

XC74UL4066



CMOS Logic

- ◆CMOS Logic Analog Switch
- ◆Operating Voltage Range : 2V ~ 5.5V
- ◆High Speed Operations : $t_{pd} = 2\text{ns}$ TYP
- ◆Low Power Consumption : $1\mu\text{A}$ (max)
- ◆Low ON Resistance : $R_{on} = 22\Omega$ TYP

Applications

- Palmtops
- Digital Equipment

Description

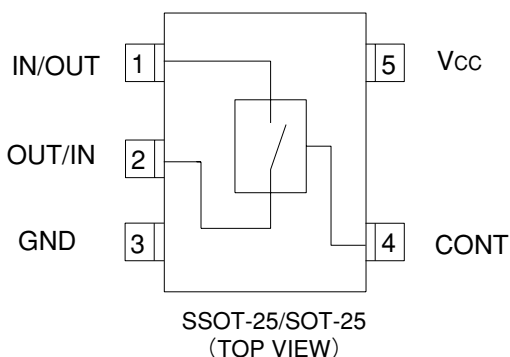
XC74UL4066M is CMOS Analog Switch manufactured using silicon gate CMOS processes. The small quiescent current, which is one of the features of the CMOS logic, gives way to high speed analog or digital signal switching.

As the series is integrated into a mini molded, SSOT-25 and SOT-25 packages, high density mounting is possible.

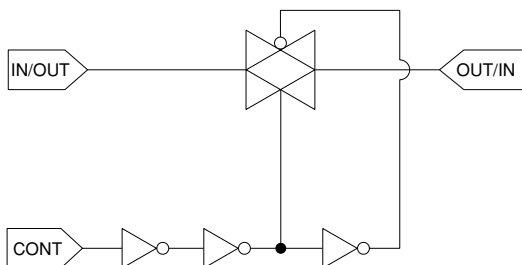
Features

- High Speed Operations** : $t_{pd} = 2\text{ns}$ TYP
- Operating Voltage Range**: 2V ~ 5.5V
- Low Power Consumption**: $1\mu\text{A}$ (max)
- Low ON Resistance** : 22Ω TYP
- Ultra Small Package** : SSOT-25 and SOT-25

Pin Configuration



Logic Diagram



Functions

CONTROL	STATE
L	OFF
H	ON

H = High Level
L = Low Level

Absolute Maximum Ratings

Ta=-40°C~85°C

PARAMETER		SYMBOL	RATINGS	UNITS
Power Supply Voltage		V _{CC}	-0.5 ~ +6.0	V
Control Input Voltage		V _{CONT}	-0.5 ~ +6.0	V
Switch Output Voltage		V _{OUT}	-0.5 ~ V _{CC} +0.5	V
Control Input Diode Current		I _{IK}	-20	mA
Switch Output Diode Current		I _{OK}	±20	mA
Switch Output Current		I _{OUT}	±25	mA
V _{CC} , GND Current		I _{CC} , I _{GND}	±50	mA
Power Dissipation (Ta=25°C)	SSOT-25	P _d	150	mW
	SOT-25		200	
Storage Temperature		T _{stg}	-65 ~ +150	°C

Note : Voltage is all Ground standardized.

Recommended Operating Conditions

PARAMETER	SYMBOL	V _{CC} (V)	CONDITIONS	UNITS
Supply Voltage	V _{CC}	—	2 ~ 5.5	V
Input Voltage	V _{IN}	—	0 ~ 5.5	V
Output Voltage	V _{OUT}	—	0 ~ V _{CC}	V
Operating Temperature	T _{opr}	—	-40 ~ +85	°C
Input Rise and Fall Time	tr, tf	3.3	0 ~ 100	ns/V
		5.0	0 ~ 20	

DC Electrical Characteristics

PARAMETER	SYMBOL	V _{CC} (V)	CONDITIONS	Ta=25°C			Ta=-40~85°C		UNITS
				MIN	TYP	MAX	MIN	MAX	
"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 _{ONmax}	2.0	V _{CONT} =V _{IH}	—	130	350	—	550	Ω
		3.0	V _{IN} =0~V _{CC}	—	22	50	—	65	
		4.5	I _{IN} /O _{UT} =1mA	—	12	25	—	35	
ON Resistance	R _{ON(1)}	2.0	V _{CONT} =V _{IH}	—	23	50	—	65	
		3.0	V _{IN} =GND or V _{CC}	—	14	30	—	40	
		4.5	I _{IN} /O _{UT} =1mA	—	10	20	—	25	
Power Off Leakage Current	I _{S(OFF)}	5.5	V _{CONT} =V _{IL} , V _{IN} =V _{CC} , V _{OUT} =GND	—	—	±0.1	—	±1.0	μA
Power On Leakage Current	I _{S(ON)}	5.5	V _{CONT} =V _{IH} , V _{IN} =V _{CC} or GND	—	—	±0.1	—	±1.0	μA
Control Input Current	I _{CONT}	5.5	V _{IN} = V _{CC} or GND	—	—	±0.1	—	±1.0	μA
Quiescent Supply Current	I _{CC}	5.5	V _{IN} = V _{CC} or GND	—	—	1.0	—	5.0	μA

■ Switching Electrical Characteristics

(tr = tf = 3ns)

PARAMETER	SYMBOL	V _{CC} (V)	CONDITIONS	Ta=25°C			Ta=-40~85°C		UNITS
				MIN	TYP	MAX	MIN	MAX	
Propagation Delay Time	t _{PLH}	2.0	R _L =10kΩ	—	4	20	—	23	ns
	t _{PHL}	3.3	C _L =50pF	—	3	6	—	8	
		5.0		—	2	5	—	6	
Output Enable Time	t _{ZL}	2.0	R _L =1kΩ	—	9	50	—	65	ns
	t _{ZH}	3.3	C _L =50pF	—	5	10	—	12	
		5.0		—	3	8	—	10	
Output Disable Time	t _{LZ}	2.0	R _L =1kΩ	—	12	60	—	75	ns
	t _{HZ}	3.3	C _L =50pF	—	10	23	—	27	
		5.0		—	8	20	—	25	
Sine Wave Distortion Rate		3.0	R _L =10kΩ C _L =50pF f _{IN} =1kHz	—	0.05	—	—	—	%
-3dB Band Width		3.0	R _L =600Ω, C _L =50pF $20\log_{10} \frac{V_{OUT}}{V_{IN}} = -3dB$	—	200	—	—	—	MHz
Feed Through (Switch-off)		3.0	R _L =600Ω C _L =50pF f _{IN} =1MHz	—	-60	—	—	—	dB
Cross Talk (Control Switch)		2.0	R _L =600Ω	—	60	—	—	—	mV
		3.0	C _L =50pF	—	100	—	—	—	
		4.5	f _{IN} =1MHz	—	150	—	—	—	
Maximum Control Input Frequency		2.0	R _L =1kΩ	—	30	—	—	—	MHz
		3.0	C _L =15pF	—	30	—	—	—	
		4.5	V _{OUT} =V _{CC} /2	—	30	—	—	—	
Control Input Capacitance	C _{in}	—		—	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	C _{PD}	—		—	13	—	—	—	pF

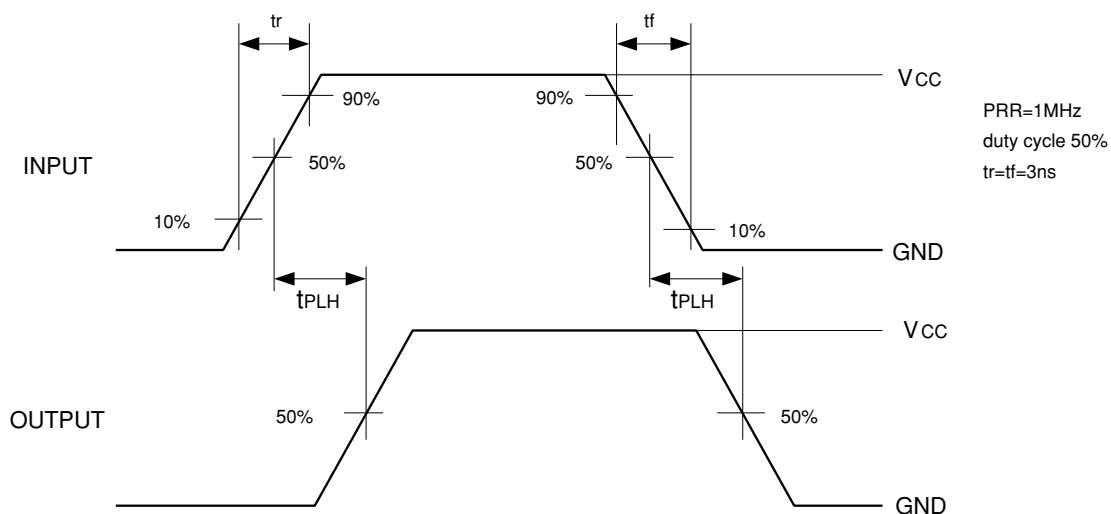
Note: C_{PD} is defined as the value of the internal equivalent capacitance which is derived from the operating supply current at times of "No Load".

Ensure that the average operating supply current at times of "No Load" meets the following conditions:

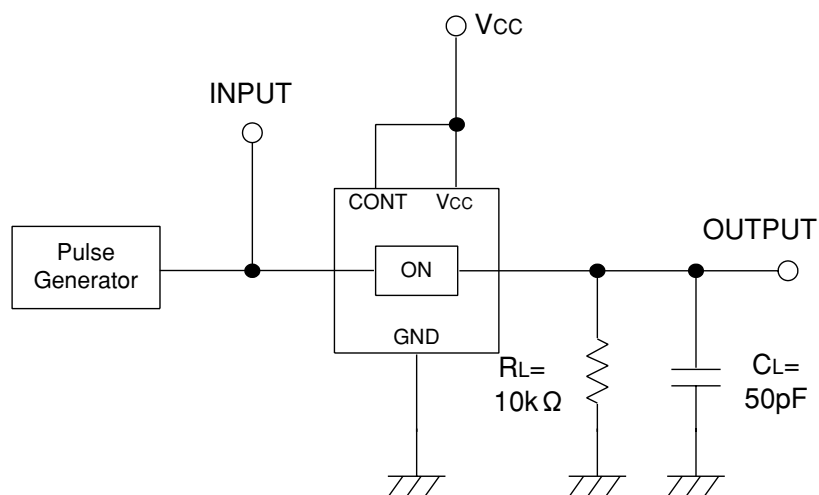
I_{CC (opr)}=C_{PD} · V_{CC} · f_{IN}+I_{CC}

■ Propagation Delay Time

■ Waveforms



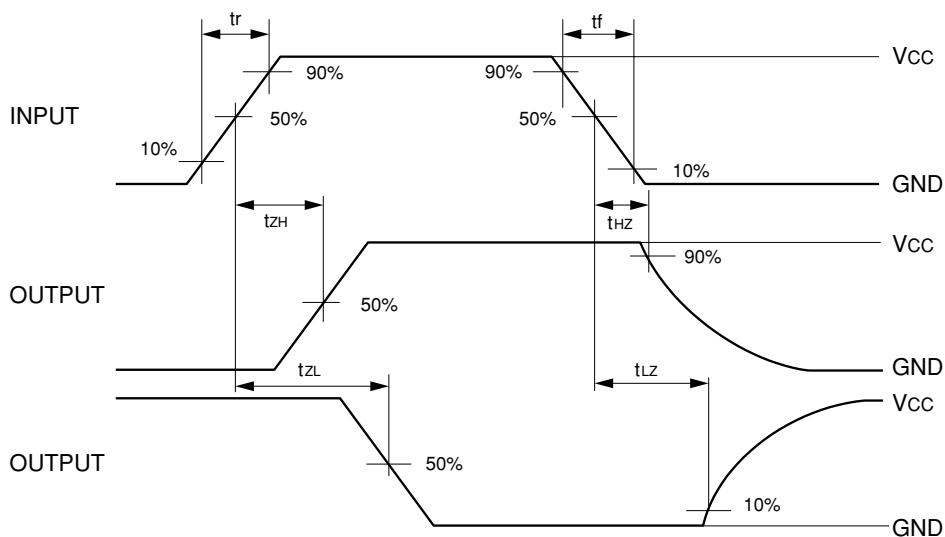
■ Typical Application Circuit



Note: Open output when measuring supply current

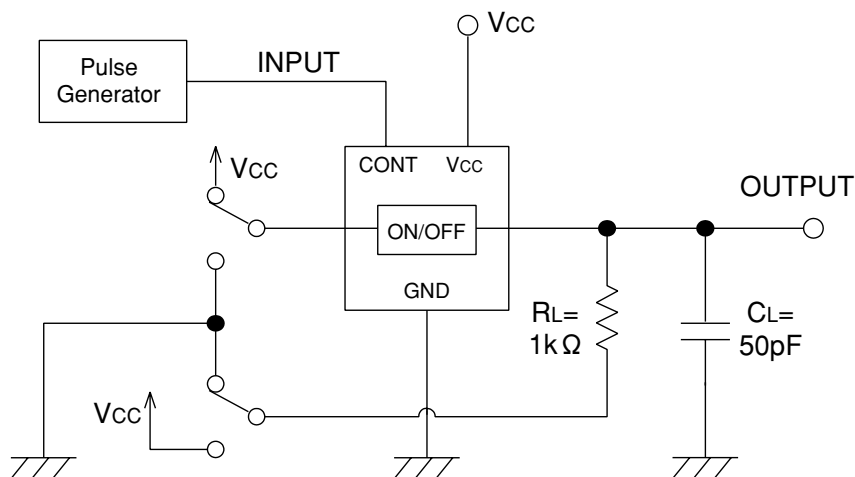
■ Output Enable Time, Output Disable Time

■ Waveforms

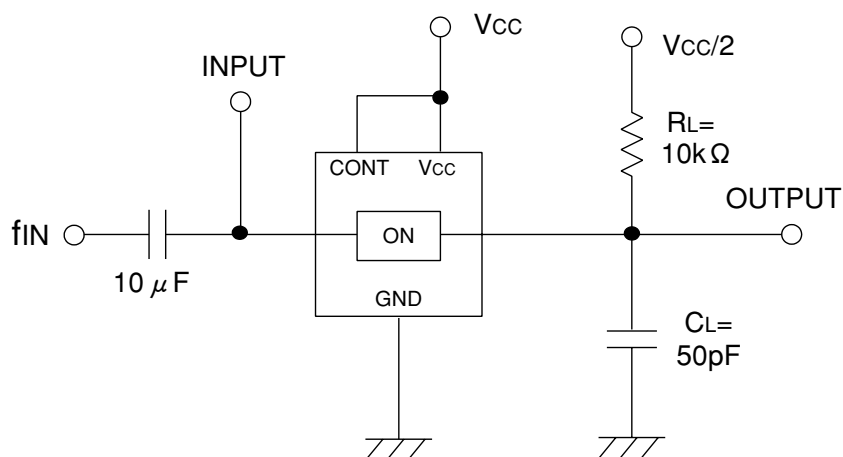


PRR = 1 MHz
duty cycle 50%
 $t_r = t_f = 3\text{ns}$

■ Typical Application Circuit

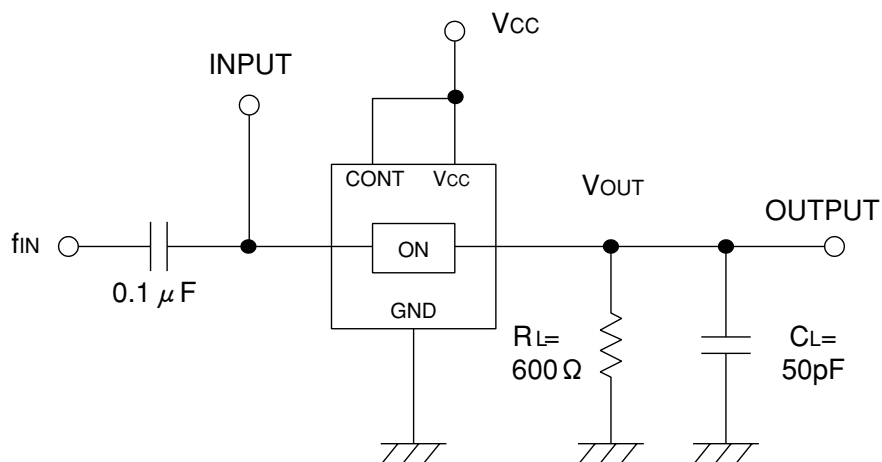


■ Sine Wave Distortion Rate



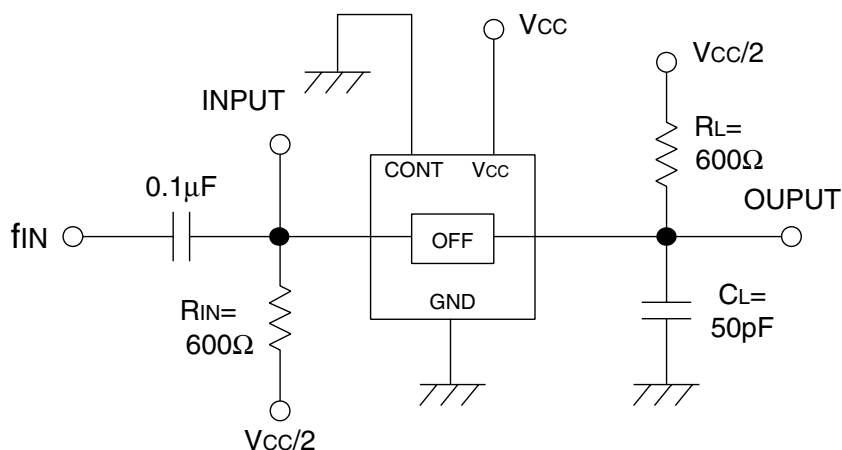
* Input by sine wave

■ -3dB Band Width



* Input by sine wave

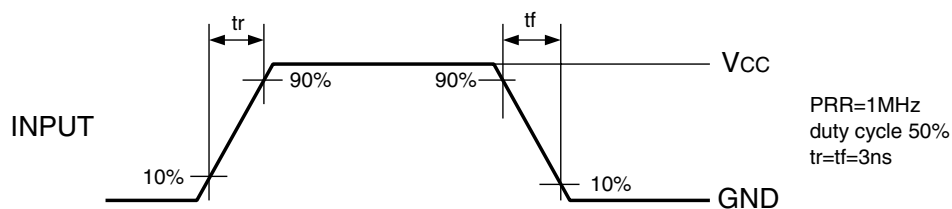
■ Feed Through Test Circuit



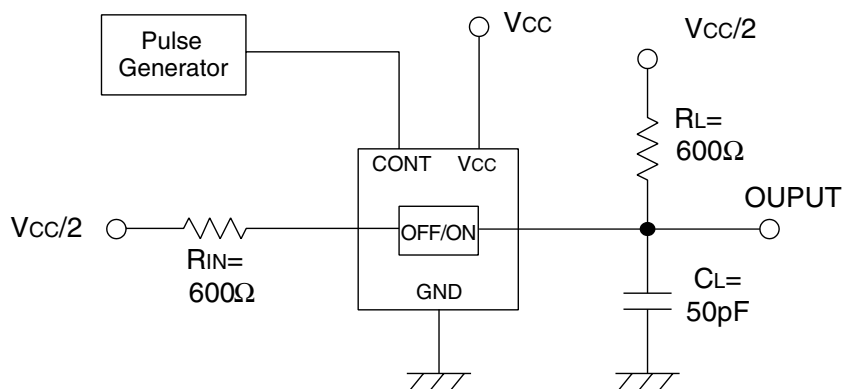
* Input by sine wave

■ Cross Talk

■ Waveforms

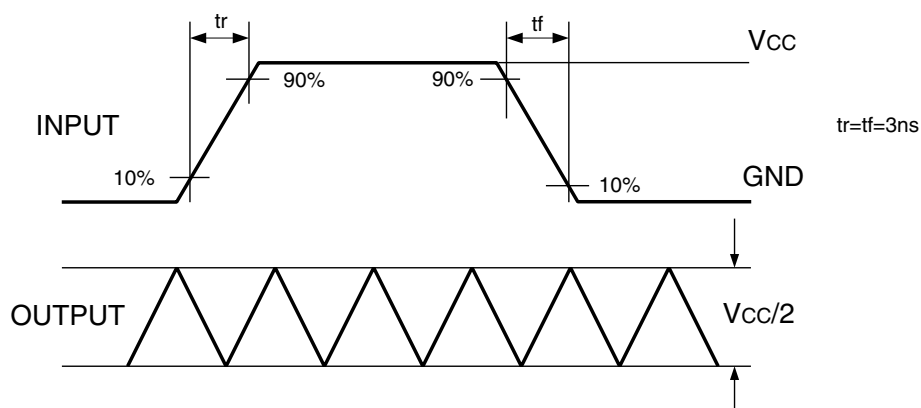


■ Typical Application Circuit

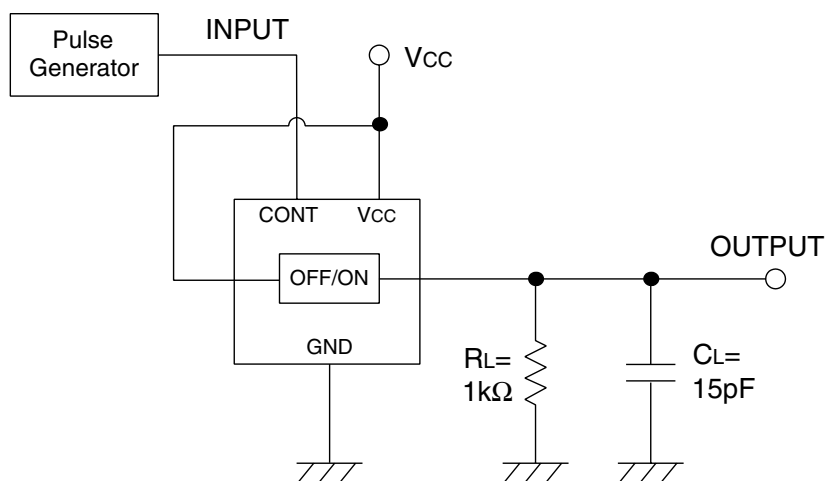


Maximum Control Input Frequency

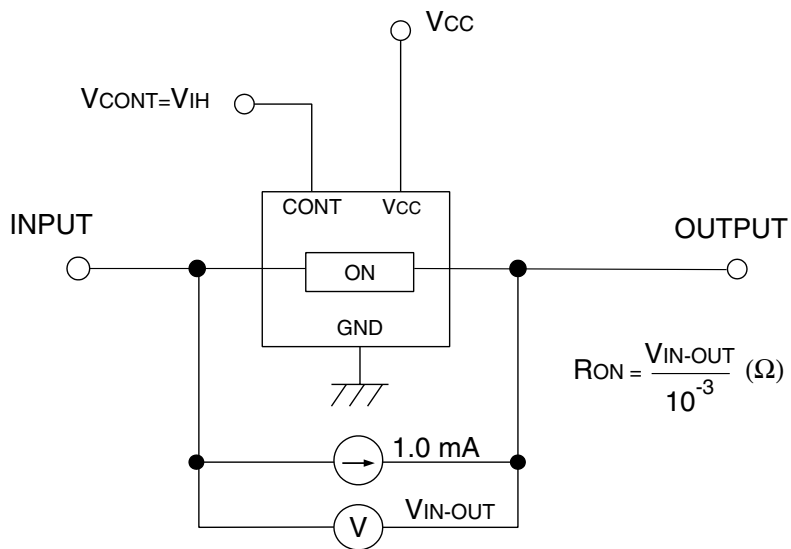
Waveforms



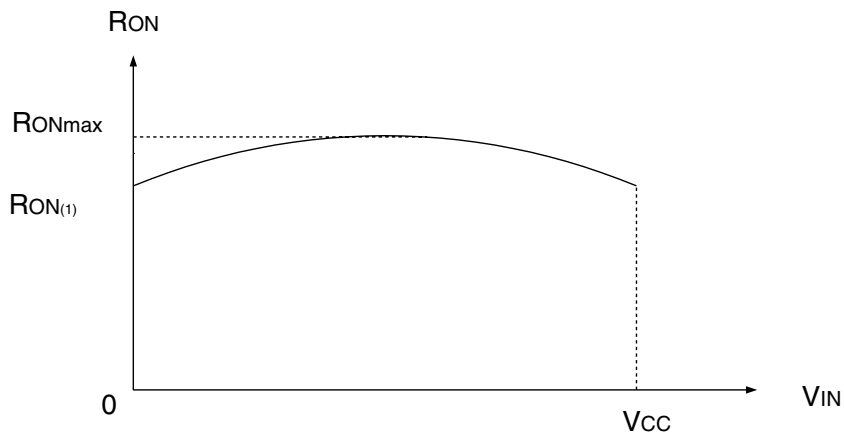
Typical Application Circuit



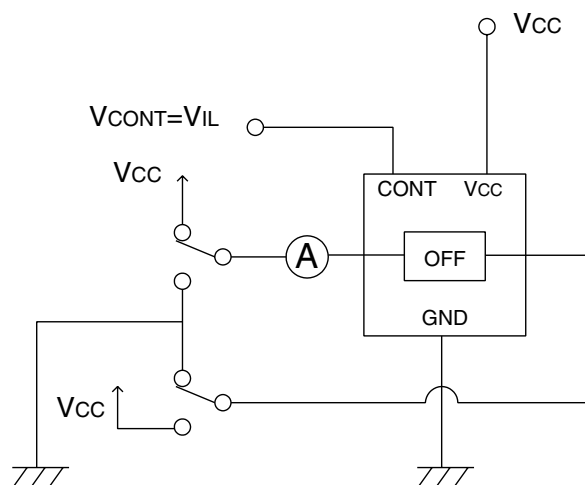
■ On Resistance



■ Voltage Dependencies of ON Resistance



■ Power Off Leakage Current



■ Power On Leakage Current

