

Monolithic Dual SPST CMOS Analog Switch

FEATURES

- ± 15 V Input Signal Range
- 44-V Maximum Supply Ranges
- On-Resistance: $45\ \Omega$
- TTL and CMOS Compatibility

BENEFITS

- Wide Dynamic Range
- Simple Interfacing
- Reduced External Component Count

APPLICATIONS

- Servo Control Switching
- Programmable Gain Amplifiers
- Audio Switching
- Programmable Filters

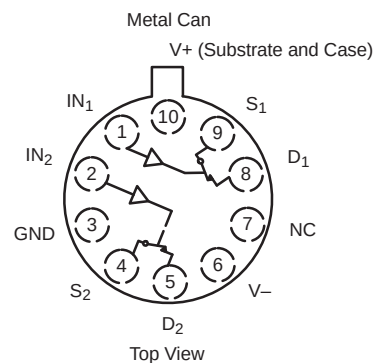
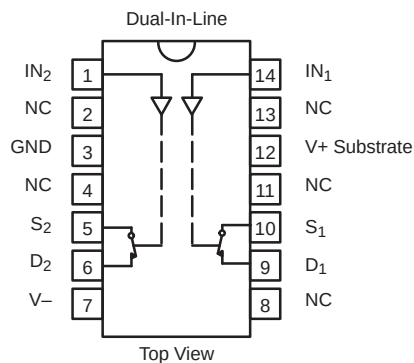
DESCRIPTION

The DG200A_MIL is a dual, single-pole, single-throw analog switch designed to provide general purpose switching of analog signals. This device is ideally suited for designs requiring a wide analog voltage range coupled with low on-resistance.

Each switch conducts equally well in both directions when on, and blocks up to 30 V peak-to-peak when off. In the on condition, this bi-directional switch introduces no offset voltage of its own.

The DG200A_MIL is designed on Vishay Siliconix' improved PLUS-40 CMOS process. An epitaxial layer prevents latchup.

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION



TRUTH TABLE

Logic	Switch
0	ON
1	OFF

Logic "0" ≤ 0.8 V
Logic "1" ≥ 2.4 V

ORDERING INFORMATION		
Temp Range	Package	Part Number
-55 to 125°C	14-Pin CerDIP	DG200AAK
		DG200AAK/883, JM38510/12301BCA, 5962-9562901QCA
	10-Pin Metal Can	DG200AAA
		DG200AAA/883, JM38510/12301BIC
	14-Pin Sidebraz	JM38510/12301BCC

ABSOLUTE MAXIMUM RATINGS

$V+$ to $V-$ 44 V
 GND to $V-$ 25 V
 Digital Inputs^a, V_S , V_D ($V-$) -2 V to ($V+$) +2 V or 30 mA, whichever occurs first
 Current (Any Terminal) Continuous 30 mA
 Current S or D (Pulsed at 1 ms, 10% Duty Cycle Max) 100 mA
 Storage Temperature -65 to 150°C

Power Dissipation (Package)^b
 10-Pin Metal Can^c 450 mW
 14-Pin CerDIP^d 825 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 mW/°C above 75°C
- Derate 11 mW/°C above 75°C

SCHEMATIC DIAGRAM (TYPICAL CHANNEL)

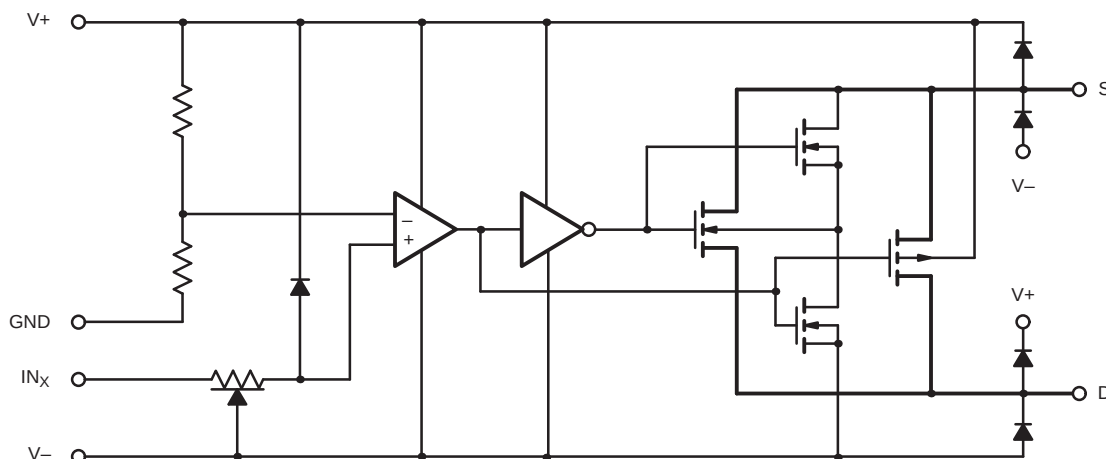


FIGURE 1.

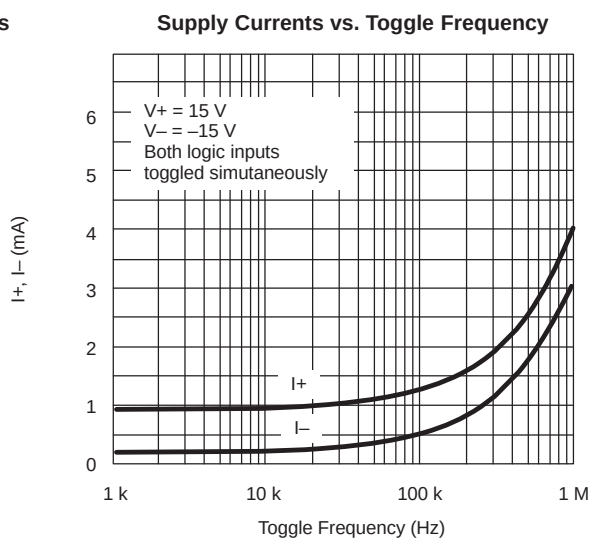
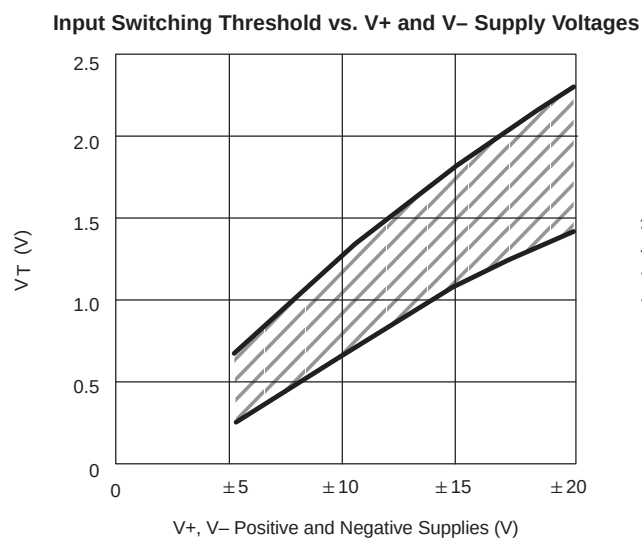
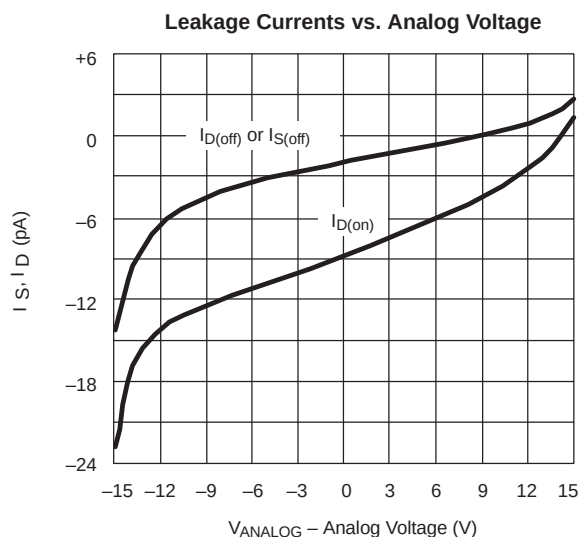
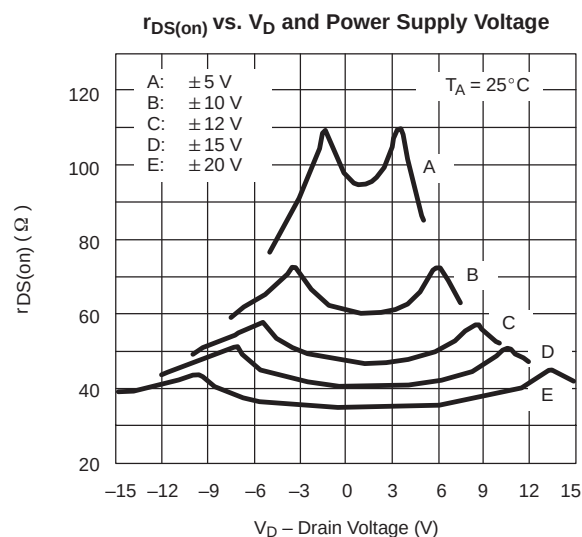


SPECIFICATIONS ^a							
Parameter	Symbol	Test Conditions Unless Otherwise Specified V ⁺ = 15 V, V [−] = −15 V V _{IN} = 2.4 V, 0.8 V ^f	Temp ^b	Limits −55 to 125°C			Unit
				Min ^c	Typ ^d	Max ^c	
Analog Switch							
Analog Signal Range ^e	V _{ANALOG}		Full	−15		15	V
Drain-Source On-Resistance	r _{DS(on)}	V _D = ±10 V, I _S = −1 mA	Room Full		45	70 100	Ω
Source Off Leakage Current	I _{S(off)}	V _S = ±14 V, V _D = ∓14 V	Room Full	−2 −100	±0.01	2 100	nA
Drain Off Leakage Current	I _{D(off)}	V _D = ±14 V, V _S = ∓14 V	Room Full	−2 −100	±0.01	2 100	
Channel On Leakage Current ^f	I _{D(on)}	V _S = V _D = ±14 V	Room Full	−2 −200	±0.1	2 200	
Digital Control							
Input Current with Input Voltage High	I _{INH}	V _{IN} = 2.4 V	Room Full	−0.5 −1	0.0009		μA
		V _{IN} = 15 V	Room Full		0.005	0.5 1	
Input Current with Input Voltage Low	I _{INL}	V _{IN} = 0 V	Room Full	−0.5 −1	−0.0015		
Dynamic Characteristics							
Turn-On Time	t _{ON}	See Switching Time Test Circuit	Room		440	1000	ns
Turn-Off Time	t _{OFF}		Room		340	425	
Charge Injection	Q	C _L = 1000 pF, V _g = 0 V R _g = 0 Ω	Room		−10		pC
Source-Off Capacitance	C _{S(off)}	f = 140 kHz V _{IN} = 5 V	V _S = 0 V	Room		9	pF
Drain-Off Capacitance	C _{D(off)}		V _D = 0 V	Room		9	
Channel-On Capacitance	C _{D(on)} + C _{S(on)}	V _D = V _S = 0 V, V _{IN} = 0 V	Room		25		
Off Isolation	OIRR	V _{IN} = 5 V, R _L = 75 Ω V _S = 2 V, f = 1 MHz	Room		75		dB
Crosstalk (Channel-to-Channel)	X _{TALK}		Room		90		
Power Supplies							
Positive Supply Current	I ⁺	Both Channels On or Off V _{IN} = 0 V and 2.4 V	Room		0.8	2	mA
Negative Supply Current	I [−]		Room	−1	−0.23		

Notes:

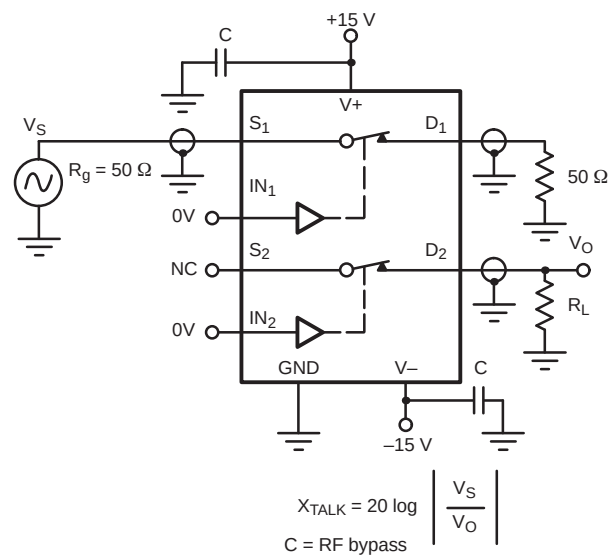
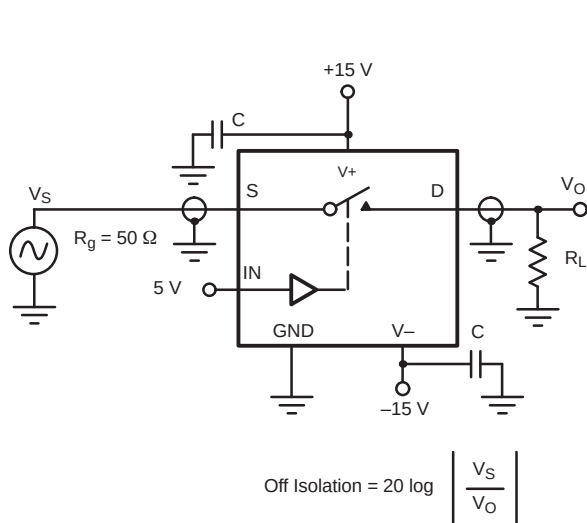
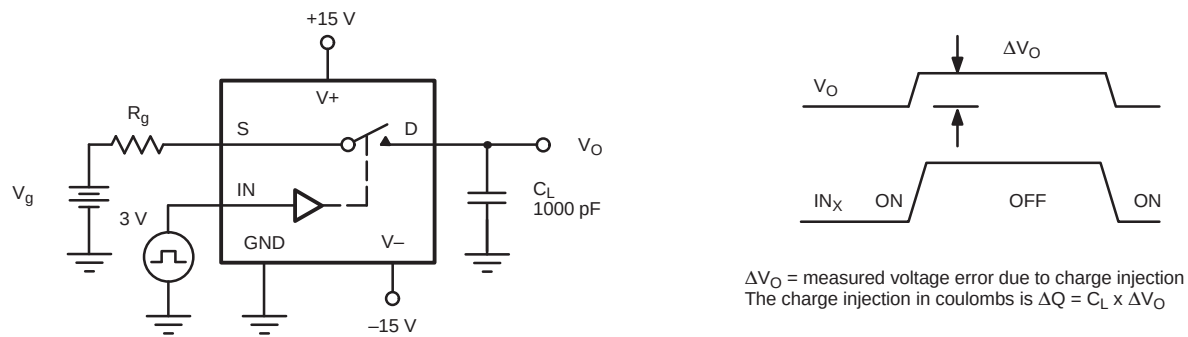
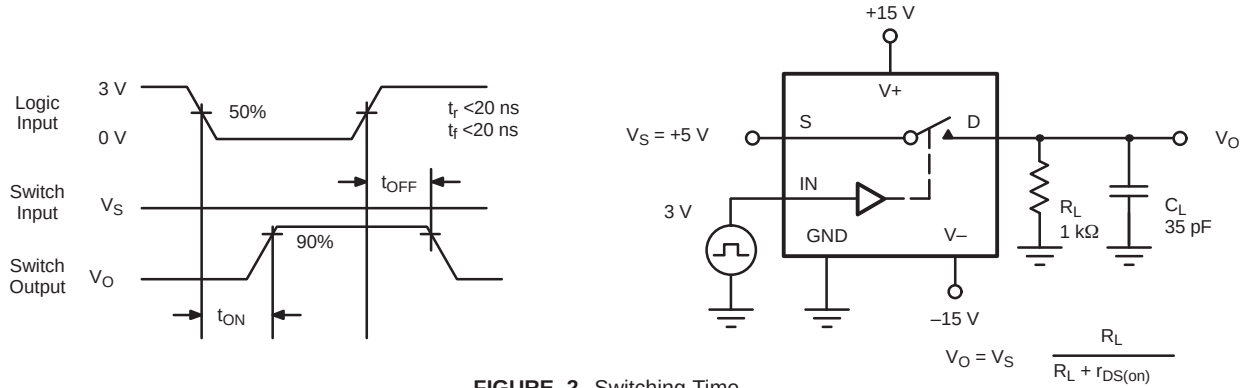
- Refer to PROCESS OPTION FLOWCHART.
- Room = 25°C, Full = as determined by the operating temperature suffix.
- The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.
- Typical values are for DESIGN AID ONLY, not guaranteed nor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

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



TEST CIRCUITS

V_O is the steady state output with switch on. Feedthrough via gate capacitance may result in spikes at leading and trailing edge of output waveform.





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