

General Description

The DE-SWADJ is designed to be the easiest possible way to utilize the benefits of switch-mode power when you need an unusual or easily changed voltage. The DE-SWADJ family is pin-compatible with the common 78XX family of linear voltage regulators, and can step down to 1.25v to 13v with no external circuitry required. It has integrated decoupling capacitors, so external capacitors are not generally necessary.

The DE-SWADJ operates over a wide input voltage range, from 3v to 30v, at up to one amp of continuous output current. Maximum power output is 10W. Efficiencies are up to 92% (Figure 2). Ripple is less than 2% of output.

The DE-SWADJ works on a breadboard, making it an ideal solution for prototyping and one-off circuits.

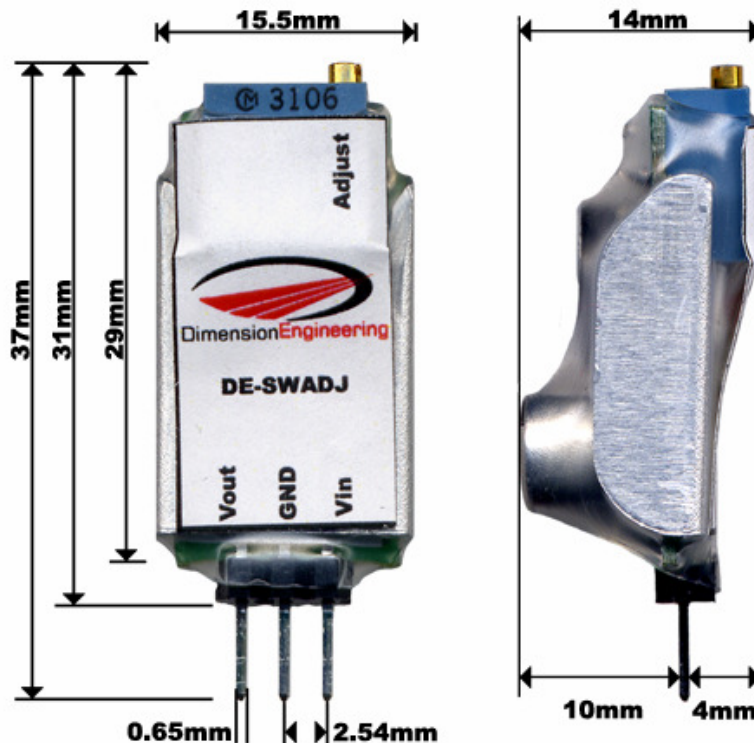
Features

- Drop-in replacement for any of the LM78XX regulators
- Outputs any voltage between 1.25v and 13v
- Adjustment is by a 25-turn potentiometer, making it easy to dial in exactly the right output
- 3 to 30V input voltage
- Up to 10W output power
- 1A continuous output current²
- Efficiency up to 92%
- Integrated bypass capacitors
- Integrated heat sink
- Weighs only 5.5g

Applications

- Battery powered applications
- Robots
- Battery charging and maintenance
- Point of load voltage regulation
- Any application needing a nonstandard voltage
- Overclocking and over or under-volting standard products for more performance or less power draw

Figure 1



Typical Performance Characteristics

The device can be expected to perform as characterized within these parameters

Characteristic	Min	Typical	Max
Input voltage ¹	3V		30V
Output Voltage, Min		1.25v	
Output Voltage, Max	13v	14v	14.5v
Output Power			10W
Output Current (RMS) ²	0A		1A
Pulsed Output Current (5 sec)			1.5A
Output Ripple	30mV	70mV	100mV
Efficiency (See Figure 2)	55%		92%
Transient response in load regulation (0-1A pulses, 1ms, Vp-p)		4%	
Power dissipation	100mW	800mW	1.2W
Power output in still air	0W		10W
Switching frequency	230kHz	270kHz	290kHz

¹ The sum of input and output voltages must not exceed 40v

² Limited at high voltages by the max power output – see graph below

² For input voltages above 25V, an output current of at least 40mA is needed to maintain the regulated output voltage. This can be accomplished by adding a 1k Ω load resistor, or by simply connecting the load you wanted to use anyway.

Absolute Maximum ratings

Operation beyond these parameters may permanently damage the device

Characteristic	Min	Max
Input voltage	0V	35v
Output Current	0A	1.5A
Power dissipation		1.5W
Ambient Temperature	-20C	70C

Overcurrent/overtemperature behavior

If the current limit has been considerably exceeded or if the device is overheated the product 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 the regulator 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

DE-SWADJ uses a 25 turn worm gear driven potentiometer and cannot wiggle loose. Do not apply glue to the voltage adjustment pot. Turning the pot clockwise reduces the output voltage.

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

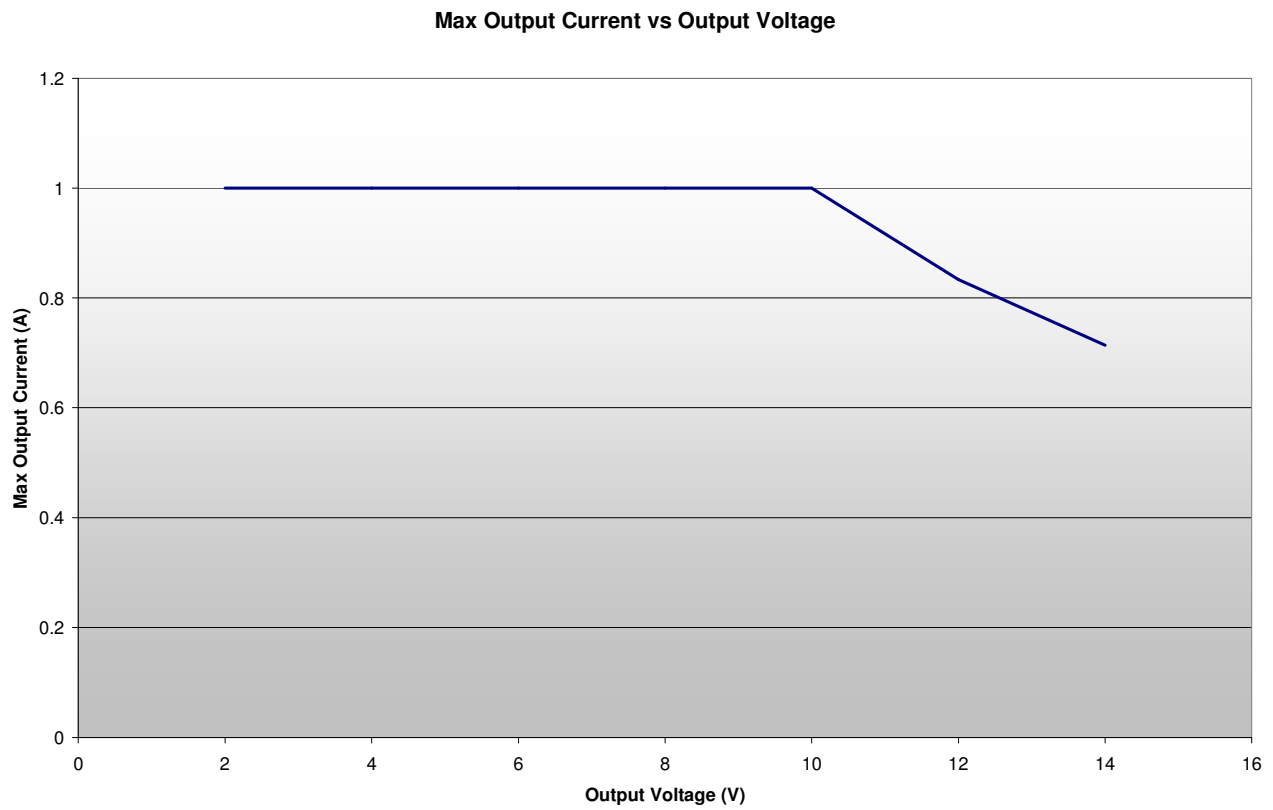
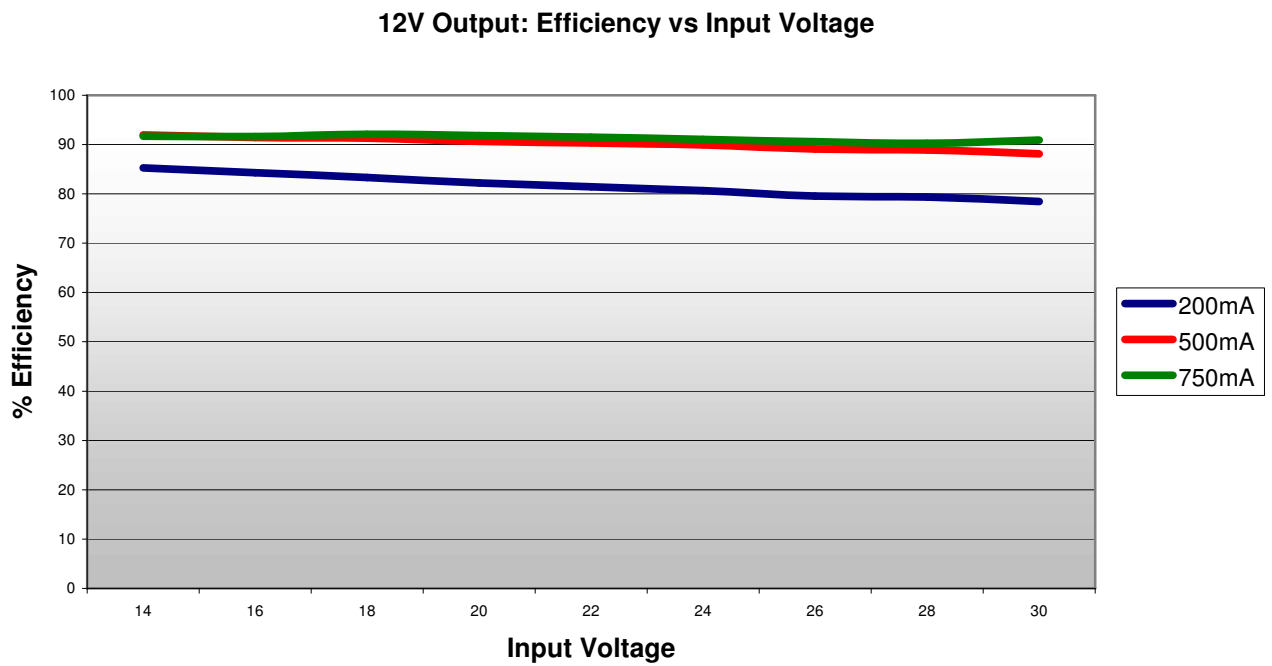
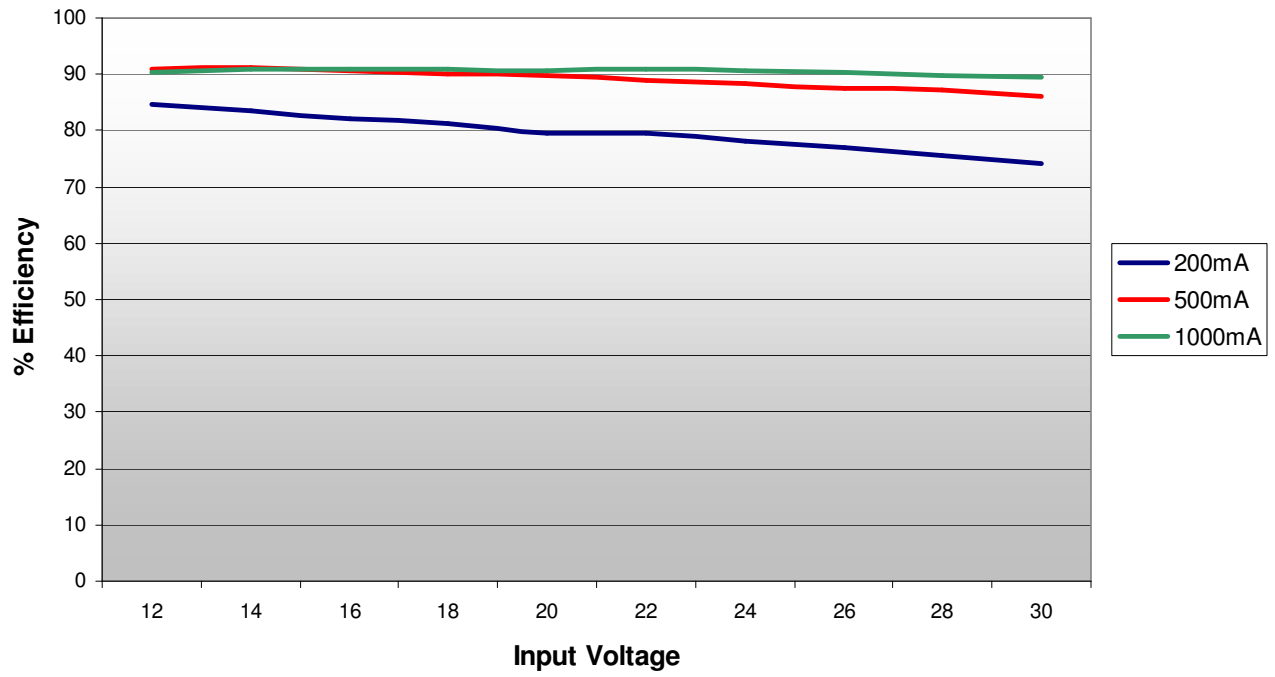


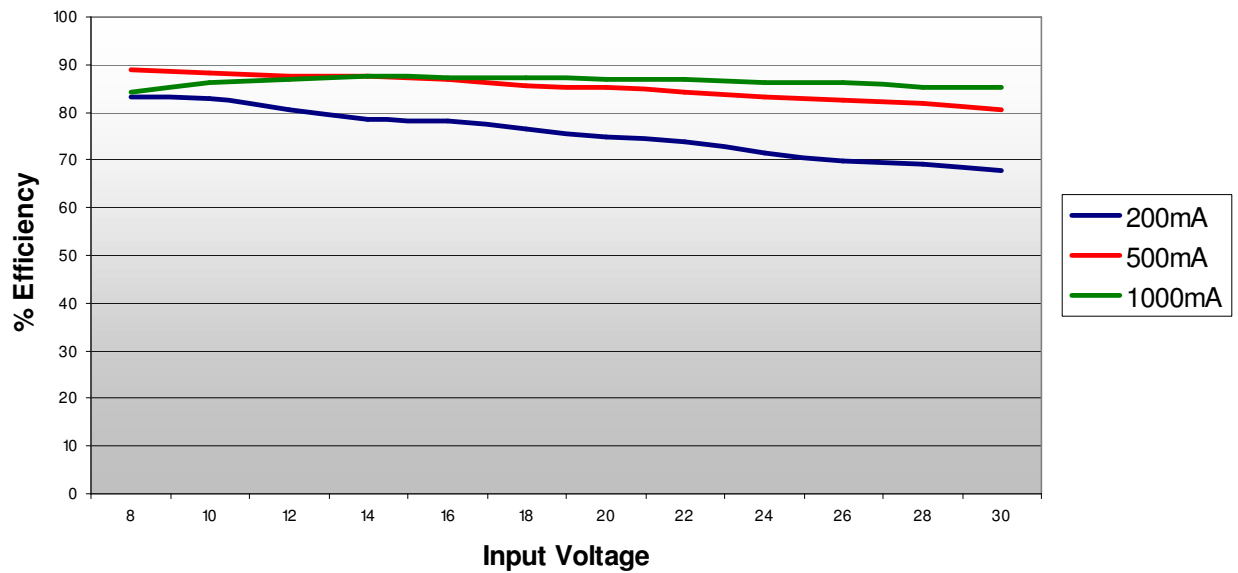
Figure 2: Efficiency vs. Input Voltage



9V Output: Efficiency vs Input Voltage



6V Output: Efficiency vs Input Voltage



3V Output: Efficiency vs Input Voltage

