



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

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-2	30	1.5	45 @ V <sub>GS</sub> = 10 V	0.5	2
SD214DE-2	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

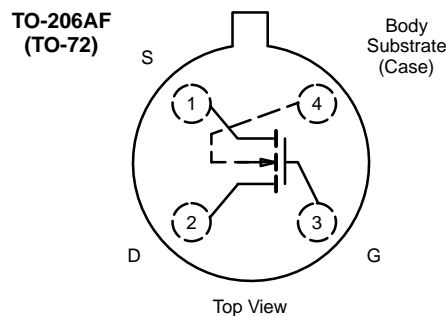
- Fast Analog Switch
- Fast Sample-and-Holds
- Pixel-Rate Switching
- DAC Deglitchers
- High-Speed Driver

### DESCRIPTION

The SD210DE-2/214DE-2 are enhancement-mode MOSFETs designed for high speed low-glitch switching in audio, video, and high-frequency applications. 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. 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.

The SD210DE/214DE 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.

For similar products see: quad array—SD5000I-2, and Zener protected—SD211DE-2/213DE-2/215DE-2.



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C UNLESS OTHERWISE NOTED)

Gate-Drain, Gate-Source Voltage	±40 V	Source-Substrate Voltage (SD210DE-2)	15 V
Gate-Substrate Voltage	±30 V	(SD214DE-2)	25 V
Drain-Source Voltage (SD210DE-2)	30 V	Drain Current	50 mA
(SD214DE-2)	20 V	Lead Temperature (1/16" from case for 10 seconds)	300 °C
Source-Drain Voltage (SD210DE-2)	10 V	Storage Temperature	-65 to 150 °C
(SD214DE-2)	20 V	Operating Junction Temperature	-55 to 125 °C
Drain-Substrate Voltage (SD210DE-2)	30 V	Power Dissipation <sup>a</sup>	300 mW
(SD214DE-2)	25 V	Notes:	
		a. Derate 3 mW/°C above 25 °C	

Applications Information—See Applications Note AN502

SPECIFICATIONS <sup>a</sup>									
Parameter	Symbol <sup>b</sup>	Test Conditions <sup>b</sup>	Typ <sup>c</sup>	Limits				Unit	
				SD210DE-2		SD214DE-2			
				Min	Max	Min	Max		
<b>Static</b>									
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		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	$V_{(BR)SBO}$	$V_{GB} = 0\text{ V}, I_S = 10\ \mu\text{A}$ , 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	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 1\ \mu\text{A}, V_{SB} = 0\text{ V}$	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	$t_{d(on)}$	$V_{SB} = 0\text{ V}, V_{IN} 0\text{ to }5\text{ V}, R_G = 25\ \Omega$ $V_{DD} = 5\text{ V}, R_L = 680\ \Omega$	0.5		1		1	ns	
	$t_r$		0.6		1		1		
Turn-Off Time	$t_{d(off)}$		2						
	$t_f$		6						

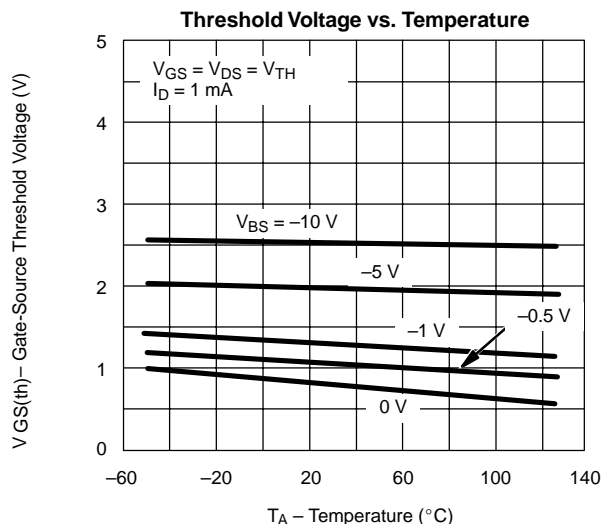
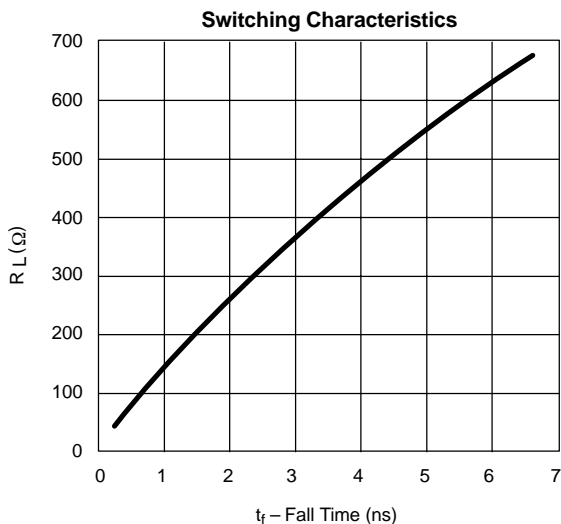
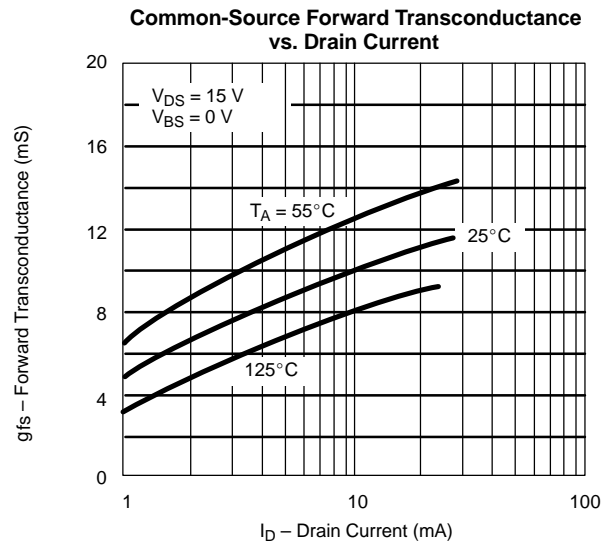
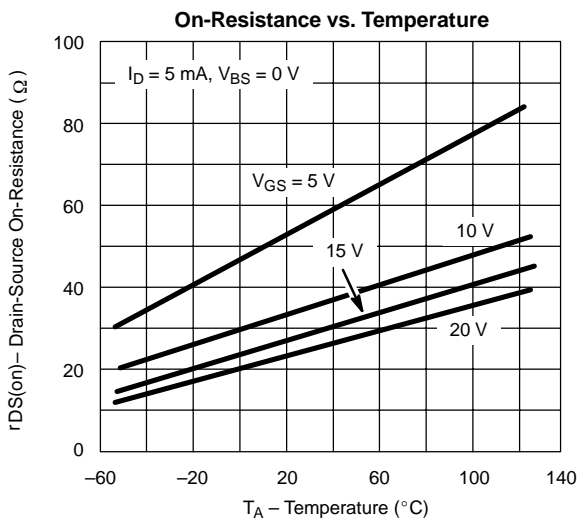
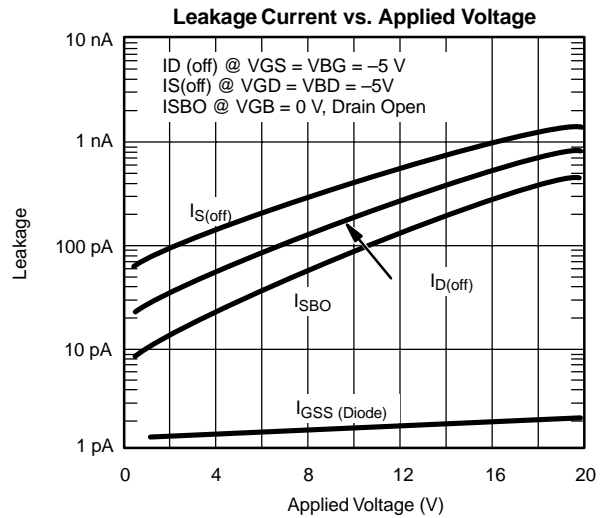
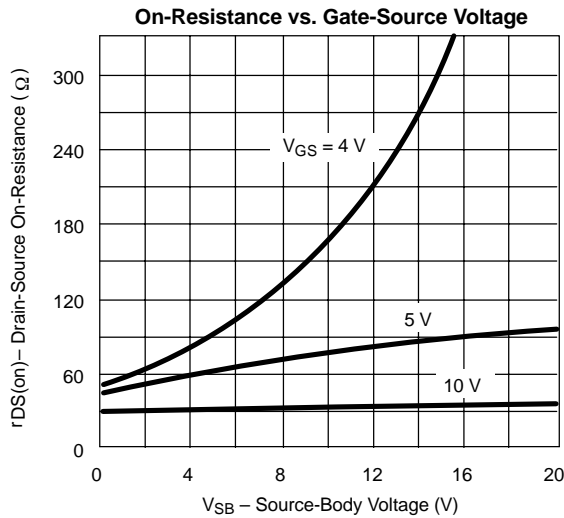
## Notes:

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

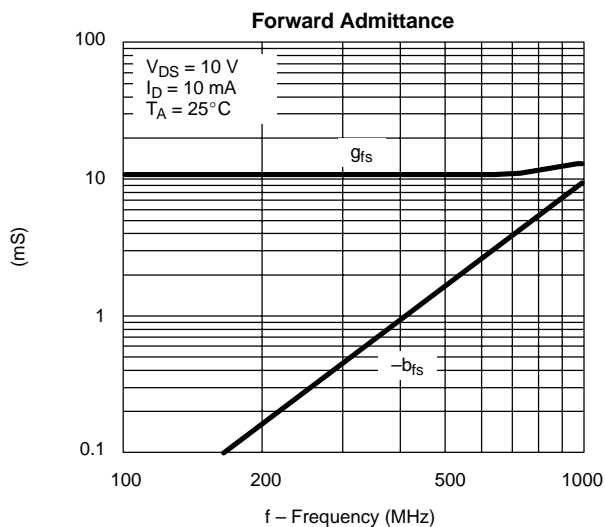
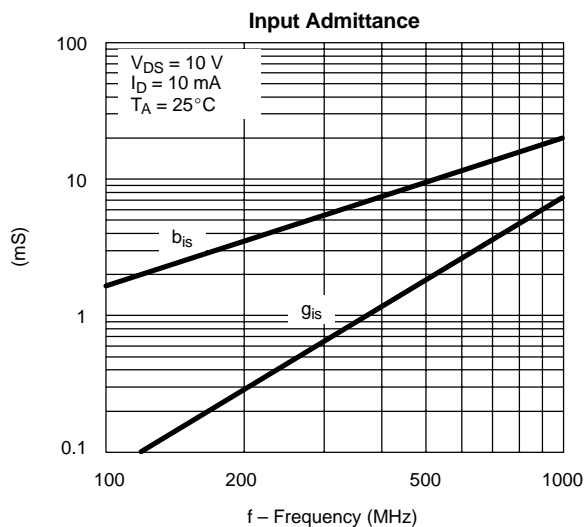
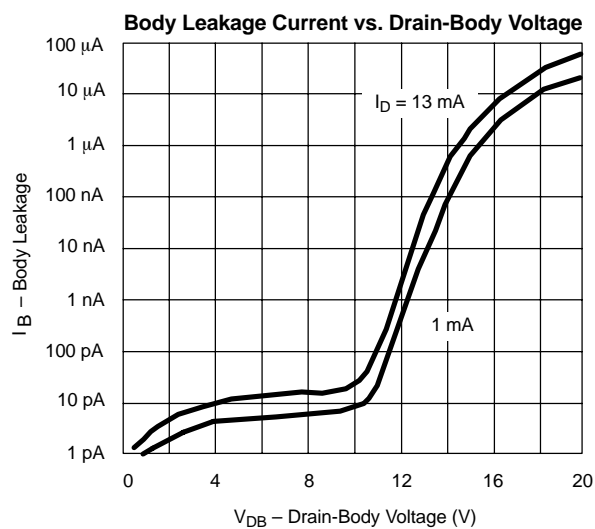
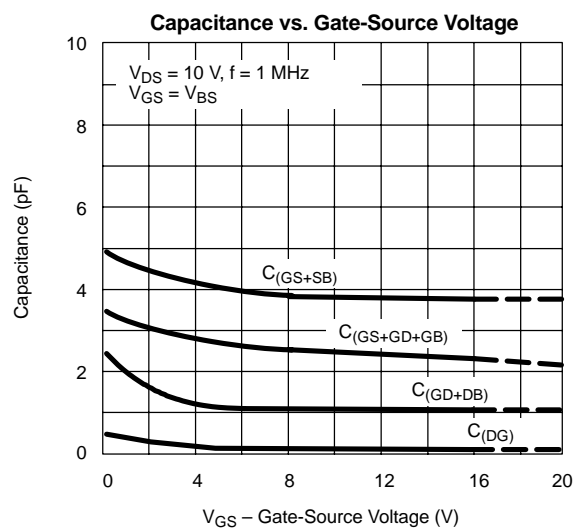
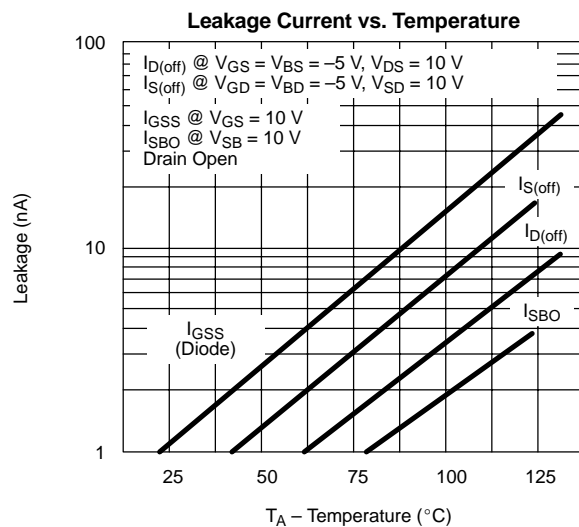
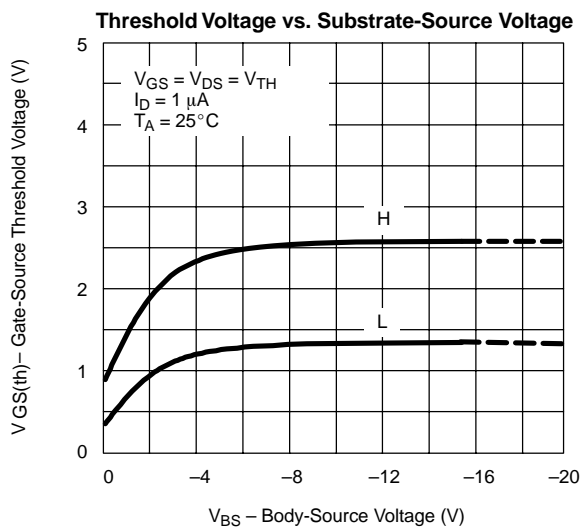
DMCBB



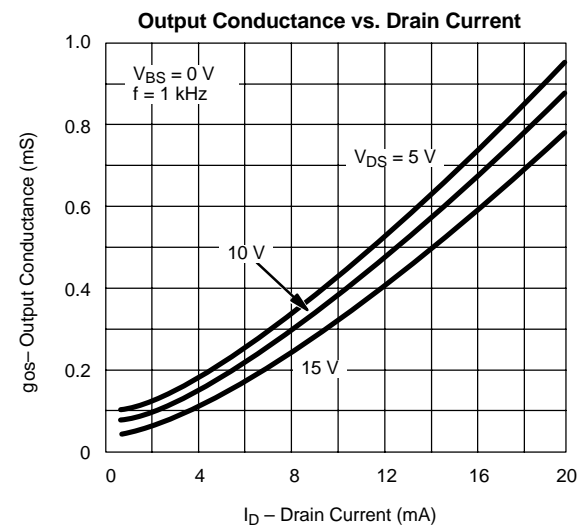
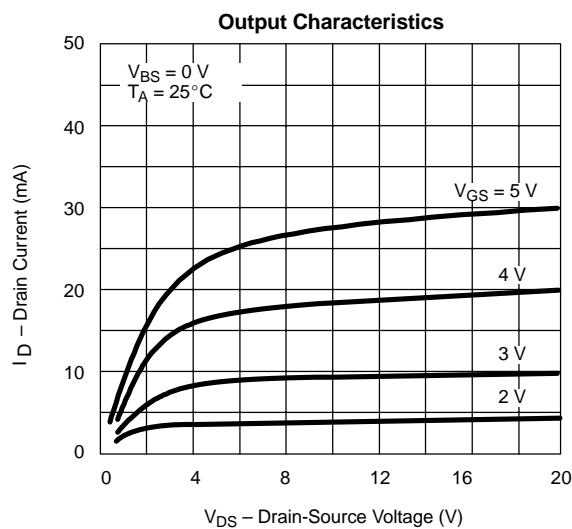
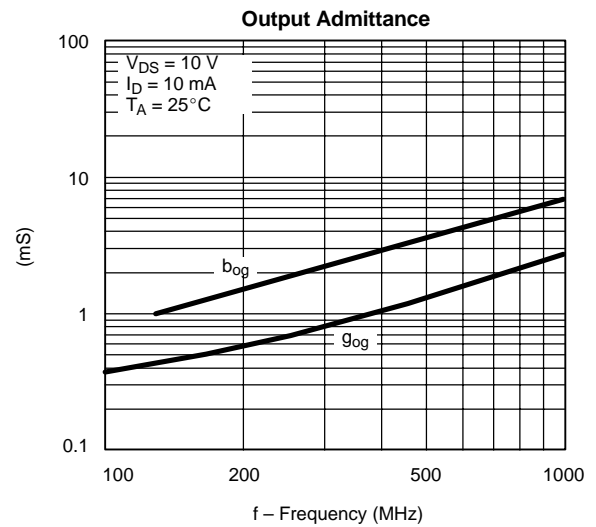
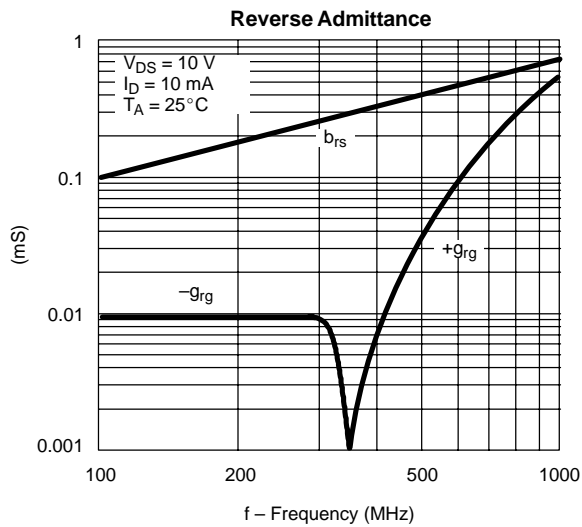
**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**



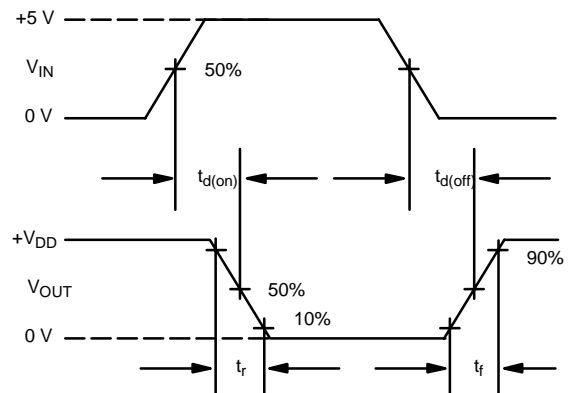
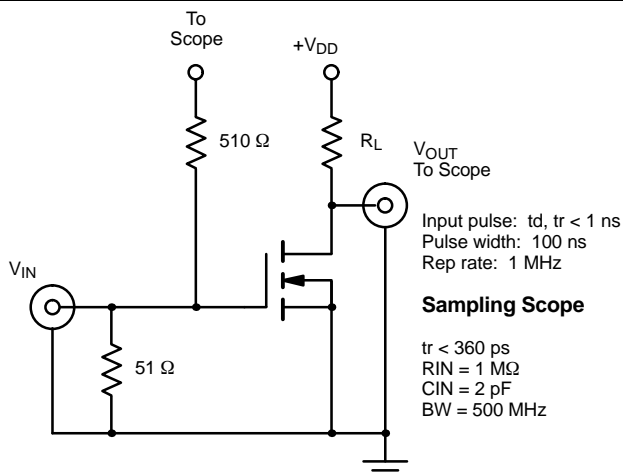
### TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



### TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



### SWITCHING TIME TEST CIRCUIT





## Disclaimer

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