

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.

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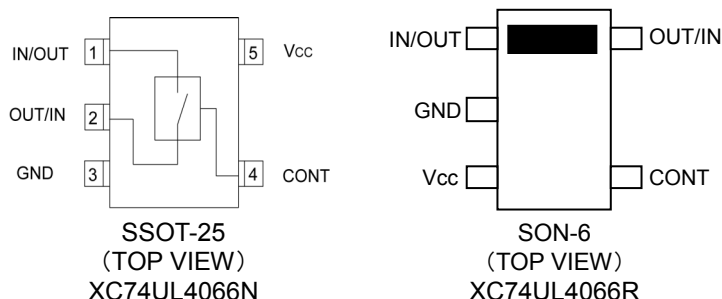
APPLICATIONS

- Palmtops
- Digital equipment

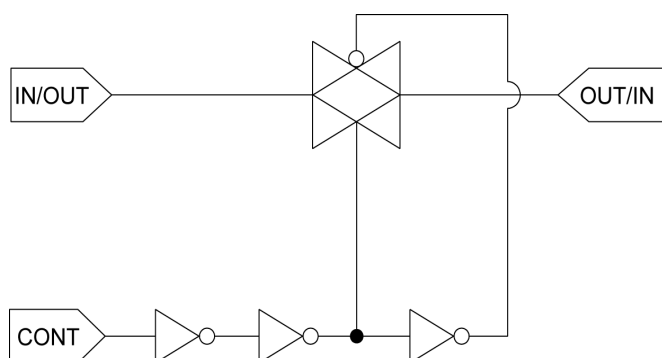
FEATURES

- High Speed Operation** : $t_{pd} = 2\text{ns}$ (TYP.)
- Operating Voltage Range** : $2\text{V} \sim 5.5\text{V}$
- Low Power Consumption** : $1\mu\text{A}$ (MAX.)
- Low ON Resistance** : 22Ω (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		IIK	-20	mA
Switch Output Diode Current		IOK	±20	mA
Switch Output Current		IOUT	±25	mA
VCC,GND Current		ICC,IGND	±50	mA
Power Dissipation*	SSOT-25	Pd	150	mW
	SON-6		200	
Storage Temperature Range		Tstg	-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	Topr	—	-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} /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 VCC	—	14	30	—	40	
		4.5	I _{IN} /O _{UT} =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	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 =600kΩ, C _L =50pF $20\log_{10} \frac{V_{OUT}}{V_{IN}} = -3\text{dB}$	—	200	—	—	—	MHz
Feed Through (Switch- off)		3.0	R _L =600kΩ C _L =50pF f _{IN} =1kHz	—	-60	—	—	—	dB
Cross Talk (Control Switch)		2.0	R _L =600kΩ	—	60	—	—	—	mV
		3.0	C _L =50pF	—	100	—	—	—	
		4.5	f _{IN} =1kHz	—	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	CPD	—		—	13	—	—	—	pF

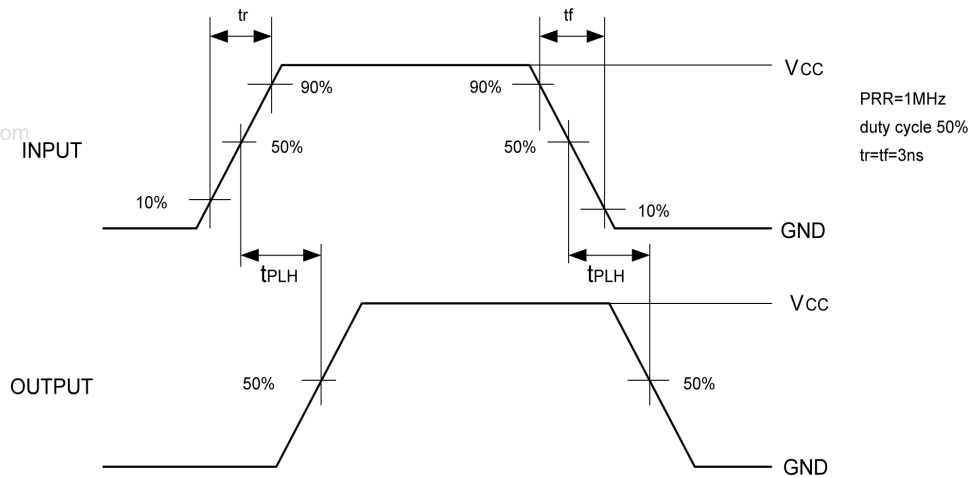
Note: CPD is defined as the value of the internal equivalent capacitance which is derived from the operating supply current at times of "No Load".

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

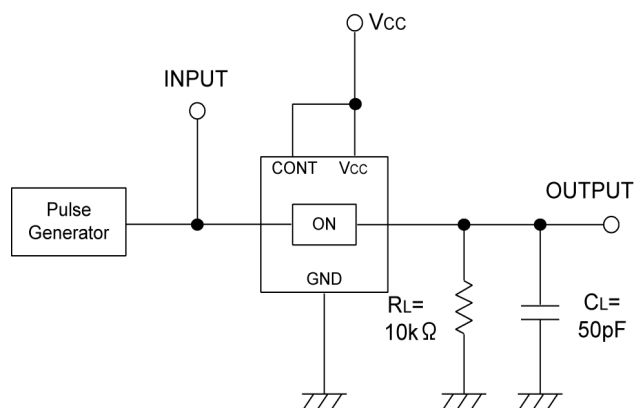
$$I_{CC}(\text{opr}) = \text{CPD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

■ DELAY TIME

● WAVEFORM



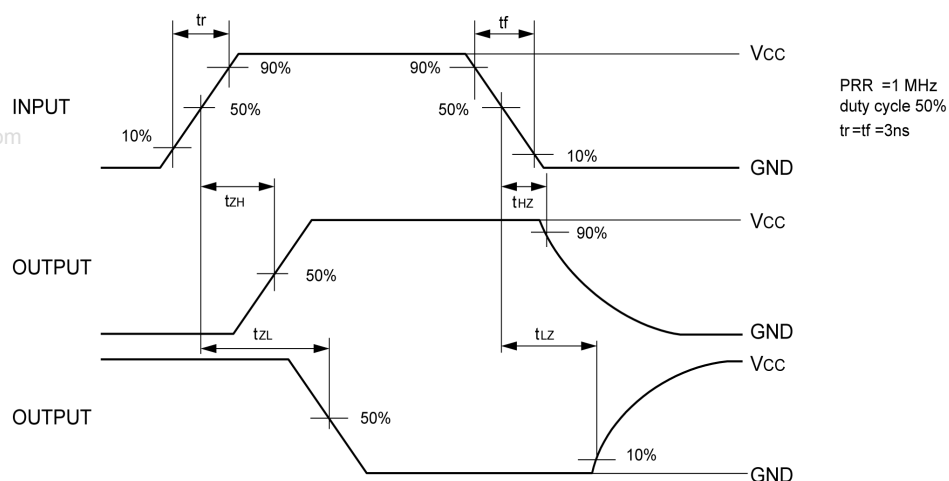
● TEST CIRCUIT



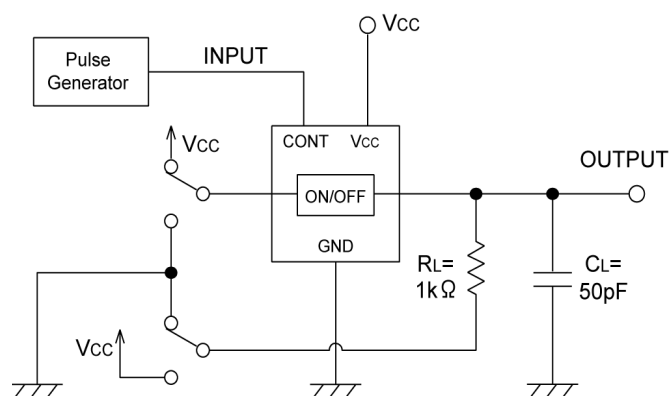
Note: Open output when measuring supply current

■ OUTPUT ENABLE TIME, OUTPUT DISABLE TIME

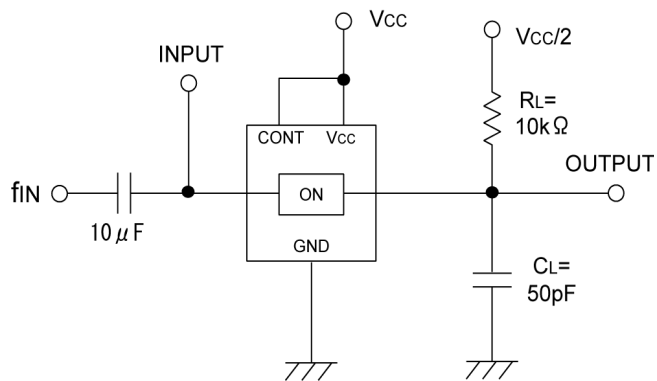
● WAVEFORM



● TEST CIRCUIT

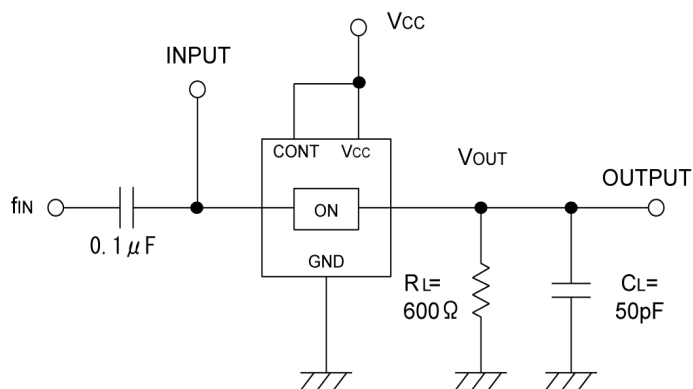


■ SINE WAVE DISTORTION RATE



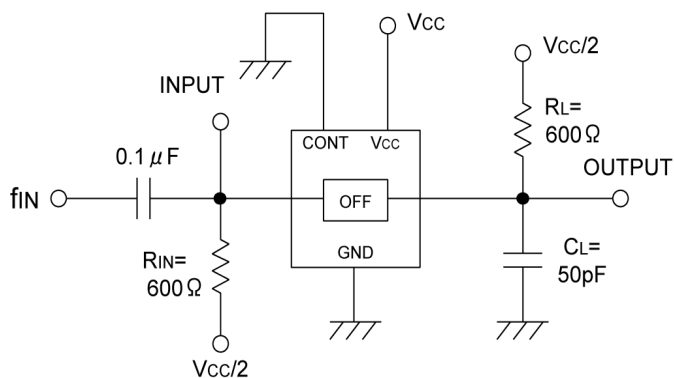
* Input by sine wave

■ -3dB BAND WIDTH



* Input by sine wave

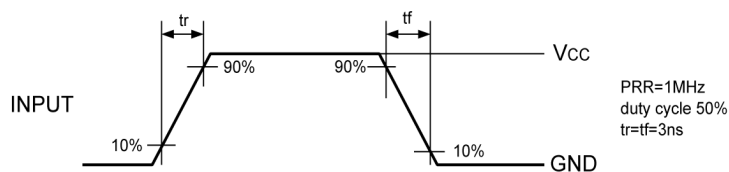
■ FEED THROUGH TEST CIRCUIT



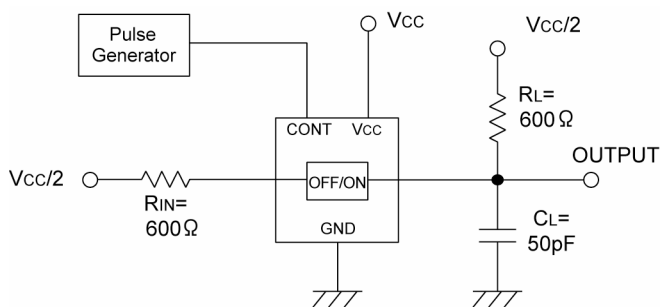
* Input by sine wave

■ CROSS TALK

● WAVEFORM

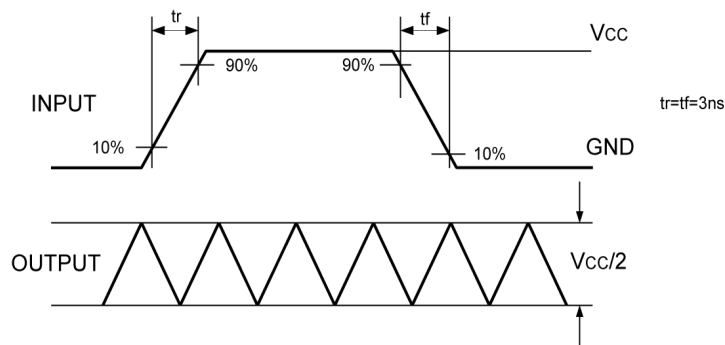


● TEST CIRCUIT

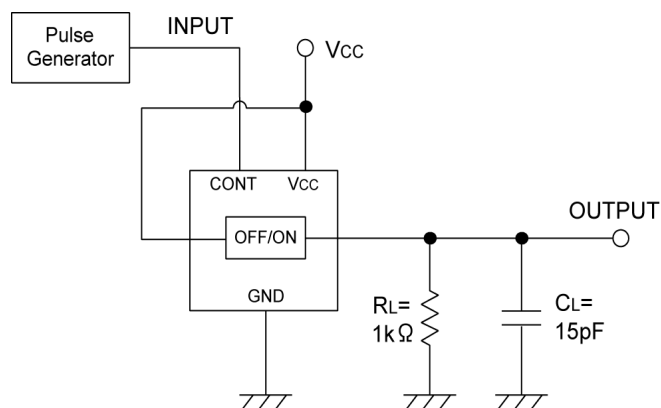


■ MAXIMUM CONTROL INPUT FREQUENCY

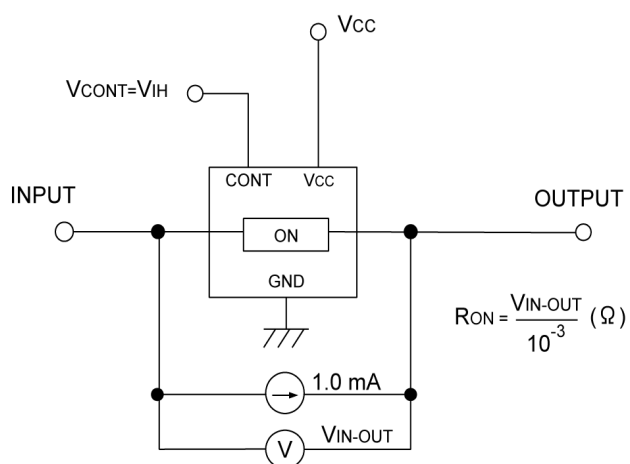
● WAVEFORM



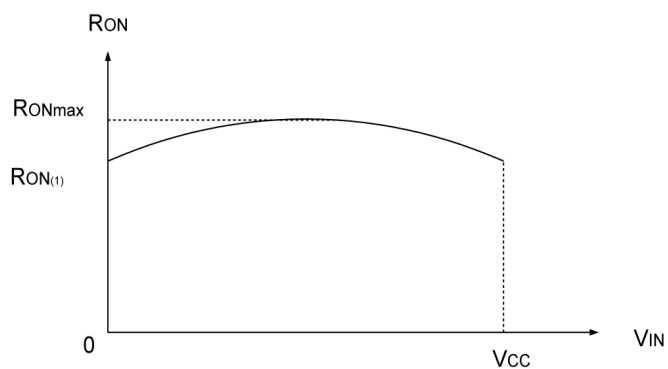
● TEST CIRCUIT



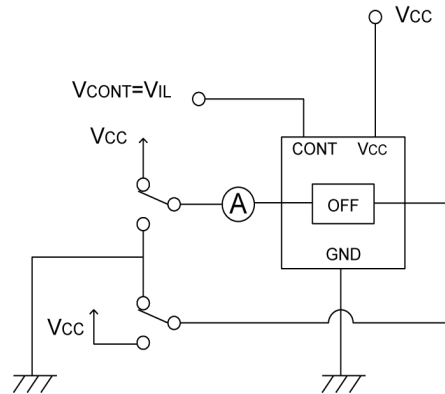
■ ON RESISTANCE



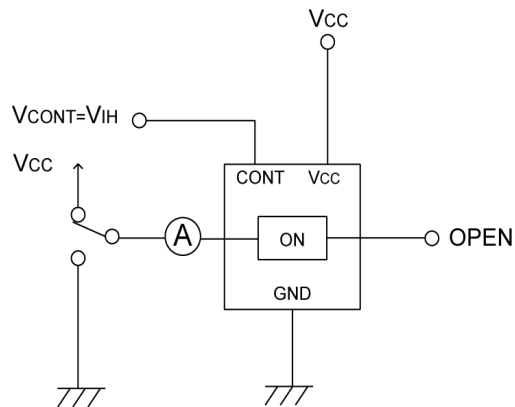
■ VOLTAGE DEPENDANCIES OF ON RESISTANCE



■ POWER OFF LEAK CURRENT



■ POWER ON LEAK CURRENT



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