

Product Summary

| Part Number | V _{(BR)DS} Min (V) | V _{GS(th)} Max (V) | r _{DS(on)} Max (Ω) | C _{rss} Max (pF) | t _{ON} Max (ns) |
|-------------|-----------------------------|-----------------------------|-----------------------------|---------------------------|--------------------------|
| SD5000I | 20 | 1.5 | 70 @ V _{GS} = 5 V | 0.5 | 2 |
| SD5000N | 20 | 1.5 | 70 @ V _{GS} = 5 V | 0.5 | 2 |
| SD5001N | 10 | 1.5 | 70 @ V _{GS} = 5 V | 0.5 | 2 |
| SD5400CY | 20 | 1.5 | 75 @ V _{GS} = 5 V | 0.5 | 2 |
| SD5401CY | 10 | 1.5 | 75 @ V _{GS} = 5 V | 0.5 | 2 |

Features

- Quad SPST Switch with Zener Input Protection
- Low Interelectrode Capacitance and Leakage
- Ultra-High Speed Switching—t_{ON}: 1 ns
- Ultra-Low Reverse Capacitance: 0.2 pF
- Low Guaranteed r_{DS} @ 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

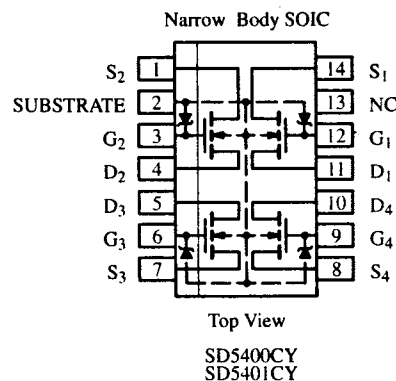
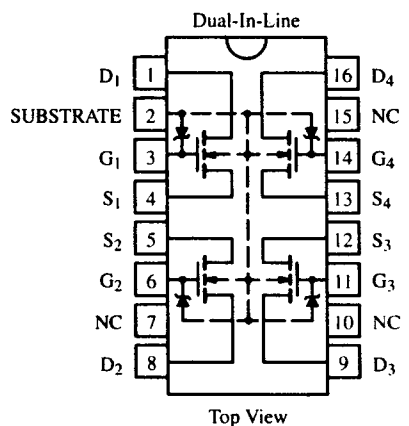
The SD5000/5400 series of monolithic switches features four individual double-diffused enhancement-mode MOSFETs built on a common substrate. These bidirectional devices provide low on-resistance and low interelectrode capacitances to minimize insertion loss and crosstalk.

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.



Absolute Maximum Ratings (T_A = 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 ^{a, b} : (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^a

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

Specifications^a

| Parameter | Symbol ^b | Test Conditions ^b | Typ ^c | Limits | | | | Unit |
|------------------|---------------------|--|------------------|------------------|-----|------------------|-----|------|
| | | | | SD5000 SD5400 | | SD5001 SD5401 | | |
| | | | | Min | Max | Min | Max | |
| Switching | | | | | | | | |
| 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