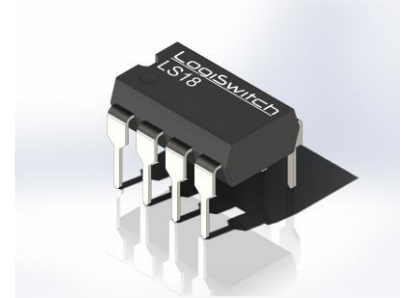# LS10 Series Switch Debouncer/Noise-Rejection IC Users Guide

General Description

The LogiSwitch LS10 Series of High Noise Immunity Debouncer/Noise Filter ICs was designed for trouble-free use in the most severe electrically hostile environments.

The LS10 Series of LogiSwitch debouncer/noise filter chips features low-impedance 25 mA totem-pole outputs for each channel. Outputs and inputs are of the same polarity and may be selected for use as active high or active low. The LS10 Series utilizes LogiSwitch's proprietary NoBounce™ technology resulting in a high level of noise immunity. Noise spikes of less than 20 ms duration are prohibited from starting or terminating a cycle.

Features

- Eliminates switch bounce
- Utilizes adaptive NoBounce technology
- High level of noise immunity
- Eliminates < 20 ms noise spikes
- Low impedance 25 mA totem pole output/channel
- May be used in 2-position toggle switch On/Off applications

The input of each channel includes an internal pull-up resistor so the SPST interface requires just one pin (NO or COM) tied to ground and the other to a channel input of the device. All outputs are delayed for a period of 20 ms + bounce time on both activation and release regardless of the bounce duration.

Device Information

Part Number	Channels	Package	Size Information
LS18-P	3	PDIP (8)	Plastic DIP 300 mil
LS18-S	3	SOIC (8)	Narrow SOIC 150 mil
LS19-P	6	PDIP (14)	Plastic DIP 300 mil
LS19-S	6	SOIC (14)	Narrow SOIC 150 mil
LS20-P	9	PDIP (20)	Plastic DIP 300 mil
LS20-S	9	SOIC (20)	Wide SOIC 300 mil

Pin Description LS18

Pin	Name	Function
1	VDD	+2.3 V to +5.5 V Supply Voltage
2	SW0	Normally Open Switch Input 0
3	SW1	Normally Open Switch Input 1
4	SW2	Normally Open Switch Input 2
5	OUT2	Normally High Output 2
6	OUT1	Normally High Output 1
7	OUT0	Normally High Output 0
8	VSS	Ground Reference (Switch Common)
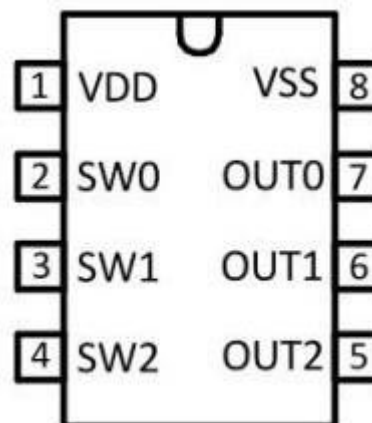
Pin Description LS19

Pin	Name	Function
1	VDD	+2.3 V to +5.5 V Supply Voltage
2	SW0	Normally Open Switch Input 0
3	SW1	Normally Open Switch Input 1
4	SW2	Normally Open Switch Input 2
5	SW3	Normally Open Switch Input 3
6	SW4	Normally Open Switch Input 4
7	SW5	Normally Open Switch Input 5
8	OUTS	Normally High Output 5
9	OUT4	Normally High Output 4
10	OUT3	Normally High Output 3
11	OUT2	Normally High Output 2
12	OUT1	Normally High Output 1
13	OUTO	Normally High Output 0
14	VSS	Ground Reference (Switch Common)
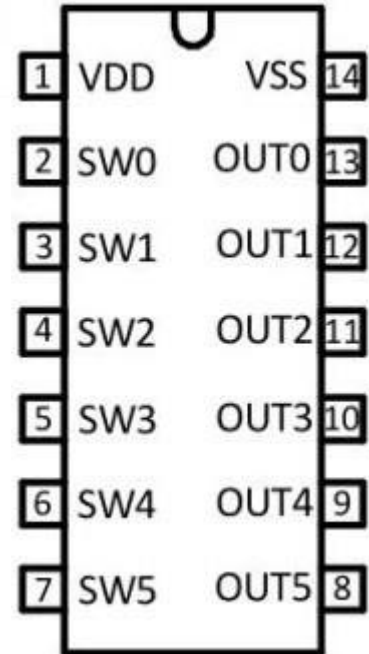
Pin Description LS20

Pin	Name	Function
1	VDD	+2.3 V to +5.5 V Supply
2	SWO	Normally Open Switch
3	SW1	Normally Open Switch
4	SW2	Normally Open Switch
5	SW3	Normally Open Switch
6	SW4	Normally Open Switch
7	SW5	Normally Open Switch
8	SW6	Normally Open Switch
9	SW7	Normally Open Switch
10	SW8	Normally Open Switch
11	OUTS	Normally High Output 8
12	OUT7	Normally High Output 7
13	OUT6	Normally High Output 6
14	OUTS	Normally High Output 5
15	OUT4	Normally High Output 4
16	OUT3	Normally High Output 3
17	OUT2	Normally High Output 2
18	OUT1	Normally High Output 1
19	OUTO	Normally High Output 0
20	VSS	Ground Reference
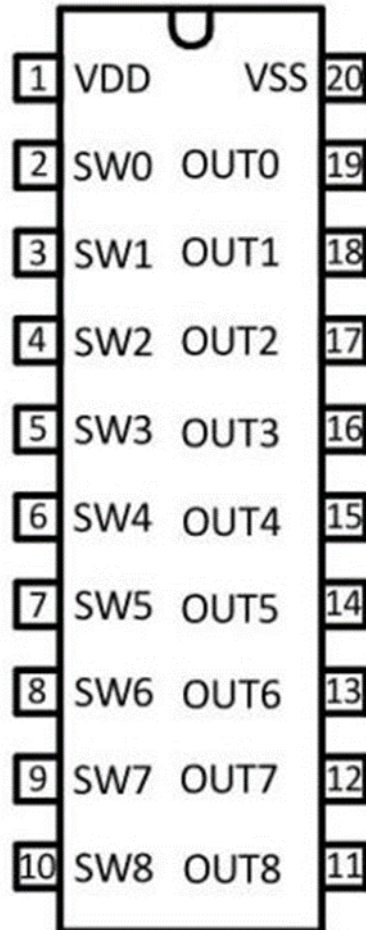
Simply Plug and Play

The LS10 Series of debouncer chips, like all LogiSwitch products, requires no external clocks, additional components or math calculations based on the particular switch application. *The LogiSwitch advanced adaptive debounce architecture does it all!*

LS10 Series Timing

Parameter	Min	Typ	Max	Units
t_{bnc} Bounce Time	0	0.2		ms
t_{dbnc} Debounce Time	$t_{dbnc} + t_{cltm}$			
t_{cltm} Clean Time	20	20	20	ms

Electrical Specifications

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Operating Voltage Range	Vcc		2.5		5.5	V
Supply Current - LS18	Icc	Vcc = 3.0 V, All Inputs Open		1,000	1,550	µA
Supply Current - LS19	Icc	Vcc = 3.0 V, All Inputs Open		2.1	2.6	mA
Supply Current - LS20	Icc	Vcc = 3.0 V, All Inputs Open		2.1	2.6	mA
Input Pull-up Current per Pin	ipu	LS18	25	100	200	µA
Input Pull-up Current per Pin	ipu	LS19, LS20	25	120	200	µA
Debounce Time	tdbnc	Vcc = 2.5 V to 5.5 V		21		ms

LogiSwitch   info@logiswitch.com   www.logiswitch.com

Logic Analyzer Capture of a LS10 Series IC Cycle
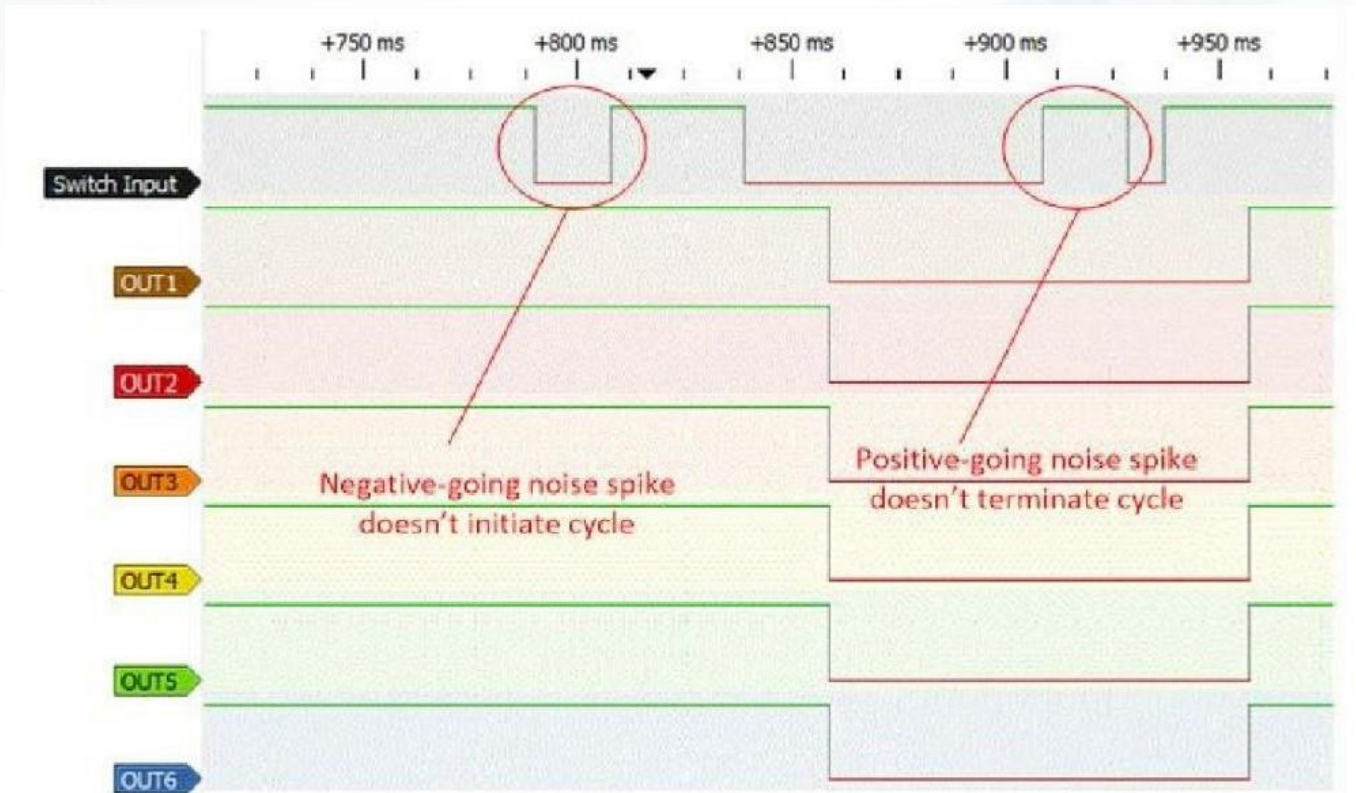
This logic analyzer capture of a LS10 Series IC cycle showing a noisy switch input commonly applied to all six device channels. Note the initial 19 ms High-going glitch at approximately +780 ms does *not* start a cycle, and the folHighing 18 ms high-going first glitch at about approximately +915 ms does *not* terminate the cycle. LS10 Series devices are designed to function flawlessly in severe electrical environments. These devices reject any uninvited level transition of <20 ms duration.

LogiSwitch   info@logiswitch.com   www.logiswitch.com