

XC74WL4053SR



CMOS Logic

◆CMOS Logic 2-channel Analog

Multiplexer/Demultiplexer

◆Operating Voltage Range : 2V ~ 5.5V

◆High Speed Operations : tpd = 1.5ns TYP

◆Low Power Consumption : 2μA (max)

◆MSOP-8B Package

■Description

XC74WL4053SR is 2-channel Analog Multiplexer/Demultiplexer manufactured using silicon gate CMOS processes. The small quiescent current, which is one of the features of the CMOS logic, gives way to high speed operations which enables LS-TTL.

With wave forming buffers connected internally, stabilized output can be achieved as the series offers high noise immunity.

As the series is integrated into a mini molded, MSOP-8B package, high density mounting is possible.

■Applications

- Palmtops
- Digital Equipment

■Features

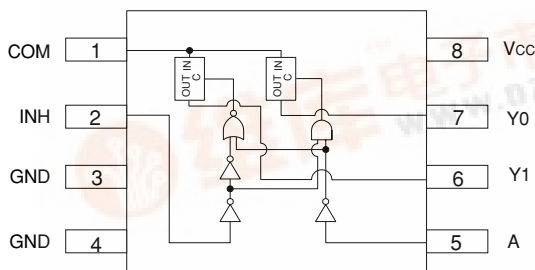
High Speed Operations : tpd = 1.5ns TYP (Vcc=5V)

Operating Voltage Range: 2V ~ 5.5V

Low Power Consumption: 2μA (max)

Small Package : MSOP-8B

■Pin Configuration



MSOP-8B
(TOP VIEW)

■Functions

CONTROL INPUT		ON CHANNEL
INH	A	
H	X	NONE
L	H	Y1
L	L	Y0

H = High Level

L = Low Level

X = Don't care

■Absolute Maximum Ratings

Ta = -40°C ~ 85°C

PARAMETER	SYMBOL	RATINGS	UNITS
Power Supply Voltage	VCC	-0.5~+6.0	V
Control Input Voltage	VCONT	-0.5~+6.0	V
Switch Input/Output Voltage	Vi/o	-0.5~VCC+0.5	V
Control Input Diode Current	IiK	-20	mA
Switch Output Diode Current	IOK	±20	mA
Switch Input/Output Current	Ii/O	±25	mA
VCC, GND Current	ICC, IGND	±50	mA
Power Dissipation (Ta = 25°C)	Pd	300	mW
Storage Temperature	Tstg	-65~+150	°C



Recommended Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	VCC	2~5.5	V
Control Input Voltage	VCONT	0~5.5	V
Switch Input/Output Voltage	V _{i/o}	0~VCC	V
Operating Temperature	T _{opr}	-40~+85	°C
Input Rise and Fall Time	tr, tf	0~200 (VCC=3.3V)	ns
		0~100 (VCC=5V)	

DC Electrical Characteristics

PARAMETER	SYMBOL	VCC (V)	CONDITIONS	Ta=25°C			Ta=-40~85°C		UNITS
				MIN	TYP	MAX	MIN	MAX	
Control Input Voltage	V _{IH}	2.0		1.5	—	—	1.5	—	V
		3.0		2.1	—	—	2.1	—	
		5.5		3.85	—	—	3.85	—	
	V _{IL}	2.0		—	—	0.5	—	0.5	V
		3.0		—	—	0.9	—	0.9	
		5.5		—	—	1.65	—	1.65	
Peak ON Resistance	R _{ONmax}	2.0	V _{IH} =V _{IL}	—	130	350	—	550	Ω
		3.0	V _{COM} =0~VCC	—	22	50	—	65	
		4.5	I _{COM} =1mA	—	12	25	—	35	
ON Resistance	R _{ON(1)}	2.0	V _{IH} =V _{IL}	—	23	50	—	65	Ω
		3.0	V _{COM} =GND or VCC	—	14	30	—	40	
		4.5	I _{COM} =1mA	—	10	20	—	25	
Switch ON Resistance Differential	ΔR _{ON}	2.0	V _{IH} =V _{IL}	—	13	35	—	55	Ω
		3.0	V _{COM} =0~VCC	—	3	6	—	8	
		4.5	I _{COM} =1mA	—	2	4	—	6	
Power Off Leakage Current	I _{S(OFF)}	5.5	V _{IH} =V _{IH} , V _{COM} =VCC, V _Y =GND	—	—	±0.1	—	±0.1	μA
Power On Leakage Current	I _{S(ON)}	5.5	V _{IH} =V _{IL} , V _{COM} =VCC or GND	—	—	±0.1	—	±0.1	μA
Control Input Current	I _{IH}	0~5.5	V _{COM} =VCC or GND	—	—	±0.1	—	±0.1	μA
Quiescent Supply Current	I _{CC}	5.5	V _{COM} =VCC or GND	—	—	2.0	—	20.2	μA

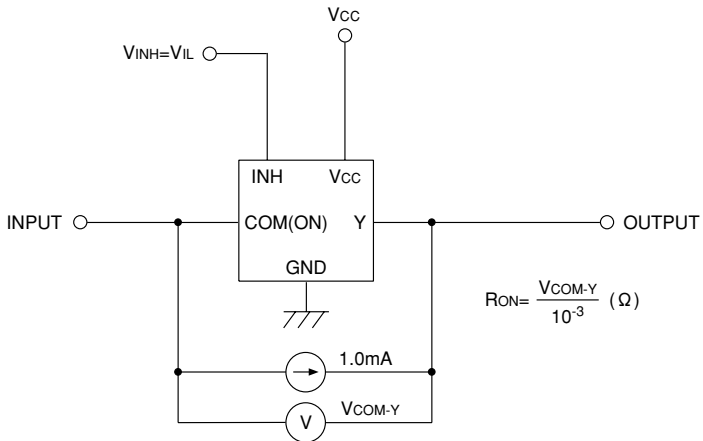
Switching Electrical Characteristics

(tr=tf=3ns)

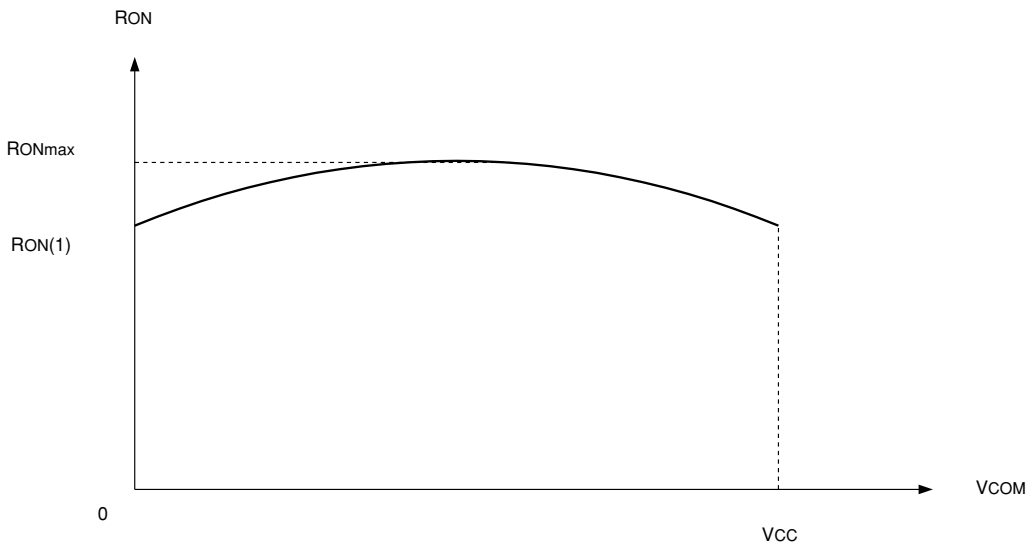
PARAMETER	SYMBOL	CL	VCC (V)	CONDITIONS	Ta=25°C			Ta=-40~85°C		UNITS	
					MIN	TYP	MAX	MIN	MAX		
Propagation Delay Time	tPLH	15pF	2.0	RL=1kΩ	—	2.5	12	—	15	ns	
			3.3		—	2	4	—	5.5		
			5.0		—	1.5	3	—	4		
	tPHL	50pF	2.0		—	4	20	—	23	ns	
			3.3		—	3	6	—	8		
			5.0		—	2	5	—	6		
Output Enable Time	tZL	15pF	2.0	RL=1kΩ	—	8.5	45	—	60	ns	
			3.3		—	4.5	9	—	11		
			5.0		—	3.5	7.5	—	9		
	tZH	50pF	2.0		RL=1kΩ	—	9	50	—	65	ns
			3.3			—	5	10	—	12	
			5.0			—	4	8.5	—	10	
Output Disable Time	tLZ	15pF	2.0	RL=1kΩ		—	9	45	—	55	ns
			3.3			—	7	17	—	20	
			5.0			—	6	14	—	18	
	tHZ	50pF	2.0		RL=1kΩ	—	12	60	—	75	ns
			3.3			—	10	23	—	27	
			5.0			—	8	20	—	25	
Sine Wave Distortion Rate		50pF	3.0	RL=10kΩ fCOM=1kHz		—	0.05	—	—	—	%
-3dB Band Width		50pF	3.0	RL=600kΩ $20\log_{10} \frac{V_Y}{V_{COM}} = -3dB$		—	200	—	—	—	MHz
Feed Through (Switch off)		50pF	3.0	RL=600kΩ		—	-60	—	—	—	dB
Cross Talk (Control Switch)	50pF	2.0	RL=600kΩ	—	60	—	—	—	mV		
		3.0	fINH=1MHz	—	100	—	—	—			
		4.5		—	150	—	—	—			
Cross Talk (between Switches)	50pF	2.0	RL=600kΩ	—	-60	—	—	—	dB		
		3.0	fCOM=1kHz	—	-60	—	—	—			
		4.5		—	-60	—	—	—			
Control Input Capacitance	CINH	—	—		—	5	10	—	10	pF	
Switch Input/Output Capacitance	CCOM/Y	—	—		—	6	—	—	—	pF	
Feed Through Capacitance	CCOM-Y	—	—		—	0.5	—	—	—	pF	
Power Dissipation Capacitance	Cpd	—	—		—	13	—	—	—	pF	

■ ON Resistance

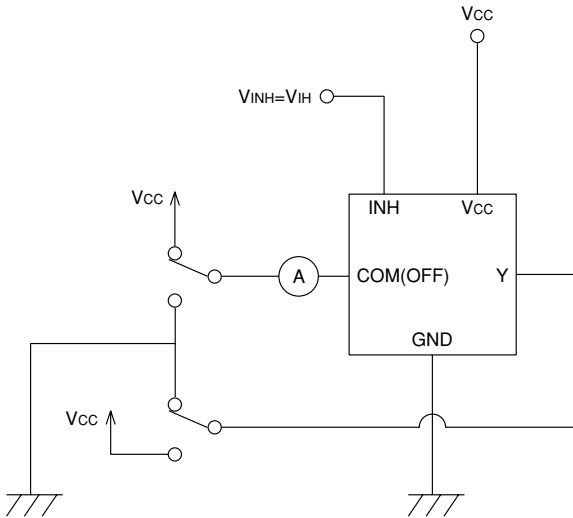
■ Typical Application Circuit



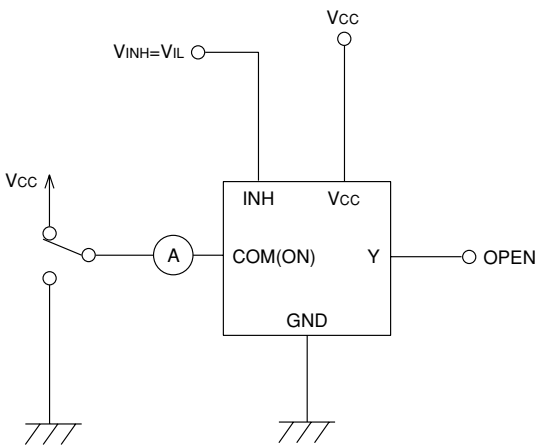
■ Voltage Dependencies of ON Resistance



■ Power Off Leakage Current

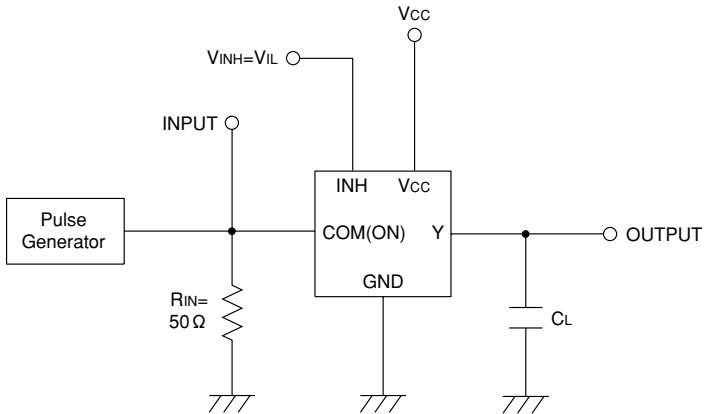


■ Power On Leakage Current

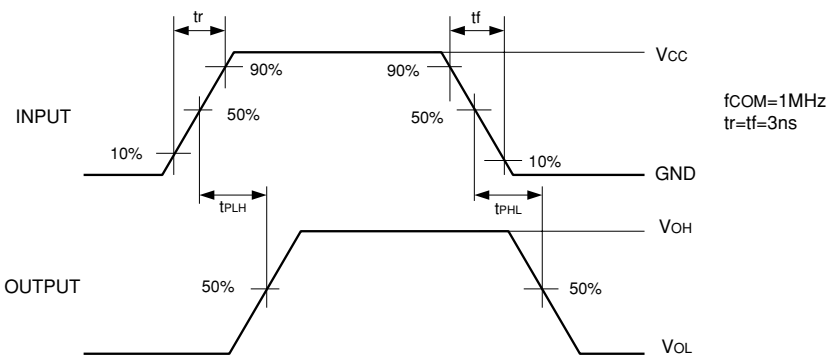


■ Propagation Delay Time

■ Typical Application Circuit

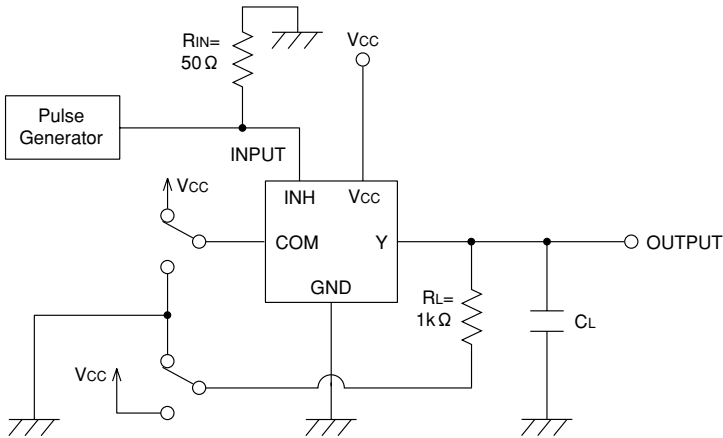


■ Waveforms

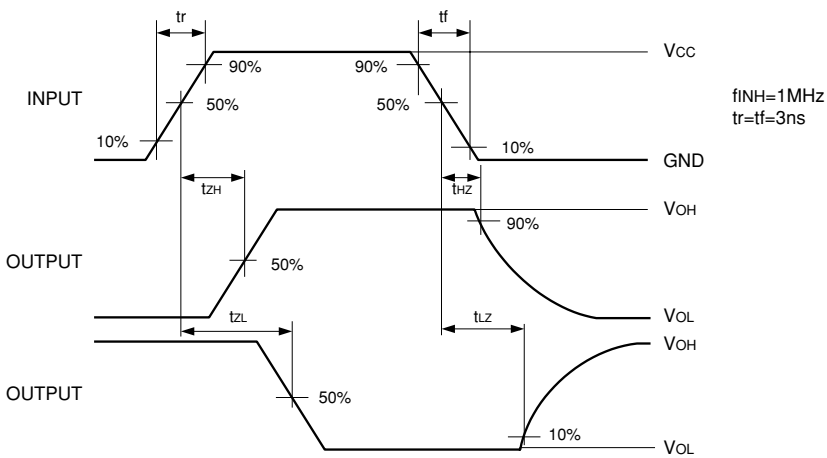


■ Output Enable Time, Output Disable Time

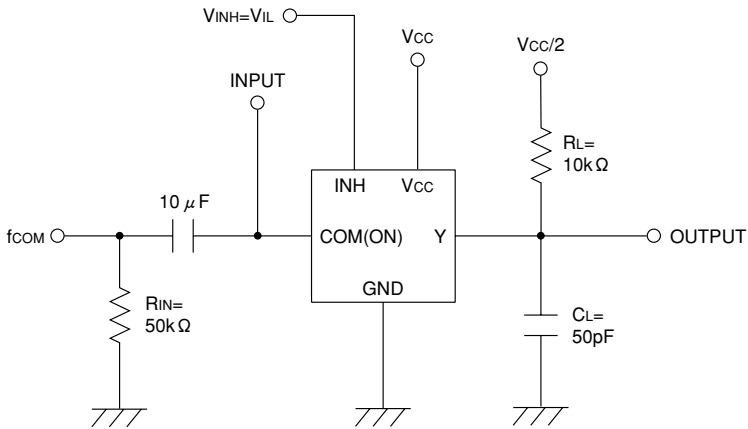
■ Typical Application Circuit



■ Waveforms

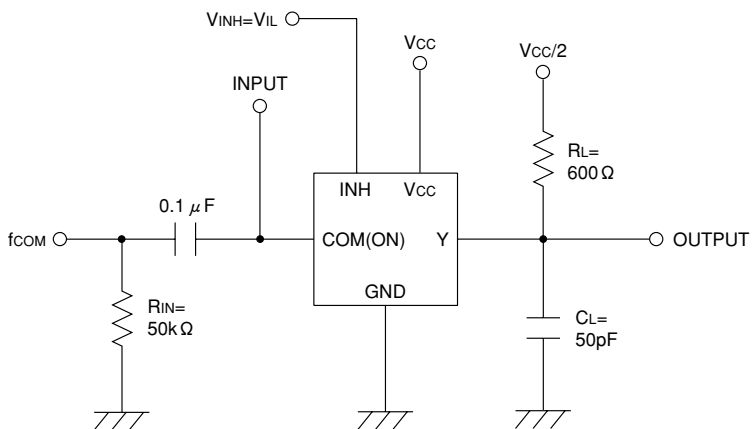


■ Sine Wave Distortion Rate



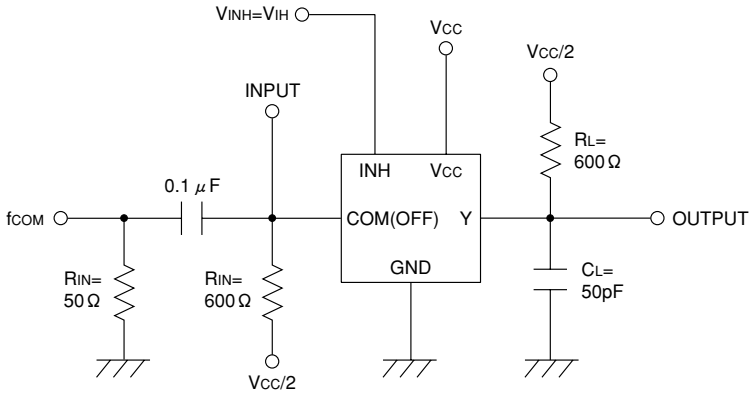
* f_{com} by sine wave ($f=1\text{kHz}$)

■ -3dB Band Width



* f_{com} by sine wave ($V_{COM}=V_{CC}/10[V_{p-p}]$)

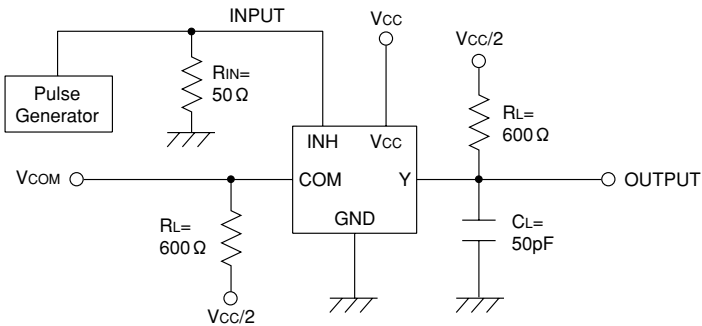
■ Feed Through Test Circuit



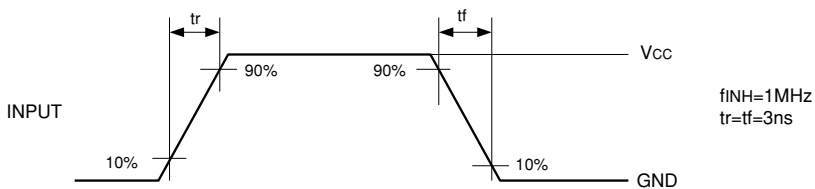
* fcom by sine wave (f=1MHz)

■ Cross Talk (Control Input → Switch Output)

■ Typical Application Circuit

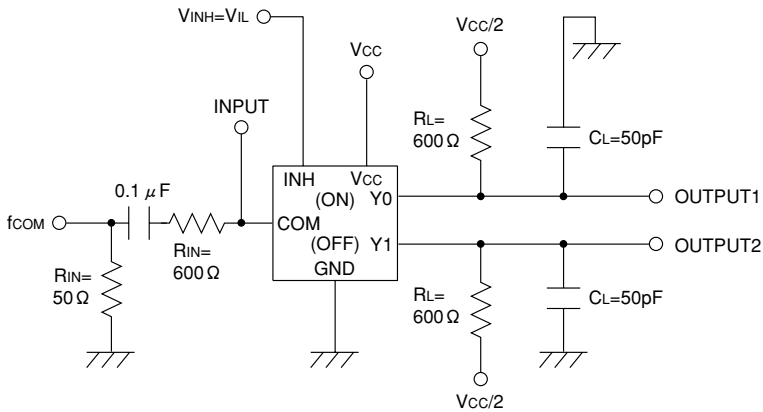


■ Waveforms



■ Cross Talk (between Switches)

■ Typical Application Circuit



■ Waveforms

