

Features

- Operation Voltage Range: 1.65~5.5V
- Inputs Accept Voltages to 5.5V
- Max tPD of 0.8 ns at 3.3V
- High Degree of Linearity
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

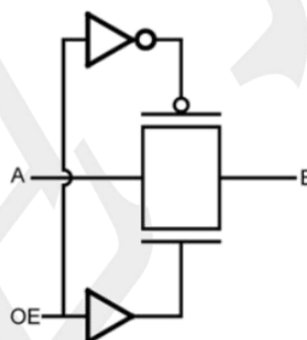
General Description

The NC7SZ66 is a ultra high-speed (UHS) CMOS compatible single-pole/single-throw (SPST) bus switch. The LOW on resistance of the switch allows inputs to be connected to outputs with minimal propagation delay and without generating additional ground bounce noise. The device is organized as a 1-bit switch with a switch enable (OE) signal. When OE is HIGH, the switch is on and port A is connected to port B. When OE is LOW, the switch is open and a high-impedance state exists between the two ports..

Applications

- Wireless Devices
- Audio and Video Signal Routing
- Portable Computing
- Wearable Devices
- Signal Gating, Chopping, Modulation or Demodulation (Modem)
- Signal Multiplexing for Analog-to-Digital and Digital-to-Analog Conversion Systems

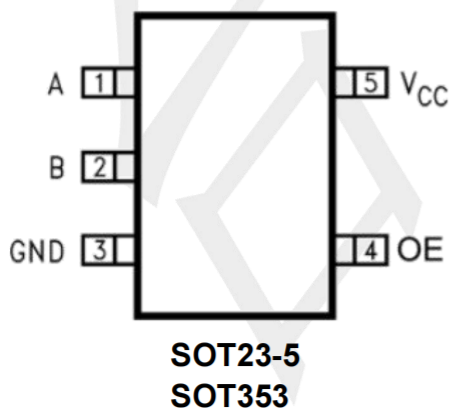
Logic Diagram



Ordering Information

ORDER NUMBER	PACKAGE DESCRIPTION	PACKAGE OPTION	Marking
NC7SZ66M5X-TP	SOT23-5	Tape and Reel,3000	7Z66D
NC7SZ66P5X-TP	SOT353	Tape and Reel,3000	Z66C

Pin Configuratio



Function Table(each gate)

QE	B0	Function
L	High Z-State	Disconnected
H	A0	Connect

Absolute Maximum Ratings

($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage(Note2)	V_{CC}	-0.5 ~ 6.5	V
Input Voltage	V_{IN}	-0.5 ~ 6.5	V
Switch I/O Voltage Range	$V_{I/O}$	-0.5~ $V_{CC}+0.5$	V
Control Input Clamp Current($V_{IN}<0$)	I_{IK}	-50	mA
I/O Port Diode Current ($V_{I/O}<0$ or $V_{I/O}>V_{CC}$)	I_{IOK}	± 50	mA
On-state Switch Current ($V_{I/O} : 0$ to V_{CC})	I_T	± 50	mA
V_{CC} or GND Current	I_{CC}	± 100	mA
Storage Temperature	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

Notes: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2.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

($T_A=25^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		1.65	--	5.5	V
Input Voltage	V_{IN}		0	--	5.5	V
I/O Port Voltage	$V_{I/O}$		0	--	V_{CC}	V
Input Transition Rise/Fall Time	t_R / t_F	$V_{CC}=1.65\text{V}\sim 1.95\text{V}$	--	--	20	ns
		$V_{CC}=2.3\text{V}\sim 2.7\text{V}$	--	--	20	ns
		$V_{CC}=3\text{V}\sim 3.6\text{V}$	--	--	10	ns
		$V_{CC}=4.5\text{V}\sim 5.5\text{V}$	--	--	10	ns
Operating Temperature	T_A		-40	--	+125	$^{\circ}\text{C}$

STATIC CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		T _A =25°C			T _A =-40°C~+125°C			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
High-level Input Voltage	V _{IH}	V _{CC} =1.65V~1.95V		0.65× V _{CC}	--	--	0.65× V _{CC}	--	--	V
		V _{CC} =2.3V~2.7V		1.7	--	--	1.7	--	--	V
		V _{CC} =3V ~3.6V		2	--	--	2	--	--	V
		V _{CC} =4.5V~5.5V		0.7× V _{CC}	--	--	0.7× V _{CC}	--	--	V
Low-level Input Voltage	V _{IL}	V _{CC} =1.65V~1.95V		--	--	0.35× V _{CC}	--	--	0.35× V _{CC}	V
		V _{CC} =2.3V~2.7V		--	--	0.7	--	--	0.7	V
		V _{CC} =3V~3.6V		--	--	0.8	--	--	0.8	V
		V _{CC} =4.5V~5.5V		--	--	0.3× V _{CC}	--	--	0.3× V _{CC}	V
ON-Resistance (Rail)	R _{ON(rail)}	V _I =GND or V _{CC}	V _{CC} =1.65V, I _S =4mA	--	12	30	--	--	45	Ω
			V _{CC} =2.3V, I _S =8mA	--	9	25	--	--	30	Ω
			V _{CC} =3V, I _S =24mA	--	7.5	20	--	--	23	Ω
			V _{CC} =4.5V, I _S =32mA	--	5.5	15	--	--	15	Ω
ON-Resistance (Peak)	R _{ON(peak)}	V _I =GND to V _{CC}	V _{CC} =1.65V, I _S =4mA	--	105	140	--	--	185	Ω
			V _{CC} =2.3V, I _S =8mA	--	30	40	--	--	50	Ω
			V _{CC} =3V, I _S =24mA	--	11.5	20	--	--	30	Ω
			V _{CC} =4.5V, I _S =32mA	--	7.5	15	--	--	23	Ω
On-state Switch Leakage Current	I _{S(ON)}	V _I = V _{CC} or GND, V _C =V _{IH} , V _O = Open, V _{CC} =5.5V		--	--	±0.1	--	--	2	μA
Off-state Switch Leakage Current	I _{S(off)}	V _I = V _{CC} and V _O = GND or V _I = GND and V _O = V _{CC} , V _C =V _{IL} , V _{CC} =5.5V		--	--	±0.1	--	--	1	μA
Control Input Current	I _{I(CTL)}	V _C = V _{CC} or GND, V _{CC} =5.5V		--	--	±0.1	--	--	1	μA
Quiescent Supply Current	I _{CC}	V _C = V _{CC} or GND, V _{CC} =5.5V		--	--	1	--	--	10	μA
Additional Quiescent Supply Current	ΔI _{CC}	V _C = V _{CC} -0.6V, V _{CC} =5.5V		--	--	500	--	--	500	μA

ANALOG SWITCH CHARACTERISTICS

(T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Frequency Response From Input (A or B) to Output (B or A) (Note 1) (Switch ON)	f _{MAX}	C _L =50pF, R _L =600Ω, F _{IN} =Wine Wave	V _{CC} =1.65V	--	35	--	MHz
			V _{CC} =2.3	--	120	--	MHz
			V _{CC} =3V	--	175	--	MHz
			V _{CC} =4.5V	--	195	--	MHz
		C _L =5pF, R _L =50Ω, F _{IN} =Sine Wave	V _{CC} =1.65V	--	>300	--	MHz
			V _{CC} =2.3V	--	>300	--	MHz
			V _{CC} =3V	--	>300	--	MHz
			V _{CC} =4.5V	--	>300	--	MHz
Crosstalk Voltage From Input (C) to Output (A or B) (Control Input to Signal Output)	V _{CT}	C _L =50pF, R _L =600Ω, F _{IN} =1MHZ (Square Wave)	V _{CC} =1.65V	--	35	--	mV
			V _{CC} =2.3V	--	50	--	mV
			V _{CC} =3V	--	70	--	mV
			V _{CC} =4.5V	--	100	--	mV
Feedthrough Attenuation From Input (A or B) to Output (B or A) (Note 2) (Switch OFF)	α _{iso}	C _L =50pF, R _L =600Ω, F _{IN} =1MHZ (Square Wave)	V _{CC} =1.65V	--	-58	--	dB
			V _{CC} =2.3V	--	-58	--	dB
			V _{CC} =3V	--	-58	--	dB
			V _{CC} =4.5V	--	-58	--	dB
		C _L =5pF, R _L =50Ω, F _{IN} =1MHZ (Square Wave)	V _{CC} =1.65V	--	-42	--	dB
			V _{CC} =2.3V	--	-42	--	dB
			V _{CC} =3V	--	-42	--	dB
			V _{CC} =4.5V	--	-42	--	dB
Sine-Wave Distortion From Input (A or B) to Output (B or A)	THD	C _L =50pF, R _L =10KΩ, F _{IN} =1KHZ (Square Wave)	V _{CC} =1.65V	--	0.1	--	%
			V _{CC} =2.3V	--	0.025	--	%
			V _{CC} =3V	--	0.015	--	%
			V _{CC} =4.5V	--	0.01	--	%
		C _L =50pF, R _L =10kΩ, F _{IN} =10KHZ (Square Wave)	V _{CC} =1.65V	--	0.15	--	%
			V _{CC} =2.3V	--	0.025	--	%
			V _{CC} =3V	--	0.015	--	%
			V _{CC} =4.5V	--	0.01	--	%

Notes: 1. Adjust f_{IN} voltage to obtain 0 dBm at output. Increase f_{IN} frequency until dB meter reads -3dB.

2. Adjust f_{IN} voltage to obtain 0 dBm at input.

DYNAMIC CHARACTERISTICS

(Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A or B) to Output (B or A)	t _{PD} (Note 1)	V _{CC} =1.8V±0.15V	--	--	3	--	--	4	ns
		V _{CC} =2.5V±0.2V	--	--	2.4	--	--	3.4	ns
		V _{CC} =3.3V±0.3V	--	--	2.2	--	--	3.2	ns
		V _{CC} =5V±0.5V	--	--	2	--	--	3	ns
Enable Time From Input (C) to Output (A or B)	t _{EN} (Note 2)	V _{CC} =1.8V±0.15V	1.0	--	12	--	--	15.5	ns
		V _{CC} =2.5V±0.2V	1.0	--	7.5	--	--	9.5	ns
		V _{CC} =3.3V±0.3V	1.0	--	6.5	--	--	8	ns
		V _{CC} =5V±0.5V	1.0	--	5.5	--	--	6.5	ns
Disable Time From Input (C) to Output (A or B)	t _{DIS} (Note 3)	V _{CC} =1.8V±0.15V	1.0	--	10	--	--	13	ns
		V _{CC} =2.5V±0.2V	1.0	--	6.9	--	--	9	ns
		V _{CC} =3.3V±0.3V	1.0	--	6.5	--	--	8.5	ns
		V _{CC} =5V±0.5V	1.0	--	5	--	--	6.5	ns

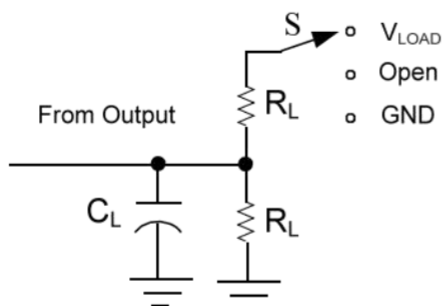
- Notes: 1. t_{PLH} and t_{PHL} are the same as t_{PD}.
 2. t_{PZL} and t_{PZH} are the same as t_{EN}.
 3. t_{PLZ} and t_{PHZ} are the same as t_{DIS}.

OPERATING CHARACTERISTICS

(T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
C _{IC} Control input Capacitance	C _{IC}	V _{CC} =5V	--	2	--	pF
C _{IO(OFF)} Switch Input/Output Capacitance	C _{OFF}	V _{CC} =5V	--	6	--	pF
C _{IO(ON)} Switch Input/Output Capacitance	C _{ON}	V _{CC} =5V	--	13	--	pF
Power Dissipation Capacitance	C _{PD}	V _{CC} =3.3V, f=10MHz	--	9	--	pF

TEST CIRCUIT AND WAVEFORMS



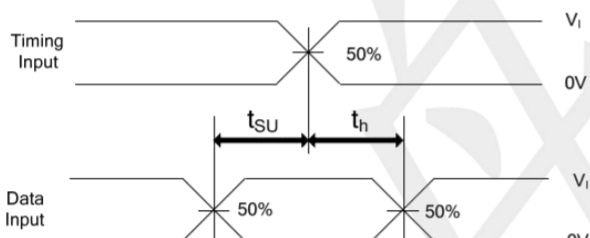
TEST	S
t_{PLH}/t_{PHL}	Open
t_{PHZ}/t_{PZH}	GND
t_{PLZ}/t_{PZL}	V_{LOAD}

t_{PD} is the same as t_{PHL} and t_{PLH} .
 t_{en} is the same as t_{PZL} and t_{PZH} .
 t_{dis} is the same as t_{PLZ} and t_{PHZ} .

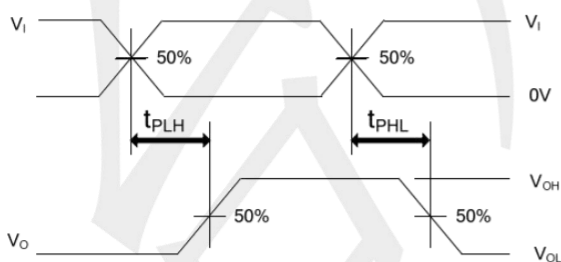
TEST CIRCUIT

Note: C_L includes probe and jig capacitance.

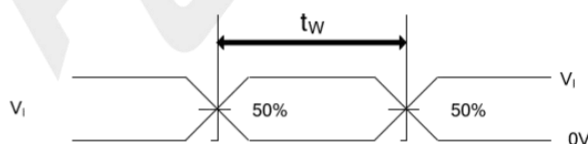
V_{CC}	V_I	t_R, t_F	V_M	V_{LOAD}	C_L	R_L	V_{Δ}
1.65V~1.95V	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
2.3V~2.7V	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
3.0V~3.6V	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V
4.5V~5.5V	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	0.3V



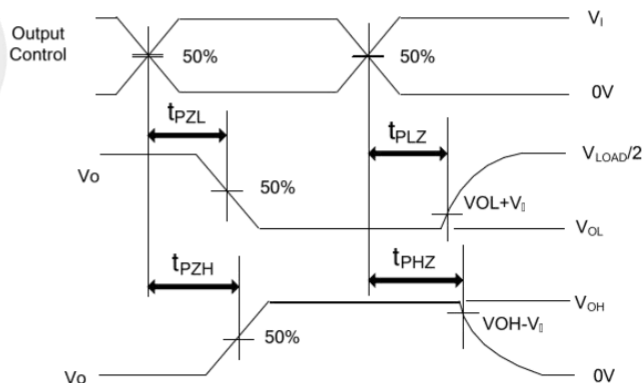
SETUP TIME AND HOLD TIME



PROPAGATION DELAY TIMES



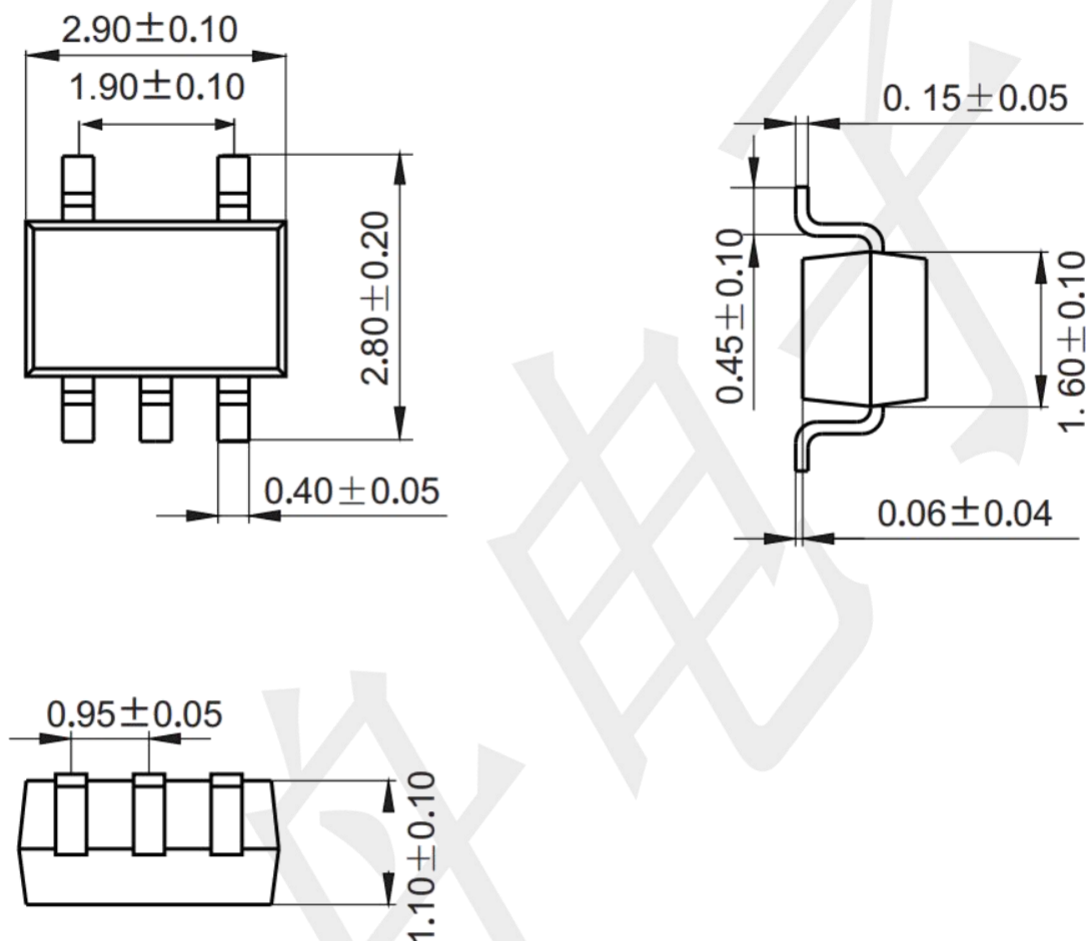
PULSE WIDTH



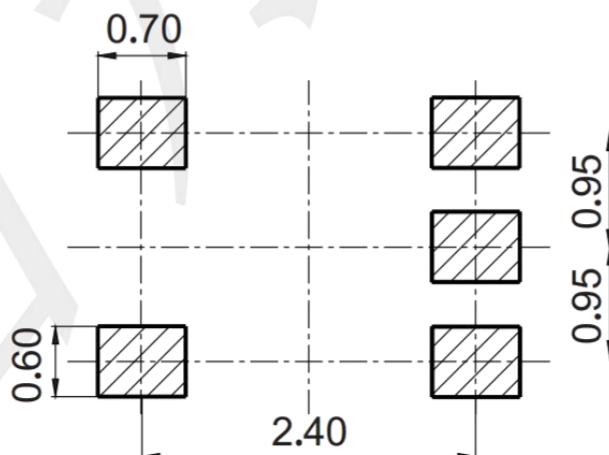
ENABLE AND DISABLE TIMES

Package informantion

SOT23-5 (Unit: mm)

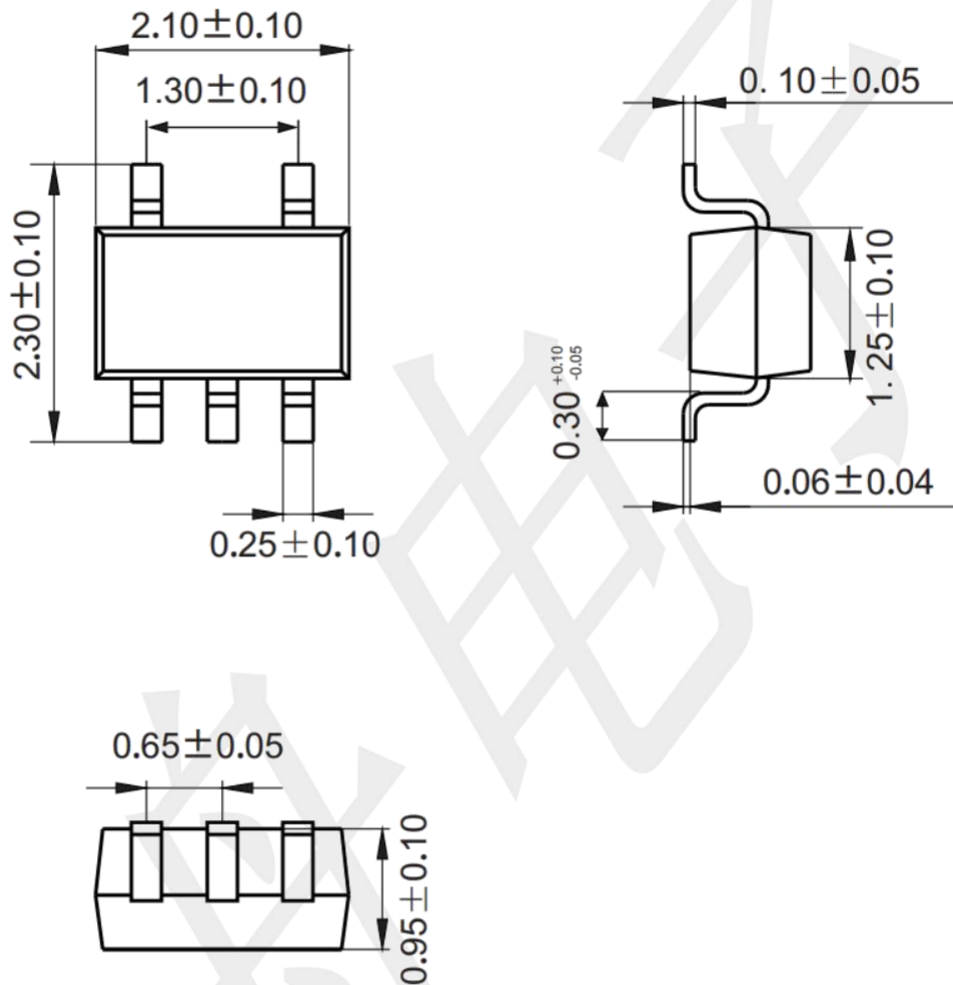


Mounting Pad Layout (Unit: mm)



Package informantion

SOT353 (Unit: mm)



Mounting Pad Layout (Unit: mm)

