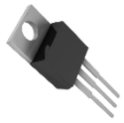
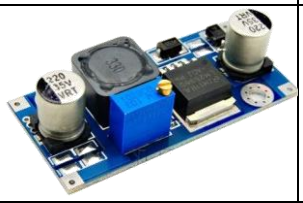
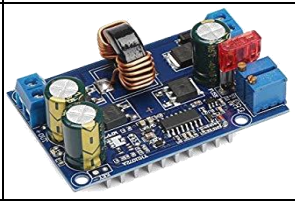
Voltage Conversion/Regulation

Quick Comparison:

Type	Picture	Advantages	Disadvantages
Linear Regulator		• Low cost • Low noise • Small packaging	• Can only step down voltage. • Low efficiency (burns off excess voltage) • High heat generation • Cannot be used in most power circuits
Buck Converter		• Vout can be much lower than Vin • High efficiency	• Can only step down voltages • More complicated • Higher cost • Large size
Boost Converter		• Can have higher output than input • Decent efficiency	• Can only step up voltages • More complicated • Higher cost • Large size
Buck-Boost Converter (Inverter)		• Can have higher or lower output • Decent efficiency	• Can step voltage up or down • More complicated • Higher cost • Large size

The Project Support Center stocks the following linear regulators and Buck converters:

LM1084/LM1117 Linear regulators:
Vmax Input: 25V
Output Voltage: 3.3 or 5V
Max Power Dissipation: 2W
Linear regulators are the least expensive and most compact form of regulator. They act like a resistor that "burns off" excess voltage as heat to produce the desired output voltage. The amount of energy lost (W) is given by (Vin – Vout)*(Current). These regulators cannot exceed 3 watts without overheating. For example, this means that with 12V input, the max current draw is about 200mA (3.3V regulator) or 250mA (5V regulator). Before you decide to use a linear regulator, make sure you will not be dissipating too much power by drawing too much current for the input voltage. It is strongly recommended that you do not exceed the specifications above.

LM2596 Buck Converter:
Input Voltage Range: 3.2V – 35V
Output Voltage Range: 1.25V – 30V (Output voltage must be 1.5V lower than input voltage)
Max Current Draw: 3A
Buck converters are a lot more versatile than linear regulators. They rapidly switch the supply voltage on and off, then use a capacitor to smooth the signal, much like using PWM. They are slightly more expensive but can more easily handle various power requirements. Use these when you are unable to use a linear regulator.