

CMOS Logic

DESCRIPTION

XC74UL4066 is CMOS analog switch 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 analog or digital signal switching. As the series is integrated into a mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

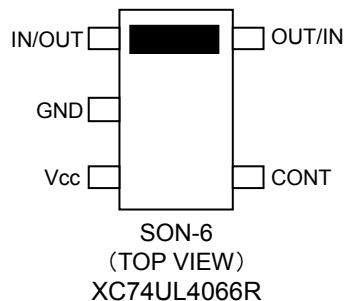
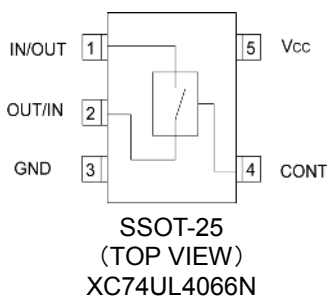
APPLICATIONS

- Palmtops
- Digital equipment

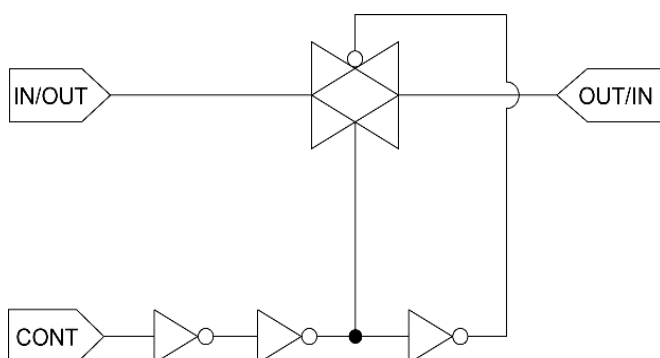
FEATURES

- High Speed Operation** : tpd = 2ns (TYP.)
- Operating Voltage Range** : 2V ~ 5.5V
- Low Power Consumption** : 1 μ A (MAX.)
- Low ON Resistance** : 22 Ω (TYP.)
- CMOS Logic Analog Switch**
- Ultra Small Packages** : SSOT-25, SON-6*
- * Under Development

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
Supply Voltage	VCC	-0.5~+6.0	V
Control Input Voltage	VCONT	-0.5~+6.0	V
Switch Output Voltage	VOUT	-0.5~VCC+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
VCC,GND Current	I _{CC} ,I _{GND}	±50	mA
Power Dissipation *	SSOT-25	Pd	150
	SON-6		200
Storage Temperature Range	T _{stg}	-65~+150	°C

Voltage is all ground standardized.
* Ta=25°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VCC(V)	CONDITIONS	UNITS
Supply Voltage	VCC	—	2~5.5	V
Input Voltage	V _{IN}	—	0~5.5	V
Output Voltage	V _{OUT}	—	0~VCC	V
Operating Temperature Range	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	VCC(V)	CONDITIONS	Ta=25°C			Ta=-40°C~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~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	
Power Off Leak Current	I _{S(OFF)}	5.5	V _{CONT} =V _{IL} , V _{IN} =VCC, V _{OUT} =GND	—	—	±0.1	—	±1.0	μA
Power On Leak 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}	5.5	V _{IN} =VCC or GND	—	—	±0.1	—	±1.0	μA
Static Supply Current	I _{CC}	5.5	V _{IN} =VCC or GND	—	—	1.0	—	5.0	μA

SWITCHING ELECTRICAL CHARACTERISTICS

(tr=tf=3ns)

PARAMETER	SYMBOL	V _{CC} (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
				MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	tPLH	2.0	RL=10kΩ	—	4	20	—	23	ns
	tPHL	3.3	CL=50pF	—	3	6	—	8	
		5.0		—	2	5	—	6	
Output Enable Time	tZL	2.0	RL=1kΩ	—	9	50	—	65	ns
	tZH	3.3	CL=50pF	—	5	10	—	12	
		5.0		—	3	8	—	10	
Output Disable Time	tLZ	2.0	RL=1kΩ	—	12	60	—	75	ns
	tHZ	3.3	CL=50pF	—	10	23	—	27	
		5.0		—	8	20	—	25	
Sine Wave Distortion Rate		3.0	RL=10kΩ CL=50pF f _{IN} =1kHz	—	0.05	—	—	—	%
-3dB Band Width		3.0	RL=600kΩ, CL=50pF $20 \log_{10} \frac{V_{OUT}}{V_{IN}} = -3dB$	—	200	—	—	—	MHz
Feed Through (Switch- off)		3.0	RL=600kΩ CL=50pF f _{IN} =1kHz	—	-60	—	—	—	dB
Cross Talk (Control Switch)		2.0	RL=600kΩ	—	60	—	—	—	mV
		3.0	CL=50pF	—	100	—	—	—	
		4.5	f _{IN} =1kHz	—	150	—	—	—	
Maximum Control Input Frequency		2.0	RL=1kΩ	—	30	—	—	—	MHz
		3.0	CL=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	CPD	—		—	13	—	—	—	pF

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

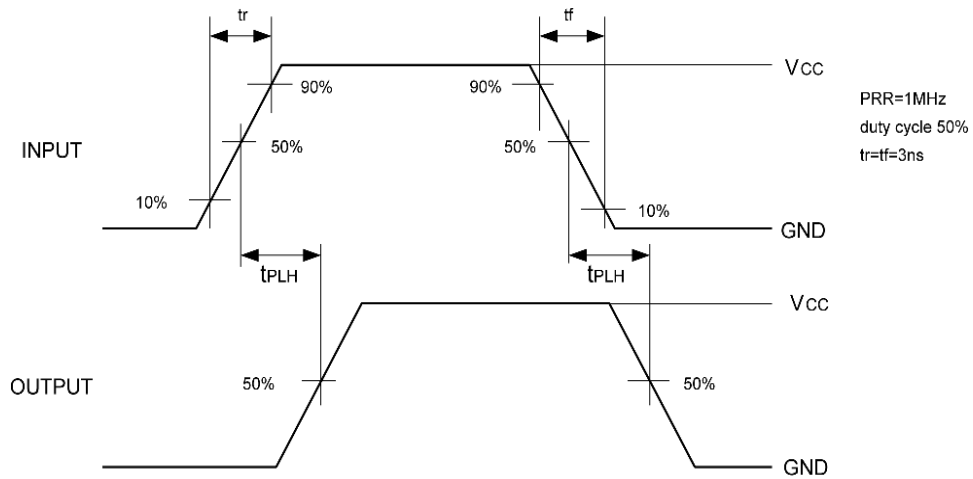
Ensure that the average operating supply current at times of "No Load" meets the following conditions:

$$I_{CC}(\text{opr}) = CPD \cdot V_{CC} \cdot F_{IN} + I_{CC}$$

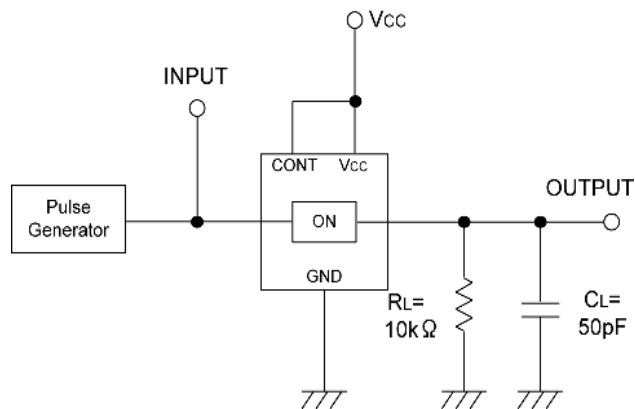
XC74UL4066

■ DELAY TIME

● WAVEFORM



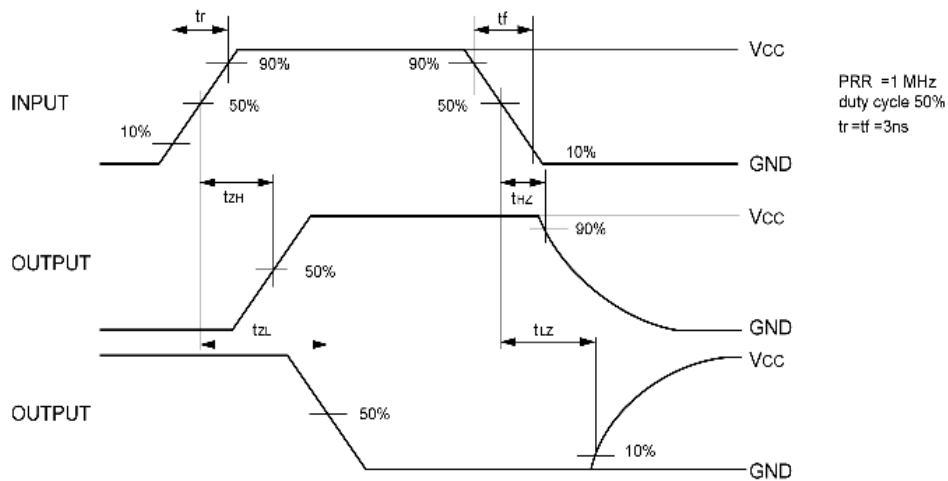
● TEST CIRCUIT



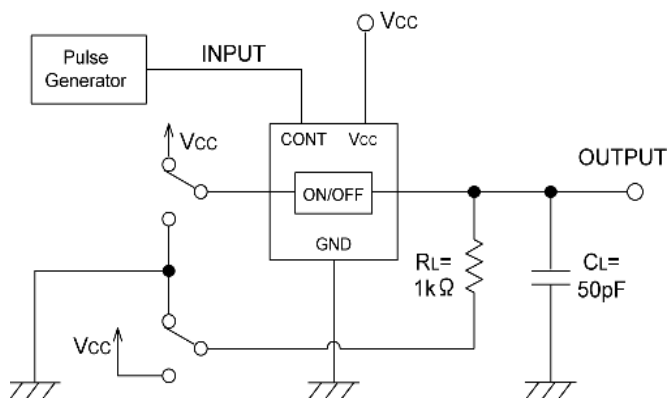
Note: Open output when measuring supply current

■ OUTPUT ENABLE TIME, OUTPUT DISABLE TIME

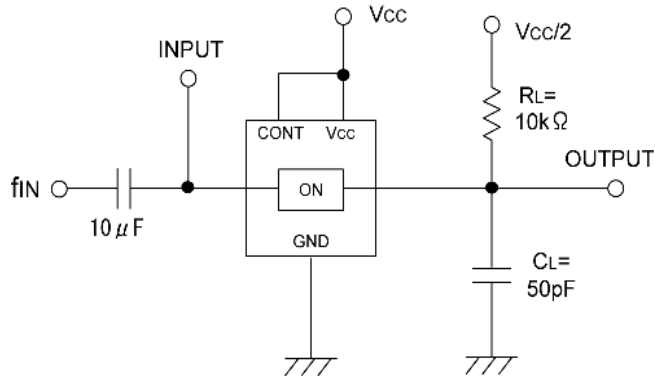
● WAVEFORM



● TEST CIRCUIT

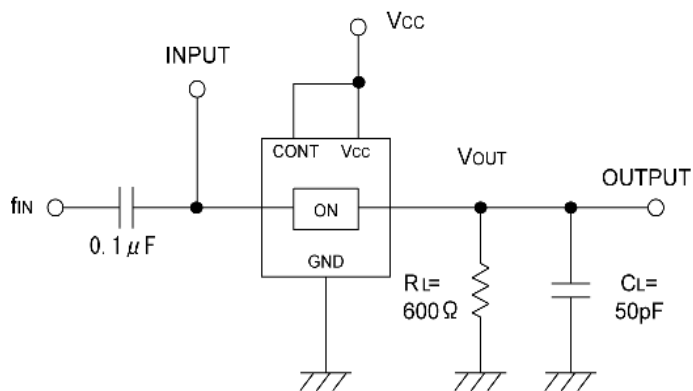


■ SINE WAVE DISTORTION RATE



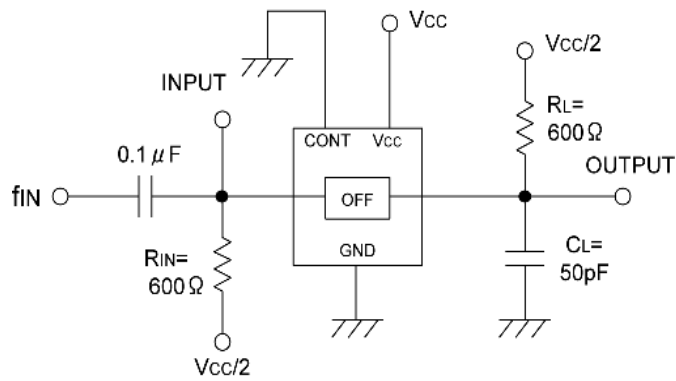
* Input by sine wave

■ -3dB BAND WIDTH



* Input by sine wave

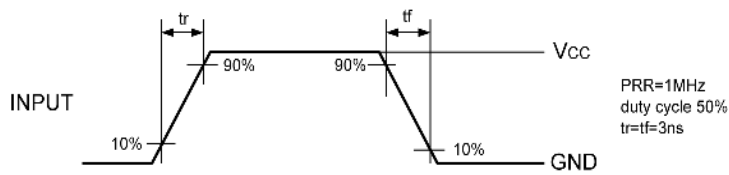
■ FEED THROUGH TEST CIRCUIT



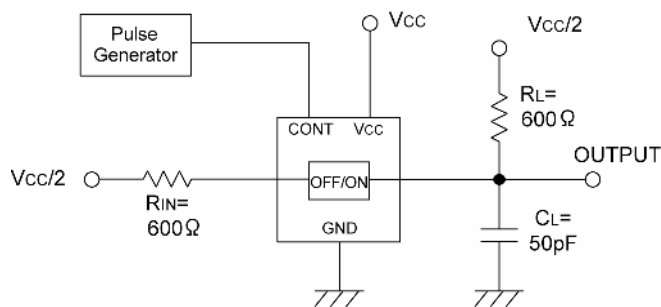
* Input by sine wave

■ CROSS TALK

● WAVEFORM

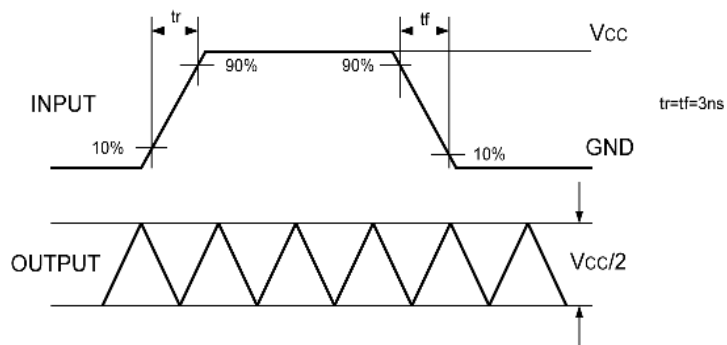


● TEST CIRCUIT

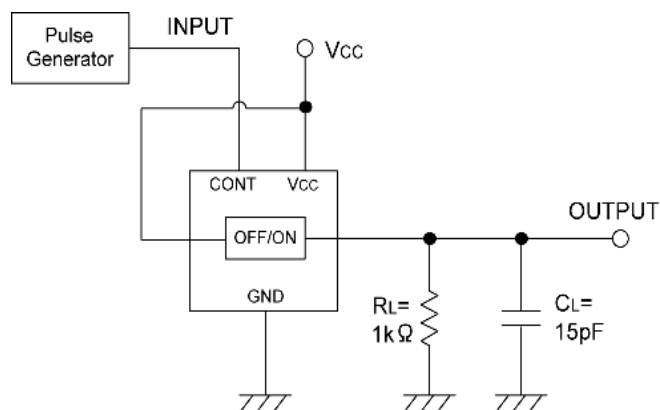


■ MAXIMUM CONTROL INPUT FREQUENCY

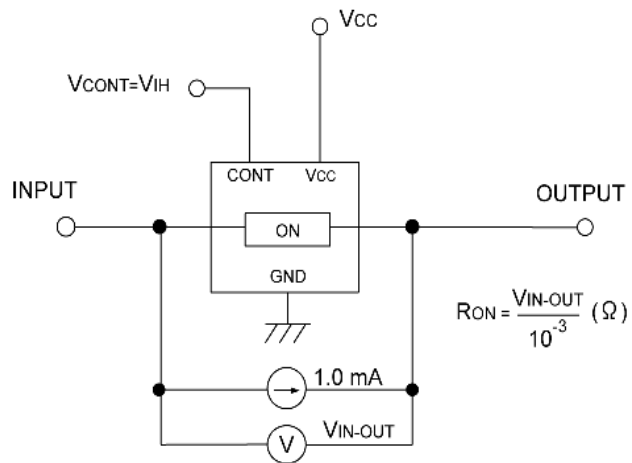
● WAVEFORM



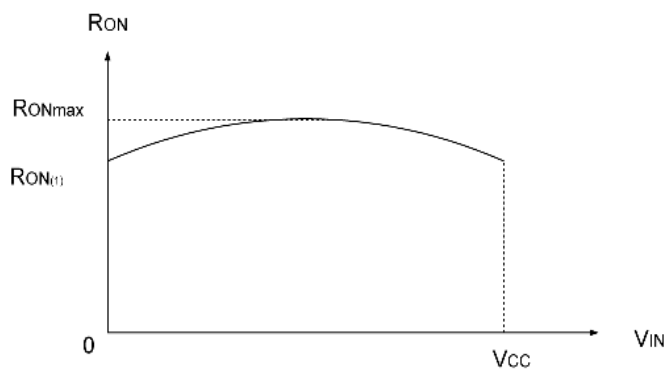
● TEST CIRCUIT



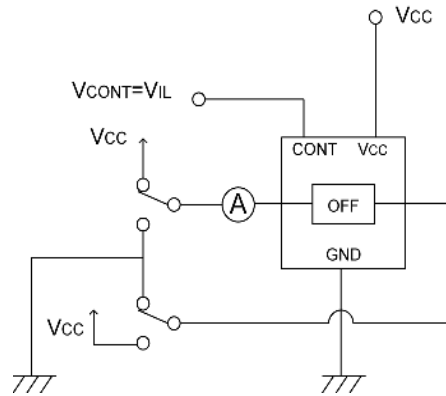
■ ON RESISTANCE



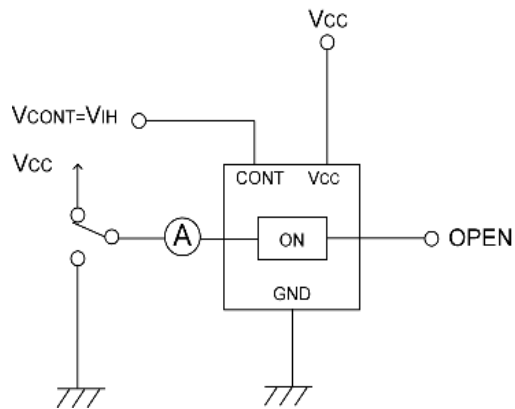
■ VOLTAGE DEPENDANCIES OF ON RESISTANCE



■ POWER OFF LEAK CURRENT



■ POWER ON LEAK CURRENT



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