

Re: schottky tempco

"regular" silicon diode won't work. It would have 2.2 mV/C out of nearly 2 volts ($1.2 + V_f$), giving me in the 1000 ppm range. So I need to consider using a schottky.

Apparently temperature coefficient varies with the log of the current according to the shockley equation. If I can determine the parameters (like the ideality factor) for a particular schottky I can get the math worked out and fiddle with the current setting to get the temperature characteristic of the circuit right.

I'm going to set the current at 5 or 10 mA to make sure the 317 works right.

Schottkies tend to run less, -1.5 maybe, except that the very small signal-level diodes have decreasing tc's as the current increases. Some go to zero tc at 10–20 mA. I think the exact tempco depends on the metal used.

How about an LM35? It outputs 10 mV per degree C, so you could scale that as needed. But it won't sink much current, so you'd have to buffer it with an opamp or something.

Don't run an LM35 from over +5 volts! And don't pull the output below ground!

John– Hide quoted text –

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Whatever kind of temperature sensing element used, be it a diode, LM35 or whatever, needs to be screwed on to the battery terminal. The LM35 probably comes in some fragile package like a TO–92. On the other hand, I can solder a ring terminal right onto the lead of a diode and it will be rugged enough to screw to the battery terminal, and the diode's lead will provide a good thermal path from the battery into the diode.

Ambient temperature sensing really isn't feasible here. The battery enclosure's temperature will undergo temperature variations to extremes, from around freezing to at least 85 C (outdoor machinery). The temp sensing must be through a direct connection to the battery

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terminal. I think I'm kind of stuck with a diode just for physical reasons.

Thanks for the advice, John.

Well, then use a diode, or maybe a TO-220 transistor, which would be better thermally. The tempco of a silicon diode is around $-2.5/650 = -3800$ PPM, so mix that with some constant voltage to get the result you need.

John

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