

Single Non-inverting Schmitt Trigger Buffer

General Description

The ET74LVCSZ17 is a single Non-inverting Schmitt Trigger Buffer in three tiny footprint packages. The device performs much as LCX multi-gate products in speed and drive.

Features

- Source/Sink 24 mA at 3.0 Volts
- Chip Complexity: FETs = 20 ns
- Designed for 1.65 V to 5.5 V VCC
- These Devices are Pb-Free and are RoHS Compliant
- Part No. and Package

Part No.	Package	Size
ET74LVCSZ17	SC70-5	1.3mm×2.1mm

Pin Configuration

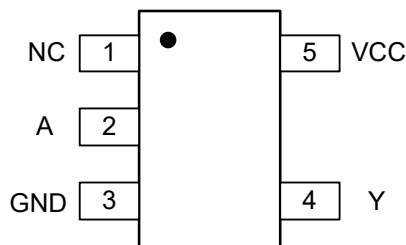


Figure1. Top View

Pin Function

Pin No.	Pin Name	Function
1	NC	No connect
2	A	Input
3	GND	Ground
4	Y	Output
5	VCC	Supply Voltage

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Block Diagram

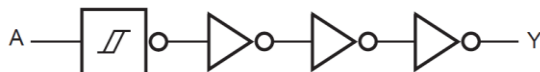


Figure2. Logic Symbol

Functional Description

Function Table

Input A	Output Y
L	L
H	H

Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		-0.5 to 7.0	V
V_I	DC Input Voltage		$-0.5 \leq V_I \leq +7.0$	V
V_O	DC Output Voltage Output in Higher or Low State ⁽¹⁾		-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	$V_I < GND$	-50	mA
I_{OK}	DC Output Diode Current	$V_O < GND, V_O > V_{CC}$	± 50	mA
I_O	DC Output Sink Current		± 50	mA
I_{CC}	DC Supply Current per Supply Pin		± 100	mA
I_{GND}	DC Ground Current per Supply Pin		± 100	mA
T_{STG}	Storage Temperature Range		-65 to 150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
T_J	Junction Temperature Under Bias		150	°C
θ_{JA}	Thermal Resistance ⁽²⁾	SC70-5	325	°C /W
P_D	Power Dissipation in Still Air at 85°C		180	mW
V_{ESD}	ESD Classification	Human Body Model ⁽³⁾	± 4000	V
		Charged Device Model ⁽⁴⁾	± 1000	
I_{LU}	Max Latch up Current Above V_{CC} and GND at 125°C ⁽⁵⁾		± 100	mA

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Notes:

1. IO absolute maximum rating must be observed.
2. Measured with minimum pad spacing on an FR4 board, using 10 mm-by-1 inch, 2-ounce copper trace with no air flow.
3. Tested to EIA/JESD22-A114-A
4. Tested to JESD22-C101-A.
5. Tested to EIA/JESD78.

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Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	1.65	5.5	V
	Operating Date Retention	1.5	5.5	
V _I	DC Input Voltage ⁽⁶⁾	0	5.5	V
V _{OUT}	DC Output Voltage(High or Low State)	0	5.5	V
T _A	Operating Temperature Range	-40	125	°C
t _r , t _f	Input Rise and Fall Time	V _{CC} = 2.5 V ± 0.2 V	0	ns/V
		V _{CC} = 3.0 V ± 0.3 V	0	
		V _{CC} = 5.0 V ± 0.5 V	0	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

Note6. Unused inputs may not be left open. All inputs must be tied to a high-logic voltage level or a low-logic input voltage level.

Electrical Characteristics

DC Electrical Characteristics

Symbol	Parameter	Conditions	V _{CC}	T _A = 25 °C			-40°C ≤ T _A ≤ 125°C		Unit
				Min	Typ	Max	Min	Max	
V _{T+}	Positive Input Threshold Voltage		1.65	0.6	1.0	1.4	0.6	1.4	V
			2.3	1.0	1.5	1.8	1.0	1.8	
			2.7	1.2	1.7	2.0	1.2	2.0	
			3.0	1.3	1.9	2.2	1.3	2.2	
			4.5	1.9	2.7	3.1	1.9	3.1	
			5.5	2.2	3.3	3.6	2.2	3.6	
V _{T-}	Negative Input Threshold Voltage		1.65	0.2	0.5	0.8	0.2	0.8	V
			2.3	0.4	0.75	1.15	0.4	1.15	
			2.7	0.5	0.87	1.4	0.5	1.4	
			3.0	0.6	1.0	1.5	0.6	1.5	
			4.5	1.0	1.5	2.0	1.0	2.0	
			5.5	1.2	1.9	2.3	1.2	2.3	
V _H	Input Hysteresis Voltage		1.65	0.1	0.48	0.9	0.1	0.9	V
			2.3	0.25	0.75	1.1	0.25	1.1	
			2.7	0.3	0.83	1.15	0.3	1.15	
			3.0	0.4	0.93	1.2	0.4	1.2	
			4.5	0.6	1.2	1.5	0.6	1.5	
			5.5	0.7	1.4	1.7	0.7	1.7	

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V_{OH}	High-Level Output Voltage $V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -100 \mu A$	1.65-5.5	$V_{CC}-0.1$	V_{CC}		$V_{CC} -0.1$		V
		$I_{OH} = -3 \text{ mA}$	1.65	1.29	1.52		1.29		
		$I_{OH} = -8 \text{ mA}$	2.3	1.9	2.1		1.9		
		$I_{OH} = -12 \text{ mA}$	2.7	2.2	2.4		2.2		
		$I_{OH} = -16 \text{ mA}$	3.0	2.4	2.7		2.4		
		$I_{OH} = -24 \text{ mA}$	3.0	2.3	2.5		2.3		
		$I_{OH} = -32 \text{ mA}$	4.5	3.8	4.0		3.8		
V_{OL}	Low-Level Output Voltage $V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 100 \mu A$	1.65-5.5			0.1		0.1	V
		$I_{OL} = 3 \text{ mA}$	1.65		0.08	0.24		0.24	
		$I_{OL} = 8 \text{ mA}$	2.3		0.2	0.3		0.3	
		$I_{OL} = 12 \text{ mA}$	2.7		0.22	0.4		0.4	
		$I_{OL} = 16 \text{ mA}$	3.0		0.28	0.4		0.4	
		$I_{OL} = 24 \text{ mA}$	3.0		0.38	0.55		0.55	
		$I_{OL} = 32 \text{ mA}$	4.5		0.42	0.55		0.55	
I_{IN}	Input Leakage Current	$V_{IN} = 5.5 \text{ V}$ or GND	0-5.5			± 0.1		± 1.0	μA
I_{OFF}	Power Off Leakage Current	$V_{IN} = 5.5 \text{ V}$ or $V_{OUT} = 5.5 \text{ V}$	0			1.0		10	μA
I_{CC}	Quiescent Supply Current	$V_{IN} = 5.5 \text{ V}$ or GND	5.5			1.0		10	μA

AC Electrical Characteristics

Symbol	Parameter	Conditions	V_{CC}	$T_A = 25^\circ C$			$-40^\circ C \leq T_A \leq 125^\circ C$		Unit
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation Delay Input A to Y	$R_L = 1M\Omega$ $C_L = 15pF$	1.65	2.0	10.1	18	2.0	19	ns
			1.8	2.0	8.0	15.5	2.0	16	
			2.5 ± 0.2	1.0	5.0	9.0	1.0	9.5	
			3.3 ± 0.3	1.0	3.7	6.3	1.0	6.5	
			5.0 ± 0.5	0.5	3.1	5.2	0.5	5.5	
		$R_L = 500\Omega$ $C_L = 50pF$	3.3 ± 0.3	1.5	4.4	7.2	1.5	7.5	
			5.0 ± 0.5	0.8	3.7	5.9	0.8	6.2	

Capacitive Characteristics

Symbol	Parameter	Condition	Typical	Unit
C_{IN}	Input Capacitance	$V_{CC} = 5.5 \text{ V}$, $V_I = 0 \text{ V}$ or V_{CC}	>2.5	pF
C_{PD}	Power Dissipation Capacitance ⁽⁷⁾	10 MHz, $V_{CC} = 3.3 \text{ V}$, $V_I = 0 \text{ V}$ or V_{CC}	9	pF
		10 MHz, $V_{CC} = 5.5 \text{ V}$, $V_I = 0 \text{ V}$ or V_{CC}	11	

Note7. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation:

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$I_{CC(OPR)} = C_{PD} \times V_{CC} \times f_{in} + I_{CC} \times C_{PD}$ is used to determine the no-load dynamic power consumption;
 $P_D = C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC} \times Fig.$

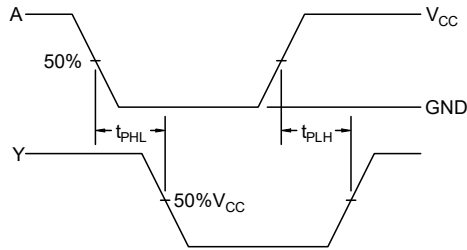


Figure 3. Switching Waveform

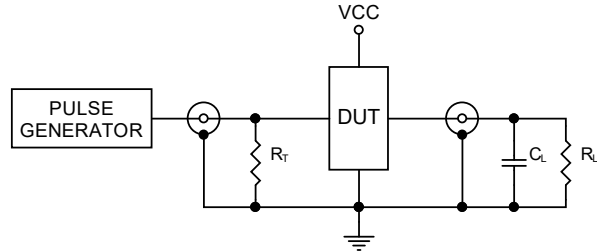


Figure4. Test Circuit $R_T = 50\Omega(\text{typ})$

A 1 MHz square input wave is recommended for propagation delay tests.

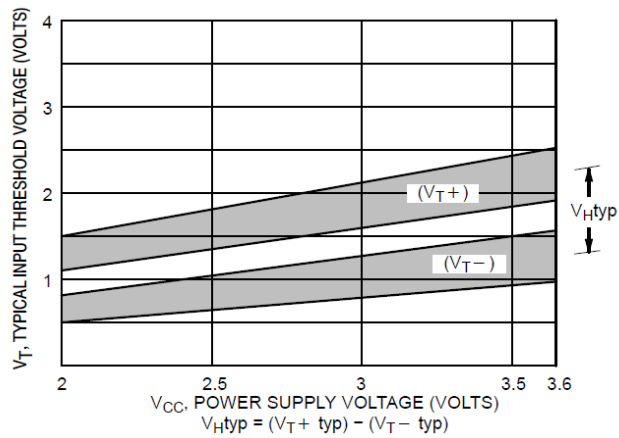


Figure5. Typical Input Threshold, V_{T+} , V_{T-} versus Power Supply Voltage

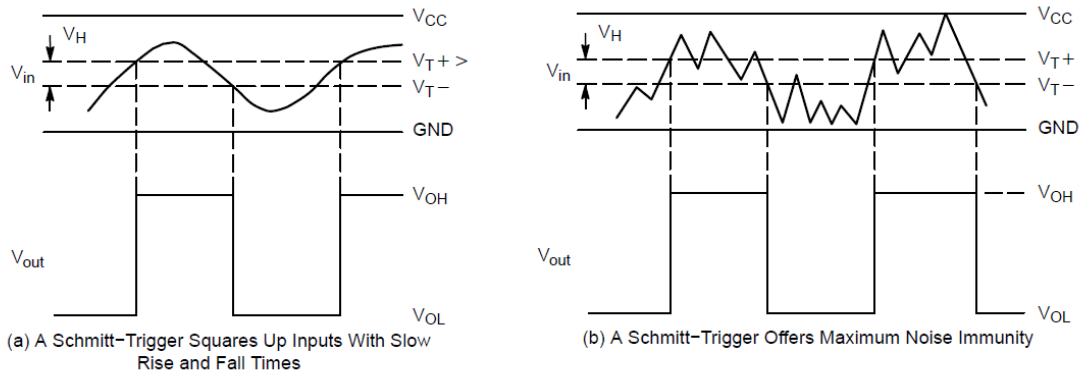
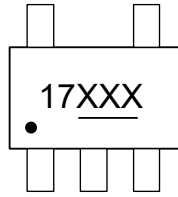


Figure6. Typical Schmitt Trigger Applications

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Marking



17 - Part Number

XXX - Tracking Number

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
1.0	2017-04-25	Original Version	Mayj	Mayj	Zhuji
1.1	2017-07-21	Remove one item in features which is not applicable.	Mayj	Mayj	Zhuji
1.2	2021-1-25	Add Marking	Mayj	Mayj	Zhuji
1.3	2022-6-18	Updated form	Shibo	Shibo	Zhuji
1.4	2023-11-29	Update Typeset /ESD	Shibo	Shibo	Shibo