

Solution Summary

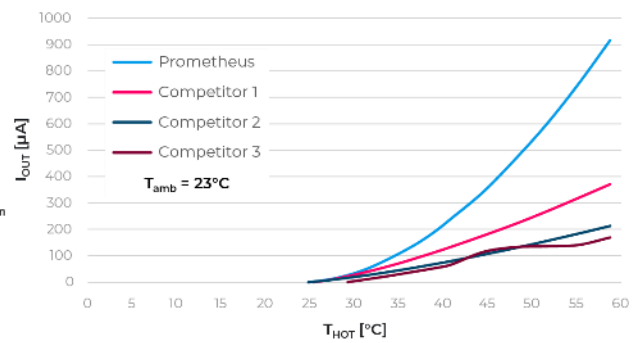
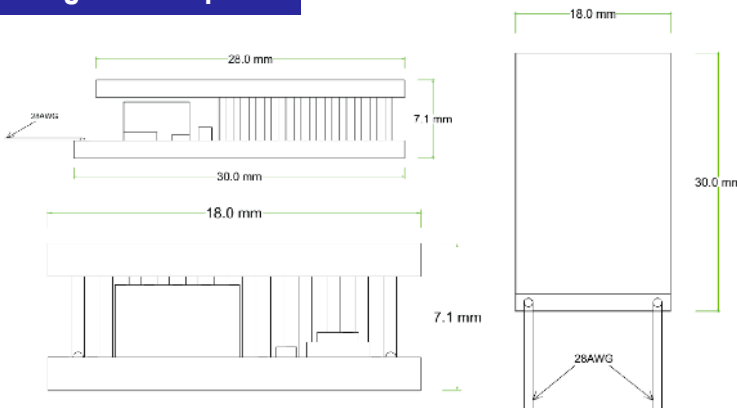
MATRIX Prometheus is a family of energy harvesting modules designed for converting thermal energy between small temperature gradients into useful electrical output. The Prometheus module fits the [Renesas RE01 Microcontroller](#) seamlessly and simplifies thermoelectric-based energy harvesting system designs.

Features/Benefits

- Regulated Voltage Output
 - Configurable
 - 2 to 5 volts
- Recharge batteries or powers circuits directly
- Easy to Use
 - Select the appropriate thermal impedance for application
 - Add heat sink and mount to heat source

Each Prometheus module integrates a MATRIX Thermoelectric Generator (TEG) with a MATRIX Mercury Energy Harvesting Boost Converter. This patented technology ensures perfect electrical impedance matching between the TEG and its companion Boost Converter. Such integration enables MATRIX Prometheus to produce much greater output current than equivalent competitive solutions under identical conditions.

Diagrams/Graphics



Output current I_{OUT} vs hot side temperature T_{HOT} for Prometheus and equivalent solutions with output voltage of 4.2V and thermal impedance of 21K/W.

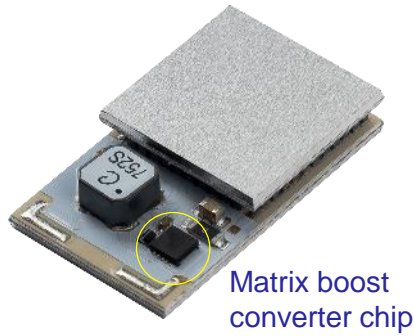
Target Markets and Applications

- Wearables
 - Watches
 - Vital Sign Monitors
 - Location Trackers
- Industrial IoT devices

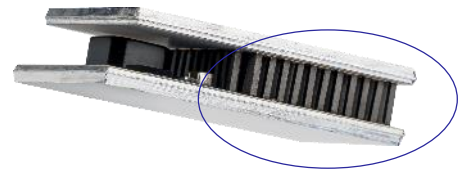


MATRIX Industries provides advanced fully integrated thermoelectric energy harvesting solutions. Its combination of advanced thermoelectric materials with power conversion chips and circuits and thermal engineering produces modules that can be easily integrated into wearables and remote sensors and devices of many kinds. Solutions from smartwatches to vital sign monitors and self-powered IoT devices are all in use today. Renesas products from low-power MCUs to sensors of many kinds integrate quickly and easily with Prometheus.

Prometheus Energy Harvesting Module

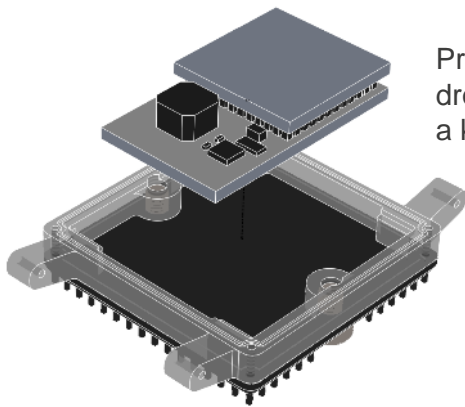


Matrix thermoelectric energy generator

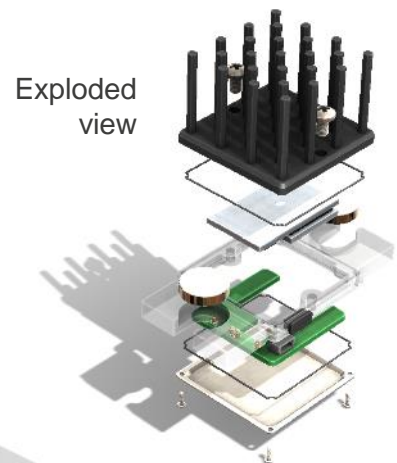


Development Kits

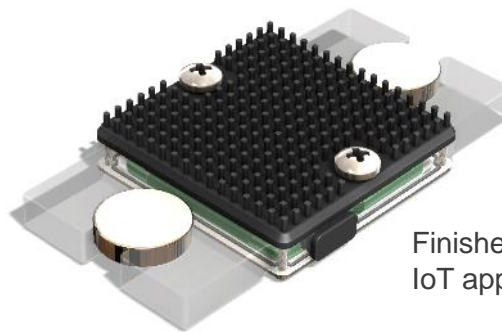
Prometheus modules come in different sizes and shapes. There are evaluation and development kits for both watch and industrial IoT applications. Depending on customer design requirements, different heat sinks can be easily mounted to the kits.



Prometheus dropping into a kit housing



Exploded view



Finished assembly for an IoT application

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