LINEAR SYSTEMS

Twenty-Five Years Of Quality Through Innovation

SD210DE/214DE

N-CHANNEL LATERAL DMOS SWITCH

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)
SD210DE	30	1.5	45 @ V_{GS}=10V	0.5	2
SD214DE	20	1.5	45 @ V_{GS}=10V	0.5	2

Features
- Ultra-High Speed Switching—t_{ON}: 1ns
- Ultra-Low Reverse Capacitance: 0.2pF
- Low Guaranteed r_{DS} @5V
- 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

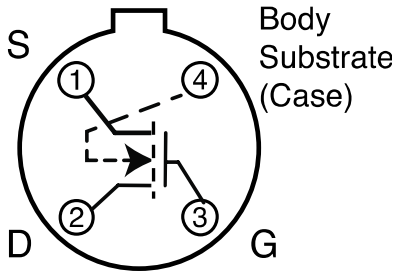
Applications
- Fast Analog Switch
- Fast Sample-and-Holds
- Pixel-Rate Switching
- DAC Deglitchers
- High-Speed Driver

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 a ±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.

TOP VIEW

TO-206AF
(TO-72)



Absolute Maximum Ratings (T_A = 25°C unless otherwise noted)

Gate-Drain, Gate-Source Voltage	± 40V	Source-Substrate Voltage	(SD210DE) 15V
Gate-Substrate Voltage	± 30V		(SD210DE) 25V
Drain-Source Voltage	(SD210DE) 30V	Drain Current	. . . . . .50mA
	(SD214DE) 20V	Lead Temperature (1/16" from ease for 10 seconds)	. . . . . 300°C
Source-Drain Voltage	(SD210DE) 10V	Storage Temperature	. . . . . -65 to 150°C
	(SD214DE) 20V	Operating Junction Temperature	. . . . . -55 to 125°C
Drain-Substrate Voltage	(SD210DE) 30V	Power Dissipation*	. . . . . .300mW
	(SD214DE) 25V		

Note:
* Derate 3mW/°C above 25°C

Specifications[a]

PARAMETER	SYMBOL[b]	TEST CONDITIONS[b]		TYP[c]	LIMITS SD210DE Min	LIMITS SD210DE Max	LIMITS SD214DE Min	LIMITS SD214DE Max	UNIT
Static									
Drain - Source Breakdown Voltage	$V_{(BR)DS}$	V_{GS} = V_{BS} = 0V, I_D = 10 µA		35	30				V
		V_{GS} = V_{BS} = -5V, I_D = 10 nA		30	10		20		
Source - Drain Breakdown Voltage	$V_{(BR)SD}$	V_{GD} = V_{BD} = -5V, I_S = 10 nA		22	10		20		
Drain - Substrate Breakdown Voltage	$V_{(BR)DBO}$	V_{GB} = 0V, I_D= 10 nA Source Open		35	15		25		
Source - Substrate Breakdown Voltage	$V_{(BR)SBO}$	V_{GB} = 0V, I_s = 10 µA Drain Open		35	15		25		
Drain – Source Leakage	$I_{DS(off)}$	V_{GS} = V_{BS} = -5V	V_{DS} = 10V	0.4		10			nA
			V_{DS} = 20V	0.9				10	
Source - Drain Leakage	$I_{SD(off)}$	V_{GD} = V_{BD} = -5V	V_{SD} = 10V	0.5		10			
			V_{SD} = 20V	0.8				10	
Gate Leakage	I_{GBS}	V_{DB} = V_{SB} = 0V, V_{GB} = ±4 0V		0.001		0.1		0.1	
Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 µA , V_{SB} = 0V		0.8	0.5	1.5	0.1	1.5	V
Drain – Source On-Resistance	$r_{DS(on)}$	V_{SB} = 0V I_D = 1mA	V_{GS} = 5V	58		70		70	Ω
			V_{GS} = 10V	38		45		45	
			V_{GS} = 15V	30					
			V_{GS} = 20V	26					
			V_{GS} = 25V	24					

Specifications[a]

PARAMETER	SYMBOL[b]	TEST CONDITIONS[b]	TYP[c]	LIMITS				UNIT
				SD210DE		SD214DE		
				Min	Max	Min	Max	
Dynamic								
Forward Transconductance	g_{fs}	V_{DS} = 10V, V_{SB} = 0V, I_D = 20mA, f = 1kHz	11	10		10		mS
	g_{os}		0.9					
Gate Node Capacitance	$C_{(GS+GD+GB)}$	V_{DS} = 10V, f = 1MHz V_{GS} = V_{BS} = -15V	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	
Switching								
Turn-On Time	$t_{D(on)}$	V_{SB} = 0V, V_{IN}0 to 5V, R_G = 25Ω V_{DD} = 5V, R_L = 680Ω	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°C unless otherwise noted.

b. B is the body (substrate) and $V_{(BR)}$ is breakdown voltage.

c. Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

Linear Integrated Systems (LIS) is a 25-year-old, third-generation precision semiconductor company providing high-quality discrete components. Expertise brought to LIS is based on processes and products developed at Amelco, Union Carbide, Intersil and Micro Power Systems by company President John H. Hall. Hall, a protégé of Silicon Valley legend Dr. Jean Hoerni, was the director of IC Development at Union Carbide, co-founder and vice president of R&D at Intersil, and founder/president of Micro Power Systems.