

Diodes for Li coin cell protection

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I had to look pretty hard to find a small, inexpensive diode pair to allow an RTC to be powered by both a Li coin cell and the power rail. The RTC I am using is very low current when not being controlled, but starts using a lot more current when controlled over the I2C bus. This would exhaust the cell long before the expected 5 year life, so I needed a way to power it from the Vcc rail when the board is powered. Diodes are the right idea, but primary Li cells have a very low tolerance for reverse current (charging). It seems that reverse current builds up a layer inside that reduces the capacity of the cell.

I have looked at a lot of diodes and I finally found some that have a low enough reverse current. Maybe I have missed a whole family of low reverse current parts somewhere, but I was not finding very many and mostly they were not cheap. Finally I stumbled on some Varactors which seems to be built with very low reverse currents to work optimally in tuning apps.

The ON MMBV432LT1 is a dual, common cathode varactor diode in a SOT23 package. Digikey sells it for under \$0.10 qty 1000. The reverse current at 125C and 5 volts is under 5 nA.

So if anyone needs to power an RTC or an MCU from both Li coin cell and other power, this is a good part to isolate the two.