

# XC74WL4066SR



## CMOS Logic

### ◆CMOS Logic Dual Analog Switch/Multiplexer

◆Operating Voltage Range : 2V ~ 5.5V

◆High Speed Operations :  $t_{pd} = 1.5\text{ns}$  TYP

◆Low Power Consumption :  $2\mu\text{A}$  (max)

◆Low ON Resistance :  $R_{on} = 22\Omega$  TYP

◆MSOP-8B Package

### ■Description

XC74WL4066SR is Dual Analog Switch 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** :  $t_{pd} = 1.5\text{ns}$  TYP ( $V_{cc} = 5\text{V}$ )

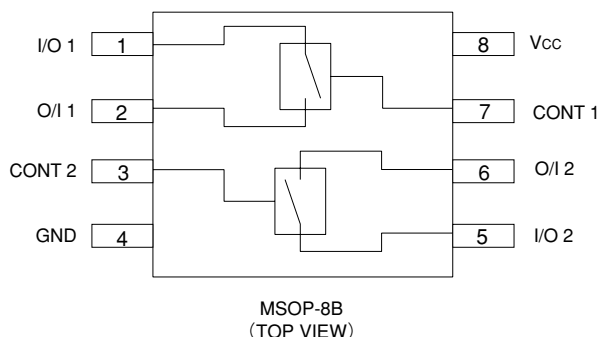
**Operating Voltage Range**: 2V ~ 5.5V

**Low Power Consumption**:  $2\mu\text{A}$  (max)

**Low ON Resistance** :  $22\Omega$  TYP

**Small Package** : MSOP-8B

### ■Pin Configuration



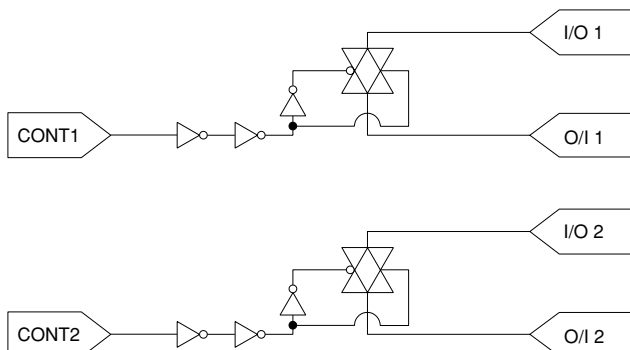
### ■Functions

| Control | State |
|---------|-------|
| L       | OFF   |
| H       | ON    |

H = High Level

L = Low Level

### ■Logic Diagram



## Absolute Maximum Ratings

Ta=−40°C~85°C

| PARAMETER                     | SYMBOL    | RATINGS      | UNITS |
|-------------------------------|-----------|--------------|-------|
| Power Supply Voltage          | VCC       | −0.5~+6.0    | V     |
| Input Voltage                 | VCONT     | −0.5~+6.0    | V     |
| Output Voltage                | Vi/o      | −0.5~VCC+0.5 | V     |
| Input Diode Current           | IiK       | −20          | mA    |
| Output Diode Current          | IOK       | ±20          | mA    |
| Switch 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    |

Note : Voltage is all Ground standardized.

## Recommended Operating Conditions

| PARAMETER                | SYMBOL | CONDITIONS       | UNITS |
|--------------------------|--------|------------------|-------|
| Supply Voltage           | VCC    | 2~5.5            | V     |
| Input Voltage            | VCONT  | 0~5.5            | V     |
| Output Voltage           | Vi/o   | 0~VCC            | V     |
| Operating Temperature    | Topr   | −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  |       |
| "High" Level Control Input Voltage | VIH     | 2.0     |                              | 1.5     | —   | —    | 1.5         | —    | V     |
|                                    |         | 3.0     |                              | 2.1     | —   | —    | 2.1         | —    |       |
|                                    |         | 5.5     |                              | 3.85    | —   | —    | 3.85        | —    |       |
| "Low" Level Control Input Voltage  | VIL     | 2.0     |                              | —       | —   | 0.5  | —           | 0.5  | V     |
|                                    |         | 3.0     |                              | —       | —   | 0.9  | —           | 0.9  |       |
|                                    |         | 5.5     |                              | —       | —   | 1.65 | —           | 1.65 |       |
| Peak ON Resistance                 | RONmax  | 2.0     | VCONT=VIH                    | —       | 130 | 350  | —           | 550  | Ω     |
|                                    |         | 3.0     | VIN=0~VCC                    | —       | 22  | 50   | —           | 65   |       |
|                                    |         | 4.5     | IIN/OUT=1mA                  | —       | 12  | 25   | —           | 35   |       |
| ON Resistance                      | RON(1)  | 2.0     | VCONT=VIH                    | —       | 23  | 50   | —           | 65   | Ω     |
|                                    |         | 3.0     | VIN=GND or VCC               | —       | 14  | 30   | —           | 40   |       |
|                                    |         | 4.5     | IIN/OUT=1mA                  | —       | 10  | 20   | —           | 25   |       |
| Switch ON Resistance Differential  | ΔRON    | 2.0     | VCONT=VIH                    | —       | 13  | 35   | —           | 55   | Ω     |
|                                    |         | 3.0     | VIN=0~VCC                    | —       | 3   | 6    | —           | 8    |       |
|                                    |         | 4.5     | IIN/OUT=1mA                  | —       | 2   | 4    | —           | 6    |       |
| Power Off Leakage Current          | IS(OFF) | 5.5     | VCONT=VIL, VIN=VCC, VOUT=GND | —       | —   | ±0.1 | —           | ±1.0 | μA    |
| Power On Leakage Current           | IS(ON)  | 5.5     | VCONT=VIH, VIN=VCC or GND    | —       | —   | ±0.1 | —           | ±1.0 | μA    |
| Control Input Current              | ICONT   | 0~5.5   | VIN=VCC or GND               | —       | —   | ±0.1 | —           | ±1.0 | μA    |
| Quiscent Supply Current            | ICC     | 5.5     | VIN=VCC or GND               | —       | —   | 2.0  | —           | 20.0 | μA    |

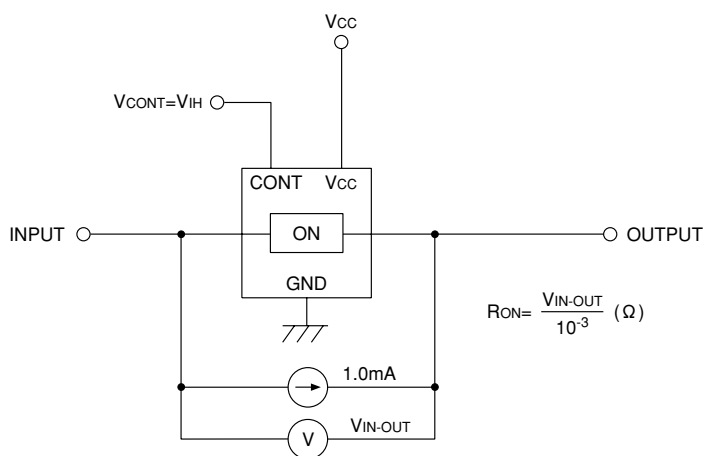
## Switching Electrical Characteristics

(tr=tf=3ns)

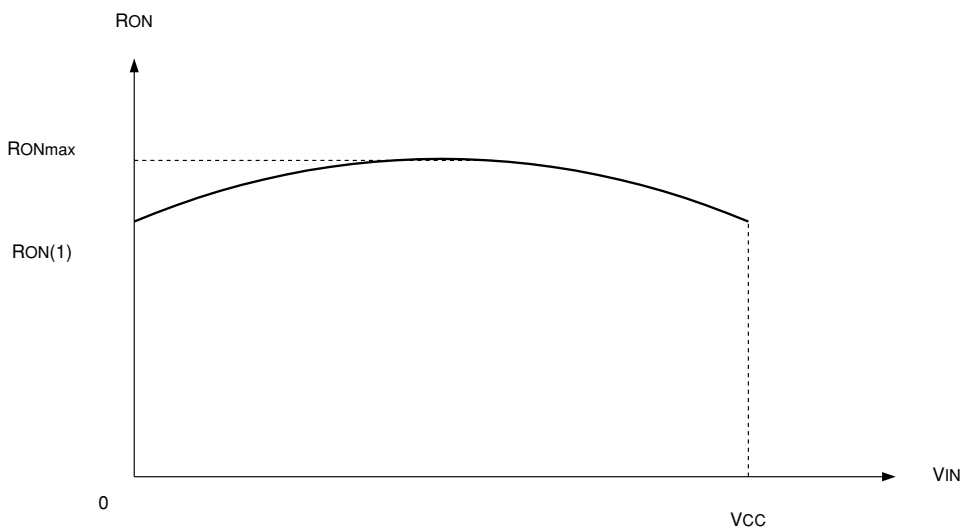
| PARAMETER                        | SYMBOL  |      |         | CONDITIONS  | Ta=25°C |      |     | Ta=-40~85°C |     | UNITS |
|----------------------------------|---------|------|---------|---|---------|------|-----|-------------|-----|-------|
|                                  |         | CL   | VCC (V) |   | MIN     | TYP  | MAX | MIN         | MAX |       |
| Propagation Delay Time           | tPLH    | 15pF | 2.0     |   | —       | 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<br>fIN=1kHz   | —       | 0.05 | —   | —           | —   | %     |
| -3dB Band Width                  |         | 50pF | 3.0     | RL=600Ω<br>$20\log_{10} \frac{V_{OUT}}{V_{IN}} = -3\text{dB}$ | —       | 200  | —   | —           | —   | MHz   |
| Feed Through<br>(Switch-off)     |         | 50pF | 3.0     | RL=600Ω   | —       | -60  | —   | —           | —   | dB    |
| Cross Talk<br>(Control Switch)   |         | 50pF | 2.0     | RL=600Ω   | —       | 60   | —   | —           | —   | mV    |
|                                  |         |      | 3.0     | fCONT=1MHz  | —       | 100  | —   | —           | —   |       |
|                                  |         |      | 4.5     |   | —       | 150  | —   | —           | —   |       |
| Cross Talk<br>(between Switches) |         | 50pF | 2.0     | RL=600Ω   | —       | -60  | —   | —           | —   | dB    |
|                                  |         |      | 3.0     | fIN=1MHz  | —       | -60  | —   | —           | —   |       |
|                                  |         |      | 4.5     |   | —       | -60  | —   | —           | —   |       |
| Control Input Capacitance        | CCONT   | —    | —       |   | —       | 5    | 10  | —           | 10  | pF    |
| Switch Input/Output Capacitance  | CIN/OUT | —    | —       |   | —       | 6    | —   | —           | —   | pF    |
| Feed Through Capacitance         | CIN-OUT | —    | —       |   | —       | 0.5  | —   | —           | —   | pF    |
| Power Dissipation Capacitance    | Cpd     | —    | —       |   | —       | 13   | —   | —           | —   | pF    |

## ■ ON Resistance

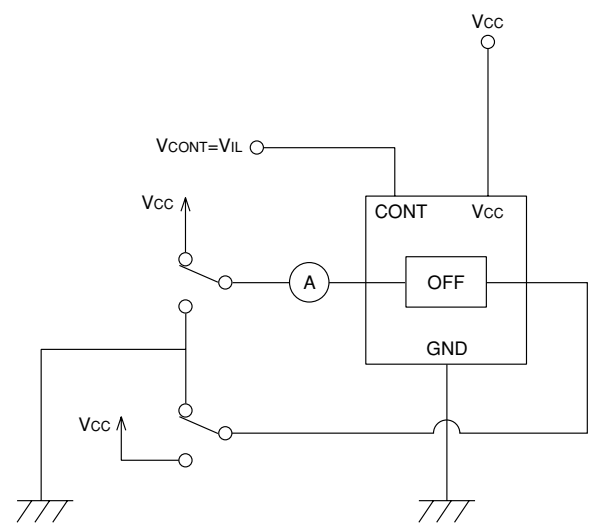
### ■ Typical Application Circuit



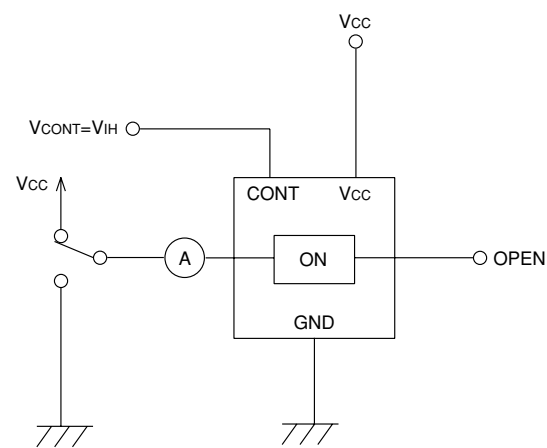
### ■ Voltage Dependencies of ON Resistance



■Power Off Leakage Current

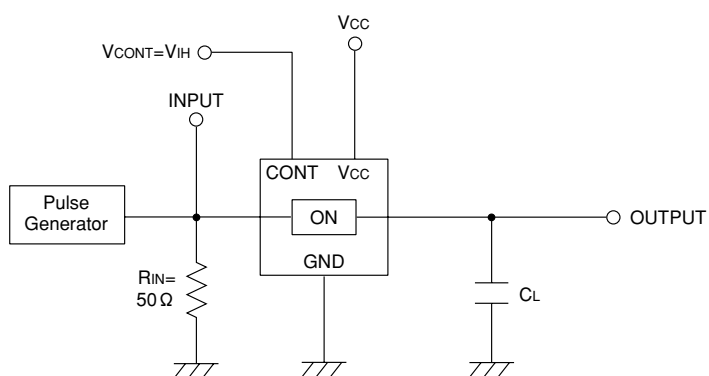


■Power On Leakage Current

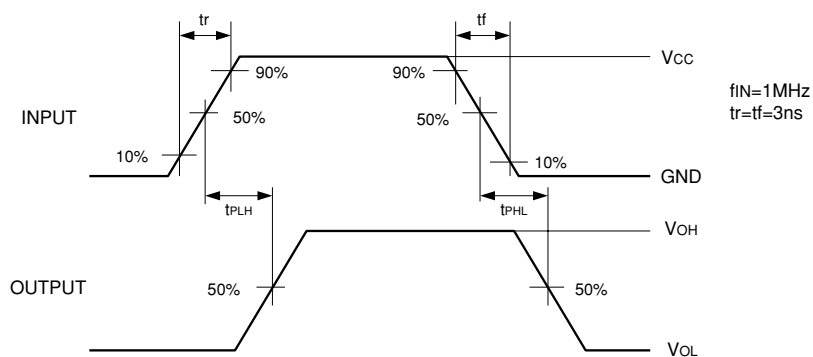


## ■ Propagation Delay Time

### ■ Typical Application Circuit

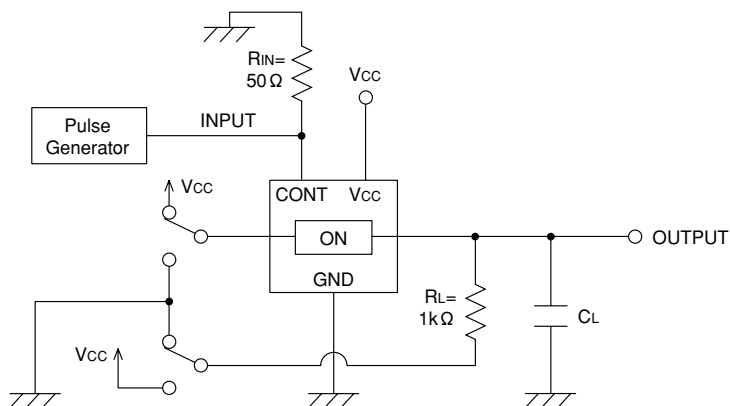


### ■ Waveforms

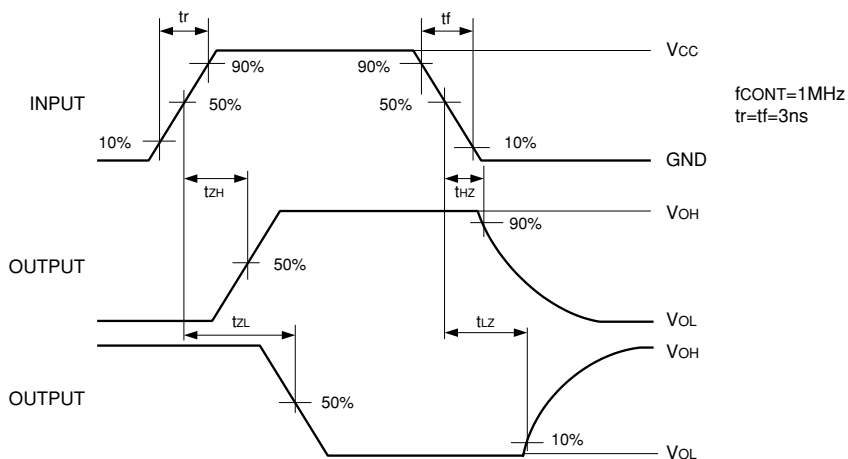


## ■Output Enable Time, Output Disable Time

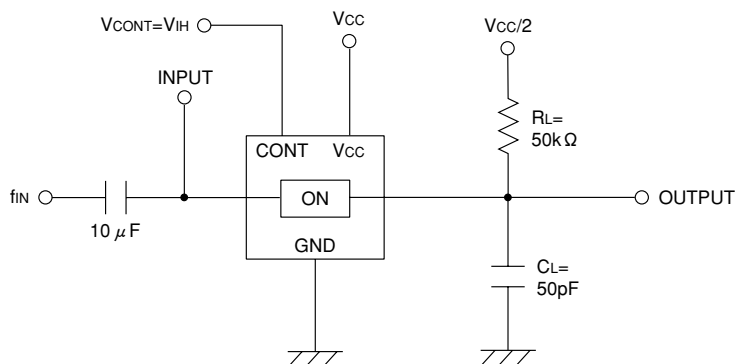
### ■Typical Application Circuit



### ■Waveforms

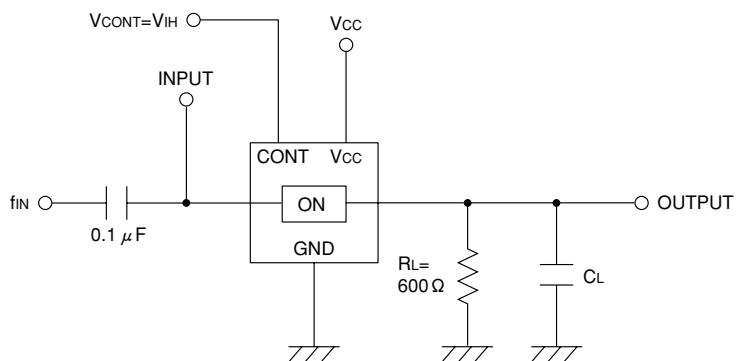


## ■ Sine Wave Distortion Rate



\* Input by sine wave

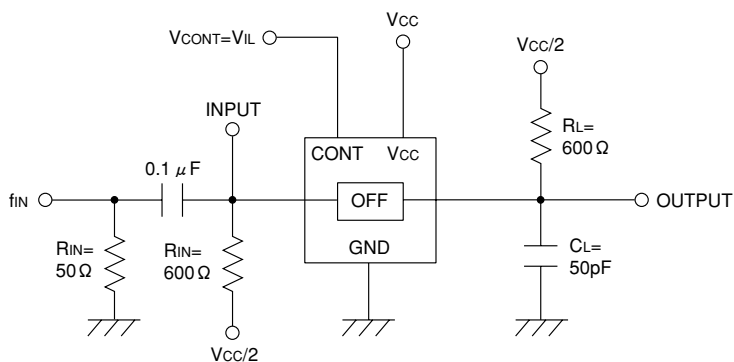
## ■ -3dB Band Width



\* Input by sine wave ( $V_{\text{IN}}=0\text{dBm}$ ,  $f=1\text{MHz}$ )



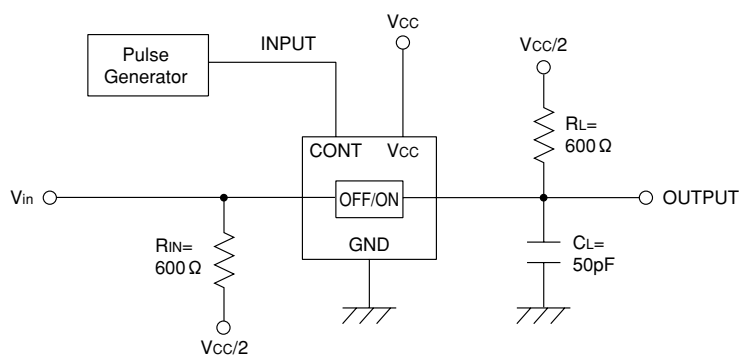
## ■Feed Through Test Circuit



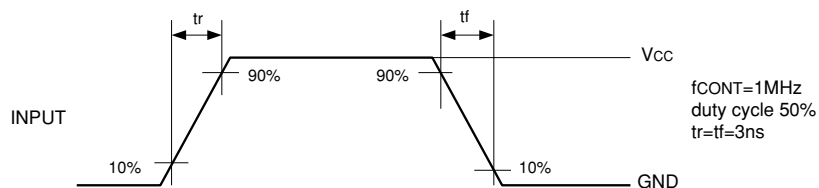
\* Input by sine wave ( $V_{IN}=0dBm$ ,  $f=1MHz$ )

## ■Cross Talk (Control Input → Switch Output)

### ■Typical Application Circuit

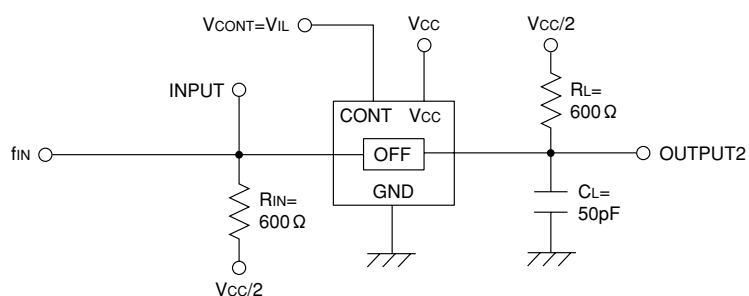
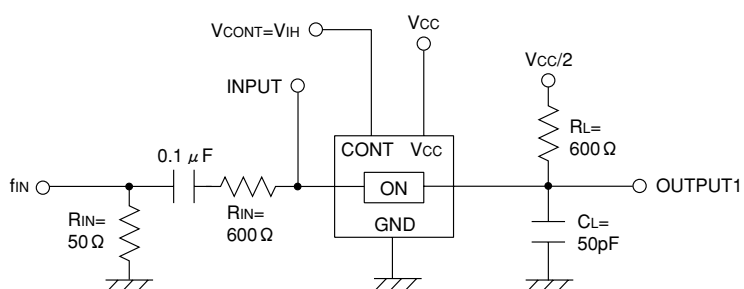


## ■Waveforms



## ■ Cross Talk (between Switches)

### ■ Typical Application Circuits



### ■ Waveforms

