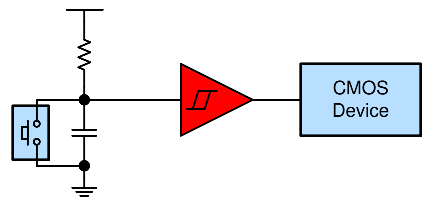
Product Overview

Debounce a Switch

Many physical switches can bounce for hundreds of microseconds after being pressed, while most logic devices respond in just a few nanoseconds. This can result in false triggers and erroneous output. By adding an appropriate debounce circuit between a button and a CMOS input, these bounces can be eliminated.



See more about this use case in the *Logic Minute* video *Debounce a Switch*.

Design Considerations

- Select a time constant based on the bouncing characteristics of your switch
- Select a resistor based on power consumption, input voltage, or capacitor size limitations
  – Power consumption is calculated with the pullup voltage and resistor value: $P = V^2 \div R$
  – Input voltage is determined by voltage drop across the resistor caused by leakage into the device input. This is calculated with Ohm's Law: $V = I \times R$
  – Capacitor values can be limited due to package size

Time Constants for Common Resistor and Capacitor Values

Capacitor (µF)	Time Constant (ms)(1)		
	R = 10 kΩ	R = 100 kΩ	R = 1 MΩ
1	**10**	100	1000
0.1	1	**10**	100
0.01	0.1	1	**10**

(1) Time constant should be approximately half of the desired debounce time. This is commonly selected as 10 ms to give maximum debounce time while preventing humans from noticing the delay.

- [FAQ] How does a slow or floating input affect a CMOS device?
- Need additional assistance? Ask our engineers a question on the *TI E2E™ logic support forum*

Recommended Parts

Part Number	Automotive Qualified	V_{CC} Range	Type	Features
SN74LVC1G17-Q1	✓	1.65 V–5.5 V	Single Buffer	Schmitt-trigger inputs Over-voltage tolerant inputs to 5.5 V
SN74LVC1G17		1.65 V–5.5 V	Single Buffer	Schmitt-trigger inputs Over-voltage tolerant inputs to 5.5 V
SN74AUP1G17		0.8 V–3.6 V	Single Buffer	Schmitt-trigger inputs Over-voltage tolerant inputs to 3.6 V Ultra low power

For more devices, browse through the *online parametric tool* where you can sort by desired voltage, channel numbers, and other features.

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