DimensionEngineering

LVBoost

General Description

LVBoost is a boost converter that can take voltages as low as 0.5V and convert them into higher, more useful voltages like 3.3V and 5V. It has an exceptionally low quiescent draw – typically under .4mA. These Features make LVBoost a great choice for powering projects from renewable energy sources.

From a 3V input, 500mA @ 5V out is easily achievable, allowing you to charge nearly any portable device that meets the USB spec.

The output voltage is set with a small screw potentiometer on the side of the LV Boost. The input and output wires are labeled.

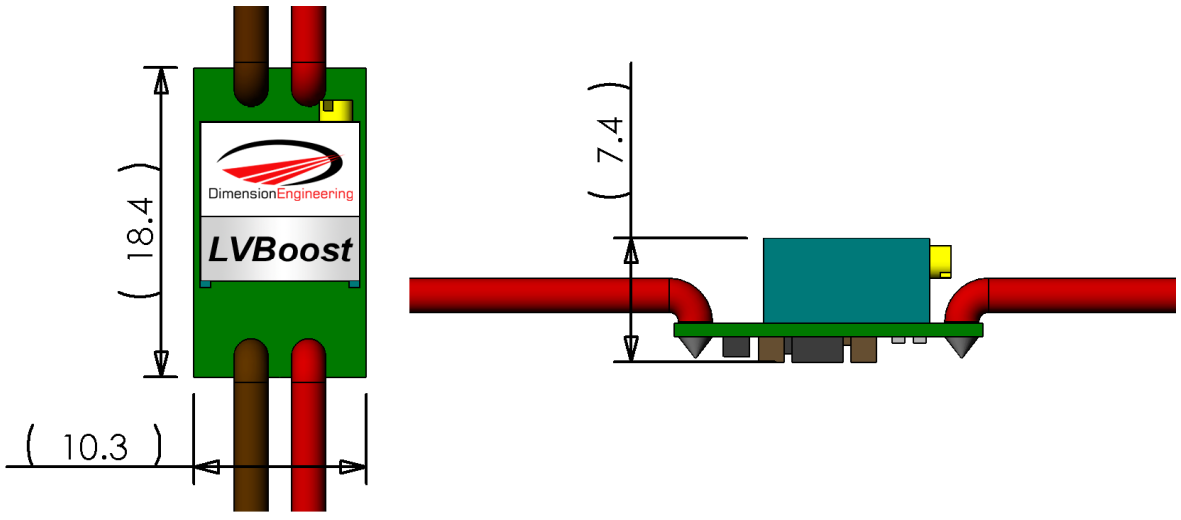
Features

2.2 to 5V output voltage range
.5V to 5V input voltage range
1.5A max input
20mV typical ripple
No external components needed
Weighs 3.5 grams
Thermal protection
Over current protection and short circuit protection

Applications

1 or 2 cell Alkaline/NiMH to USB chargers
Solar cell regulation
Thermoelectric generators
Small wind generators and other dynamos
Phone chargers

Mechanical Drawing	All dimensions are in mm



Characteristic	Min	Typical	Max
Input Voltage	0.5V		5V
Output Voltage	2.2V	3.3 (adjustable)	5V
Continuous Input Current		1A	1.5A
Continuous Output Current			1.5A
Output Ripple (Vp-p)		20mV	100mV
Quiescent current draw	.142mA	.357mA	1.310mA
Efficiency		85.6%	92%

Adjusting the output voltage
With the adjustment screw facing you, turning it counter-clockwise increases the voltage

Current handling capabilities
The amount of current LVBoost can deliver will depend on the input and output voltages. Since you are stepping up voltage, higher currents will be drawn on the input. You are essentially trading amps for volts. Below is a table of the absolute maximum current a LVBoost can supply while retaining accurate voltage regulation:

Input(v)	Max output current at 5V out(mA)	Max output current at 3.3V out (ma)
1.0	150	180
1.5	280	350
2.0	375	510
3.0	650	850
3.7	800	1100
4.0	900	1000

Example:
The output of the LVBoost in a certain project is 5V, and it is supplying a constant 300mA. What will the input current be if I am powering the LVBoost with a 1.5V supply?
“Power = Volts * Amps”
5V*0.3 = 1.5W
So the power output is 1.5W
“Output power / efficiency = Input power”
Looking at the efficiency curves of the LVBoost datasheet, efficiency is about 75% in this situation.
1.5 / 0.75 = 2W
So the power going into the LVBoost is 2W
“Power / Volts = Amps”
2W / 5V = 1.33A
So the current at the LVBoost’s input is around 0.1.33A. This is within limits for now, but if the input voltage supply were to drop significantly below 1.5V, the over current condition would be reached.

Over Current / Over Temperature behavior
If the current limit has been considerably exceeded, or if the device is over heated to beyond 85ºC the LVBoost will gradually reduce the output voltage in an attempt to reduce the load on the device. Once the extra load is removed or the temperature is brought down, the desired output voltage will be restored. It is unlikely that you will destroy an

LVBoost by exceeding the current/temperature ratings but we still recommend practicing good engineering techniques and do not overload the device beyond the recommended operating parameters.

Additional notes
LVBoost uses a 22 turn worm gear driven potentiometer and cannot wiggle loose. Do not apply glue to the voltage adjustment pot.

LVBoost should be mounted at least 2 inches away from any circuitry that is sensitive to RF.

For best performance, mount LVBoost in an open space with some air flowing across it to keep it cool.

Efficiency Curves