

## CMOS Logic

### ■ GENERAL DESCRIPTION

The XC74UL00AA is a 2-input CMOS NAND Gate, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL00AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

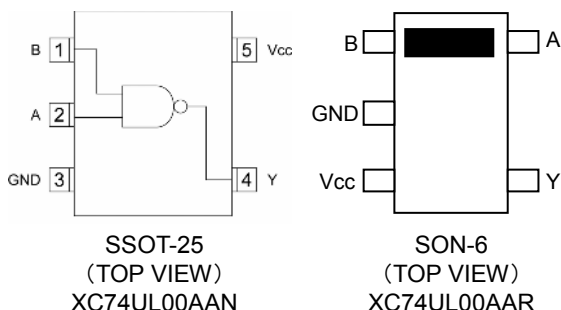
### ■ APPLICATIONS

- Palmtops
- Digital equipment

### ■ FEATURES

- High Speed Operation** : tpd = 2.6ns (TYP.)
- Operating Voltage Range** : 2V ~ 5.5V
- Low Power Consumption**: 1  $\mu$ A (MAX.)
- CMOS 2-Input NAND Gate**
- Ultra Small Package** : SSOT-25, SON-6\*
- \* Under Development

### ■ PIN CONFIGURATION



### ■ FUNCTIONS

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

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
Input Voltage	VIN	-0.5~+6.0	V
Output Voltage	VOUT	-0.5~Vcc+0.5	V
Input Diode Current	I <sub>IK</sub>	-20	mA
Output Diode Current	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±25	mA
Vcc,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation	SSOT-25* <sup>1</sup>	Pd	mW
	SON-6* <sup>2</sup>		
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

Voltage is all ground standardized.

\* 1) Ta=55°C

\* 2) Ta=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	
Input Rise and Fall Time	tr,tf	3.3	0~100	ns/V
		5.0	0~20	

## DC ELECTRICAL CHARACTERISTICS

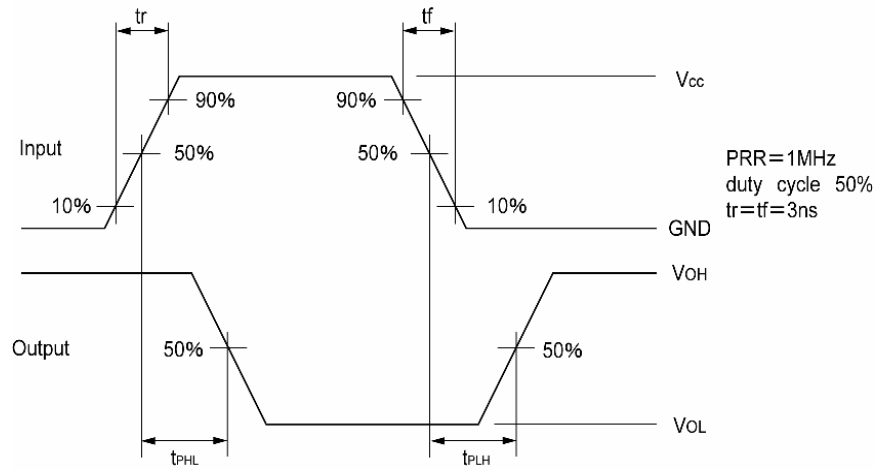
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS		
				MIN.	TYP.	MAX.	MIN.	MAX.			
Input Voltage	V <sub>IH</sub>	2.0		1.5	—	—	1.5	—	V		
		3.0		2.1	—	—	2.1	—			
		5.5		3.85	—	—	3.85	—			
	V <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V		
		3.0		—	—	0.9	—	0.9			
		5.5		—	—	1.65	—	1.65			
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V	
		3.0			2.9	3.0	—	2.9	—		
		4.5			4.4	4.5	—	4.4	—		
		3.0			I <sub>OH</sub> =-4mA	2.58	—	—	2.48		—
		4.5				I <sub>OH</sub> =-8mA	3.94	—	—		3.80
	V <sub>OL</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OL</sub> =50 μA	—		—	0.1	—	0.1	V
		3.0			—	—	0.1	—	0.1		
		4.5			—	—	0.1	—	0.1		
		3.0			I <sub>OL</sub> =4mA	—	—	0.36	—	0.44	
		4.5				I <sub>OL</sub> =8mA	—	—	0.36	—	
Input Current	I <sub>IN</sub>	0~5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1	—		0.1	-1.0	1.0	μA	
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0	μA		

## SWITCHING ELECTRICAL CHARACTERISTICS

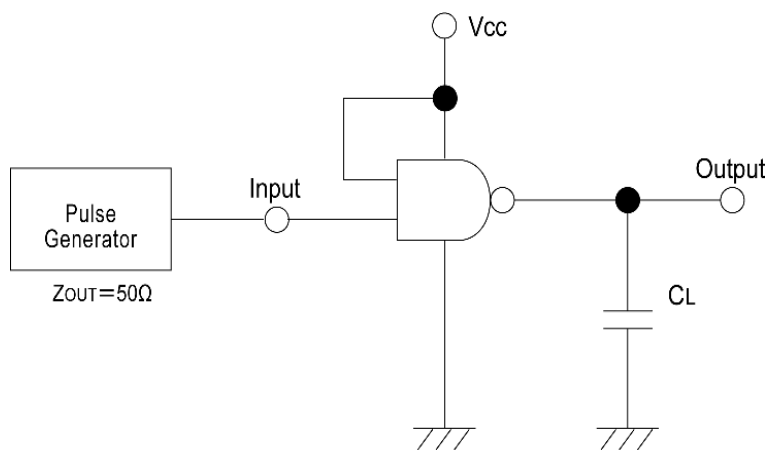
tr=tf=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	3.7	7.9	1.0	9.5	ns
			5.0		—	2.7	5.5	1.0	6.5	
		50pF	3.3		—	5.4	11.4	1.0	13.0	ns
			5.0		—	3.6	7.5	1.0	8.5	
	t <sub>PHL</sub>	15pF	3.3		—	3.3	7.9	1.0	9.5	ns
			5.0		—	2.5	5.5	1.0	6.5	
		50pF	3.3		—	4.6	11.4	1.0	13.0	ns
			5.0		—	3.5	7.5	1.0	8.5	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	2	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	9.3	—	—	—	pF

## ■ WAVEFORM



## ■ TEST CIRCUIT



Note: Open output when measuring supply current

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**TOREX SEMICONDUCTOR LTD.**

# XC74UL02AA

ETR1303\_002

## CMOS Logic

### ■ GENERAL DESCRIPTION

The XC74UL02AA is a 2-input CMOS NOR Gate, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL02AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

### ■ APPLICATIONS

- Palmtops
- Digital equipment

### ■ FEATURES

**High Speed Operation** : tpd = 2.65ns (TYP.)

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

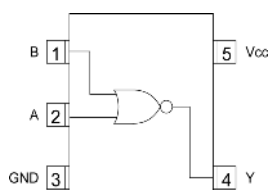
**Low Power Consumption** : 1  $\mu$  A (MAX.)

**CMOS 2-Input NOR Gate**

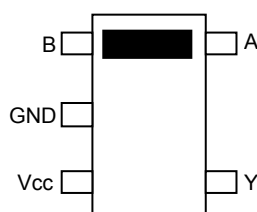
**Ultra Small Packages** : SSOT-25, SON-6\*

\* Under Development

### ■ PIN CONFIGURATION



SSOT-25  
(TOP VIEW)  
XC74UL02AAN



SON-6  
(TOP VIEW)  
XC74UL02AAR

### ■ FUNCTIONS

INPUT		OUTPUT
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

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
Input Voltage	VIN	-0.5~+6.0	V
Output Voltage	VOUT	-0.5~Vcc+0.5	V
Input Diode Current	I <sub>IK</sub>	-20	mA
Output Diode Current	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±25	mA
Vcc,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation	SSOT-25* <sup>1</sup>	Pd	mW
	SON-6* <sup>2</sup>		
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

Voltage is all ground standardized.

\* 1) Ta=55°C

\* 2) Ta=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	
Input Rise and Fall Time	t <sub>r,tf</sub>	3.3	0~100	ns
		5.0	0~20	

## DC ELECTRICAL CHARACTERISTICS

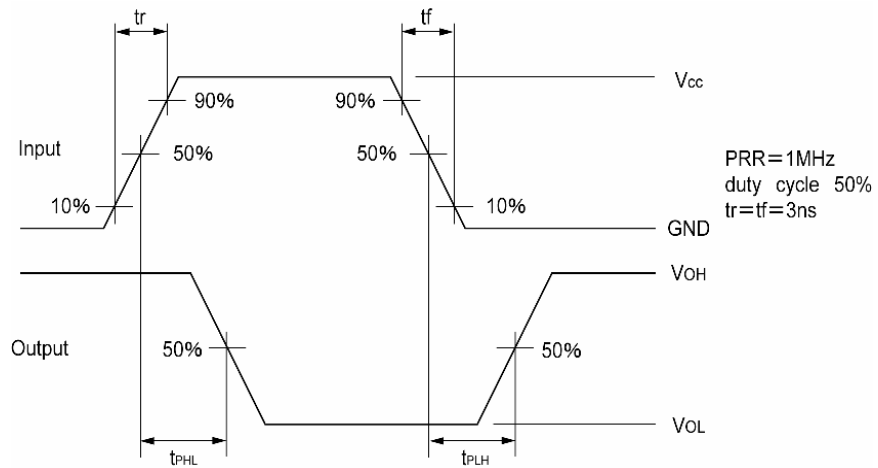
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS	
				MIN.	TYP.	MAX.	MIN.	MAX.		
Input Voltage	V <sub>IH</sub>	2.0		1.5	—	—	1.5	—	V	
		3.0		2.1	—	—	2.1	—		
		5.5		3.85	—	—	3.85	—		
	V <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V	
		3.0		—	—	0.9	—	0.9		
		5.5		—	—	1.65	—	1.65		
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V
		3.0			2.9	3.0	—	2.9	—	
		4.5		4.4	4.5	—	4.4	—		
		3.0		I <sub>OH</sub> =-4mA	2.58	—	—	2.48	—	
		4.5			I <sub>OH</sub> =-8mA	3.94	—	—	3.80	
	V <sub>OL</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OL</sub> =50 μA		—	—	0.1	—	0.1
		3.0			—	—	0.1	—	0.1	
		4.5			—	—	0.1	—	0.1	
		3.0		I <sub>OL</sub> =4mA	—	—	0.36	—	0.44	
		4.5			I <sub>OL</sub> =8mA	—	—	0.36	—	0.44
Input Current	I <sub>IN</sub>	0~5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1		—	0.1	-1.0	1.0	μA
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0		

## SWITCHING ELECTRICAL CHARACTERISTICS

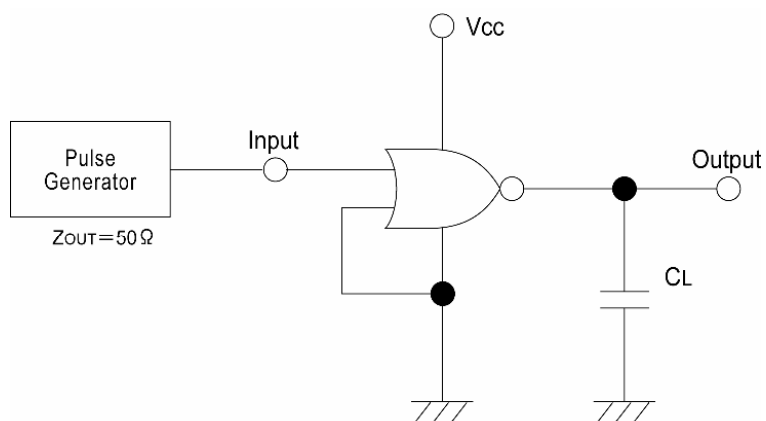
t<sub>r</sub>=t<sub>f</sub>=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	3.9	7.9	1.0	9.5	ns
			5.0		—	2.7	5.5	1.0	6.5	
		50pF	3.3		—	5.5	11.4	1.0	13.0	ns
			5.0		—	3.9	7.5	1.0	8.5	
	t <sub>PHL</sub>	15pF	3.3		—	3.5	7.9	1.0	9.5	ns
			5.0		—	2.6	5.5	1.0	6.5	
		50pF	3.3		—	4.9	11.4	1.0	13.0	ns
			5.0		—	3.6	7.5	1.0	8.5	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	4	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	9.7	—	—	—	pF

## ■ WAVEFORM



## ■ TEST CIRCUIT



Note: Open output when measuring supply current

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**TOREX SEMICONDUCTOR LTD.**



## CMOS Logic

### ■ GENERAL DESCRIPTION

The XC74UL04AA is a CMOS inverter, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

The internal circuit is composed of inverter and buffer, which provide high noise immunity and stable output.

As the XC74UL04AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

### ■ APPLICATIONS

- Palmtops
- Digital equipment

### ■ FEATURES

**High Speed Operation** : tpd = 2.05ns(TYP.)

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

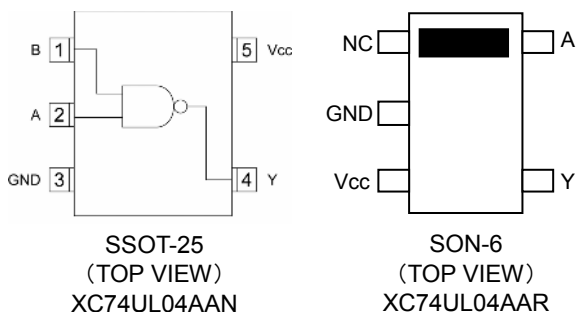
**Low Power Consumption**: 1  $\mu$  A (MAX.)

**CMOS Inverter**

**Ultra Small Packages** : SSOT-25, SON-6\*

\* Under Development

### ■ PIN CONFIGURATION



### ■ FUNCTIONS

INPUT	OUTPUT
A	Y
H	L
L	H

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
Input Voltage	VIN	-0.5~+6.0	V
Output Voltage	VOUT	-0.5~Vcc+0.5	V
Input Diode Current	IiK	-20	mA
Output Diode Current	Iok	±20	mA
Output Current	IOUT	±25	mA
Vcc,GND Current	ICC,IGND	±50	mA
Power Dissipation	SSOT-25*1	150	mW
	SON-6*2	200	
Storage Temperature Range	Tstg	-65~+150	°C

Voltage is all ground standardized.

\* 1) Ta=55°C

\* 2) Ta=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	
Input Rise and Fall Time	t <sub>r,tf</sub>	3.3	0~100	ns
		5.0	0~20	

## DC ELECTRICAL CHARACTERISTICS

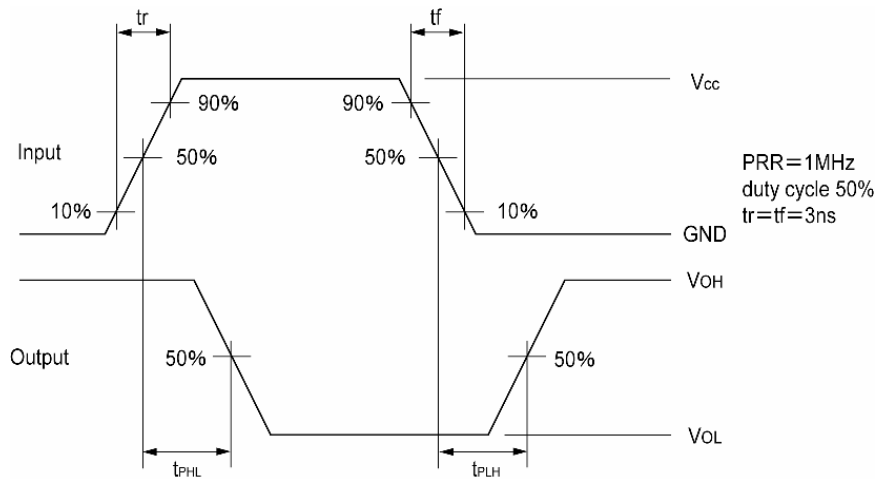
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS	
				MIN.	TYP.	MAX.	MIN.	MAX.		
Input Voltage	V <sub>IH</sub>	2.0		1.5	—	—	1.5	—	V	
		3.0		2.1	—	—	2.1	—		
		5.5		3.85	—	—	3.85	—		
	V <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V	
		3.0		—	—	0.9	—	0.9		
		5.5		—	—	1.65	—	1.65		
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IL</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V
		3.0			2.9	3.0	—	2.9	—	
		4.5			4.4	4.5	—	4.4	—	
		3.0			2.58	—	—	2.48	—	
		4.5			3.94	—	—	3.80	—	
	V <sub>OL</sub>	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OL</sub> =50 μA	2.0	—	—	0.1	—	0.1	V
				3.0	—	—	0.1	—	0.1	
				4.5	—	—	0.1	—	0.1	
				3.0	—	—	0.36	—	0.44	
				4.5	—	—	0.36	—	0.44	
Input Current	I <sub>IN</sub>	0~5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1	—	0.1	-1.0	1.0	μA	
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0		

## SWITCHING ELECTRICAL CHARACTERISTICS

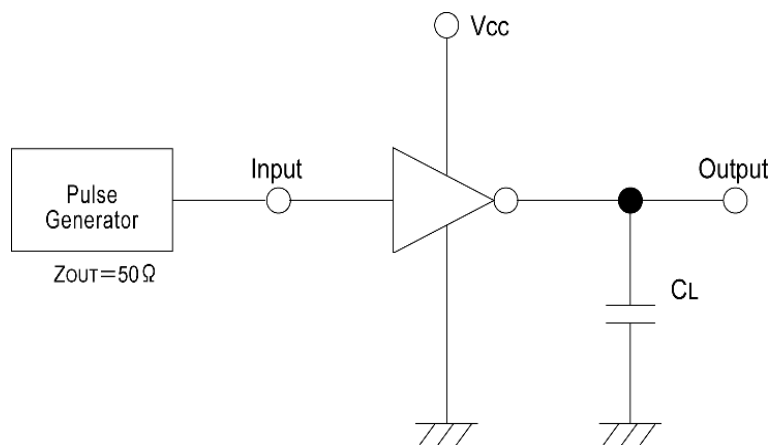
t<sub>r</sub>=t<sub>f</sub>=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	2.7	7.1	1.0	8.5	ns
			5.0		—	2.1	5.5	1.0	6.5	
		50pF	3.3		—	4.1	10.6	1.0	12.0	ns
			5.0		—	3.2	7.5	1.0	8.5	
	t <sub>PHL</sub>	15pF	3.3		—	2.5	7.1	1.0	8.5	ns
			5.0		—	2.0	5.5	1.0	6.5	
		50pF	3.3		—	3.9	10.6	1.0	12.0	ns
			5.0		—	3.0	7.5	1.0	8.5	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	2	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	8.9	—	—	—	pF

## WAVEFORM



## TEST CIRCUIT



Note: Open output when measuring supply current

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# XC74UL08AA

ETR1305\_002

## CMOS Logic

### ■ GENERAL DESCRIPTION

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CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL08AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

### ■ APPLICATIONS

- Palmtops
- Digital equipment

### ■ FEATURES

**High Speed Operation** : tpd = 2.6ns (TYP.)

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

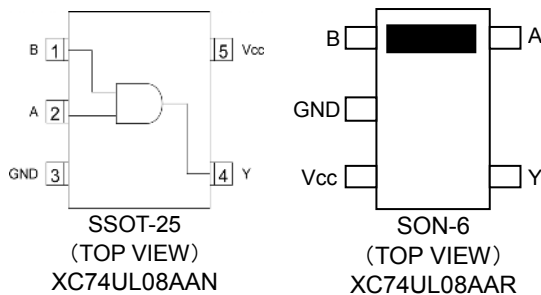
**Low Power Consumption** : 1  $\mu$  A (MAX.)

**CMOS 2-Input AND Gate**

**Ultra Small Packages** : SSOT-25, SON-6\*

\* Under Development

### ■ PIN CONFIGURATION



### ■ FUNCTIONS

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

H=High level

L=Low level

### ■ ABSOLUTE MAXIMUM RATINGS

Ta=-40°C~85°C

PARAMETER	SYMBOL	RATINGS	UNITS
Supply Voltage	V <sub>CC</sub>	-0.5~+6.0	V
Input Voltage	V <sub>IN</sub>	-0.5~+6.0	V
Output Voltage	V <sub>OUT</sub>	-0.5~V <sub>CC</sub> +0.5	V
Input Diode Current	I <sub>IK</sub>	-20	mA
Output Diode Current	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±25	mA
V <sub>CC</sub> ,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation	SSOT-25* <sup>1</sup>	Pd	mW
	SON-6* <sup>2</sup>		
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

Voltage is all ground standardized.

\* 1) Ta=55°C

\* 2) Ta=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	
Input Rise and Fall Time	t <sub>r,tf</sub>	3.3	0~100	ns
		5.0	0~20	

## DC ELECTRICAL CHARACTERISTICS

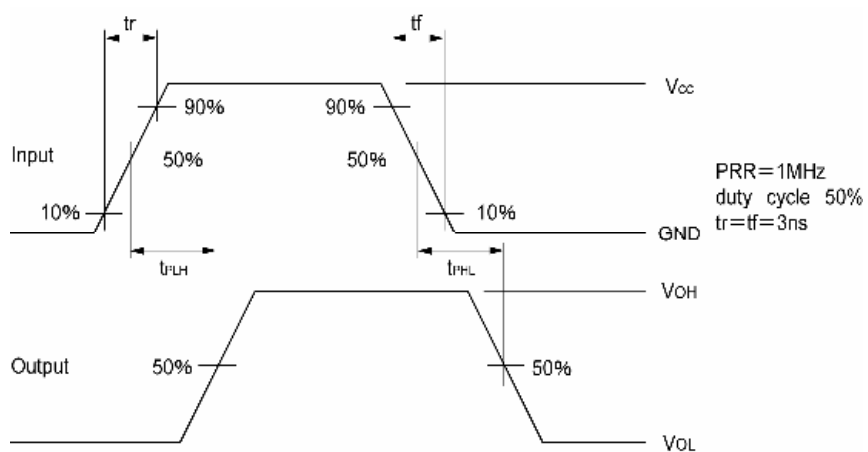
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS	
				MIN.	TYP.	MAX.	MIN.	MAX.		
Input Voltage	V <sub>IH</sub>	2.0		1.5	—	—	1.5	—	V	
		3.0		2.1	—	—	2.1	—		
		5.5		3.85	—	—	3.85	—		
	V <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V	
		3.0		—	—	0.9	—	0.9		
		5.5		—	—	1.65	—	1.65		
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V
		3.0			2.9	3.0	—	2.9	—	
		4.5			4.4	4.5	—	4.4	—	
		3.0			2.58	—	—	2.48	—	
	V <sub>OL</sub>	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>	2.0	I <sub>OL</sub> =50 μA	—	—	0.1	—	0.1	V
					3.0	—	—	0.1	—	
			4.5		—	—	0.1	—	0.1	
			3.0		—	—	0.36	—	0.44	
			4.5		—	—	0.36	—	0.44	
					—	—	—	—	—	
Input Current	I <sub>IN</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1	—	0.1	-1.0	1.0	μA	
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0	μA	

## SWITCHING ELECTRICAL CHARACTERISTICS

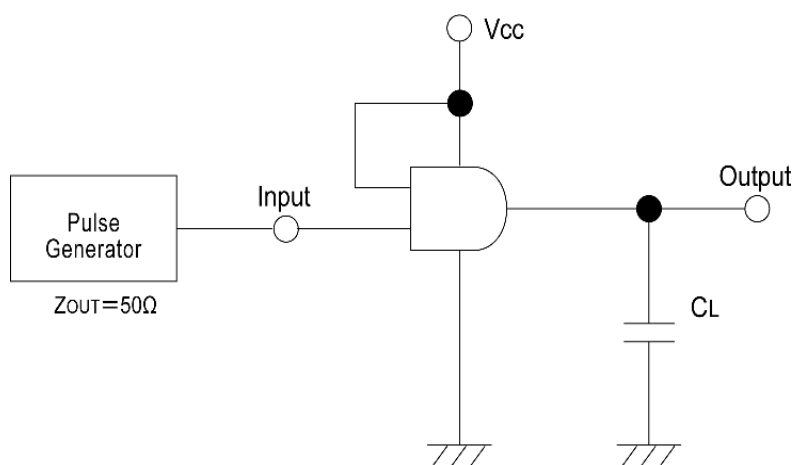
t<sub>r</sub>=t<sub>f</sub>=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	3.7	8.8	1.0	10.5	ns
			5.0		—	2.8	5.9	1.0	7.0	
		50pF	3.3		—	5.2	12.3	1.0	14.0	ns
			5.0		—	3.7	7.9	1.0	9.0	
	t <sub>PHL</sub>	15pF	3.3		—	3.2	8.8	1.0	10.5	ns
			5.0		—	2.4	5.9	1.0	7.0	
		50pF	3.3		—	4.5	12.3	1.0	14.0	ns
			5.0		—	3.4	7.9	1.0	9.0	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	4	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	9.3	—	—	—	pF

## ■ WAVEFORM



## ■ TEST CIRCUIT



Note: Open output when measuring supply current

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**TOREX SEMICONDUCTOR LTD.**



## CMOS Logic

## ■ GENERAL DESCRIPTION

The XC74UL14AA is a CMOS schmitt trigger inverter, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL14AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

## ■ APPLICATIONS

- Palmtops
- Digital equipment

## ■ FEATURES

**High Speed Operation** : tpd = 2.3ns (TYP.)

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

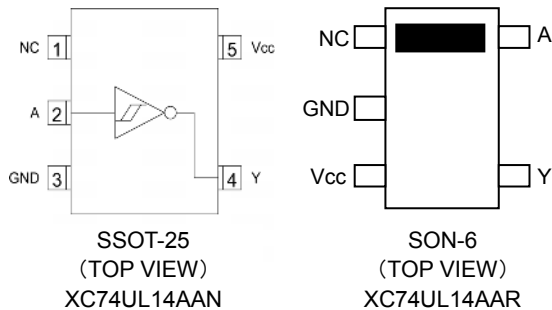
**Low Power Consumption** : 1  $\mu$  A (MAX.)

**CMOS Schmitt Trigger Inverter**

**Ultra Small Packages** : SSOT-25, SON-6\*

\* Under Development

## ■ PIN CONFIGURATION



## ■ FUNCTIONS

INPUT	OUTPUT
A	Y
H	L
L	H

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
Input Voltage	VIN	-0.5~+6.0	V
Output Voltage	VOUT	-0.5~VCC+0.5	V
Input Diode Current	I <sub>IK</sub>	-20	mA
Output Diode Current	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±25	mA
VCC,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation	SSOT-25* <sup>1</sup>	150	mW
	SON-6* <sup>2</sup>	200	
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

Voltage is all ground standardized.

\* 1) Ta=55°C

\* 2) Ta=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	Topr	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	

## DC ELECTRICAL CHARACTERISTICS

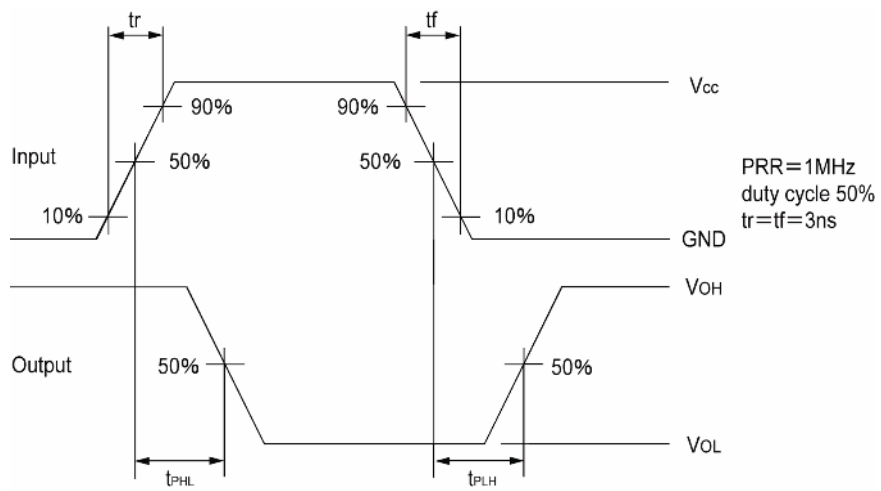
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS	
				MIN.	TYP.	MAX.	MIN.	MAX.		
Threshold Voltage	V <sub>T+</sub>	2.0		—	—	2.2	—	2.2	V	
		3.0		—	—	3.15	—	3.15		
		5.5		—	—	3.85	—	3.85		
	V <sub>T-</sub>	2.0		0.9	—	—	0.9	—	V	
		3.0		1.35	—	—	1.35	—		
		5.5		1.65	—	—	1.65	—		
Hysteresis Voltage	V <sub>H</sub>	3.0	0.25	—	1.2	0.25	1.2			
		4.5	0.30	—	1.4	0.30	1.4			
		5.5	0.35	—	1.6	0.35	1.6			
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IL</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V
		3.0			2.9	3.0	—	2.9	—	
		4.5			4.4	4.5	—	4.4	—	
		3.0			2.58	—	—	2.48	—	
		4.5			3.94	—	—	3.80	—	
	V <sub>OL</sub>	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OL</sub> =50 μA	2.0	—	—	0.1	—	0.1	V
				3.0	—	—	0.1	—	0.1	
				4.5	—	—	0.1	—	0.1	
				3.0	—	—	0.36	—	0.44	
				4.5	—	—	0.36	—	0.44	
Input Current	I <sub>IN</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1	—	0.1	-1.0	1.0	μA	
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0		

## SWITCHING ELECTRICAL CHARACTERISTICS

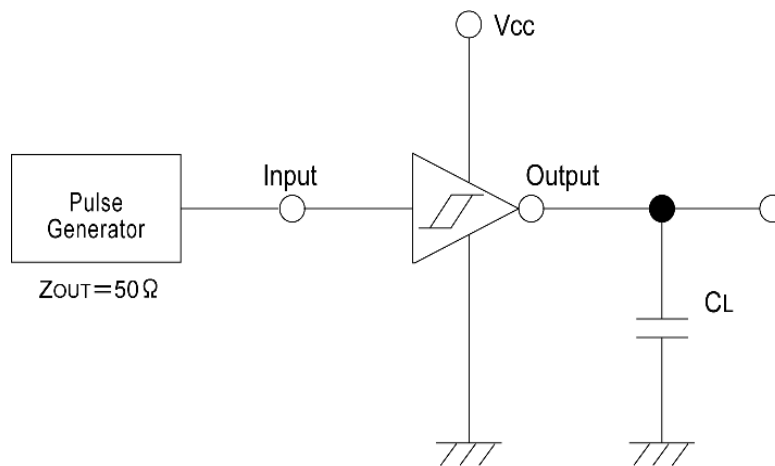
tr=tf=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	2.8	12.8	1.0	15.0	ns
			5.0		—	2.1	8.6	1.0	10.0	
		50pF	3.3		—	4.3	16.3	1.0	18.5	ns
			5.0		—	3.1	10.6	1.0	12.0	
	t <sub>PHL</sub>	15pF	3.3		—	3.1	12.8	1.0	15.0	ns
			5.0		—	2.5	8.6	1.0	10.0	
		50pF	3.3		—	4.4	16.3	1.0	18.5	ns
			5.0		—	3.4	10.6	1.0	12.0	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	2	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	10	—	—	—	pF

## ■ WAVEFORM



## ■ TEST CIRCUIT



Note: Open output when measuring supply current

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**TOREX SEMICONDUCTOR LTD.**

## CMOS Logic

### ■ GENERAL DESCRIPTION

The XC74UL32AA is a 2-input CMOS OR Gate, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL32AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

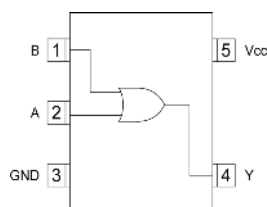
### ■ APPLICATIONS

- Palmtops
- Digital equipment

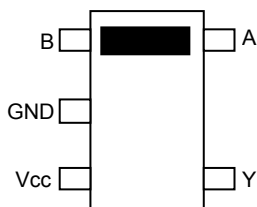
### ■ FEATURES

- High Speed Operation** : tpd = 3.8ns (TYP.)
- Operating Voltage Range** : 2V ~ 5.5V
- Low Power Consumption** : 1  $\mu$  A (MAX.)
- CMOS 2-Input OR Gate**
- Ultra Small Packages** : SSOT-25, SON-6\*
- \* Under Development

### ■ PIN CONFIGURATION



SSOT-25  
(TOP VIEW)  
XC74UL32AAN



SON-6  
(TOP VIEW)  
XC74UL32AAR

### ■ FUNCTIONS

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	H

H=High level

L=Low level

### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNITS
Supply Voltage	V <sub>CC</sub>	-0.5~+6.0	V
Input Voltage	V <sub>IN</sub>	-0.5~+6.0	V
Output Voltage	V <sub>OUT</sub>	-0.5~V <sub>CC</sub> +0.5	V
Input Diode Current	I <sub>IK</sub>	-20	mA
Output Diode Current	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±25	mA
V <sub>CC</sub> ,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation	SSOT-25* <sup>1</sup>	Pd	mW
	SON-6* <sup>2</sup>		
		200	
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

Voltage is all ground standardized.

\* 1) T<sub>a</sub>=55°C

\* 2) T<sub>a</sub>=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	
Input Rise and Fall Time	t <sub>r,tf</sub>	3.3	0~100	ns
		5.0	0~20	

## DC ELECTRICAL CHARACTERISTICS

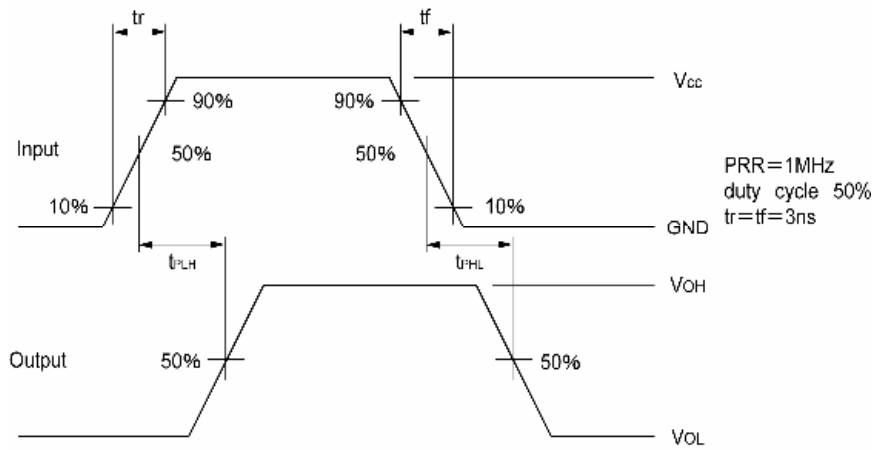
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS		
				MIN.	TYP.	MAX.	MIN.	MAX.			
Input Voltage	V <sub>IH</sub>	2.0		1.5	—	—	1.5	—	V		
		3.0		2.1	—	—	2.1	—			
		5.5		3.85	—	—	3.85	—			
	V <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V		
		3.0		—	—	0.9	—	0.9			
		5.5		—	—	1.65	—	1.65			
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V	
		3.0			2.9	3.0	—	2.9	—		
		4.5			4.4	4.5	—	4.4	—		
		3.0			I <sub>OH</sub> =-4mA	2.58	—	—	2.48		—
		4.5				I <sub>OH</sub> =-8mA	3.94	—	—		3.80
	V <sub>OL</sub>	2.0	V <sub>IN</sub> =V <sub>IL</sub>	I <sub>OL</sub> =50 μA	—		—	0.1	—	0.1	V
		3.0			—	—	0.1	—	0.1		
		4.5			—	—	0.1	—	0.1		
		3.0			I <sub>OL</sub> =4mA	—	—	0.36	—	0.44	
		4.5				I <sub>OL</sub> =8mA	—	—	0.36	—	
Input Current	I <sub>IN</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1	—		0.1	-1.0	1.0	μA	
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0			

## SWITCHING ELECTRICAL CHARACTERISTICS

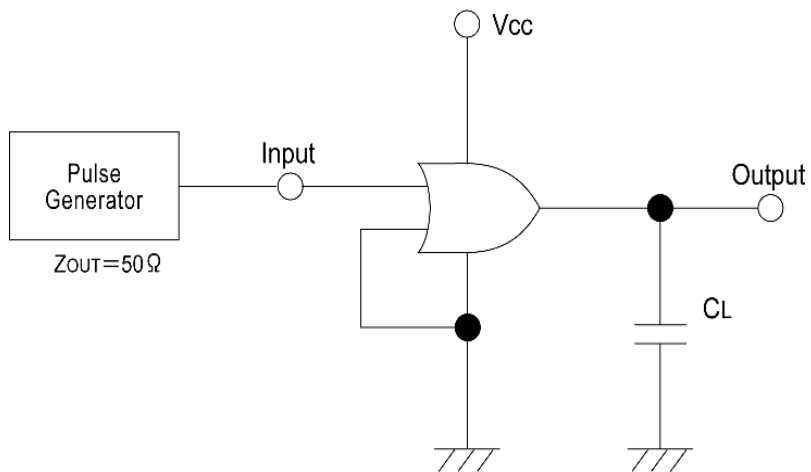
t<sub>r</sub>=t<sub>f</sub>=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	5.5	7.9	1.0	9.5	ns
			5.0		—	3.8	5.5	1.0	6.5	
		50pF	3.3		—	8.0	11.4	1.0	13.0	ns
			5.0		—	5.3	7.5	1.0	8.5	
	t <sub>PHL</sub>	15pF	3.3		—	5.5	7.9	1.0	9.5	ns
			5.0		—	3.8	5.5	1.0	6.5	
		50pF	3.3		—	8.0	11.4	1.0	13.0	ns
			5.0		—	5.3	7.5	1.0	8.5	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	2	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	8.9	—	—	—	pF

## WAVEFORM



## TEST CIRCUIT



Note: Open output when measuring supply current

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## 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 package, high density mounting is possible.

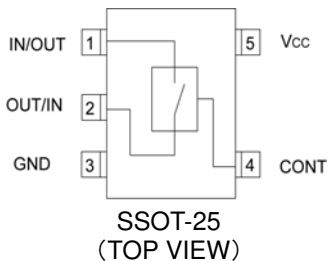
## ■ APPLICATIONS

- Palmtops
- Digital equipment

## ■ FEATURES

- High Speed Operation** : tpd = 2ns (TYP.)
- Operating Voltage Range** : 2V ~ 5.5V
- Low Power Consumption** : 1  $\mu$  A (MAX.)
- Low ON Resistance** : 22  $\Omega$  (TYP.)
- CMOS Logic Analog Switch**
- Ultra Small Package** : SSOT-25

## ■ PIN CONFIGURATION

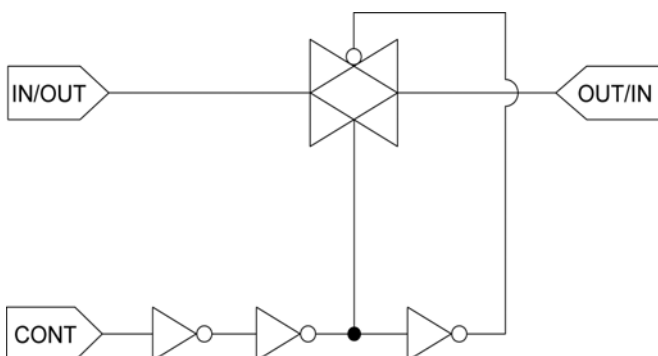


## ■ PRODUCT CLASSIFICATION

- Ordering Information

PRODUCT NAME	PACKAGE	ORDER UNIT
XC74UL4066NR	SSOT-25	3,000/Reel

## ■ 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 <sub>IK</sub>	-20	mA
Switch Output Diode Current	I <sub>OK</sub>	±20	mA
Switch Output Current	I <sub>OUT</sub>	±25	mA
Vcc,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation*	P <sub>d</sub>	150	mW
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

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

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-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 <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
				MIN.	TYP.	MAX.	MIN.	MAX.	
“High” Level Control Input Voltage	V <sub>IH</sub>	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 <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V
		3.0		—	—	0.9	—	0.9	
		5.5		—	—	1.65	—	1.65	
Peak ON Resistance	R <sub>ONmax</sub>	2.0	V <sub>CONT</sub> =V <sub>IH</sub>	—	130	350	—	550	Ω
		3.0	V <sub>IN</sub> =0~V <sub>CC</sub>	—	22	50	—	65	
		4.5	I <sub>IN</sub> /O <sub>UT</sub> =1mA	—	12	25	—	35	
ON Resistance	R <sub>ON(1)</sub>	2.0	V <sub>CONT</sub> =V <sub>IH</sub>	—	23	50	—	65	Ω
		3.0	V <sub>IN</sub> =GND or V <sub>CC</sub>	—	14	30	—	40	
		4.5	I <sub>IN</sub> /O <sub>UT</sub> =1mA	—	10	20	—	25	
Power Off Leak Current	I <sub>S(OFF)</sub>	5.5	V <sub>CONT</sub> =V <sub>IL</sub> , V <sub>IN</sub> =V <sub>CC</sub> , V <sub>OUT</sub> =GND	—	—	±0.1	—	±1.0	μA
Power On Leak Current	I <sub>S(ON)</sub>	5.5	V <sub>CONT</sub> =V <sub>IH</sub> , V <sub>IN</sub> =V <sub>CC</sub> , OR GND	—	—	±0.1	—	±1.0	μA
Control Input Current	I <sub>CONT</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	—	±0.1	—	±1.0	μA
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	—	1.0	—	5.0	μA

## SWITCHING ELECTRICAL CHARACTERISTICS

(tr=tf=3ns)

PARAMETER	SYMBOL	V <sub>CC</sub> (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 <sub>IN</sub> =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 <sub>IN</sub> =1kHz	—	-60	—	—	—	dB
Cross Talk (Control Switch)		2.0	RL=600kΩ	—	60	—	—	—	mV
		3.0	CL=50pF	—	100	—	—	—	
		4.5	f <sub>IN</sub> =1kHz	—	150	—	—	—	
Maximum Control Input Frequency		2.0	RL=1kΩ	—	30	—	—	—	MHz
		3.0	CL=15pF	—	30	—	—	—	
		4.5	V <sub>OUT</sub> =V <sub>CC</sub> /2	—	30	—	—	—	
Control Input Capacitance	C <sub>iN</sub>	—		—	5	10	—	10	pF
Switch Input/Output Capacitance	C <sub>iN/OUT</sub>	—		—	6	—	—	—	pF
Feed Through Capacitance	C <sub>iN-OUT</sub>	—		—	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".

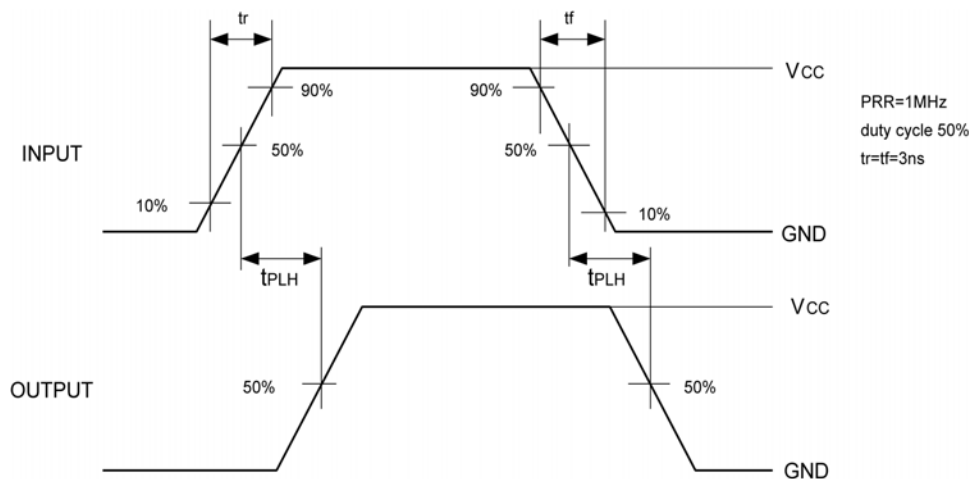
Ensure that the average operating supply current at times of "No Load" meets the following conditions:

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

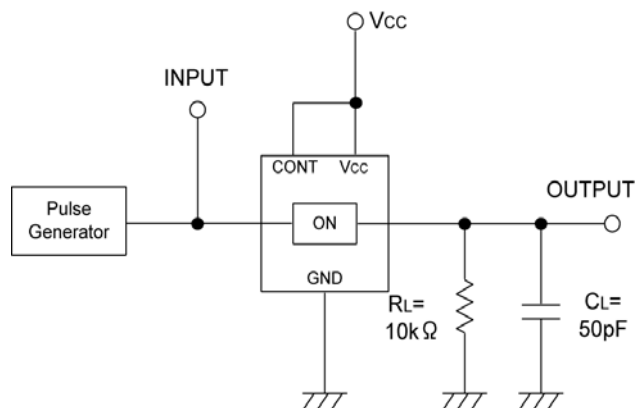
# XC74UL4066

## ■ DELAY TIME

### ● WAVEFORM



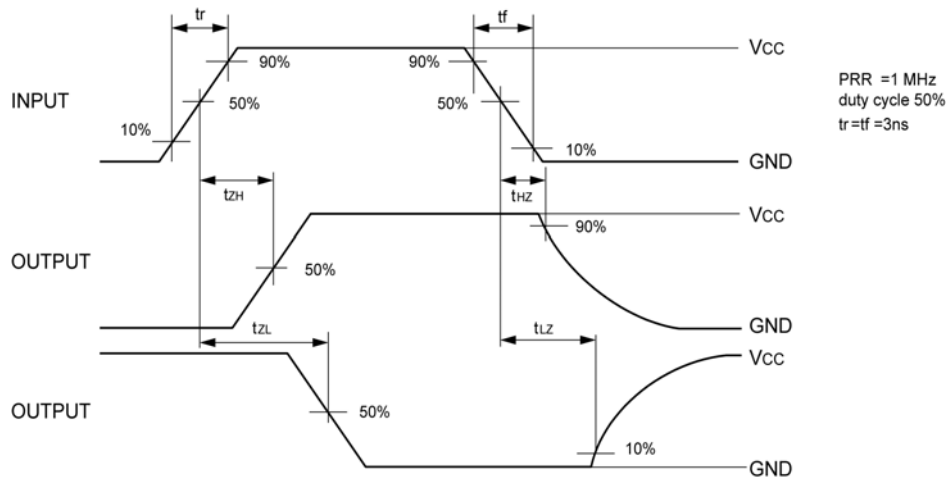
### ● TEST CIRCUIT



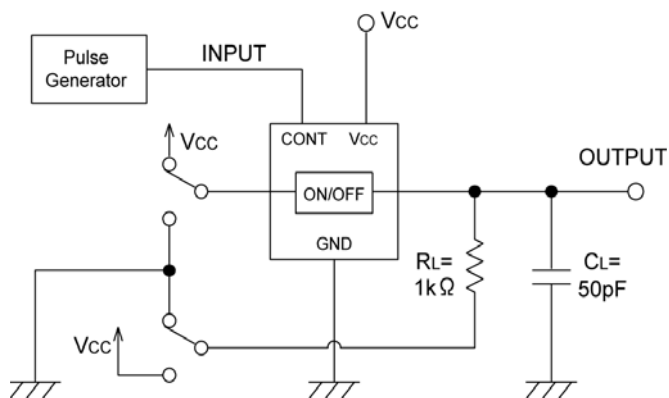
Note: Open output when measuring supply current

## ■ OUTPUT ENABLE TIME, OUTPUT DISABLE TIME

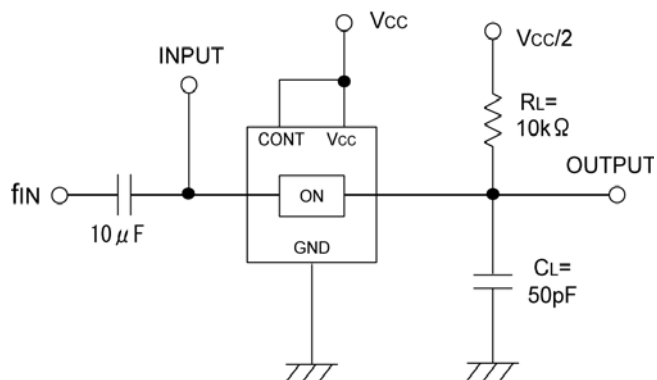
### ● WAVEFORM



### ● TEST CIRCUIT

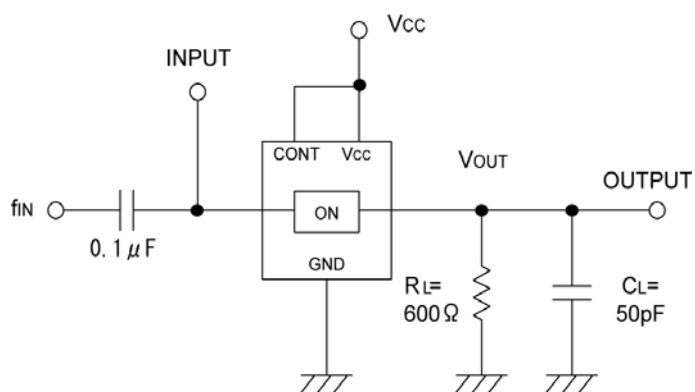


## ■ SINE WAVE DISTORTION RATE



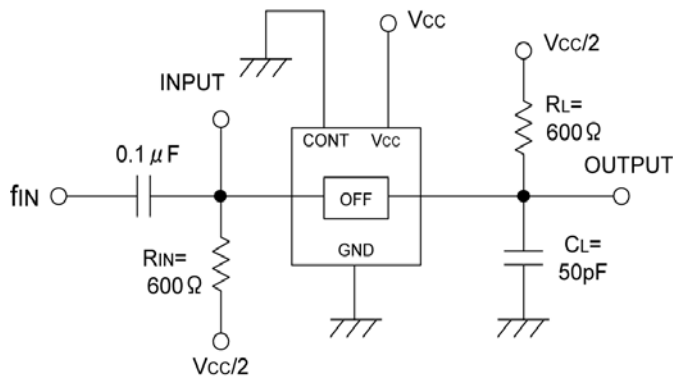
\* Input by sine wave

## ■ -3dB BAND WIDTH



\* Input by sine wave

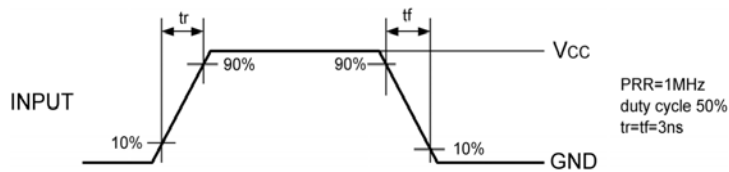
## ■ FEED THROUGH TEST CIRCUIT



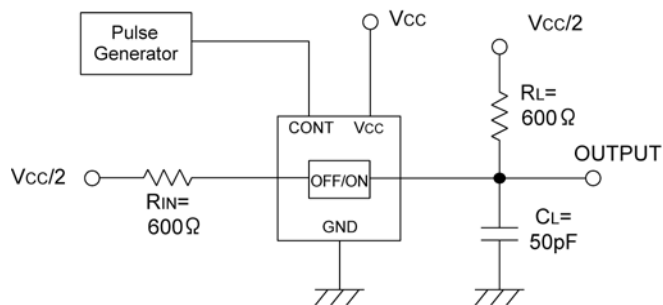
\* Input by sine wave

## ■ CROSS TALK

### ● WAVEFORM

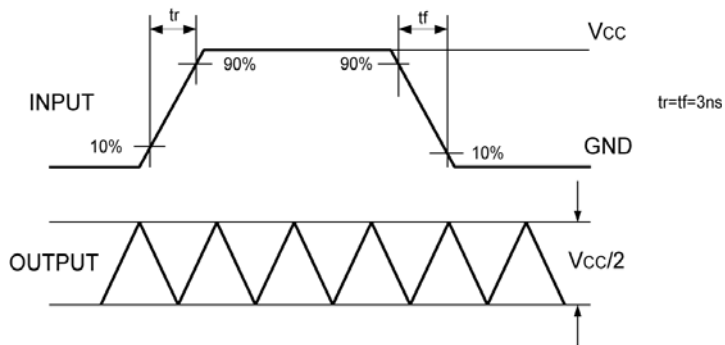


### ● TEST CIRCUIT

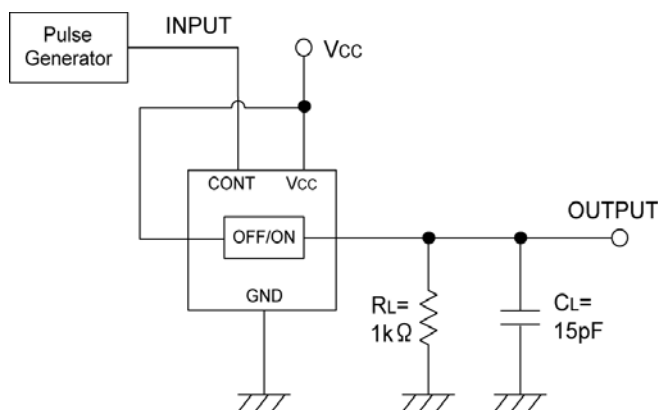


## ■ MAXIMUM CONTROL INPUT FREQUENCY

### ● WAVEFORM

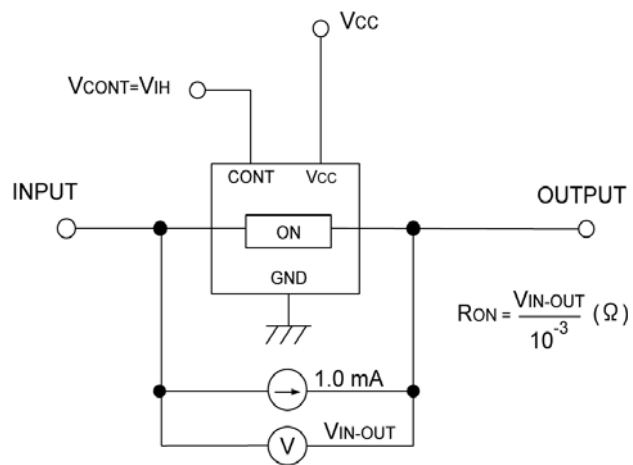


### ● TEST CIRCUIT

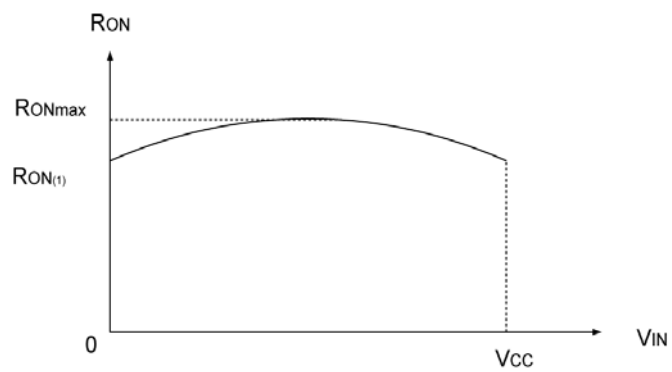




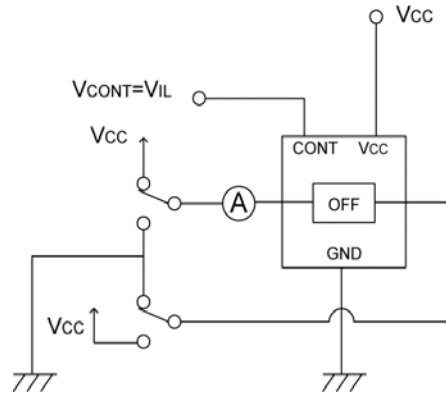
## ■ ON RESISTANCE



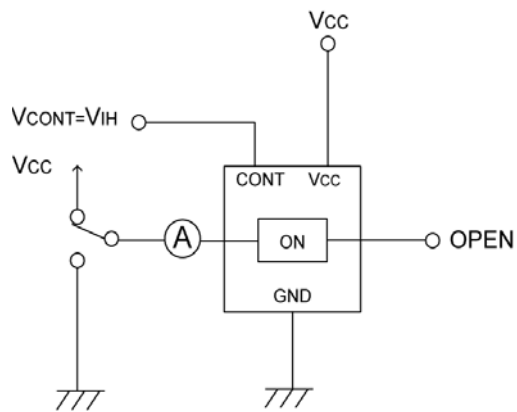
## ■ VOLTAGE DEPENDANCIES OF ON RESISTANCE



## ■ POWER OFF LEAK CURRENT



## ■ POWER ON LEAK CURRENT



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**TOREX SEMICONDUCTOR LTD.**

# XC74UL86AA

ETR1309\_002

## CMOS Logic

### ■ GENERAL DESCRIPTION

The XC74UL86AA is a 2-input CMOS exclusive-OR Gate, manufactured using silicon gate CMOS fabrication.

CMOS low power circuit operation makes high speed LS-TTL operation achievable.

With a wave forming buffer connected internally, stabilized output can be achieved as the circuit offers high noise immunity.

As the XC74UL86AA is integrated into mini molded, SSOT-25 and SON-6 package, high density mounting is possible.

### ■ APPLICATIONS

- Palmtops
- Digital equipment

### ■ FEATURES

**High Speed Operation** : tpd = 3.1ns (TYP.)

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

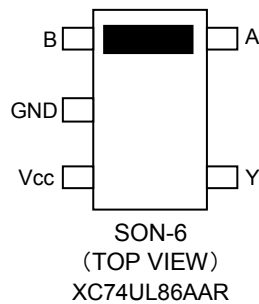
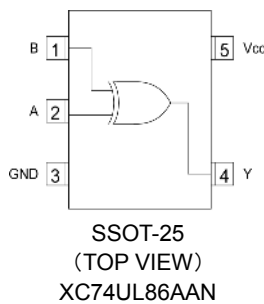
**Low Power Consumption** : 1  $\mu$  A (MAX.)

**CMOS 2-Input Exclusive-OR Gate**

**Ultra Small Packages** : SSOT-25, SON-6\*

\* Under Development

### ■ PIN CONFIGURATION



### ■ FUNCTIONS

INPUT		OUTPUT
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

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
Input Voltage	VIN	-0.5~+6.0	V
Output Voltage	VOUT	-0.5~VCC+0.5	V
Input Diode Current	I <sub>IK</sub>	-20	mA
Output Diode Current	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±25	mA
VCC,GND Current	I <sub>CC</sub> ,I <sub>GND</sub>	±50	mA
Power Dissipation	SSOT-25* <sup>1</sup>	Pd	mW
	SON-6* <sup>2</sup>		
Storage Temperature Range	T <sub>stg</sub>	-65~+150	°C

Voltage is all ground standardized.

\* 1) Ta=55°C

\* 2) Ta=25°C

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	UNITS
Supply Voltage	V <sub>CC</sub>	—	2~5.5	V
Input Voltage	V <sub>IN</sub>	—	0~5.5	V
Output Voltage	V <sub>OUT</sub>	—	0~V <sub>CC</sub>	V
Operating Temperature Range	T <sub>opr</sub>	—	-40~+85	°C
Output Current	I <sub>OH</sub>	3.0	-4	mA
		4.5	-8	
	I <sub>OL</sub>	3.0	4	
		4.5	8	
Input Rise and Fall Time	t <sub>r,tf</sub>	3.3	0~100	ns
		5.0	0~20	

## DC ELECTRICAL CHARACTERISTICS

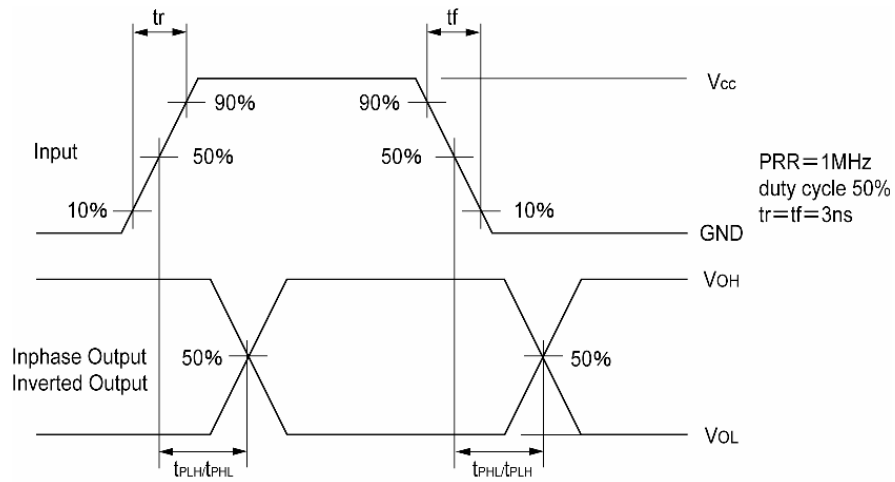
PARAMETER	SYMBOL	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS		
				MIN.	TYP.	MAX.	MIN.	MAX.			
Input Voltage	V <sub>IH</sub>	2.0		1.5	—	—	1.5	—	V		
		3.0		2.1	—	—	2.1	—			
		5.5		3.85	—	—	3.85	—			
	V <sub>IL</sub>	2.0		—	—	0.5	—	0.5	V		
		3.0		—	—	0.9	—	0.9			
		5.5		—	—	1.65	—	1.65			
Output Voltage	V <sub>OH</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> =-50 μA	1.9	2.0	—	1.9	—	V	
		3.0			2.9	3.0	—	2.9	—		
		4.5			4.4	4.5	—	4.4	—		
		3.0			I <sub>OH</sub> =-4mA	2.58	—	—	2.48		—
		4.5				I <sub>OH</sub> =-8mA	3.94	—	—		3.80
	V <sub>OL</sub>	2.0	V <sub>IN</sub> =V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> =50 μA	—		—	0.1	—	0.1	V
		3.0			—	—	0.1	—	0.1		
		4.5			—	—	0.1	—	0.1		
		3.0			I <sub>OL</sub> =4mA	—	—	0.36	—	0.44	
		4.5				I <sub>OL</sub> =8mA	—	—	0.36	—	
Input Current	I <sub>IN</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND	-0.1	—		0.1	-1.0	1.0	μA	
Static Supply Current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0 μA	—	—	1.0	—	10.0			

## SWITCHING ELECTRICAL CHARACTERISTICS

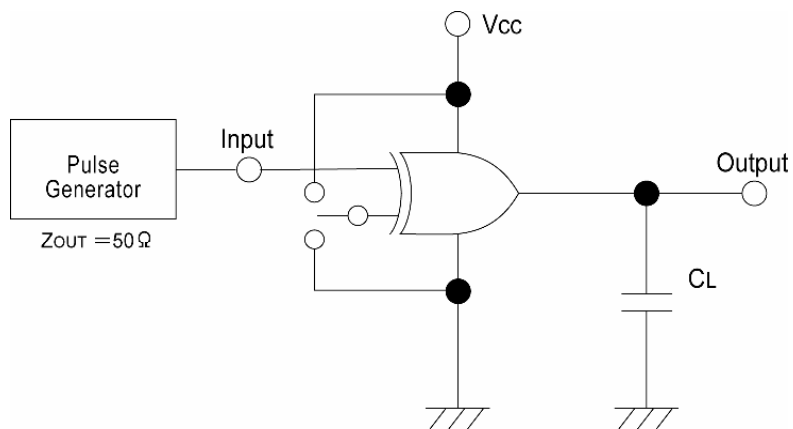
t<sub>r</sub>=t<sub>f</sub>=3ns

PARAMETER	SYMBOL	C <sub>L</sub>	V <sub>CC</sub> (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS
					MIN.	TYP.	MAX.	MIN.	MAX.	
Delay Time	t <sub>PLH</sub>	15pF	3.3		—	4.4	11.0	1.0	13.0	ns
			5.0		—	3.3	6.8	1.0	8.0	
		50pF	3.3		—	6.1	14.5	1.0	16.5	ns
			5.0		—	4.4	8.8	1.0	10.0	
	t <sub>PHL</sub>	15pF	3.3		—	4.0	11.0	1.0	13.0	ns
			5.0		—	2.9	6.8	1.0	8.0	
		50pF	3.3		—	5.6	14.5	1.0	16.5	ns
			5.0		—	4.1	8.8	1.0	10.0	
Input Capacitance	C <sub>IN</sub>	—	5.0	V <sub>IN</sub> =V <sub>CC</sub> or GND	—	4	10	—	10	pF
Power Dissipation Capacitance	C <sub>pd</sub>	No Load, f=1MHz			—	12	—	—	—	pF

## ■ WAVEFORM



## ■ TEST CIRCUIT



Note: Open output when measuring supply current

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