SGS-THOMSON MICROELECTRONICS

74V1G125

SINGLE BUS BUFFER (3-STATE)

PRELIMINARY DATA

- HIGH SPEED: t_{PD} = 3.8 ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION: I_{CC} = 1 µA (MAX.) at T_A = 25 °C
- HIGH NOISE IMMUNITY: $V_{NIH} = V_{NIL}$ = 28% V_{CC} (MIN.)
- POWER DOWN PROTECTION ON INPUTS
- SYMMETRICAL OUTPUT IMPEDANCE: $|I_{OH}| = I_{OL}$ = 8 mA (MIN)
- BALANCED PROPAGATION DELAYS: $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE: V_{CC} (OPR) = 2V to 5.5V
- IMPROVED LATCH-UP IMMUNITY

S
(SOT23-5L)

ORDER CODE:
74V1G125S

DESCRIPTION

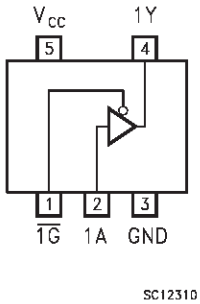
The 74V1G125 is an advanced high-speed CMOS SINGLE BUS BUFFER fabricated with sub-micron silicon gate and double-layer metal wiring C^2MOS technology. It has similar high speed performance of equivalent Bipolar Schottky TTL combined with true CMOS low power dissipation.

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

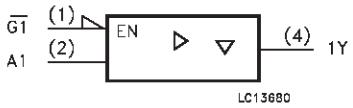
Power down protection is provided on all inputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage. This device can be used to interface 5V to 3V.

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

PIN CONNECTION AND IEC LOGIC SYMBOLS

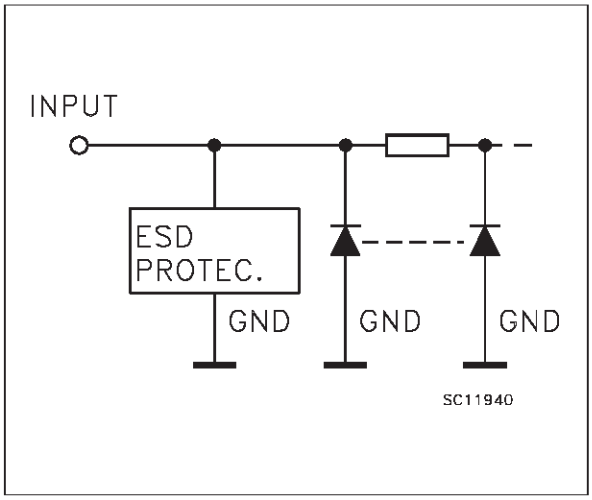


SC12310



LC13680

INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

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

TRUTH TABLE

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

X: "H" or "L" Z: High Impadance

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7.0	V
V_I	DC Input Voltage	-0.5 to +7.0	V
V_O	DC Output Voltage	-0.5 to V_{CC} + 0.5	V
I_{IK}	DC Input Diode Current	- 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	^oC
T_L	Lead Temperature (10 sec)	260	^oC

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_{CC}	Supply Voltage	2.0 to 5.5	V
V_I	Input Voltage	0 to 5.5	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-40 to +85	^oC
dt/dv	Input Rise and Fall Time (see note 1) (V_{CC} = 3.3 ± 0.3V) (V_{CC} = 5.0 ± 0.5V)	0 to 100 0 to 20	ns/V ns/V

1) V_{IN} from 30% to 70% of V_{CC}

DC SPECIFICATIONS

Symbol	Parameter	Test Conditions			Value					Unit
		V_{CC} (V)			T_A = 25 °C			-40 to 85 °C		
					Min.	Typ.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	2.0			1.5			1.5		V
		3.0 to 5.5			0.7V_{CC}			0.7V_{CC}		
V_{IL}	Low Level Input Voltage	2.0					0.5		0.5	V
		3.0 to 5.5					0.3V_{CC}		0.3V_{CC}	
V_{OH}	High Level Output Voltage	2.0	V_I = V_{IH} or V_{IL}	I_O=-50 µA	1.9	2.0		1.9		V
		3.0		I_O=-50 µA	2.9	3.0		2.9		
		4.5		I_O=-50 µA	4.4	4.5		4.4		
		3.0		I_O=-4 mA	2.58			2.48		
		4.5		I_O=-8 mA	3.94			3.8		
V_{OL}	Low Level Output Voltage	2.0	V_I = V_{IH} or V_{IL}	I_O=50 µA		0.0	0.1		0.1	V
		3.0		I_O=50 µA		0.0	0.1		0.1	
		4.5		I_O=50 µA		0.0	0.1		0.1	
		3.0		I_O=4 mA			0.36		0.44	
		4.5		I_O=8 mA			0.36		0.44	
I_{OZ}	3 State Output Leakage Current	5.5	V_I = V_{IH} or V_{IL} V_O = V_{CC} or GND				±0.25		±2.5	µA
I_I	Input Leakage Current	0 to 5.5	V_I = 5.5V or GND				±0.1		±1.0	µA
I_{CC}	Quiescent Supply Current	5.5	V_I = V_{CC} or GND				1		10	µA

AC ELECTRICAL CHARACTERISTICS (Input t_r = t_f =3 ns)

Symbol	Parameter	Test Condition		Value					Unit
		V_{CC} (V)		T_A = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay Time	3.3(*)	C_L = 15 pF		5.6	8.0	1.0	9.5	ns
		3.3(*)	C_L = 50 pF		8.1	11.5	1.0	13.0	
		5.0(**)	C_L = 15 pF		3.8	5.5	1.0	6.5	
		5.0(**)	C_L = 50 pF		5.3	7.5	1.0	8.5	
t_{PLZ} t_{PHZ}	Output Disable Time	3.3(*)	C_L = 15 pF (***)		5.4	8.0	1.0	9.5	ns
		3.3(*)	C_L = 50 pF (***)		7.9	11.5	1.0	13.0	
		5.0(**)	C_L = 15 pF (***)		3.6	5.0	1.0	6.0	
		5.0(**)	C_L = 50 pF (***)		5.1	7.0	1.0	8.0	
t_{PZL} t_{PZH}	Output Enable Time	3.3(*)	C_L = 50 pF (***)		9.5	13.0	1.0	15.0	ns
		5.0(**)	C_L = 50 pF (***)		6.1	8.5	1.0	10.0	

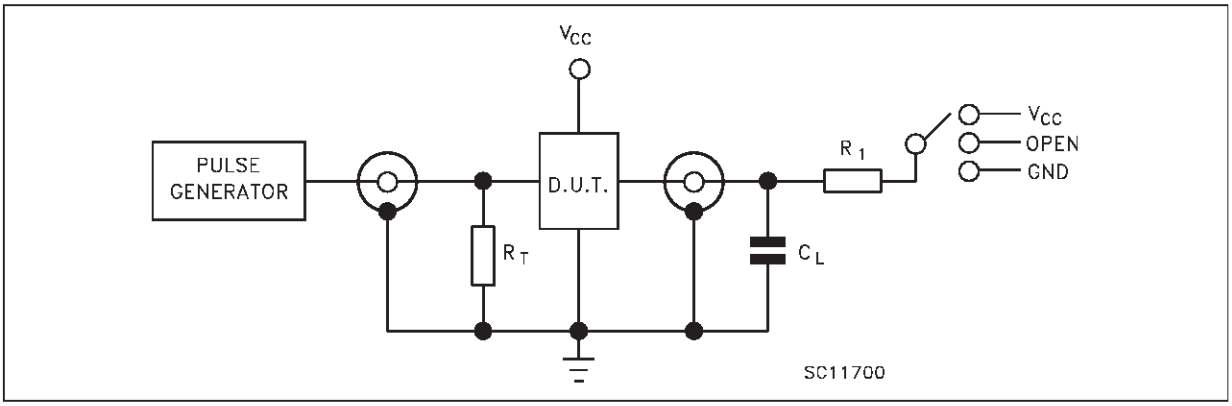
(*) Voltage range is 3.3V ± 0.3V
(**) Voltage range is 5V ± 0.5V
(***) R_L = 1KΩ

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions	Value					Unit
			T_A = 25 °C			-40 to 85 °C		
			Min.	Typ.	Max.	Min.	Max.	
C_{IN}	Input Capacitance			4				pF
C_{OUT}	Output Capacitance			6	10		10	pF
C_{PD}	Power Dissipation Capacitance (note 1)			14				pF

1) C_{PD} 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 operting current can be obtained by the following equation. $I_{CC}(opr) = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}$

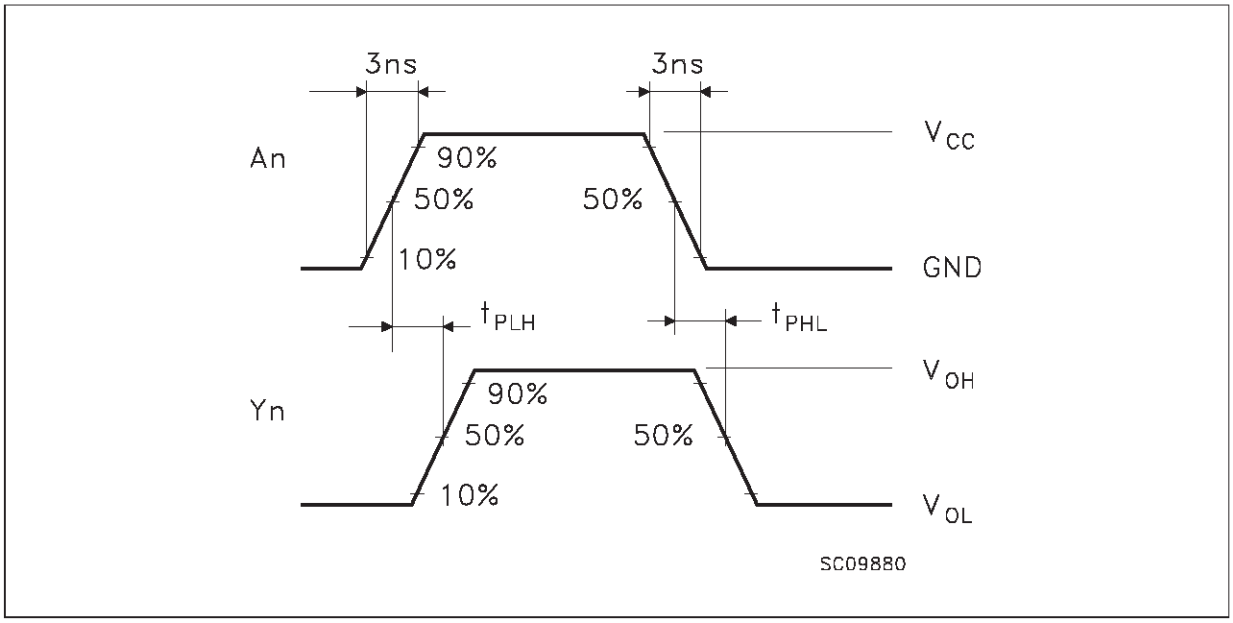
TEST CIRCUIT



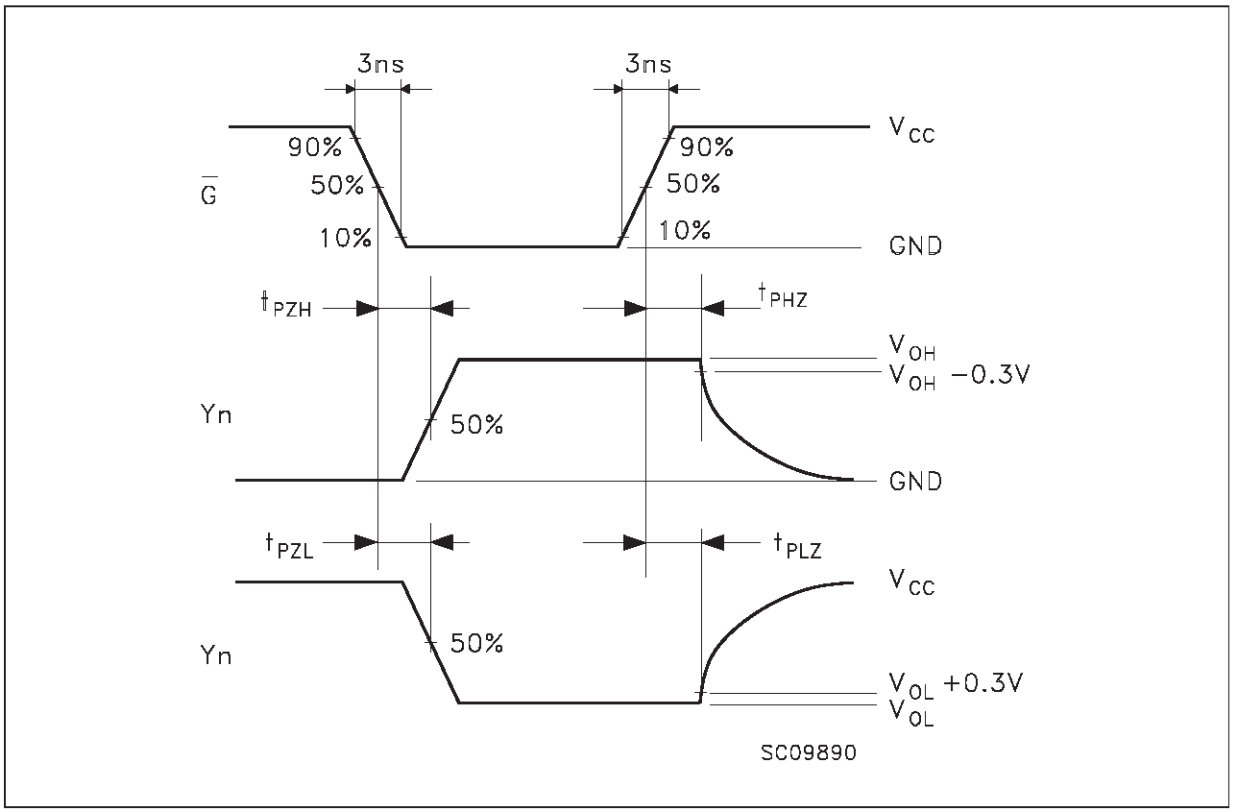
TEST	SWITCH
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	V_{CC}
t_{PZH}, t_{PHZ}	GND

C_L = 15/50 pF or equivalent (includes jig and probe capacitance)
$R_L = R_1$ = 1KΩ or equivalent
$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

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



WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME (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