

## SINGLE BUS BUFFER (3-STATE)

### PRELIMINARY DATA

- HIGH SPEED:  $t_{PD} = 3.8 \text{ ns}$  (TYP.) at  $V_{CC} = 5V$
- LOW POWER DISSIPATION:  
 $I_{CC} = 1 \mu A$  (MAX.) at  $T_A = 25^\circ C$
- COMPATIBLE WITH TTL OUTPUTS:  
 $V_{IH} = 2V$  (MIN),  $V_{IL} = 0.8V$  (MAX)
- POWER DOWN PROTECTION ON INPUTS & OUTPUT
- SYMMETRICAL OUTPUT IMPEDANCE:  
 $|I_{OH}| = I_{OL} = 8 \text{ mA}$  (MIN)
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:  
 $V_{CC}$  (OPR) = 4.5V to 5.5V
- IMPROVED LATCH-UP IMMUNITY

### DESCRIPTION

The 74V1T125 is an advanced high-speed CMOS SINGLE BUS BUFFER 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



**S**  
(SOT23-5L)

**ORDER CODE:**  
74V1T125S

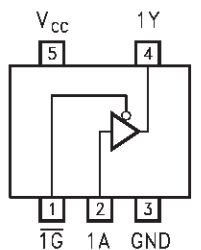
power dissipation.

3-STATE control input  $\overline{G}$  has to be set high to place the output into the high impedance state.

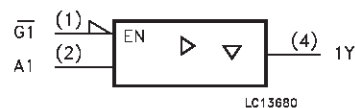
Power down protection is provided on all inputs and output and 0 to 7V can be accepted on inputs with no regard to the supply voltage. This device can be used to interface 5V to 3V.

All inputs and output are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

### PIN CONNECTION AND IEC LOGIC SYMBOLS

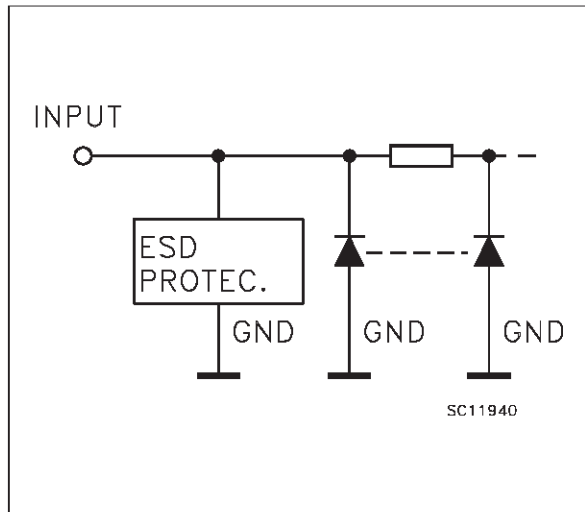


SC12310



LC13680

## INPUT EQUIVALENT CIRCUIT



## PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	$\overline{1G}$	Output Enable Input
2	1A	Data Input
4	1Y	Data Output
3	GND	Ground (0V)
5	V <sub>CC</sub>	Positive Supply Voltage

## TRUTH TABLE

A	$\overline{G}$	Y
X	H	Z
L	L	L
H	L	H

X: "H" or "L"

Z: High Impedance

## 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 (see note 1)	-0.5 to +7.0	V
V <sub>O</sub>	DC Output Voltage (see note 2)	-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.

1) Output in OFF state

2) High or Low State

## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	4.5 to 5.5	V
V <sub>I</sub>	Input Voltage	0 to 5.5	V
V <sub>O</sub>	Output Voltage (see note 1)	0 to 5.5	V
V <sub>O</sub>	Output Voltage (see note 2)	0 to V <sub>CC</sub>	V
T <sub>op</sub>	Operating Temperature	-40 to +85	°C
dt/dv	Input Rise and Fall Time (see note 3) (V <sub>CC</sub> = 5.0 ± 0.5V)	0 to 20	ns/V

1) Output in OFF state

2) High or Low State

3) V<sub>IN</sub> from 0.8V to 2 V

## DC SPECIFICATIONS

Symbol	Parameter	Test Conditions			Value					Unit
		V <sub>CC</sub> (V)			T <sub>A</sub> = 25 °C			-40 to 85 °C		
					Min.	Typ.	Max.	Min.	Max.	
V <sub>IH</sub>	High Level Input Voltage	4.5 to 5.5			2			2		V
V <sub>IL</sub>	Low Level Input Voltage	4.5 to 5.5					0.8		0.8	V
V <sub>OH</sub>	High Level Output Voltage	4.5	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> =-50 μA	4.4	4.5		4.4		V
		4.5		I <sub>O</sub> =-8 mA	3.94			3.8		
V <sub>OL</sub>	Low Level Output Voltage	4.5	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>O</sub> =50 μA		0.0	0.1		0.1	V
		4.5		I <sub>O</sub> =8 mA			0.36		0.44	
I <sub>OZ</sub>	3 State Output Leakage Current	5.5	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> V <sub>O</sub> = V <sub>CC</sub> or GND				±0.25		±2.5	μA
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
ΔI <sub>CC</sub>	Additional Worst Case Supply Current	5.5	One Input at 3.4V, other input at V <sub>CC</sub> or GND				1.35		1.5	mA
I <sub>OPD</sub>	Output Leakage Current	0	V <sub>OUT</sub> = 5.5V		0		0.5		5.0	μA

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

Symbol	Parameter	Test Condition		Value					Unit
		V <sub>CC</sub> (*) (V)		T <sub>A</sub> = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
t <sub>PLH</sub>	Propagation Delay Time	5.0	C <sub>L</sub> = 15 pF		3.8	5.5	1.0	6.5	ns
t <sub>PHL</sub>		5.0	C <sub>L</sub> = 50 pF		5.3	7.5	1.0	8.5	
t <sub>PLZ</sub>	Output Disable Time	5.0	C <sub>L</sub> = 15 pF		3.6	5.1	1.0	6.0	ns
t <sub>PHZ</sub>		5.0	C <sub>L</sub> = 50 pF		5.1	7.1	1.0	8.0	
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable Time	5.0	C <sub>L</sub> = 15 pF		6.1	8.8	1.0	10.0	ns

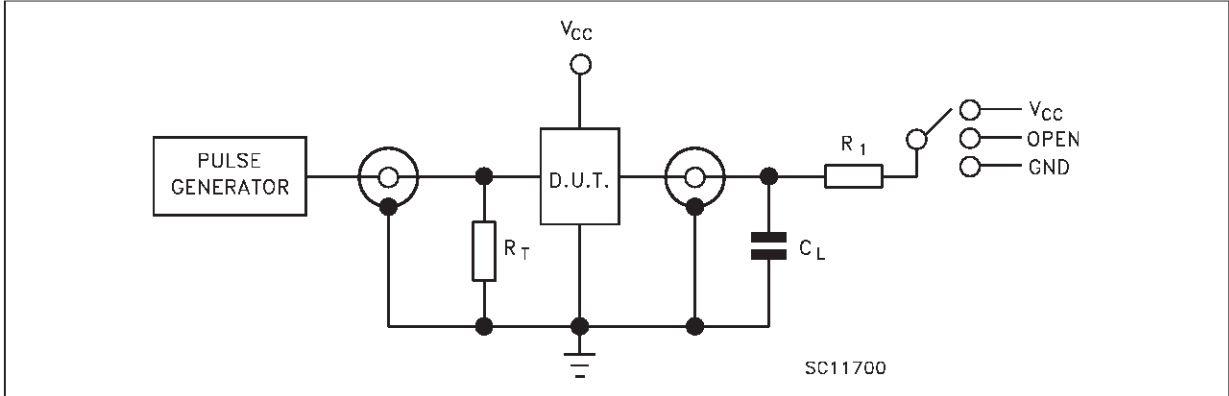
(\*) Voltage range is 5V ± 0.5V

## 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			4	10		10	pF
C <sub>OUT</sub>	Output Capacitance			10				pF
C <sub>PD</sub>	Power Dissipation Capacitance (note 1)			14				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(opr)</sub> = C<sub>PD</sub> • V<sub>CC</sub> • f<sub>IN</sub> + I<sub>CC</sub>

TEST CIRCUIT



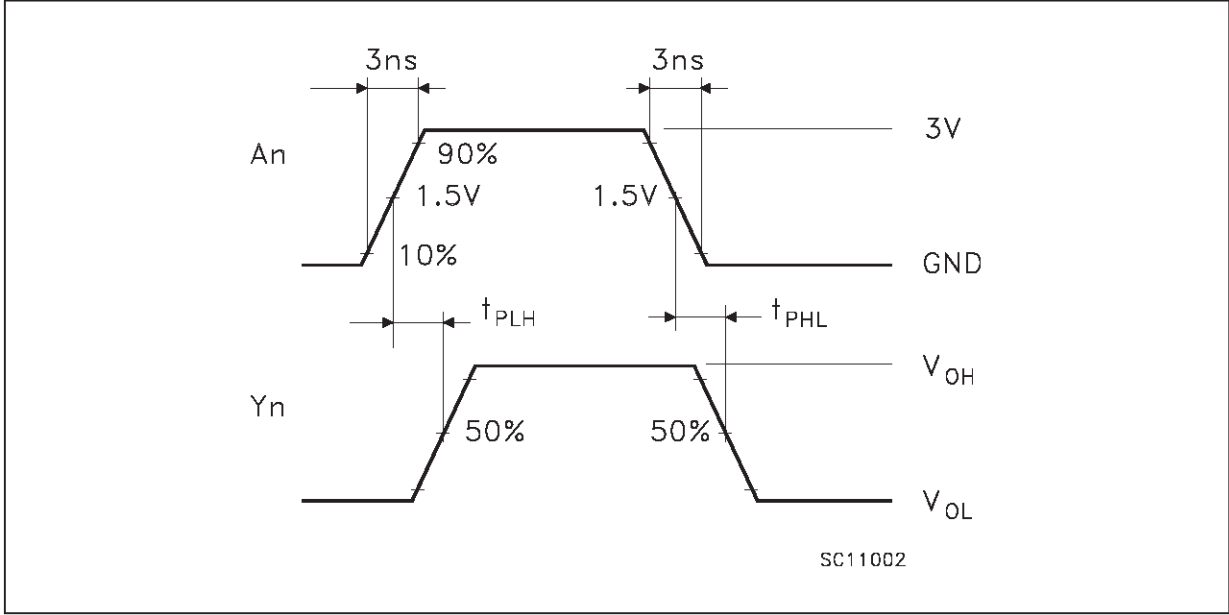
TEST	SWITCH
$t_{PLH}$ , $t_{PHL}$	Open
$t_{PZL}$ , $t_{PLZ}$	$V_{CC}$
$t_{PZH}$ , $t_{PHZ}$	GND

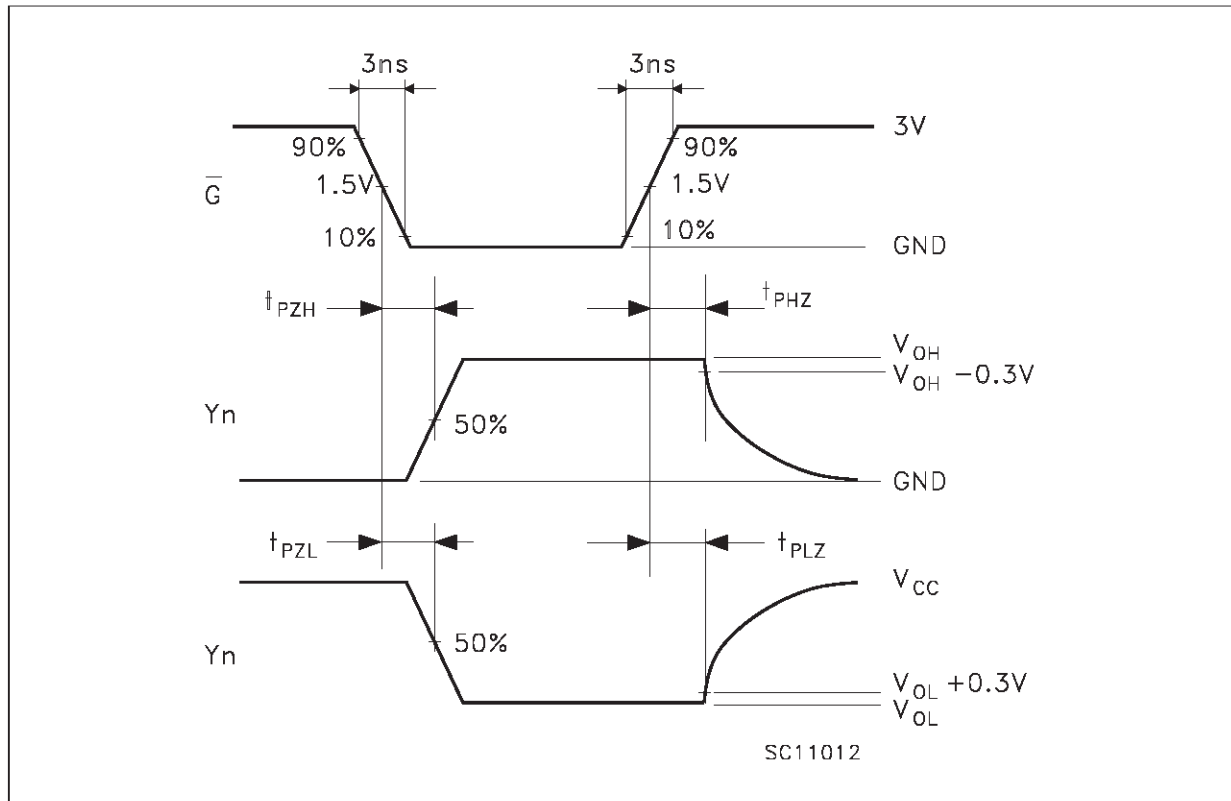
$C_L = 15/50$  pF or equivalent (includes jig and probe capacitance)

$R_L = R_1 = 1K\Omega$  or equivalent

$R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

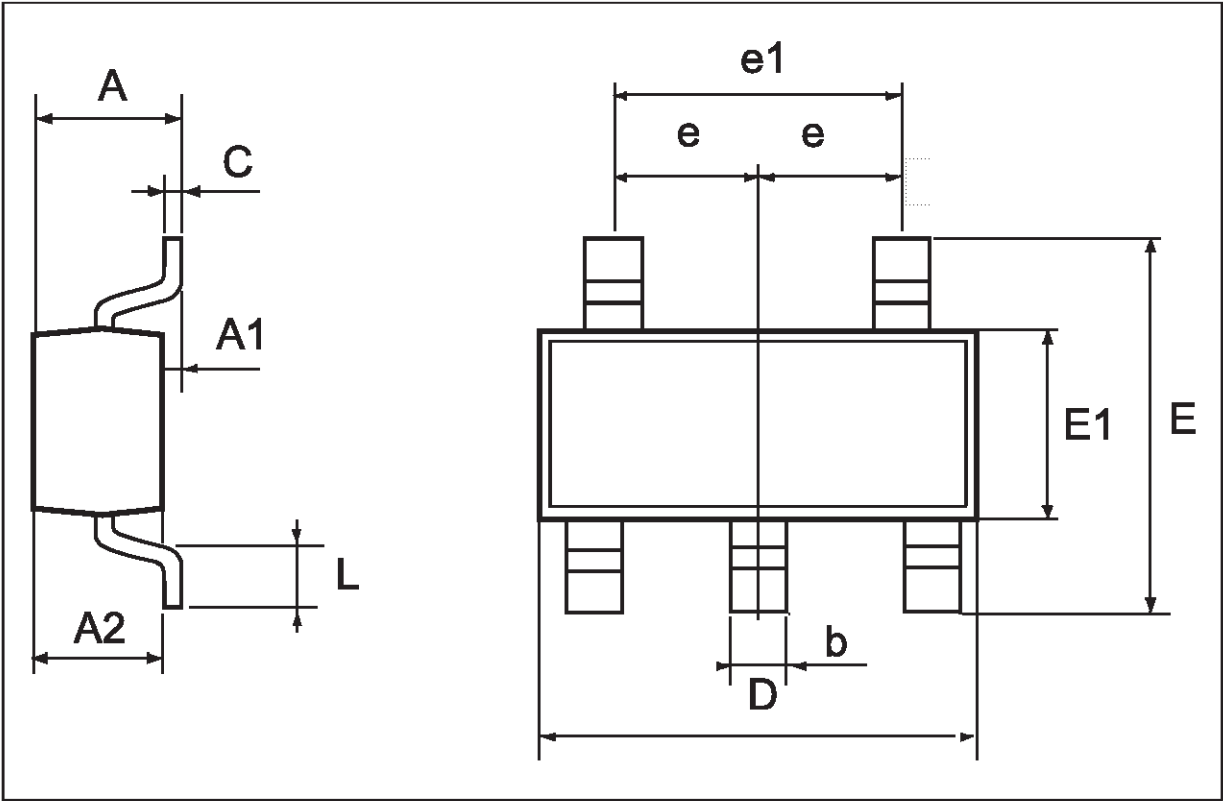
WAVEFORM 1: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)



**WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME** ( $f=1\text{MHz}$ ; 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	



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