



LIVE-IC

Low Input Voltage Energy harvesting Integrated Circuit

Project Summary

ALP035 CMOS integrated circuit able to convert a low input voltage at very low power in a output voltage high enough to be able to supply a portable system. The energy is provided by a thermoelectric generator (TEG).

The circuit is composed of a DCDC converter controlled by an ultra-low-power supervisor powered by a battery. The consumption of the supervisor is of the order of magnitude of the leakage current of a button battery which ensures a battery life of more than ten years. In addition it is possible to consider a version of the supervisor with a ultra-low-power real time clock (RTC), which could be very useful depending on the application. The supervisor enables the DCDC converter when the thermal energy is available. It also helps to regulate the output voltage.

This device can be used in the program I1 "Diagnostic-Biochip" in order to power, from the thermal energy of the holder, smart wearable devices used for measuring and transmit physical or biological values for the medical diagnosis.

Valorisation

This project has involved students directly and especially to achieve a Bachelor's thesis (LIVE_IC Controller, Anthony Groccia, TB2014 HE-Arc.)

A meeting with Asulab and EM Microelectronic Marin (Swatch Group) has allowed us to show our partial results. A sequel is being discussed.

Patent pending through the CETT (HEIG-VD).

The company greenTEG in Zurich (<http://www.greenteg.com/>), which announced a TEG new technology for 2014 and with whom we exchanged several emails, showed their interested in our circuit. However, it seems that some technological problems did not allow the placing on the market of their TEG so far. We need to re-contact them to discuss a future collaboration (CTI).

We also have contacts with the company Semtech (<http://www.semtech.com/>) in Neuchâtel about it.

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This project has been carried out by the RCSO ISYS in collaboration with HES-SO Valais-Wallis, HEIG-VD, HE-Arc