



# High-Speed Analog N-Channel DMOS FETs

## SD210 / SD212 / SD214

### 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.
- No protection Diode from Gate to Substrate for Very High Impedance Applications
- Maximum Gate Voltage .....  $\pm 40V$

### APPLICATIONS

#### SD210:

- Analog Switch Driver

#### SD212 and SD214:

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

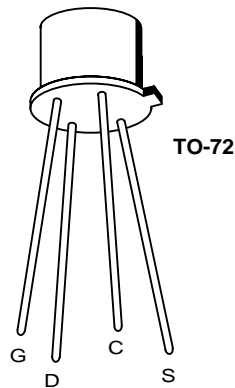
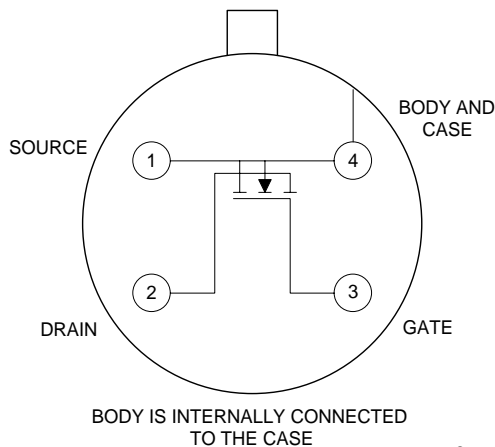
### DESCRIPTION

The Calogic SD210 is a 30V analog switch driver without a built-in protection diode from gate to substrate for use with SD212 and SD214 DMOS analog switches.

### ORDERING INFORMATION

Part	Package	Temperature Range
SD210E	Hermetic TO-72 Package	-55°C to +125°C
XSS210	Sorted Chips in Carriers	-55°C to +125°C
SD212DE	Hermetic TO-72 Package	-55°C to +125°C
XSD212	Sorted Chips in Carriers	-55°C to +125°C
SD214DE	Hermetic TO-72 Package	-55°C to +125°C
XSD214	Sorted Chips in Carriers	-55°C to +125°C

### SCHEMATIC DIAGRAM (Top View)



CD1-2

**SD210 / SD212 / SD214****ABSOLUTE MAXIMUM RATINGS**

Drain Current . . . . . 50mA  
 Total Device Dissipation at 25°C Case Temperature . . . 1.2W  
 Storage Temperature Range . . . . . -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	SD210	SD212	SD214	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	±40	±40	±40	V <sub>dc</sub>
V <sub>GB</sub>	Gate-to-Body	±40	±40	±40	V <sub>dc</sub>
V <sub>GD</sub>	Gate-to-Drain	±40	±40	±40	V <sub>dc</sub>

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

SYMBOL	PARAMETER	SD210			SD212			SD214			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			0.1			0.1			0.1		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			17			17			I <sub>D</sub> = 1.0mA, V <sub>SB</sub> = 0, V <sub>GS</sub> = +25V

**AC ELECTRICAL CHARACTERISTICS**

SYMBOL	PARAMETER	SD210			SD212			SD214			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>(GS+GD+GB)</sub>	Gate Node		2.4	3.5		2.4	3.5		2.4	3.5	pF	V <sub>DS</sub> = 10V, f = 1MHz V <sub>GS</sub> = V <sub>BS</sub> = -15V
C <sub>(GD+DB)</sub>	Drain Node		1.3	1.5		1.3	1.5		1.3	1.5		
C <sub>(GS+SB)</sub>	Source Node		3.5	5.5		3.5	5.5		3.5	5.5		
C <sub>DG</sub>	Reverse Transfer		0.3	0.5		0.3	0.5		0.3	0.5		

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