



## N-Channel Lateral DMOS FET

(Available Only In Extended Hi-Rel Flow)

<b>PRODUCT SUMMARY</b>				
$V_{(BR)DS}$ Min (V)	$V_{GS(th)}$ Max (V)	$r_{DS(on)}$ Max ( $\Omega$ )	$C_{rss}$ Max (pF)	$t_{ON}$ Max (ns)
20	1.5	70 @ $V_{GS} = 5\text{ V}$	0.5	2

**FEATURES**

- Quad SPST Switch with Zener Input Protection
- Low Interelectrode Capacitance and Leakage
- 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

**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
- Video Switch
- Multiplexer
- DAC Deglitchers
- High-Speed Driver

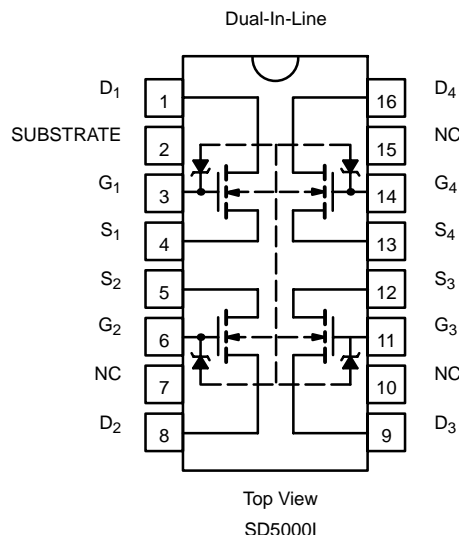
**DESCRIPTION**

The SD5000I-2 monolithic switch features four individual double-diffused enhancement-mode MOSFETs built on a common substrate. This bidirectional device provides low on-resistance and low interelectrode capacitances to minimize insertion loss and crosstalk.

SD5000I-2 utilizes lateral construction to achieve low capacitance and ultra-fast switching speeds. For manufacturing reliability, these devices feature poly-silicon gates protected by Zener diodes.

Built on Vishay Siliconix' proprietary DMOS process, the

The SD5000I is 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.



Applications Information—See Applications Note AN502

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

Gate-Drain, Gate-Source Voltage	+30 V/-25 V	Storage Temperature	-65 to 150°C
Gate-Substrate Voltage	+30 V/-0.3 V	Operating Junction Temperature	-55 to 150°C
Drain-Source Voltage	20 V	Power Dissipation <sup>a, b</sup> :	(Package) 500 mW
Drain-Source-Substrate Voltage	25 V		(Each Device) 300 mW
Drain Current	50 mA	Notes:	
Lead Temperature (1/16" from case for 10 seconds)	300°C	a. Derate 4 mW/°C above 25°C	

SPECIFICATIONS <sup>a</sup>						
Parameter	Symbol <sup>b</sup>	Test Conditions <sup>b</sup>	Limits			Unit
			Min	Typ <sup>c</sup>	Max	
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DS</sub>	V <sub>GS</sub> = V <sub>BS</sub> = -5 V, I <sub>D</sub> = 10 nA	20	30		V
Source-Drain Breakdown Voltage	V <sub>(BR)SD</sub>	V <sub>GD</sub> = V <sub>BD</sub> = -5 V, I <sub>S</sub> = 10 nA	20	22		
Drain-Substrate Breakdown Voltage	V <sub>(BR)DBO</sub>	V <sub>GB</sub> = 0 V, I <sub>D</sub> = 10 nA, Source Open	25	35		
Source-Substrate Breakdown Voltage	V <sub>(BR)SBO</sub>	V <sub>GB</sub> = 0 V, I <sub>S</sub> = 10 μA, Drain Open	25	35		
Drain-Source Leakage	I <sub>DS(off)</sub>	V <sub>GS</sub> = V <sub>BS</sub> = -5 V	V <sub>DS</sub> = 10 V	0.4		nA
			V <sub>DS</sub> = 15 V	0.7		
			V <sub>DS</sub> = 20 V	0.9	10	
Source-Drain Leakage	I <sub>SD(off)</sub>	V <sub>GD</sub> = V <sub>BD</sub> = -5 V	V <sub>SD</sub> = 10 V	0.5		
			V <sub>SD</sub> = 15 V	0.8		
			V <sub>SD</sub> = 20 V	1	10	
Gate Leakage	I <sub>GBS</sub>	V <sub>DB</sub> = V <sub>SB</sub> = 0 V, V <sub>GB</sub> = 30V		0.01	100	
Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 μA, V <sub>SB</sub> = 0 V	0.1	0.8	1.5	V
Drain-Source On-Resistance	r <sub>DS(on)</sub>	V <sub>SB</sub> = 0 V I <sub>D</sub> = 1 mA	V <sub>GS</sub> = 5 V	58	70	Ω
			V <sub>GS</sub> = 10 V	38		
			V <sub>GS</sub> = 15 V	30		
			V <sub>GS</sub> = 20 V	26		
Resistance Match	Δr <sub>DS(on)</sub>		V <sub>GS</sub> = 5 V	1	5	
<b>Dynamic</b>						
Forward Transconductance	g <sub>fs</sub>	V <sub>DS</sub> = 10 V, V <sub>SB</sub> = 0 V, I <sub>D</sub> = 20 mA, f = 1 kHz	10	12		mS
Gate-Node Capacitance	C <sub>(GS+GD+GB)</sub>	V <sub>DS</sub> = 10 V, f = 1 MHz V <sub>GS</sub> = V <sub>BS</sub> = -15 V		2.5	3.5	pF
Drain-Node Capacitance	C <sub>(GD+DB)</sub>			2.0	3	
Source-Node Capacitance	C <sub>(GS+SB)</sub>			3.7	5	
Reverse Transfer Capacitance	C <sub>rSS</sub>			0.2	0.5	
Crosstalk		f = 3 kHz		-107		dB
<b>Switching</b>						
Turn-On Time	t <sub>d(on)</sub>	V <sub>SB</sub> = 5 V, V <sub>IN</sub> 0 to 5 V, R <sub>G</sub> = 25 Ω V <sub>DD</sub> = 5 V, R <sub>L</sub> = 680 Ω		0.5	1	ns
	t <sub>r</sub>			0.6	1	
Turn-Off Time	t <sub>d(off)</sub>			2		
	t <sub>f</sub>			6		

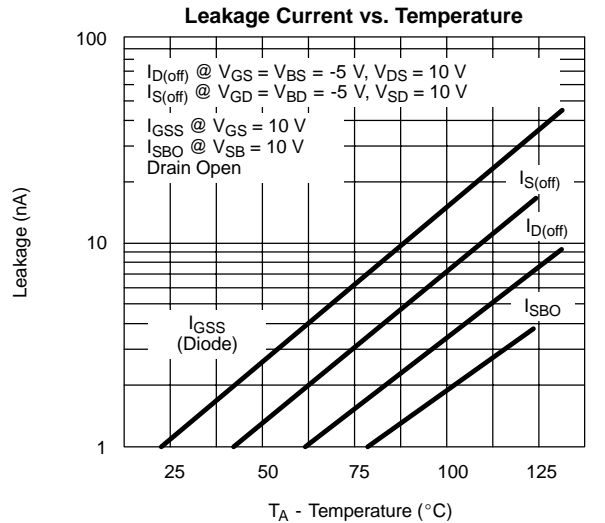
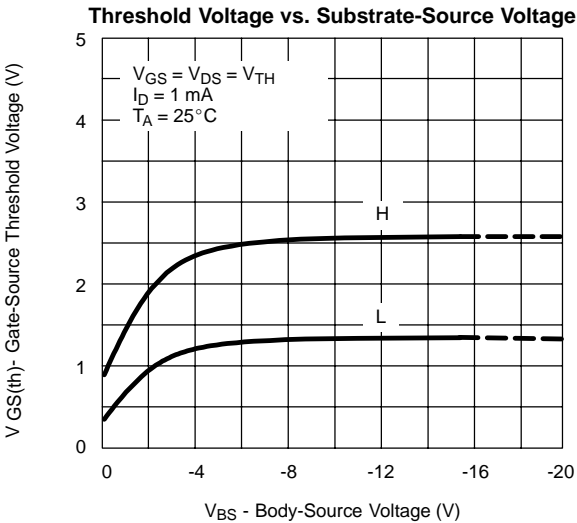
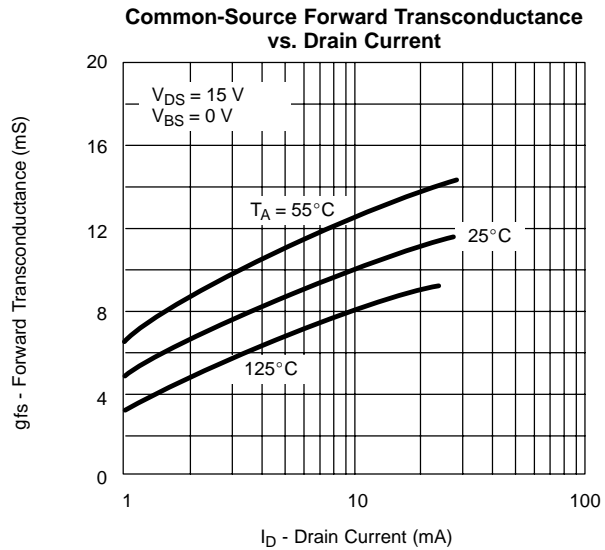
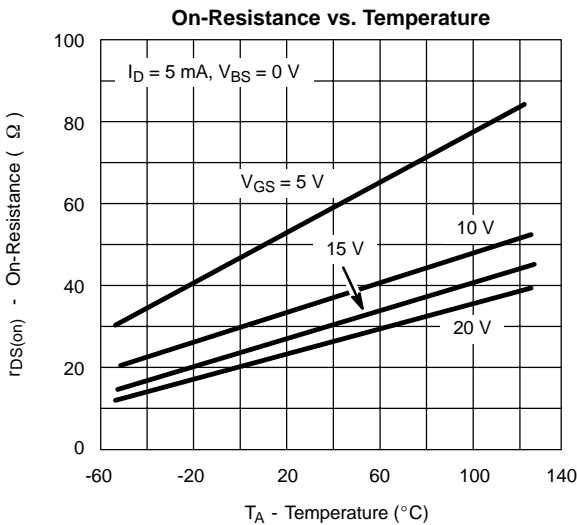
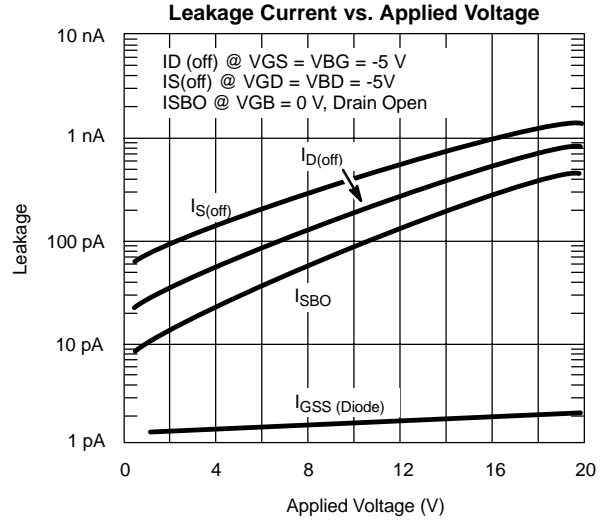
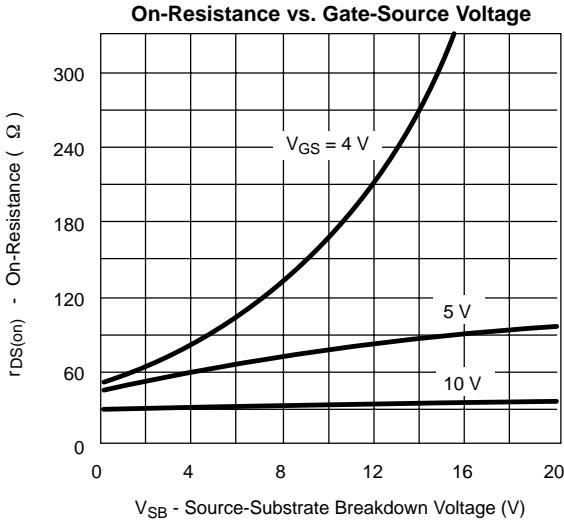
## Notes:

- T<sub>A</sub> = 25°C unless otherwise noted.
- B is the body (substrate) and V<sub>(BR)</sub> is breakdown.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.

DMCA

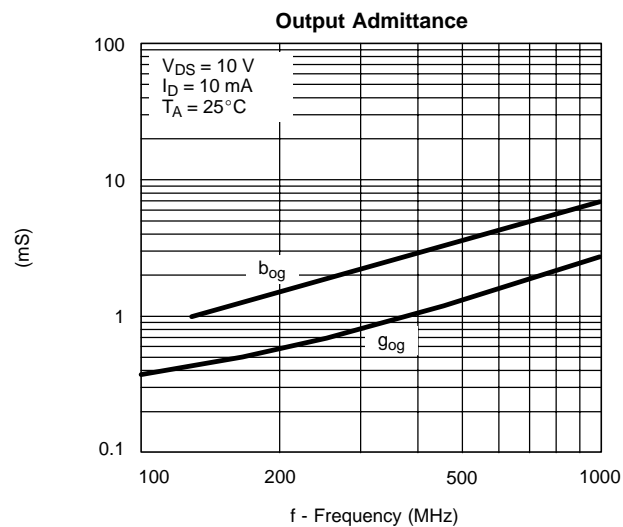
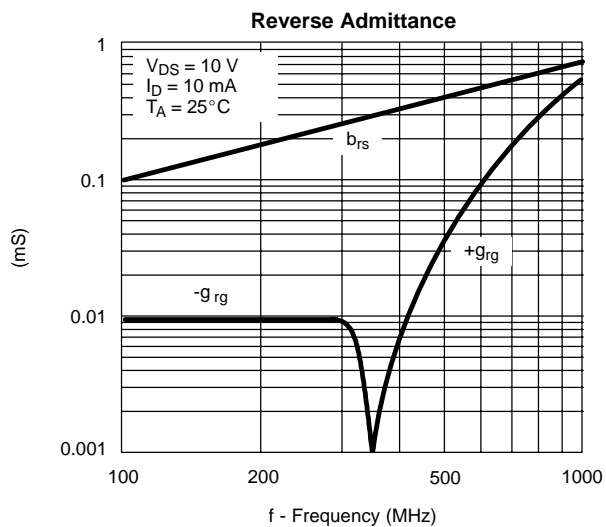
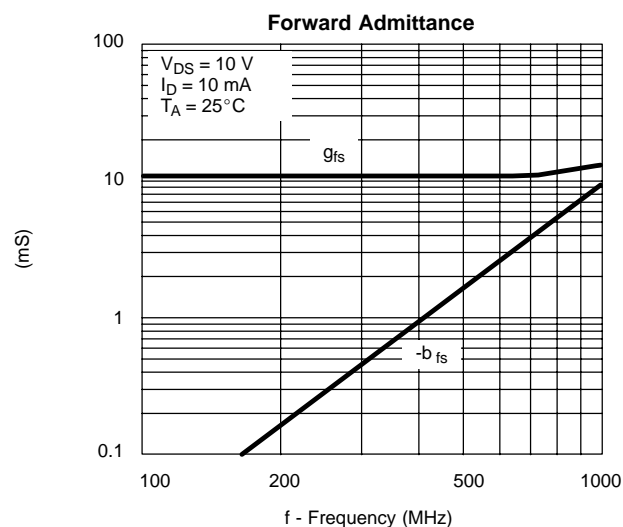
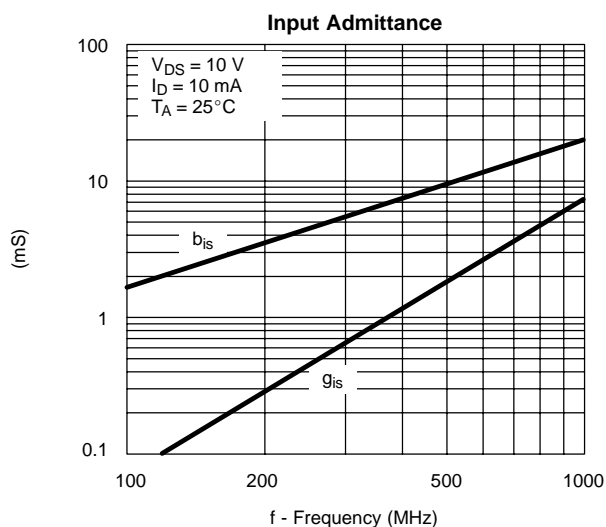
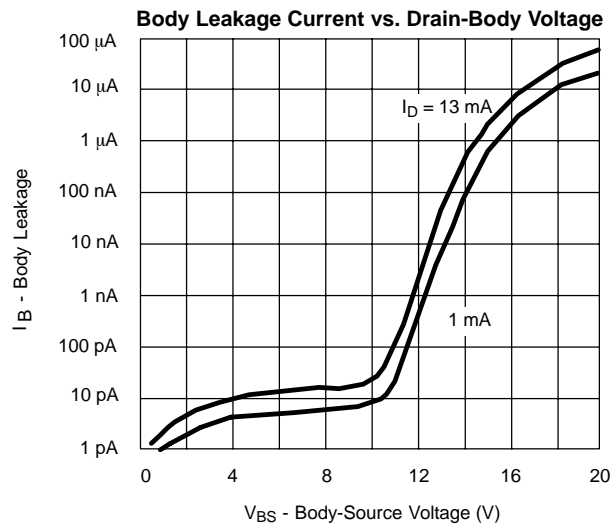
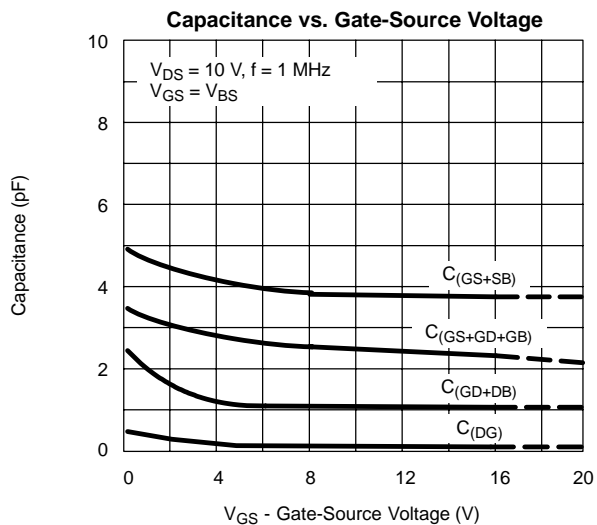


**TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)**

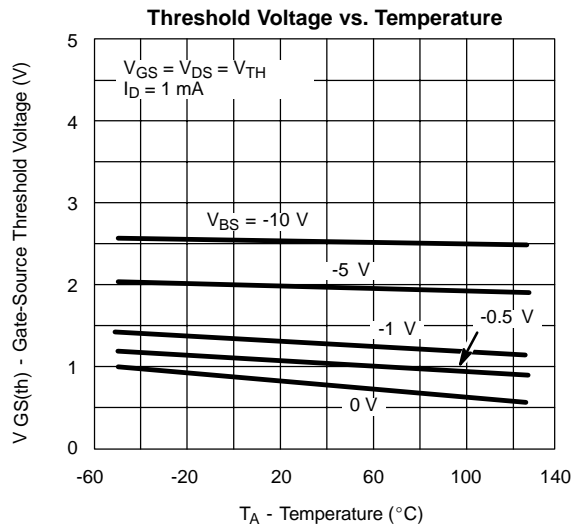
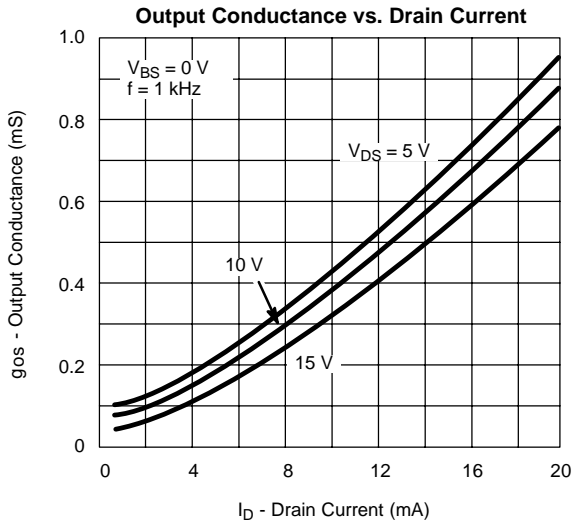
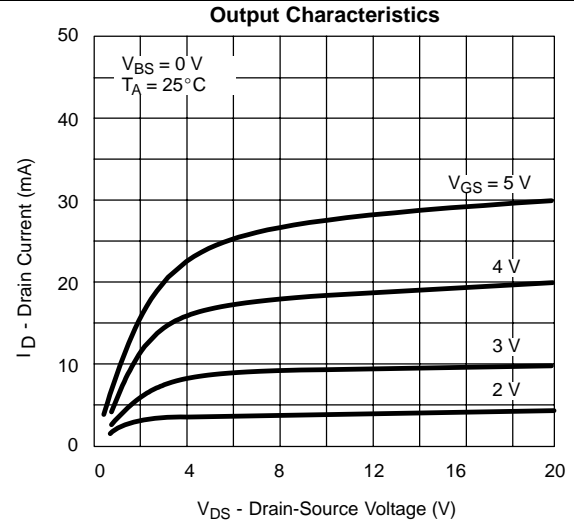
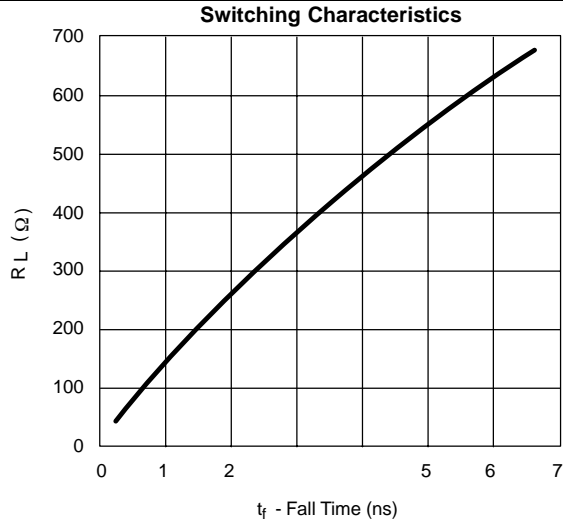




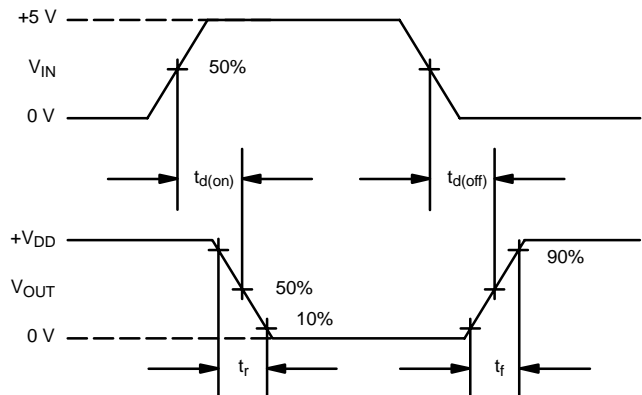
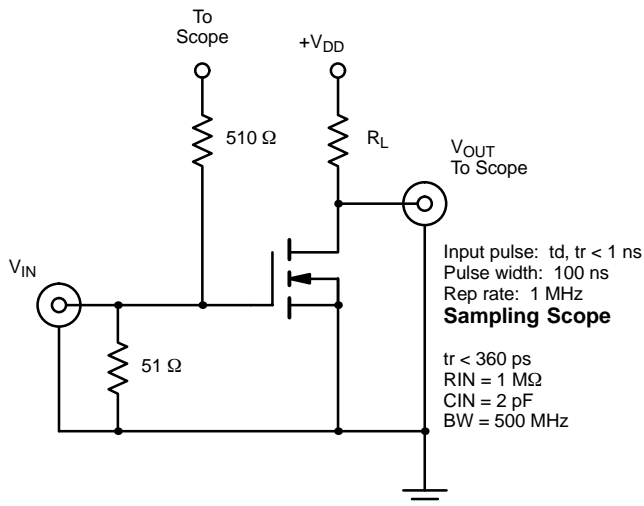
### TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



## TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)



## SWITCHING TIME TEST CIRCUIT





## Disclaimer

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