

### 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

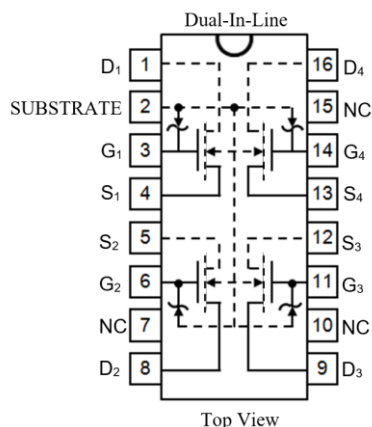
The SD5000/5400 series of monolithic switches features four individual double-diffused enhancement-mode MOSFETs built on a common substrate. These bidirectional devices provide low on-resistance and low interelectrode capacitances to minimize insertion loss and crosstalk.

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

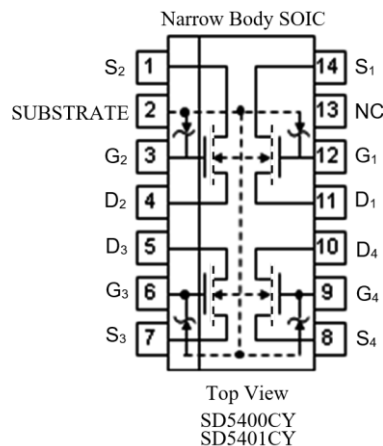
ultra-fast switching speeds. For manufacturing reliability, these devices feature poly-silicon gates protected by Zener diodes

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



# SD5000/5001/5400/5401

## Quad N-Channel Lateral DMOS Switch, Zener Protected

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

Gate-Drain, Gate-Source Voltage (SD5000, SD5400).....	+30V/-25V
(SD5001, SD5401).....	+25V/-15V
Gate-Substrate Voltage (SD5000, SD5400).....	+30V/-0.3V
(SD5001I, SD5401).....	+25V/-0.3V
Drain-Source Voltage (SD5000, SD5400).....	20V
(SD5001I, SD5401).....	10V
Drain-Source-Substrate Voltage (SD5000, SD5400).....	25V
(SD5001I, SD5401).....	15V

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": (Package).....	500 mW
(each Device).....	300 mW

Notes:

- a. SD5000/SD5001I 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> =-5V, I <sub>D</sub> =10nA	30	20		10		V
Source-Drain Breakdown Voltage	V <sub>(BR)SD</sub>	V <sub>GD</sub> =V <sub>BD</sub> =-5V, I <sub>S</sub> =10nA	22	20		10		
Drain-Substrate Breakdown Voltage	V <sub>(BR)DBO</sub>	V <sub>GB</sub> =0 V, I <sub>D</sub> =10μA, Source Open	35	25		15		
Source-Substrate Breakdown Voltage	V <sub>(BR)SBO</sub>	V <sub>GB</sub> =0 V, I <sub>S</sub> =10μA, 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> =0V	0.8		1.5	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>	V <sub>GS</sub> = 5 V	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> = -15V	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

# SD5000/5001/5400/5401

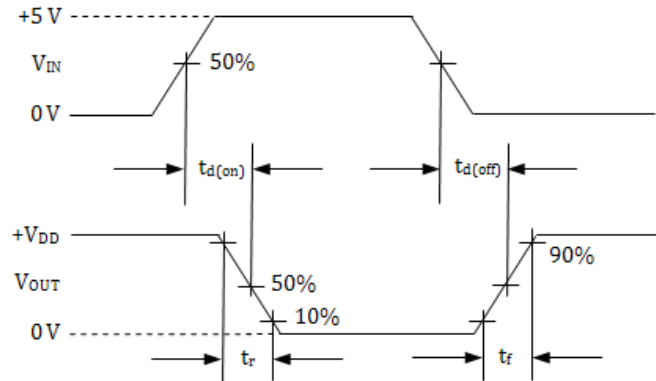
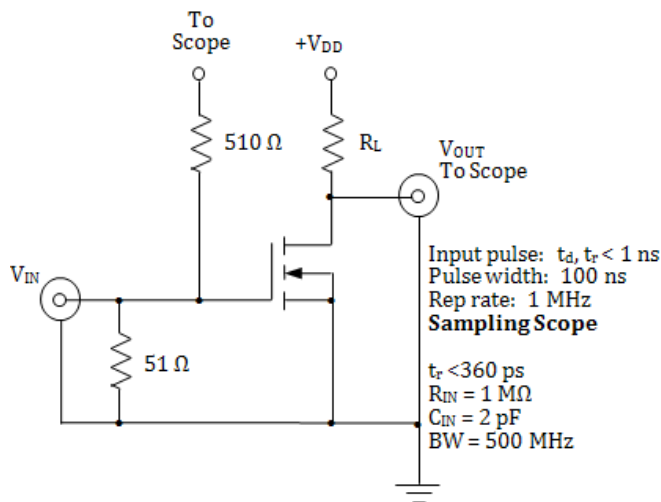
## Quad N-Channel Lateral DMOS Switch, Zener Protected

### 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	$t_{d(on)}$	$V_{SB} = 1-5 V_{in}, V_{GN} 0 \text{ to } 5 V, R_G = 25 \Omega$ $V_{DD} = 5 V, R_L = 680 \Omega$	0.5		1		1	ns
	$t_r$		0.6		1		1	
Turn-Off Time	$t_{d(off)}$		2					
	$t_f$		6					

DMCA

### Switching Time Test Circuit



$V_{IN}$	Switch (On/Off)	$V_{OUT}$
High	On	GND
Low	Off	VDD

### Notes:

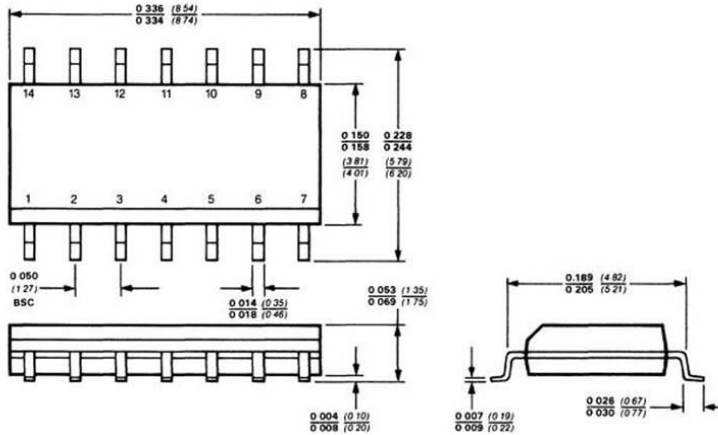
- $T_A = 25^\circ\text{C}$  unless otherwise noted.
- B is the body (substrate) and  $V_{(BR)}$  is breakdown.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Information furnished by Linear Integrated Systems is believed to be accurate and reliable. However, no responsibility is assumed for its use; nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Linear Integrated Systems.

# SD5000/5001/5400/5401

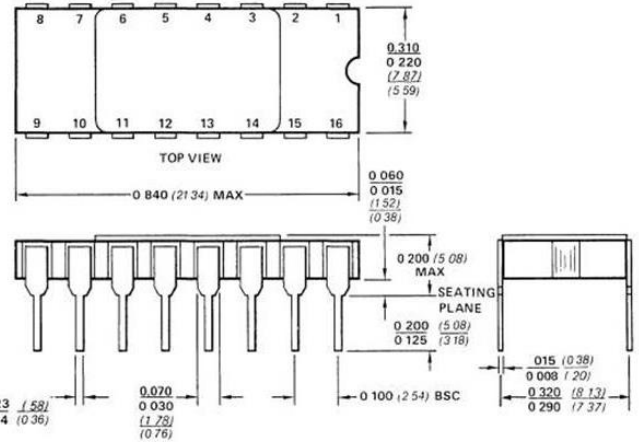
## Quad N-Channel Lateral DMOS Switch, Zener Protected

### Package Dimensions:

SOIC 14 Lead Narrow Body Plastic Package



S/B (Side Braze) DIP 16 Lead Dual In Line Package



### Ordering Information:

Standard Part Call-Out
SD5000N PDIP 16L RoHS
SD5001N PDIP 16L RoHS
SD5000I S/B DIP 16L RoHS
SD5400CY SOIC 14L RoHS
SD5401CY SOIC 14L RoHS
Custom Part Call-Out (Custom Parts Include SEL + 4 Digit Numeric Code)
SD5000N PDIP 16L RoHS SELXXXX
SD5001N PDIP 16L RoHS SELXXXX
SD5000I S/B DIP 16L RoHS SELXXXX
SD5400CY SOIC 14L RoHS SELXXXX
SD5401CY SOIC 14L RoHS SELXXXX

PDIP 16 Lead Dual In Line Plastic Package

