

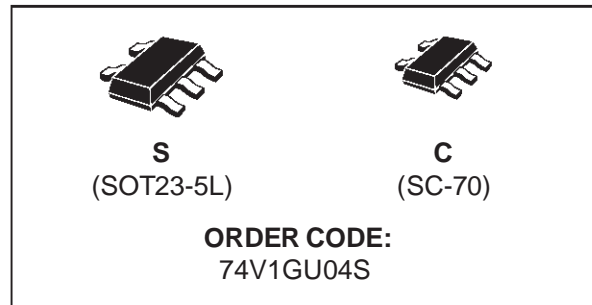


## SINGLE INVERTER (SINGLE STAGE)

- HIGH SPEED:  $t_{PD} = 3.5 \text{ ns}$  (TYP.) at  $V_{CC} = 5V$
- LOW POWER DISSIPATION:  
 $I_{CC} = 1 \mu\text{A}$  (MAX.) at  $T_A = 25^\circ\text{C}$
- HIGH NOISE IMMUNITY:  
 $V_{NIH} = V_{NIL} = 10\% V_{CC}$  (MIN.)
- POWER DOWN PROTECTION ON INPUT
- SYMMETRICAL OUTPUT IMPEDANCE:  
 $|I_{OH}| = I_{OL} = 8 \text{ mA}$  (MIN)
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:  
 $V_{CC} \text{ (OPR)} = 2V \text{ to } 5.5V$
- IMPROVED LATCH-UP IMMUNITY

### DESCRIPTION

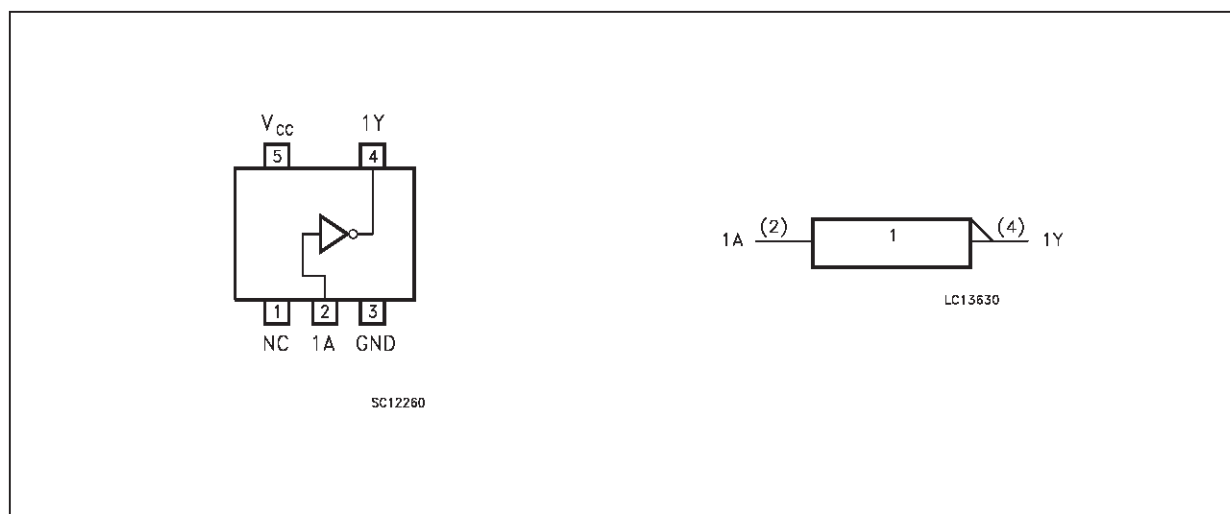
The 74V1GU04 is an advanced high-speed CMOS SINGLE INVERTER fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology. It has similar high speed performance of equivalent Bipolar Schottky TTL combined with true CMOS low power dissipation.



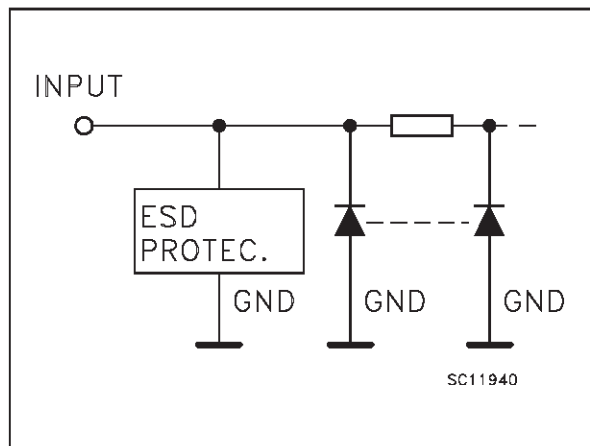
As the internal circuit is composed of a single stage inverter, it can be used in analog application such a crystal oscillator.

Power down protection is provided on input and 0 to 7V can be accepted on input with no regard to the supply voltage. This device can be used to interface 5V to 3V.

### PIN CONNECTION AND IEC LOGIC SYMBOLS



**INPUT EQUIVALENT CIRCUIT**



**PIN DESCRIPTION**

PIN No	SYMBOL	NAME AND FUNCTION
1	N.C.	Not Connected
2	1A	Data Input
4	1Y	Data Output
3	GND	Ground (0V)
5	V <sub>CC</sub>	Positive Supply Voltage

**TRUTH TABLE**

A	Y
L	H
H	L

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	-0.5 to +7.0	V
V <sub>I</sub>	DC Input Voltage	-0.5 to +7.0	V
V <sub>O</sub>	DC Output Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	DC Input Diode Current	- 20	mA
I <sub>OK</sub>	DC Output Diode Current	± 20	mA
I <sub>O</sub>	DC Output Current	± 25	mA
I <sub>CC</sub> or I <sub>GND</sub>	DC V <sub>CC</sub> or Ground Current	± 50	mA
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
T <sub>L</sub>	Lead Temperature (10 sec)	260	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

**RECOMMENDED OPERATING CONDITIONS**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	2.0 to 5.5	V
V <sub>I</sub>	Input Voltage	0 to 5.5	V
V <sub>O</sub>	Output Voltage	0 to V <sub>CC</sub>	V
T <sub>op</sub>	Operating Temperature	-40 to +85	°C

## DC SPECIFICATIONS

Symbol	Parameter	Test Conditions		Value					Unit	
				T <sub>A</sub> = 25 °C			-40 to 85 °C			
				Min.	Typ.	Max.	Min.	Max.		
V <sub>IH</sub>	High Level Input Voltage	2.0		1.7			1.7		V	
		3.0 to 5.5		0.8V <sub>CC</sub>			0.8V <sub>CC</sub>			
V <sub>IL</sub>	Low Level Input Voltage	2.0				0.3		0.3	V	
		3.0 to 5.5				0.2V <sub>CC</sub>		0.2V <sub>CC</sub>		
V <sub>OH</sub>	High Level Output Voltage	2.0	V <sub>I</sub> = V <sub>IL</sub>	I <sub>O</sub> =-50 μA	1.8	2.0		1.8	V	
		3.0		I <sub>O</sub> =-50 μA	2.7	3.0		2.7		
		4.5		I <sub>O</sub> =-50 μA	4.0	4.5		4.0		
		3.0		I <sub>O</sub> =-4 mA	2.58			2.48		
		4.5		I <sub>O</sub> =-8 mA	3.94			3.8		
V <sub>OL</sub>	Low Level Output Voltage	2.0	V <sub>I</sub> = V <sub>IH</sub>	I <sub>O</sub> =50 μA		0.0	0.2		0.2	V
		3.0		I <sub>O</sub> =50 μA		0.0	0.3		0.3	
		4.5		I <sub>O</sub> =50 μA		0.0	0.5		0.5	
		3.0		I <sub>O</sub> =4 mA			0.36		0.44	
		4.5		I <sub>O</sub> =8 mA			0.36		0.44	
I <sub>I</sub>	Input Leakage Current	0 to 5.5	V <sub>I</sub> = 5.5V or GND			±0.1		±1.0	μA	
I <sub>CC</sub>	Quiescent Supply Current	5.5	V <sub>I</sub> = V <sub>CC</sub> or GND			1		10	μA	

AC ELECTRICAL CHARACTERISTICS (Input t<sub>r</sub> = t<sub>f</sub> = 3 ns)

Symbol	Parameter	Test Condition		Value					Unit	
				T <sub>A</sub> = 25 °C			-40 to 85 °C			
				Min.	Typ.	Max.	Min.	Max.		
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Time	3.3 <sup>(*)</sup>	C <sub>L</sub> = 15 pF		5.0	8.9	1.0	10.5	ns	
		3.3 <sup>(*)</sup>		C <sub>L</sub> = 50 pF		7.5	11.4	1.0		13.0
		5.0 <sup>(**)</sup>		C <sub>L</sub> = 15 pF		3.5	5.5	1.0		6.5
		5.0 <sup>(**)</sup>		C <sub>L</sub> = 50 pF		5.0	7.0	1.0		8.0

(\*) Voltage range is 3.3V ± 0.3V

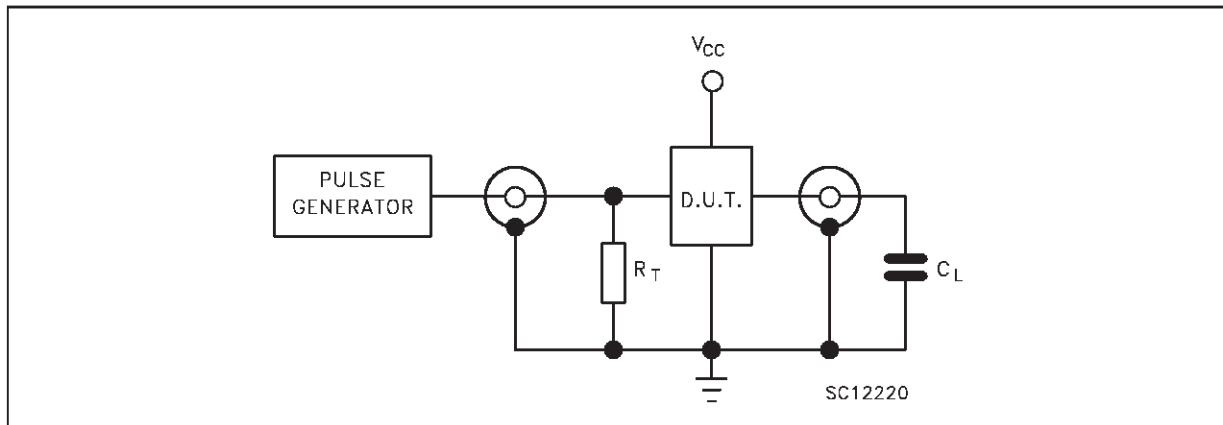
(\*\*) Voltage range is 5V ± 0.5V

## CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions		Value					Unit
				T <sub>A</sub> = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
C <sub>IN</sub>	Input Capacitance			5	10			10	pF
C <sub>PD</sub>	Power Dissipation Capacitance (note 1)			9					pF

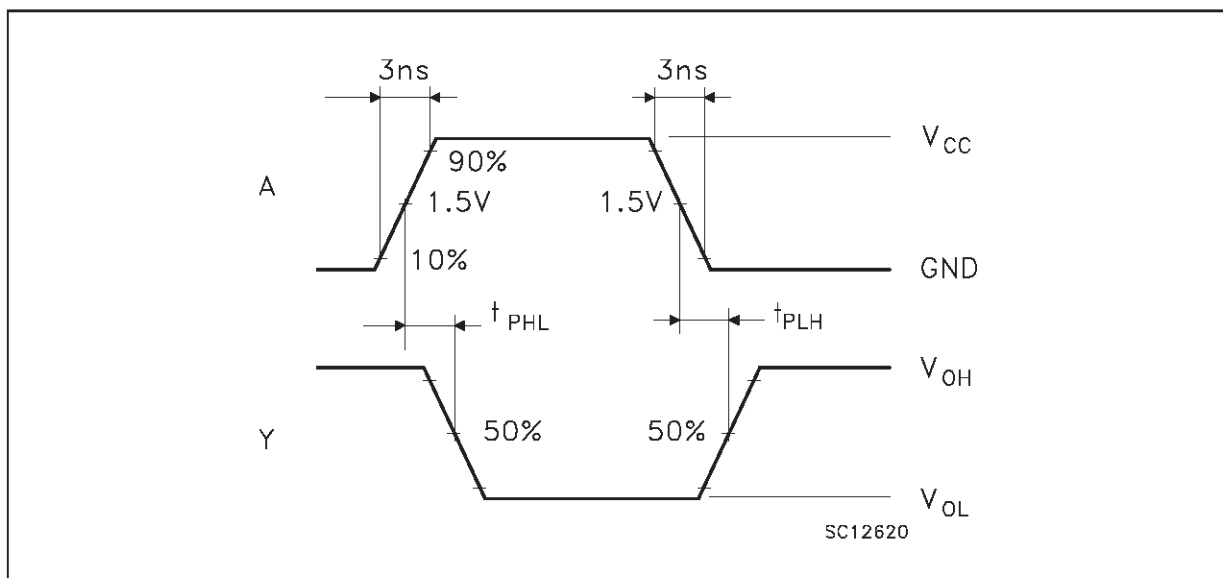
1) C<sub>PD</sub> is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I<sub>CC</sub>(opr) = C<sub>PD</sub> • V<sub>CC</sub> • f<sub>IN</sub> + I<sub>CC</sub>

TEST CIRCUIT



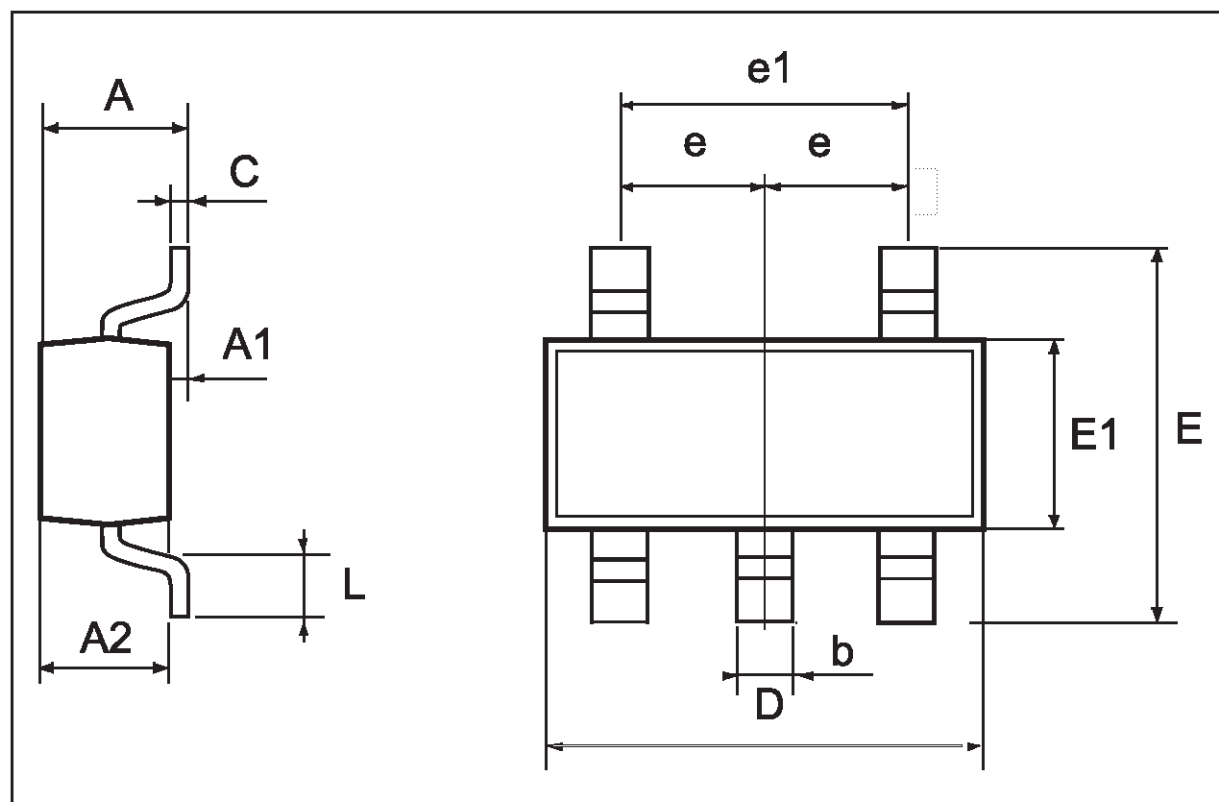
$C_L = 15/50$  pF or equivalent (includes jig and probe capacitance)  
 $R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

WAVEFORM: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)



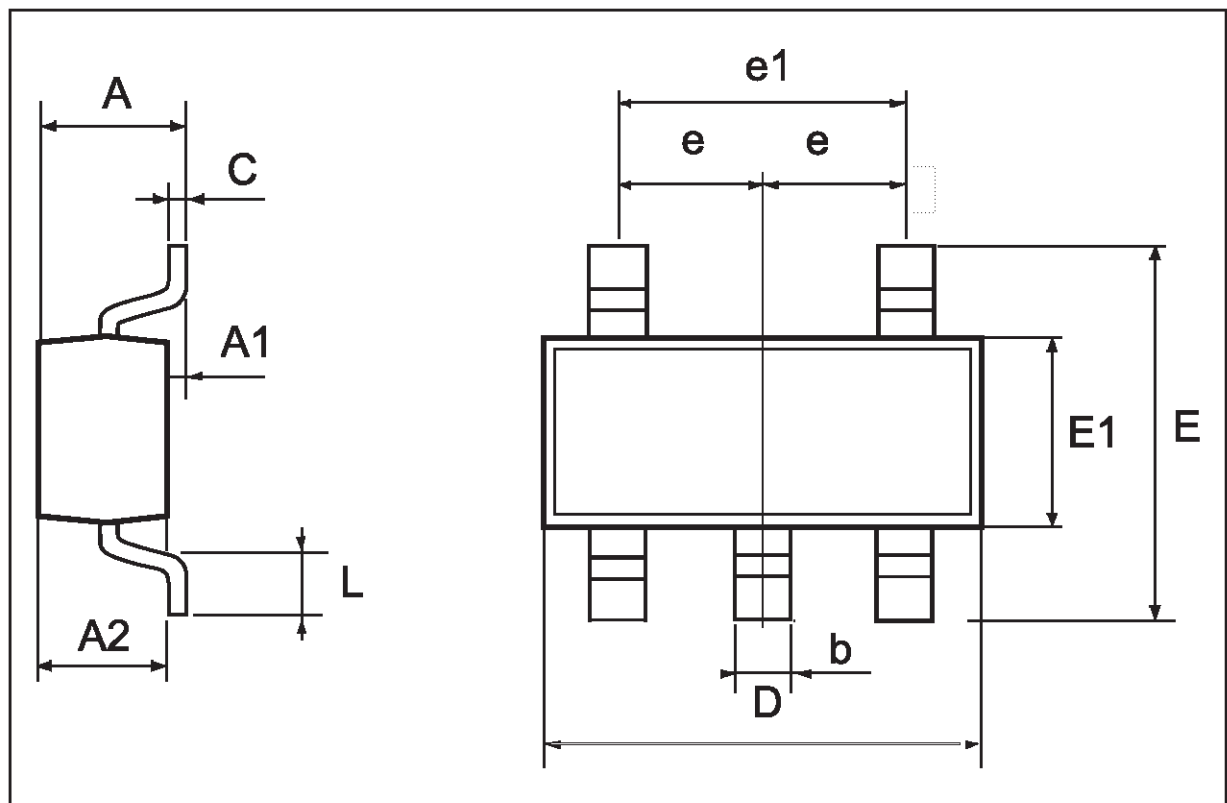
## SOT23-5L MECHANICAL DATA

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	35.4		57.1
A1	0.00		0.15	0.0		5.9
A2	0.90		1.30	35.4		51.2
b	0.35		0.50	13.7		19.7
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	2.60		3.00	102.3		118.1
E1	1.50		1.75	59.0		68.8
L	0.35		0.55	13.7		21.6
e		0.95			37.4	
e1		1.9			74.8	



**SC-70 MECHANICAL DATA**

DIM.	mm			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.80		1.10	31.5		43.3
A1	0.00		0.10	0.0		3.9
A2	0.80		1.00	31.5		39.4
b	0.15		0.30	5.9		11.8
C	0.10		0.18	3.9		7.1
D	1.80		2.20	70.9		86.6
E	1.80		2.40	70.9		94.5
E1	1.15		1.35	45.3		53.1
L	0.10		0.30	3.9		11.8
e		0.65			25.6	
e1		1.3			51.2	



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