MiniLogic Device Corporation

- **COMS Inverter**
- **High Speed Operation : tpd = 2.05ns TYP**
- **Operating Voltage Range : 2V ~ 5.5V**
- **Low Power Consumption : 1μA (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.

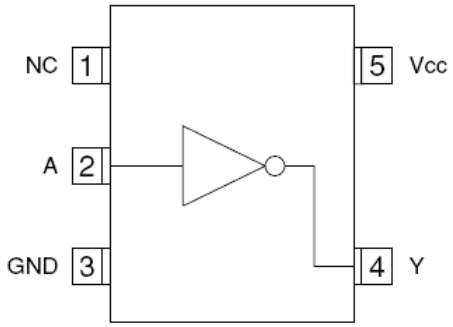
■Applications

- Crystal Oscillators
- Palmtops
- Digital Equipment

■Features

High Speed Operation : tpd = 2.05ns TYP
Operating Voltage Range: 2V ~ 5.5V
Low Power Consumption: 1μA (max)
Ultra Small Package : SOT-23-5

■Pin Configuration



SOT-23-5 (TOP VIEW)

■Function

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
Power Supply Voltage	Vcc	-0.5 ~ +6.0	V
Input voltage	V_{IN}	-0.5 ~ +6.0	V
Output Voltage	V_{OUT}	-0.5 ~ Vcc +0.5	V
Input Diode Current	I_{IK}	±20	mA
Output Diode current	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
Vcc, GND Current	I_{CC}, I_{GND}	±50	mA
Continuous Total Power Dissipation (Ta=55°C)	Pd	150	mW
Storage Temperature	Tstg	-65 ~ +150	°C

Note: Voltage is all Ground standardized.

■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	Topr	-	-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

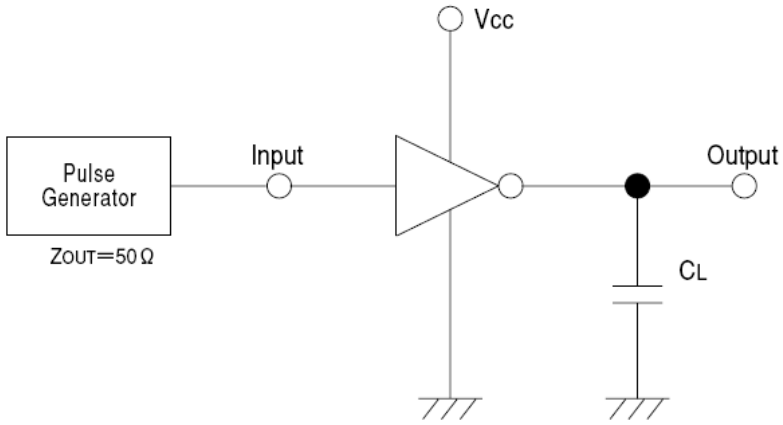
PARAMETER	SYMBOL	Vcc(V)	CONDITIONS		Ta=25°C MIN	Ta=25°C TYP	Ta=25°C MAX	Ta=-40~85°C MIN	Ta=-40~85°C MAX	UNITS
Input Voltage	V_{IH}	2.0			1.5	-	-	1.5	-	V
		3.0			2.1	-	-	2.1	-	
		5.5			3.85	-	-	3.85	-	
	V_{IL}	2.0			-	-	0.5	-	0.5	V
		3.0			-	-	0.9	-	0.9	
		5.5			-	-	1.65	-	1.65	
Output Voltage	V_{OH}	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		I_{OH}=-4mA	2.58	-	-	2.48	-	
		4.5		I_{OH}=-8mA	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		I_{OL} =4mA	-	-	0.36	-	0.44	
		4.5		I_{OL} =8mA	-	-	0.36	-	0.44	
Input Current	I_{IN}	0~5.5	V_{IN}=Vcc or GND		-0.1	-	0.1	-1.0	1.0	μA
Quiescent Supply Current	Icc	5.5	V_{IN}=Vcc or GND, I_{OUT}=0μA		-	-	1.0	-	10.0	μA

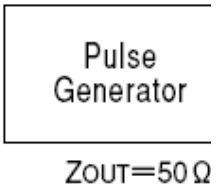
■Switching Electrical Characteristics

Tr=tf=3ns

PARAMETER	SYMBOL	C_L	Vcc(V)	CONDITIONS	Ta=25°C MIN	Ta=25°C TYP	Ta=25°C MAX	Ta=-40~85°C MIN	Ta=-40~85°C MAX	UNITS
Propagation Delay Time	tPLH	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	
	tPHL	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}=Vcc or GND	-	2	10	-	10	pF
Power Dissipation Capacitance	Cpd	No Load, f=1MHz			-	8.9	-	-	-	pF

■Typical Application Circuit





Note: Open output when measuring supply current

■Waveforms