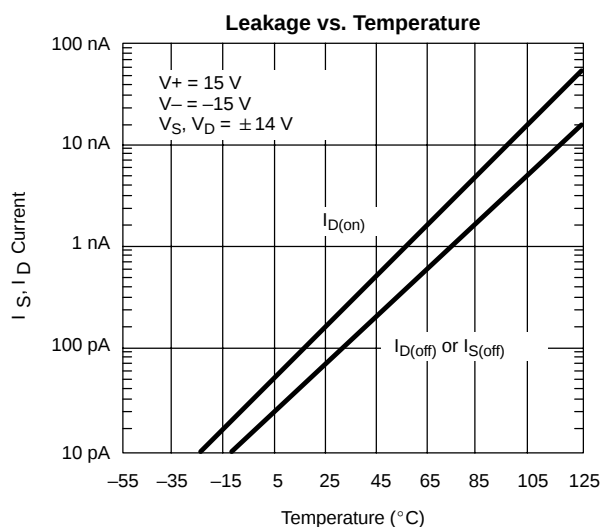
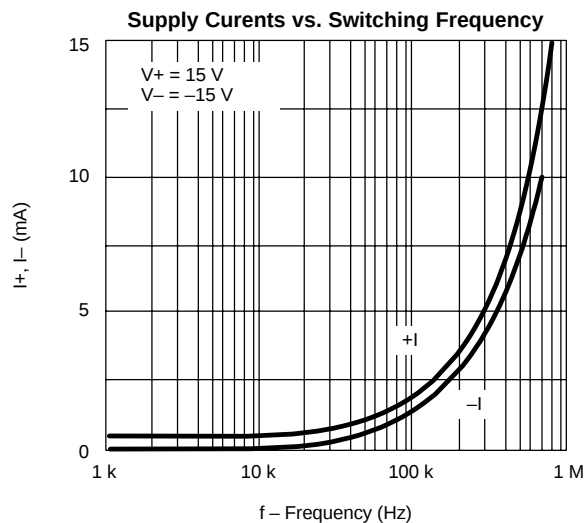
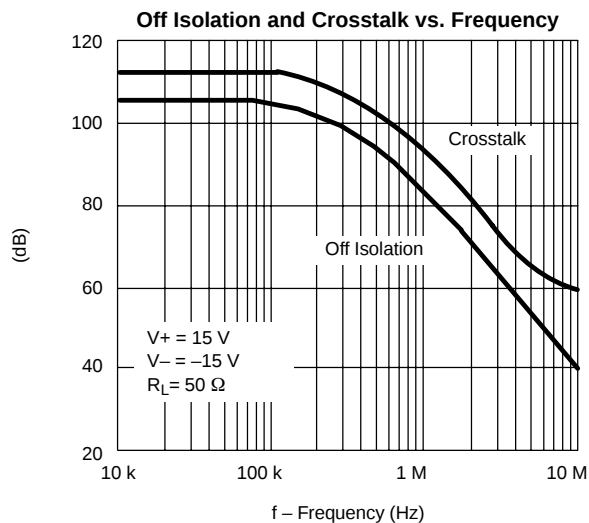
SPECIFICATIONS ^a								
Parameter	Symbol	Test Conditions Unless Specified V ₊ = 15 V, V ₋ = -15 V V _{IN} = 0.8 V or 4 V ^f	Temp ^b	Limits -40 to 85°C			Unit	
				Min ^d	Typ ^c	Max ^d		
Analog Switch								
Analog Signal Range ^e	V _{ANALOG}		Full	-15		15	V	
Drain-Source On-Resistance	r _{DS(on)}	V _D = ±10 V, I _S = -10 mA	Room Full		30	50 75	Ω	
Source Off Leakage Current	I _{S(off)}	V _S = ±14 V, V _D = ∓14 V	Room Hot	-5 -100	±0.1	5 100	nA	
Drain Off Leakage Current	I _{D(off)}	V _S = ±14 V, V _D = ∓14 V	Room Hot	-5 -100	±0.1	5 100		
Drain On Leakage Current	I _{D(on)}	V _D = V _S = ±14 V	Room Hot	-5 -100	±0.1	5 100		
Digital Control								
Input Current with Input Voltage High	I _{INH}	V _{IN} = 5 V	Room Full	-1	-0.001		μA	
		V _{IN} = 15 V	Room Full		0.001	1		
Input Current with Input Voltage Low	I _{INL}	V _{IN} = 0 V	Room Full	-1	-0.001			
Dynamic Characteristics								
Turn-On Time	t _{ON}	See Figure 2	Room		150		ns	
Turn-Off Time	t _{OFF}		Room		130			
Break-Before-Make Time	t _{OPEN}	See Figure 3	Room		50			
Charge Injection	Q	C _L = 0.01 μF, R _{gen} = 0 Ω V _{gen} = 0 V		Room		10	pC	
Source-Off Capacitance	C _{S(off)}	f = 1 MHz; V _S , V _D = 0 V		Room		14	pF	
Drain-Off Capacitance	C _{D(off)}			Room		14		
Channel-On Capacitance	C _{D(on)}			Room		40		
Input Capacitance	C _{IN}	f = 1 MHz	V _{IN} = 0 V	Room		6		
			V _{IN} = 15 V	Room		7		
Off-Isolation	OIRR	V _{IN} = 0 V, R _L = 1 kΩ V _S = 1 V _{rms} , f = 500 kHz		Room		62	dB	
Crosstalk (Channel-to-Channel)	X _{TALK}			Room		74		
Power Supplies								
Positive Supply Current	I ₊	V _{IN} = 4 V (One Input) (All Others = 0)		Room Full		0.23	1	mA
Negative Supply Current	I ₋			Room Full	-100	-0.001		μA
Positive Supply Current	I ₊	V _{IN} = 0.8 V (All Inputs)		Room Full		0.001	100	
Negative Supply Current	I ₋			Room Full	-100	-0.001		

Notes:

- Refer to PROCESS OPTION FLOWCHART.
- 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.

**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



TEST CIRCUITS

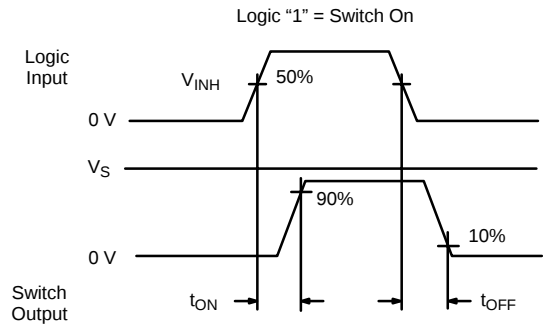
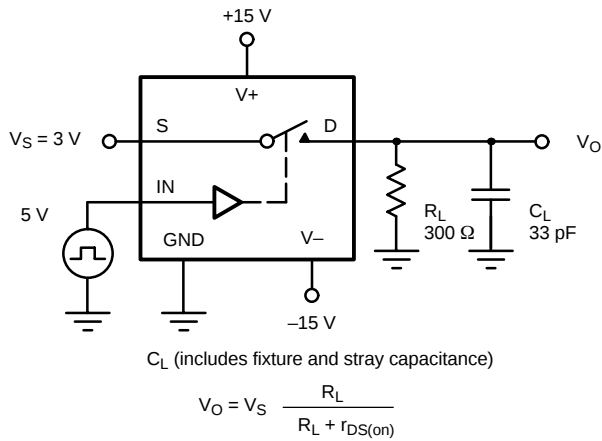


FIGURE 2. Switching Time

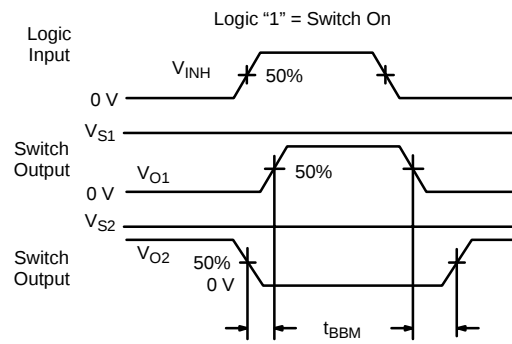
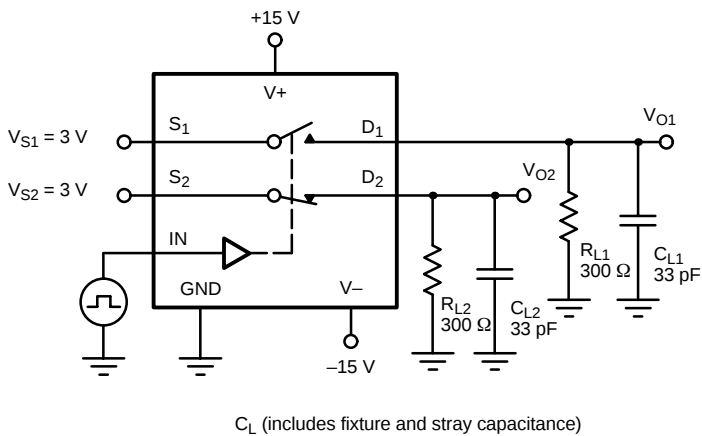


FIGURE 3. Break-Before-Make SPDT (DG387B, DG390B)

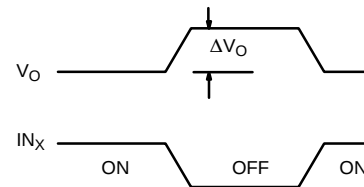
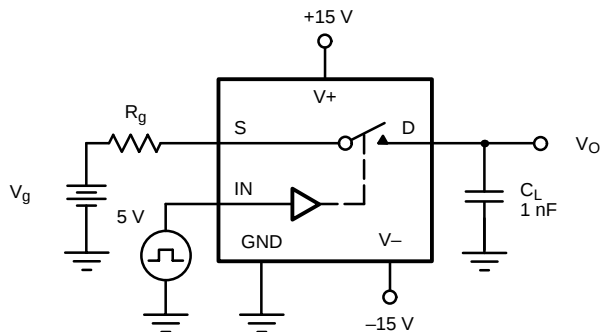


FIGURE 4. Charge Injection

APPLICATIONS

The DG381B series of analog switches will switch positive analog signals while using a single positive supply. This allows their use in applications where only one supply is available. The trade-offs or performance given up while using single supplies are: 1) increased $r_{DS(on)}$, 2) slower switching speed. Typical curves for aid in designing with single supplies are supplied (see Typical Characteristics). The analog voltage should not go above or below the supply voltages which in single operation are V^+ and 0 V.

In the integrator of Figure 4, R_D controls the discharge rate of the capacitor so that the pulsed or continuous current ratings are not exceeded. During reset SW_1 is closed and SW_2 is open. Opening SW_2 with SW_1 also open will hold the integrator output at its present value.

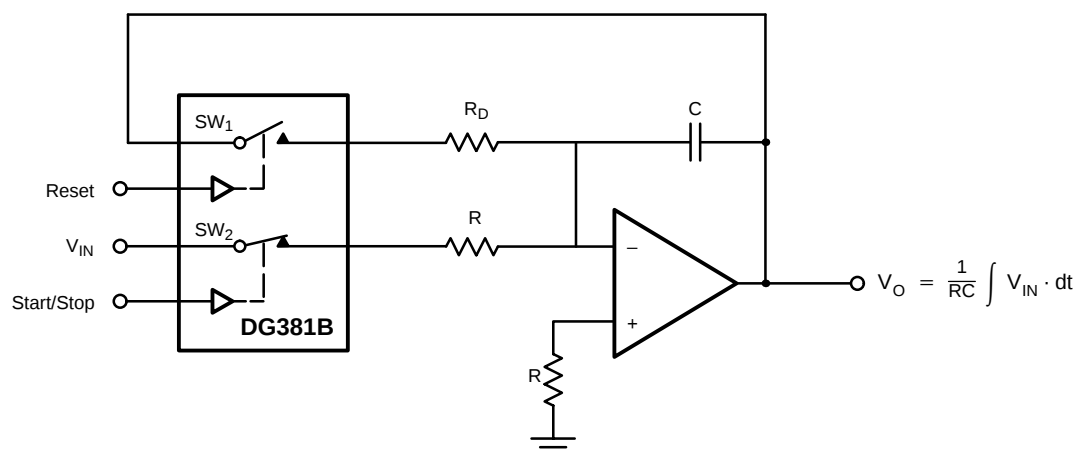


FIGURE 5. Integrator with Reset and Start/Stop



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