

Monolithic Dual SPST CMOS Analog Switch

Features

- ± 15 V Input Signal Range
- 44-V Maximum Supply Ranges
- On-Resistance: 45Ω
- 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

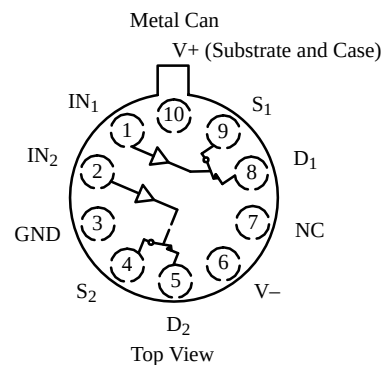
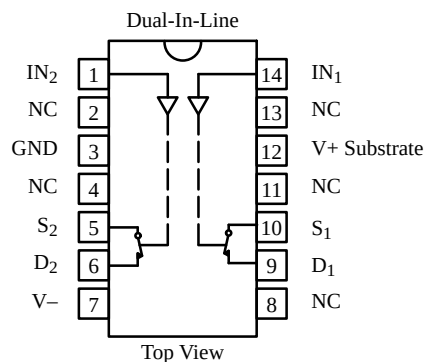
Description

The DG200A 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 is designed on 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

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70035.

Ordering Information

Temp Range	Package	Part Number
0 to 70°C	14-Pin Plastic DIP	DG200ACJ
-25 to 85°C	14-Pin CerDIP	DG200ABK
	10-Pin Metal Can	DG200ABA
-55 to 125°C	14-Pin CerDIP	DG200AAK
		DG200AAK/883, JM38510/12301BCA
	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 (AX, BX Suffix) -65 to 150°C
 (CJ Suffix) -65 to 125°C

Power Dissipation (Package)^b

10-Pin Metal Can^c 450 mW
 14-Pin CerDIP^d 825 mW
 14-Pin Plastic DIP^e 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 mW/°C above 75°C
- Derate 11 mW/°C above 75°C
- Derate 6.5 mW/°C above 25°C

Schematic Diagram (Typical Channel)

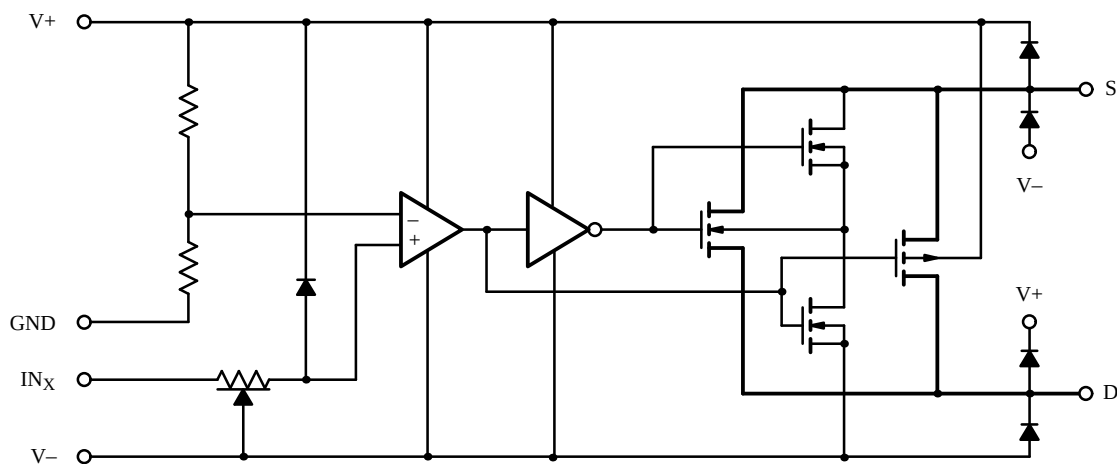


Figure 1.

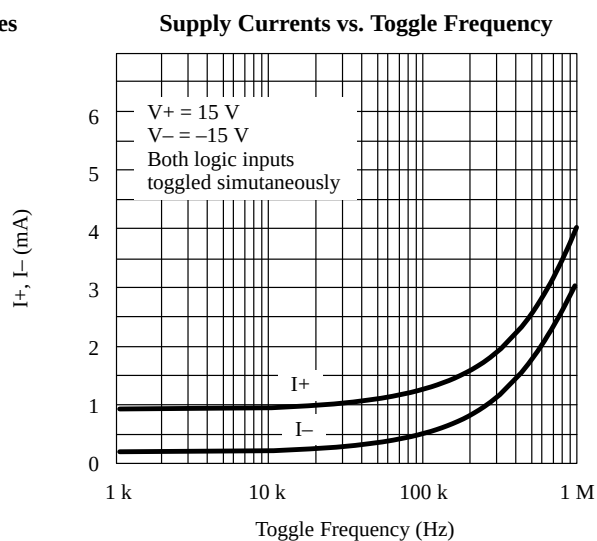
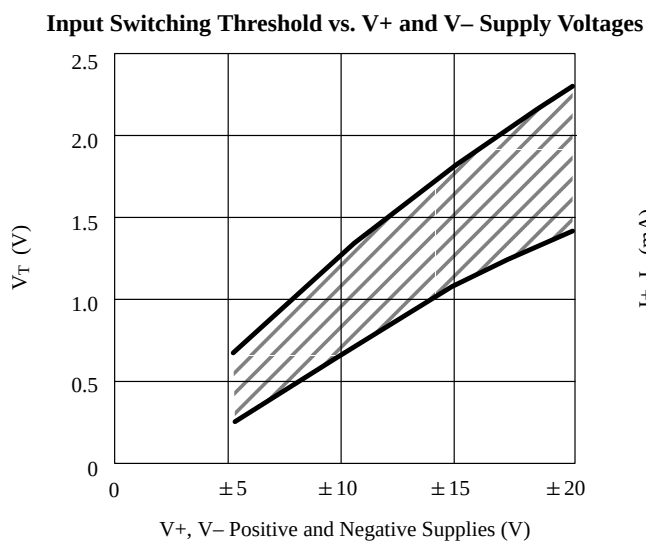
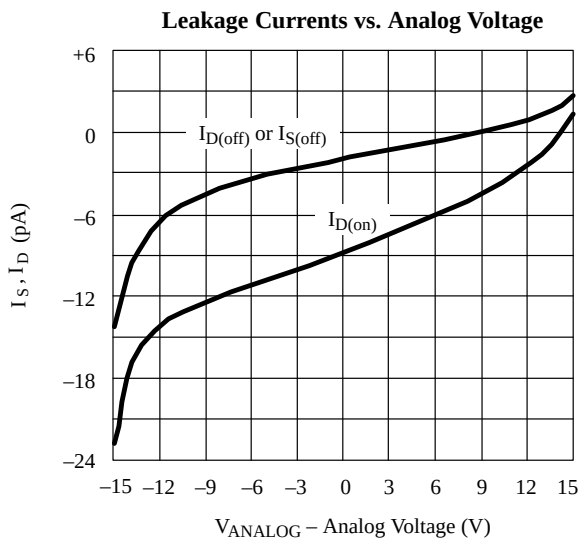
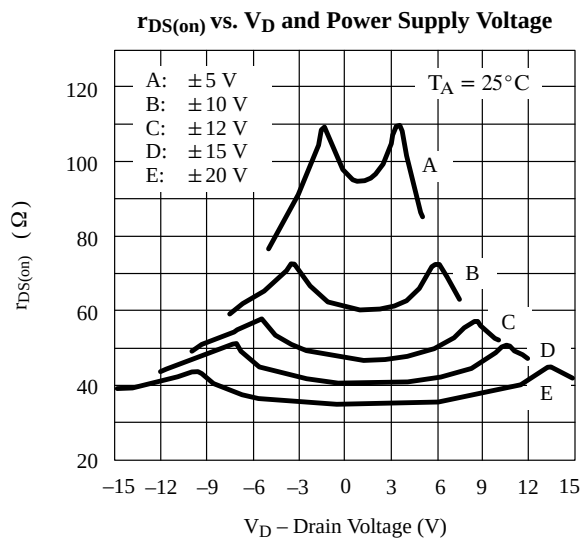
Specifications^a

Parameter	Symbol	Test Conditions Unless Otherwise Specified		Temp ^b	Typ ^c	A Suffix –55 to 125°C		B, C Suffix		Unit
		$V_+ = 15\text{ V}$, $V_- = -15\text{ V}$ $V_{IN} = 2.4\text{ V}$, 0.8 V^f				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 = ± 10 V, I _S = –1 mA		Room Full	45		70 100		80 100	Ω
Source Off Leakage Current	I _{S(off)}	V _S = ± 14 V, V _D = ∓ 14 V		Room Full	± 0.01	–2 –100	2 100	–5 –100	5 100	nA
Drain Off Leakage Current	I _{D(off)}	V _D = ± 14 V, V _S = ∓ 14 V		Room Full	± 0.01	–2 –100	2 100	–5 –100	5 100	
Channel On Leakage Current ^f	I _{D(on)}	V _S = V _D = ± 14 V		Room Full	± 0.1	–2 –200	2 200	–5 –200	5 200	
Digital Control										
Input Current with Input Voltage High	I _{INH}	V _{IN} = 2.4 V		Room Full	0.0009	–0.5 –1		–1 –10		μA
		V _{IN} = 15 V		Room Full	0.005		0.5 1		1 10	
Input Current with Input Voltage Low	I _{INL}	V _{IN} = 0 V		Room Full	–0.0015	–0.5 –1		–1 –10		
Dynamic Characteristics										
Turn-On Time	t _{ON}	See Switching Time Test Circuit		Room	440		1000		1000	ns
Turn-Off Time	t _{OFF}			Room	340		425		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		2	mA
Negative Supply Current	I _–			Room	–0.23	–1		–1		

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



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.

