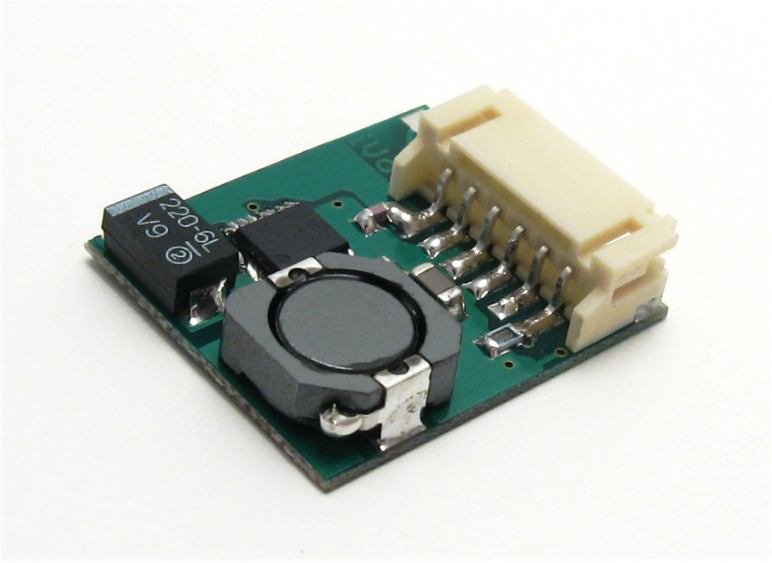
High Efficiency Voltage Converter

iVOLT-Up

Datasheet (preliminary)



Revision History

Revision	Change
V1.0	Initial version

Overview

The iVOLT modules provide scaleable and small sized solutions for different mobile power supply requirements.

iVOLT-Up is an adjustable voltage converter module which provides the user with a high efficiency in a small size. It is a switch mode DC/DC stepup converter and fits into applications where size and/or performance are high priority.

The characteristics of a step-up switch mode converter are:

- output voltage is higher than input voltage
- high energy efficiency, very low power dissipation in converter
- some remaining noise on output voltage (compared to linear regulator)

Features

In addition to the previous mentioned characteristics, iVOLT-Up provides the following features:

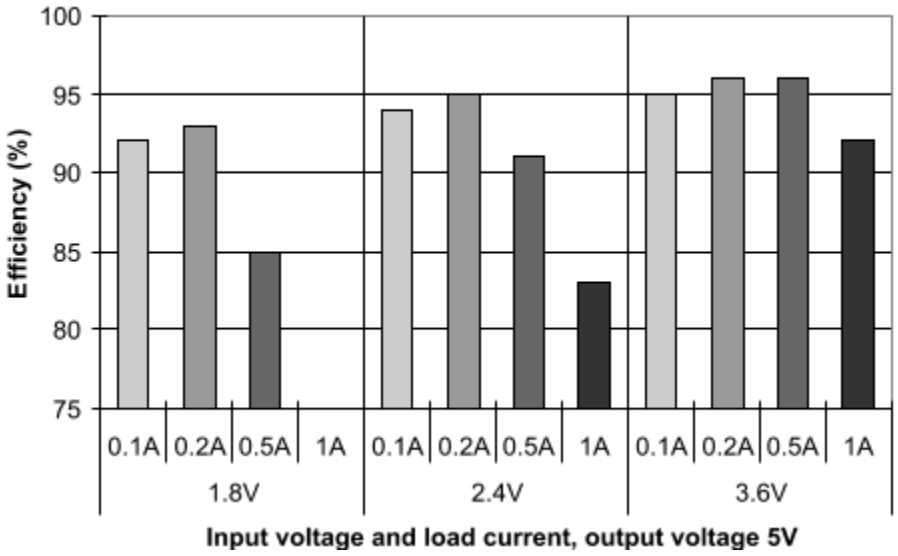
- small size
- low weight
- adjustable output voltage
- multi-stage capable with master/slave enable
- Optional: Low voltage warning, battery monitor, interval operation

Specifications

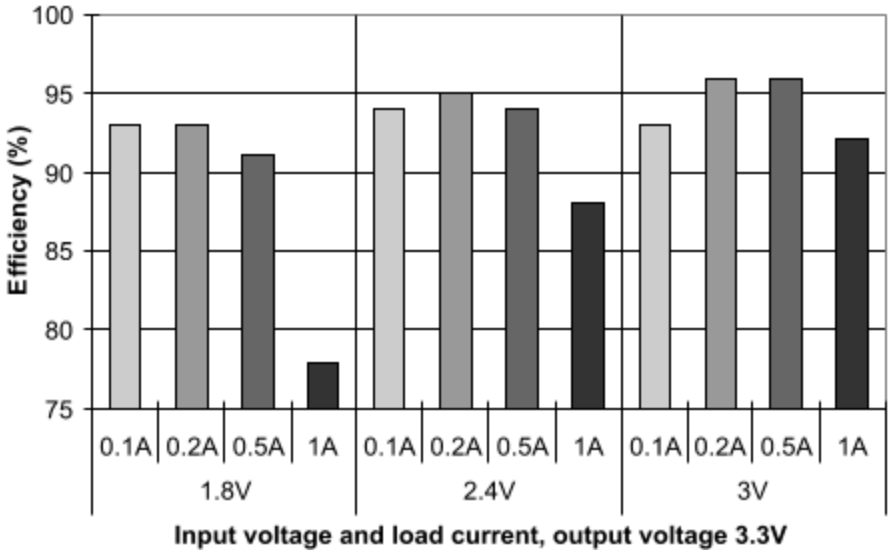
Input voltage range	1.8 to 5.5V
Output voltage	Adjustable from input voltage to 5.5V
Output voltage accuracy	+/- 3%
Max. load current @ 1.8V input	0.9A (5V output); 1.2A (3.3V output)
Max. load current @ 2.4V input	1.3A (5V output); 1.5A (3.3V output)
Max. load current @ 3.6V input	1.8A (5V output); 1.9A (3.3V output)
Max. Startup load current	3.3V out: 260mA (1.8V in), 330mA (2.4V in), 450mA (3V) 5V out: 400mA (1.8V in), 500mA (2.4V in), 800mA (3.6V)
Standby current	tbd
Enable threshold	Disable: <0.2 x Input voltage; active: >0.8 x Input voltage
Warning output	Low active: < 0.1 x Input voltage
Conversion efficiency	Up to 96% (see below)
Switch mode frequency	0.5 – 0.7 MHz
Temperature range	-40 to 85degC
Size	22 x 25mm (0.87 x 1 inch)
Weight	4g (0.14oz)

Efficiency

The conversion efficiency was measured with typical mobile application input voltages (2x NiMh cells = 2.4V; 1x Lithium cell = 3.6V) as well as the minimum input voltage (1.8V). No special tuned module was used. The results should be considered as nominal values.

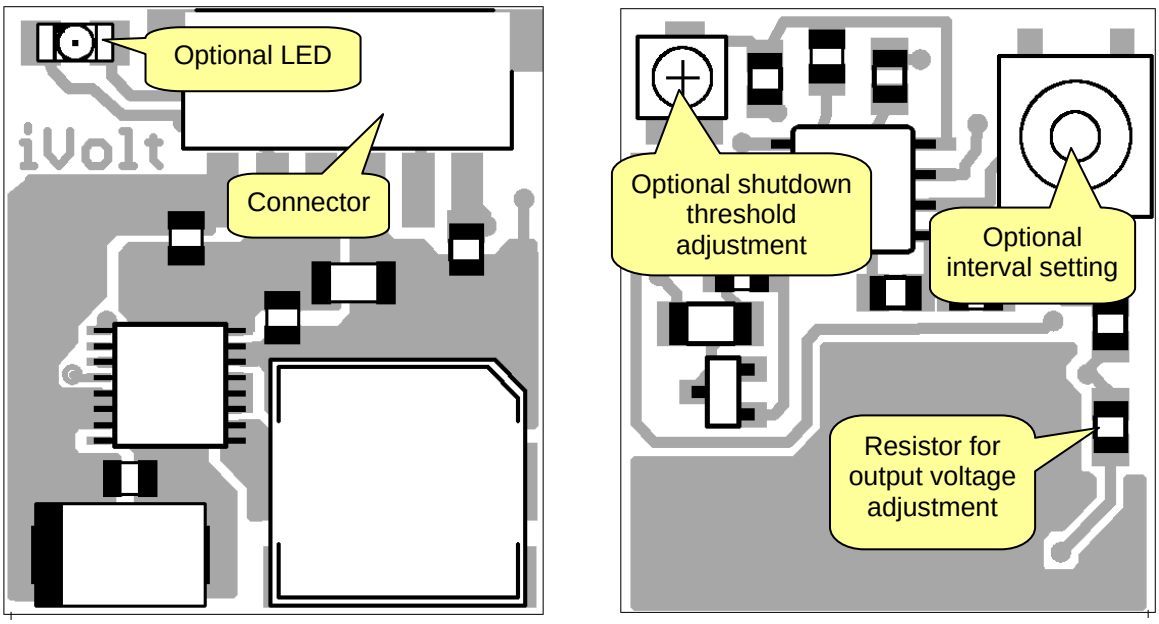


Input voltage and load current, output voltage 5V



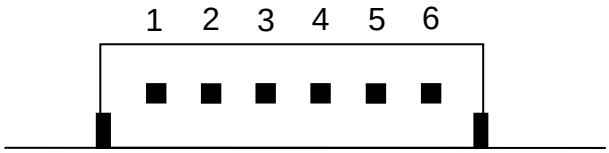
Input voltage and load current, output voltage 3.3V

Board Layout



Interface Connector Pin-Out

Connector front view:



Pin	Signal
1	Enable input (Module in slave mode) Enable output (Module in master mode)
2	Warning output (Module in master mode), active low
3	Input voltage
4	Ground
5	Ground
6	Output voltage

Output Voltage Adjustment

The output voltage is adjusted using resistor R1 on the board. Replacing this resistor with an other value will adjust the output voltage. Please keep in mind that the step-up converter can only supply output voltages higher than the input voltage.

The value of the resistor is determined with the following formula:

$$R1 = 180k \cdot \left(\frac{V_{output}}{0.5V} - 1 \right)$$

This look-up table will give you a quick result for typical output voltages:

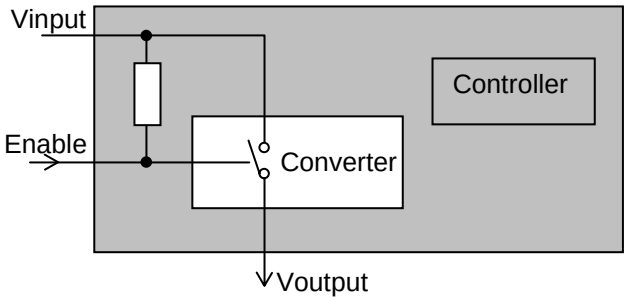
Output voltage	Resistor value
2.8V	825k
3.3V	1 MOhm
5V	1.62 MOhm

Enable/Shutdown

The module can be in master or slave mode. In slave mode the voltage converter can be disabled by an external source. In master mode the module can control other modules in slave mode.

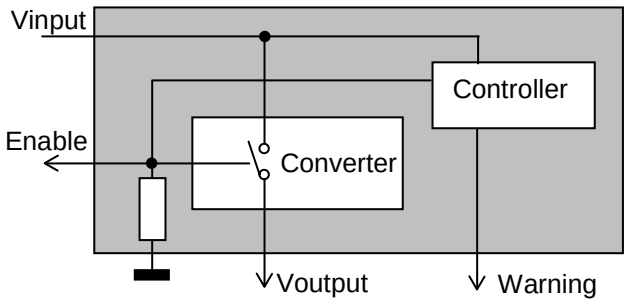
a) Slave Mode

Without an external connection, the Enable signal will be pulled high internally allowing the converter to work. If the Enable signal is pulled low externally, the converter stops working and goes into standby mode.



b) Master Mode

The Enable signal is controlled internally. If battery voltage is high enough the controller enables the converter as well as all slave modules. If the battery voltage is below an adjustable threshold the converter and all slave modules are switched off. If battery voltage reaches 20% above shutdown threshold the Warning output is driven low.



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