▌dc MiniLogic Device Corporation

◆ **CMOS Logic Analog Switch/Multiplexer**

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

◆ **High Speed Operation   : tpd = 1.5ns TYP**

◆ **Low Power Consumption : 2μA (max)**
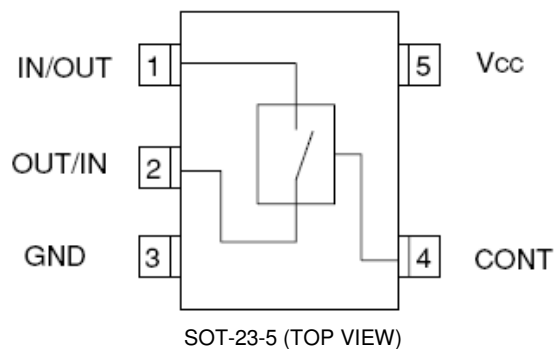
◆ **Low ON Resistance   : Ron=22Ω TYP**

■Description

ML74UL4066MRG is an 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, SOT-23-5 package, high density mounting is possible.

■Pin Configuration

SOT-23-5 (TOP VIEW)

■Applications

● Palmtops
● Digital Equipment

■Features

High Speed Operation   : tpd = 1.5ns TYP (Vcc=5V)
Operating Voltage Range: 2V ~ 5.5V
Low Power Consumption: 2μA (max)
Low ON Resistance   : 22Ω TYP
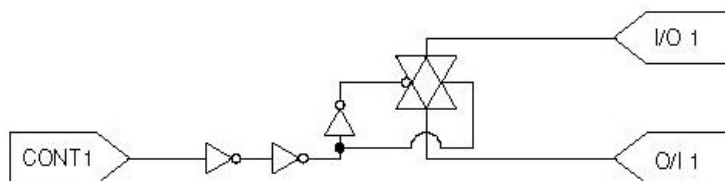**Small Package**   : SOT-23-5

■Function

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	V$_{CONT}$	-0.5 ~ +6.0	V
Output Voltage	V$_{i/O}$	-0.5 ~ Vcc +0.5	V
Input Diode Current	I$_{IK}$	±20	mA
Output Diode current	I$_{OK}$	±20	mA
Switch Output Current	I$_{i/O}$	±25	mA
Vcc, GND Current	I$_{CC}$, I$_{GND}$	±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	V$_{IN}$	0 ~ 5.5	V
Output Voltage	V$_{i/O}$	0 ~ Vcc	V
Operating Temperature	Topr	-40 ~ +85	°C
Input Rise / 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 MIN	Ta=25°C TYP	Ta=25°C MAX	Ta=-40~85°C MIN	Ta=-40~85°C MAX	UNITS
"High" Level Control Input Voltage	V$_{IH}$	2.0		1.5	-	-	1.5	-	V
		3.0		2.1	-	-	2.1	-	
		5.5		3.85	-	-	3.85	-	
"Low" Level Control Input Voltage	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$_{ON}$max	2.0	V$_{CONT}$=V$_{IH}$	-	130	350	-	550	Ω
		3.0	V$_{IN}$=0~Vcc	-	22	50	-	65	
		4.5	I$_{IN/OUT}$=1mA	-	12	25	-	35	
ON Resistance	R$_{ON}$(1)	2.0	V$_{CONT}$= V$_{IH}$	-	23	50	-	65	Ω
		3.0	V$_{IN}$= GND or Vcc	-	14	30	-	40	
		4.5	I$_{IN/OUT}$=1mA	-	10	20	-	25	
Switch ON Resistance Differential	△R$_{ON}$	2.0	V$_{CONT}$= V$_{IH}$	-	13	35	-	55	Ω
		3.0	V$_{IN}$=0~Vcc	-	3	6	-	8	
		4.5	I$_{IN/OUT}$=1mA	-	2	4	-	6	
Power Off Leakage Current	I$_{S}$(OFF)	5.5	V$_{CONT}$= V$_{IL}$, V$_{IN}$= Vcc or GND	-	-	±0.1	-	±1.0	μA
Power Off Leakage Current	I$_{S}$(ON)	5.5	V$_{CONT}$= V$_{IH}$, V$_{IN}$= Vcc or GND	-	-	±0.1	-	±1.0	μA
Control Input Current	I$_{CONT}$	0~5.5	V$_{IN}$=Vcc or GND	-	-	±0.1	-	±1.0	μA
Quiscent Supply Current	Icc	5.5	V$_{IN}$=Vcc or GND	-	-	2.0	-	20.0	μA

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■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	tPHL tPHL	15pF	2.0		-	2.5	12	-	15	ns
			3.3		-	2	4	-	5.5	
			5.0		-	1.5	3	-	4	
		50pF	2.0		-	4	20	-	23	ns
			3.3		-	3	6	-	8	
			5.0		-	2	5	-	6	
Output Enable Time	tZL tZH	15pF	2.0	R_L=1kΩ	-	8.5	45	-	60	ns
			3.3		-	4.5	9	-	11	
			5.0		-	3.5	7.5	-	9	
		50pF	2.0	R_L=1kΩ	-	9	50	-	65	ns
			3.3		-	5	10	-	12	
			5.0		-	4	8.5	-	10	
Output Disable Time	tLZ tHZ	15pF	2.0	R_L=1kΩ	-	9	45	-	55	ns
			3.3		-	7	17	-	20	
			5.0		-	6	14	-	18	
		50pF	2.0	R_L=1kΩ	-	12	60	-	75	ns
			3.3		-	10	23	-	27	
			5.0		-	8	20	-	25	
Sine Wave Distortion Rate		50pF	3.0	R_L=10kΩ fIN=1kHz	-	0.05	-	-	-	%
-3dB Band Width		50pF	3.0	R_L=600kΩ 20log10 $\underline{V_{OUT}}$=-3dB VIN	-	200	-	-	-	MHz
Feed Through (Switch-off)		50pF	3.0	R_L=600kΩ	-	-60	-	-	-	dB
Cross Talk (Control Switch)		50pF	2.0	R_L=600kΩ fCONT=1MHz	-	60	-	-	-	mV
			3.0		-	100	-	-	-	
			4.5		-	150	-	-	-	
Cross Talk (between Switches)		50pF	2.0	R_L=600kΩ fIN=1MHz	-	-60	-	-	-	dB
			3.0		-	-60	-	-	-	
			4.5		-	-60	-	-	-	
Control Input Capacitance	C_{CONT}	-	-		-	5	10	-	10	pF
Switch Input/Output Capacitance	$C_{IN/OUT}$	-	-		-	6	-	-	-	pF
Feed Through Capacitance	C_{IN-OUT}	-	-		-	0.5	-	-	-	pF
Power Dissipation Capacitance	Cpd	-	-		-	13	-	-	-	pF

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■ON Resistance

■Typical Application Circuit

$$R_{ON} = \frac{V_{IN-OUT}}{10^{-3}} \; (\Omega)$$
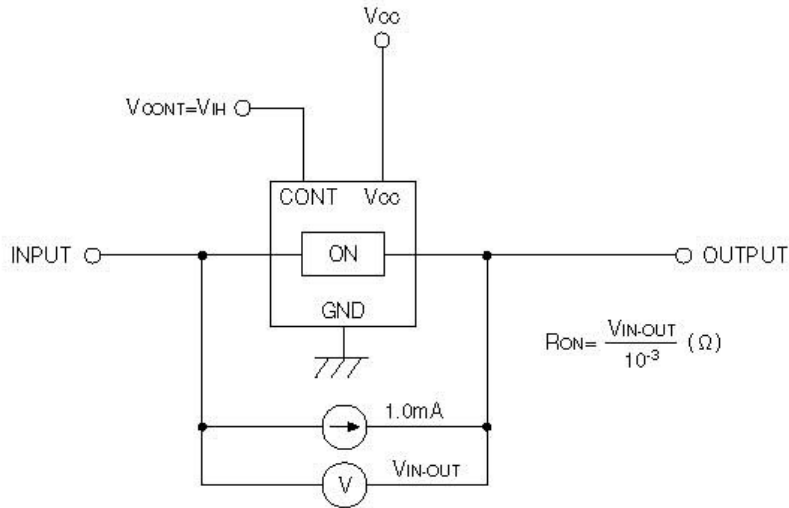
■Voltage Dependancies of ON Resistance

![Mdc logo] **MiniLogic Device Corporation**
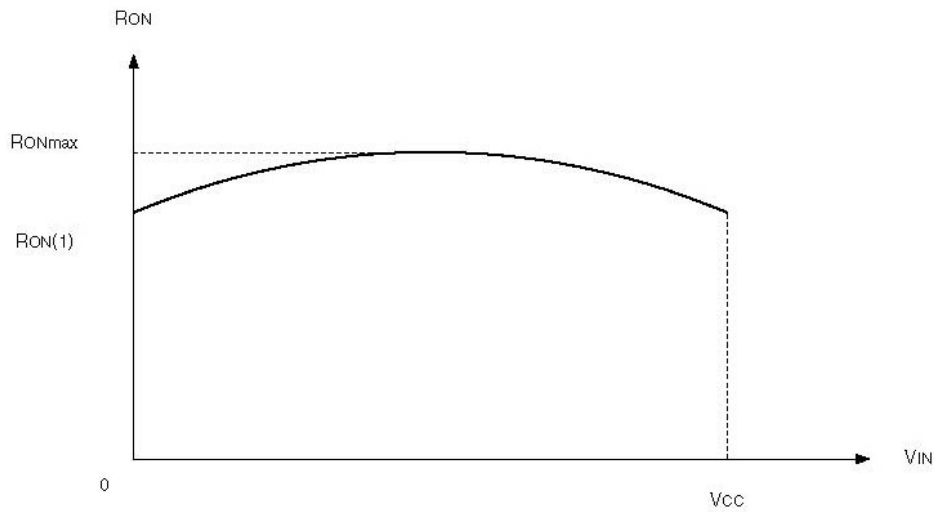
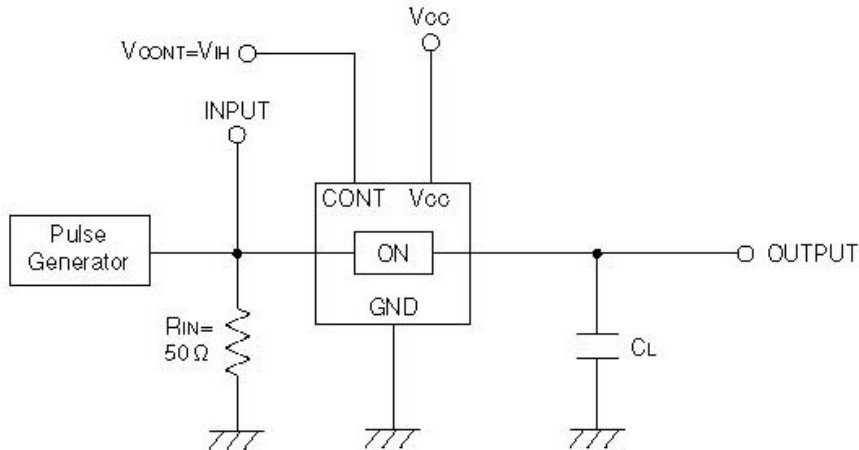■ **Power Off Leakage Current**
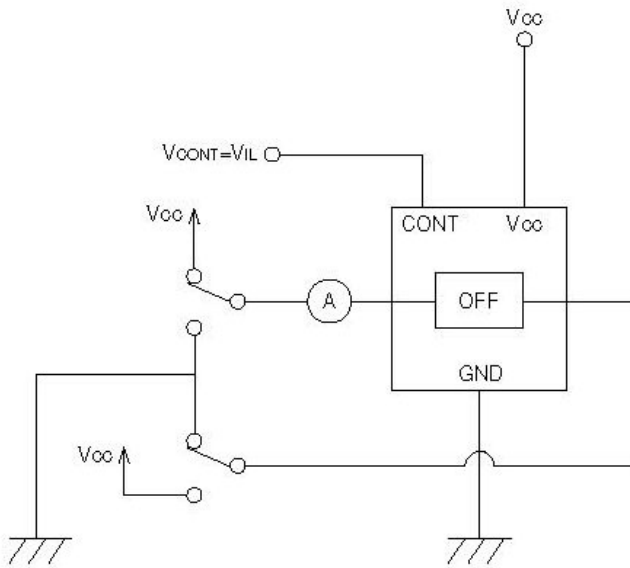
■ **Power On Leakage Current**
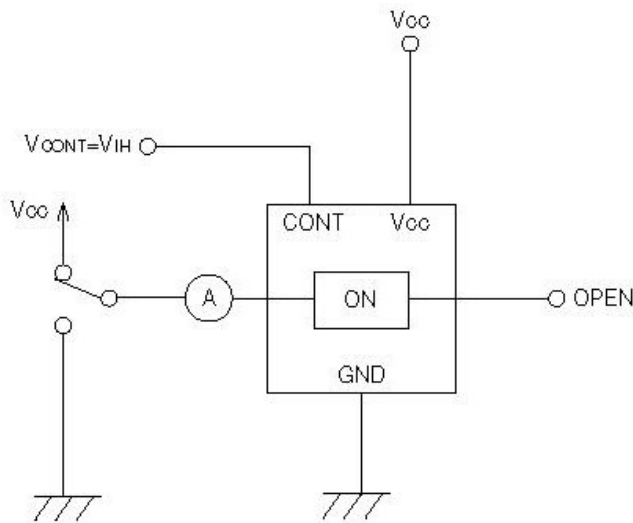
■Propagation Delay Time

■Typical Application Circuit

■Waveforms

![logo] MiniLogic Device Corporation
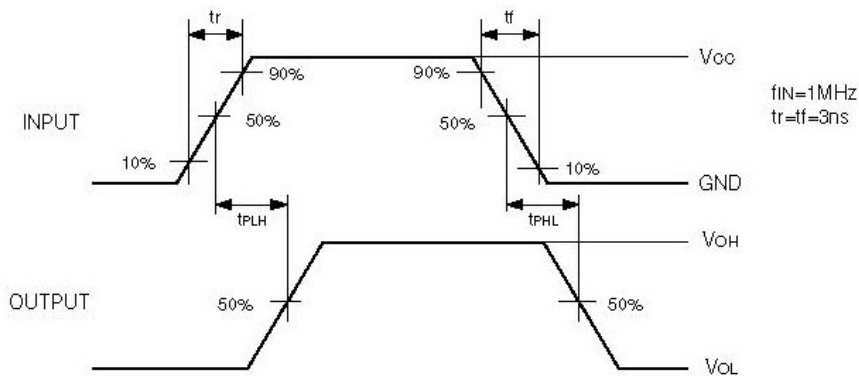
■Output Enable Time, Output Disable Time

■Typical Application Circuit
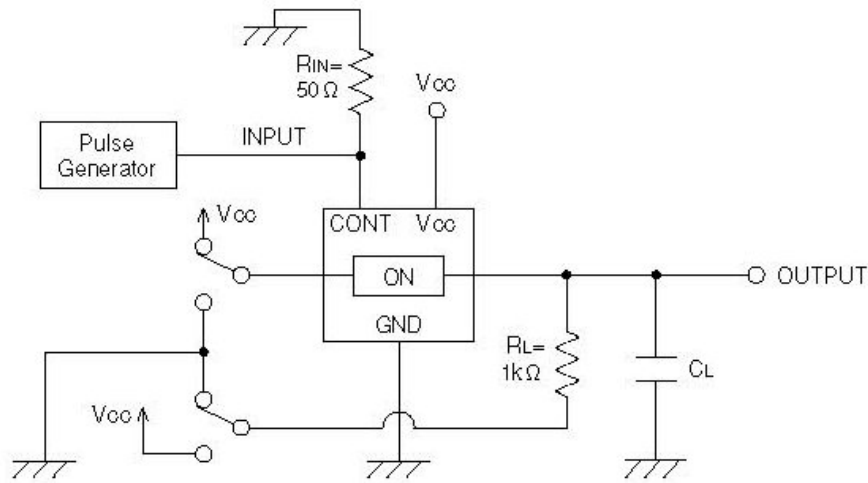
■Waveforms

fCONT=1MHz
tr=tf=3ns
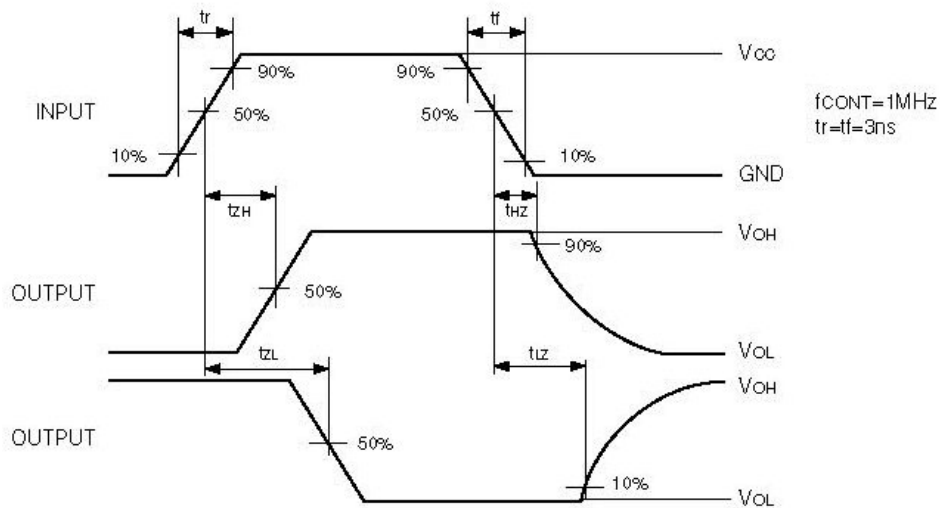
■Sine Wave Distortion Rate
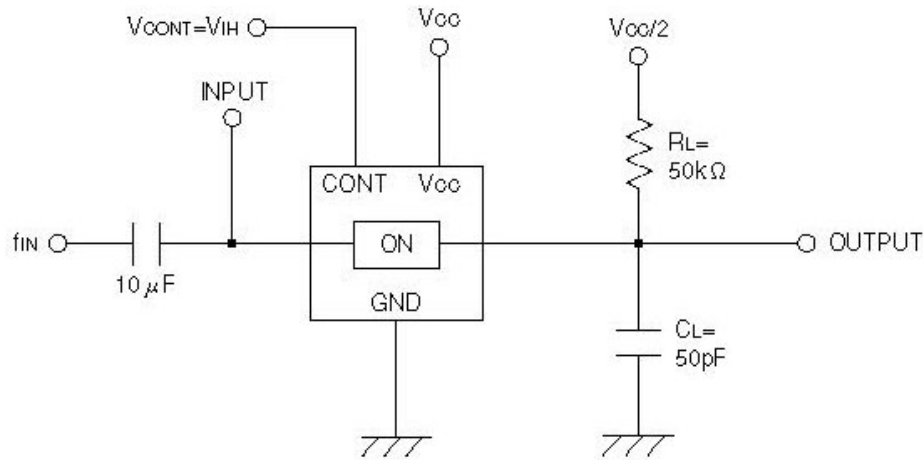
* Input by sine wave

■-3dB Band Width

* Input by sine wave (VIN=0dBm, f=1MHz)

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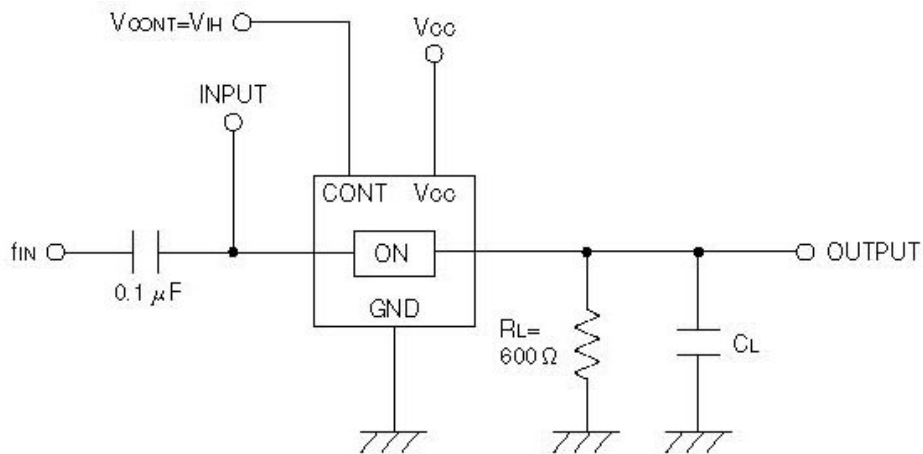
■Feed Through Test Circuit
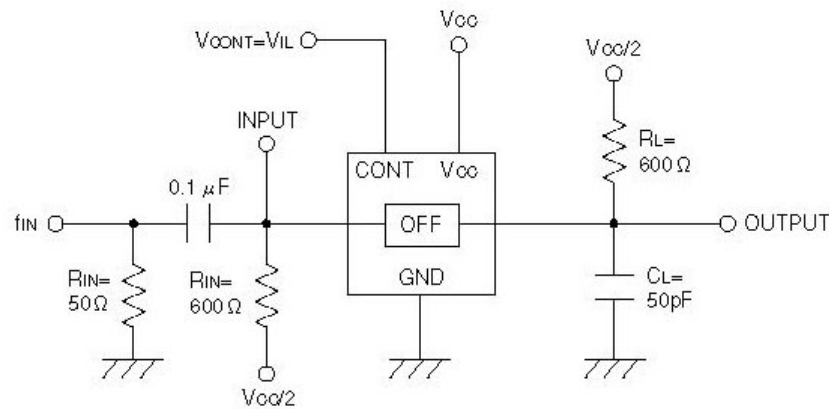
* Input by sine wave (V$_{IN}$=0dBm, f=1MHz)

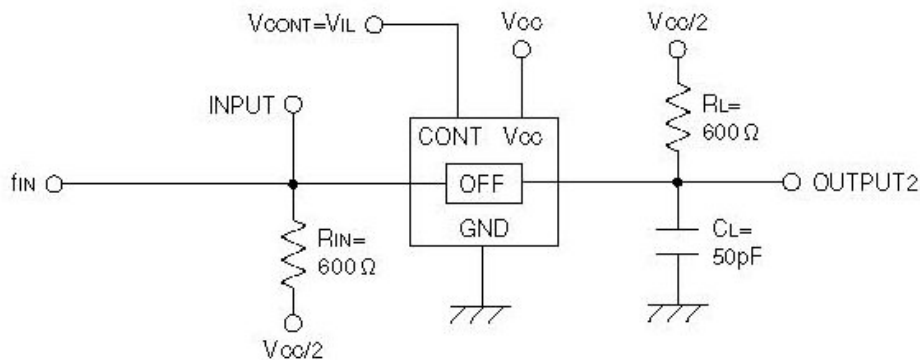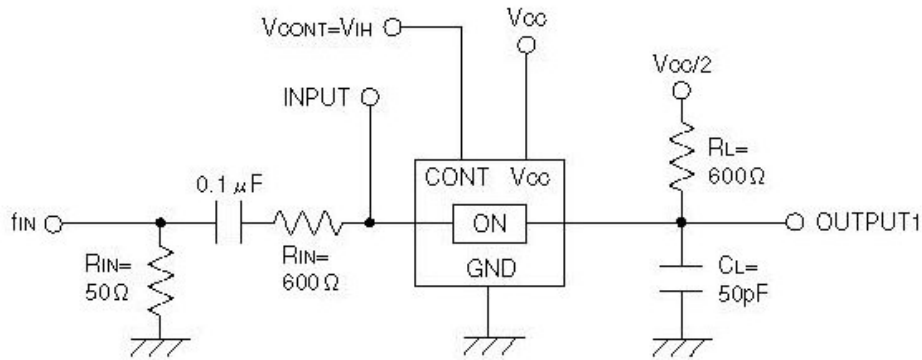## ■Cross Talk (Control Input ⟶ Switch Output)
■Typical Application Circuit

■Waveforms

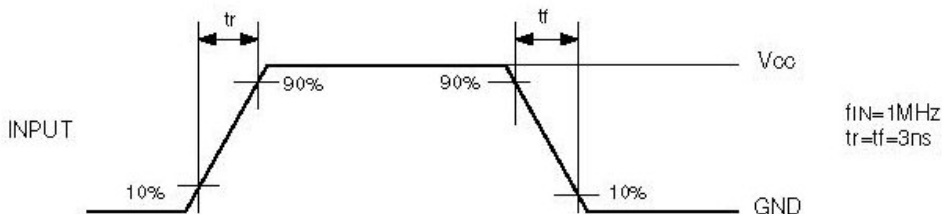f$_{CONT}$=1MHz
duty cycle 50%
tr=tf=3ns

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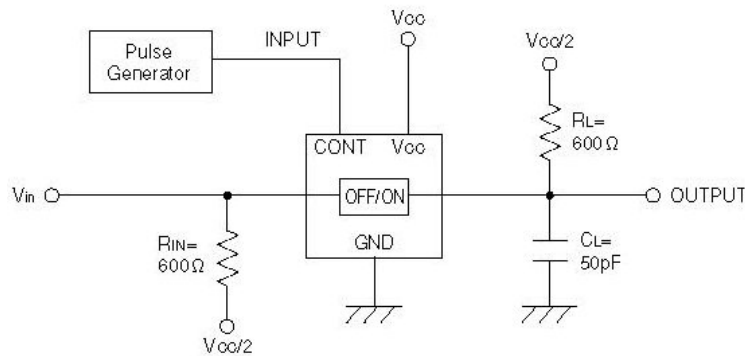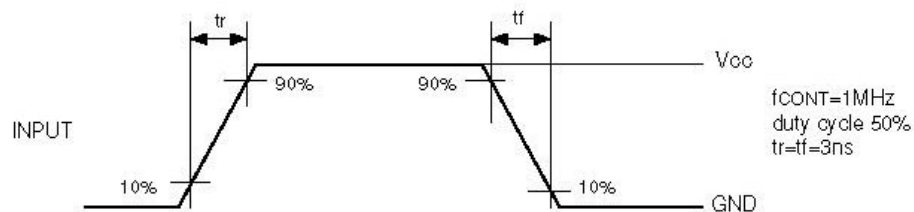
■Cross Talk (Between Switches)

■Typical Application Circuit

■Waveforms