



## HIGH-SPEED LDMOS QUAD FET ANALOG SWITCH ARRAY

### ABSOLUTE MAXIMUM RATINGS

( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

Stresses in excess of the maximum ratings can cause permanent damage to the device.

Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the document. Exposure to maximum ratings for extended periods of time can adversely affect reliability.

<b>Gate-Source Voltage</b>	30/-25V	<b>Operating Junction Temp.</b>	-55 to +85 °C
<b>Gate-Substrate Voltage</b>	30/-0.3V	<b>Storage Temperature</b>	-55 to +150 °C
<b>Gate-Drain Voltage</b>	30/-25V	<b>Continuous Drain Current</b>	50mA
<b>Package - Power Dissipation</b>	640mW (linear derating factor – 10.7mW/ °C above 25 °C)		
<b>Each Device - Power Dissipation</b>	300mW (linear derating factor – 5.0mW/ °C above 25 °C)		

### ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	SD5000			Units
			Min	Typ	Max	
Analog Signal Range	$V_{\text{analog}}$		-10		+10	V
Drain-Source Breakdown Voltage	$BV_{\text{DS}}$	$I_D = 10\text{ nA}$ $V_{\text{GS}} = V_{\text{BS}} = -5\text{ V}$	20	25		V
Source-Drain Breakdown Voltage	$BV_{\text{SD}}$	$I_S = 10\text{ nA}$ $V_{\text{GD}} = V_{\text{BD}} = -5\text{ V}$	20			V
Drain-Substrate Breakdown Voltage	$BV_{\text{DB}}$	$I_D = 10\text{ nA}$ , $V_{\text{GB}} = 0$ Source Open	25			V
Source-Substrate Breakdown Voltage	$BV_{\text{SB}}$	$I_D = 10\text{ }\mu\text{A}$ , $V_{\text{GB}} = 0$ Drain Open	25			V
Drain-Source Leakage	$I_{\text{D(off)}}$	$V_{\text{GS/BS}} = -5$	$V_{\text{DS}} = 20\text{ V}$	1.0	10.0	nA
			$V_{\text{DS}} = 10\text{ V}$			nA
Source- Drain Leakage	$I_{\text{S(off)}}$	$V_{\text{GD/BD}} = -5$	$V_{\text{SD}} = 20\text{ V}$	1.0	10.0	nA
			$V_{\text{SD}} = 10\text{ V}$			nA
Gate Leakage	$I_{\text{GBS}}$	$V_{\text{DB/SB}} = 0$	$V_{\text{GB}} = 30\text{ V}$		1.0	$\mu\text{A}$
			$V_{\text{GB}} = 25\text{ V}$			$\mu\text{A}$
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}} = V_{\text{GS}}$ , $I_D = 1\text{ }\mu\text{A}$ , $V_{\text{SB}} = 0$	0.1	1.0	2.0	V
Drain-Source ON Resistance	$r_{\text{S(on)}}$	$I_D = 1\text{ mA}$ $V_{\text{SB}} = 0\text{ V}$	$V_{\text{GS}} = 5\text{ V}$	50	70	$\Omega$
			$V_{\text{GS}} = 10\text{ V}$	30		$\Omega$
			$V_{\text{GS}} = 15\text{ V}$	23		$\Omega$
			$V_{\text{GS}} = 20\text{ V}$	19		$\Omega$
Match ON Resistance	$r_{\text{S(on)}}$	$V_{\text{GS}} = 5\text{ V}$		1	5	$\Omega$

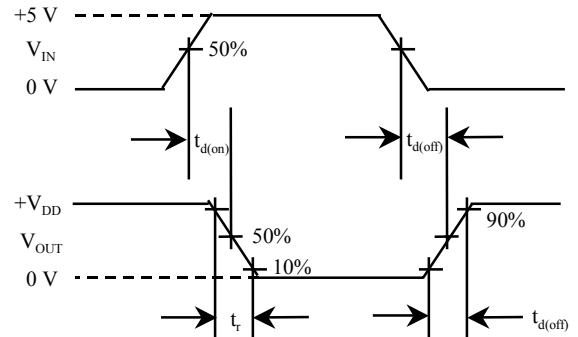
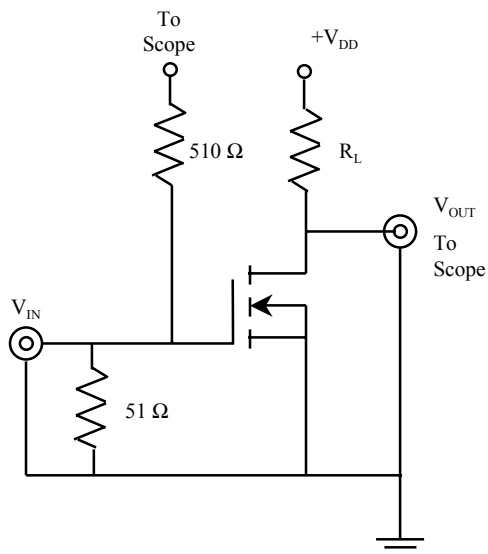
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ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

Parameter	Symbol	Test Conditions	SD5000			Units	
			Min	Typ	Max		
DYNAMIC	Common-Source Forward Transconductance	$g_{fs}$	$V_{DS}=10\text{V}$ $I_D=20\text{mA}$ $f=1\text{kHz}$ , $V_{SB}=0$ Pulsed	10	12		mS
	Gate Node Capacitance	$C_{(gs+gd+gb)}$	$V_{DS}=10\text{V}$ $V_{GS}=V_{BS}=-15\text{V}$ $f=1\text{MHz}$		2.4	3.5	pF
	Drain Node Capacitance	$C_{(gd+db)}$			1.3	1.5	pF
	Source Node Capacitance	$C_{(gs+sb)}$			3.5	4.0	pF
	Reverse Transfer Capacitance	$C_{(dg)}$			0.3	0.5	pF
	Crosstalk	$C_T$	$f=3\text{kHz}$ , $R_G=600$		-107.0		dB
	Turn ON Delay Time	$t_{d(on)}$	$V_{DD}=5\text{V}$ $V_{G(on)}=10\text{V}$ $R_L=680\Omega$ $R_G=51\Omega$		0.7	1.0	ns
	Rise Time	$t_r$			0.8	1.0	ns
Turn OFF Time	$t_{d(off)}^*$			10.0		ns	

\*  $t_{d(off)}$  is dependent on  $R_L$  and  $c$  and does not depend on the device characteristics

### Switching Time Test Circuit



Input Pulse:  $t_d, t_r < 1\text{ ns}$

Rep rate: 1 MHz

Sampling Scope  $t_r < 350\text{ ps}$

$R_{IN} = 1\text{ M}\Omega$

$C_{IN} = 2\text{ pF}$