TECH PUBLIC
台舟电子

NC7SP32P5X-TP
SINGLE 2-INPUT OR GATE

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Features

- Wide supply voltage range from 0.8V to 3.6V
- Inputs accept voltages up to 3.6V
- I_{OFF} supports partial-power-down mode
- Low static power consumption; I_{CC}=0.5μA (Max.)
- ESD Protection Exceeds JESD 22
  -2000-V Human-Body Model (A114-A)
  -200-V Machine Model (A115-A)
  -1000-V Charged-Device Model (C101)

Applications

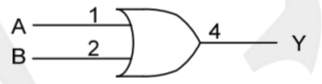
- AV Receiver
- Audio Dock:Portable
- Blu-ray Player and Home Theater
- Embedded PC
- Personal Digital Assistant(PDA)
- Power:Telecom/Server AC/DC Supply:Single Controller:Analog and Digital
- Solid State Drive(SSD):Client and Enterprise
- Wireless Headset,Keyboard,and Mouse

General Description

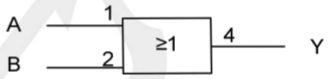
The NC7SP32P5X-TP is a single 2-input OR gate which provides the Function Y=A+B or $Y=\overline{\overline{A}+\overline{B}}$ in positive logic.

This device ensures a very low static and dynamic power consumption across the entire VCC range from 0.8V to 3.6V.

Logic Diagram



Logic symbol

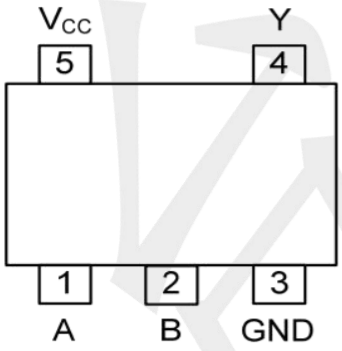


IEC logic symbol

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
NC7SP32P5X-TP	SOT353	Tape and Reel,3000

Pin Configuratio (TOP VIEW)



SOT353

Function Table (each gate)

INPUT(A)	INPUT(B)	OUTPUT(Y)
L	L	L
L	H	H
H	L	H
H	H	H

Note:H: HIGH voltage level;L: LOW voltage level.

Absolute Maximum Ratings

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ +4.6	V
Input Voltage	V_{IN}		-0.5 ~ +4.6	V
Output Voltage	V_{OUT}	Output in the high or low state	-0.5 ~ +V_{CC}+0.5V	V
		Output in the power-off state	-0.5 ~ +4.6	V
VCC or GND Current	I_{CC}		±50	mA
Continuous Output Current	I_{OUT}	VOUT=0~VCC	±20	mA
Input Clamp Current	I_{IK}	VIN<0	-50	mA
Output Clamp Current	I_{OK}	VOUT<0	-50	mA
Storage Temperature Range	T_{STG}		-65 ~ +150	℃
Junction to Ambient	θ_{JA}	SOT353	280	℃/W

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	0.8	--	3.6	V
Input Voltage	V_{IN}		0	--	3.6	V
Output Voltage	V_{OUT}	High or low state	0	--	V_{CC}	V
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$	V_{CC}=0.8V ~ 3.6V	--	--	200	ns/V
Operating Temperature	T_A		-40	--	+125	°C

Electrical Characteristics (T_A=25°C ,unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
High-level Input Voltage	V_{IH}	V_{CC}=0.8V		V_{CC}	--	--	V
		V_{CC}=1.1V ~ 1.95V		0.65×V_{CC}	--	--	V
		V_{CC}=2.3V ~ 2.7V		1.6	--	--	V
		V_{CC}=3V ~ 3.6V		2	--	--	V
Low-level Input Voltage	V_{IL}	V_{CC}=0.8V		--	--	0	V
		V_{CC}=1.1V ~ 1.95V		--	--	0.35×V_{CC}	V
		V_{CC}=2.3V ~ 2.7V		--	--	0.7	V
		V_{CC}=3V ~ 3.6V		--	--	0.9	V
High-Level Output Voltage	V_{OH}	V_{CC}=0.8 ~ 3.6V, I_{OH}=-20μA		V_{CC}-0.1	--	--	V
		V_{CC}=1.1V, I_{OH}=-1.1mA		0.75×V_{CC}	--	--	V
		V_{CC}=1.4V, I_{OH}=-1.7mA		1.11	--	--	V
		V_{CC}=1.65V, I_{OH}=-1.9mA		1.32	--	--	V
		V_{CC}=2.3V	I_{OH}=-2.3mA	2.05	--	--	V
			I_{OH}=-3.1mA	1.9	--	--	V
		V_{CC}=3V	I_{OH}=-2.7mA	2.72	--	--	V
			I_{OH}=-4mA	2.6	--	--	V
Low-Level Output Voltage	V_{OL}	V_{CC}=0.8 ~ 3.6V, I_{OL}=20μA		--	--	0.1	V
		V_{CC}=1.1V, I_{OL}=1.1mA		--	--	0.3×V_{CC}	V
		V_{CC}=1.4V, I_{OL}=1.7mA		--	--	0.31	V
		V_{CC}=1.65V, I_{OL}=1.9mA		--	--	0.31	V
		V_{CC}=2.3V	I_{OL}=2.3mA	--	--	0.31	V
			I_{OL}=3.1mA	--	--	0.44	V
		V_{CC}=3V	I_{OL}=2.7mA	--	--	0.31	V
			I_{OL}=4mA	--	--	0.44	V
Input Leakage Current	$I_{I(LEAK)}$	V_{CC}=0 ~ 3.6V, V_{IN}=GND ~ 3.6V		--	--	±0.1	μA
Power OFF Leakage Current	I_{off}	V_{CC}=0 V, V_{IN} or V_{OUT}=0 ~ 3.6V		--	--	±0.2	μA
Additional Power OFF Leakage Current	ΔI_{off}	V_{CC}=0 V~0.2V,V_{IN} or V_{OUT}=0 ~ 3.6V		--	--	±0.2	μA
Quiescent Supply Current	I_{CC}	V_{CC}=0.8 ~3.6V, V_{IN}=V_{CC} or GND,I_{OUT}=0		--	--	0.5	μA
Additional Quiescent Supply Current Per Input Pin	ΔI_{CC}	V_{CC}=3.3 V, V_{IN} =V_{CC}-0.6V, I_{OUT}=0		--	--	40	μA
Input Capacitance	CI	V_{CC}=0V-3.6V, V_{IN}=V_{CC} or GND		--	1.5	--	pF
Output Capacitance	C_{OUT}	V_{CC} =0V, V_{OUT}=GND		--	3.0	--	pF

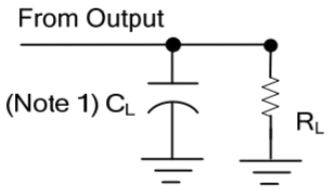
OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	V_{CC}=0.8V	--	4.1	--	pF
		V_{CC}=1.2±0.1V	--	4.1	--	pF
		V_{CC}=1.5±0.1V	--	4.1	--	pF
		V_{CC}=1.8±0.15V	--	4.1	--	pF
		V_{CC}=2.5±0.2V	--	4.2	--	pF
		V_{CC}=3.3±0.3V	--	4.3	--	pF

SWITCHING CHARACTERISTICS (TA =25°C，unless otherwise specified)

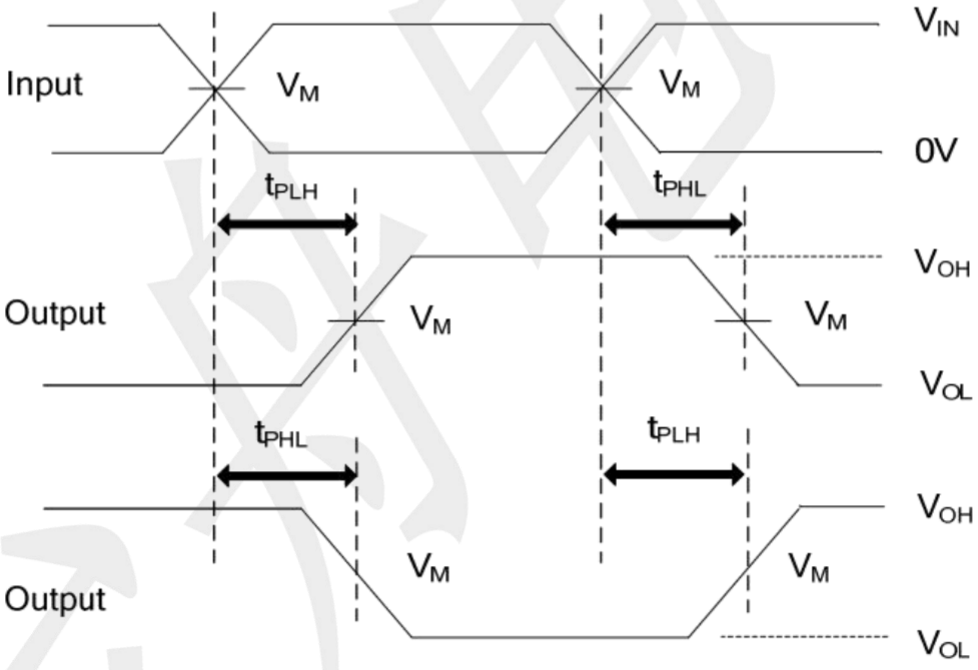
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Propagation delay from inputs (A or B) to output(Y)	t_{PD}	CL=5pF, RL=1MΩ	V_{CC}=0.8V	--	27	--	ns
			V_{CC}=1.2±0.1V	2.6	13	18	ns
			V_{CC}=1.5±0.1V	1.4	9.2	13	ns
			V_{CC}=1.8±0.15V	1.0	7.1	9.5	ns
			V_{CC}=2.5±0.2V	1.0	4.6	7.0	ns
			V_{CC}=3.3±0.3V	1.0	3.5	6.0	ns
		CL=10pF, RL=1MΩ	V_{CC}=0.8V	--	34	--	ns
			V_{CC}=1.2±0.1V	1.5	14.6	20	ns
			V_{CC}=1.5±0.1V	1.0	10.4	13.5	ns
			V_{CC}=1.8±0.15V	1.0	7.6	10	ns
			V_{CC}=2.5±0.2V	1.0	5.2	7.5	ns
			V_{CC}=3.3±0.3V	1.0	4.1	6.4	ns
		CL=15pF, RL=1MΩ	V_{CC}=0.8V	--	39	--	ns
			V_{CC}=1.2±0.1V	3.6	16.5	22	ns
			V_{CC}=1.5±0.1V	2.3	11.6	15	ns
			V_{CC}=1.8±0.15V	1.6	7.8	11	ns
			V_{CC}=2.5±0.2V	1.0	5.8	8.0	ns
			V_{CC}=3.3±0.3V	1.0	4.7	6.6	ns
		CL=30pF, RL=1MΩ	V_{CC}=0.8V	--	48	--	ns
			V_{CC}=1.2±0.1V	4.9	18	24	ns
			V_{CC}=1.5±0.1V	3.4	13.5	17	ns
			V_{CC}=1.8±0.15V	2.5	8.3	13	ns
			V_{CC}=2.5±0.2V	1.8	6.8	9.0	ns
			V_{CC}=3.3±0.3V	1.5	5.0	7.0	ns

TEST CIRCUIT AND WAVEFORMS



TEST CIRCUIT

V_{CC}	V_{IN}	t_R / t_F	V_M	C_L	R_L
0.8V	V_{CC}	≤3ns	V_{CC}/2	5,10,15,30pF	1MΩ
1.2V±0.1V	V_{CC}	≤3ns	V_{CC}/2	5,10,15,30pF	1MΩ
1.5V±0.1V	V_{CC}	≤3ns	V_{CC}/2	5,10,15,30pF	1MΩ
1.8V±0.15V	V_{CC}	≤3ns	V_{CC}/2	5,10,15,30pF	1MΩ
2.5V±0.2V	V_{CC}	≤3ns	V_{CC}/2	5,10,15,30pF	1MΩ
3.3V±0.3V	V_{CC}	≤3ns	V_{CC}/2	5,10,15,30pF	1MΩ



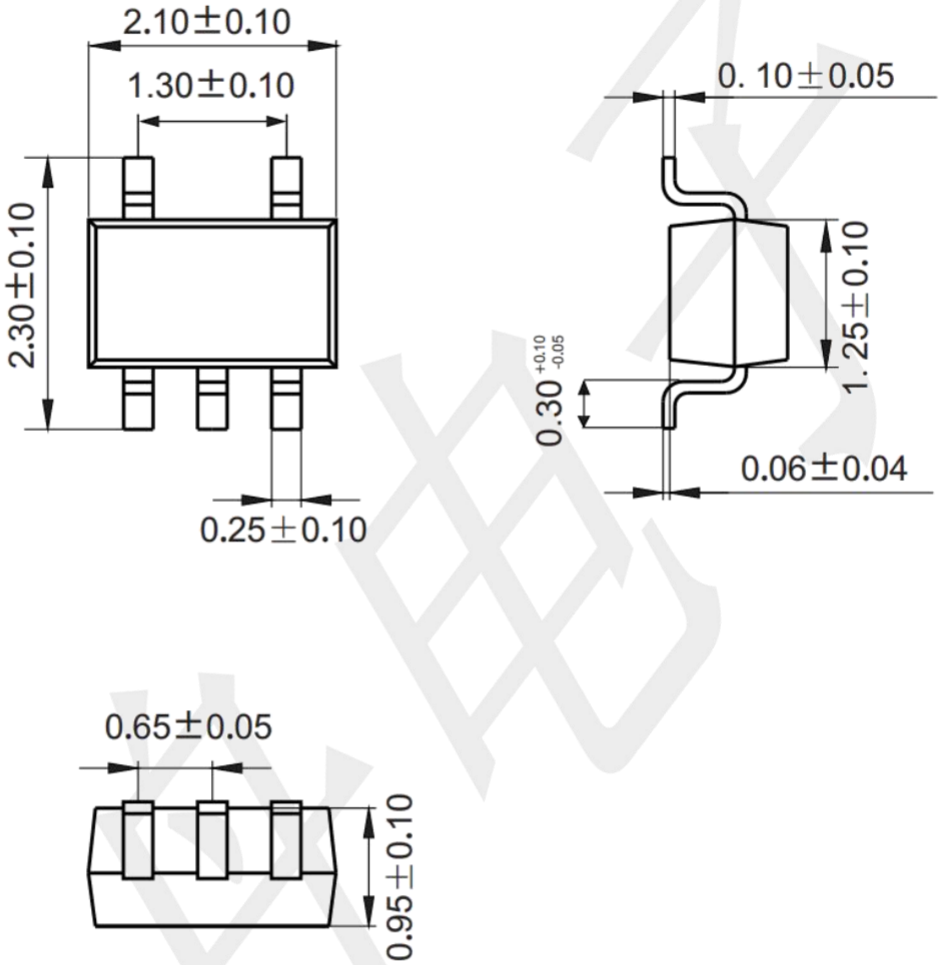
PROPAGATION DELAY TIMES

Notes:

1. CL includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics: PRR ≤10MHz, ZO = 50Ω.

Package information (Unit: mm)

SOT353



Mounting Pad Layout (unit: mm)

