

# SD210DE/214DE

## N-Channel Lateral DMOS FETs

### 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)
SD210DE	30	1.5	45 @ V <sub>GS</sub> = 10 V	0.5	2
SD214DE	20	1.5	45 @ V <sub>GS</sub> = 10 V	0.5	2

### Features

- 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
- N-Channel Enhancement Mode

### Benefits

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

### Applications

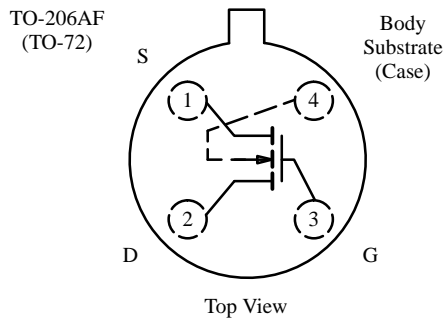
- Fast Analog Switch
- Fast Sample-and-Holds
- Pixel-Rate Switching
- DAC Deglitchers
- High-Speed Driver

### Description

The SD210DE/214DE are enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency applications. The SD214DE is normally used for ±10-V analog switching. These MOSFETs utilize lateral construction to achieve low capacitance and ultra-fast switching speeds. These MOSFETs do not have a gate protection Zener diode

which results in lower gate leakage and ± voltage capability from gate to substrate. A poly-silicon gate is featured for manufacturing reliability.

For similar products see: quad array—SD5000/5400 series, and Zener protected—SD211DE/SST211 series.



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

Gate-Drain, Gate-Source Voltage	±40 V	Source-Substrate Voltage (SD210DE)	15 V
Gate-Substrate Voltage	±30 V	(SD214DE)	25 V
Drain-Source Voltage (SD210DE)	30 V	Drain Current	50 mA
(SD214DE)	20 V	Lead Temperature (1/16" from case for 10 seconds)	300°C
Source-Drain Voltage (SD210DE)	10 V	Storage Temperature	-65 to 150°C
(SD214DE)	20 V	Operating Junction Temperature	-55 to 125°C
Drain-Substrate Voltage (SD210DE)	30 V	Power Dissipation <sup>a</sup>	300 mW
(SD214DE)	25 V	Notes:	
		a. Derate 3 mW/°C above 25°C	

Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70294. Applications information may also be obtained via FaxBack, request document #70607.

# SD210DE/214DE

## Specifications<sup>a</sup>

Parameter	Symbol <sup>b</sup>	Test Conditions <sup>b</sup>	Typ <sup>c</sup>	Limits				Unit	
				SD210DE		SD214DE			
				Min	Max	Min	Max		
<b>Static</b>									
Drain-Source Breakdown Voltage	$V_{(BR)DS}$	$V_{GS} = V_{BS} = 0\text{ V}, I_D = 10\text{ }\mu\text{A}$	35	30				V	
		$V_{GS} = V_{BS} = -5\text{ V}, I_D = 10\text{ nA}$	30	10		20			
Source-Drain Breakdown Voltage	$V_{(BR)SD}$	$V_{GD} = V_{BD} = -5\text{ V}, I_S = 10\text{ nA}$	22	10		20			
Drain-Substrate Breakdown Voltage	$V_{(BR)DBO}$	$V_{GB} = 0\text{ V}, I_D = 10\text{ nA},$ Source Open	35	15		25			
Source-Substrate Breakdown Voltage	$V_{(BR)SBO}$	$V_{GB} = 0\text{ V}, I_S = 10\text{ }\mu\text{A},$ Drain Open	35	15		25			
Drain-Source Leakage	$I_{DS(off)}$	$V_{GS} = V_{BS} = -5\text{ V}$	$V_{DS} = 10\text{ V}$	0.4		10		nA	
			$V_{DS} = 20\text{ V}$	0.9			10		
Source-Drain Leakage	$I_{SD(off)}$	$V_{GD} = V_{BD} = -5\text{ V}$	$V_{SD} = 10\text{ V}$	0.5		10			
			$V_{SD} = 20\text{ V}$	0.8			10		
Gate Leakage	$I_{GBS}$	$V_{DB} = V_{SB} = 0\text{ V}, V_{GB} = \pm 40\text{ V}$	0.001		0.1		0.1		
Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\text{ }\mu\text{A}, V_{SB} = 0\text{ V}$	0.8	0.5	1.5	0.1	1.5	V	
Drain-Source On-Resistance	$r_{DS(on)}$	$V_{SB} = 0\text{ V}$ $I_D = 1\text{ mA}$	$V_{GS} = 5\text{ V}$	58		70		70	$\Omega$
			$V_{GS} = 10\text{ V}$	38		45		45	
			$V_{GS} = 15\text{ V}$	30					
			$V_{GS} = 20\text{ V}$	26					
			$V_{GS} = 25\text{ V}$	24					
<b>Dynamic</b>									
Forward Transconductance	$g_{fs}$	$V_{DS} = 10\text{ V}, V_{SB} = 0\text{ V}, I_D = 20\text{ mA}$ $f = 1\text{ kHz}$	11	10		10		mS	
	$g_{os}$		0.9						
Gate Node Capacitance	$C_{(GS+GD+GB)}$	$V_{DS} = 10\text{ V}, f = 1\text{ MHz}$ $V_{GS} = V_{BS} = -15\text{ V}$	2.5		3.5		3.5	pF	
Drain Node Capacitance	$C_{(GD+DB)}$		1.1		1.5		1.5		
Source Node Capacitance	$C_{(GS+SB)}$		3.7		5.5		5.5		
Reverse Transfer Capacitance	$C_{rss}$		0.2		0.5		0.5		
<b>Switching</b>									
Turn-On Time	$t_{d(on)}$	$V_{SB} = 0\text{ V}, V_{IN} 0\text{ to }5\text{ V}, R_G = 25\text{ }\Omega$ $V_{DD} = 5\text{ V}, R_L = 680\text{ }\Omega$	0.5		1		1	ns	
	$t_r$		0.6		1		1		
Turn-Off Time	$t_{d(off)}$		2						
	$t_f$		6						

Notes:

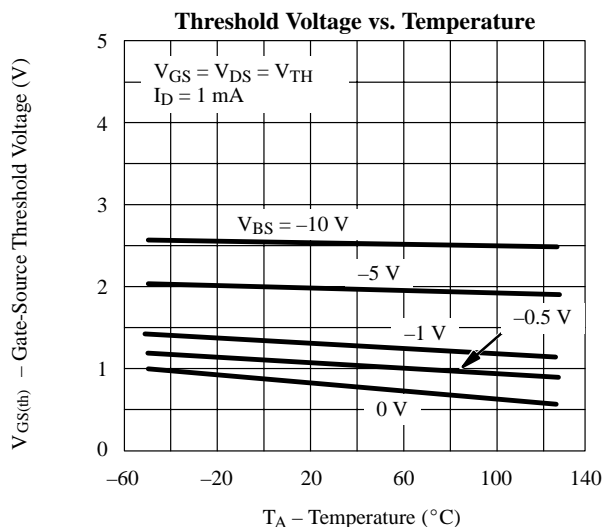
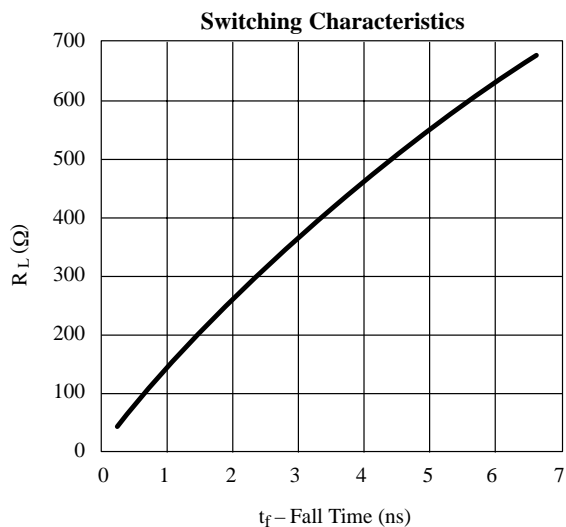
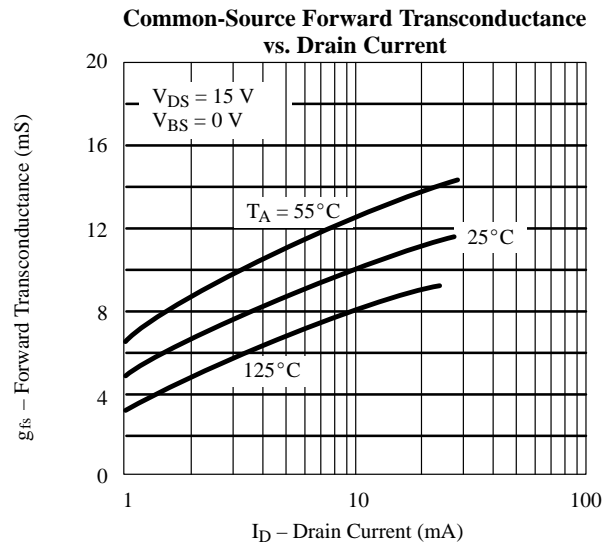
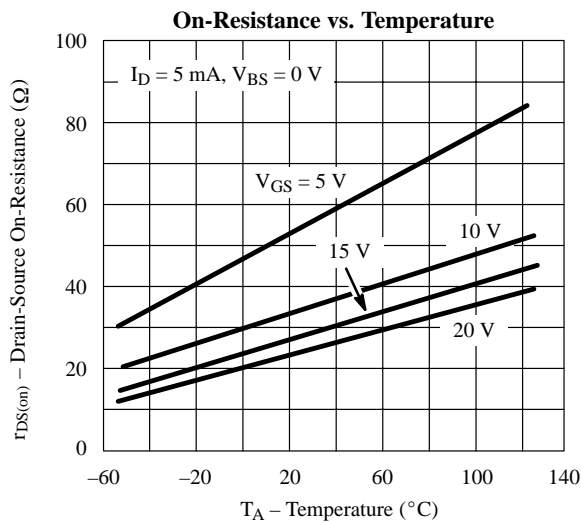
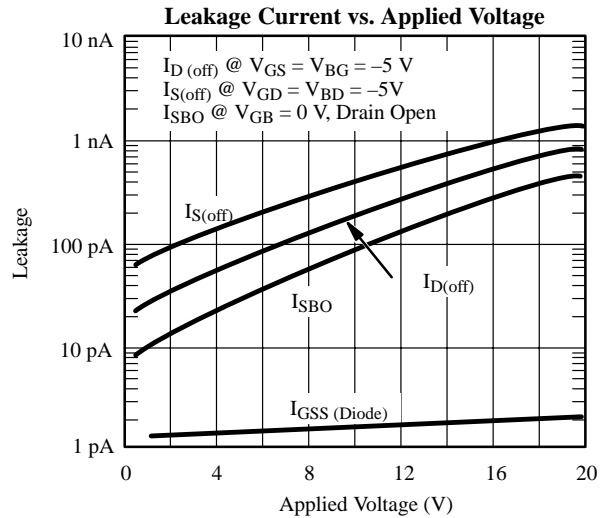
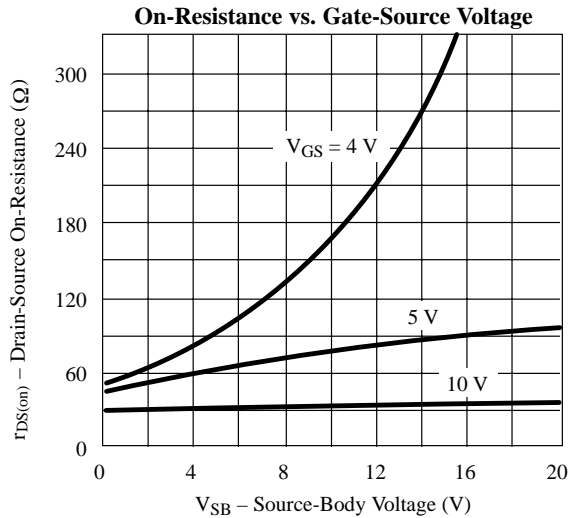
a.  $T_A = 25^\circ\text{C}$  unless otherwise noted.

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.

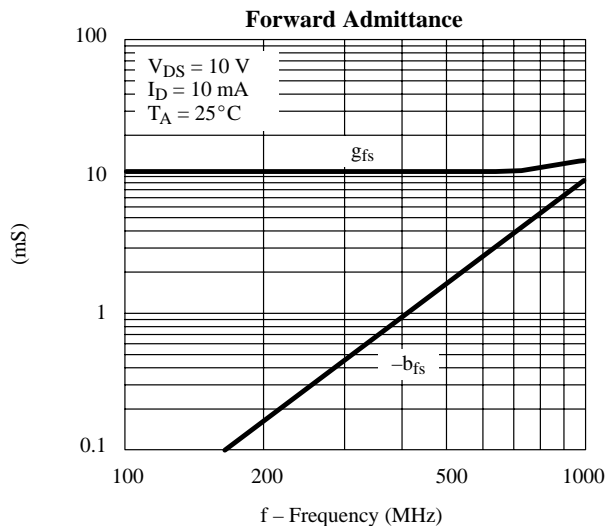
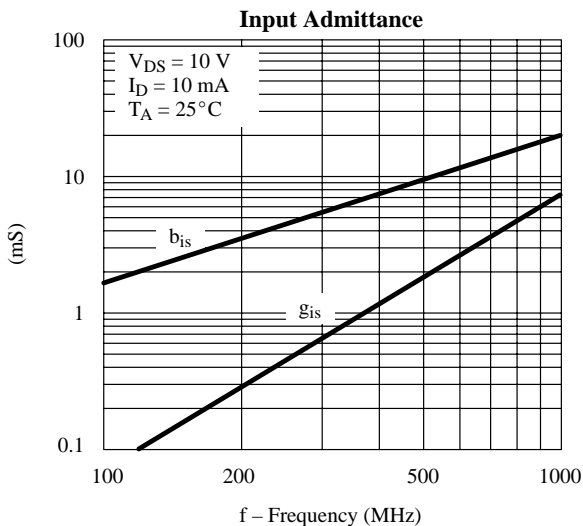
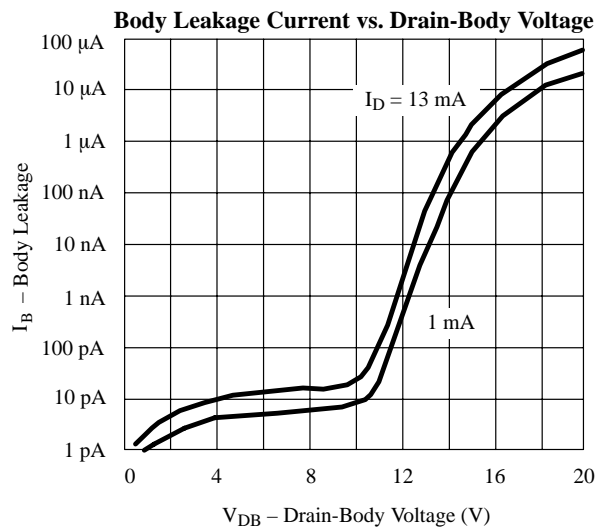
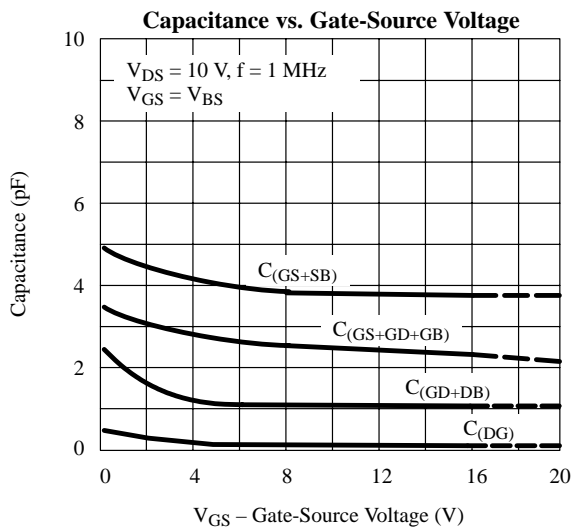
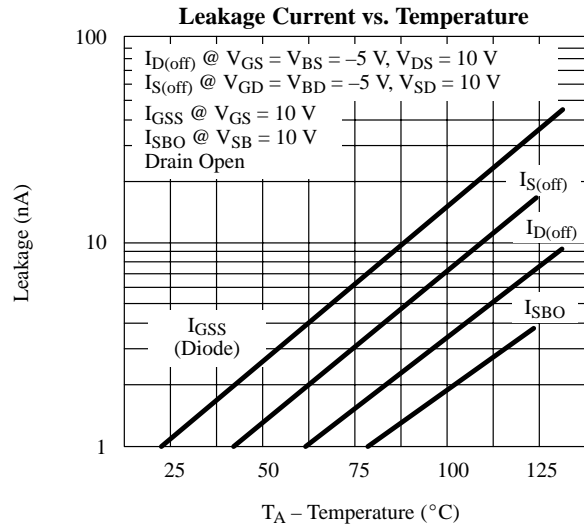
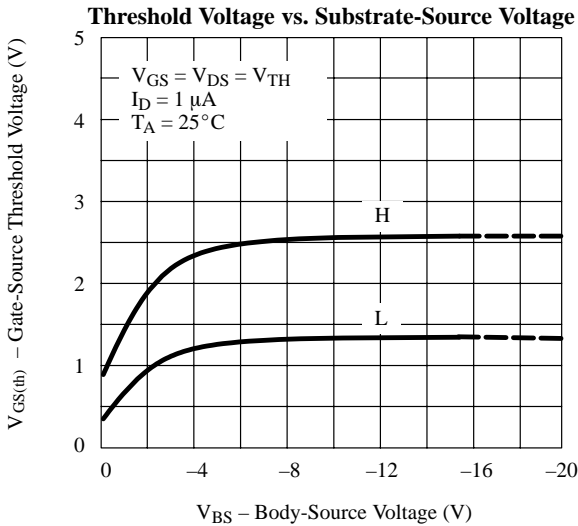
DMCBB

## Typical Characteristics

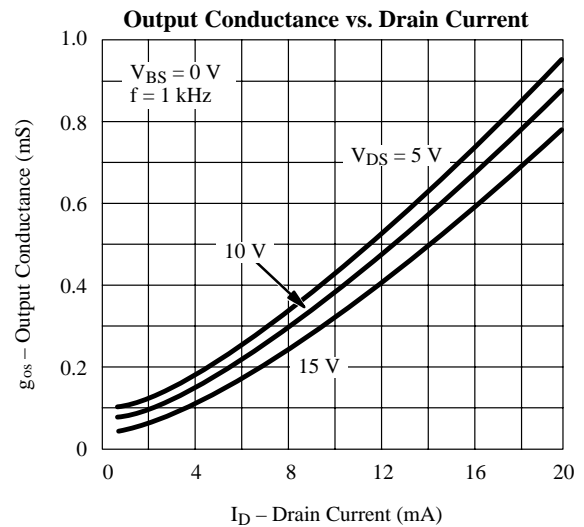
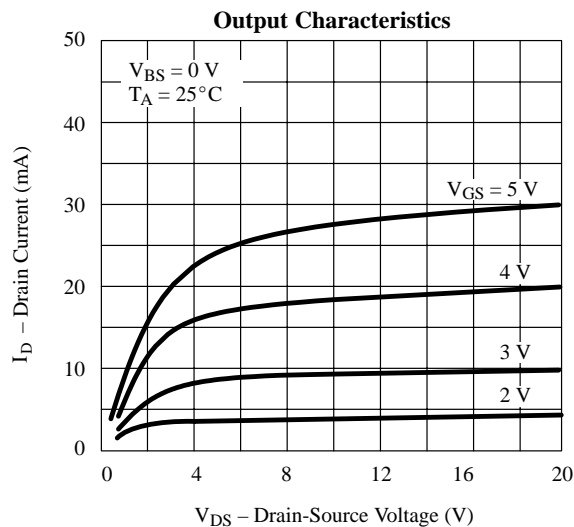
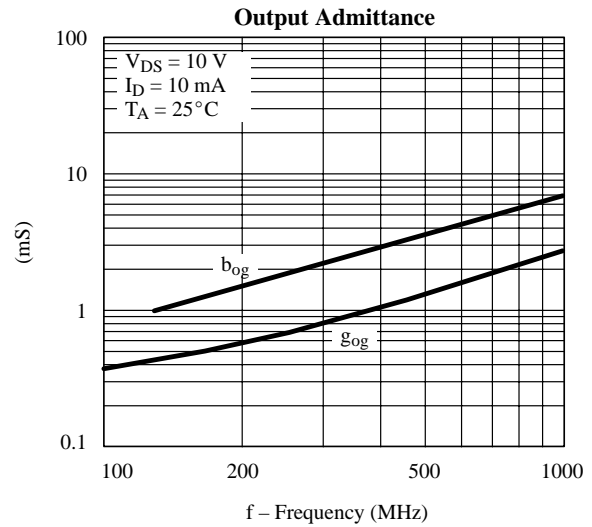
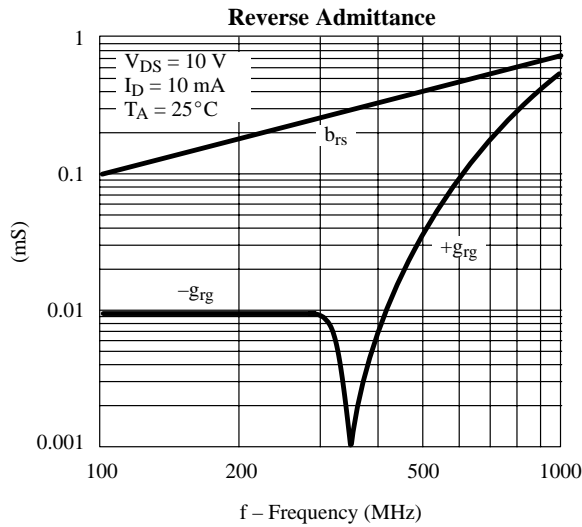


# SD210DE/214DE

## Typical Characteristics (Cont'd)



## Typical Characteristics



## Switching Time Test Circuit

