General Description

The DG200A is a dual, normally closed, single-polesingle-throw (SPST) analog switch. This CMOS switch can be operated with power supplies ranging from \pm 4.5V to \pm 18V. The DG200A has guaranteed breakbefore-make switching. Its maximum turn-off time is 500ns, and its maximum turn-on time is 100ns.

Maxim guarantees that the DG200A will not latch-up if the power supplies are turned off with input signals still connected as long as absolute maximum ratings are not violated.

Compared to the original manufacturer's product, Maxim's DG200A consumes significantly lower power, making it better suited for portable applications.

Applications

Winchester Disk Drives

Test Equipment

Communications Systems

PBX, PABX

Guidance and Control Systems

Head up Displays

Military Radios

- ♦ Improved 2nd Source! Power Supply Current <300µA</p>
- ♦ Wide Supply Range ±4.5V to ±18V
- Single Supply Operation

Top View

 IN_2

NC 2

NC 4

S₂5

D₂6

v-[7

(3 GNE

S₂

GND 3

- Non-Latching with Supplies Turned-off and Input Signals Present
- CMOS and TTL Logic Compatible
- Monolithic, Low Power CMOS Design

Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE
DG200AAK	-55°C to +125°C	14 Lead CERDIP
DG200ABK	-25°C to +85°C	14 Lead CERDIP*
DG200ACK	0°C to +70°C	14 Lead CERDIP
DG200ACJ	0°C to +70°C	14 Lead Plastic DIP
DG200ADJ	-40°C to +85°C	14 Lead Plastic DIP
DG200ACY	0°C to +70°C	14 Lead SO
DG200ADY	-40°C to +85°C	14 Lead SO
DG200AC/D	0°C to +70°C	Dice
DG200AAA	-55°C to +125°C	10 Pin Metal Can*
DG200ABA	-25°C to +85°C	10 Pin Metal Can*
DG200ACA	0°C to +70°C	10 Pin Metal Can*
*Contact factory for	or availability.	

MAXIM

DG200A

V⁺ (SUBSTRATE AND CASE)

D₂

Pin Configuration

14 IN1

13 NC

11 NC

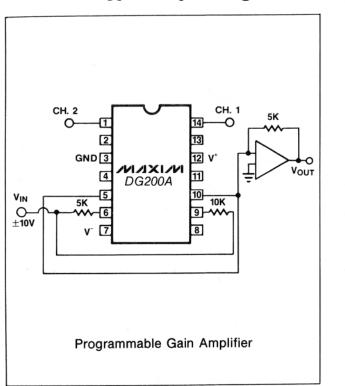
10 S₁

9 D1

8 NC

D.

12 V⁺ (SUB -12 STRATE)



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_ Maxim Integrated Products 1

Features Current



Typical Operating Circuit

For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to V⁻

V ⁺	.44V
GND	
Digital Inputs VS, VD (Note 1)	2V to (V ⁺ + 2V)
с с	or 20mA, whichever occurs first.
Current, Any Terminal Except S or D.	
Continuous Current, S or D	20mA
(Pulsed at 1msec, 10% duty cycle r	max)100mA
Storage Temperature (A & B Suffix)	
(C Suffix)	65 to 125°C

Operating Temperature (A Suffix)	55 to 125°C
(B Suffix)	25 to 85°C
(C Suffix)	25 to 85°C
(D Suffix)	
Power Dissipation (Package)*	
Metal Can**	450mW
14 Pin Ceramic DIP***	825mW
14 Pin Plastic DIP****	
* All leads soldered or welded to PC board.	

** Derate 6mW/°C above 75°C.

*** Derate 11mW/°C above 75°C.

**** Derate 6.5mW/°C above 25°C.

Stresses listed under "Absolute Maximum Ratings" may be applied (one at a time) to devices without resulting in permanent damage. These are stress ratings only, and functional operation of the device at these or any other conditions above 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.

ELECTRICAL CHARACTERISTICS (V* = +15V, V⁻ = -15V, GND = 0V, T_A = 25°C, unless otherwise indicated.)

PARAMETER			LIMITS							
	SYMBOL	TEST CONDITIONS		DG200A			DG200 B/C/D			
PARAMETER	STMBOL			MIN (Note 2	TYP (Note 3)	MAX	MIN (Note 2	TYP) (Note 3)	MAX	
SWITCH										
Analog Signal Range (Note 1)	VANALOG			-15		15	-15		15	v
Drain-Source ON Resistance	r _{DS(on)}	$V_D = \pm 10V$, $V_{in} = 0.8V$, $I_S = 1mA$			45	70		45	80	Ω
Source OFF			$V_{\rm S}$ = 14V, $V_{\rm D}$ = -14V		0.01	2.0		0.01	5.0	nA
Leakage Current	IS(off)	V _{in} = 2.4V	V _S = -14V, V _D = 14V	-2.0	-0.02		-5.0	-0.02		
Drain OFF		v _{in} – 2.4v	$V_{\rm S}$ = -14V, $V_{\rm D}$ = 14V		0.01	2.0		0.01	5.0	
Leakage Current	I _{D(off)}		$V_{\rm S}$ = 14V, $V_{\rm D}$ = -14V	-2.0	-0.02		-5.0	-0.02		
Drain ON Leakage Current (Note 4)	I _{D(on)}	V _{in} = 0.8V	$V_{S} = V_{D} = 14V$		0.1	2.0		0.1	5.0	
			$V_{\rm S} = V_{\rm D} = -14 V$	-2.0	-0.1		-5.0	-0.1		
INPUT			-							
Input Current with Input		V _{in} = 2.4V,		-1.0	0.0009		-1.0	0.0009		
Voltage High	INH		V _{in} = 15V		0.005	1.0		0.005	1.0	μA
Input Current with Input Voltage Low	I _{INL}	V _{in} = 0V		-1.0	-0.0015		-1.0	-0.0015		
DYNAMIC										
Turn-ON Time	t _{on}		ing Time Test Circuit		440	1000		440	1000	ns
Turn-OFF Time	t _{off}		(Figure 1)		70	500		70	500	
Charge Injection	Q	C _L = 10 R _{GEN}		10			10		рС	
Source OFF Capacitance	C _{S(off)}	f = 140kHz	V _S = 0V		9.0			9.0		
Drain OFF Capacitance	C _{D(off)}	V _{in} = 5V	V _D = 0V		9.0			9.0		pF
Channel ON Capacitance	C _{D(on)} + C _{S(on)}	or V _S = 0V	$V_D = V_S = 0V$		25			25]
OFF Isolation Figure 3 (Note 5)		V _{in} = 5V, Z _L = 75Ω			75			75		dB
Crosstalk Figure 4 (Channel to Channel)		V _S =	90			90				

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ELECTRICAL CHARACTERISTICS (continued)

 $(V^* = +15V, V^- = -15V, GND = 0V, T_A = 25^{\circ}C, unless otherwise indicated.)$

PARAMETER									
	SYMBOL	TEST CONDITIONS	DG200A			DG200 B/C/D			
	or mode		MIN (Note 2)	TYP (Note 3)	MAX	MIN (Note 2)	TYP (Note 3)	MAX	
SUPPLY									
Positive Supply Current	I +	Both Channels ON or OFF		180	300		200	500	
Negative Supply Current	I-	V _{in} = 0 and 2.4V	-10	-0.1		-100	-0.1		μA

ELECTRICAL CHARACTERISTICS (Over Temperature)

(V⁺ = +15V, V⁻ = -15V, GND = 0V, T_A = Over Temperature Range, unless otherwise indicated.)

PARAMETER		TEST CONDITIONS		LIMITS						
	SYMBOL			DG200A			DG200 B/C			
	STIMBOL			MIN (Note 2)	TYP (Note 3)	MAX	MIN (Note 2)	TYP (Note 3)	MAX	
SWITCH										
Analog Signal Range (Note 1)	VANALOG			-15		15	-15		15	v
Drain-Source ON Resistance	r _{DS(on)}	V _D = :	±10V, V _{in} = 0.8V, I _S = 1mA			100			100	Ω
Source OFF			V _S = 14V, V _D = -14V			100			100	
Leakage Current	I _{S(off)}	V - 0 4V	V _S = -14V, V _D = 14V	-100			-100]
Drain OFF		V _{in} = 2.4V	V _S = -14V, V _D = 14V			100			100	nA
Leakage Current	I _{D(off)}		V _S = 14V, V _D = -14V	-100			-100			
Drain ON Leakage		V = 0.0V	V _S = V _D = 14V			200			200]
Current (Note 4)	I _{D(on)}	V _{in} = 0.8V	$V_{\rm S} = V_{\rm D} = -14 \rm V$	-200			-200			
INPUT	-		-							
Input Current/				-10			-10			
Voltage High	V _{in} = 2.4V, V _{in} = 15V				10			10	1.	
Input Current/ Voltage Low	I _{INL}		V _{in} = 0V	-10			-10			μΑ

Note 1: 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.

Note 2: The algebraic convention whereby the most negative value is a minimum, and the most positive is a maximum, is used in this data sheet.

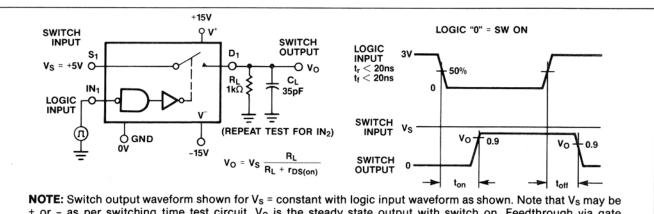
Note 3: Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Note 4: I_{D(on)} is leakage from driver into "ON" switch.

Note 5: "OFF" isolation = 20 log V_S/V_D , V_S = input to OFF switch, V_D = output.

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Test Circuits



+ or - as per switching time test circuit. V_0 is the steady state output with switch on. Feedthrough via gate capacitance may result in spikes at leading and trailing edge of output waveform.

Figure 1. Switching Time Test Circuit

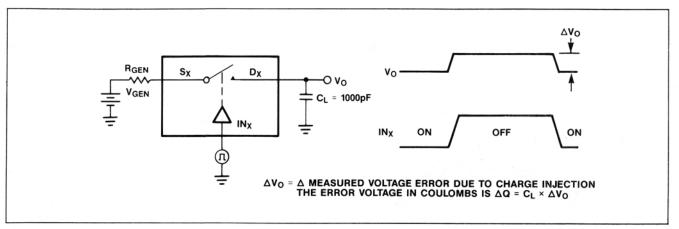


Figure 2. Charge Injection Test Circuit

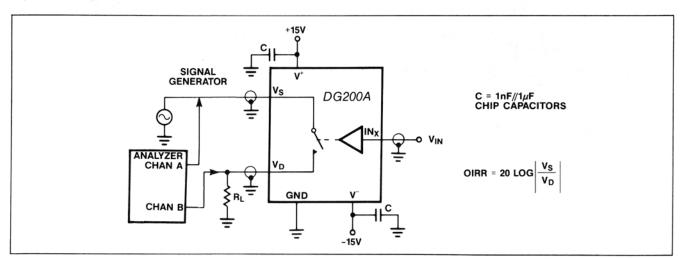
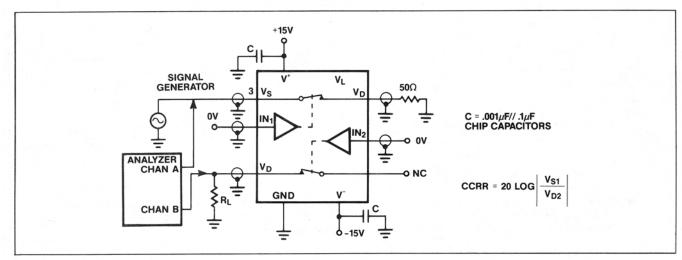


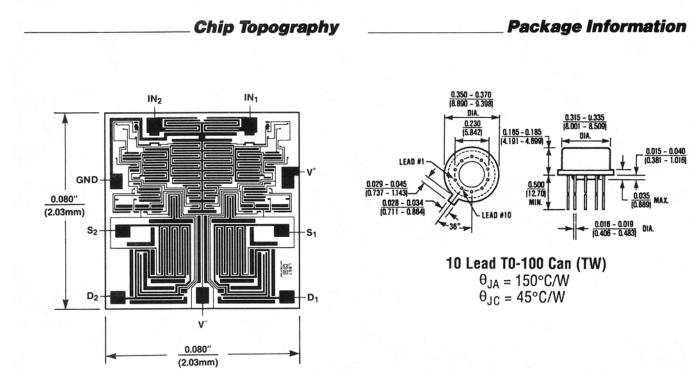
Figure 3. OFF Isolation Test Circuit

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Test Circuits (continued)





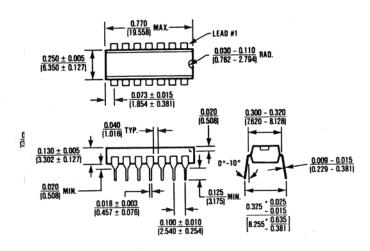


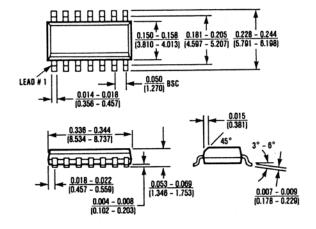
DG200A

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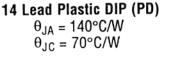
Package Information

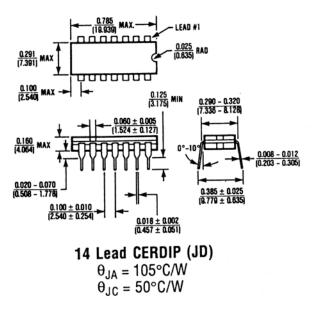
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to **www.maxim-ic.com/packages**.)





14 Lead Small Outline (SD) $\theta_{JA} = 115^{\circ}C/W$ $\theta_{JC} = 60^{\circ}C/W$





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DG200A

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