

N-Channel Lateral DMOS FETs

SD211DE
SD213DE
SD215DE

SST211
SST213
SST215

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	30	1.5	45 @ V _{GS} = 10 V	0.5	2
SD213DE	10	1.5	45 @ V _{GS} = 10 V	0.5	2
SD215DE	20	1.5	45 @ V _{GS} = 10 V	0.5	2
SST211	30	1.5	50 @ V _{GS} = 10 V	0.5	2
SST213	10	1.5	50 @ V _{GS} = 10 V	0.5	2
SST215	20	1.5	50 @ 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

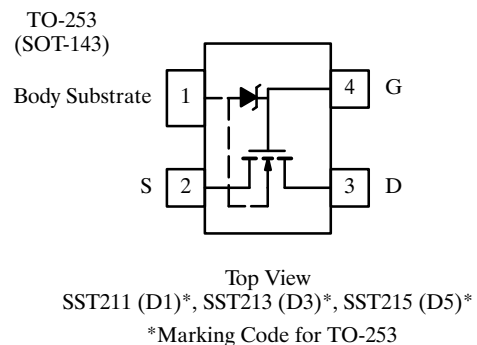
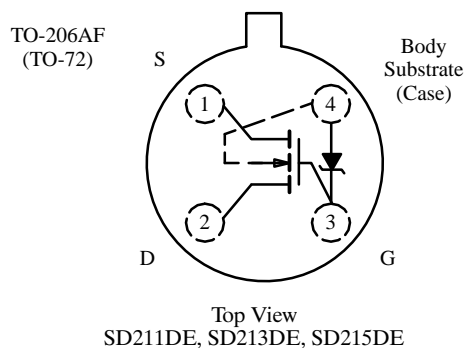
- Fast Analog Switch
- Fast Sample-and-Holds
- Pixel-Rate Switching
- DAC Deglitchers
- High-Speed Driver

Description

The SD211DE/SST211 series consists of enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency applications. The SD211 may be used for ±5-V analog switching or as a high speed driver of the SD214. The SD214 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.

For similar products see: quad array—SD5000/5400 series and non-Zener protection—SD210DE/214DE.



Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70295. Applications information may also be obtained via FaxBack, request document #70607.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Gate-Drain, Gate-Source Voltage (SD211DE/SST211)	-30/25 V	Source-Substrate Voltage (SD211DE/SST211)	15 V
(SD213DE/SST213)	-15/25 V	(SD213DE/SST213)	15 V
(SD215DE/SST215)	-25/30 V	(SD215DE/SST215)	25 V
Gate-Substrate Voltage ^a (SD211DE/SST211)	-0.3/25 V	Drain Current	50 mA
(SD213DE/SST213)	-0.3/25 V	Lead Temperature (¹ / ₁₆ " from case for 10 seconds)	300°C
(SD215DE/SST215)	-0.3/30 V	Storage Temperature	-65 to 150°C
Drain-Source Voltage (SD211DE/SST211)	30 V	Operating Junction Temperature	-55 to 125°C
(SD213DE/SST213)	10 V	Power Dissipation ^a	300 mW
(SD215DE/SST215)	20 V		
Source-Drain Voltage (SD211DE/SST211)	10 V		
(SD213DE/SST213)	10 V		
(SD215DE/SST215)	20 V		
Drain-Substrate Voltage (SD211DE/SST211)	30 V		
(SD213DE/SST213)	15 V		
(SD215DE/SST215)	25 V		

Notes:
a. Derate 3 mW/°C above 25°C

Specifications^a

Parameter	Symbol ^b	Test Conditions ^b	Typ ^c	Limits						Unit	
				211 Series		213 Series		215 Series			
				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		V	
Drain-Substrate Breakdown Voltage	$V_{(BR)DBO}$	$V_{GB} = 0\text{ V}, I_D = 10\ \text{nA},$ Source Open	35	15		15		25		V	
Source-Substrate Breakdown Voltage	$V_{(BR)SBO}$	$V_{GB} = 0\text{ V}, I_S = 10\ \mu\text{A},$ Drain Open	35	15		15		25		V	
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		nA	
			$V_{SD} = 20\text{ V}$	1					10		
Gate Leakage	I_{GBS}	$V_{DB} = V_{SB} = 0\text{ V}, V_{GB} = 30\text{ V}$	0.01		100		100		100	nA	
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	$r_{DS(on)}$	$V_{SB} = 0\text{ V}$ $I_D = 1\ \text{mA}$	$V_{GS} = 5\text{ V}$ (SD Series)	58		70		70		70	Ω
			$V_{GS} = 5\text{ V}$ (SST Series)	60		75		75		75	
			$V_{GS} = 10\text{ V}$ (SD Series)	38		45		45		45	
			$V_{GS} = 10\text{ V}$ (SST Series)	40		50		50		50	
			$V_{GS} = 15\text{ V}$	30							
			$V_{GS} = 20\text{ V}$	26							
		$V_{GS} = 25\text{ V}$	24								

Specifications^a

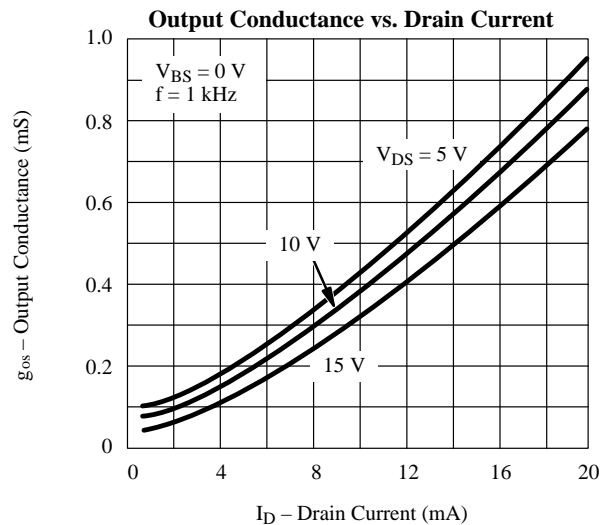
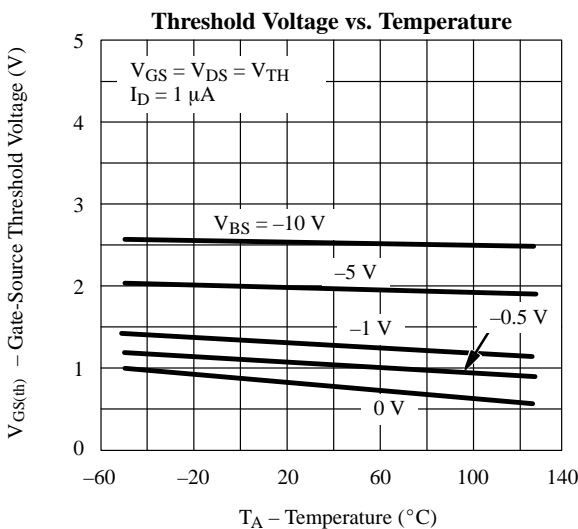
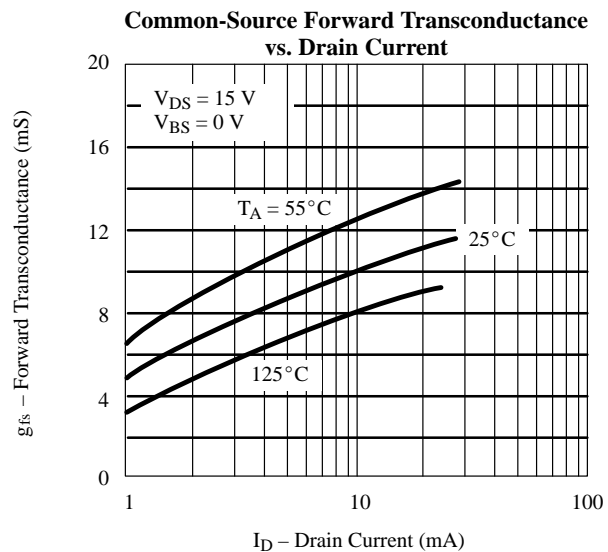
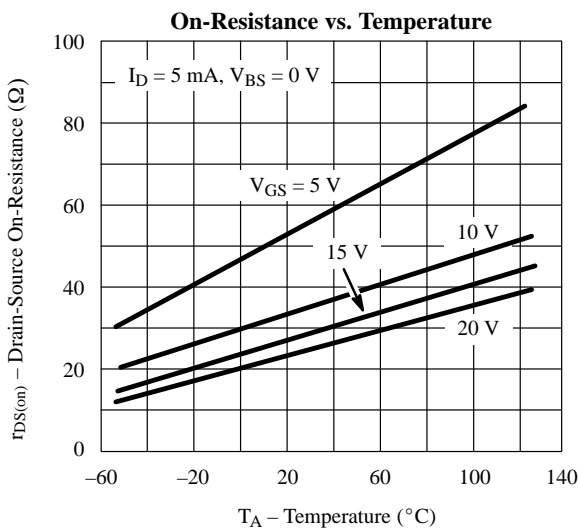
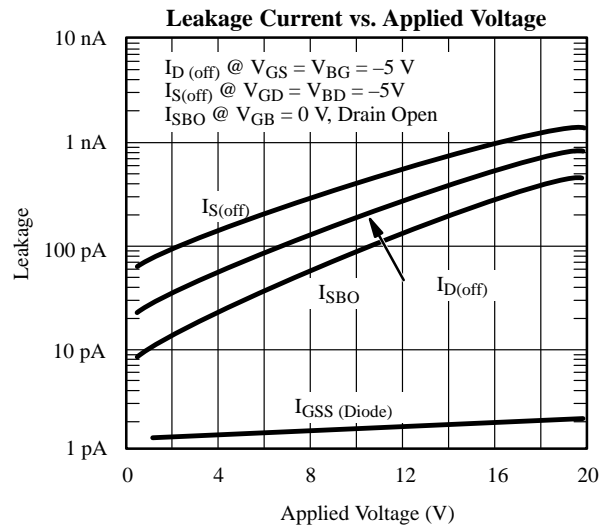
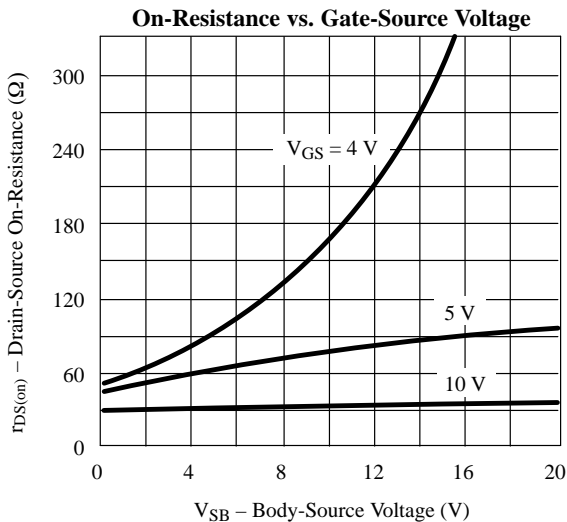
Parameter	Symbol ^b	Test Conditions ^b	Typ ^c	Limits						Unit	
				211 Series		213 Series		215 Series			
				Min	Max	Min	Max	Min	Max		
Dynamic											
Forward Transconductance	g_{fs}	$V_{DS} = 10\text{ V}$ $V_{SB} = 0\text{ V}$ $I_D = 20\text{ mA}, f = 1\text{ kHz}$	SD Series	11	10		10		10		mS
			SST Series	10.5	9		9		9		
	g_{os}		All	0.9							
Gate Node Capacitance	$C_{(GS+GD+GB)}$	$V_{DS} = 10\text{ V}$ $f = 1\text{ MHz}$ $V_{GS} = V_{BS} = -15\text{ V}$	SD Series	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}			SST Series	4.2						
			SD Series	0.2		0.5		0.5		0.5	
Switching											
Turn-On Time	$t_{d(on)}$	SD Series Only $V_{SB} = 0\text{ V}, V_{IN} 0\text{ to }5\text{ V}, R_G = 25\ \Omega$ $V_{DD} = 5\text{ V}, R_L = 680\ \Omega$	0.5		1		1		1		ns
	t_r		0.6		1		1		1		
Turn-Off Time	$t_{d(off)}$		2								
	t_f		6								

Notes:

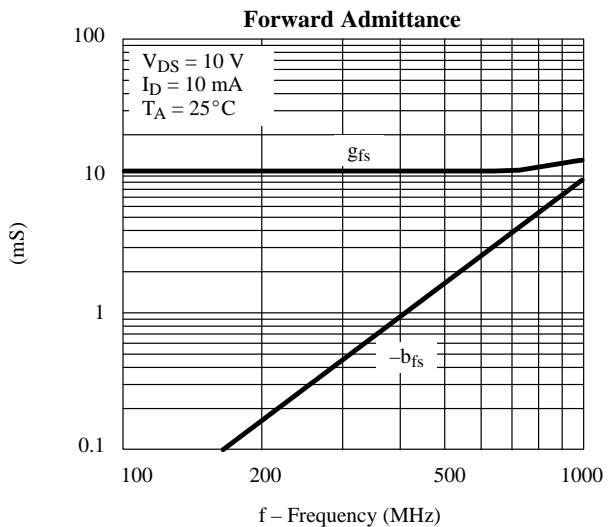
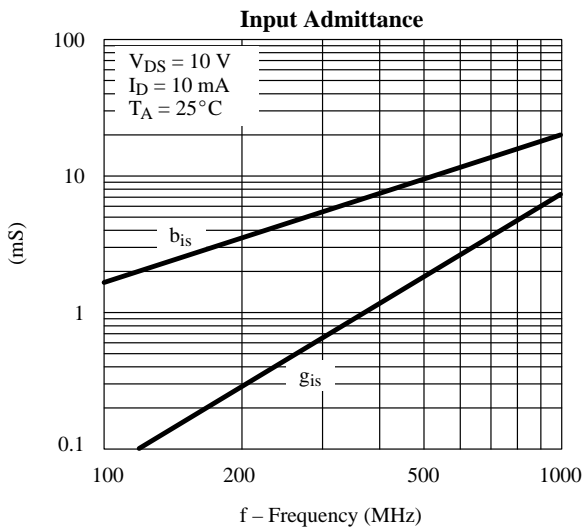
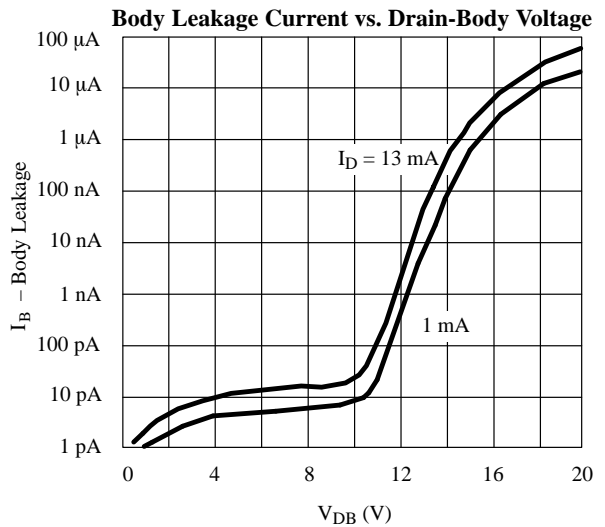
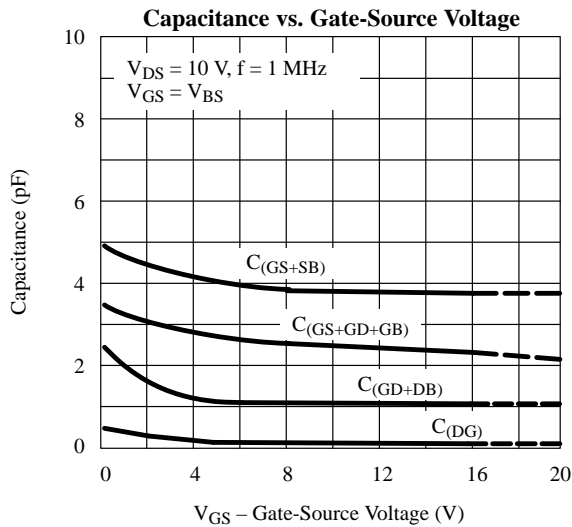
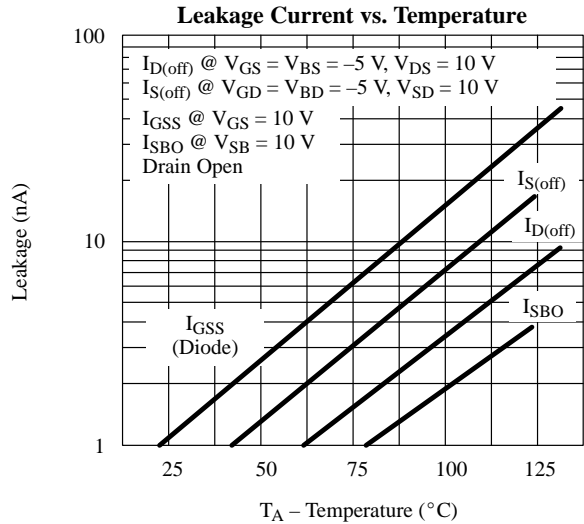
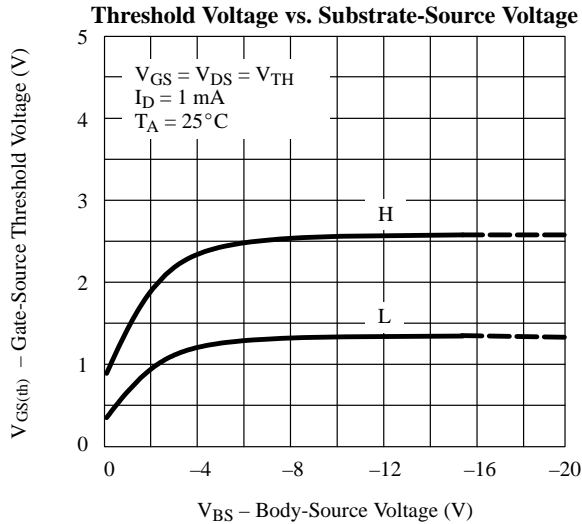
- $T_A = 25^\circ\text{C}$ unless otherwise noted.
- B is the body (substrate), and (BR) is breakdown.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

DMCBA

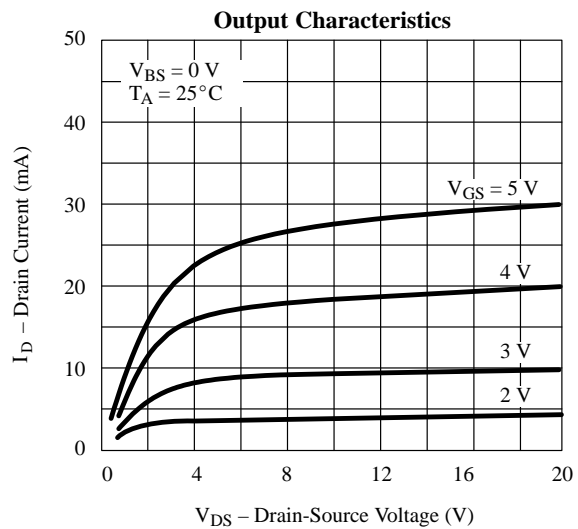
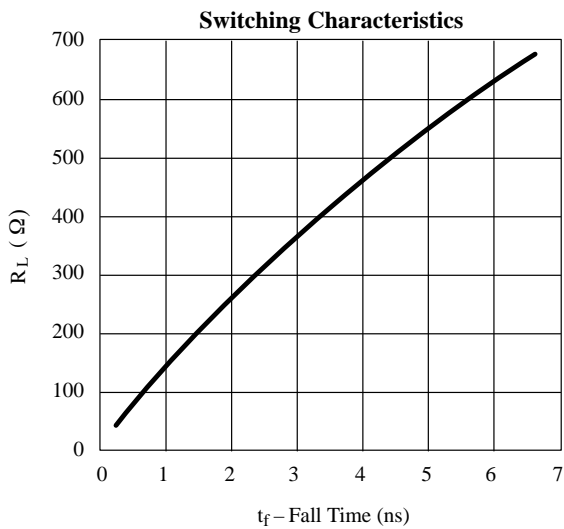
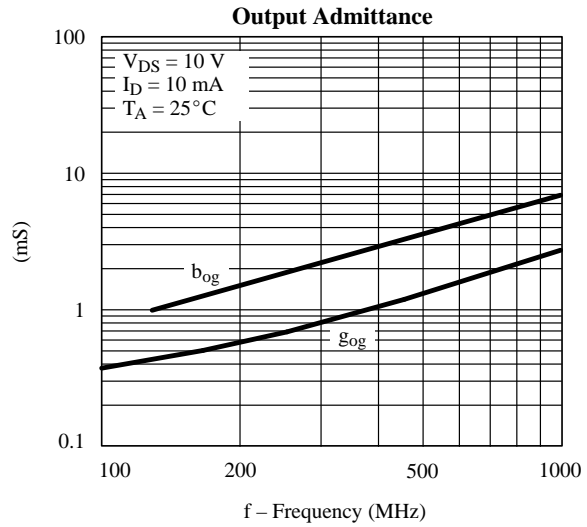
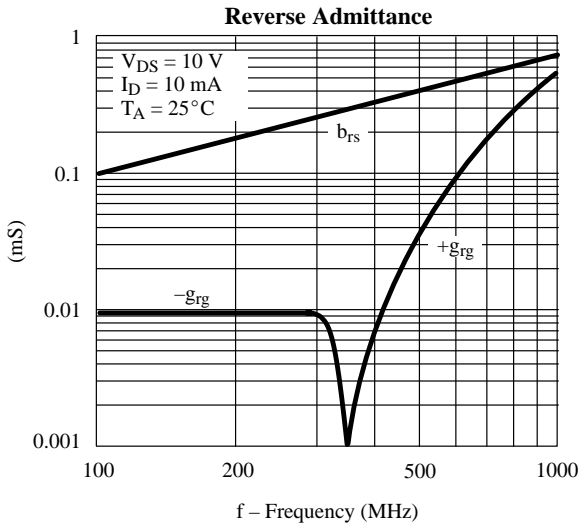
Typical Characteristics



Typical Characteristics (Cont'd)



Typical Characteristics



Switching Time Test Circuit

