

## ECT 310 Perpetuum

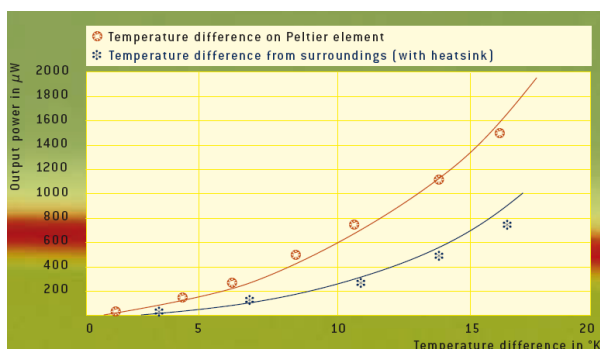
EnOcean powered by Thermal Energy

**ECT 310 is a low-cost ultra-low-voltage DC/DC converter for powering battery-less EnOcean radio modules by Thermal Energy. Wireless sensors and even actuators can be operated.**

**Operation starts at typ. 20 mV relating to a 2 Kelvin temperature difference at a standard low-cost Peltier element.**

The output power is in the range from  $\mu\text{W}$  to  $\text{mW}$  and depends on the actual temperature difference at the Peltier element. ECT 310 is designed and optimized for powering EnOcean radio modules in sensors and actuators. To achieve best system efficiency the output voltage is regulated only roughly. A typical thermo-driven sensor consists of a sensor element, a small Peltier element, the ECT 310 DC/DC converter and an EnOcean STM 300 or STM 312 radio module. Other than STM 300, the STM 312 module already has an energy storage on board.

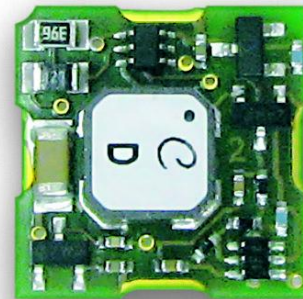
### Energy Calculation Example



Output power from ECT 310 in combination with Peltier element TEC2L-15-15-15-5.6:

- Red = temp. diff. @ Peltier, blue = temp. diff. against ambient temp. (via heat sink).
- Start up at 2K,  $\sim 100 \mu\text{W}$  of energy is already produced for a temp. diff. of 7 K.

An EnOcean radio module that wakes up every 2 min. to transmit a telegram needs  $\sim 5 \mu\text{W}$  on average only. **Enough energy is left even to power some actuators!**



### ECT 310 key features

- Best in-class Thermo Harvester solution
- Low-cost DC/DC converter, works with lowest-cost standard Peltier elements
- Designed and optimized for thermo-powered EnOcean wireless applications
- SMD footprint
- Directly to be soldered onto EnOcean STM 312 wireless sensor transmitter module
- Powers STM 300 module to realize bi-directional wireless sensors and actuators

For evaluation of ECT 310 the development kit EDK 312 is provided:

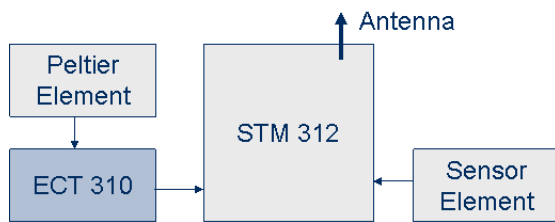
### EDK 312 consists of following parts

- 868 MHz STM 312 all-in-one wireless sensor module with integrated energy storage
- ECT 310 ultra-low-voltage DC/DC converter
- Peltier element TEC2L-15-15-15-5.6
- Adapter Board EVA 330
- Detailed documentation

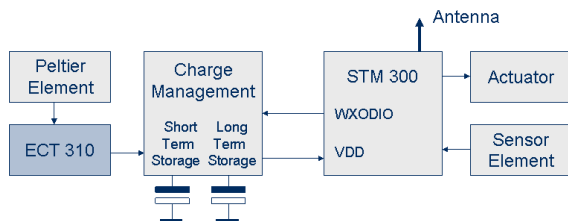
### Key Applications

- Sensors for Building and Industrial automation and Medical (heat cost allocator, temperature sensor, process control, preventive maintenance, etc.)
- Actuators for Building and Industrial automation (water valve, air flap, other mech. dev.)

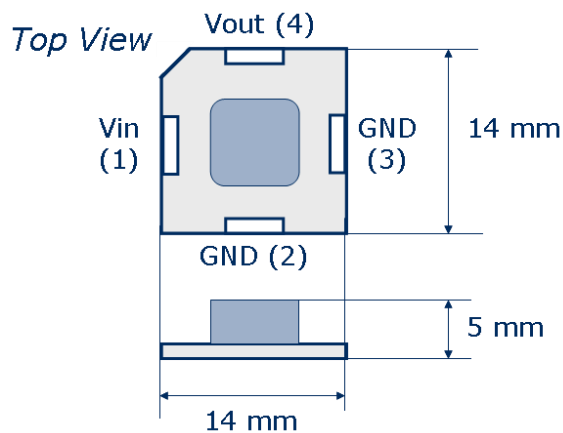
**Thermo powered STM 312 radio sensor**



**Thermo powered actuator with STM 300**



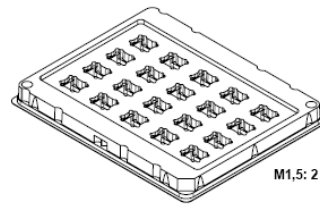
**Dimensions & Pinout (Top View)**



**Technical Data**

<b>Input start-up voltage</b>	<b>20 mV typ.</b> oc
<b>Input voltage max.</b>	<b>500 mV</b> oc (oc = open circuit)
<b>Output voltage</b>	<b>3 .. 5 V</b> (input = 20 .. 500 mV, load < 10 MΩ)
<b>Input source impedance</b>	<b>&lt; 2 Ohm</b>
<b>Efficiency @ 25 mV</b>	<b>30 % typ.</b>
<b>Operating temperature</b>	<b>-20 °C .. +60 °C</b>
<b>Storage temperature</b>	<b>-40 °C .. +85 °C</b>
<b>Humidity</b>	<b>0 .. 93 % rH,</b> <b>non-condensing</b>

**Packaging Information**



**Ordering Information**

Type	Ordering Code
ECT 310 Module	S3004-P310
EDK 312 Dev Kit 868 MHz	S3004-X312
EDK 312C Dev Kit 315 Mhz	S3034-X312

**Note**

EnOcean GmbH owns multiple patents in the area of self-powered applications. An overview can be found at following link: <http://www.enocean.com/en/patents/> . Patent pending for ECT 310.

**Purchase of the ECT 310 DC/DC converter module or ECT 310 developer kit does not give the right to use this component to power any radio interface other than the EnOcean Radio protocol.**