

## CMOS Logic: CMOS inverter

### General Description

The LN74SZ04 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 LN74SZ04 is integrated into mini molded, SOT-353 /SOT23-5L package, high density mounting is possible.

### Features

- High speed operation : tpd = 2.6ns (TYP.)

### Functions

Input	Output
A	Y
L	H
H	L

H=High Level

L=Low Level

### Pin Configuration

Pin Number	Pin Name	Function Description
1	B	Input B
2	A	Input A
3	GND	ground
4	Y	Output Y
5	Vcc	Power supply

### Ordering Information

Product name	Package	Mark	Symbol
LN74SZ04KR	SOT353	Z04K	INV
LN74SZ04MR	SOT23-5L	Z04M	INV

- Operating voltage range : 1.2V ~ 6.0V
- Low power consumption : 1 $\mu$ A (MAX.)
- CMOS inverter
- Ultra small package : SOT-353  
SOT23-5L

### Applications

- Palmtops
- Digital equipment
- Portable electronic products

### Package

- SOT-353/SOT23-5L



(Top View)  
SOT-353

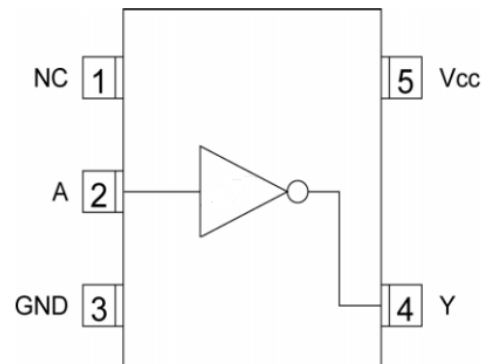


Fig 1. Pin Configuration

■ **Absolute maximum ratings**

Supply voltage-----	-0.5V to 7V
Output voltage -----	-0.5V to Vcc+0.3V
Input voltage-----	-0.5V to 7V
Output current-----	±25mA
Ground current-----	±50mA
Storage temperature range -----	-65°C to 150°C
Lead temperature(Soldering)-----	260°C
Power dissipation P <sub>D</sub> (On PCB board, 25)	
SOT-353-----	150mW
SOT23-5L-----	250mW

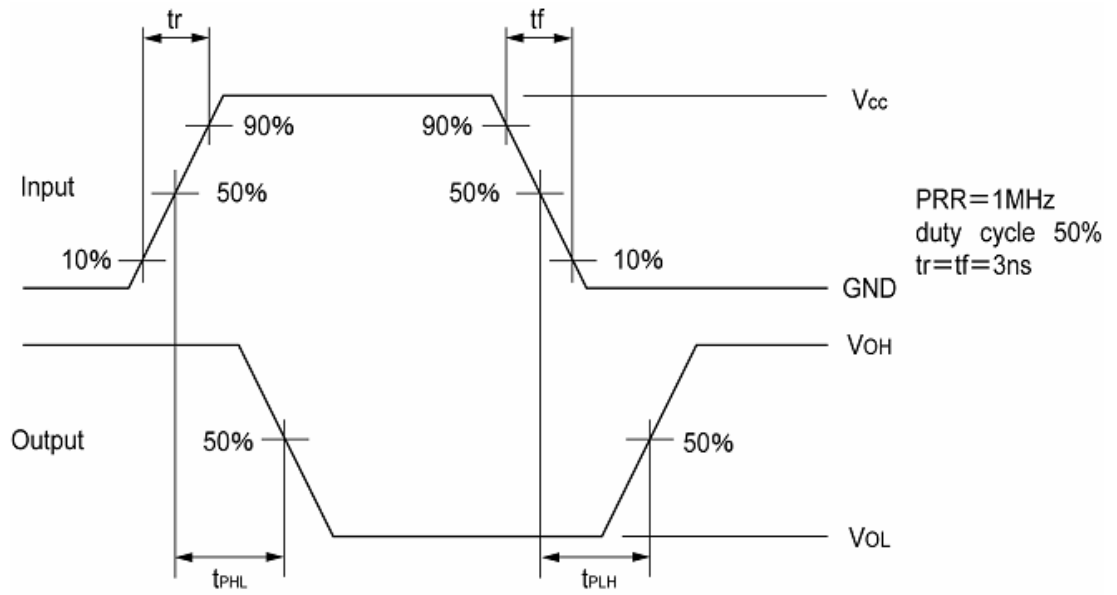
■ **Recommended operating environment**

Supply voltage -----	2V to 5.5V
Output voltage -----	0V to Vcc
Input voltage -----	0V to Vcc
Operating temperature-----	-40°C to 85°C
Output current-----	±4mA@3V
Output current -----	±8mA@4.5V
Input signal rise and fall time-----	0-100ns/V@3.3V
Input signal rise and fall time -----	0-20ns/V@5.0V

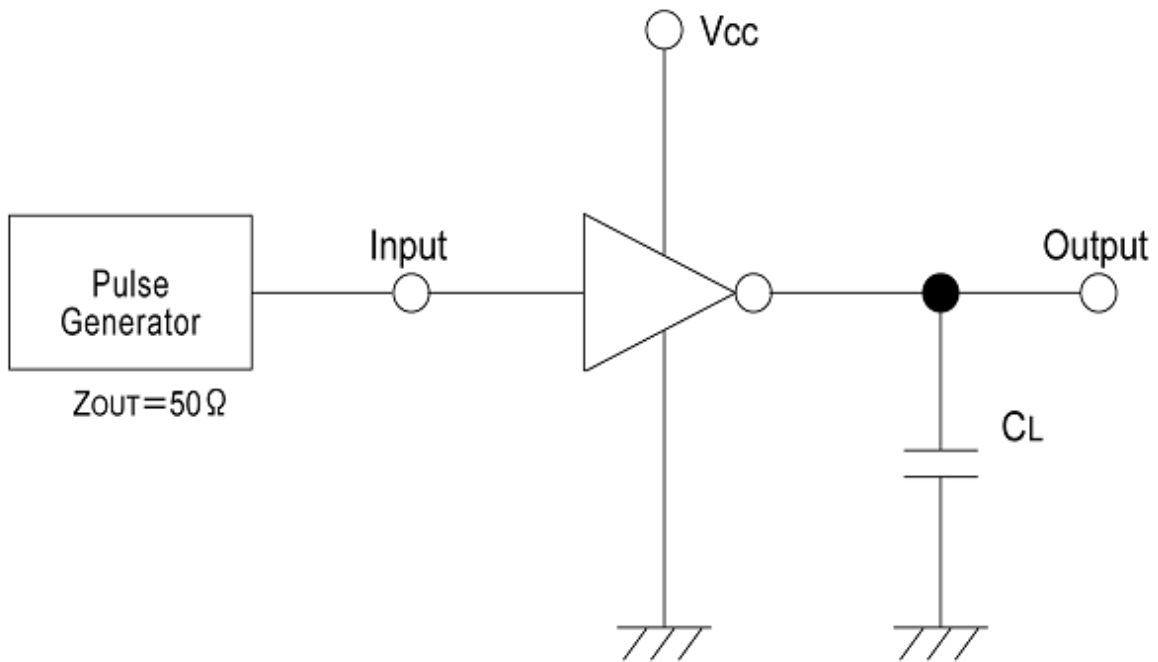
**Electrical Characteristics**

Parameter	Symbol	Voltage(V)	Conditions	Ta=25°C			Ta=-40-85°C		Unit	
				Min	Typ	Max	Min	Max		
Input voltage	V <sub>IH</sub>	1.2		0.9	—	—	0.9	—	V	
		2.0		1.5	—	—	1.5	—		
		3.0		2.1	—	—	2.1	—		
		5.5		3.85	—	—	3.85	—		
	V <sub>IL</sub>	1.2		—	—	0.3	—	0.3	V	
		2.0		—	—	0.5	—	0.5		
		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> =-50μA	1.9	2.0	—	1.9	—	V
		3.0			2.9	3.0	—	2.9	—	
		4.5	Or V <sub>IN</sub> =V <sub>IL</sub>	I <sub>OH</sub> =-4mA	4.4	4.5	—	4.4	—	
		3.0			2.58	—	—	2.48	—	
	4.5	V <sub>IN</sub> =V <sub>IH</sub>	I <sub>OH</sub> =-8mA	3.94	—	—	3.80	—		
	2.0			I <sub>OH</sub> =50μA	—	—	0.1	—	0.1	V
	3.0	—	—		0.1	—	0.1			
	4.5	—	—		0.1	—	0.1			
	3.0	I <sub>OH</sub> =4mA	—		—	0.36	—	0.44		
	4.5		I <sub>OH</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	
Quiescent current	I <sub>CC</sub>	5.5	V <sub>IN</sub> =V <sub>CC</sub> or GND I <sub>OUT</sub> =0μA	—	—	1	—	10	μA	
Delay time	t <sub>PLH</sub>	3.3	C <sub>L</sub> =15pF	—	2.7	7.1	1.0	8.5	nS	
			C <sub>L</sub> =50pF	—	4.1	10.6	1.0	12.0		
		5.0	C <sub>L</sub> =15pF	—	2.1	5.5	1.0	6.5		
			C <sub>L</sub> =50pF	—	3.2	7.5	1.0	8.5		
	t <sub>PHL</sub>	3.3	C <sub>L</sub> =15pF	—	2.5	7.1	1.0	8.5		
			C <sub>L</sub> =50pF	—	3.9	10.6	1.0	11.0		
		5.0	C <sub>L</sub> =15pF	—	2.0	5.5	1.0	6.5		
			C <sub>L</sub> =50pF	—	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	

■ Timing Chart



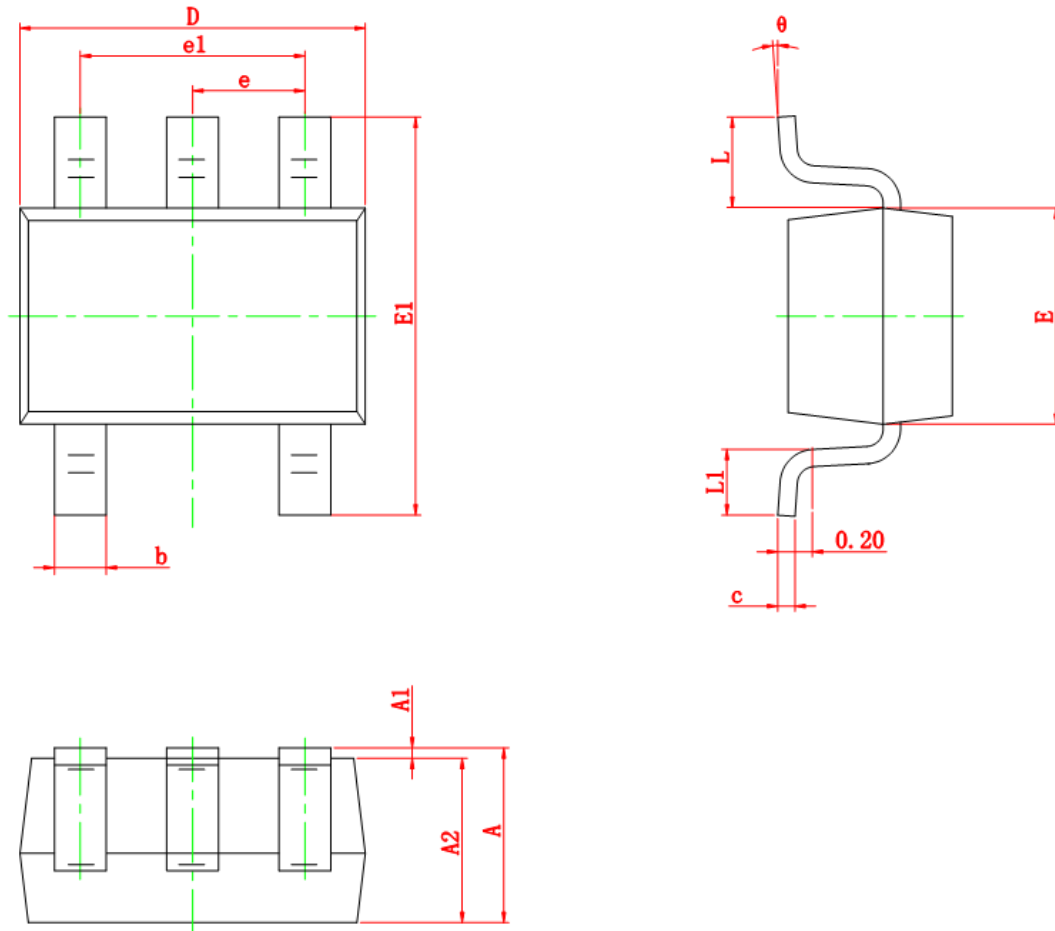
■ Test Circuit



Note: Open output when measuring supply current

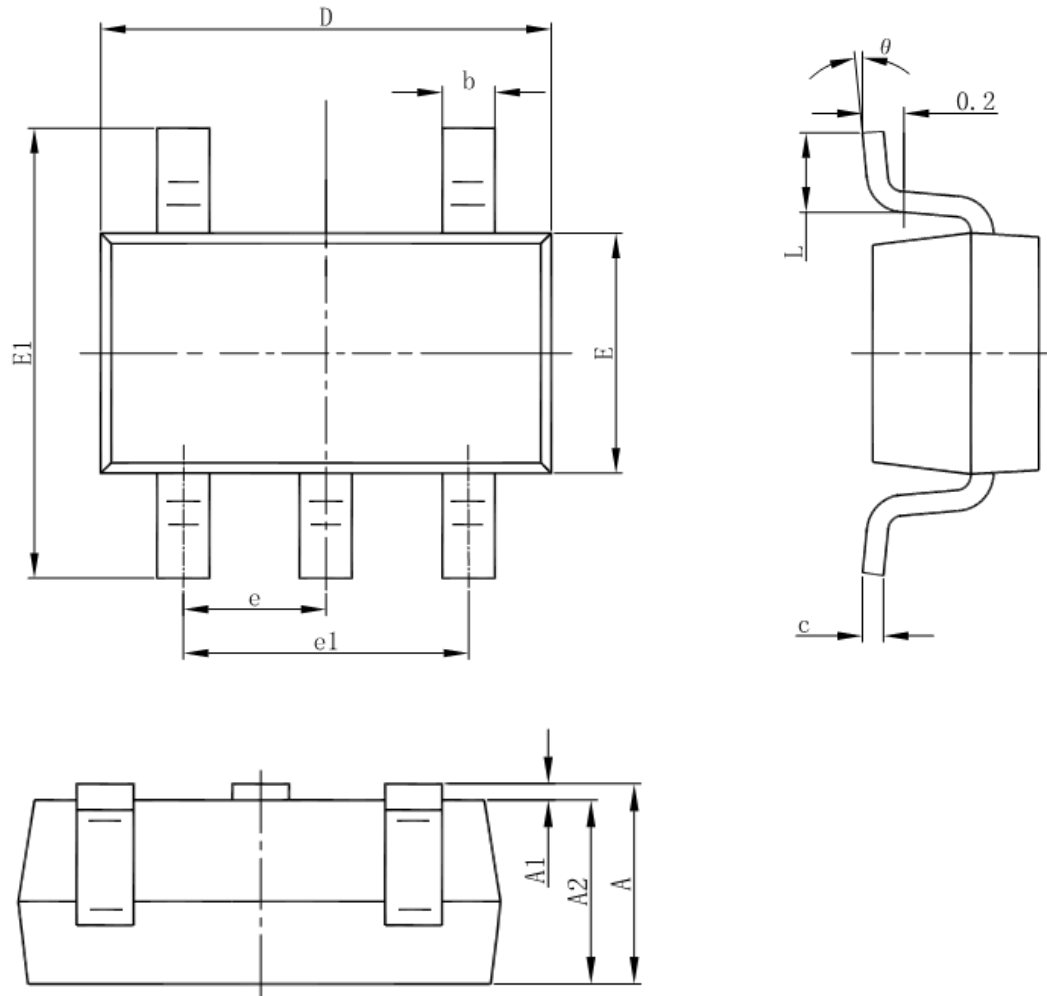
**Package Information**

- SOT-353



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650 TYP		0.026 TYP	
e1	1.200	1.400	0.047	0.055
L	0.525 REF		0.021 REF	
L1	0.260	0.460	0.010	0.018
$\theta$	0°	8°	0°	8°

## • SOT23-5L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°