

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

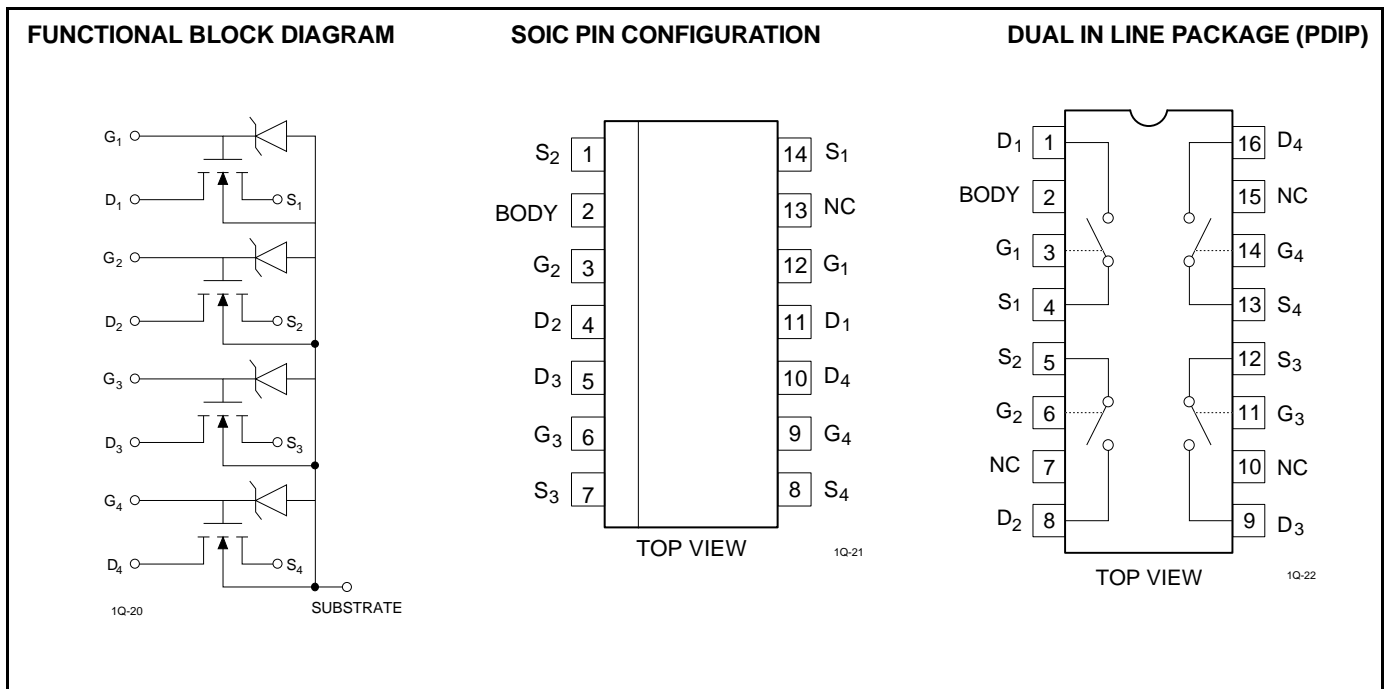
- Analog Switching
- Audio Routing
- Sample & Hold
- Crosspoint Switches
- Choppers
- Video Switches

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	SOIC-14	-55°C to +150°C
SD5401CY	SOIC-14	-55°C to +150°C
SD5402CY	SOIC-14	-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



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.



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

Package: 14 Ld SOIC

Device: Calogic LLC - SD5400CY-Pb free

Material	Material Name	Composition	Composition %	Composition Weight(mg)	Total Material Weight (mg)	%	PPM
MOLD COMPOUND	Sumitomo EME G600	Silica Epoxy resin Epoxy, Cresol Novolac Phenol resin Carbon black	87.00 5.20 2.50 5.00 0.30	66.6477 3.9835 1.9152 3.8303 0.2298	76.6065	55.1309	551309
LEAD FRAME	QPL 14L (90X150) mils	Copper (Cu) Phosphorus (P) Zinc (Zn) Iron(fe) Silver(Ag)	96.46 0.083 0.125 2.30 1.035	55.4316 0.0474 0.0718 1.3218 0.5948	57.4674	41.3572	413572
DIE	Die Die Size: 40X32 mils	Silicon (Si)	100.00	100	0.6694	0.4817	4817
DIE ATTACH EPOXY	Sumitomo CRM-1076NS	Silver Epoxy resin Diluent Dicynadiamide Hardener	82.00 8.20 6.00 0.30 3.50	0.02624 0.00262 0.00192 0.00010 0.00112	0.0320	0.0230	230
GOLD WIRE	AW 14 1.0 mil	Gold (Au)	100.00	0.2330	0.2330	0.1677	1677
EXTERNAL PLATING	100% Matte Tin	Tin (Sn) Lead (Pb)	100.00 0.002	3.8430 0.0001	3.8431	2.7657	27657
Marking Ink	M238		100.00	0.1025	0.1025	0.0738	738
					138.954	100.0000	1000000