CALMOS
TECHNOLOGIES

SD5400CY

HIGH-SPEED LDMOS QUAD FET ANALOG SWITCH ARRAY

Features

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

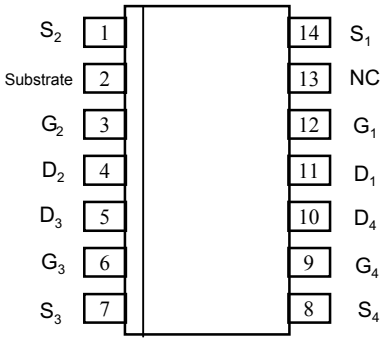
Applications

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

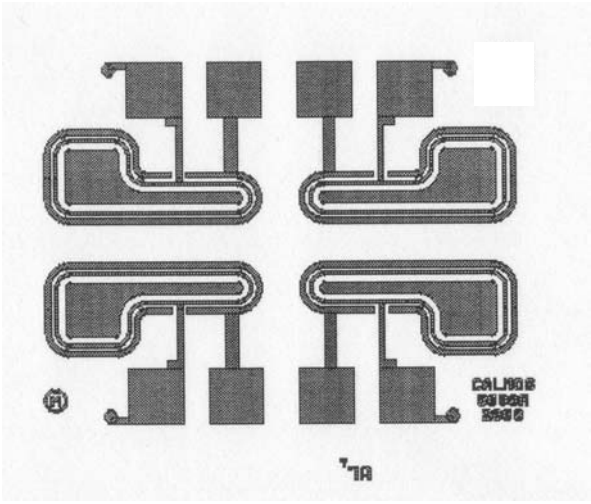
Description

The SD5400 series consists of enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency applications. The SD5400 is optimized as an Analog Switch with a 25V Source to Body breakdown and low Drain Leakage. The SD5000 series uses CALMOS TECHNOLOGIES ULTRA REL DMOS Process for reliability and robust performance. These MOSFETs utilize lateral construction to achieve low capacitance and ultra-fast switching speeds. An integrated Zener diode provides ESD protection. The devices are available in 14-pin plastic package and in die form for hybrid applications.

SO-14 Pin Configuration



Top View



ORDERING INFORMATION

Part	Package	Temp Range
SD5400CY	Plastic SO-14 Package	0 to +85°C
SD5400CP	Sorted Chips in Carriers	0 to +85°C
SD5400W	Die in Wafer Form	0 to +85°C

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ABSOLUTE MAXIMUM RATINGS
(T_A = 25 ºC unless otherwise noted)

Stresses in excess of the maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the document. Exposure to maximum ratings for extended periods of time can adversely affect reliability.

Gate-Source Voltage	30/-25V	**Operating Junction Temp.**	-55 to +85 °C
Gate-Substrate Voltage	30/-0.3V	**Storage Temperature**	-55 to +150 °C
Gate-Drain Voltage	30/-25V	**Continuous Drain Current**	50mA

Package - Power Dissipation 640mW (linear derating factor – 10.7mW/ °C above 25 °C)

Each Device - Power Dissipation 300mW (linear derating factor – 5.0mW/ °C above 25 °C)

ELECTRICAL CHARACTERISTICS (T_A = 25 ºC unless otherwise noted)

	Parameter	Symbol	Test Conditions		SD5000 Min	SD5000 Typ	SD5000 Max	Units
STATIC	Analog Signal Range	V_{analog}			-10		+10	V
	Drain-Source Breakdown Voltage	BV_{DS}	I_D= 10nA, V_{GS}= V_{BS} = -5V		20	25		V
	Source-Drain Breakdown Voltage	BV_{SD}	I_S= 10nA, V_{GD}= V_{BD} = -5V		20			V
	Drain-Substrate Breakdown Voltage	BV_{DB}	I_D= 10nA, V_{GB}= 0 Source Open		25			V
	Source-Substrate Breakdown Voltage	BV_{SB}	I_D= 10µA, V_{GB}= 0 Drain Open		25			V
	Drain-Source Leakage	$I_{D(off)}$	$V_{GS/BS}$= -5	V_{DS}= 20V		1.0	10.0	nA
				V_{DS}= 10V				nA
	Source- Drain Leakage	$I_{S(off)}$	$V_{GD/BD}$= -5	V_{SD}= 20V		1.0	10.0	nA
				V_{SD}= 10V				nA
	Gate Leakage	I_{GBS}	$V_{DB/SB}$= 0	V_{GB}= 30V			1.0	µA
				V_{GB}= 25V				µA
	Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D= 1µA, V_{SB}= 0		0.1	1.0	2.0	V
	Drain-Source ON Resistance	$r_{S(on)}$	I_D=1mA, V_{SB}= 0 V	V_{GS}= 5V		50	70	Ω
				V_{GS}= 10V		30		Ω
				V_{GS}= 15V		23		Ω
				V_{GS}= 20V		19		Ω
	Match ON Resistance	$r_{S(on)}$	V_{GS}= 5V			1	5	Ω

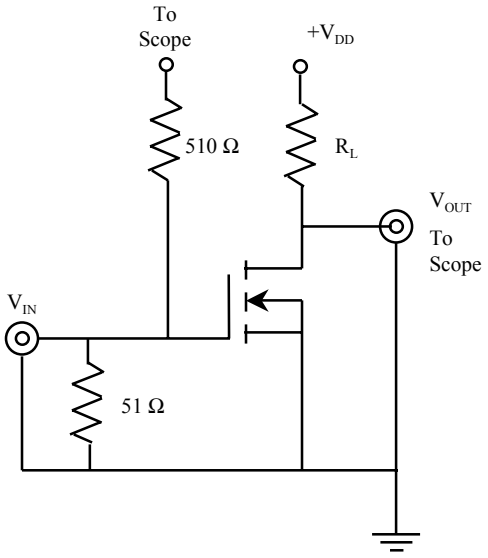
HIGH-SPEED LDMOS QUAD FET ANALOG SWITCH ARRAY

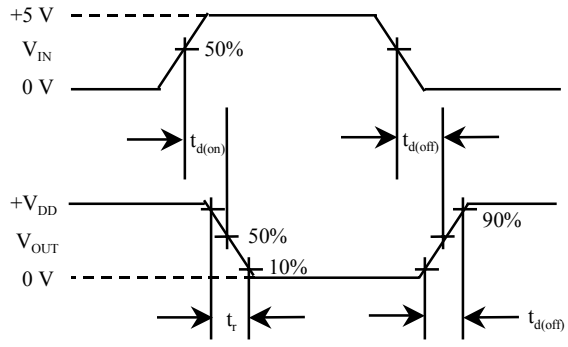
ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted)

	Parameter	Symbol	Test Conditions	SD5000			Units
				Min	Typ	Max	
DYNAMIC	Common-Source Forward Transconductance	g_{fs}	V_{DS}=10V I_D=20mA f= 1kHz, V_{SB}=0 Pulsed	10	12		mS
	Gate Node Capacitance	$c_{(gs+gd+gb)}$	V_{DS}=10V V_{GS}=V_{BS}=-15V f = 1MHz		2.4	3.5	pF
	Drain Node Capacitance	$c_{(gd+db)}$			1.3	1.5	pF
	Source Node Capacitance	$c_{(gs+sb)}$			3.5	4.0	pF
	Reverse Transfer Capacitance	$c_{(dg)}$			0.3	0.5	pF
	Crosstalk	c_T	f = 3kHz, R_G = 600		-107.0		dB
	Turn ON Delay Time	$t_{d(on)}$	V_{DD}=5V $V_{G(on)}$=10V R_L=680Ω R_G=51Ω		0.7	1.0	ns
	Rise Time	t_r			0.8	1.0	ns
	Turn OFF Time	$t_{d(off)}$*			10.0		ns

* $t_{d(off)}$ is dependent on R_L and c and does not depend on the device characteristics

Switching Time Test Circuit





Input Pulse: t_d, t_r < 1 ns

Rep rate: 1 MHz

Sampling Scope t_r < 350 ps

R_{IN} = 1 MΩ

C_{IN} = 2 pF