



N-Channel Lateral DMOS FETs (Available Only In Extended Hi-Rel Flow)

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)
SD211DE-2	30	1.5	45 @ V _{GS} = 10 V	0.5	2
SD213DE-2	10	1.5	45 @ V _{GS} = 10 V	0.5	2
SD215DE-2	20	1.5	45 @ V _{GS} = 10 V	0.5	2

FEATURES

- 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
- 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

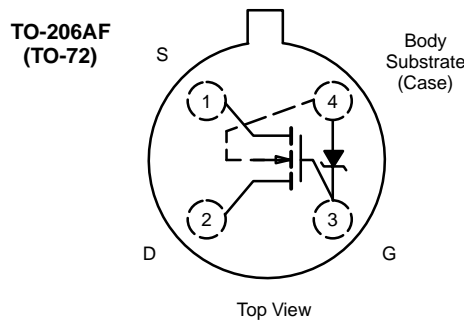
- Fast Analog Switch
- Fast Sample-and-Holds
- Pixel-Rate Switching
- DAC Deglitchers
- High-Speed Driver

DESCRIPTION

The SD211DE-2 series consists of enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency applications. The SD211DE-2 may be used for ±5-V analog switching or as a high speed driver of the SD214DE-2. The SD214DE-2 is normally used for ±10-V analog switching. These MOSFETs utilize lateral construction to achieve low capacitance and ultra-fast switching speeds. An integrated Zener diode

provides ESD protection. These devices feature a poly-silicon gate for manufacturing reliability.

The SD211DE/213DE/215DE are available only in the “-2” extended hi-rel flow. The Vishay Siliconix “-2” flow complies with the requirements of MIL-PRF-19500 for JANTX discrete devices.



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C UNLESS OTHERWISE NOTED)

Gate-Drain, Gate-Source Voltage (SD211DE-2)	-30/25 V	Drain-Substrate Voltage (SD211DE-2)	30 V
(SD213DE-2)	-15/25 V	(SD213DE-2)	15 V
(SD215DE-2)	-25/30 V	(SD215DE-2)	25 V
Gate-Substrate Voltage (Derate 3 mW/°C above 25°C)		Source-Substrate Voltage (SD211DE-2)	15 V
(SD211DE-2)	-0.3/25 V	(SD213DE-2)	15 V
(SD213DE-2)	-0.3/25 V	(SD215DE-2)	25 V
(SD215DE-2)	-0.3/30 V	Drain Current	50 mA
Drain-Source Voltage (SD211DE-2)	30 V	Lead Temperature (1/16" from case for 10 seconds)	300°C
(SD213DE-2)	10 V	Storage Temperature	-65 to 150°C
(SD215DE-2)	20 V	Operating Junction Temperature	-55 to 125°C
Source-Drain Voltage (SD211DE-2)	10 V	Power Dissipation (Derate 3 mW/°C above 25°C)	300 mW
(SD213DE-2)	10 V		
(SD215DE-2)	20 V		

Applications Information—See Applications Note AN502

SPECIFICATIONS ^a											
Parameter	Symbol ^b	Test Conditions ^b	Typ ^c	Limits						Unit	
				211DE-2		213 DE-2		215 DE-2			
				Min	Max	Min	Max	Min	Max		
Static											
Drain-Source Breakdown Voltage	$V_{(BR)DS}$	$V_{GS} = V_{BS} = 0\text{ V}, I_D = 10\ \mu\text{A}$	35	30						V	
		$V_{GS} = V_{BS} = -5\text{ V}, I_D = 10\ \text{nA}$	30	10		10		20			
Source-Drain Breakdown Voltage	$V_{(BR)SD}$	$V_{GD} = V_{BD} = -5\text{ V}, I_S = 10\ \text{nA}$	22	10		10		20			
Drain-Substrate Breakdown Voltage	$V_{(BR)DBO}$	$V_{GB} = 0\text{ V}, I_D = 10\ \text{nA}$ Source Open	35	15		15		25			
Source-Substrate Breakdown Voltage	$V_{(BR)SBO}$	$V_{GB} = 0\text{ V}, I_S = 10\ \mu\text{A}$ Drain Open	35	15		15		25			
Drain-Source Leakage	$I_{DS(off)}$	$V_{GS} = V_{BS} = -5\text{ V}$	$V_{DS} = 10\text{ V}$	0.4		10		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		10			
			$V_{SD} = 20\text{ V}$	1					10		
Gate Leakage	I_{GBS}	$V_{DB} = V_{SB} = 0\text{ V}, V_{GB} = 30\text{ V}$	0.01		100		100		100		
Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\ \mu\text{A}, V_{SB} = 0\text{ V}$	0.8	0.5	1.5	0.1	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		70	Ω
			$V_{GS} = 10\text{ V}$	38		45		45		45	
			$V_{GS} = 15\text{ V}$	30							
			$V_{GS} = 20\text{ V}$	26							
			$V_{GS} = 25\text{ V}$	24							
Dynamic											
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		10		mS	
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		3.5	pF	
Drain Node Capacitance	$C_{(GD+DB)}$		1.1		1.5		1.5		1.5		
Source Node Capacitance	$C_{(GS+SB)}$		3.7		5.5		5.5		5.5		
Reverse Transfer Capacitance	C_{rss}		0.2		0.5		0.5		0.5		
Switching											
Turn-On Time	$t_{d(on)}$	$V_{SB} = 0\text{ V}, V_{IN}\ 0\ \text{to}\ 5\text{ V}, R_G = 25\ \Omega$ $V_{DD} = 5\text{ V}, R_L = 680\ \Omega$	0.5		1		1		1	ns	
	t_r		0.6		1		1		1		
Turn-Off Time	$t_{d(off)}$		2								
	t_f		6								

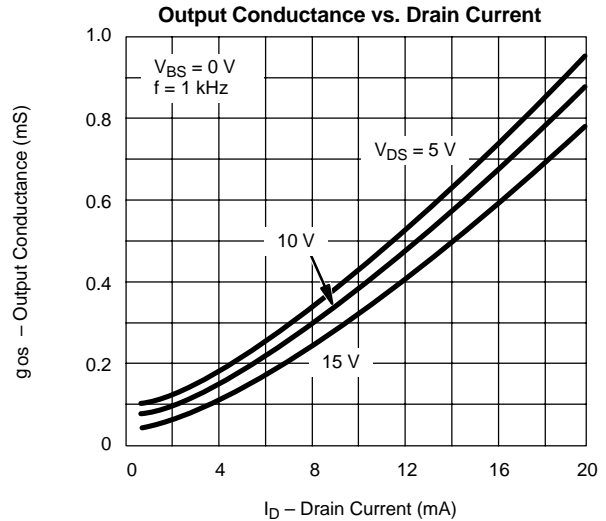
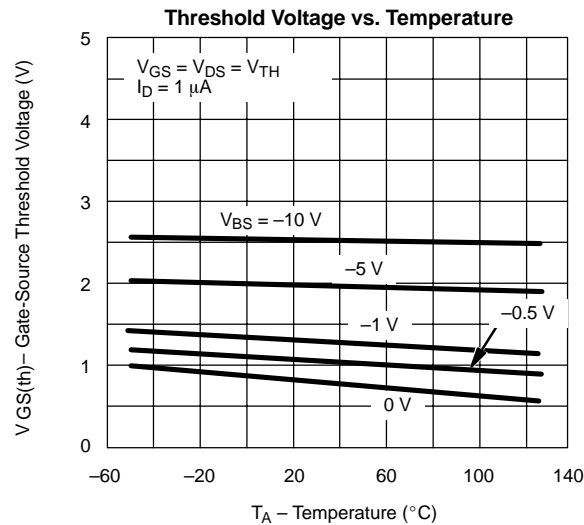
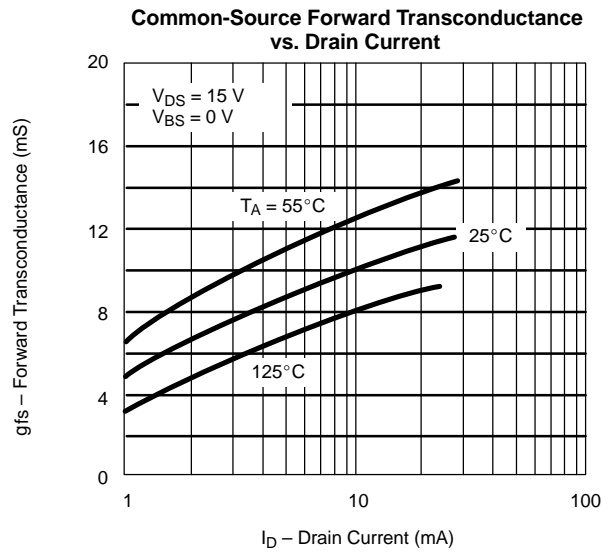
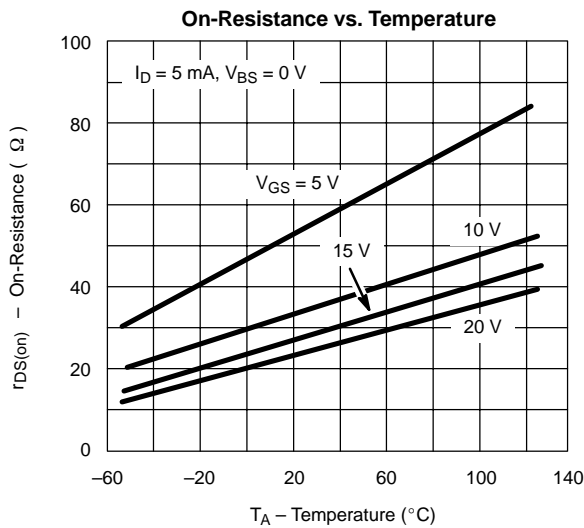
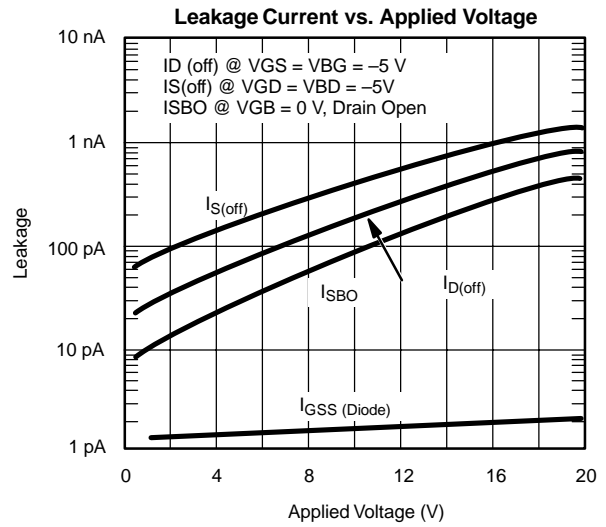
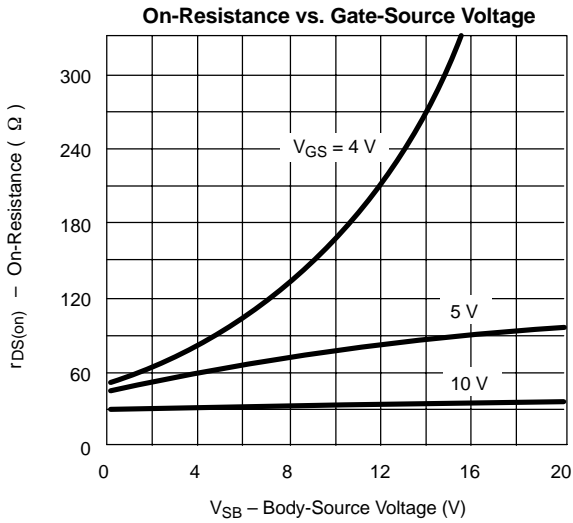
Notes:

- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- B is the body (substrate), and (BR) is breakdown.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

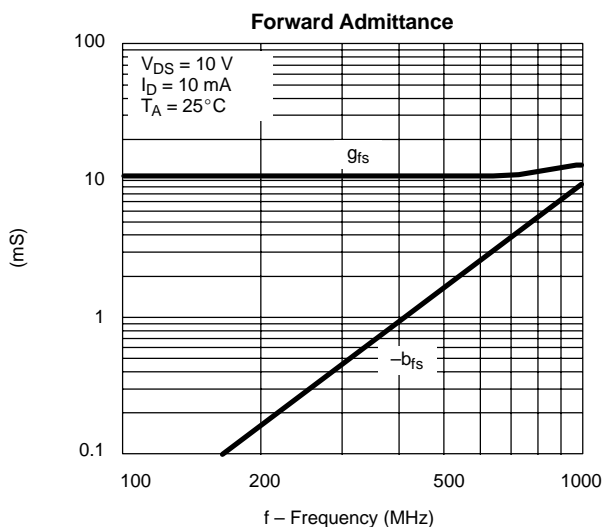
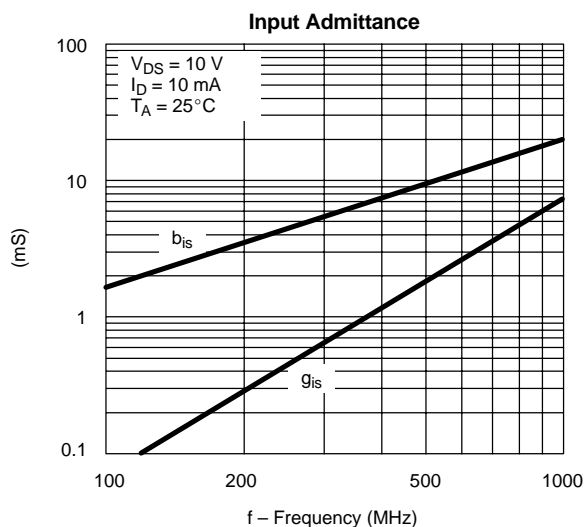
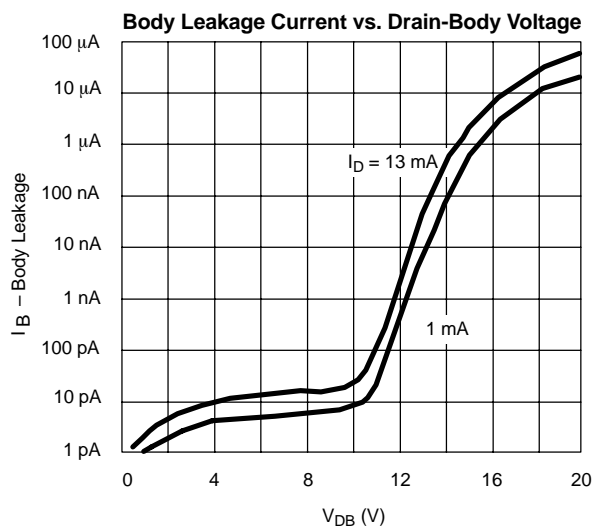
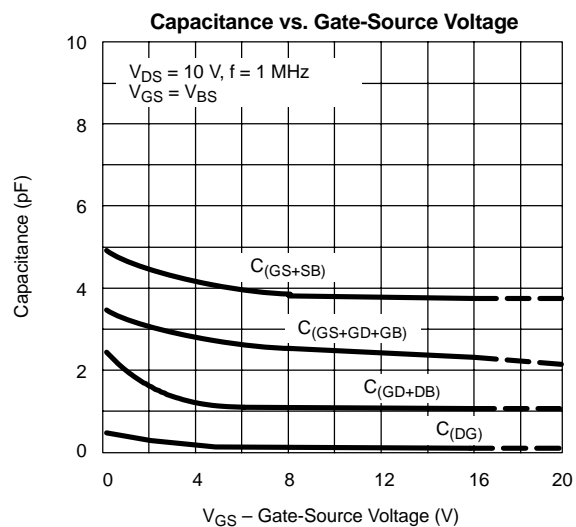
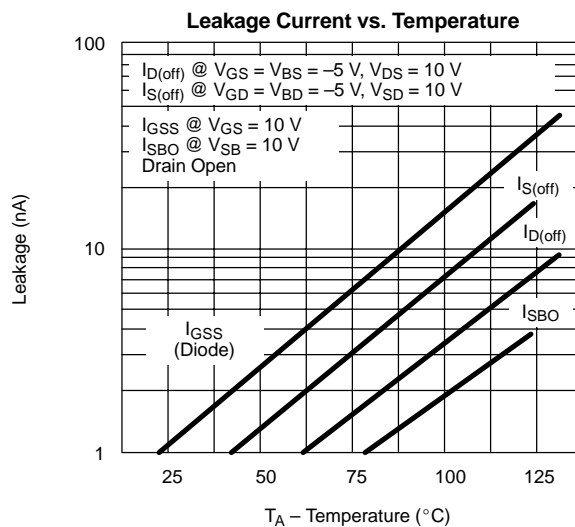
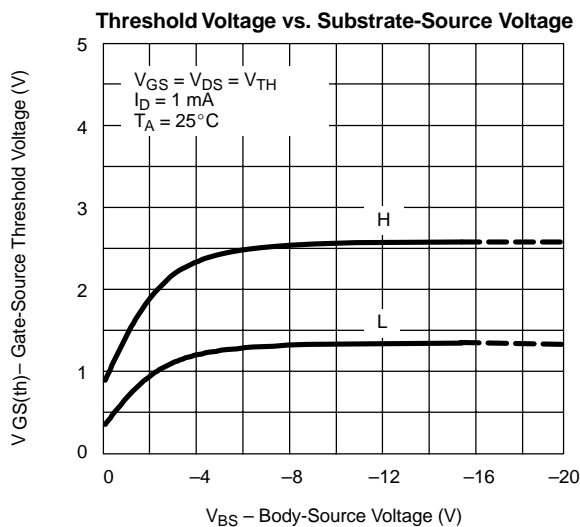
DMCBA



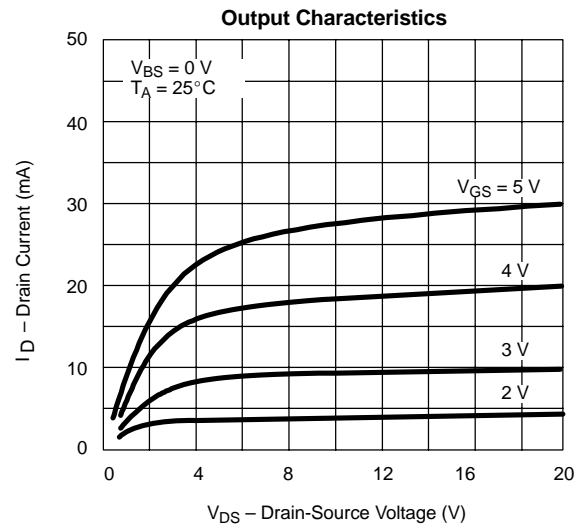
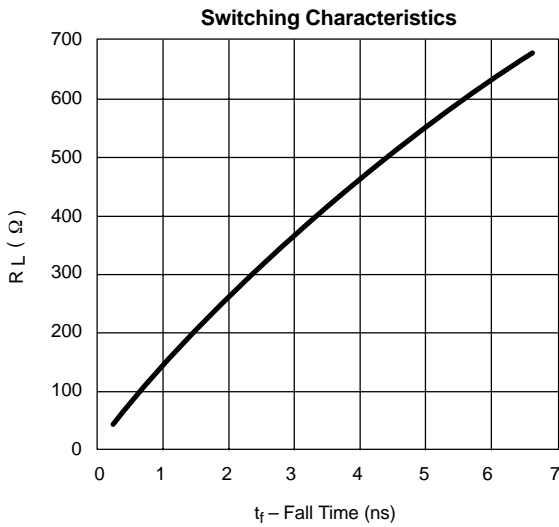
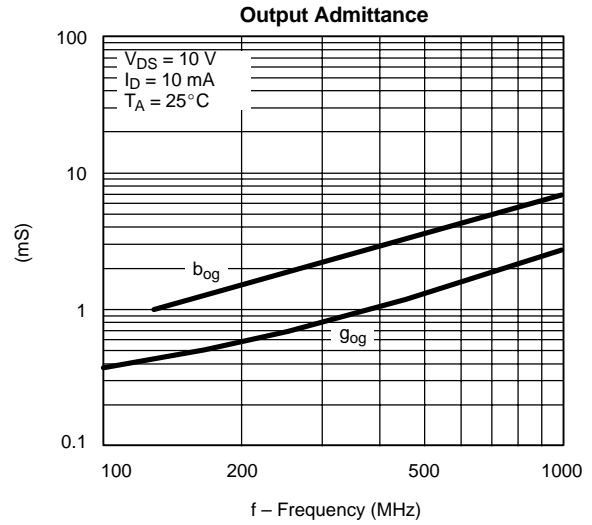
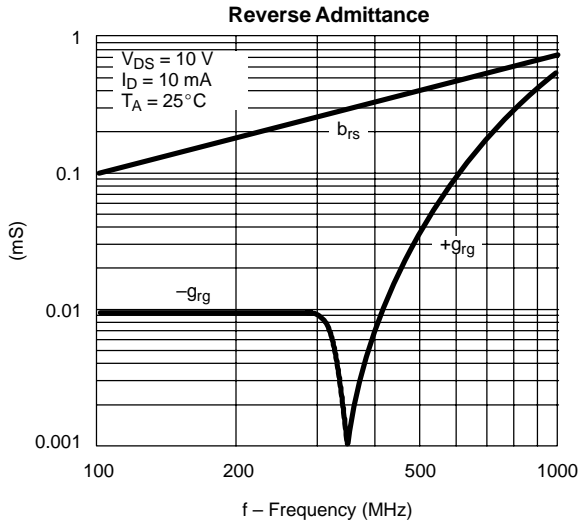
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



SWITCHING TIME TEST CIRCUIT

