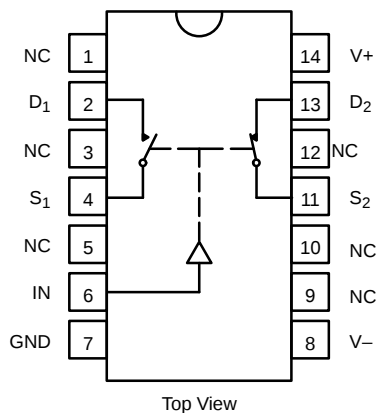


FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION

DG301B

Plastic DIP



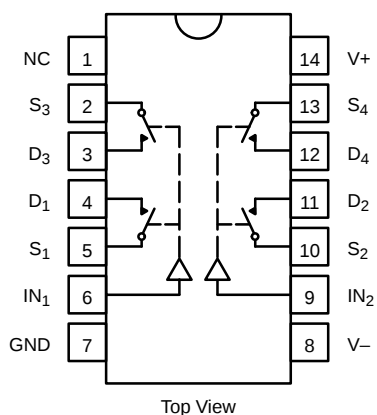
TRUTH TABLE

Logic	SW ₁	SW ₂
0	OFF	ON
1	ON	OFF

Logic "0" ≤ 0.8 V
Logic "1" ≥ 4 V

DG302B

Plastic DIP



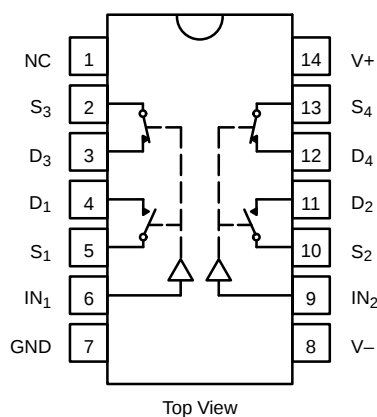
TRUTH TABLE

Logic	Switch
0	OFF
1	ON

Logic "0" ≤ 0.8 V
Logic "1" ≥ 4 V

DG303B

Plastic DIP and SOIC



TRUTH TABLE

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

Logic "0" ≤ 0.8 V
Logic "1" ≥ 4 V

ORDERING INFORMATION		
Temp Range	Package	Part Number
DG300B		
-40 to 85°C	14-Pin Plastic DIP	DG300BDJ
DG301B		
-40 to 85°C	14-Pin Plastic DIP	DG301BDJ
DG302B		
-40 to 85°C	14-Pin Plastic DIP	DG302BDJ
DG303B		
-40 to 85°C	14-Pin Plastic DIP	DG303BDJ
	14-SOIC	DG303BDY

ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to V₋

V+ 44 V

GND 25 V

Digital Inputs^{NO TAG}, V_S, V_D (V⁻) -2 V to (V⁺) +2V or
30 mA, whichever occurs first

Current, Any Terminal 30 mA

Continuous Current, S or D

(Pulsed at 1 ms, 10% duty cycle max) 100 mA

Storage Temperature -65 to 150°C

Power Dissipation^{NO TAG}

14-Pin Plastic DIP^{NO TAG} 470 mW

SOIC-14^d 600 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 6.5 mW/°C above 25°C
- Derate 7.6 mW/°C above 75°C

SCHEMATIC DIAGRAM (TYPICAL CHANNEL)

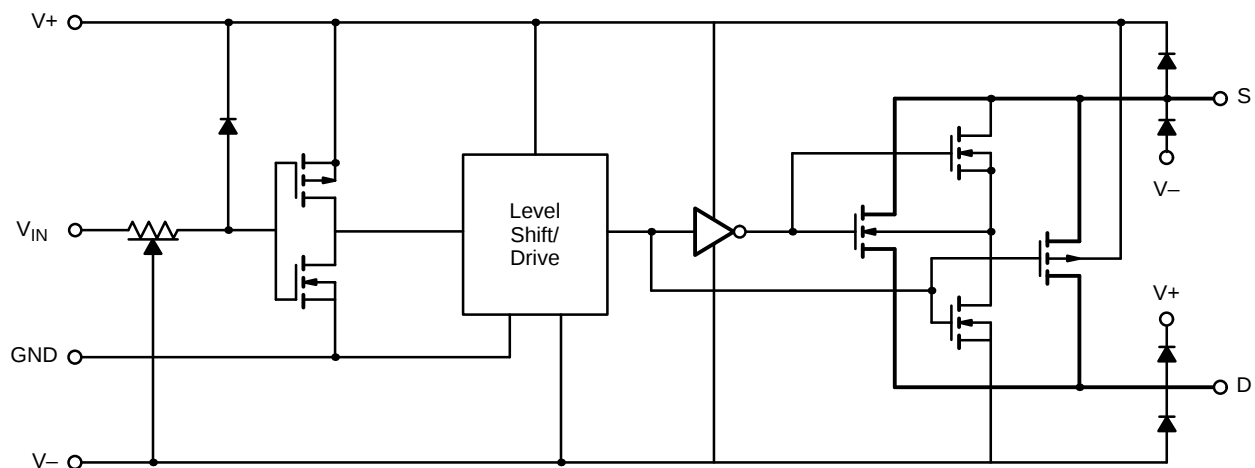
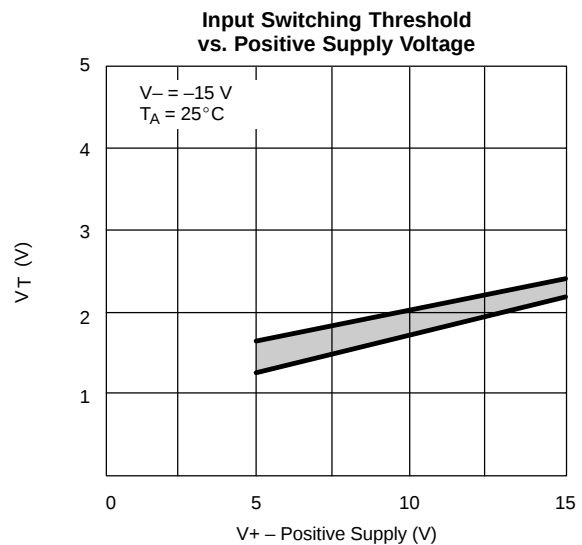
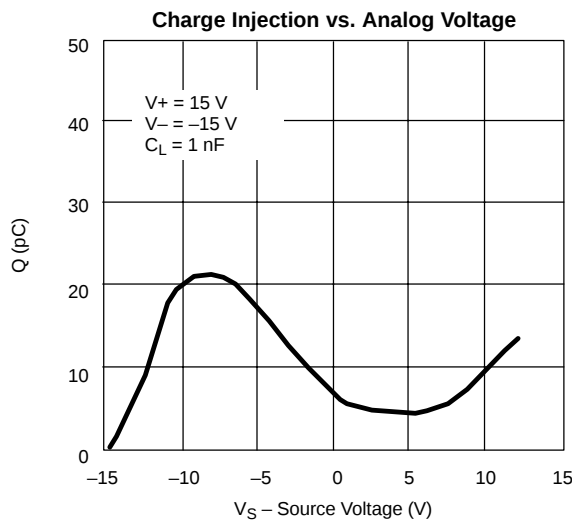
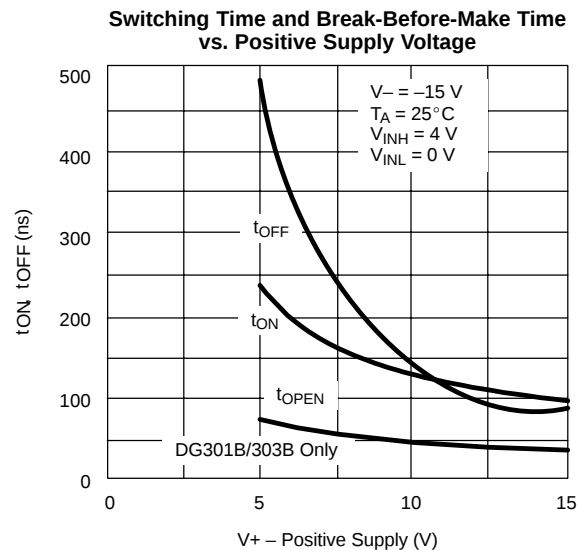
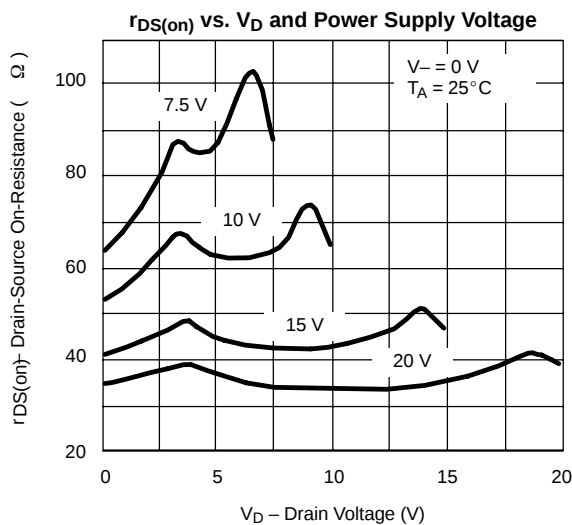
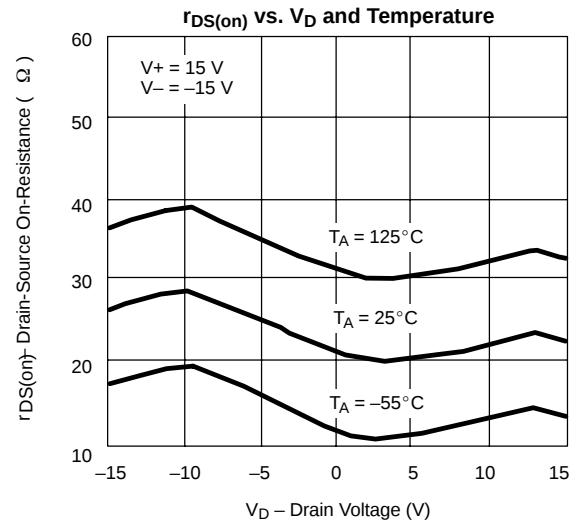
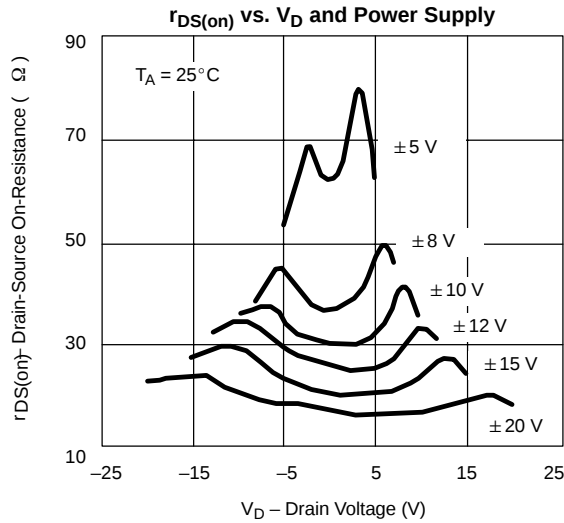


FIGURE 1.

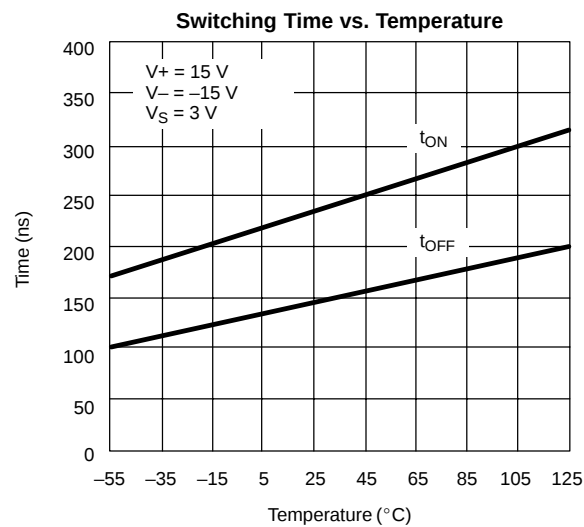
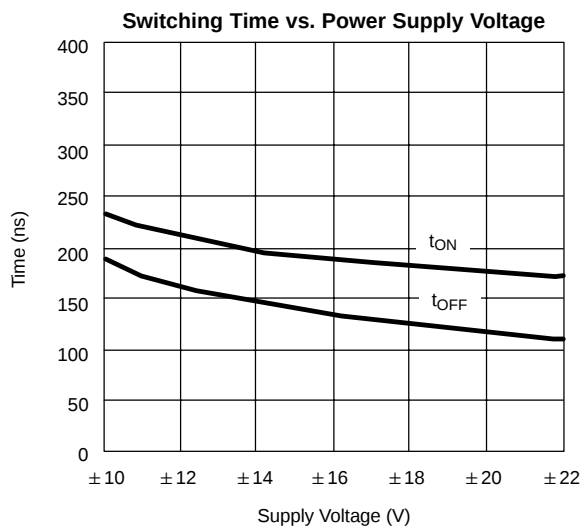
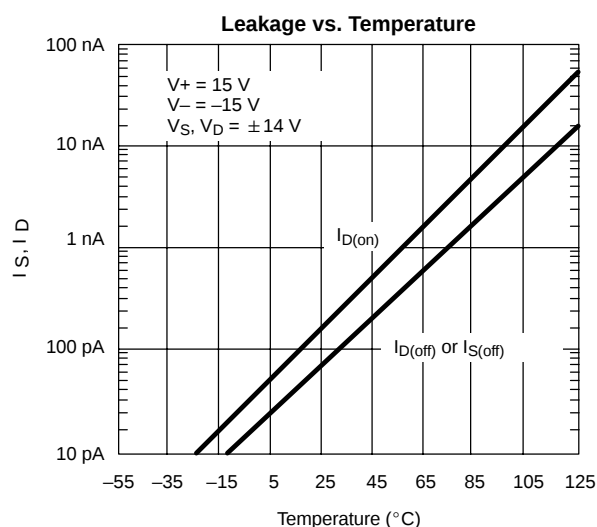
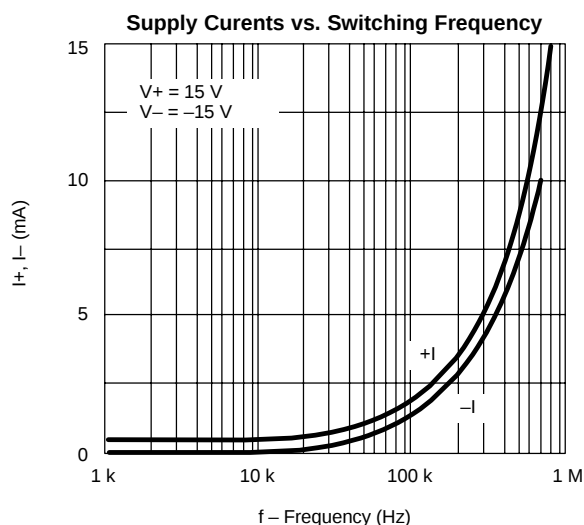
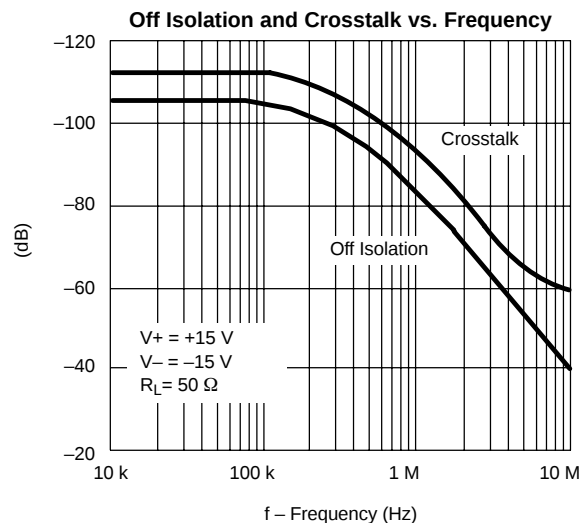
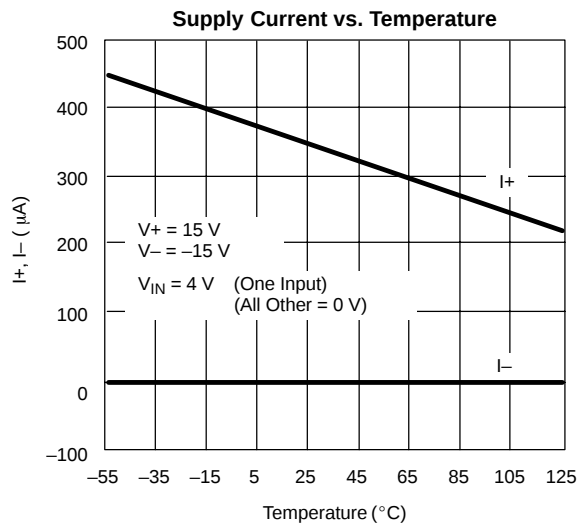
SPECIFICATIONS ^a							
Parameter	Symbol	Test Conditions Unless Specified V ₊ = 15 V, V ₋ = -15 V V _{IN} = 0.8 V or V _{IN} = 4 V ^f	Temp ^b	Limits -40 to 85°C			Unit
				Min ^d	Typ ^c	Max ^d	
Analog Switch							
Analog Signal Range ^e	V _{ANALOG}		Full	-15		15	V
Drain-Source On-Resistance	r _{DS(on)}	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)}		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 NO TAG	Room		150		ns
Turn-Off Time	t _{OFF}		Room		130		
Break-Before-Make Time	t _{OPEN}	DG301B/303B Only Figure NO TAG	Room		50		
Charge Injection	Q	C _L = 1 nF, R _{gen} = 0 Ω V _{gen} = 0 V, Figure NO TAG	Room		8		pC
Source-Off Capacitance	C _{S(off)}	V _S , V _D = 0 V, f = 1 MHz	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 V	Room Full		0.23	1	mA
Negative Supply Current	I ₋		Room Full	-100	-0.001		
Positive Supply Current	I ₊	V _{IN} = 0.8 V (All Inputs)	Room Full		0.001	100	μA
Negative Supply Current	I ₋		Room Full	-100	-0.001		

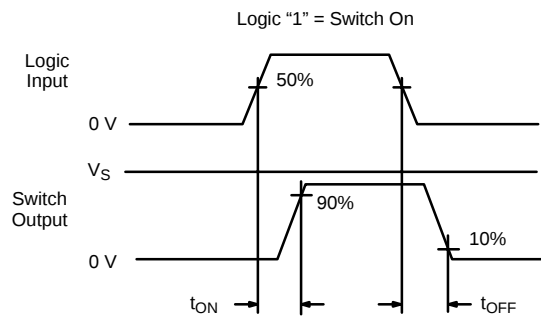
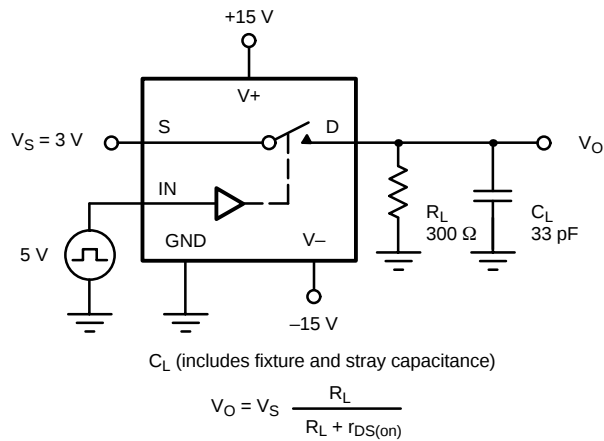
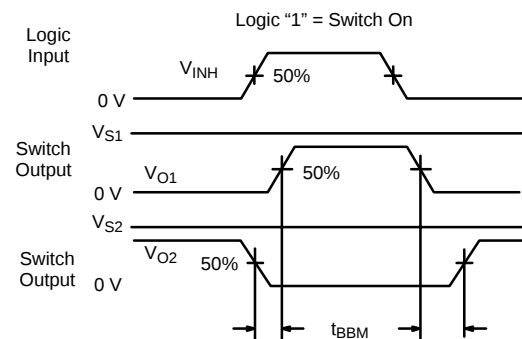
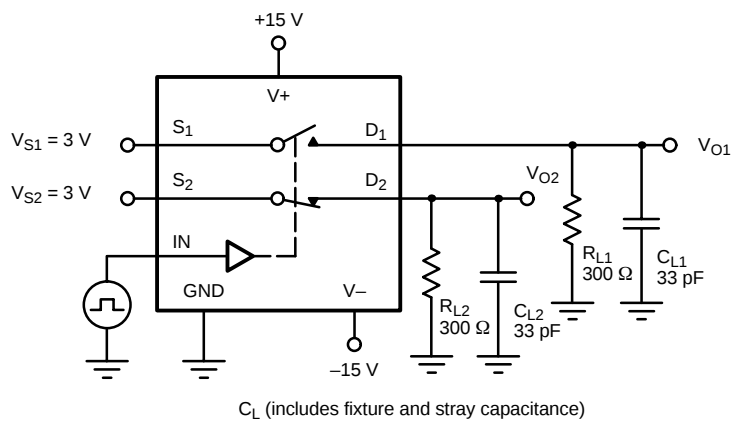
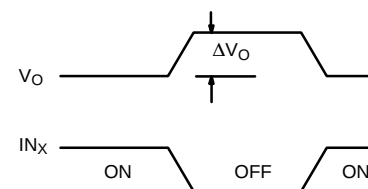
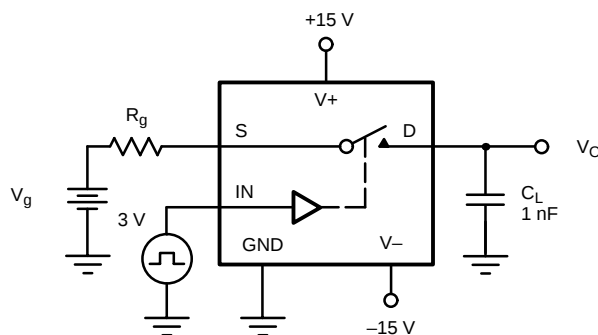
Notes:

- 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 (DG301B, DG303B)

FIGURE 4. Charge Injection

APPLICATION HINTS NO TAG				
V+ Positive Supply Voltage (V)	V- Negative Supply Voltage (V)	GND Voltage (V)	V _{IN} Logic Input Voltage V _{INH(min)} /V _{INL(max)} (V)	V _S or V _D Analog Voltage Range (V)
15	-15	0	4/0.8	-15 to 15
20	-20	0	4/0.8	-20 to 20
15	0	0	4/0.8	0 to 15

Note:

a. Application Hints are for DESIGN AID ONLY, not guaranteed and not subject to production testing.

APPLICATIONS

The DG300B series of analog switches will switch positive analog signals while using a single positive supply. This facilitates their use in applications where only one supply is available. The trade-offs of using single supplies are:

1) Increased $r_{DS(on)}$; 2) slower switching speed. The analog voltage should not go above or below the supply voltages which in single operation are V+ and 0 V. (See Input Switching Threshold vs. Positive Supply Voltage Curve.)

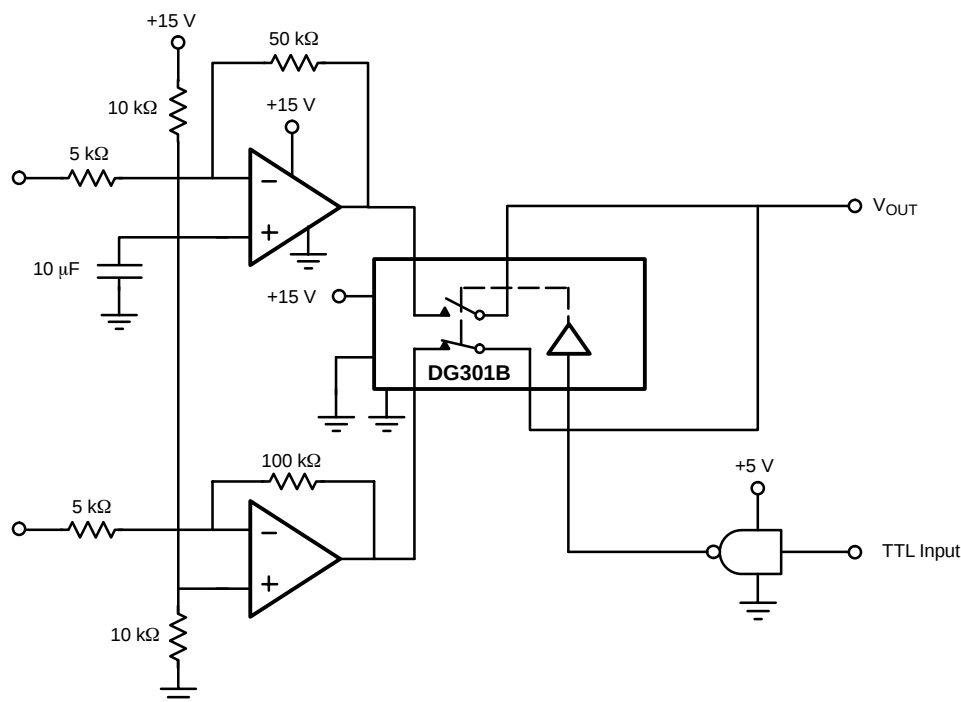


FIGURE 5. Single Supply Op Amp Switching

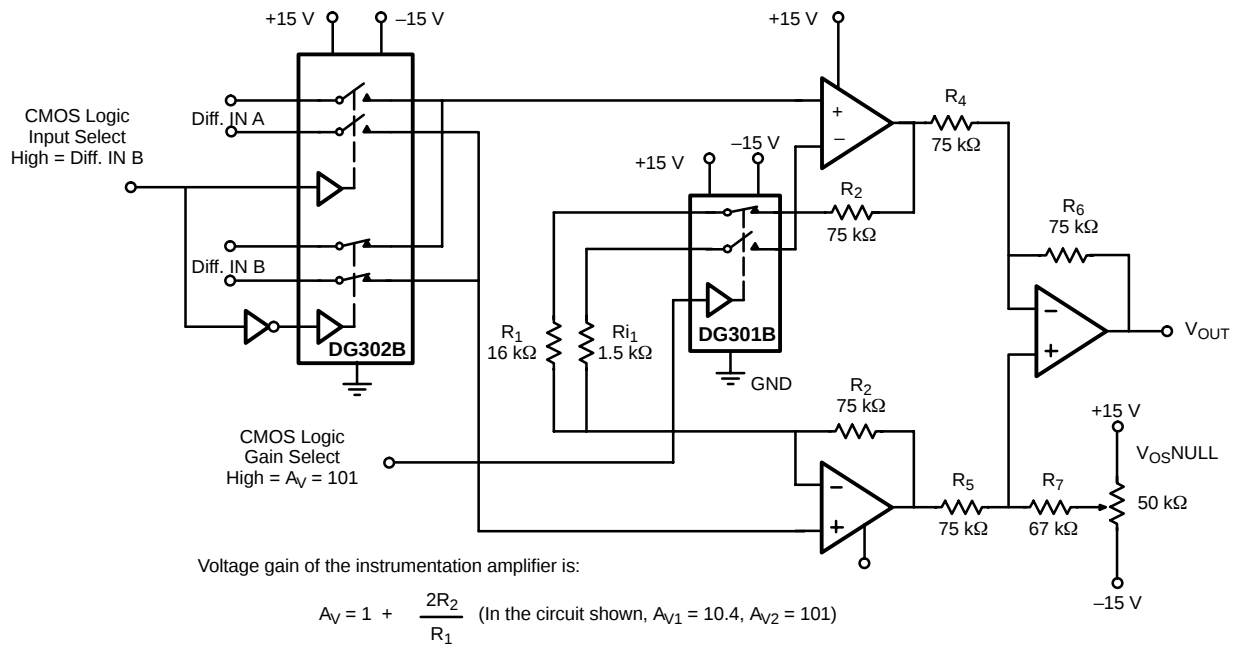


FIGURE 6. Low Power Instrumentation Amplifier with Digitally Selectable Inputs and Gain



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