

# Ideas for low voltage sound activated switch

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I'm looking for ideas how to solve a problem of designing a very small sound-activated switch.

The basic requirements are:

0) Sound triggers a mechanical action. A piece of nylon stops the mechanical action, so if the nylon is melted, the action takes place. Hence sound must melt nylon.

1) Circuit works from two button cells. Size is a real limit. The ultimate (and distant) aim is to build a circuit that is small enough that a person could swallow it.

2) Sound at a specific frequency triggers the switch.

3) When the switch is triggered, the battery voltage is applied to a 0.2 Ohm resistor, which heats up and melts the nylon.

Are there any switching devices that will have an on-resistance of well under 0.1 Ohms whilst still being very small? A large power FET is out of the question due to size.

A high on-resistance will mean the switching device will dissipate more power than the load resistor, which is not a good idea. At that point I might as well use the switch as the heater! That might be possible in fact, although a concern is the semiconductor will be destroyed before the nylon melts.

The load, which acts as the heater is (or at least should be) matched to the internal resistance of the cells. So the on-load voltage will drop to half the off-load voltage. So whatever switch mechanism is used, it will have to keep triggered even if the battery voltage drops to about 1.4V (0.7 V/cell), although triggering will start with full battery voltage.

Using a DC-DC step up converter and storing some charge in a cap is one idea I am considering. That way, I will have a source of reasonable

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voltage even if the battery voltage drops to 0.7 V/cell on load. But could anything be built that is smaller than a couple of button cells? If not, more batteries would be easier. But the potential client does not want the power source being any larger than two small button cells.

I've been asked to look at designing this, but I think the size constraints are quite serious given the circuit will need to supply about 7W of power for a short time period.

Any ideas?