XC74WL4053SR

CMOS Logic

■GENERAL DESCRIPTION

XC74WL4053SR is 2-channel analog multiplexer / demultiplexer manufactured using silicon gate CMOS processes. The small supply 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 ON Resistance : R_{ON} = 12Ω (TYP.)

Low Power Consumption : 2μA (MAX.)@Ta=25℃

CMOS Logic 2-channel Analog

Multiplexer/Demultiplexer

Small Package : MSOP-8B

■PIN CONFIGURATION

MSOP-8B
（TOP VIEW）
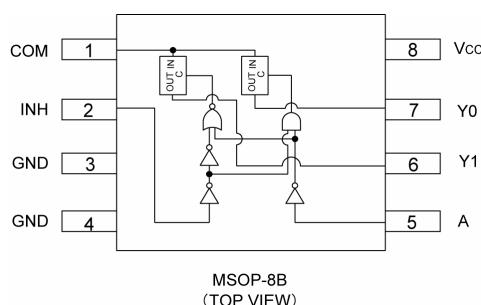
■FUNCTIONS

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℃~85℃

PARAMETER	SYMBOL	RATINGS	UNITS
Supply Voltage	V_{CC}	-0.5~+6.0	V
Control Input Voltage	V_{CONT}	-0.5~+6.0	V
Switch Input/Output Voltage	$V_{i/o}$	-0.5~V_{CC}+0.5	V
Control Input Diode Current	I_{IK}	-20	mA
Switch Output Diode Current	I_{OK}	±20	mA
Switch Input/Output Current	$I_{i/O}$	±25	mA
V_{CC},GND Current	I_{CC},I_{GND}	±50	mA
Power Dissipation (Ta = 25℃)	Pd	300	mW
Storage Temperature Range	Tstg	-65~+150	℃

Note: Voltage is all ground standardized

XC74WL4053SR

■RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	V_{CC}	2~5.5	V
Control Input Voltage	V_{CONT}	0~5.5	V
Switch Input/Output Voltage	$V_{i/o}$	0~VCC	V
Operating Temperature Range	Topr	-40~+85	℃
Input Rise and Fall Time	tr,tf	0~200（VCC=3.3V）	ns
		0~100（VCC=5V）	

■DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	$V_{CC}(V)$	CONDITIONS	Ta=25℃ MIN.	Ta=25℃ TYP.	Ta=25℃ MAX.	Ta=-40℃~85℃ MIN.	Ta=-40℃~85℃ MAX.	UNITS
High Level Control Input Voltage	V_{IH}	2.0		1.50	—	—	1.50	—	V
		3.0		2.10	—	—	2.10	—	
		5.5		3.85	—	—	3.85	—	
Low Level Control Input Voltage	V_{IL}	2.0		—	—	0.50	—	0.50	V
		3.0		—	—	0.90	—	0.90	
		5.5		—	—	1.65	—	1.65	
Peak ON Resistance	R_{ONmax}	2.0	$V_{INH}=V_{IL}$	—	130	350	—	550	Ω
		3.0	$V_{COM}=0~V_{CC}$	—	22	50	—	65	
		4.5	$I_{COM}=1mA$	—	12	25	—	35	
ON Resistance	$R_{ON(1)}$	2.0	$V_{INH}=V_{IL}$	—	23	50	—	65	Ω
		3.0	$V_{COM}=GND$ OR V_{CC}	—	14	30	—	40	
		4.5	$I_{COM}=1mA$	—	10	20	—	25	
Switch ON Resistance Differential	$\triangle R_{ON}$	2.0	$V_{INH}=V_{IL}$	—	13	35	—	55	Ω
		3.0	$V_{COM}=0~V_{CC}$	—	3	6	—	8	
		4.5	$I_{COM}=1mA$	—	2	4	—	6	
Power Off Leak Current	$I_{S(OFF)}$	5.5	$V_{INH}=V_{IH}$, $V_{OM}=V_{CC}$, $V_Y=GND$	—		±0.1	—	±0.1	μA
Power On Leak Current	$I_{S(ON)}$	5.5	$V_{INH}=V_{IL}$, $V_{COM}=V_{CC}$, or GND	—	—	±0.1	—	±0.1	μA
Control Input Current	I_{INH}	0~5.5	$V_{COM}=V_{CC}$ or GND	—	—	±0.1	—	±0.1	μA
Static Supply Current	I_{CC}	5.5	$V_{COM}=V_{CC}$ or GND	—	—	2.0	—	20.2	μA

■SWITCHING ELECTRICAL CHARACTERISTICS

(tr=tf=3ns)

PARAMETER	SYMBOL	C_L	V_CC(V)	CONDITIONS	Ta=25℃ MIN.	Ta=25℃ TYP.	Ta=25℃ MAX.	Ta=-40℃~85℃ MIN.	Ta=-40℃~85℃ MAX.	UNITS
Delay Time	t_{PLH} t_{PHL}	15pF	2.0		—	2.5	12.0	—	15.0	ns
			3.3		—	2.0	4.0	—	5.5	
			5.0		—	1.5	3.0	—	4.0	
		50pF	2.0		—	4.0	20.0	—	23	ns
			3.3		—	3.0	6.0	—	8.0	
			5.0		—	2.0	5.0	—	6.0	
Output Enable Time	t_{ZL} t_{ZH}	15pF	2.0	R_L=1kΩ	—	8.5	45.0	—	60.0	ns
			3.3		—	4.5	9.0	—	11.0	
			5.0		—	3.5	7.5	—	9.0	
		50pF	2.0	R_L=1kΩ	—	9.0	50.0	—	65.0	ns
			3.3		—	5.0	10.0	—	12.0	
			5.0		—	4.0	8.5	—	10.0	
Output Disable Time	t_{LZ} t_{HZ}	15pF	2.0	R_L=1kΩ	—	9.0	45.0	—	55.0	ns
			3.3		—	7.0	17.0	—	20.0	
			5.0		—	6.0	14.0	—	18.0	
		50pF	2.0	R_L=10kΩ	—	12	60.0	—	75.0	ns
			3.3		—	10	23.0	—	27.0	
			5.0		—	8.0	20.0	—	25.0	
Sine Wave Distortion Rate		50pF	3.0	R_L=1kΩ f_{COM}=1kHz	—	0.05	—	—	—	%
-3dB Band Width		50pF	3.0	R_L=600kΩ $20\log_{10}\dfrac{V_Y}{V_{COM}}$=-3dB	—	200	—	—	—	MHz
Feed Through (Switch off)		50pF	3.0	R_L=600kΩ	—	-60	—	—	—	dB
Cross Talk (Control Switches)		50pF	2.0	R_L=600kΩ f_{INH}=1MHz	—	60	—	—	—	mV
			3.0		—	100	—	—	—	
			4.5		—	150	—	—	—	
Cross Talk (Between Switches)		50pF	2.0	R_L=600kΩ f_{COM}=1kHz	—	-60	—	—	—	dB
			3.0		—	-60	—	—	—	
			4.5		—	-60	—	—	—	
Control Input Capacitance	C_{INH}	—	—		—	5	10	—	10	pF
Switch Input/Output Capacitance	$C_{OM/Y}$	—	—		—	6	—	—	—	pF
Feed Through Capacitance	$C_{OM/Y}$	—	—		—	0.5	—	—	—	pF
Power Dissipation Capacitance	C_{pd}	—	—		—	13	—	—	—	pF

■ON RESISTANCE

●Test Circuit

$$R_{ON}= \frac{V_{COM-Y}}{10^{-3}} \ (\Omega)$$
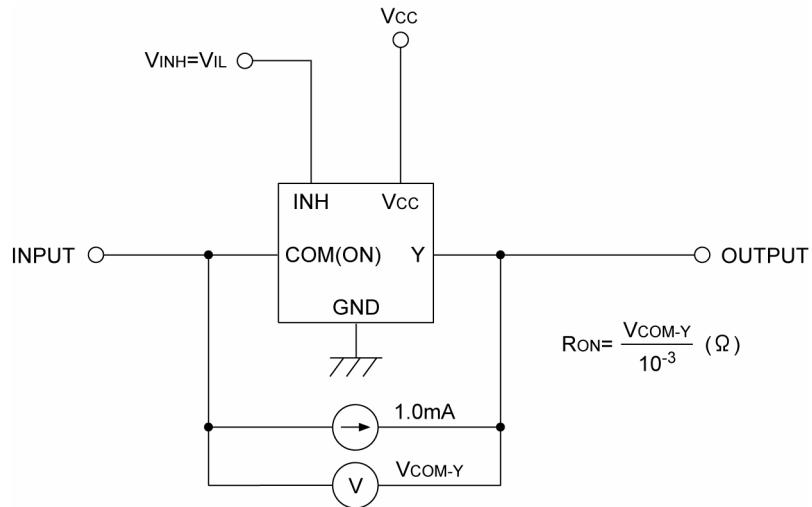
●Input Voltage Dependancies of ON Resistance
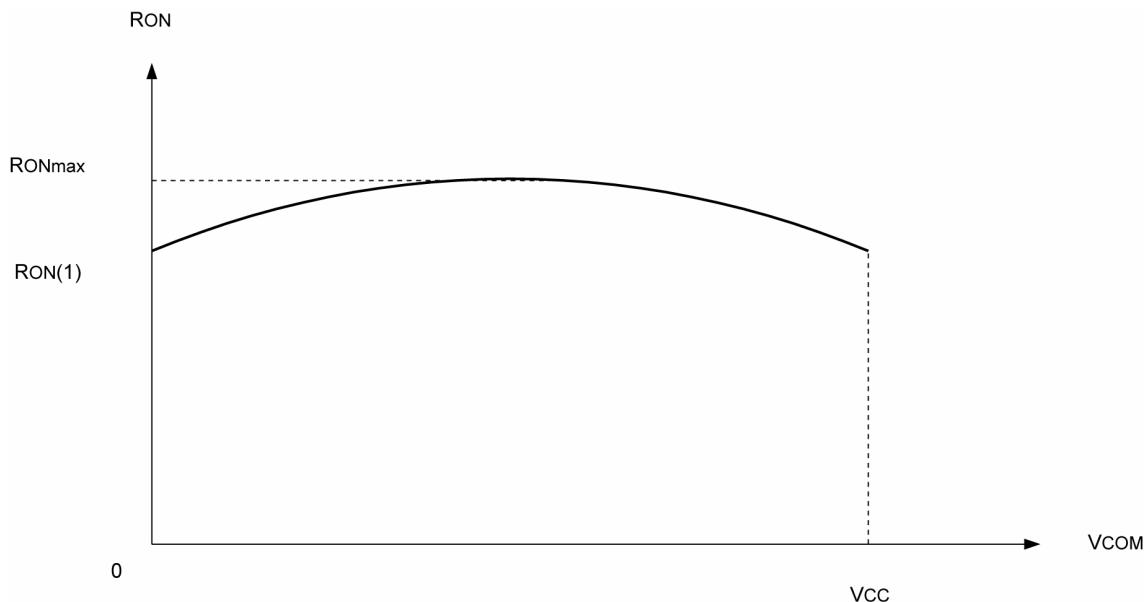
■POWER OFF LEAK CURRENT
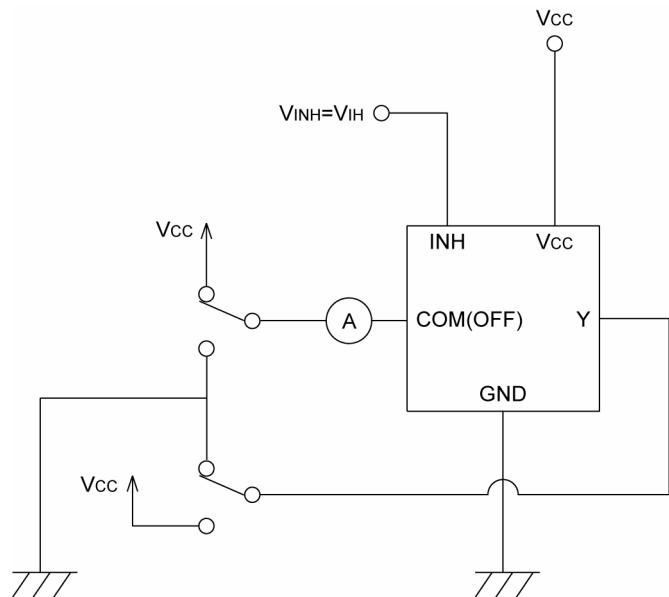
■POWER ON LEAK CURRENT
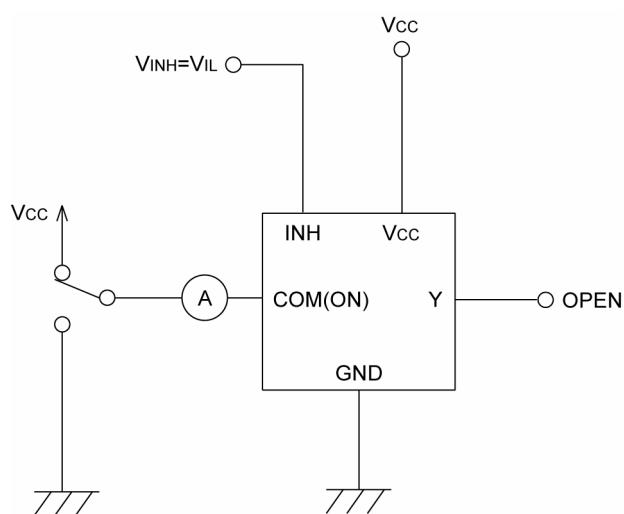
■DELAY TIME

●Test Circuit
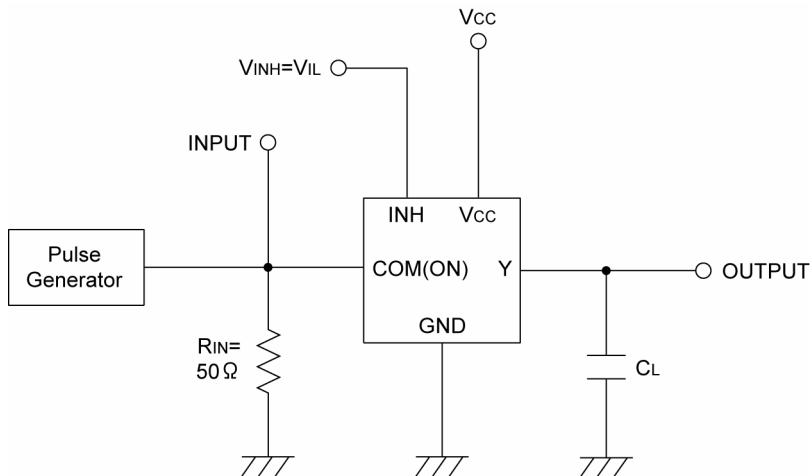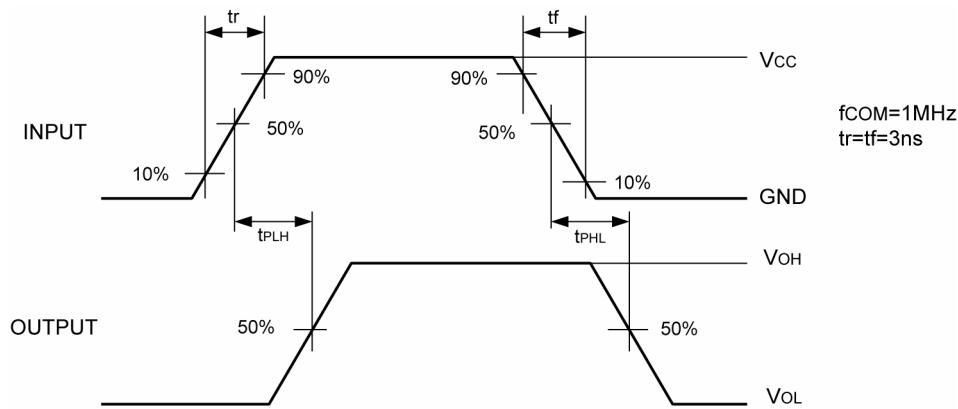
### ●Waveform

■OUTPUT ENABLE TIME, OUTPUT DISABLE TIME

●Test Circuit
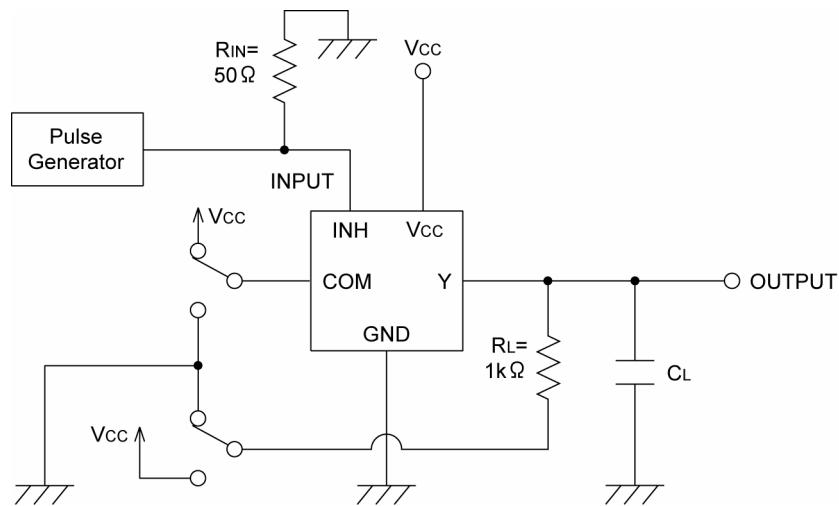
●Waveform

■SINE WAVE DISTORTION RATE

$V_{INH}=V_{IH}$ ○

Vcc

Vcc/2

INPUT

$R_L=$ 10kΩ

10μF

fcom ○

INH   Vcc

COM(ON)   Y   ○ OUTPUT

GND

$R_{IN}=$ 50kΩ

$C_L=$ 50pF
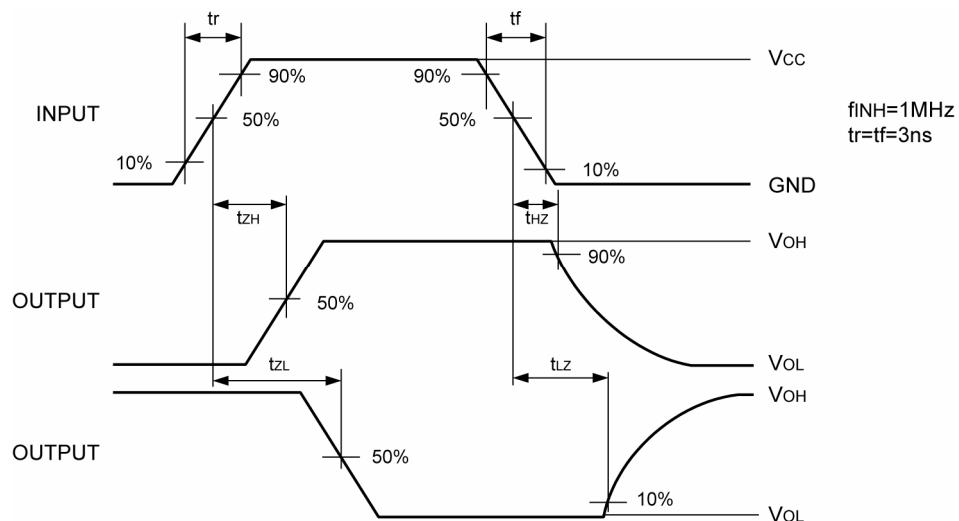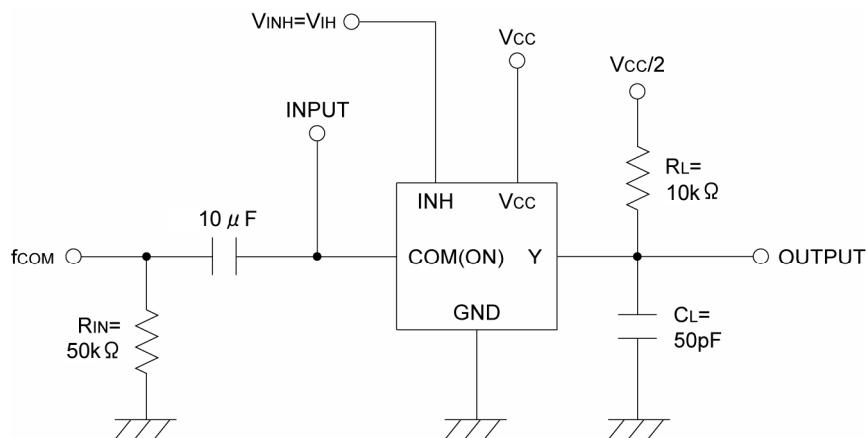
* fcom by sine wave (f=1MHz)

■-3dB BAND WIDTH

$V_{INH}=V_{IL}$ ○

Vcc

Vcc/2

INPUT

$R_L=$ 600Ω

0.1μF

fcom ○

INH   Vcc

COM(ON)   Y   ○ OUTPUT

GND

$R_{IN}=$ 50kΩ

$C_L=$ 50pF
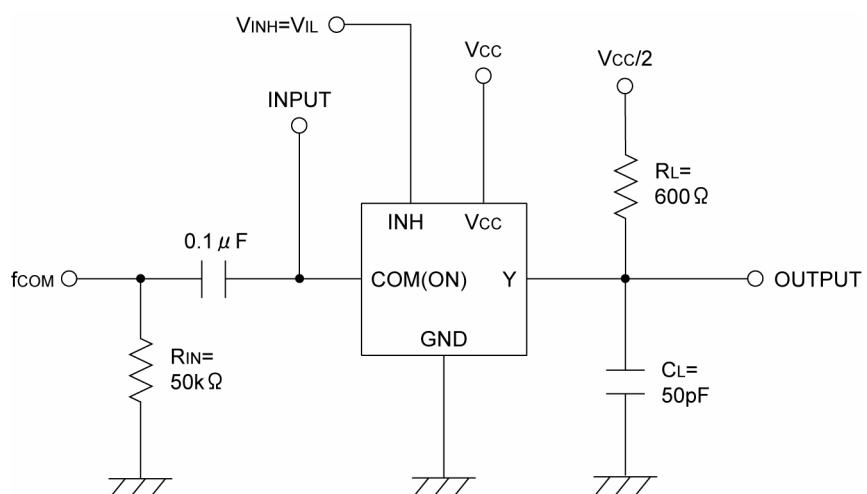
* fcom by since wave($V_{COM}=V_{CC}/10$[Vp-p])

# ■FEED THROUGH TEST CICUIT
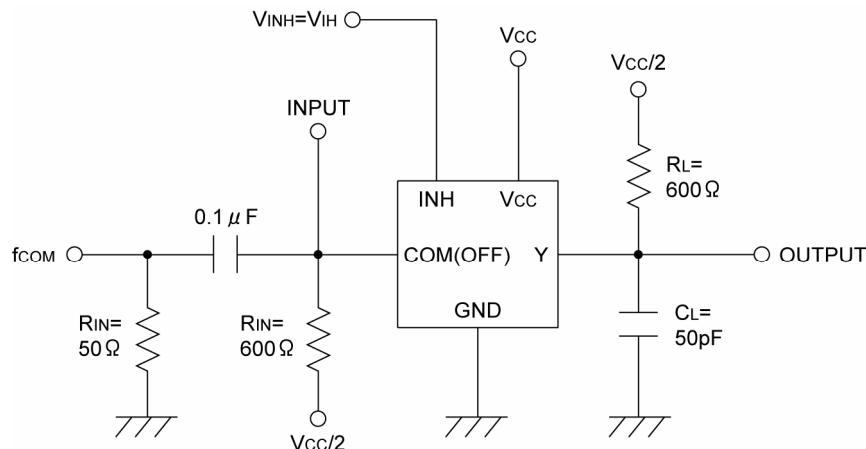
* fCOM by sine wave (f=1MHz)

■CROSS TALK (CONTROL INPUT → SWITCH OUTPUT)

●Test Circuit

●Waveform


fINH=1MHz
tr=tf=3ns
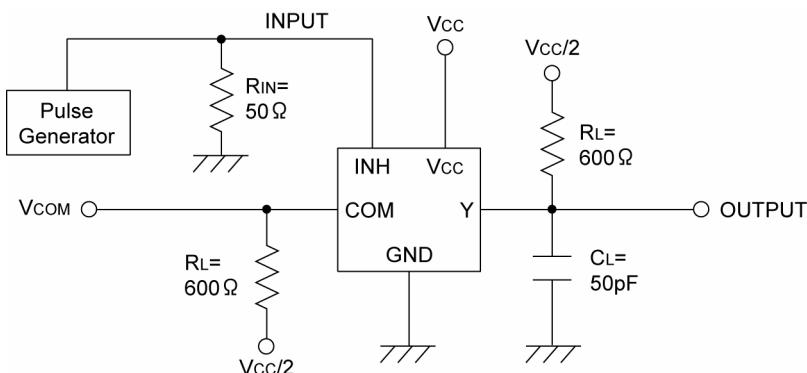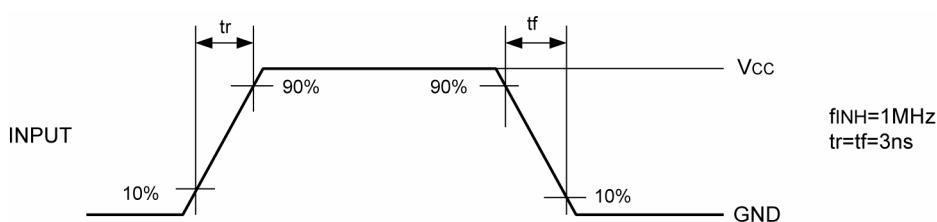
■CROSS TALK (BETWEEN SWITCHES)

●Test Circuit

●Waveform

$fCOM=1MHz$
$tr=tf=3ns$
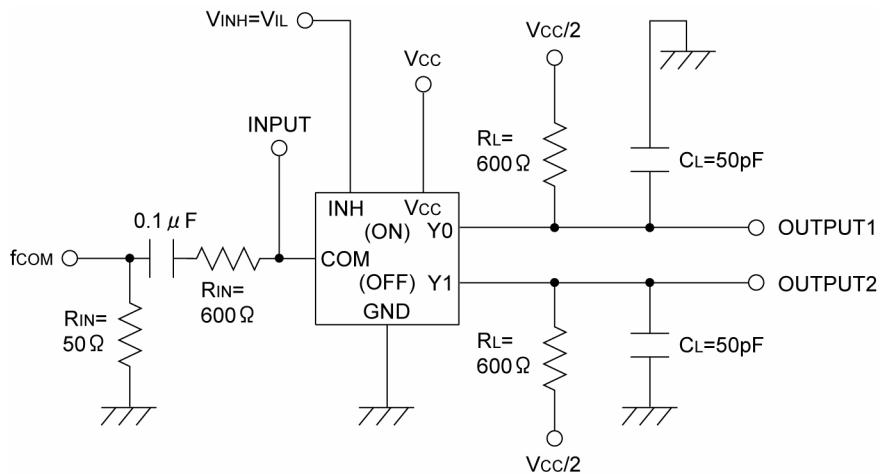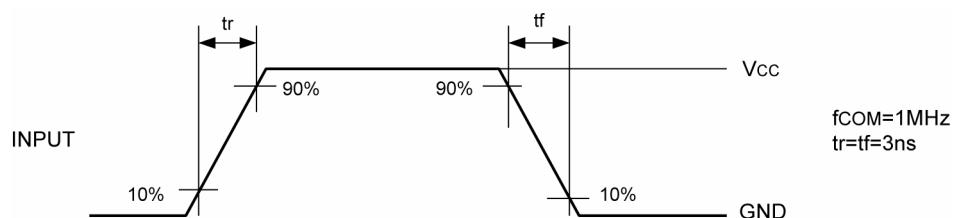
1. The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this catalog is up to date.

2. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this catalog.

3. Please ensure suitable shipping controls (including fail-safe designs and aging protection) are in force for equipment employing products listed in this catalog.

4. The products in this catalog are not developed, designed, or approved for use with such equipment whose failure of malfunction can be reasonably expected to directly endanger the life of, or cause significant injury to, the user.
(e.g. Atomic energy; aerospace; transport; combustion and associated safety equipment thereof.)

5. Please use the products listed in this catalog within the specified ranges.
Should you wish to use the products under conditions exceeding the specifications, please consult us or our representatives.

6. We assume no responsibility for damage or loss due to abnormal use.

7. All rights reserved. No part of this catalog may be copied or reproduced without the prior permission of Torex Semiconductor Ltd.

TOREX SEMICONDUCTOR LTD.