

**SD211 / SD213 / SD215**

**FEATURES**

- High Input to Output Isolation ..... 120dB
- Low On Resistance ..... 30 Ohm
- Low Feedthrough and Feedback Transients
- Low Capacitance:
  - Input (Gate)..... 2.4pF typ.
  - Output..... 1.3pF typ.
  - Feedback ..... 0.3pF typ.
- Built-in Protection Diode from Gate to Substrate

**APPLICATIONS**

**SD211:**

- Analog Switch Driver

**SD213 and SD215:**

- Analog Switches
- High-Speed Digital Switches
- Multiplexers
- A to D Converters
- D to A Converters
- Choppers
- Sample & Hold

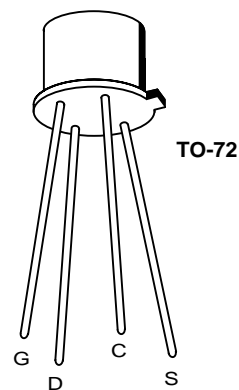
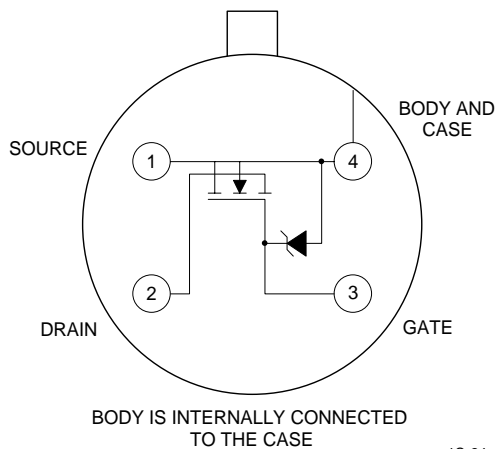
**DESCRIPTION**

The Calogic SD211 is a 30V analog switch driver with built-in protection diode from gate to substrate. The SD211 is used with SD213 and SD215 DMOS analog switches.

**ORDERING INFORMATION**

| Part    | Package                  | Temperature Range |
|---------|--------------------------|-------------------|
| SD211E  | Hermetic TO-72 Package   | -55°C to +125°C   |
| XSS211  | Sorted Chips in Carriers | -55°C to +125°C   |
| SD213DE | Hermetic TO-72 Package   | -55°C to +125°C   |
| XSD213  | Sorted Chips in Carriers | -55°C to +125°C   |
| SD215DE | Hermetic TO-72 Package   | -55°C to +125°C   |
| XSD215  | Sorted Chips in Carriers | -55°C to +125°C   |

**SCHEMATIC DIAGRAM (Top View)**



CD1-1

## ABSOLUTE MAXIMUM RATINGS

Drain Current . . . . . 50mA  
 Total Device Dissipation at 25°C Case Temperature . . . 1.2W  
 Storage Temperature . . . . . -65°C to +200°C  
 Lead Temperature (1/16" from case for 10 sec.) . . . . . 300°C  
 Operating Temperature Range . . . . . -55°C to +125°C

| PARAMETER       |                 | SD211       | SD212       | SD215       | UNIT            |
|-----------------|-----------------|-------------|-------------|-------------|-----------------|
| V <sub>DS</sub> | Drain-to-Source | +30         | +10         | +20         | V <sub>dc</sub> |
| V <sub>SD</sub> | Source-to-Drain | +10         | +10         | +20         | V <sub>dc</sub> |
| V <sub>DB</sub> | Drain-to-Body   | +30         | +15         | +25         | V <sub>dc</sub> |
| V <sub>SB</sub> | Source-to-Body  | +15         | +15         | +25         | V <sub>dc</sub> |
| V <sub>GS</sub> | Gate-to-Source  | -15<br>+25  | -15<br>+25  | -25<br>+30  | V <sub>dc</sub> |
| V <sub>GB</sub> | Gate-to-Body    | -0.3<br>+25 | -0.3<br>+25 | -0.3<br>+30 | V <sub>dc</sub> |
| V <sub>GD</sub> | Gate-to-Drain   | -30<br>+25  | -15<br>+25  | -25<br>+30  | V <sub>dc</sub> |

## DC CHARACTERISTICS (T<sub>A</sub> = 25°C, unless otherwise specified)

| SYMBOL                   | PARAMETER                  | SD211 |     |     | SD213 |     |     | SD215 |     |     | UNITS | TEST CONDITIONS   |
|--------------------------|----------------------------|-------|-----|-----|-------|-----|-----|-------|-----|-----|-------|---|
|                          |                            | MIN   | TYP | MAX | MIN   | TYP | MAX | MIN   | TYP | MAX |       |   |
| <b>BREAKDOWN VOLTAGE</b> |                            |       |     |     |       |     |     |       |     |     |       |   |
| BV <sub>DS</sub>         | Drain-to-Source            | 30    | 35  |     |       |     |     |       |     |     | V     | V <sub>GS</sub> = V <sub>BS</sub> = 0V, I <sub>D</sub> = 10μA                                   |
|                          |                            | 10    | 25  |     | 10    | 25  |     | 20    | 25  |     |       | V <sub>GS</sub> = V <sub>BS</sub> = -5V, I <sub>S</sub> = 10nA                                  |
| BV <sub>SD</sub>         | Source-to Drain            | 10    |     |     | 10    |     |     | 20    |     |     |       | V <sub>GD</sub> = V <sub>BD</sub> = -5V, I <sub>D</sub> = 10nA                                  |
| BV <sub>DB</sub>         | Drain-to-Body              | 15    |     |     | 15    |     |     | 25    |     |     |       | V <sub>GB</sub> = 0V, source OPEN, I <sub>D</sub> = 10nA  |
| BV <sub>SB</sub>         | Source-to-Body             | 15    |     |     | 15    |     |     | 25    |     |     |       | V <sub>GB</sub> = 0V, drain OPEN, I <sub>S</sub> = 10μA   |
| <b>LEAKAGE CURRENT</b>   |                            |       |     |     |       |     |     |       |     |     |       |   |
| I <sub>DS</sub> (OFF)    | Drain-to-Source            |       | 1   | 10  |       | 1   | 10  |       |     |     | nA    | V <sub>GS</sub> = V <sub>BS</sub> = -5V, V <sub>DS</sub> = +10V                                 |
|                          |                            |       |     |     |       |     |     |       | 1   | 10  |       | V <sub>GS</sub> = V <sub>BS</sub> = -5V, V <sub>DS</sub> = +20V                                 |
| I <sub>SD</sub> (OFF)    | Source-to-Drain            |       | 1   | 10  |       | 1   | 10  |       |     |     |       | V <sub>GS</sub> = V <sub>BD</sub> = -5V, V <sub>SD</sub> = +10V                                 |
|                          |                            |       |     |     |       |     |     |       | 1   | 10  |       | V <sub>GS</sub> = V <sub>BD</sub> = -5V, V <sub>SD</sub> = +20V                                 |
| I <sub>GBS</sub>         | Gate                       |       |     | 10  |       |     | 10  |       |     | 10  |       | V <sub>DB</sub> = V <sub>SB</sub> = 0V, V <sub>GS</sub> = ±40V                                  |
| V <sub>T</sub>           | Threshold Voltage          | 0.5   | 1.0 | 2.0 | 0.1   | 1.0 | 2.0 | 0.1   | 1.0 | 2.0 | V     | V <sub>DS</sub> = V <sub>GS</sub> = V <sub>T</sub> , I <sub>S</sub> = 1μA, V <sub>SB</sub> = 0V |
| r <sub>DS</sub> (ON)     | Drain-to-Source Resistance |       | 50  | 70  |       | 50  | 70  |       | 50  | 70  | Ω     | I <sub>D</sub> = 1.0mA, V <sub>SB</sub> = 0, V <sub>GS</sub> = +5V                              |
|                          |                            |       | 30  | 45  |       | 30  | 45  |       | 30  | 45  |       | I <sub>D</sub> = 1.0mA, V <sub>SB</sub> = 0, V <sub>GS</sub> = +10V                             |
|                          |                            |       | 23  |     |       | 23  |     |       | 23  |     |       | I <sub>D</sub> = 1.0mA, V <sub>SB</sub> = 0, V <sub>GS</sub> = +15V                             |
|                          |                            |       | 19  |     |       | 19  |     |       | 19  |     |       | I <sub>D</sub> = 1.0mA, V <sub>SB</sub> = 0, V <sub>GS</sub> = +20V                             |
|                          |                            |       |     |     |       |     |     |       |     | 17  |       |   |

## AC ELECTRICAL CHARACTERISTICS

| SYMBOL                           | PARAMETER                | SD211 |     |     | SD213 |     |     | SD215 |     |     | UNITS | TEST CONDITIONS  |
|----------------------------------|--------------------------|-------|-----|-----|-------|-----|-----|-------|-----|-----|-------|--|
|                                  |                          | MIN   | TYP | MAX | MIN   | TYP | MAX | MIN   | TYP | MAX |       |  |
| g <sub>fs</sub>                  | Forward Transconductance | 10    | 15  |     | 10    | 15  |     | 10    | 15  |     | ms    | V <sub>DS</sub> = 10V, V <sub>SB</sub> = 0V, I <sub>D</sub> = 20mA, f = 1kHz |
| <b>SMALL SIGNAL CAPACITANCES</b> |                          |       |     |     |       |     |     |       |     |     |       |  |
| C <sub>ISS</sub>                 | Gate Node                |       | 2.4 | 3.5 |       | 2.4 | 3.5 |       | 2.4 | 3.5 | pF    | V <sub>DS</sub> = 10V, f = 1MHz<br>V <sub>GS</sub> = V <sub>BS</sub> = -15V  |
| C <sub>OSS</sub>                 | Drain Node               |       | 1.3 | 1.5 |       | 1.3 | 1.5 |       | 1.3 | 1.5 |       |  |
| C <sub>RSS</sub>                 | Source Node              |       | 0.3 | 0.5 |       | 0.3 | 0.5 |       | 0.3 | 0.5 |       |  |

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