

ORDERING INFORMATION			
Temp. Range	Package	Part Number	
- 55 °C to 125 °C	8-Pin CerDIP	DG201BAK/883	
		DG202BAK/883	
	LCC-20	DG201BAZ/883	
		DG202BAZ/883	
- 40 °C to 85 °C	16-Pin Plastic DIP	DG201BDJ	
		DG201BDJ-E3	
		DG202BDJ DG202BDJ-E3	
	16-Pin Narrow SOIC	DG201BDY	
		DG201BDY-E3	
		DG201BDY-T1	
		DG201BDY-T1-E3	
	16-Pin TSSOP	DG202BDY DG202BDY-E3 DG202BDY-T1 DG202BDY-T1-E3	
			DG201BDQ
			DG201BDQ-E3
DG201BDQ-T1			
DG201BDQ-T1-E3			
DG202BDQ DG202BDQ-E3 DG202BDQ-T1 DG202BDQ-T1-E3			

ABSOLUTE MAXIMUM RATINGS			
Parameter		Limit	Unit
Voltages Referenced, V ₊ to V ₋		44	V
GND		25	
Digital Inputs ^a , V _S , V _D		(V ₋) - 2 to (V ₊) + 2 or 30 mA, whichever occurs first	
Current (Any terminal)		30	mA
Peak Current S or D (Pulsed at 1 ms, 10 % duty cycle max.)		100	
Storage Temperature	(AK, DK Suffix)	- 65 to 150	°C
	(DJ, DY, DQ Suffix)	- 65 to 125	
Power Dissipation (Package) ^b	16-Pin Plastic DIP ^c	470	mW
	16-Pin Narrow SOIC and TSSOP ^d	640	
	16-Pin CerDIP ^e	900	
	LCC-20 ^f	750	

Notes:

- a. 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.
- b. All leads welded or soldered to PC board.
- c. Derate 6.5 mW/°C above 75 °C.
- d. Derate 7.6 mW/°C above 75 °C.
- e. Derate 12 mW/°C above 75 °C.
- f. Derate 10 mW/°C above 75 °C.

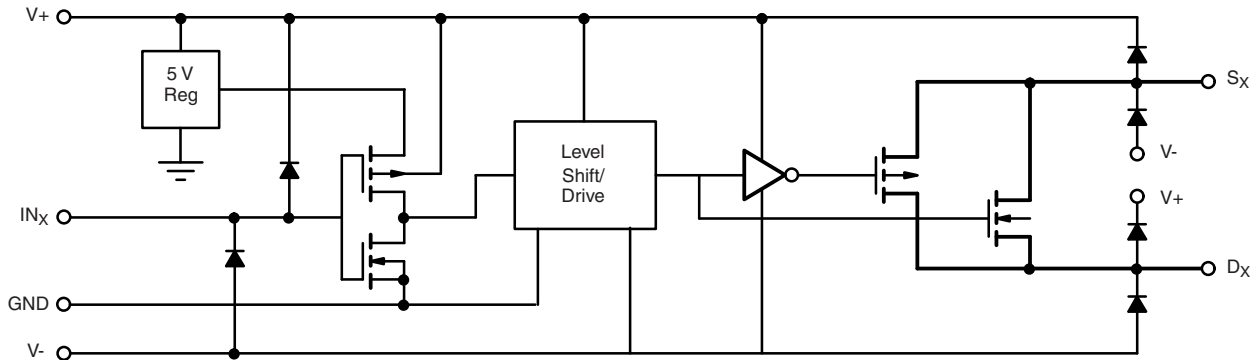
SCHEMATIC DIAGRAM (Typical Channel)


Figure 1.

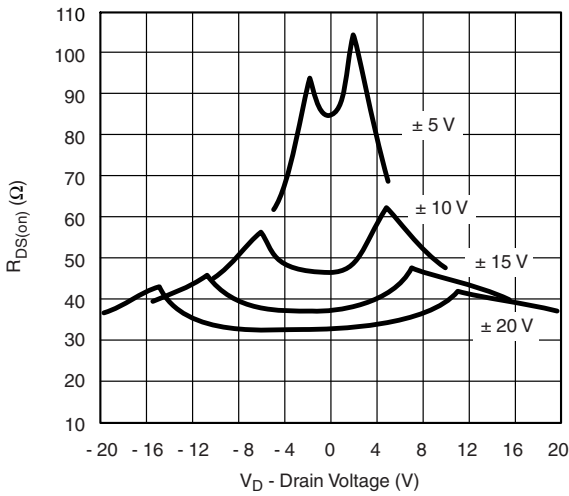
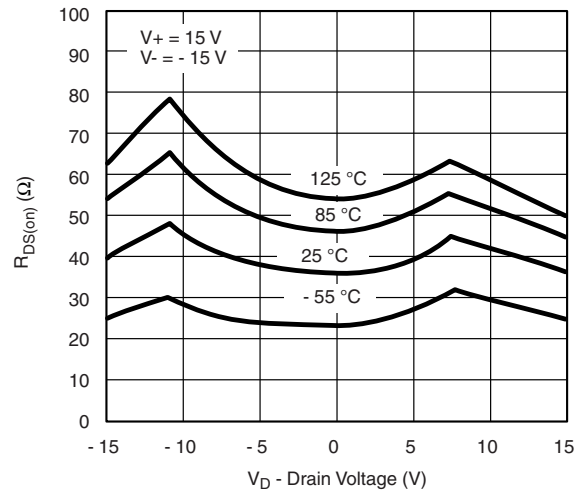
SPECIFICATIONS^a									
Parameter	Symbol	Test Conditions Unless Specified $V_+ = 15\text{ V}$, $V_- = -15\text{ V}$ $V_{IN} = 2.4\text{ V}$, 0.8 V^f	Temp. ^b	Typ. ^c	A Suffix -55 °C to 125 °C		D Suffix -40 °C to 85 °C		Unit
					Min. ^d	Max. ^d	Min. ^d	Max. ^d	
Analog Switch									
Analog Signal Range ^e	V_{ANALOG}		Full		-15	15	-15	15	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_D = \pm 10\text{ V}$, $I_S = 1\text{ mA}$	Room	45		85		85	Ω
$R_{DS(on)}$ Match	$\Delta R_{DS(on)}$		Room	2					
Source Off Leakage Current	$I_{S(off)}$	$V_S = \pm 14\text{ V}$, $V_D = \pm 14\text{ V}$	Room	± 0.01	-0.5	0.5	-0.5	0.5	nA
Drain Off Leakage Current	$I_{D(off)}$	$V_D = \pm 14\text{ V}$, $V_S = \pm 14\text{ V}$	Room	± 0.01	-0.5	0.5	-0.5	0.5	
Drain On Leakage Current	$I_{D(on)}$	$V_S = V_D = \pm 14\text{ V}$	Room	± 0.02	-0.5	0.5	-0.5	0.5	
Digital Control									
Input Voltage High	V_{INH}		Full		2.4		2.4		V
Input Voltage Low	V_{INL}		Full			0.8		0.8	
Input Current	I_{INH} or I_{INL}	V_{INH} or V_{INL}	Full		-1	1	-1	1	μA
Input Capacitance	C_{IN}		Room	5					pF
Dynamic Characteristics									
Turn-On Time	t_{ON}	$V_S = 2\text{ V}$ see switching time test circuit	Room	120		300		300	ns
Turn-Off Time	t_{OFF}		Room	65		200		200	
Charge Injection	Q	$C_L = 1000\text{ pF}$, $V_g = 0\text{ V}$ $R_g = 0\ \Omega$	Room	1					pC
Source-Off Capacitance	$C_{S(off)}$	$V_S = 0\text{ V}$, $f = 1\text{ MHz}$	Room	5					pF
Drain-Off Capacitance	$C_{D(off)}$		Room	5					
Channel On Capacitance	$C_{D(on)}$		$V_D = V_S = 0\text{ V}$, $f = 1\text{ MHz}$	Room	16				
Off Isolation	OIRR	$C_L = 15\text{ pF}$, $R_L = 50\ \Omega$ $V_S = 1\text{ V}_{RMS}$, $f = 100\text{ kHz}$	Room	90					dB
Channel-to-Channel Crosstalk	X_{TALK}		Room	95					
Power Supply									
Positive Supply Current	I_+	$V_{IN} = 0$ or 5 V	Room			50		50	μA
Negative Supply Current	I_-		Room			-1		-1	
Power Supply Range for Continuous Operation	V_{OP}		Full		± 4.5	± 22	± 4.5	± 22	V

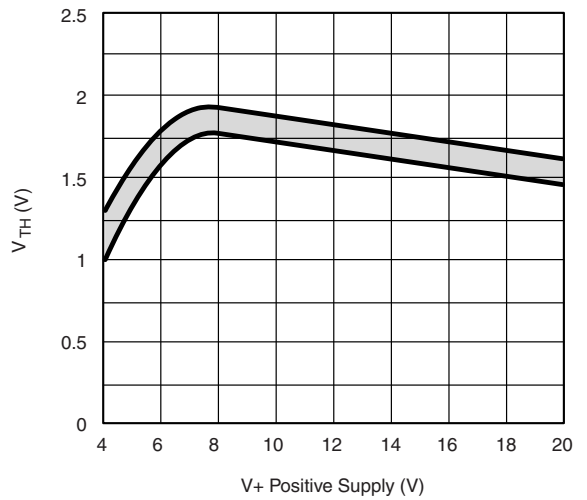
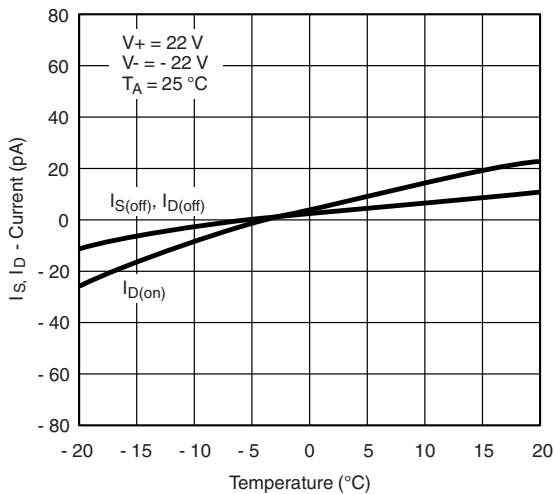
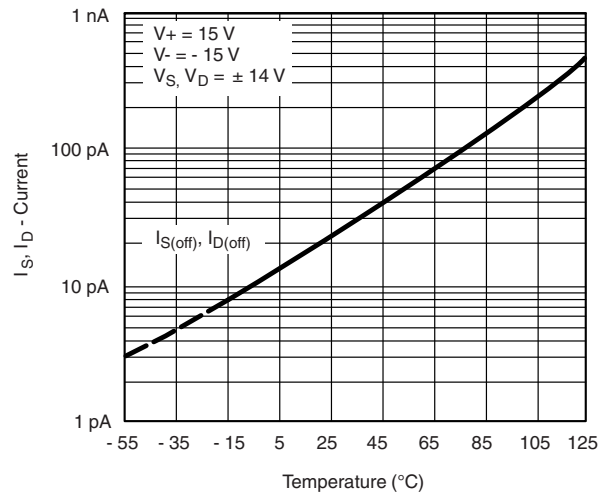
SPECIFICATIONS (for Single Supply) ^a									
Parameter	Symbol	Test Conditions Unless Specified $V_+ = 12\text{ V}$, $V_- = 0\text{ V}$ $V_{IN} = 2.4\text{ V}$, 0.8 V^f	Temp. ^b	Typ. ^c	A Suffix - 55 °C to 125 °C		D Suffix - 40 °C to 85 °C		Unit
					Min. ^d	Max. ^d	Min. ^d	Max. ^d	
Analog Switch									
Analog Signal Range ^e	V_{ANALOG}		Full		0	12	0	12	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_D = 3\text{ V}$, 8 V , $I_S = 1\text{ mA}$	Room Full	90		160 200		160 200	Ω
Dynamic Characteristics									
Turn-On Time	t_{ON}	$V_S = 8\text{ V}$ see switching time test circuit	Room	120		300		300	ns
Turn-Off Time	t_{OFF}		Room	60		200		200	
Charge Injection	Q	$C_L = 1\text{ nF}$, $V_{gen} = 6\text{ V}$ $R_{gen} = 0\ \Omega$	Room	4					pC
Power Supply									
Positive Supply Current	I+	$V_{IN} = 0\text{ or }5\text{ V}$	Room Full			50 100		50 100	μA
Negative Supply Current	I-		Room Full		- 1 - 5		- 1 - 5		
Power Supply Range for Continuous Operation	V_{OP}		Full		+ 4.5	+ 25	+ 4.5	+ 25	V

Notes:

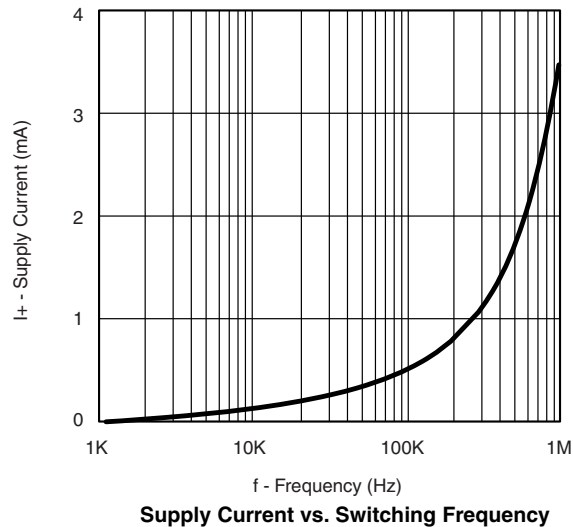
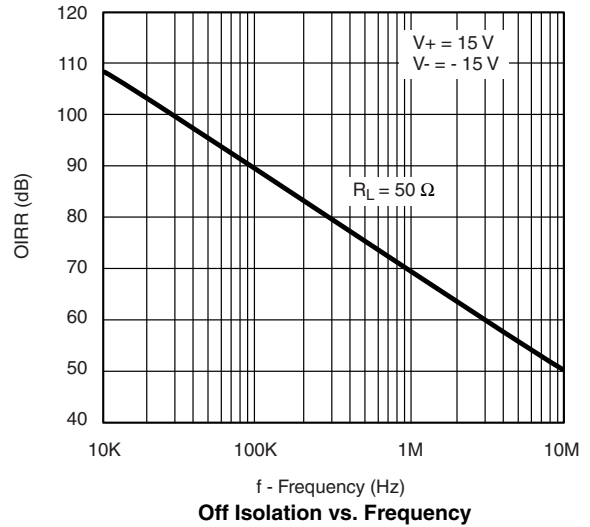
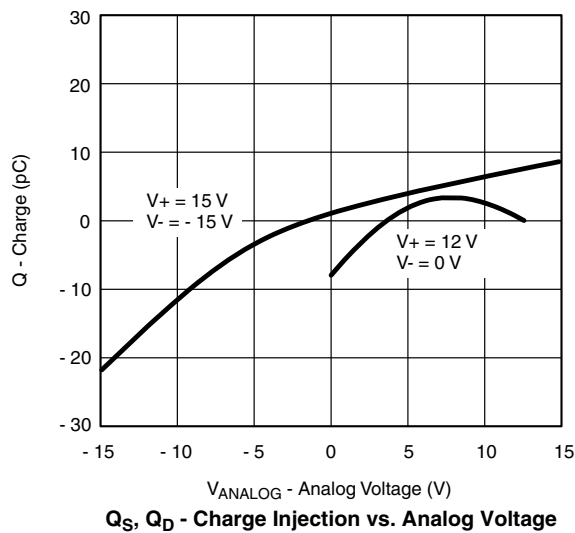
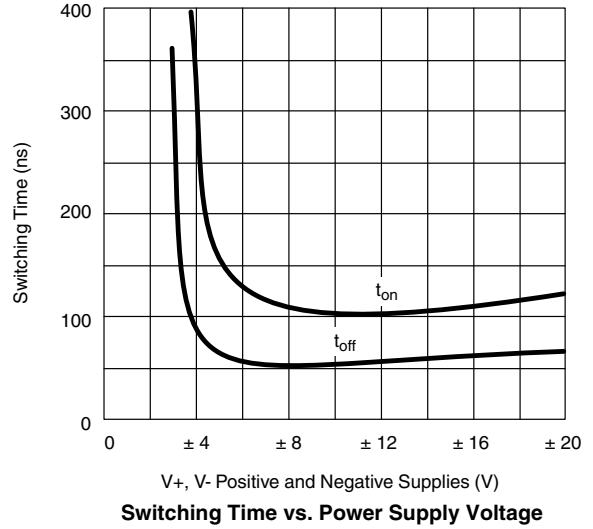
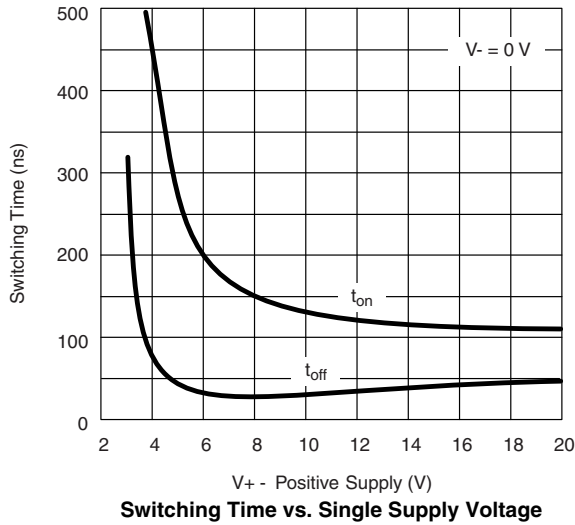
- Refer to PROCESS OPTION FLOWCHART.
- Room = 25 °C, Full = as determined by the operating temperature suffix.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum,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

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.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

 $R_{DS(on)}$ vs. V_D and Power Supply Voltages

 $R_{DS(on)}$ vs. V_D and Temperature

 $R_{DS(on)}$ vs. V_D and Single Power Supply Voltages

Input Switching Threshold vs. Supply Voltage

Leakage Currents vs. Analog Voltage

Leakage Currents vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



TEST CIRCUITS

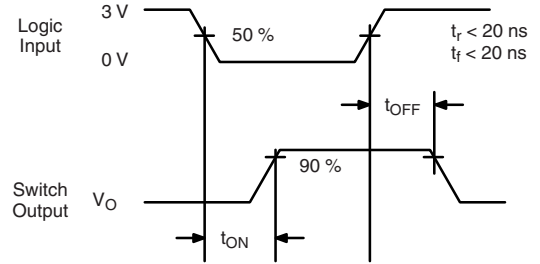


Figure 2. Switching Time

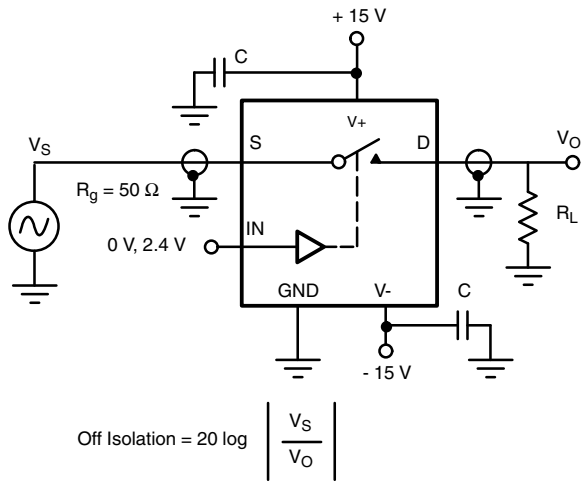


Figure 3. Off Isolation

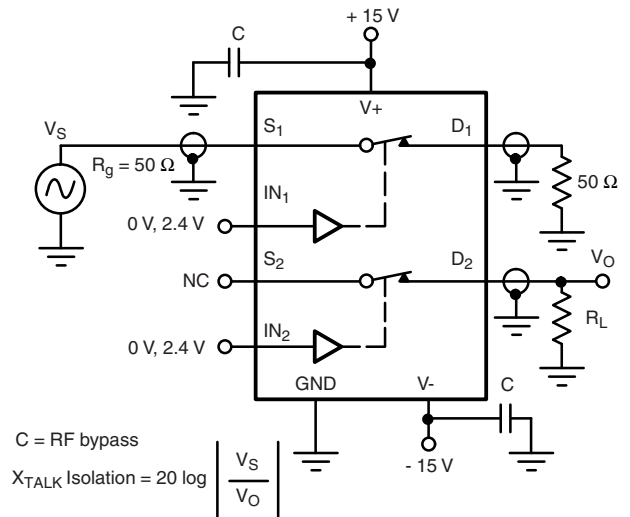
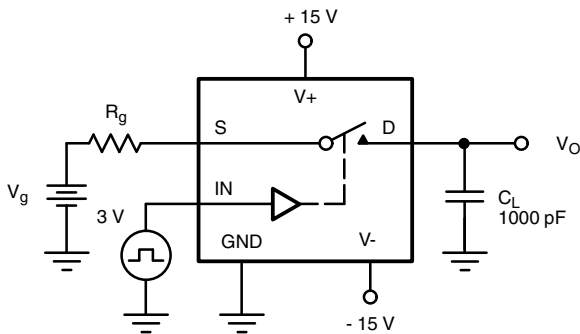


Figure 4. Channel-to-Channel Crosstalk



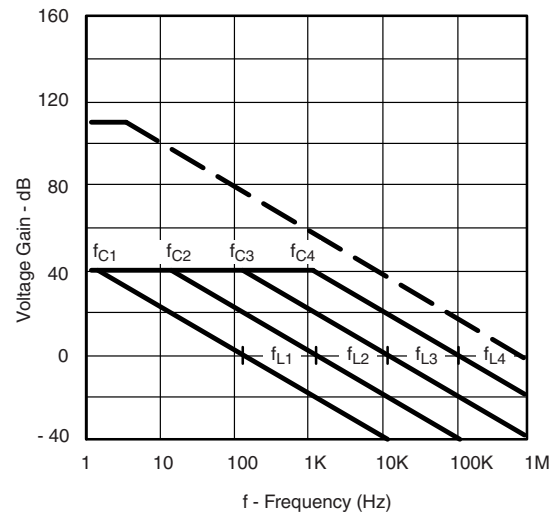
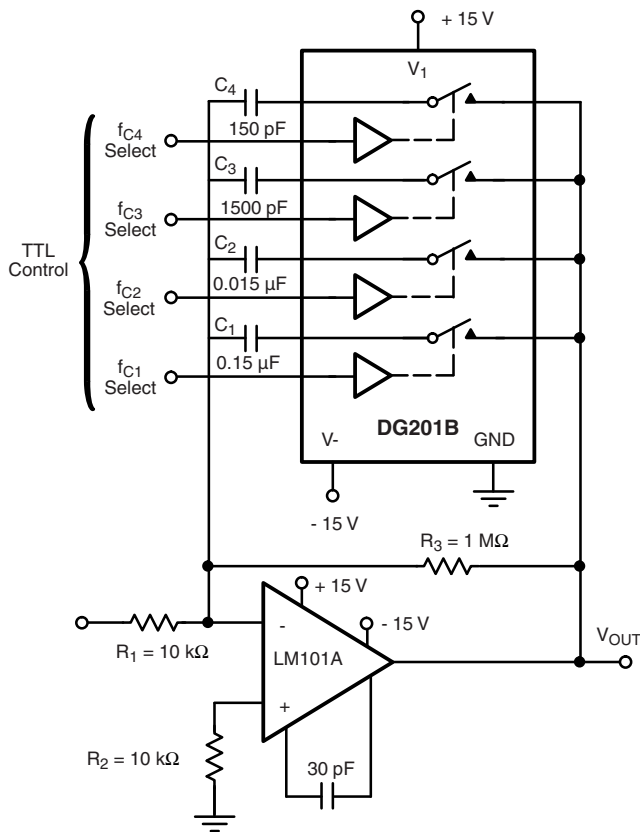
ΔV_O = measured voltage error due to charge injection
The charge injection in coulombs is $Q = C_L \times \Delta V_O$

Figure 5. Charge Injection

APPLICATIONS



Figure 6. Sample-and-Hold



$$A_L \text{ (Voltage Gain Below Break Frequency)} = \frac{R_3}{R_1} = 100 \text{ (40 dB)}$$

$$f_C \text{ (Break Frequency)} = \frac{1}{2\pi R_3 C_X}$$

$$f_L \text{ (Unity Gain Frequency)} = \frac{1}{2\pi R_1 C_X}$$

$$\text{Max. Attenuation} = \frac{R_{DS(on)}}{10 \text{ k}\Omega} \approx -47 \text{ dB}$$

Figure 7. Active Low Pass Filter with Digitally Selected Break Frequency

APPLICATIONS

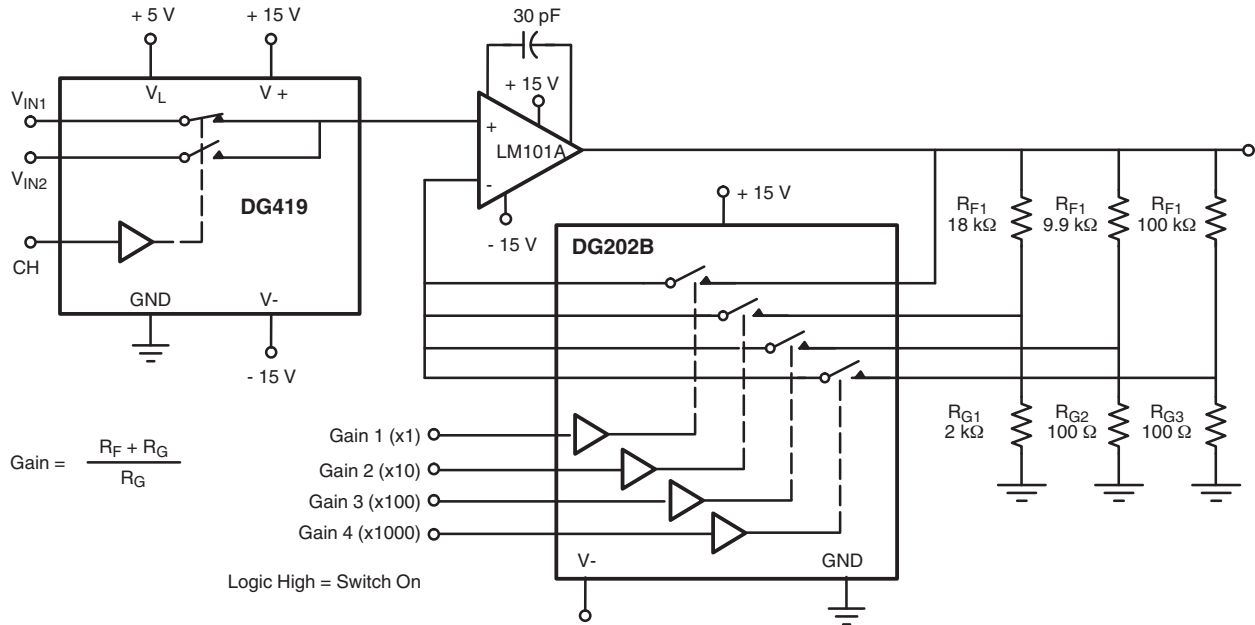


Figure 8. A Precision Amplifier with Digitally Programmable Input and Gains

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