



High-Speed DMOS Quad FET Analog Switch Arrays

**SD5000 / SD5001 / SD5002
SD5400 / SD5401 / SD5402**

FEATURES

- Low Propagation Time 600 psec
- Low On Resistance
- Low Insertion Loss
- Low Capacitance:
 - Analog Input 3.5pF typ.
 - Input (Gate) 2.4pF typ.
 - Output 1.3pF typ.
 - Feedback 0.3pF typ.
- Low Crosstalk -107dB @ 3kHz
- Bidirectional Operation

APPLICATIONS

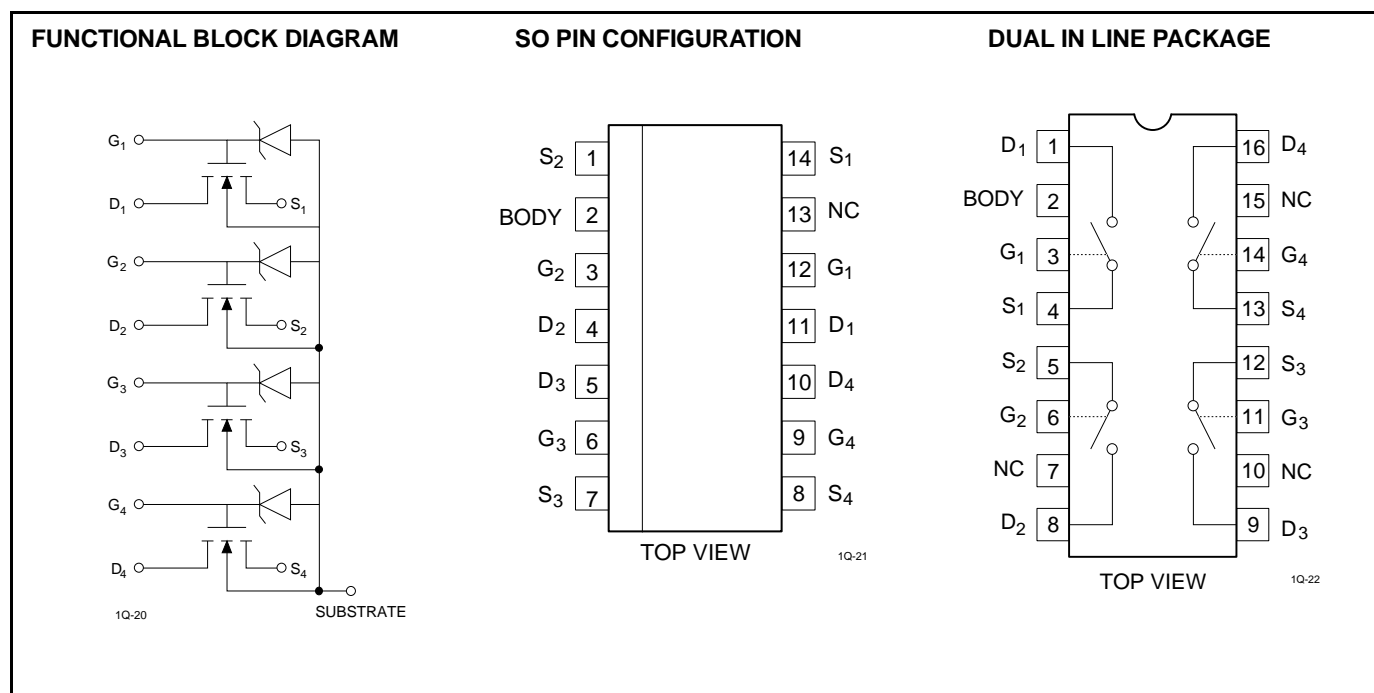
- Analog Switching
- Audio Routing
- Sample & Hold
- Crosspoint Switches
- Choppers
- Video Switches

DESCRIPTION

The SD5000 Series are monolithic arrays of four bidirectional, high performance analog switches manufactured with implanted high-speed, high-voltage and low resistance double-difused MOS (DMOS) process. The maximum threshold of 2V permits simple TTL and CMOS driving in small signal applications.

ORDERING INFORMATION

Part	Package	Temperature Range
SD5000N	Plastic DIP Package	-55°C to +150°C
SD5001N	Plastic DIP Package	-55°C to +150°C
SD5002N	Plastic DIP Package	-55°C to +150°C
XSD5000	Sorted Chips in Carriers	-55°C to +150°C
XSD5001	Sorted Chips in Carriers	-55°C to +150°C
XSD5002	Sorted Chips in Carriers	-55°C to +150°C
SD5400CY	Plastic DIP Package	-55°C to +150°C
SD5401CY	Plastic DIP Package	-55°C to +150°C
SD5402CY	Plastic DIP Package	-55°C to +150°C
XSD5400	Sorted Chips in Carriers	-55°C to +150°C
XSD5401	Sorted Chips in Carriers	-55°C to +150°C
XSD5402	Sorted Chips in Carriers	-55°C to +150°C



SD5000 / SD5001 / SD5002 SD5400 / SD5401 / SD5402



DC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETERS	SD5000/SD5400			SD5001/SD5401			SD5002/SD5402			UNITS	CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
V _{analog}	Analog Signal Range	-10		+10	-5		+5	-7.5		+7.5	V	
Breakdown Voltage												
BV _{DS} BV _{SD} BV _{DB} BV _{SB}	Drain-Source Source-Drain Drain-Body Source-Body	20 20 25 25	25		10 10 15 15	25		15 15 22.5 22.5	25		V	V _{GS} = V _{BS} = -5V, I _D = 10nA V _{GD} = V _{BD} = -5V, I _S = 10nA V _{GB} = 0V, I _D = 10nA Source Open V _{GB} = 0V, I _S = 10μA, Drain Open
Leakage Current - SD5000/SD5400												
I _{DS(OFF)} I _{SD(OFF)} I _{GBS}	Drain-Source Source-Drain Gate		1.0 1.0	10.0 10.0							nA nA μA	V _{GS} = V _{BS} = -5V, V _{DS} = 20V V _{GD} = V _{BD} = -5V, V _{SD} = 20V V _{DB} = V _{SB} = 0V, V _{GB} = 30V
Leakage Current - SD5001/SD5401												
I _{DS(OFF)} I _{SD(OFF)} I _{GBS}	Drain-Source Source-Drain Gate					1.0 1.0	10.0 10.0				nA nA μA	V _{GS} = V _{BS} = -5V, V _{DS} = 10V V _{GD} = V _{BD} = -5V, V _{SD} = 10V V _{DB} = V _{SB} = 0V, V _{GB} = 25V
Leakage Current - SD5002/SD5402												
I _{DS(OFF)} I _{SD(OFF)} I _{GBS}	Drain-Source Source-Drain Gate								1.0 1.0	10.0 10.0	nA nA μA	V _{GS} = V _{BS} = -5V, V _{DS} = 15V V _{GD} = V _{BD} = -5V, V _{SD} = 15V V _{DB} = V _{SB} = 0V, V _{GB} = 30V
V _T	Threshold Voltage	0.1	1.0	2.0	0.1	1.0	2.0	0.1	1.0	2.0	V	V _{DS} = V _{GS} = V _T , V _{SB} = 0V, I _D = 1μA
R _{DS(ON)}	Drain-Source ON Resistance		50 30 23 19	70		50 30 23 19	70		50 30 23 19	70	Ω	V _{GS} = 5V, V _{SB} = 0V, I _D = 1mA V _{GS} = 10V, V _{SB} = 0V, I _D = 1mA V _{GS} = 15V, V _{SB} = 0V, I _D = 1mA V _{GS} = 20V, V _{SB} = 0V, I _D = 1mA
R _{DS(ON)}	Match ON Resiatance		1	5		1	5		1	5	Ω	V _{GS} = 5V

AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
g _{fs}	Forward Transconductance	10	12		mS	V _{DS} = 10V, I _D = 20mA, V _{SB} = 0V, f = 1kHz
Capacitances						
C _G C _D C _S C _{DG}	Gate Node Drain Node Source Node Reverse Transfer		2.4 1.3 3.5 0.3	3.5 1.5 4.0 0.5	pF	V _{DS} = 10V, f = 1MHz, V _{GS} = V _{BS} = -15V
C _T	Crosstalk		107.0		dB	f = 3kHz, R _G = 600Ω

SWITCHING CHARACTERISTICS $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	CONDITIONS
t _{d(ON)}	Turn-On Time		0.7	1.0	nsec	R _L = 680Ω, R _G = 51 V _{DD} = 5V V _{G(ON)} = 10V
t _r	Rise Time		0.8	1.0		
t _{OFF*}	Turn-Off Time		10.0			

*t_{OFF} is dependent on R_L and C and does not depend on the device characteristics.



SD5000 / SD5001 / SD5002
SD5400 / SD5401 / SD5402

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	SD5000/SD5400 MAX. VALUE	SD5001/SD5401 MAX. VALUE	SD5002/SD5402 MAX. VALUE	UNITS
Breakdown Voltage					
V _{DS}	Drain-Source	20	10	15	V
V _{SD}	Source-Drain	20	10	15	
V _{DB}	Drain-Body	25	15	22.5	
V _{SB}	Source-Body	25	15	22.5	
V _{GS}	Gate-Source	30/ - 25	25/ - 15	30/ - 22.5	
V _{GB}	Gate-Body	30/ - 0.3	25/ - 0.3	30/ - 0.3	
V _{GD}	Gate-Drain	30/ - 25	30/ - 15	30/ - 22.5	

ABSOLUTE MAXIMUM

SYMBOL	PARAMETER	VALUE	UNIT
I _D	Drain Current	50	mA
Temperature Range			
T _J	Operating	-55 to +85	°C
T _S	Storage	-55 to +150	
Power Dissipation			
P _D	Package	640 (Note 1)	mW
P _D	Each Device	300 (Note 2)	

Note 1: Linear Derating Factor - 10.7mW/°C above 25°C

Note 2: Linear Derating Factor - 5.0mW/°C above 25°C