QUAD DMOS FET ANALOG SWITCH ARRAYS

FEATURES

- Low Interelectrode Capacitances
  - — Analog Input ..... 3.5 pF Typ
  - — Input (Gate) ..... 2.4 pF Typ
  - — Output ..... 1.3 pF Typ
  - — Feedback ..... 0.3 pF Typ
- Low Insertion Loss ..... r_{DS} <30Ω
- Low Cross Talk ..... 107 dB @ 3 kHz
- Bidirectional Switches
- Small-Outline, Surface-Mount Package

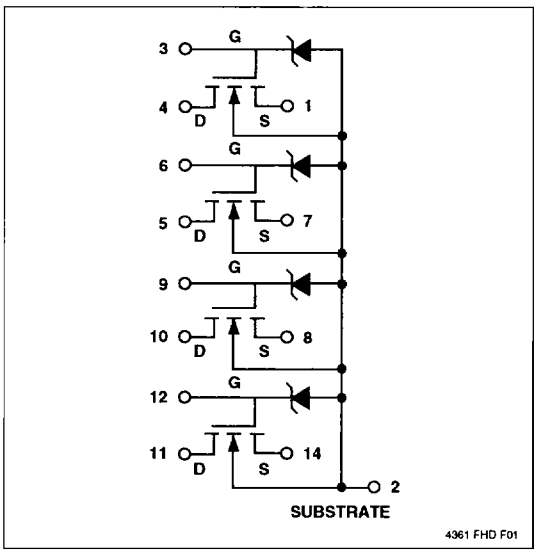
APPLICATIONS

- High-Speed Analog Switches
  - SD5400 ..... ±10V
  - SD5401 ..... ±5V
  - SD5402 ..... ±7.5V
- High-Speed Switch Drivers
  - SD5400 ..... 20V
  - SD5401 ..... 10V
  - SD5402 ..... 15V
- Sample-and-Hold

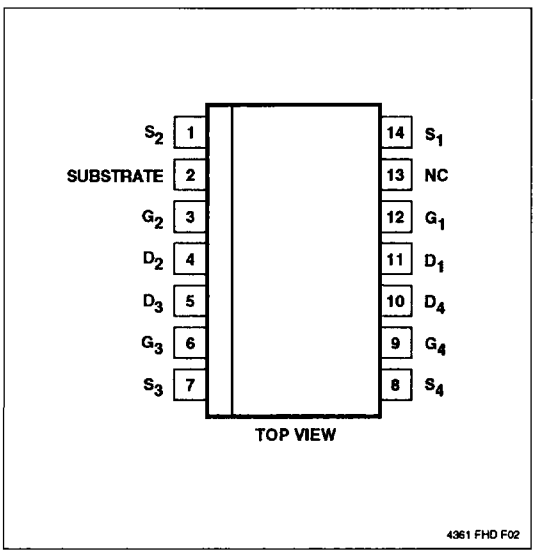
ORDERING INFORMATION

Part No.	Package	Description	Temperature Range
SD5400CY	14-Pin Plastic Small-Outline	20V, 30Ω	Commercial
SD5401CY	14-Pin Plastic Small-Outline	10V, 30Ω	Commercial
SD5402CY	14-Pin Plastic Small-Outline	15V, 30Ω	Commercial

SCHEMATIC DIAGRAM



PIN CONFIGURATION



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SD5400
SD5401
SD5402

ABSOLUTE MAXIMUM RATINGS:

T_C = +25°C, unless otherwise noted.

V_{DB} Drain-Body Voltage
- SD5400 ..... +25V
- SD5401 ..... +15V
- SD5402 ..... +22.5V

V_{DS} Drain-Source Voltage
- SD5400 ..... +20V
- SD5401 ..... +10V
- SD5402 ..... +15V

V_{SB} Source-Body Voltage
- SD5400 ..... +25V
- SD5401 ..... +15V
- SD5402 ..... +22.5V

V_{SD} Source-Drain Voltage
- SD5400 ..... +20V
- SD5401 ..... +10V
- SD5402 ..... +15V

V_{GB} Gate-Body Voltage
- SD5400 ..... −0.3V, +30V
- SD5401 ..... −0.3V, +25V
- SD5402 ..... −0.3V, +30V

V_{GD} Gate-Drain Voltage
- SD5400 ..... −25V, +30V
- SD5401 ..... −15V, +25V
- SD5402 ..... −22.5V, +30V

V_{GS} Gate-Source Voltage
- SD5400 ..... −25V, +30V
- SD5401 ..... −15V, +25V
- SD5402 ..... −22.5V, +30V

I_D Continuous Drain Current ..... 50 mA

P_D Total Package Power Dissipation
- @ or Below T_A = +25°C ..... 640 mW
- Linear Derating Factor ..... 5.33 mW/°C

P_D Single Device Power Dissipation
- @ or Below T_A = +25°C ..... 300 mW

T_J Operating Junction Temperature Range ..... 0°C to +70°C

T_{STG} Storage Temperature Range ..... −55°C to +125°C

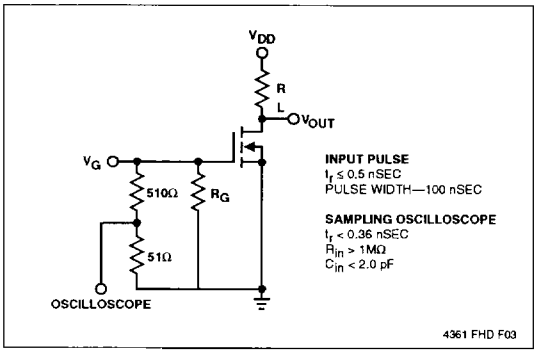
Static-sensitive device. Unused devices must be stored in conductive material. Protect devices from static discharge and static fields. Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions above those indicated in the operation sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS (T_A = +25°C per channel, unless otherwise noted.)

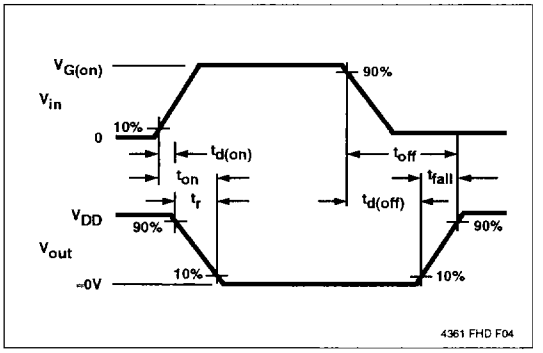
Symbol	Parameter	Test Conditions	SD5400			SD5401			SD5402			Unit
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Static												
BV_{DS}	Drain-Source Breakdown Voltage	I_D = 10 nA, V_{GS} = V_{BS} = –5V	20	25	—	10	25	—	15	25	—	V
BV_{SD}	Source-Drain Breakdown Voltage	I_S = 10 nA, V_{GD} = V_{BD} = –5V	20	—	—	10	—	—	15	—	—	V
BV_{DB}	Drain-Substrate Breakdown Voltage	I_D = 10 nA, V_{GB} = 0V, Source OPEN	25	—	—	15	—	—	22.5	—	—	V
BV_{SB}	Source-Substrate Breakdown Voltage	I_S = 10 µA, V_{GB} = 0V, Drain OPEN	25	—	—	15	—	—	22.5	—	—	V
$I_{D(OFF)}$	Drain-Source OFF Current	V_{GS} = V_{BS} = –5V, V_{DS} = 10V	—	—	—	—	—	10	—	—	—	nA
		V_{GS} = V_{BS} = –5V, V_{DS} = 15V	—	—	—	—	—	—	—	—	10	
		V_{GS} = V_{BS} = –5V, V_{DS} = 20V	—	—	10	—	—	—	—	—	—	
$I_{S(OFF)}$	Source-Drain OFF Current	V_{GD} = V_{BD} = –5V, V_{SD} = 10V	—	—	—	—	—	10	—	—	—	nA
		V_{GD} = V_{BD} = –5V, V_{SD} = 15V	—	—	—	—	—	—	—	—	10	
		V_{GD} = V_{BD} = –5V, V_{SD} = 20V	—	—	10	—	—	—	—	—	—	
I_{GBS}	Gate-Body Source Leakage Current	V_{DB} = V_{SB} = 0V, V_{GB} = 25V	—	—	—	—	—	1	—	—	—	µA
		V_{DB} = V_{SB} = 0V, V_{GB} = 30V	—	—	1	—	—	—	—	—	1	
$V_{GS(TH)}$	Gate Source Threshold Voltage	V_{DS} = V_{GS}, I_D = 1 µA, V_{SB} = 0V	0.1	1	2	0.1	1	2	0.1	1	2	V
$r_{DS(ON)}$	Drain-Source ON Resistance	V_{GS} = 5V, I_D = 1 mA, V_{SB} = 0V	—	50	70	—	50	70	—	50	70	Ω
		V_{GS} = 10V, I_D = 1 mA, V_{SB} = 0V	—	30	—	—	30	—	—	30	—	Ω
		V_{GS} = 15V, I_D = 1 mA, V_{SB} = 0V	—	23	—	—	23	—	—	23	—	Ω
		V_{GS} = 20V, I_D = 1 mA, V_{SB} = 0V	—	19	—	—	19	—	—	19	—	Ω
$r_{DSM(ON)}$	Drain-Source Match ON Resistance	V_{GS} = 5V, I_D = 1 mA, V_{SB} = 0V	—	1	5	—	1	5	—	1	5	Ω
Dynamic												
$g_{m(FS)}$	Common-Source Forward Transconductance	V_{DS} = 10V, I_D = 20 mA, V_{SB} = 0 f = 1 kHz	10	12	—	10	12	—	10	12	—	mmhos
$C_{(GS+GD+GB)}$	Gate Node Capacitance	V_{DS} = 10V, V_{GS} = V_{BS} = –15V, f = 1 MHz	—	2.4	3.5	—	2.4	3.5	—	2.4	3.5	pF
$C_{(GS+DB)}$	Drain Node Capacitance	V_{DS} = 10V, V_{GS} = V_{BS} = –15V, f = 1 MHz	—	1.3	1.5	—	1.3	1.5	—	1.3	1.5	pF
$C_{(GS+SB)}$	Source Node Capacitance	V_{DS} = 10V, V_{GS} = V_{BS} = –15V, f = 1 MHz	—	3.5	4	—	3.5	4	—	3.5	4	pF
$C_{(DG)}$	Reverse Transfer Capacitance	V_{DS} = 10V, V_{GS} = V_{BS} = –15V, f = 1 MHz	—	0.3	0.5	—	0.3	0.5	—	0.3	0.5	pF
CT	Cross-Talk	f = 3 kHz, R_G = 600Ω	—	–107	—	—	–107	—	—	–107	—	dB
$t_{D(ON)}$	Turn ON Delay Time	V_{DD} = 5V, $V_{G(ON)}$ = 10V, R_L = 680Ω, R_G = 51Ω	—	0.7	1	—	0.7	1	—	0.7	1	ns
t_R	Rise Time	V_{DD} = 5V, $V_{G(ON)}$ = 10V, R_L = 680Ω, R_G = 51Ω	—	0.8	1	—	0.8	1	—	0.8	1	ns
t_{OFF}	Turn OFF Time	V_{DD} = 5V, $V_{G(ON)}$ = 10V, R_L = 680Ω, R_G = 51Ω	—	10	—	—	10	—	—	10	—	ns

SD5400
SD5401
SD5402

SWITCHING TIMES TEST CIRCUIT

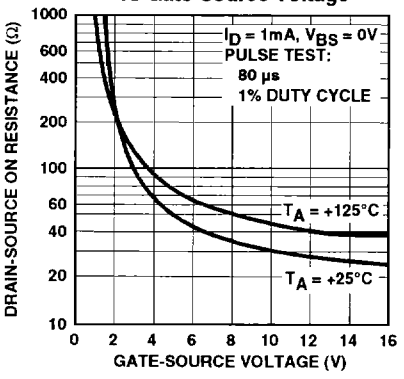


TEST WAVEFORMS

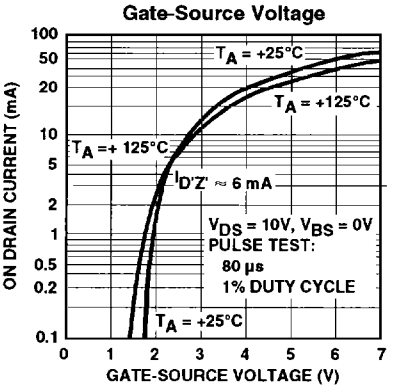


TYPICAL PERFORMANCE CHARACTERISTICS: T_A = +25°C per channel, unless otherwise noted.

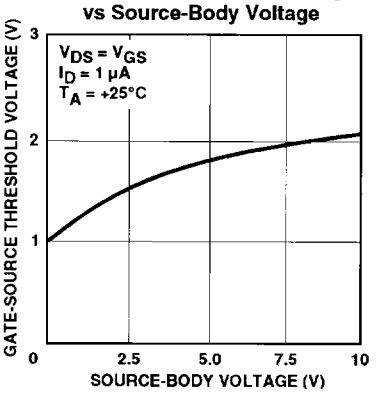
Drain-Source On Resistance vs Gate-Source Voltage



On Drain Current vs Gate-Source Voltage



Gate-Source Threshold Voltage vs Source-Body Voltage



Forward Transconductance vs On Drain Current