



- ◆ COMS 2-Input NOR Gate
- ◆ High Speed Operation : $t_{pd} = 2.65\text{ns TYP}$
- ◆ Operating Voltage Range : $2\text{V} \sim 5.5\text{V}$
- ◆ Low Power Consumption : $1\mu\text{A (max)}$

■ Applications

- Palmtops
- Digital Equipment

■ General Description

The ML74UL02MRG is a 2-input CMOS NOR gate, manufactured using silicon gate CMOS fabrication.

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

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

As the ML74UL02MRG is integrated into mini molded, SOT-23-5 package, high density mounting possible.

■ Features

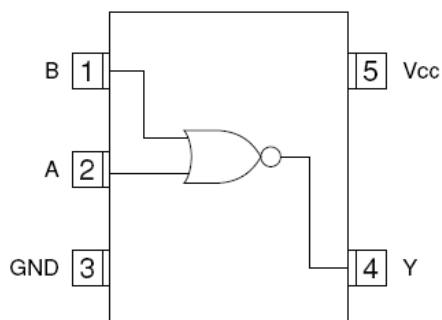
High Speed Operation : $t_{pd} = 2.6\text{ns TYP}$

Operating Voltage Range: $2\text{V} \sim 5.5\text{V}$

Low Power Consumption: $1\mu\text{A (max)}$

Ultra Small Package : SOT-23-5

■ Pin Configuration



SOT-23-5 (TOP VIEW)

■ Function

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

$T_a = -40^\circ\text{C} \sim 85^\circ\text{C}$

PARAMETER	SYMBOL	RATINGS	UNITS
Power Supply Voltage	V_{CC}	$-0.5 \sim +6.0$	V
Input voltage	V_{IN}	$-0.5 \sim +6.0$	V
Output Voltage	V_{OUT}	$-0.5 \sim V_{CC} + 0.5$	V
Input Diode Current	I_{IK}	± 20	mA
Output Diode current	I_{OK}	± 20	mA
Output Current	I_{OUT}	± 25	mA
V_{CC} , GND Current	I_{CC} , I_{GND}	± 50	mA
Continuous Total Power Dissipation ($T_a = 55^\circ\text{C}$)	P_d	150	mW
Storage Temperature	T_{stg}	$-65 \sim +150$	$^\circ\text{C}$

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
Output Current	I _{OH}	3.0	-4	mA
		4.5	-8	
	I _{OL}	3.0	4	
		4.5	8	
Input Rise and Fall Time	tr, tf	3.3	0 ~ 100	ns
		5.0	0 ~ 20	

■ DC Electrical Characteristics

PARAMETER	SYMBOL	Vcc(V)	CONDITIONS		Ta=25°C			Ta=-40~85°C		UNITS
					MIN	TYP	MAX	MIN	MAX	
Input Voltage	VIH	2.0			1.5	-	-	1.5	-	V
		3.0			2.1	-	-	2.1	-	
		5.5			3.85	-	-	3.85	-	
	VIL	2.0			-	-	0.5	-	0.5	V
		3.0			-	-	0.9	-	0.9	
		5.5			-	-	1.65	-	1.65	
Output Voltage	VOH	2.0	VIN=VIH or VIL	IOH=-50μA	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		IOH=-4mA	2.58	-	-	2.48	-	
		4.5		IOH=-8mA	3.94	-	-	3.80	-	
	VOL	2.0	VIN=VIH	IOL=50μA	-	-	0.1	-	0.1	V
		3.0			-	-	0.1	-	0.1	
		4.5			-	-	0.1	-	0.1	
		3.0		IOL =4mA	-	-	0.36	-	0.44	
		4.5		IOL =8mA	-	-	0.36	-	0.44	
Input Current	IIN	5.5	VIN=Vcc or GND		-0.1	-	0.1	-1.0	1.0	μA
Quiescent Supply Current	Icc	5.5	VIN=Vcc or GND, IOUT=0μA		-	-	1.0	-	10.0	

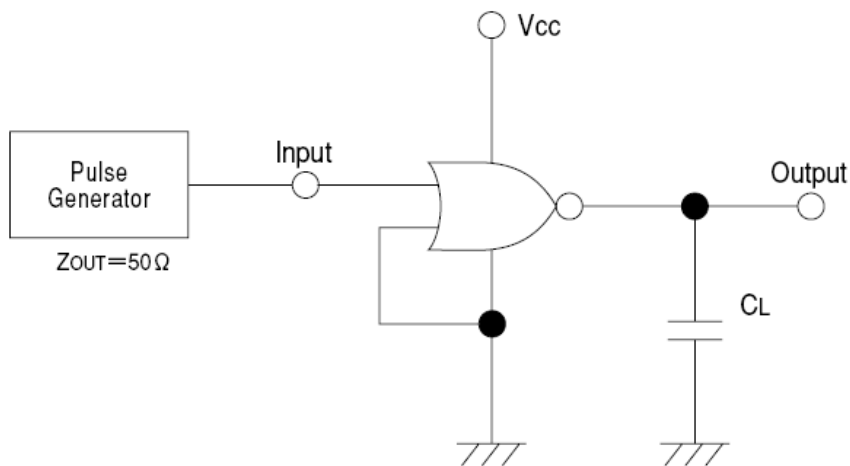
■ Switching Electrical Characteristics

PARAMETER	SYMBOL	C _L	V _{cc} (V)	CONDITIONS	Ta=25°C			Ta=-40~85°C		UNITS
					MIN	TYP	MAX	MIN	MAX	
Propagation Delay Time	t _{PLH}	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	ns
			5.0		-	3.9	7.5	1.0	8.5	
	t _{PHL}	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	ns
			5.0		-	3.6	7.5	1.0	8.5	
Input Capacitance	C _{IN}	-	5.0	V _{IN} =V _{cc} or GND	-	4	10	-	10	pF
Power Dissipation Capacitance	C _{pd}	No Load, f=1MHz			-	9.7	-	-	-	pF

Tr=tf=3ns

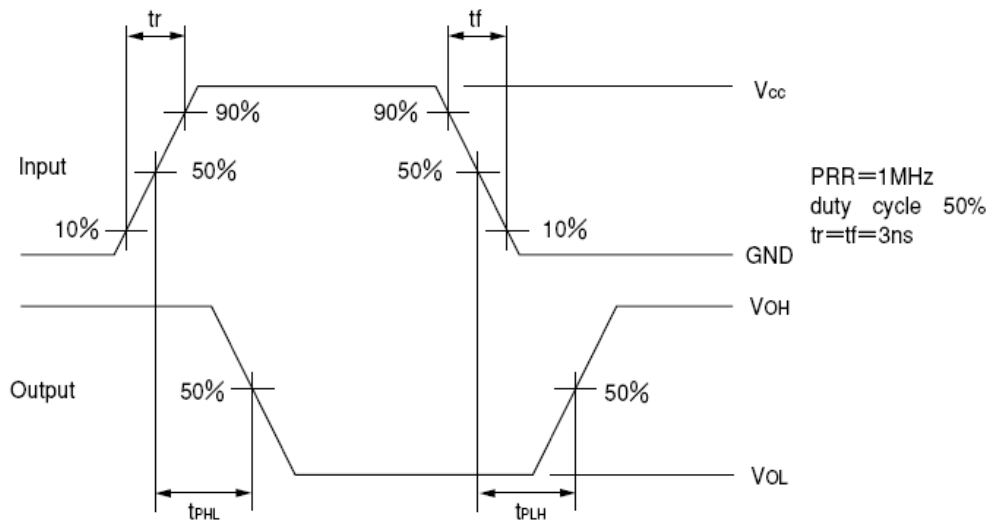


■ Typical Application Circuit



Note: Open output when measuring supply current

■ Waveforms



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