



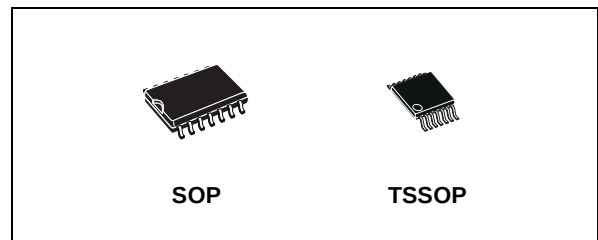
74LVX132

LOW VOLTAGE CMOS QUAD 2-INPUT SCHMITT NAND GATE WITH 5V TOLERANT INPUTS

- HIGH SPEED :
 $t_{PD} = 5.9ns$ (TYP.) at $V_{CC} = 3.3V$
- 5V TOLERANT INPUTS
- LOW POWER DISSIPATION:
 $I_{CC} = 2 \mu A$ (MAX.) at $T_A = 25^\circ C$
- TYPICAL HYSTERESIS : $0.7V$ at $V_{CC} = 3.3V$
- LOW NOISE:
 $V_{OLP} = 0.3V$ (TYP.) at $V_{CC} = 3.3V$
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 4mA$ (MIN)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \approx t_{PHL}$
- OPERATING VOLTAGE RANGE:
 $V_{CC}(OPR) = 2V$ to $3.6V$ ($1.2V$ Data Retention)
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 132
- IMPROVED LATCH-UP IMMUNITY
- POWER DOWN PROTECTION ON INPUTS

DESCRIPTION

The 74LVX132 is a low voltage CMOS QUAD 2-INPUT SCHMITT NAND GATE fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology. It is ideal for low power, battery operated and low noise 3.3V applications. Power down protection is provided on all inputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage.



ORDER CODES

PACKAGE	TUBE	T & R
SOP	74LVX132M	74LVX132MTR
TSSOP		74LVX132TTR

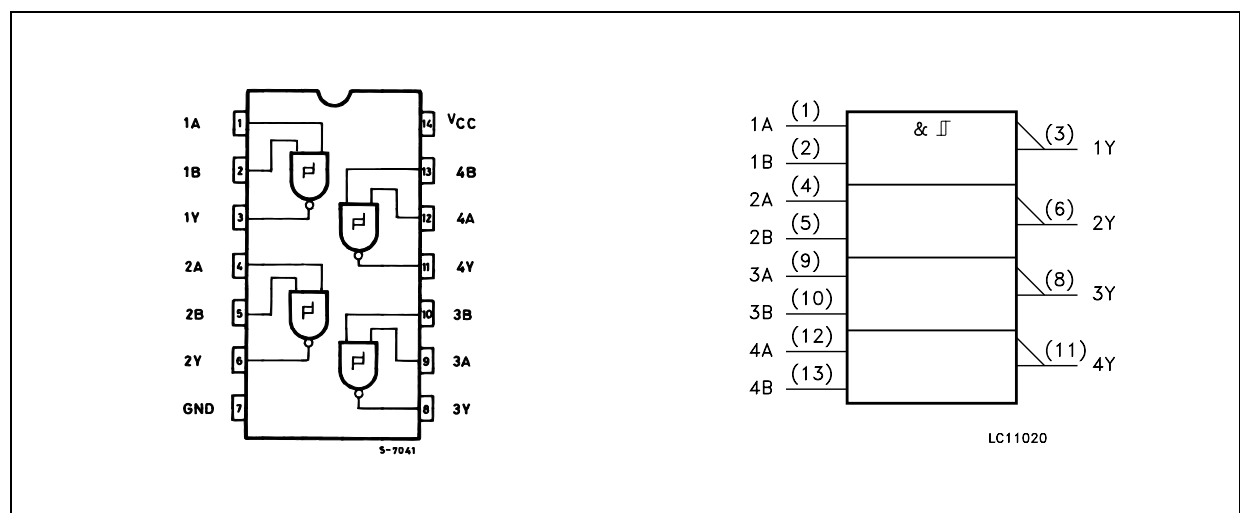
This device can be used to interface 5V to 3V system. It combines high speed performance with the true CMOS low power consumption.

Pin configuration and function are the same as those of the 74LVX00 but the 74LVX132 has hysteresis.

This together with its schmitt trigger function allows it to be used on line receivers with slow rise/fall input signals.

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



The diagram shows an input signal line labeled "INPUT" entering from the left. A node on this line is connected to a rectangular block labeled "ESD PROTEC.". This node is also connected to a series of components: a diode pointing towards ground (GND), followed by a resistor, and then another diode pointing towards ground (GND). The final node after the second diode is connected to ground (GND). A dashed line connects the two diodes, indicating they are part of the same protection structure. The label "SC11940" is located at the bottom right of the diagram.

PIN No	SYMBOL	NAME AND FUNCTION
1, 4, 9, 12	1A to 4A	Data Inputs
2, 5, 10, 13	1B to 4B	Data Inputs
3, 6, 8, 11	1Y to 4Y	Data Outputs
7	GND	Ground (0V)
14	V _{CC}	Positive Supply Voltage

A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

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	°C
T_L	Lead Temperature (10 sec)	300	°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage (note 1)	2 to 3.6	V
V_I	Input Voltage	0 to 5.5	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-55 to 125	°C

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value						Unit	
		V _{CC} (V)		T _A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
V _{t+}	High Level Input Threshold	3.0				2.2		2.2		2.2	V
V _{t-}	Low Level Input Threshold	3.0		0.9				0.9		0.9	V
V _H	Hysteresis Voltage	3.0		0.3		1.2	0.3	1.2	0.3	1.2	V
V _{OH}	High Level Output Voltage	2.0	I _O =-50 μA	1.9	2.0		1.9		1.9		V
		3.0	I _O =-50 μA	2.9	3.0		2.9		2.9		
		3.0	I _O =-4 mA	2.58			2.48		2.4		
V _{OL}	Low Level Output Voltage	2.0	I _O =50 μA		0.0	0.1		0.1		0.1	V
		3.0	I _O =50 μA		0.0	0.1		0.1		0.1	
		3.0	I _O =4 mA			0.36		0.44		0.55	
I _I	Input Leakage Current	3.6	V _I = 5V or GND			± 0.1		± 1		± 1	μA
I _{CC}	Quiescent Supply Current	3.6	V _I = V _{CC} or GND			2		20		20	μA

DYNAMIC SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Condition		Value						Unit	
		V _{CC} (V)		T _A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
V _{OLP}	Dynamic Low Voltage Quiet Output (note 1, 2)	3.3	C _L = 50 pF		0.3	0.5					V
V _{OLV}				-0.5	-0.3						
V _{IHD}	Dynamic High Voltage Input (note 1, 3)	3.3		2.2							
V _{ILD}	Dynamic Low Voltage Input (note 1, 3)	3.3					0.9				

1) Worst case package.

2) Max number of outputs defined as (n). Data inputs are driven 0V to 3.3V, (n-1) outputs switching and one output at GND.

3) Max number of data inputs (n) switching. (n-1) switching 0V to 3.3V. Inputs under test switching: 3.3V to threshold (V_{ILD}), 0V to threshold (V_{IHD}), f=1MHz.

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3\text{ns}$)

Symbol	Parameter	Test Condition			Value							Unit
		V _{CC} (V)	C _L (pF)		T _A = 25°C			-40 to 85°C		-55 to 125°C		
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay Time	2.7	15			7.5	10.5	1.0	12.0	1.0	12.0	ns
		2.7	50			8.3	12.0	1.0	13.5	1.0	13.5	
		3.3 ^(*)	15			5.9	8.0	1.0	9.0	1.0	9.0	
		3.3 ^(*)	50			6.5	9.0	1.0	10.0	1.0	10.0	
t _{OSLH} t _{OSHL}	Output To Output Skew Time (note1, 2)	2.7	50			0.5	1.0		1.5		1.5	ns
		3.3 ^(*)	50			0.5	1.0		1.5		1.5	

1) Skew is defined as the absolute value of the difference between the actual propagation delay for any two outputs of the same device switching in the same direction, either HIGH or LOW

2) Parameter guaranteed by design

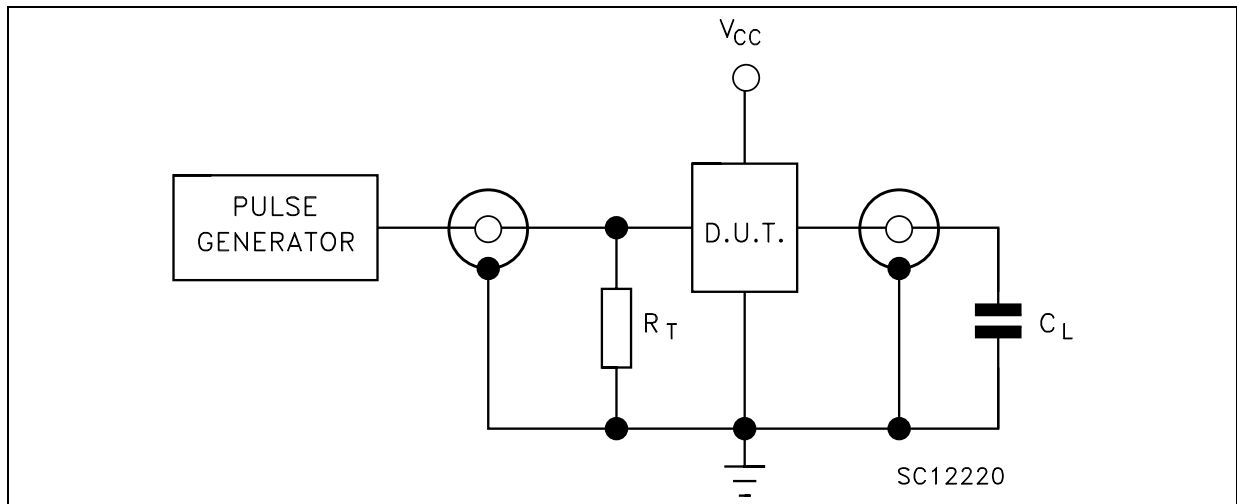
(*) Voltage range is $3.3\text{V} \pm 0.3\text{V}$

CAPACITIVE CHARACTERISTICS

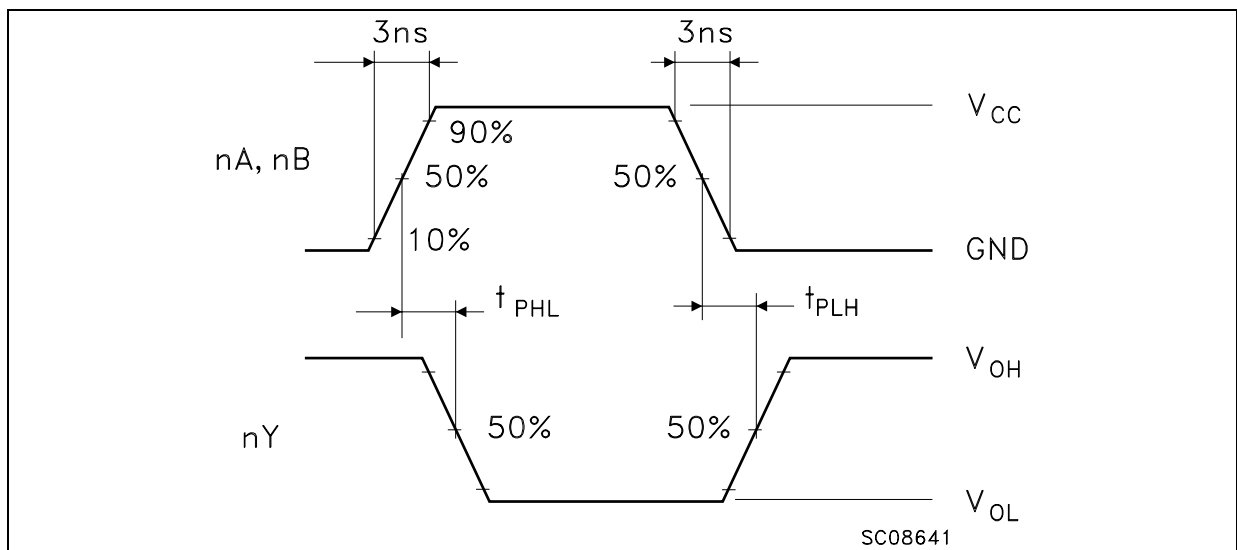
Symbol	Parameter	Test Condition		Value						Unit	
		V _{CC} (V)		T _A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
C _{IN}	Input Capacitance	3.3			6	10		10		10	pF
C _{PD}	Power Dissipation Capacitance (note 1)	3.3			16						pF

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 operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/4$ (per gate)

TEST CIRCUIT

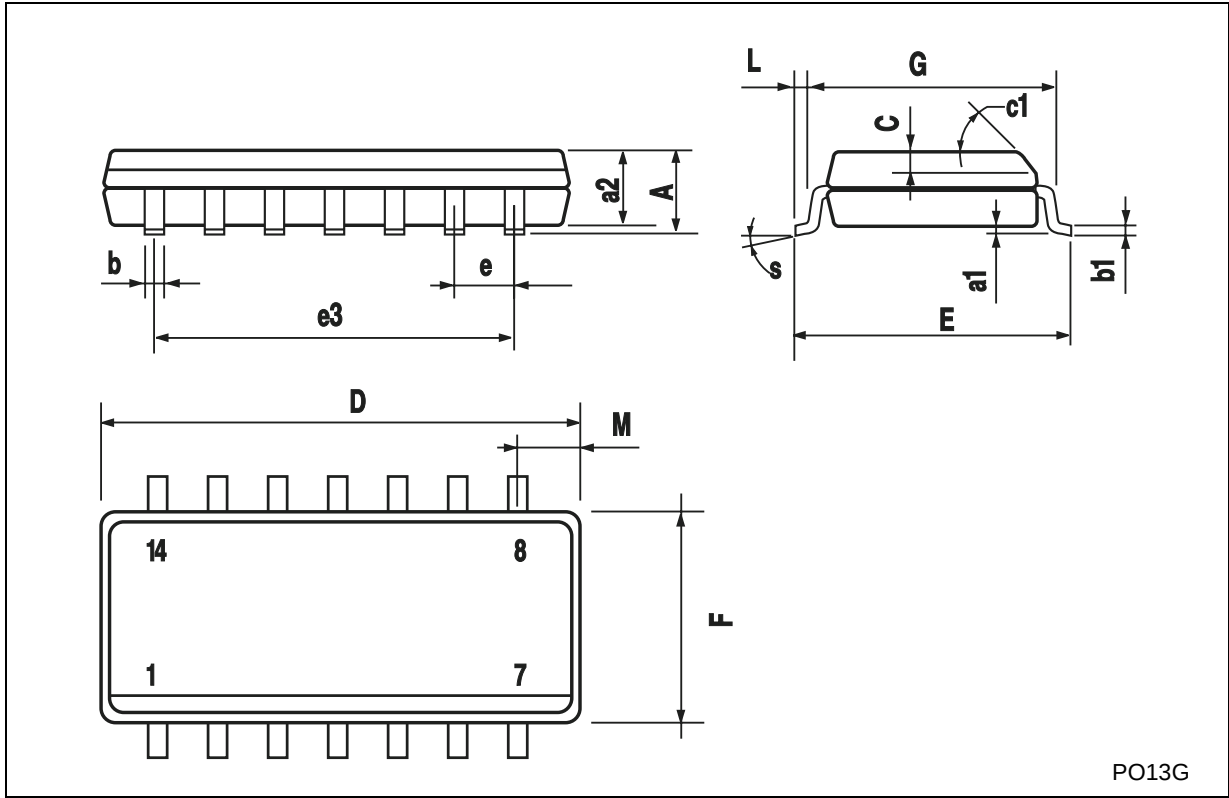


$C_L = 15/50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

WAVEFORM : PROPAGATION DELAYS ($f=1\text{MHz}$; 50% duty cycle)

SO-14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.68			0.026
S	8° (max.)					

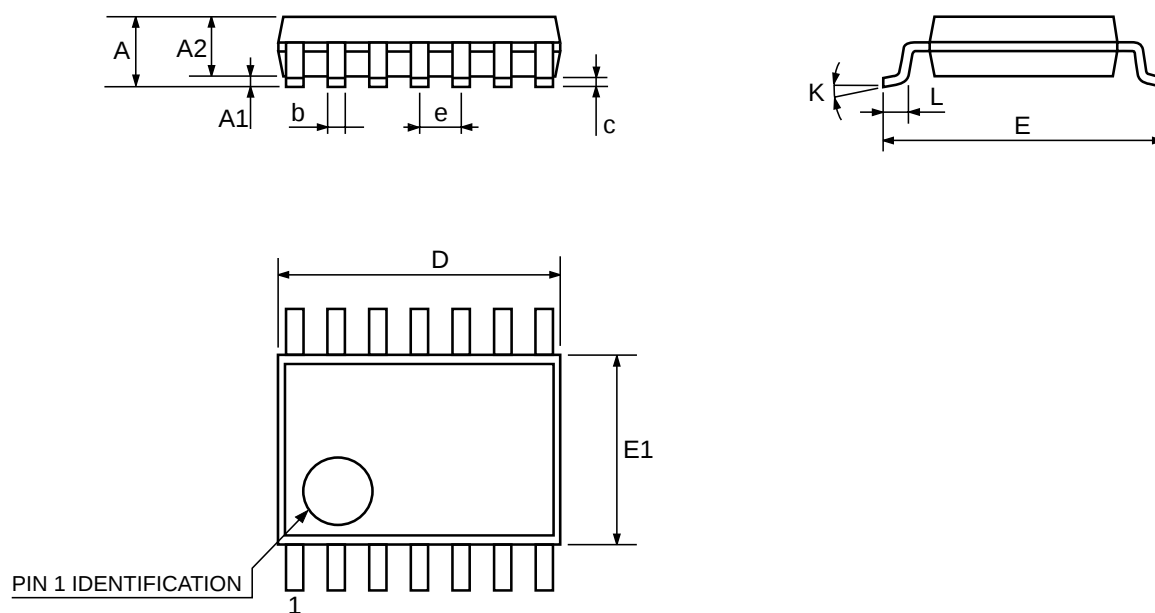


PO13G



TSSOP14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



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