

### Product Summary

Part Number	V <sub>(BR)DS</sub> Min (V)	V <sub>GS(th)</sub> Max (V)	r <sub>DS(on)</sub> Max (Ω)	C <sub>rss</sub> Max (pF)	t <sub>ON</sub> Max (ns)
SD5000I	20	1.5	70 @ V <sub>GS</sub> = 5 V	0.5	2
SD5000N	20	1.5	70 @ V <sub>GS</sub> = 5 V	0.5	2
SD5001N	10	1.5	70 @ V <sub>GS</sub> = 5 V	0.5	2
SD5400CY	20	1.5	75 @ V <sub>GS</sub> = 5 V	0.5	2
SD5401CY	10	1.5	75 @ V <sub>GS</sub> = 5 V	0.5	2

### Features

- Quad SPST Switch with Zener Input Protection
- Low Interelectrode Capacitance and Leakage
- Ultra-High Speed Switching—t<sub>ON</sub>: 1 ns
- Ultra-Low Reverse Capacitance: 0.2 pF
- Low Guaranteed r<sub>DS</sub> @ 5 V
- Low Turn-On Threshold Voltage

### Benefits

- High-Speed System Performance
- Low Insertion Loss at High Frequencies
- Low Transfer Signal Loss
- Simple Driver Requirement
- Single Supply Operation

### Applications

- Fast Analog Switch
- Fast Sample-and-Holds
- Pixel-Rate Switching
- Video Switch
- Multiplexer
- DAC Deglitchers
- High-Speed Driver

### Description

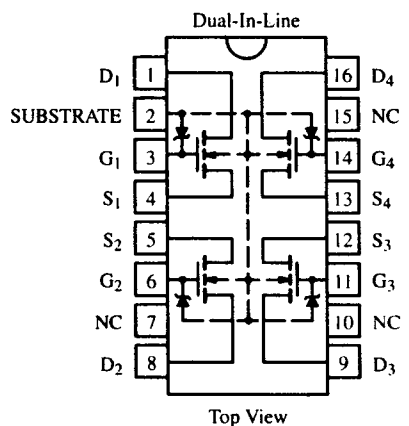
The SD5000/5400 series of monolithic switches features four individual double-diffused enhancement-mode MOSFETs built on a common substrate. These bidirectional devices provide low on-resistance and low interelectrode capacitances to minimize insertion loss and crosstalk.

Built on Siliconix' proprietary DMOS process, the SD5000/5400 series utilizes lateral construction to achieve low capacitance and

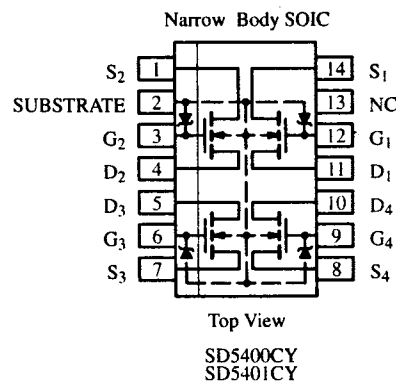
ultra-fast switching speeds. For manufacturing reliability, these devices feature poly-silicon gates protected by Zener diodes

The SD 5000/5400 are rated to handle ±10-V analog signals, while the SD5001/5401 are rated for ±5-V signals.

For similar products packaged in TO-206AF (TO-72) and TO-253 (SOT-143) see the SD211DE/SST211 series.



Plastic: SD5000N  
SD5001N  
Sidebrazed: SD5000I



# Absolute Maximum Ratings (T<sub>A</sub> = 25°C Unless Otherwise Noted)

Gate-Drain, Gate-Source Voltage (SD5000, SD5400) .....	+30 V/-25 V
(SD5001, SD5401) .....	+25 V/-15 V
Gate-Substrate Voltage (SD5000, SD5400) .....	+30 V/-0.3 V
(SD5001, SD5401) .....	+25 V/-0.3 V
Drain-Source Voltage (SD5000, SD5400) .....	20 V
(SD5001, SD5401) .....	10 V
Drain-Source-Substrate Voltage (SD5000, SD5400) .....	25 V
(SD5001, SD5401) .....	15 V

Drain Current .....	50 mA
Lead Temperature (1/16" from case for 10 seconds) .....	300°C
Storage Temperature .....	-65 to 150°C
Operating Junction Temperature .....	-55 to 150°C
Power Dissipation <sup>a, b</sup> : (Package) .....	500 mW
(each Device) .....	300 mW

- Notes:  
a. SD5000/SD5001 derate 5 mW/°C above 25°C  
b. SD5400/SD5401 derate 4 mW/°C above 25°C

## Specifications<sup>a</sup>

Parameter	Symbol <sup>b</sup>	Test Conditions <sup>b</sup>	Typ <sup>c</sup>	Limits				Unit	
				SD5000 SD5400		SD5001 SD5401			
				Min	Max	Min	Max		
<b>Static</b>									
Drain-Source Breakdown Voltage	V <sub>(BR)DS</sub>	V <sub>GS</sub> = V <sub>BS</sub> = -5 V, I <sub>D</sub> = 10 nA	30	20		10		V	
Source-Drain Breakdown Voltage	V <sub>(BR)SD</sub>	V <sub>GD</sub> = V <sub>BD</sub> = -5 V, I <sub>S</sub> = 10 nA	22	20		10			
Drain-Substrate Breakdown Voltage	V <sub>(BR)DBO</sub>	V <sub>GB</sub> = 0 V, I <sub>D</sub> = 10 nA, Source Open	35	25		15			
Source-Substrate Breakdown Voltage	V <sub>(BR)SBO</sub>	V <sub>GB</sub> = 0 V, I <sub>S</sub> = 10 μA, Drain Open	35	25		15			
Drain-Source Leakage	I <sub>DS(off)</sub>	V <sub>GS</sub> = V <sub>BS</sub> = -5 V	V <sub>DS</sub> = 10 V	0.4			10	nA	
			V <sub>DS</sub> = 15 V	0.7					
			V <sub>DS</sub> = 20 V	0.9		10			
Source-Drain Leakage	I <sub>SD(off)</sub>	V <sub>GD</sub> = V <sub>BD</sub> = -5 V	V <sub>SD</sub> = 10 V	0.5			10		
			V <sub>SD</sub> = 15 V	0.8					
			V <sub>SD</sub> = 20 V	1		10			
Gate Leakage	I <sub>GBS</sub>	V <sub>DB</sub> = V <sub>SB</sub> = 0 V, V <sub>GB</sub> = 30V	0.01		100		100		
Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 μA, V <sub>SB</sub> = 0 V	0.8	0.1	1.5	0.1	1.5	V	
Drain-Source On-Resistance	r <sub>DS(on)</sub>	V <sub>SB</sub> = 0 V I <sub>D</sub> = 1 mA	SD5000 Series V <sub>GS</sub> = 5 V	58		70		70	Ω
			SD5400 Series V <sub>GS</sub> = 5 V	60		75		75	
			V <sub>GS</sub> = 10 V	38					
			V <sub>GS</sub> = 15 V	30					
			V <sub>GS</sub> = 20 V	26					
Resistance Match	Δr <sub>DS(on)</sub>				1		5		5
<b>Dynamic</b>									
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 10 V V <sub>SB</sub> = 0 V I <sub>D</sub> = 20 mA f = 1 kHz	SD5000 Series	12	10		10		mS
			SD5400 Series	11	9		9		
Gate Node Capacitance	C <sub>(GS+GD+GB)</sub>	V <sub>DS</sub> = 10 V f = 1 MHz V <sub>GS</sub> = V <sub>BS</sub> = -15 V	SD5000 Series	2.5		3.5		3.5	pF
Drain Node Capacitance	C <sub>(GD+DB)</sub>			2.0		3		3	
Source Node Capacitance	C <sub>(GS+SB)</sub>			3.7		5		5	
Reverse Transfer Capacitance	C <sub>rss</sub>			0.2		0.5		0.5	
Crosstalk		f = 3 kHz		-107					dB

# Specifications<sup>a</sup>

Parameter	Symbol <sup>b</sup>	Test Conditions <sup>b</sup>	Typ <sup>c</sup>	Limits				Unit
				SD5000 SD5400		SD5001 SD5401		
				Min	Max	Min	Max	
<b>Switching</b>								
Turn-On Time	$t_{d(on)}$	$V_{SB} = 5\text{ V}, V_{IN} 0\text{ to }5\text{ V}, R_G = 25\ \Omega$ $V_{DD} = 5\text{ V}, R_L = 680\ \Omega$	0.5		1		1	ns
	$t_r$		0.6		1		1	
Turn-Off Time	$t_{d(off)}$		2					
	$t_f$		6					

Notes:

a.  $T_A = 25^\circ\text{C}$  unless otherwise noted.

b. B is the body (substrate) and  $V_{(BR)}$  is breakdown.

c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

DMCA