

- ◆ COMS Inverter
- ◆ High Speed Operation : $t_{pd} = 2.05\text{ns TYP}$
- ◆ Operating Voltage Range : 2V ~ 5.5V
- ◆ Low Power Consumption : $1\mu\text{A (max)}$

■ General Description

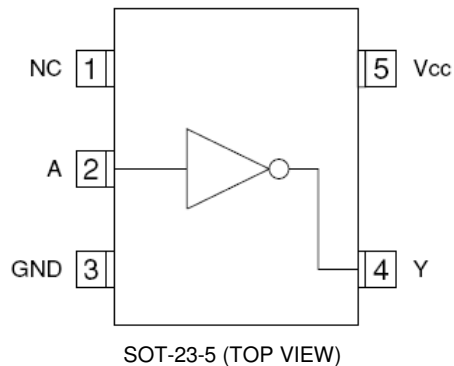
The ML74UL04MRG is a CMOS Inverter, manufactured using silicon gate CMOS fabrication.

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

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

AS the ML74UL04 is integrated into mini molded, SOT-23-5 packages, high density mounting is possible.

■ Pin Configuration



■ 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 ~ +6.0	V
Input voltage	V _{IN}	-0.5 ~ +6.0	V
Output Voltage	V _{OUT}	-0.5 ~ 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°C)	P _d	150	mW
Storage Temperature	T _{stg}	-65 ~ +150	°C

Note: Voltage is all Ground standardized.

■ Applications

- Crystal Oscillators
- Palmtops
- Digital Equipment

■ Features

High Speed Operation : $t_{pd} = 2.05\text{ns TYP}$

Operating Voltage Range: 2V ~ 5.5V

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

Ultra Small Package : SOT-23-5

■ Function

INPUT	OUTPUT
A	Y
H	L
L	H

H=High level, L=Low level

■ 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

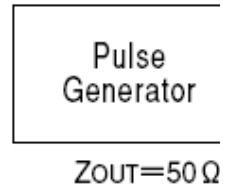
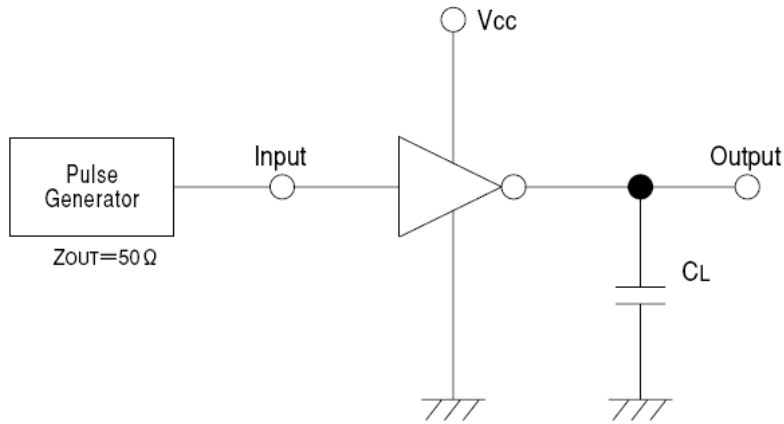
PARAMETER	SYMBOL	V _{cc} (V)	CONDITIONS	Ta=25°C			Ta=-40~85°C		UNITS	
				MIN	TYP	MAX	MIN	MAX		
Input Voltage	V _{IH}	2.0		1.5	-	-	1.5	-	V	
		3.0		2.1	-	-	2.1	-		
		5.5		3.85	-	-	3.85	-		
	V _{IL}	2.0		-	-	0.5	-	0.5	V	
		3.0		-	-	0.9	-	0.9		
		5.5		-	-	1.65	-	1.65		
Output Voltage	V _{OH}	2.0	V _{IN} =V _{IH} or V _{IL}	I _{OH} =-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			2.58	-	-	2.48	-	
		4.5			3.94	-	-	3.80	-	
	V _{OL}	2.0	V _{IN} =V _{IH}	I _{OL} =50μA	-	-	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 _{IN}	0~5.5	V _{IN} =V _{cc} or GND	-0.1	-	0.1	-1.0	1.0	μA	
Quiescent Supply Current	I _{cc}	5.5	V _{IN} =V _{cc} or GND, I _{OUT} =0μA	-	-	1.0	-	10.0	μA	

■ 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		-	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	ns
			5.0		-	3.2	7.5	1.0	8.5	
	t _{PHL}	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	ns
			5.0		-	3.0	7.5	1.0	8.5	
Input Capacitance	C _{IN}	-	5.0	V _{IN} =V _{cc} or GND	-	2	10	-	10	pF
Power Dissipation Capacitance	C _{pd}	No Load, f=1MHz			-	8.9	-	-	-	pF

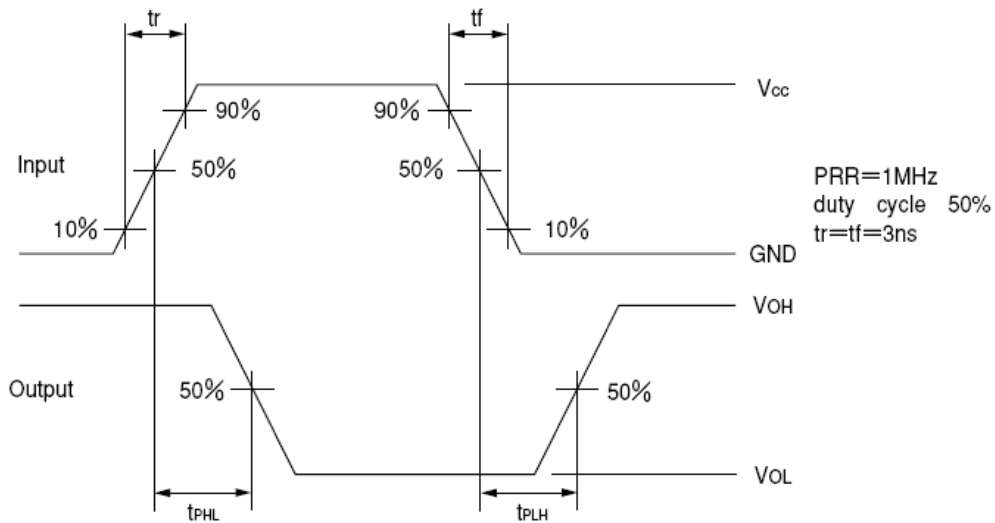
Tr=tf=3ns

■ Typical Application Circuit



Note: Open output when measuring supply current

■ Waveforms



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