

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)

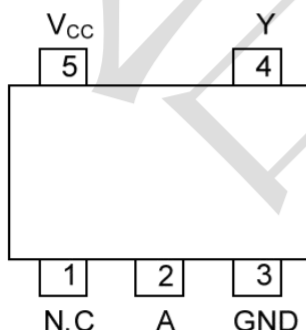
General Description

This NC7SP14P5X-TP functions as an independent gate with Schmitt-trigger inputs, which allows for slow input transition and better switching-noise immunity at the input. This device ensures a very low static and dynamic power consumption across the entire VCC range from 0.8V to 3.6V.

Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION
NC7SP14P5X-TP	SOT353	Tape and Reel, 3000

Pin Configuratio (TOP VIEW)

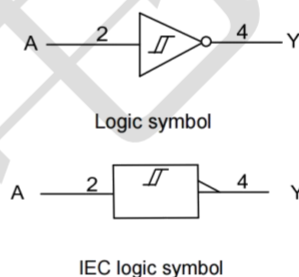


SOT353

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

Logic Diagram



Function Table (each gate)

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

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}	V _{OUT} =0~V _{CC}	±20	mA
Input Clamp Current	I _{IK}	V _{IN} <0	-50	mA
Output Clamp Current	I _{OK}	V _{OUT} <0	-50	mA
Storage Temperature Range	T _{STG}		-65 ~ +150	°C
Junction to Ambient	θ _{JA}	SOT353	280	°C/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	Δt/Δv	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
Positive-Going Input Threshold Voltage	V _{T+}	V _{CC} = 0.8V	0.3	--	0.6	V
		V _{CC} = 1.1V	0.53	--	0.9	V
		V _{CC} = 1.4V	0.74	--	1.11	V
		V _{CC} = 1.65V	0.91	--	1.29	V
		V _{CC} = 2.3V	1.37	--	1.77	V
		V _{CC} = 3V	1.88	--	2.29	V
Negative-Going Input Threshold Voltage	V _{T-}	V _{CC} = 0.8V	0.1	--	0.6	V
		V _{CC} = 1.1V	0.26	--	0.65	V
		V _{CC} = 1.4V	0.39	--	0.75	V
		V _{CC} = 1.65V	0.47	--	0.84	V
		V _{CC} = 2.3V	0.69	--	1.04	V
		V _{CC} = 3V	0.88	--	1.24	V
Hysteresis Voltage (V _{T+} -V _{T-})	ΔV _T	V _{CC} = 0.8V	0.07	--	0.5	V
		V _{CC} = 1.1V	0.08	--	0.46	V
		V _{CC} = 1.4V	0.18	--	0.56	V
		V _{CC} = 1.65V	0.27	--	0.66	V
		V _{CC} = 2.3V	0.53	--	0.92	V
		V _{CC} = 3V	0.79	--	1.31	V
High-Level Output Voltage	V _{OH}	V _{CC} = 0.8V ~ 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

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Low-Level Output Voltage	V _{OL}	V _{CC} =0.8V ~ 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	--	--	0.31	V
		V _{CC} =3V	--	--	0.31	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =0V ~ 3.6V, V _{IN} =V _{CC} or GND	--	--	±0.1	μA
Power OFF Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{CC} =3.6V	--	--	±0.2	μA
Additional Power OFF Leakage Current	ΔI _{OFF}	V _{CC} =0V~0.2V, V _{IN} or V _{OUT} =0V~3.6V	--	--	±0.2	μA
Quiescent Supply Current	I _{CC}	V _{CC} =0.8V ~3.6V, I _{OUT} =0 V _{IN} =V _{CC} or GND	--	--	0.5	μA
Additional Quiescent Supply Current	ΔI _{CC}	V _{CC} =3.3V, One input at V _{CC} -0.6V, other inputs at V _{CC} or GND	--	--	40	μA
Input Capacitance	C _i	V _{CC} =0V, V _{IN} =V _{CC} or GND	--	1.5	--	pF
		V _{CC} =3.6V, V _{IN} =V _{CC} or GND	--	1.5	--	pF
Output Capacitance	C _{OUT}	V _{CC} =0V, V _{OUT} =GND	--	2.5	--	pF

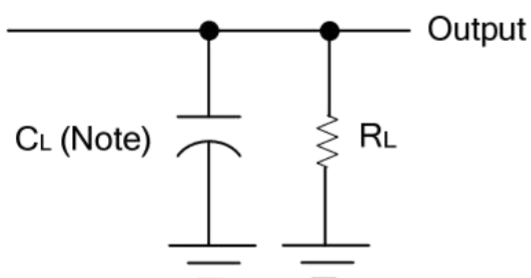
OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C _{PD}	V _{CC} =0.8V	--	4.0	--	pF
		V _{CC} =1.2±0.1V	--	4.0	--	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	--	4.3	--	pF
		V _{CC} =3.3±0.3V	--	4.4	--	pF

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

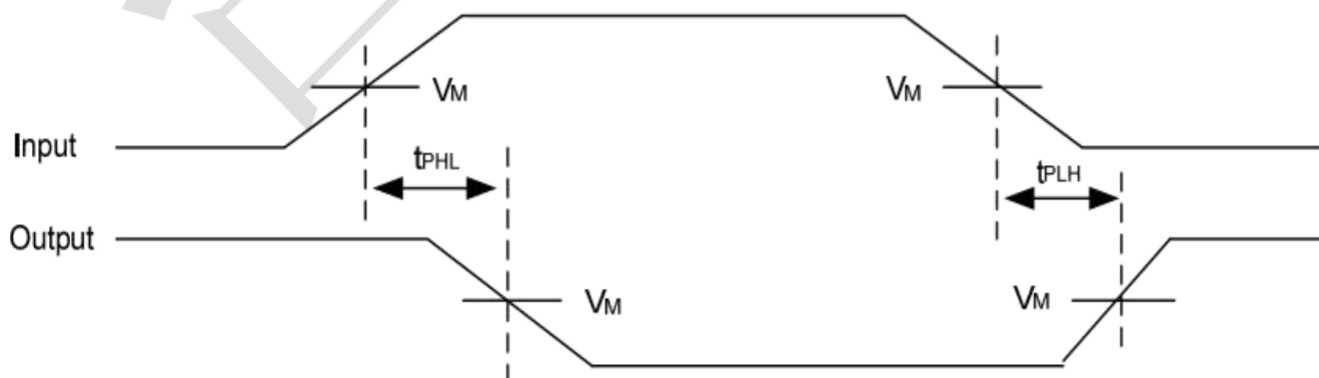
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from inputs (A) to output(Y) t _{PD}		CL=5pF, RL=1MΩ	V _{CC} =0.8V	--	20.3	ns
			V _{CC} =1.2±0.1V	3.0	6.9	ns
			V _{CC} =1.5±0.1V	2.6	5.2	ns
			V _{CC} =1.8±0.15V	2.2	4.4	ns
			V _{CC} =2.5±0.2V	2.0	3.5	ns
			V _{CC} =3.3±0.3V	1.9	3	ns
		CL=10pF, RL=1MΩ	V _{CC} =0.8V	--	23.9	ns
			V _{CC} =1.2±0.1V	3.5	7.9	ns
			V _{CC} =1.5±0.1V	3.0	6	ns
			V _{CC} =1.8±0.15V	2.7	5	ns
			V _{CC} =2.5±0.2V	2.4	4	ns
			V _{CC} =3.3±0.3V	2.4	3.5	ns
		CL=15pF, RL=1MΩ	V _{CC} =0.8V	--	27.3	ns
			V _{CC} =1.2±0.1V	3.9	8.7	ns
			V _{CC} =1.5±0.1V	3.3	6.7	ns
			V _{CC} =1.8±0.15V	3.0	5.6	ns
			V _{CC} =2.5±0.2V	2.8	4.5	ns
			V _{CC} =3.3±0.3V	2.7	3.9	ns
		CL=30pF, RL=1MΩ	V _{CC} =0.8V	--	25.7	ns
			V _{CC} =1.2±0.1V	5.1	11.2	ns
			V _{CC} =1.5±0.1V	4.3	8.5	ns
			V _{CC} =1.8±0.15V	3.9	7.2	ns
			V _{CC} =2.5±0.2V	3.6	5.7	ns
			V _{CC} =3.3±0.3V	3.5	5	ns

TEST CIRCUIT AND WAVEFORMS



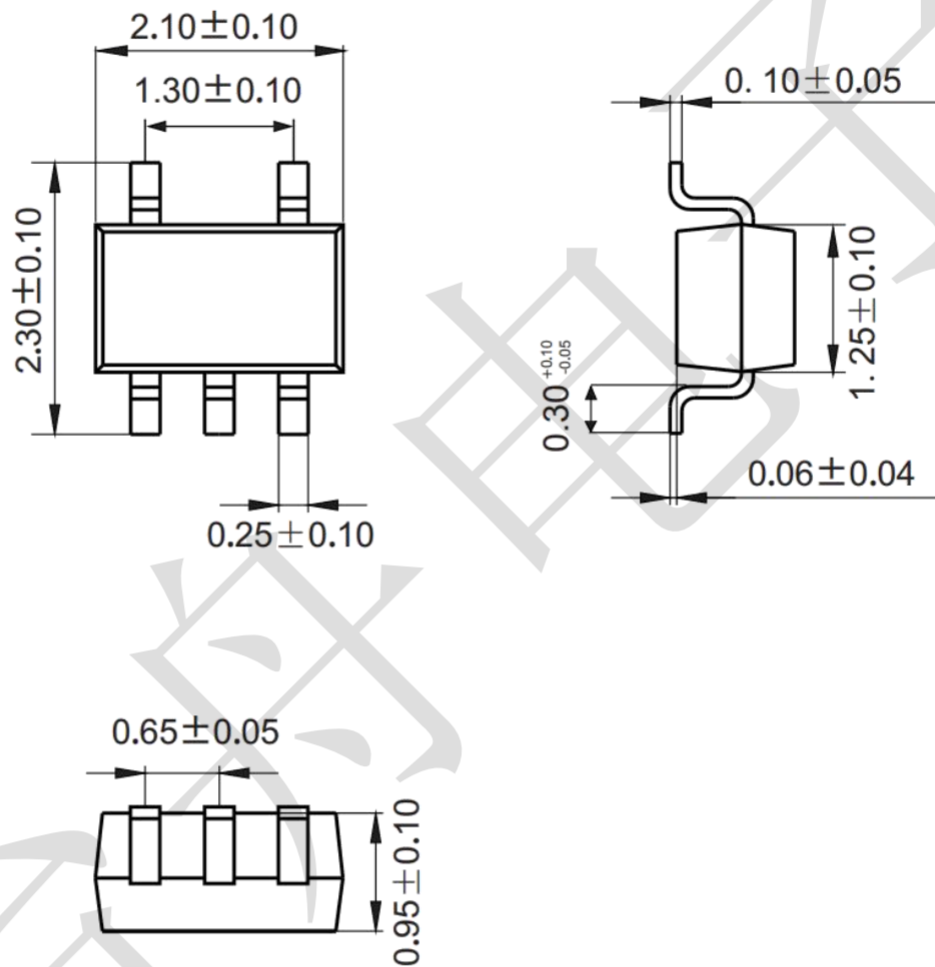
Note: C_L includes probe and jig capacitance.

V_{CC}	V_{IN}	t_R / t_F	V_M	C_L	R_L
0.8V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5,10,15,30pF	1M Ω
1.2V $\pm$ 0.1V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5,10,15,30pF	1M Ω
1.5V $\pm$ 0.1V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5,10,15,30pF	1M Ω
1.8V $\pm$ 0.15V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5,10,15,30pF	1M Ω
2.5V $\pm$ 0.2V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5,10,15,30pF	1M Ω
3.3V $\pm$ 0.3V	V_{CC}	$\leq 3\text{ns}$	$V_{CC}/2$	5,10,15,30pF	1M Ω



Package information (Unit: mm)

SOT353



Mounting Pad Layout (unit: mm)

