

QUAD D-MOS FET ANALOG SWITCH ARRAYS

ORDERING INFORMATION

14 Pin Plastic, Small-Outline Package	SD5400CY	SD5401CY	SD5402CY
Description	20V, 30Ω	10V, 30Ω	15V, 30Ω
Temperature Range	Commercial	Commercial	Commercial

FEATURES

- Low Interelectrode Capacitances
 Analog Input—3.5pF typ.
 Input (Gate) —2.4pF typ.
 Output —1.3pF typ.
 Feedback —0.3pF typ.
- Low Insertion Loss, $r_{DS} < 30$ ohms
- Low Crosstalk—107dB @ 3KHz
- Bidirectional Switches
- Small-Outline Surface Mount Package

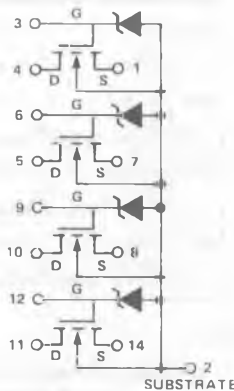
APPLICATIONS

- High Speed Analog Switches
 Analog Range $\pm 10V$ —SD5400
 Analog Range $\pm 7.5V$ —SD5402
 Analog Range $\pm 5.0V$ —SD5401
- High-Speed Switch Drivers
 20V—SD5400
 15V—SD5402
 10V—SD5401
- Sample & Hold

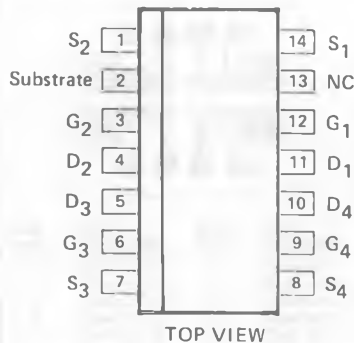
ABSOLUTE MAXIMUM RATINGS (T_C = +25°C unless otherwise noted)

PARAMETER	SD5400	SD5401	SD5402	UNITS	
V _{DS}	+20	+10	+15	V	I _D Continuous Drain Current 50mA
V _{SO}	+20	+10	+15	V	P _D Total Package Power Dissipation (at or below T _A = +25°C) 640mW
V _{DB}	+25	+15	+22.5	V	Linear Derating Factor 5.33mW/°C
V _{SB}	+25	+15	+22.5	V	P _D Single Device Power Dissipation (at or below T _A = +25°C) 300mW
V _{GS}	-25	-15	-22.5	V	T _J Operating Junction Temperature Range 0 to +70°C
V _{GB}	+30	+25	+30	V	T _S Storage Temperature Range -55 to +125°C
V _{GD}	-0.3	-0.3	-0.3	V	
	+30	+25	+30	V	
	-25	-15	-22.5	V	
	+30	+25	+30	V	

SCHEMATIC DIAGRAM



PIN CONFIGURATION



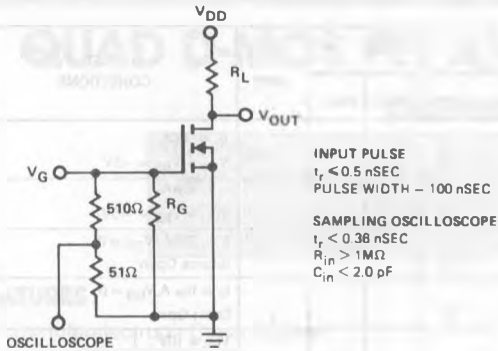
PACKAGE DIMENSIONS

SO-14
(See Package 20)

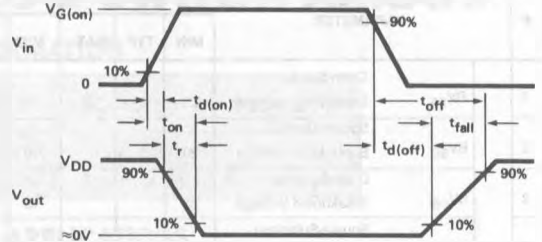
ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, per channel, unless otherwise noted)

#	PARAMETER	SD5400			SD5401			SD5402			UNIT	TEST CONDITIONS		
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX				
1	BV_{DS} Drain-Source Breakdown Voltage	20	25		10	25		15	25		V	$I_D = 10\text{nA}$ $V_{GS} = V_{BS} = -5\text{V}$		
2	BV_{SD} Source-Drain Breakdown Voltage	20			10			15			V	$I_S = 10\text{nA}$ $V_{GD} = V_{BD} = -5\text{V}$		
3	BV_{DB} Drain-Substrate Breakdown Voltage	25			15			22.5			V	$I_D = 10\text{nA}, V_{GB} = 0$ Source Open		
4	BV_{SB} Source-Substrate Breakdown Voltage	25			15			22.5			V	$I_S = 10\mu\text{A}, V_{GB} = 0$ Drain Open		
5	$I_{D(off)}$ Drain-Source Off Current							10			nA	$V_{DS} = 10\text{V}$		
6										10	nA	$V_{DS} = 15\text{V}$		
7				10								nA	$V_{DS} = 20\text{V}$	
8								10				nA	$V_{SD} = 10\text{V}$	
9	$I_{S(off)}$ Source-Drain OFF Current										10	nA	$V_{SD} = 15\text{V}$	
10				10								nA	$V_{SD} = 20\text{V}$	
11								1.0					μA	$V_{GB} = 25\text{V}$
12	I_{GBS} Gate-Body Leakage Current			1.0							1.0		μA	$V_{GB} = 30\text{V}$
13		$V_{GS(th)}$ Gate Threshold Voltage	0.1	1.0	2.0	0.1	1.0	2.0	0.1	1.0	2.0	V	$V_{DS} = V_{GS}, I_D = 1\mu\text{A}$ $V_{SB} = 0$	
15	$r_{DS(on)}$ Drain-Source ON Resistance		50	70		50	70		50	70				$V_{GS} = 5\text{V}$
16				30		30			30					$V_{GS} = 10\text{V}$
17				23		23			23				ohms	$V_{GS} = 15\text{V}$
18				19		19			19					$V_{GS} = 20\text{V}$
18	r_{DSM} ON Resistance Match		1.0	5.0		1.0	5.0		1.0	5.0				$V_{GS} = 5\text{V}$
19	g_{fs} Common-Source Forward Transcond.	10	12		10	12		10	12		mmhos	$V_{DS} = 10\text{V}, I_D = 20\text{mA}$ $f = 1\text{KHz}, V_{SB} = 0$		
20	$C_{(gs + gd + gb)}$ Gate Node Capacitance		2.4	3.5		2.4	3.5		2.4	3.5				
21	$C_{(gs + db)}$ Drain Node Capacitance		1.3	1.5		1.3	1.5		1.3	1.5		pF	$V_{DS} = 10\text{V}$ $V_{GS} = V_{BS} = -15\text{V}$ $f = 1\text{MHz}$	
22	$C_{(gs + sb)}$ Source Node Capacitance		3.5	4.0		3.5	4.0		3.5	4.0				
23	$C_{(dg)}$ Reverse Transfer Capacitance		0.3	0.5		0.3	0.5		0.3	0.5				
24	C_T Cross Talk		-107			-107			-107			dB	$f = 3\text{KHz}, R_G = 600\Omega$	
25	$t_{d(on)}$ Turn ON Delay Time		0.7	1.0		0.7	1.0		0.7	1.0		nSec	$V_{DD} = 5\text{V}, V_{G(on)} = 10\text{V}$	
26	t_r Rise Time		0.8	1.0		0.8	1.0		0.8	1.0			$R_L = 680\Omega, R_G = 51\Omega$	
27	t_{off} Turn OFF Time		10			10			10					

SWITCHING TIMES TEST CIRCUIT

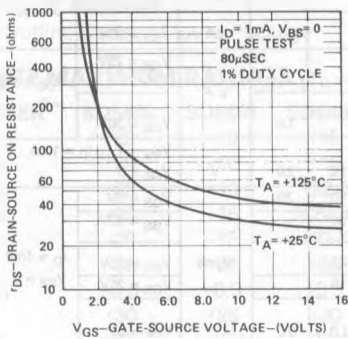


TEST WAVEFORMS

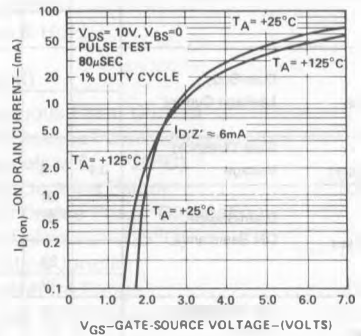


TYPICAL PERFORMANCE CHARACTERISTICS ($T_A = +25^\circ\text{C}$, per channel, unless otherwise specified)

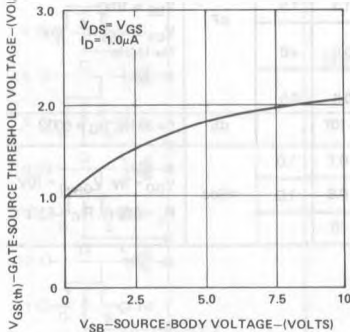
DRAIN-SOURCE ON RESISTANCE
—vs—
GATE-SOURCE VOLTAGE



ON DRAIN CURRENT
—vs—
GATE-SOURCE VOLTAGE



GATE-SOURCE THRESHOLD VOLTAGE
—vs—
SOURCE-BODY VOLTAGE



FORWARD TRANSCONDUCTANCE
—vs—
ON DRAIN CURRENT

