DimensionEngineering

AnyVolt3

General Description

The AnyVolt3 is a miniature step up / step down switching DC-DC converter. The output is adjustable from 3 to 24V.

The output voltage is set with a small screw potentiometer on the side of the AnyVolt3. Once the output voltage is set, it does not matter whether the input voltage is higher, lower, or the same as the desired output.

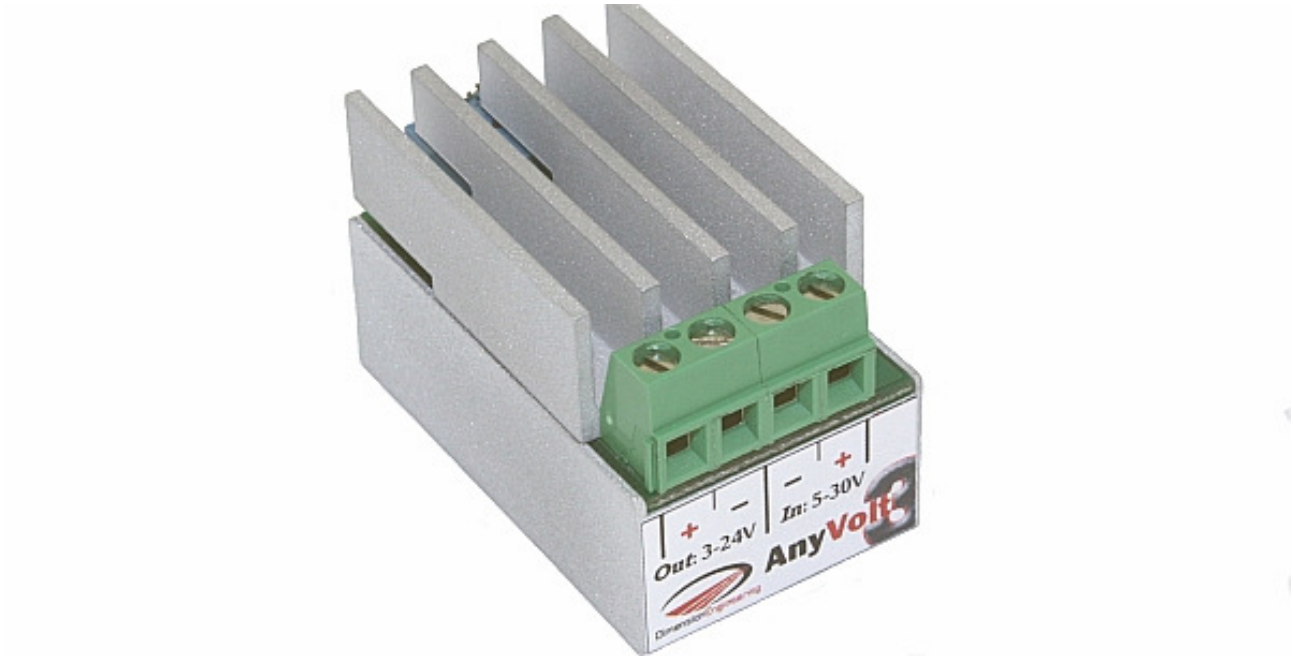
The AnyVolt3 uses four screw terminals and requires jumpers or stripped wires to operate.

Features

3V to 24V output voltage range
5V to 30V input voltage range
3A max input or output current
<50mV typical ripple
No external components needed
1.85” x 1.05” x 1.15” (46mm x 27mm x 29mm)
Weighs 46 grams
Overcurrent protection
Thermal protection

Applications

Lab work and prototyping
Powering audio amplifiers
Driving multiple LEDs in series
Backlit LCD drive
Solar powered applications
Remote video transmitters
Battery powered applications
Renewable energy source applications



Characteristic	Min	Typical	Max
Input Voltage	5V	5V to 30V	30V
Output Voltage	3V	3V to 24V	24V[1]
Continuous Input Current			3A
Continuous Output Current			3A
Output Ripple (Vp-p)		50mV	
Quiescent current draw		15mA	
Efficiency – Step-down	77%	87%	96%
Efficiency – Step-up	82%	85%	89%
Efficiency – Buffering	62%	84%	88%
Recommended ambient temperature range	-20ºC	25ºC	55ºC[2]

[1]Max output varies with manufacturing processes.
[2]Ambient temperatures higher than room temperature will decrease the amount of current AnyVolt3 can handle. For optimal performance, mount AnyVolt3 in an open space with air flowing across it.

Adjusting the output voltage
With the adjustment screw facing you, turning it clockwise increases the voltage, similar to the volume control on a stereo system.

Current limits
Input and output current to/from the AnyVolt3 should be kept track of with a multimeter if you anticipate driving heavy loads.

Stepping up from a lower to a higher voltage means that there will be a higher current on the input than the output. For this reason, **ensure that both the input and output current limits of 3A aren't being exceeded.** If for some reason you cannot use a multimeter to monitor input current, you can implicitly derive the input current using the input voltage, output voltage, and output current.

Example:
The output of the AnyVolt3 in a certain project is 12V, and it is supplying a constant .99A. What will the input current be if I am powering the AnyVolt3 with a 5V supply?
“Power = Volts * Amps”
12V*.99A = 11.88W
So the power output is 11.88W.
“Output power / efficiency = Input power”
Looking at the efficiency curves of the AnyVolt3 datasheet, efficiency is 79.75% in this situation.
11.88W / 0.7975 = 14.90W
So the power going into the AnyVolt3 is 14.90W
“Power / Volts = Amps”
14.9W / 5V = 2.98A
So the current at the AnyVolt3’s input is around 2.98A. This is within limits for now, but if the input voltage supply were to drop below 5V, the overcurrent condition would be reached.

Here is a table of max loads you can power with an AnyVolt3, depending on your input voltage.

5V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	1.75	1.27	.99	.81	.68	.59	.52

7V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	2.78	1.81	1.41	1.16	.98	.85	.75

9V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	2.11	1.83	1.52	1.28	1.11	.99

12V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	2.22	1.85	1.68	1.5	1.32

15V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	3	2.16	1.93	1.74	1.6

18V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	3	3	2.03	1.84	1.7

21V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	3	3	2.5	1.95	1.79

24V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	3	3	3	2.4	1.9

27V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	3	3	3	3	2.18

30V in

Output Voltage (V)	3	6	9	12	15	18	21	24
Max current out (A)	3	3	3	3	3	3	3	3

Overcurrent/overtemperature behavior

If the current limit has been considerably exceeded, or if the device is overheated to beyond 120ºC the AnyVolt3 will cut output current entirely. We strongly recommend practicing good engineering techniques and not overloading the device beyond operating parameters.

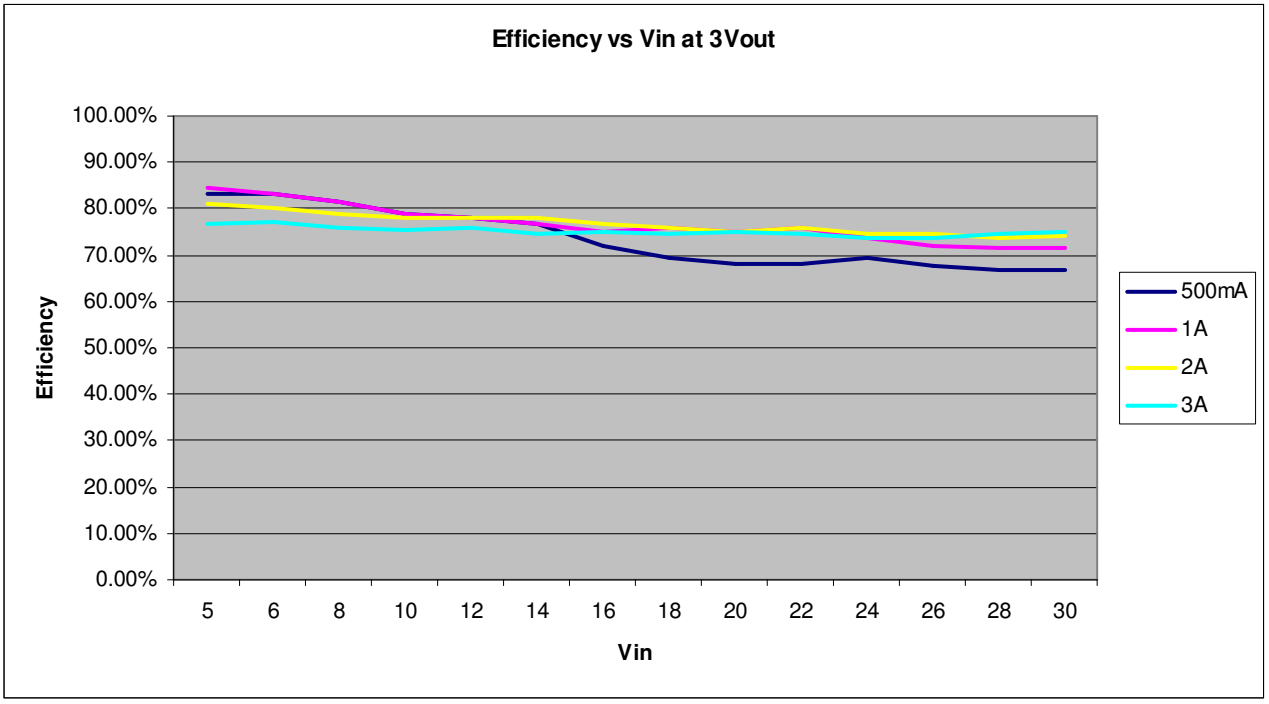
Additional notes

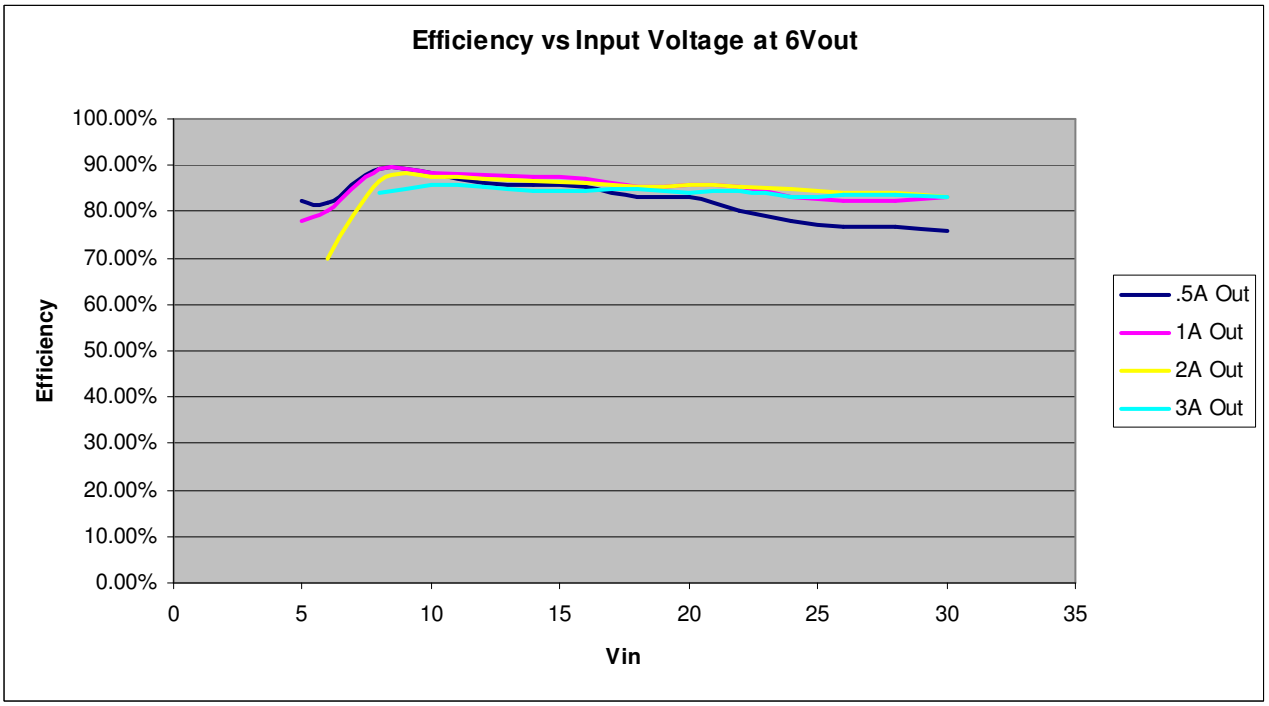
AnyVolt3 uses a 25 turn worm gear driven potentiometer and cannot wiggle loose. Do not apply glue to the voltage adjustment pot.

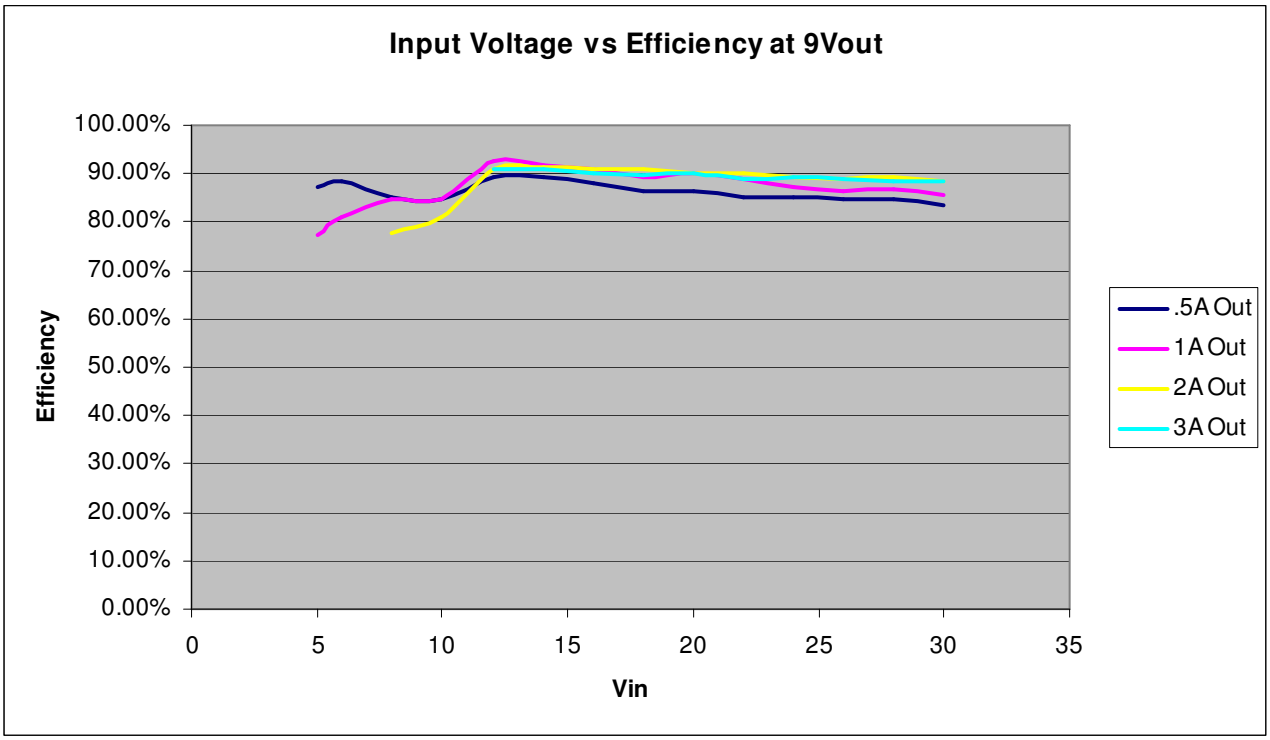
AnyVolt3 should be mounted at least 2 inches away from any circuitry that is sensitive to RF.

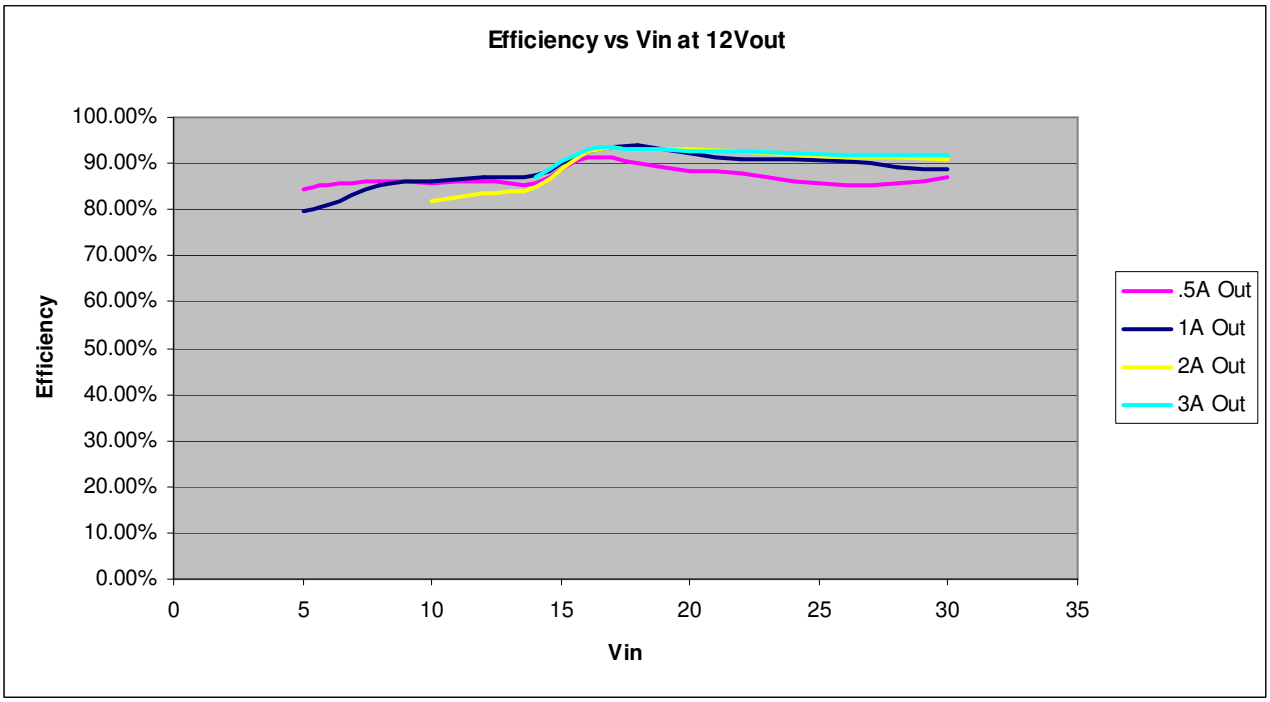
For best performance, mount AnyVolt3 in an open space with some air flowing across it to keep it cool.

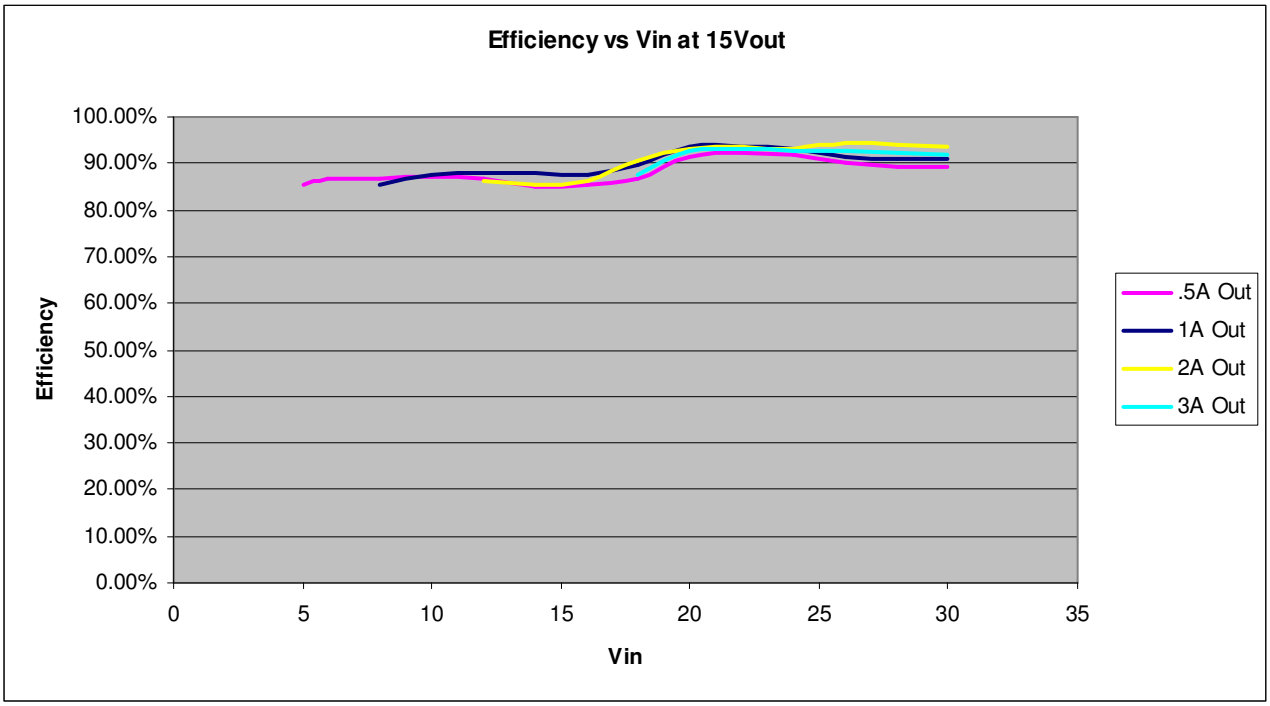
Efficiency Curves

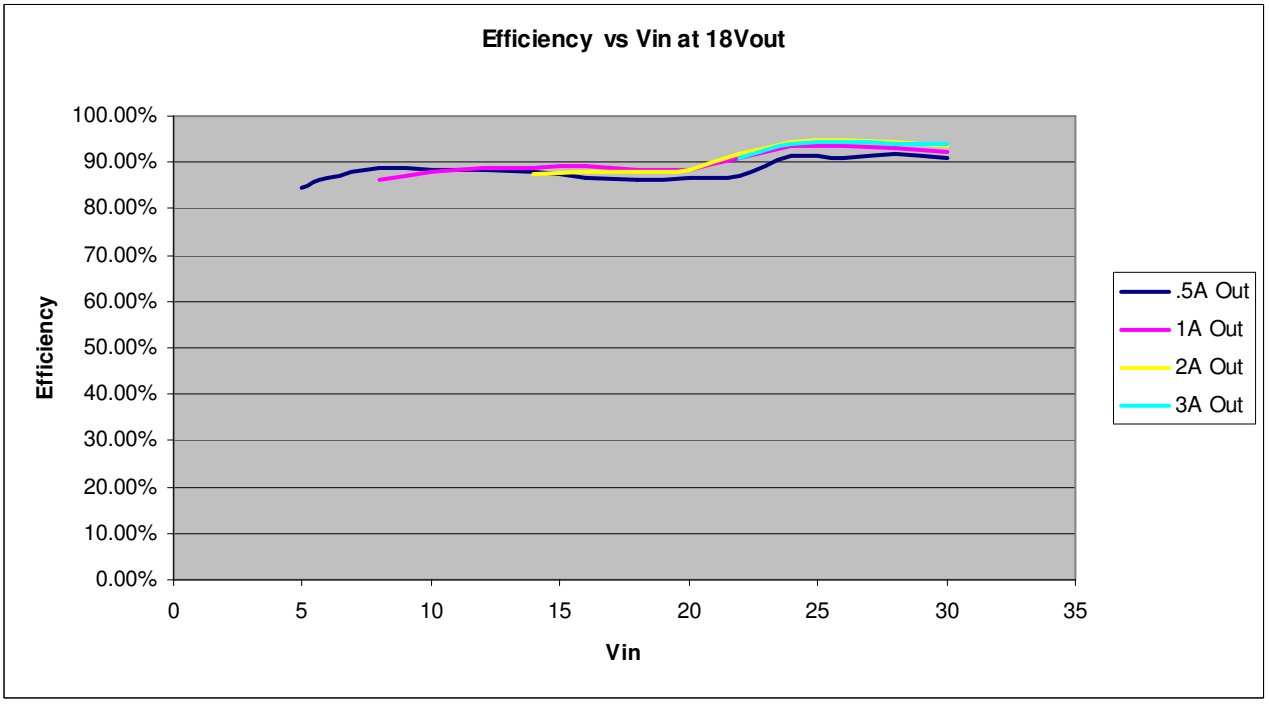


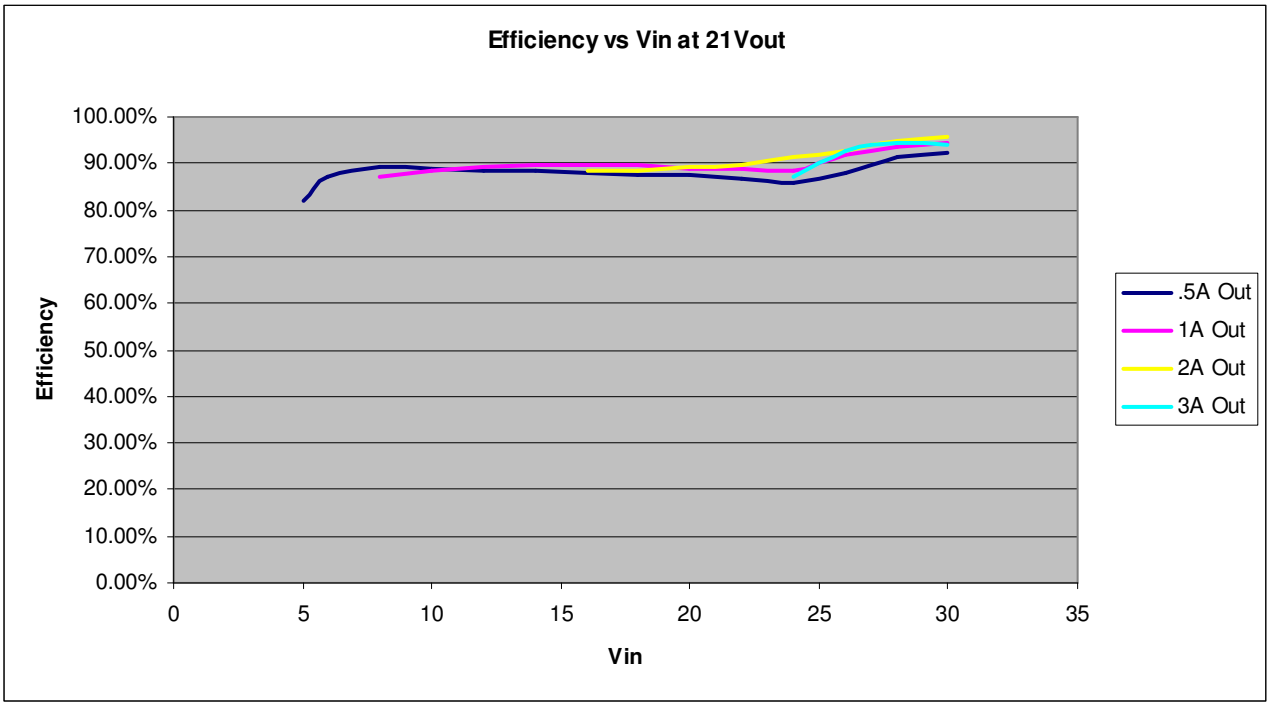


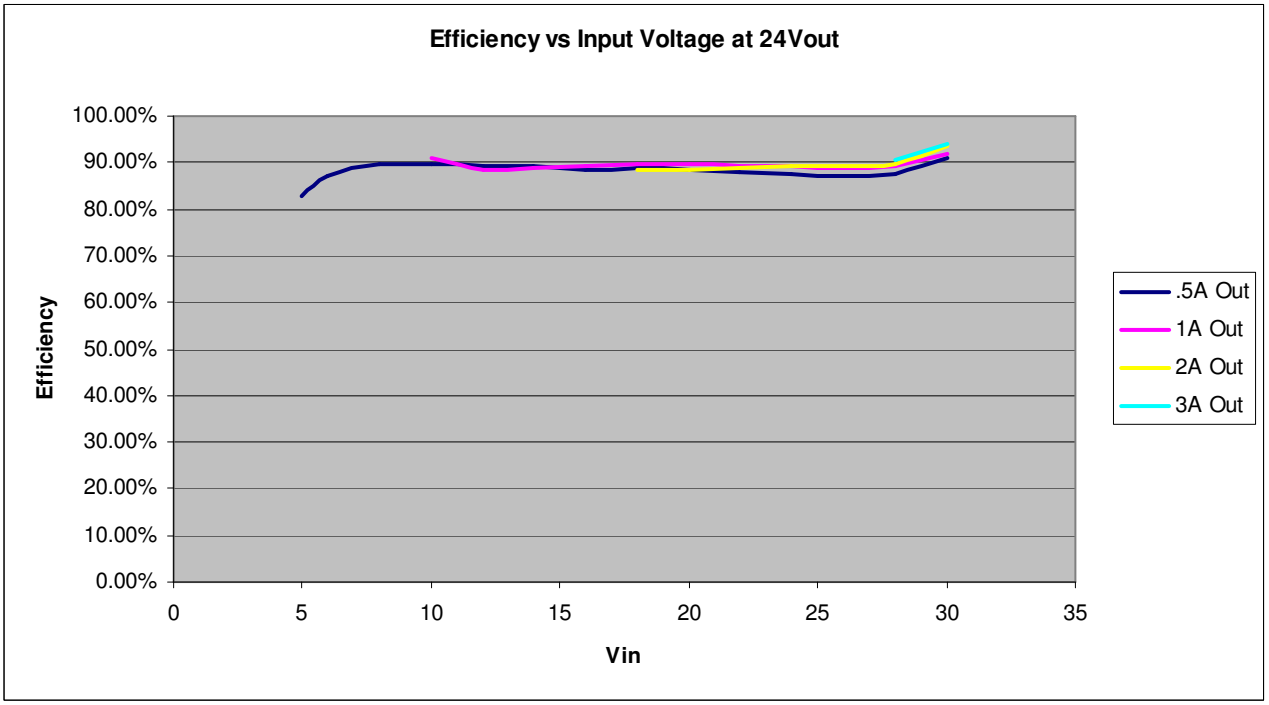

Input Voltage vs Efficiency at 9Vout
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Efficiency
0
5
10
15
20
25
30
35
Vin
.5A Out
1A Out
2A Out
3A Out


Efficiency vs Vin at 12Vout
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Efficiency
0
5
10
15
20
25
30
35
Vin
.5A Out
1A Out
2A Out
3A Out


Efficiency vs Vin at 15Vout
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Efficiency
0
5
10
15
20
25
30
35
Vin
.5A Out
1A Out
2A Out
3A Out


Efficiency vs Vin at 18Vout
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Efficiency
0
5
10
15
20
25
30
35
Vin
.5A Out
1A Out
2A Out
3A Out


Efficiency vs Vin at 21Vout
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Efficiency
0
5
10
15
20
25
30
35
Vin
.5A Out
1A Out
2A Out
3A Out


Efficiency vs Input Voltage at 24Vout
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
Efficiency
0
5
10
15
20
25
30
35
Vin
.5A Out
1A Out
2A Out
3A Out