# MAX331/DG201A/DG21

### **Quad SPST CMOS Analog Switches**

### **General Description**

The MAX331, DG201A and DG211 are normally closed, quad single-pole-single-throw (SPST) analog switches. These CMOS switches can be continuously operated with power supplies ranging from ±4.5V to ±18V. Maxim guarantees that these switches will not latch-up if the power supplies are disconnected with input signals still connected.

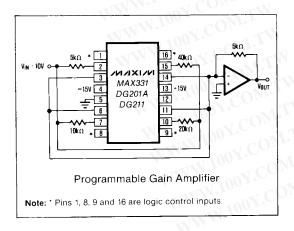
All three devices have guaranteed break-before-make switching. The MAX331 and DG201A differ with the DG211 primarily in switching speeds. The MAX331 and DG201A have a maximum turn-off time of 450ns and a maximum turn-on time of 600ns. The DG211 has a maximum turn-off time of 500ns and a maximum turn-on time of 1000ns.

Compared to the original manufacturer's products, Maxim's DG201A and DG211 consume significantly lower power, making them better suited for portable applications. By specifying the MAX331, the customer is guaranteed low power consumption units. Maxim has also eliminated the need for the third (V<sub>L</sub>) power supply that is required for the operation of the original manufacturer's DG211.

### **Applications**

Winchester Disk Drives Test Equipment Communications Systems PBX, PABX Guidance and Control Systems Head up Displays Military Radios

### **Typical Operating Circuit**



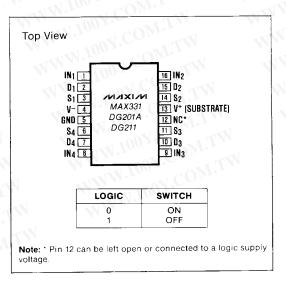
### **Features**

- Improved 2nd Source! (See pages 3 and 5 for "MAXIM Advantage™"
- Guaranteed ±4.5V to ±18V Operation
- No V<sub>I</sub> Supply Required
- 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	PACKAGE
MAX331MJE	-55°C to +125°C	16 Lead CERDIP
DG201AAK	-55°C to +125°C	16 Lead CERDIP
DG201ABK	-25°C to +85°C	16 Lead CERDIP
DG201ACK	0°C to +70°C	16 Lead CERDIP
DG201ACJ	0°C to +70°C	16 Lead Plastic DIP
DG201ACSE	0°C to +70°C	16 Lead Small Outline
DG201C/D	0°C to +70°C	Dice
DG211CJ	0°C to +70°C	16 Lead Plastic DIP
DG211CSE	0°C to +70°C	16 Lead Small Outline
DG211C/D	0°C to +70°C	Dice

### Pin Configuration



MIXLN

勝特力材料886-3-5753170 胜特力电子(上海) 86-21-54151736 胜特力电子(深圳) 86-755-83298787 Http://www.100y.com.tw

# WWW.100Y.COM.TW **Quad SPST CMOS Analog Switches**

### ABSOLUTE MAXIMUM RATINGS (DG211)

COWITH MMN. 100X COM	
ABSOLUTE MAXIMUM RATINGS (DG211)	
V+ to V-     40V       V <sub>IN</sub> to Ground     V-, V+       V <sub>L</sub> to Ground     -0.3V, 25V       V <sub>S</sub> or V <sub>D</sub> to V+     0, -40V       V <sub>S</sub> or V <sub>D</sub> to V-     0, 40V       V+ to Ground     25V       V- to Ground     -25V       Current Any Tamping Eyeant S or D     30mA	Storage Temperature -65°C to +125°C Operating Temperature 0°C to +70°C Power Dissipation (Note 1) 16 Pin Plastic DIP (Note 2) 470mW 16 Pin Small Outline (SE) (Note 3) 400mW  Note 1: Device mounted with all leads soldered to PC board.
Continuous Current, S or D	Note 3: Derate 7mW/°C above +25°C.  Note 3: Derate 7mW/°C above +25°C.
V <sub>S</sub> or V <sub>D</sub> to V <sup>+</sup> 0, -40V           V <sub>S</sub> or V <sub>D</sub> to V <sup>-</sup> 0, 40V           V <sup>+</sup> to Ground         25V           V <sup>-</sup> to Ground         -25V           Current, Any Terminal Except S or D         30mA           Continuous Current, S or D         20mA           Peak Current, S or D         20mA	16 Pin Plastic DIP (Note 2)

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 ratings conditions for extended periods may affect device reliability. Jeci

### **ELECTRICAL CHARACTERISTICS (DG211)**

(V<sup>+</sup> = +15V, V<sup>-</sup> = -15V, GND = 0V,  $T_A$  = +25°C, unless otherwise noted)

$M_A$	OV.CO			. OOY. CO	r W	LIMITS		OOX.	
	PARAMETER	SYMBOL	TES	T CONDITIONS	MIN (Note 4)	TYP (Note 5)	MAX	UNITS	
	Analog Signal Range	V <sub>ANALOG</sub>		N.To a COM	-15		15	V	
	Drain-Source ON Resistance	r <sub>DS (on)</sub>	$V_{D} = \pm 10 V, V$	/ <sub>IN</sub> = 0.8V, I <sub>S</sub> = 1mA	17.77	115	175	$\sigma \subset \Omega$	
	0551041-00		V = 0.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V	WT.	0.01	5.0	1	
Ŧ	Source OFF Leakage Current	Is (off)	V <sub>IN</sub> - 2.40	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-5.0	-0.02	-13	141.70	
SWITCH	S	-(1)	V = 0.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V	TIME	0.01	5.0	nA	
Š	Drain OFF Leakage Current	D (off)	V <sub>IN</sub> = 2.40	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-5.0	-0.02	N.	nA.	
	Drain ON Leakage Current	1.3	$V_{D} = \pm 10V, V_{IN} = 2.4V$ $V_{IN} = 2.4V$ $V_{S} = V_{D} = 14$ $V_{S} = V_{D} = -1$ $V_{IN} = 2.4V$ $V_{IN} = 15V$ $V_{IN} = 0V$ $Se$ $V_{S} = 2V$ $V_{S} = 0V, V_{IN}$ $V_{D} = 0V, V_{IN}$ $V_{D} = 0V, V_{IN}$ $V_{D} = 0V, V_{IN}$ $V_{D} = 10V, V_{D}$	V, V <sub>IN</sub> = 0.8V	COMPT	0.1	5.0	WIN	
	(Note 6)	D (on)	V <sub>S</sub> = V <sub>D</sub> = -1	4V, V <sub>IN</sub> = 0.8V	-5.0	-0.15			
	Input Current With Input	Mr.	V <sub>IN</sub> = 2.4V	TINN.	-1.0	-0.0004		WW	
INPUT	Voltage High	INH	$\begin{split} &V_{IN} = 2.4V \\ &V_{IN} = 2.4V \\ &V_{S} = V_{D} = 14V \\ &V_{S} = V_{D} = -14V \\ &V_{IN} = 2.4V \\ &V_{IN} = 15V \\ &V_{IN} = 0V \\ &See \\ &V_{S} = 2V, \\ &V_{S} = 0V, V_{IN} = 0V, V_{IN}$	100		0.003	1.0	μА	
Ä	Input Current With Input Voltage Low	I <sub>INL</sub>	V <sub>IN</sub> = 0V		-1.0	-0.0004		4111	
	Turn-ON Time	ton	Se	e Switching Time	OY.C	460	1000		
	T OFF T	t <sub>off1</sub>	-	Test Circuit	-1 CC	360	500	ns	
	Turn-OFF Time	t <sub>off2</sub>	V <sub>S</sub> = 2V	$I_{\rm R} = 1 \text{k}\Omega, C_{\rm L} = 35 \text{pF}$	007.	450			
2	Source OFF Capacitance	C <sub>S (off)</sub>	V <sub>S</sub> ÷ 0V, V <sub>IN</sub>	= 5V, f = 1MHz	Tay.C	5	1	_	
DYNAMIC	Drain OFF Capacitance	C <sub>D (off)</sub>	$V_D = 0V, V_{IN}$	= 5V, f = 1MHz	100	5		pF	
À	Channel ON Capacitance	C <sub>D·S(on)</sub>	V <sub>D</sub> = V <sub>S</sub> = 0	$V$ , $V_{1N} = 0V$ , $f = 1MHz$	1007	16		<u> </u>	
	OFF Isolation (Note 7)	OIRR	V = 5V P	= 1k0 C. = 15pE	N. J.	70			
	Crosstalk (Channel to Channel)	CCRR	V <sub>S</sub> = 1VRMS	5, f = 100kHz	$W.100^{\circ}$	90	T.T.	dB ∐	
>	Positive Supply Current	1001±	OM.T		W1100	0.35	0.48		
SUPPLY	Negative Supply Current	. AFV.	V <sub>IN</sub> = 0V and	d 2.4V	1	0.30	0.48	MA mA	
S	Logic Supply Current	V Joh.	COM		WW.I	0.5	1.2		

The algebraic convention whereby the most negative value is a minimum, and the most positive is a maximum, is used in this Note 4: data sheet.

Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing Note 5:

ID(on) is leakage from driver into "ON" switch. Note 6:

OFF Isolation = 20 log  $\frac{V_S}{V_D}$ ,  $V_S$  = input to OFF switch,  $V_D$  = output.

The electrical characteristics above are a reproduction of a portion of Siliconix's copyrighted 1985 data book. This information does not constitute any representation by Maxim that Siliconix's products will perform in accordance with these specifications. The "Electrical Characteristics Table" along with descriptive excerpts from the original manufacturer's data sheet have been included in this data sheet solely for comparative purposes.

MIXIM

V.100Y.COM.TW W.100Y.COM.TW

WW.100Y.COM.TW

NINXINI

### **Quad SPST CMOS Analog Switches**

Quad

◆ Significantly Reduced Power Consumption

- ♦ Third (Logic) Supply Not Required
- ♦ Fault Protected

**ABSOLUTE MAXIMUM RATINGS (DG211)** This device conforms to the Absolute Maximum Ratings on the adjacent page.

ELECTRICAL CHARACTERISTICS (DG211): Specifications below satisfy or exceed all "tested" parameters on adjacent page.

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

W.	LO N.		MINIT	ST CONT	×	LIMITS	1100	V.C
	PARAMETER	SYMBOL	TES	T CONDITIONS	MIN (Note 4)	TYP (Note 5)	MAX	UNITS
	Analog Signal Range	VANALOG	N CONT	100 . JOM .	-15		15	V
	Drain-Source ON Resistance	r <sub>DS (on)</sub>	V <sub>D</sub> = ±10V, V	I <sub>IN</sub> = 0.8V, I <sub>S</sub> = 1mA		115	175	Ω
т.	Source OFF Leakage Current		V <sub>IN</sub> = 2.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V		0.01	5.0	1
SWITCH	Source OFF Leakage Current	S (off)	VIN - 2.40	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-5.0	-0.02	-11	1.100
SW	Drain OFF Lookogo Current	N.	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V	W	0.01	5.0	nA
	Drain OFF Leakage Current	I <sub>D</sub> (off)	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-5.0	-0.02		TI IIA
	Drain ON Leakage Current	1111	V <sub>S</sub> = V <sub>D</sub> = 14	V, V <sub>IN</sub> = 0.8V	W.T.V	0.1	5.0	-xxi 19
	(Note 6)	I <sub>D</sub> (on)	V <sub>S</sub> = V <sub>D</sub> = -1	4V, V <sub>IN</sub> = 0.8V	-5.0	-0.15		
	Input Current With Input	1.7	V <sub>IN</sub> = 2.4V	-XXI.100	-1.0	-0.0004		WW.
TUPUI	Voltage High	INH	V <sub>IN</sub> = 15V	1007.	717	0.003	1.0	μΑ
Ž	Input Current With Input Voltage Low	INL	V <sub>IN</sub> = 0V	WWW.	-1.0	-0.0004	4	MAN
	Turn-ON Time	t <sub>on</sub>	Ser.	See Switching Time Test Circuit		460	1000	
	1007.	t <sub>off1</sub>				360	500	ns
	Turn-OFF Time	t <sub>off2</sub>	$V_S = 2V$ , $R_L = 1k\Omega$ , $C_L = 35pF$		V.Co.	450		
DYNAMIC	Source OFF Capacitance	C <sub>S (off)</sub>	V <sub>S</sub> = 0V, V <sub>IN</sub>	= 5V, f = 1MHz	-100	5	1	
Ϋ́	Drain OFF Capacitance	C <sub>D (off)</sub>	V <sub>D</sub> = 0V, V <sub>IN</sub>	= 5V, f = 1MHz	001	5		pF
á	Channel ON Capacitance	C <sub>D·S(on)</sub>	V <sub>D</sub> = V <sub>S</sub> = 0	V, V <sub>IN</sub> = 0V, f = 1MHz	av.C	16	N	
	OFF Isolation (Note 8)	OIRR	V - 5V D	= 1k0 C = 15c5	100	70	-4	
	Crosstalk (Channel to Channel)	CCRR		= $1 k\Omega$ , $C_L = 15 pF$ , S, $f = 100 kHz$	1007.	90	LM	dB
	Positive Supply Current	1	WT	Al W.	1007	0.02	0.1	T
չ	Negative Supply Current	J-C(	V <sub>IN</sub> = 0V and	d 2.4V	1.1	0.01	0.1	mA
SUPPLY	Logic Supply Current	100 F.	TIME		- XI 100	0.0		
ร	Power Supply Range for Continuous Operation	VOP	M.T	W WY	±4.5	OY.CO	±18	v

Note 8: Electrical characteristics, such as ON Resistance, will change when power supplies, other than ±15V, are used.

Http://www. 100y. com. tw

# Quad SPST CMOS Analog Switches

### **ABSOLUTE MAXIMUM RATINGS (MAX331, DG201A)**

Voltages Referenced to V <sup>~</sup>	Storage Temperature65°C to +150°C
V <sup>+</sup> 44V	Power Dissipation (Note 2)
GND 25V	16 Pin CERDIP (Note 3) 900mW
Digital Inputs (Note 1), V <sub>S</sub> , V <sub>D</sub> 2V to (V <sup>+</sup> +2V)	16 Pin Plastic DIP (Note 4) 470mW
or 20mA, whichever occurs first	16 Pin Small Outline (SE) (Note 5) 400mW
Current, Any Terminal Except S or D	
Continuous Current, S or D 20mA	Note 1: Signals on S <sub>x</sub> , D <sub>x</sub> , or IN <sub>x</sub> exceeding V <sup>+</sup> or V <sup>-</sup> on Maxim's
Peak Current, S or D	MAX331 and DG201A will be clamped by internal diodes.
(Pulsed at 1msec, 10% duty cycle max.)	and are also internally current limited to 25mA.
Operating Temperature	Note 2: Device mounted with all leads soldered to PC board.
DG201A (A Suffix)55°C to +125°C	Note 3: Derate 12mW/°C above +75°C.
(B Suffix)25°C to +85°C	Note 4: Derate 6.5mW/°C above +25°C.
(C Suffix) 0°C to +70°C	Note 5: Derate 7mW/°C above +25°C.
MAX331MJE55°C to +125°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 ratings conditions for extended periods may affect device reliability.

### **ELECTRICAL CHARACTERISTICS (DG201A)**

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

14	1001			1	007.	-1	IN	LI	VITS	1	×11(	10 1.	
	PARAMETER	SYMBOL	TEST	CONDIT	TIONS C	DA.	DG201A	A	D	G201AB	,C	UNITS	
	CM. TOOM	JOHNBOL	1591	WW			<b>TYP</b> ) (Note 7)	MAX	MIN (Note 6	<b>TYP</b> ) (Note 7)	MAX	UNITS	
	Analog Signal Range	V <sub>ANALOG</sub>		TX.	V.100	-15	Mir	15	-15		15	V	
	Drain-Source ON Resistance	r <sub>DS (on)</sub>	V <sub>D</sub> = ±10V, \	/ <sub>IN</sub> = 0.8V	, I <sub>S</sub> = 1mA		115	175		115	200	N OO	
- 1	Source OFF Leakage	TIM	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = 14	$V, V_D = -14V$	1.0	0.01	1.0		0.01	5.0	- 1	
Ď	Current	S (off)	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = -1	4V, V <sub>D</sub> = 14V	-5.0	-0.02		V -			111.2	
SWITCH	Drain OFF Leakage	Time	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = 14	V, V <sub>D</sub> = -14V	0 7.	0.01	1.0		0.01	5.0	пA	
0,	Current	D (off)	VIN - 2.40	V <sub>S</sub> = -1	4V, V <sub>D</sub> = 14V	-5.0	-0.02	- 1				nA.	
	Drain ON Leakage	COM.	V <sub>S</sub> = -14V, V	<sub>IN</sub> = 0.8V		00	0.1	1.0	- 1	0.1	5.0		
	Current (Note 8)	D (on)	V <sub>D</sub> = 14V, V <sub>II</sub>	N = 0.8V	MAL	-1.0	-0.15	1/20	-5.0	-0.15			
	Input Current With	$^{4}$ $CO_{2i}$	V <sub>IN</sub> = 2.4V			-1.0	-0.0004	O Z	-1.0	-0.0004			
INPUT	Input Voltage High	INH	V <sub>IN</sub> = 15V	M		1.10	0.003	1.0	1.7	0.003	1.0	μΑ	
ž	Input Current With Input Voltage Low	I <sub>INL</sub> V <sub>IN</sub> = 0V	NW.	-1.0	-0.0004		-1.0	-0.0004					
	Turn-ON Time	ton	See S	Switching	Time		480	600	-11	480	600	ns	
	Turn-OFF Time	t <sub>off1</sub>	OM	Test Circi	uit	M.	370	450	Diam	370	450	1115	
	Charge Injection	1000	C <sub>L</sub> = 10	000pF, V <sub>G</sub> R <sub>GEN</sub> = 0	iEN = 0V, Ω	WW	20	¥.	OM	20	Ī	рС	
DYNAMIC	Source OFF Capacitance	C <sub>S (off)</sub>	V <sub>S</sub> = 0V, V <sub>IN</sub>	= 5V			5		COJ	5			
ž	Drain OFF Capacitance	C <sub>D (off)</sub>	15 - JI, VIN		f = 140kHz	1	5	00 ×		5		ρF	
۵	Channel ON Capacitance	C <sub>D (on)</sub> + C <sub>S (on)</sub>	V <sub>D</sub> = V <sub>S</sub> = 0V	, V <sub>IN</sub> = 0V		W	16	100	I.C.	16	LIN		
	OFF Isolation	A MARS	V <sub>IN</sub> = 5V, Z <sub>L</sub>	= 75Ω	N	W	70	400	N.U	70	TV		
	Crosstalk (Channel to Channel)	MMIA	V <sub>S</sub> = 2.0V, f =	100kHz	V		90	1.10	nY.	90		dB	
ح <u>ا</u>	Positive Supply Current	I <sup>‡</sup>	All Channel	s ON or	OFF		0.9	2	V	0.9	2	mA	
SUP.	Negative Supply Current	l-	1007.0			-1	-0.3		-1	-0.3		1	

Note 6: 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 7: Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Note 8:  $I_{D(on)}$  is leakage from driver into "ON" switch.

The electrical characteristics above are a reproduction of a portion of Siliconix's copyrighted 1985 data book. This information does not constitute any representation by Maxim that Siliconix's products will perform in accordance with these specifications. The "Electrical Characteristics Table" along with descriptive excerpts from the original manufacturer's data sheet have been included in this data sheet solely for comparative purposes.



Http://www. 100y. com. tw

NIXINI

# WWW.100Y.COM.TW **Quad SPST CMOS Analog Switches**

- WWW.100Y.COM.TW WWW.100Y.COM.TW ♦ Significantly Reduced Power Consumption
- **♦ Lower Input Current Over Temperature**
- ♦ No Input Current Spike

ABSOLUTE MAXIMUM RATINGS (MAX331, DG201A) This device conforms to the Absolute Maximum Ratings on the adjacent page.

ELECTRICAL CHARACTERISTICS (MAX331, DG201A): Specifications below satisfy or exceed all "tested"

(V<sup>+</sup> = +15V, V<sup>-</sup> = -15V, GND = 0V,  $T_A$  = +25°C, unless otherwise noted)

	To COMP.	N.	THE WAY	1.2	V.CO			LII	NITS	MA	. 00	KC
	PARAMETER	SYMBOL	TEST	CONDIT	IONS	MAX	331/DG2	201AA	D	G201AB	,c	UNITS
	A 700X CO.		W.W.	- NA	00X.C	MIN (Note 6	<b>TYP</b> ) (Note 7)	MAX		<b>TYP</b> ) (Note 7)	MAX	ONITS
	Analog Signal Range	VANALOG		7	1001.	-15	TW	15	-15		15	V
	Drain-Source ON Resistance (Note 9)	r <sub>DS (an)</sub>	$V_D = \pm 10V$ , $V_I$	n = 0.8V,	I <sub>S</sub> = 1mA	CON	115	175		115	200	$\Omega$
Ŧ	Source OFF Leakage	le W.N	V = 2 4V	V <sub>S</sub> = 14	V, V <sub>D</sub> = -14V	CU	0.01	1.0		0.01	5.0	
SWITCH	Current	S (off)	VIN - 2.4V	V <sub>S</sub> = -14	IV, V <sub>D</sub> = 14V	-1.0	-0.02		-5.0	-0.02		1.70
S	Drain OFF Leakage	I <sub>D</sub> (off)	V = 2 4V		$V_{\rm D} = -14V$	Y.C.	0.01	1.0		0.01	5.0	1
	Current	.D (011)	-1	VS 12	$V, V_D = 14V$	-1.0	-0.02		-5.0	-0.02		nA
	Drain ON Leakage	I <sub>D</sub> (on)		·	<u>110</u>	05.	0.1	1.0		0.1	5.0	TVV.
	Current (Note 8)	(on)	$V_D = 14V, V_{IN}$	= 0.8V	M. M.	-1.0	-0.15		-5.0	-0.15		
_	Input Current With	TINH	V <sub>IN</sub> = 2.4V			-1.0	-0.0004	M.	-1.0	-0.0004		
INPUT	Input Voltage High	COM	$\begin{split} & V_{IN} = 2.4V \\ & V_{JN} = 2.4V \\ & V_{S} = -14V, V_{IN} = \\ & V_{D} = 14V, V_{IN} = \\ & V_{IN} = 2.4V \\ & V_{IN} = 15V \\ & V_{IN} = 0V \\ & See Swi \\ & Test \\ & C_{L} = 1000j \end{split}$		N.A.	100	0.003	1.0	$\mathcal{I}_M$	0.003	1.0	μА
Z	Input Current With Input Voltage Low	J. CINE	V <sub>IN</sub> = 0V			-1.0	-0.0004	Ohr	-1.0	-0.0004		NIN
	Turn-ON Time	ton	See S	witching	Time	10.2	480	600		480	600	ns
	Turn-OFF Time	t <sub>off1</sub>	Te	est Circu	it	xi 1	370	450	VII	370	450	1115
	Charge Injection	Q		00pF, V <sub>GE</sub> 1 <sub>GEN</sub> = 01		N N	20		M	20		pC
DYNAMIC	Source OFF Capacitance	C <sub>S (off)</sub>	V <sub>S</sub> = 0V. V <sub>IN</sub> =	5V	W		5	Y.U	Mon	5		
Ž	Drain OFF Capacitance	C <sub>D (off)</sub>		W	f = 140kHz	1/1/4	5	N.		5		рF
Δ	Channel ON Capacitance	C <sub>D (on)</sub> + C <sub>S (on)</sub>	$V_D = V_S = 0V$	V <sub>IN</sub> = 0V		NW	16	OOY	CO	16	N	
	OFF Isolation	N.Inc.	V <sub>IN</sub> = 5V, Z <sub>L</sub> =	75Ω		-10	70		7 CC	70	-41	
	Crosstalk (Channel to Channel)	W.100	V <sub>S</sub> = 2.0V, f =	100kHz	.1	M	90	100	** C	90		dΒ
_	Positive Supply Current	1.10	All Channels	ON or C	FF	14	0.02	0.1	0 7 .	0.02	0.1	
SUPPLY	Negative Supply Current	W. A.	All Channels	ON or C	FF	-0.1	-0.01	1	-0.1	-0.01		mA
SUF	Power Supply Range for Continuous Operation	V <sub>OP</sub>	ON CC	Mi	TV	±4.5	WW	±18	±4.5	_	±18	v

The algebraic convention whereby the most negative value is a minimum, and the most positive is a maximum, is used in

Note 7: Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Note 8:

 $I_{D(on)}$  is leakage from driver into "ON" switch. Electrical characteristics, such as ON Resistance, will change when power supplies other than  $\pm 15$ V, are used.

# WWW.100Y.COM.TV **Quad SPST CMOS Analog Switches**

### **ELECTRICAL CHARACTERISTICS (DG201A)**

		14	1700 1.	aoM.,		LII	MITS	- 0	OM	
	PARAMETER	SYMBOL	BOL TEST CONDITIONS		DG201	DG201AB,C			UNITS	
	COM	WW	W.7020	Y.COMI	MIN TYP (Note 6) (Note		MIN (Note 6)	TYP (Note 7)	MAX	M.T
	Analog Signal Range	V <sub>ANALOG</sub>	111.70	ZI COM.	-15	15	-15	- 05	15	٧
	Drain-Source ON Resistance	r <sub>DS (on)</sub>	V <sub>D</sub> = ±10V, \	/ <sub>IN</sub> = 0.8V, I <sub>S</sub> = 1mA		250	WW.	10a.	250	Ω
CH	Source OFF Leakage	. 1	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V	4	100		1.100	100	Mor
SWITCH	Current	S (off)	V <sub>IN</sub> - 2.4V	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-100		-100	- 40	07.	
Ś	Drain OFF Leakage	1	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V		100	-100	M.r.	100	nA
	Current	D (off)	V <sub>IN</sub> - 2.4V	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-100		-100		003	nA
	Drain ON Leakage		V <sub>S</sub> = -14V, V	IN = 0.8V	W	200	TIV	A Ass.	200	V.C
	Current (Note 10)	D (on)	V <sub>D</sub> = 14V, V <sub>II</sub>	N = 0.8V	-200	-200			- 0	
	Input Current With	-N.	V <sub>IN</sub> = 2.4V	100X	-1.0		-10		10	01.0
INPUT	Input Voltage High	INH	V <sub>IN</sub> = 15V	1111.10 =1 C(	DATE	-10			-10	μΑ
Ž	Input Current With Input Voltage Low	I <sub>INL</sub>	V <sub>IN</sub> = 0V	MM.1001.	-10	(X)	-10	- 1 N	W.1	μΑ.

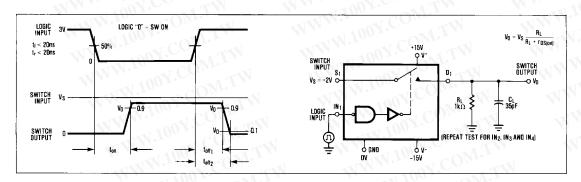
Note 10: ID(on) is leakage from driver into "ON" switch.

The electrical characteristics above are a reproduction of a portion of Siliconix's copyrighted 1985 data book. This information does not constitute any representation by Maxim that Siliconix's products will perform in accordance with these specifications. The "Electrical Characteristics Table" along with descriptive excerpts from the original manufacturer's data sheet have been included in this data sheet solely for comparative purposes.

### Switching Time Test Circuit

Switch output waveform shown for  $V_S = \mbox{constant}$  with logic input waveform as shown. Note that  $V_S$ may be +ve or -ve as per switching times test circuit.

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



### Typical R<sub>DS(ON)</sub> vs. Power Supplies for Maxim's MAX331, DG201A and DG211

POWER SUPPLIES	R <sub>DS(ON)</sub> AT ANALOG SIGNAL LEVEL										
FOWER SUPPLIES	-5V	+5V	-10V	+10V	-15V	+15V					
±5V	350Ω	380Ω	(1,1,1)								
=10V		ON CO.	165Ω	25011							
±15V	TIN.	100	125Ω	160Ω	135Ω	155Ω					

Http://www. 100y. com. tw

### **Quad SPST CMOS Analog Switches**

### WWW.100Y.COM.TW WWW.100Y.COM.T **ELECTRICAL CHARACTERISTICS (MAX331, DG201A):**

M	. 271.7		- 10			LII	MITS			OM
	PARAMETER	SYMBOL	TEST	CONDITIONS	MAX331/	DG201AB,C			UNITS	
	PARAMETER	STMBOL	NWN.	ZONDITIONS	MIN T' (Note 6) (No	YP MAX te 7)		TYP (Note 7)	MAX	$CO_{\lambda}$
1 11.7h	Analog Signal Range	og Signal Range V <sub>ANALOG</sub>					-15	111.7	15	V
	Drain-Source ON Resistance (Note 11)	r <sub>DS (on)</sub>	V <sub>D</sub> = ±10V, \	/ <sub>IN</sub> = 0.8V, I <sub>S</sub> = 1mA	T.T.	250		NW.	250	Ω
	Source OFF Leakage	A.	V = 0.4V	$V_{S} = 14V, V_{D} = -14V$	$V_{i,I}$	100			100	MY.C
F	Current	S (off)	V <sub>IN</sub> = 2.4V	V <sub>S</sub> = -14V, V <sub>D</sub> = 14V	-100	N	-100	M.		
SWITCH	Drain OFF Leakage		V = 0.4V	V <sub>S</sub> = 14V, V <sub>D</sub> = -14V		100		-01	100	DA7
S	Current	D (off)	$V_{IN} = 2.4V$	$V_S = 14V, V_D = -14V$ $V_S = -14V, V_D = 14V$	-100	N/	-100	M 4,	- 41 1	nA
	Drain ON Leakage		V <sub>S</sub> = -14V, V	' <sub>IN</sub> = 0.8V	Obs	200		WV	200	
	Current (Note 10)	D (on)	V <sub>D</sub> = 14V, V <sub>IN</sub> = 0.8V		-200	T	-200	7	-111	700
TN.	Input Current With	W	V <sub>IN</sub> = 2.4V	NW TONY	-1.0		-1.0	W	A.	- 10
5	Input Voltage High	INH	V <sub>IN</sub> = 15V		1.0		1.0		μА	
TUPUT	Input Current With Input Voltage Low	I <sub>INL</sub>	V <sub>IN</sub> = 0V	M. 100	-1.0	$M_{\perp I}$	-1.0		- 11/	W.I

Note 10: ID(on) is leakage from driver into "ON" switch.

Note 11: Electrical characteristics, such as ON Resistance, will change when power supplies other than  $\pm$ 15V, are used.

### **Protecting Against Fault Conditions**

Fault conditions occur when power supplies are turned off when input signals are still present or when over voltages occur at the inputs during normal operation. In either case, source-to-body diodes can be forward biased and conduct current from the signal source. If this current is required to be kept to low (µA) levels then the addition of external protection diodes is recommended.

To provide protection for over-voltages up to 20V above the supplies, a 1N4001 or 1N914 type diode should be placed in series with the positive and negative supplies as shown in Fig. 1. The addition of these diodes will reduce the analog signal range to 1 volt below the positive supply and 1 volt above the negative supply.

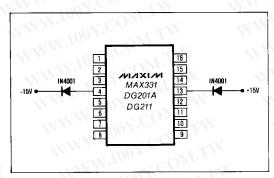
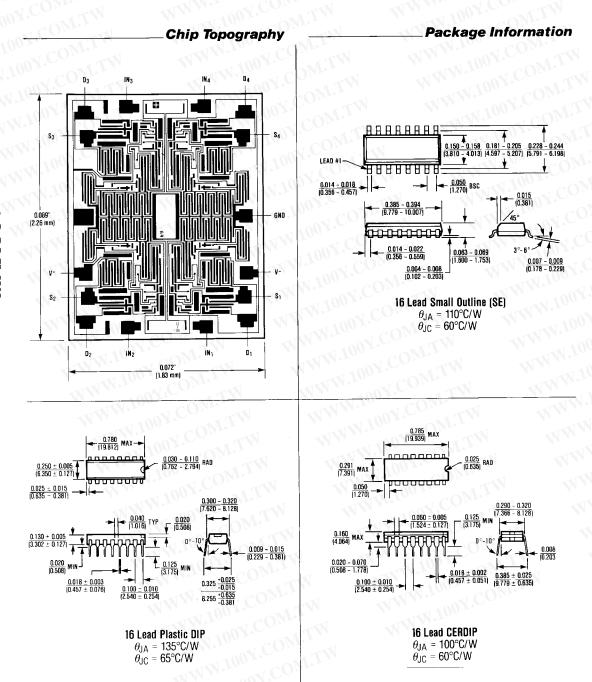


Figure 1. Protection Against Fault Conditions WWW.100Y.COM.TW WWW.100Y.COM.TW

### **Quad SPST CMOS Analog Switches**



Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 (408) 737-7600