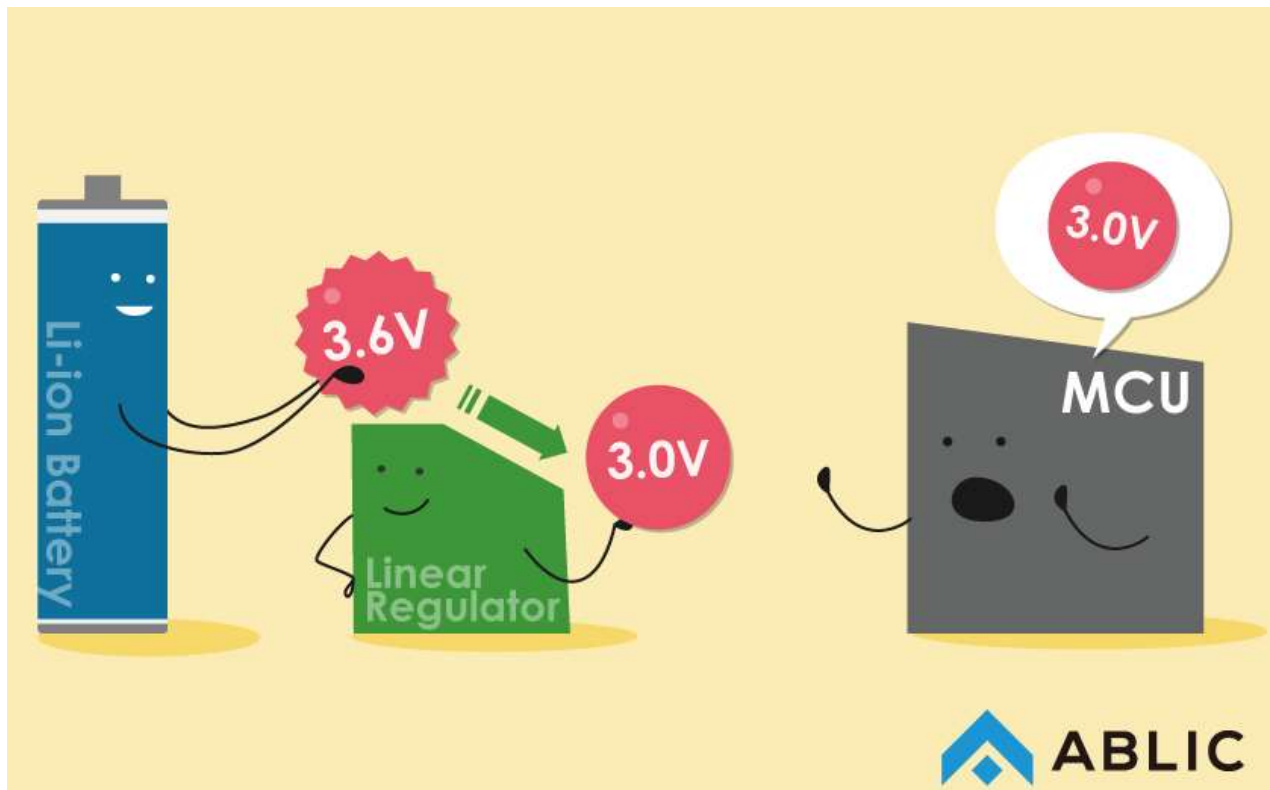


ABLIC is an evolving analog semiconductor manufacturer.

Power Management ICs

Introduction – What is a LDO? What is a linear regulator?



What is an LDO (low dropout voltage regulator)?

1. Basic role of a linear regulator
2. Linear regulator features
3. Cases that require use of a linear regulator

Operating principle and configuration of a linear regulator

1. Linear regulator operating principle
2. Internal configuration of a linear regulator

- **What is an LDO (low dropout voltage regulator)?**

An LDO regulator is a linear regulator that can operate at a very low potential difference between the input and output voltage.

A linear regulator is a type of power supply IC that can output a steady voltage from an input voltage and is used in a variety of electronic devices. **Since an LDO regulator can operate at a low potential difference between the input and output voltage, use of an LDO regulator will help control heat build-up and enable efficient use of energy.**

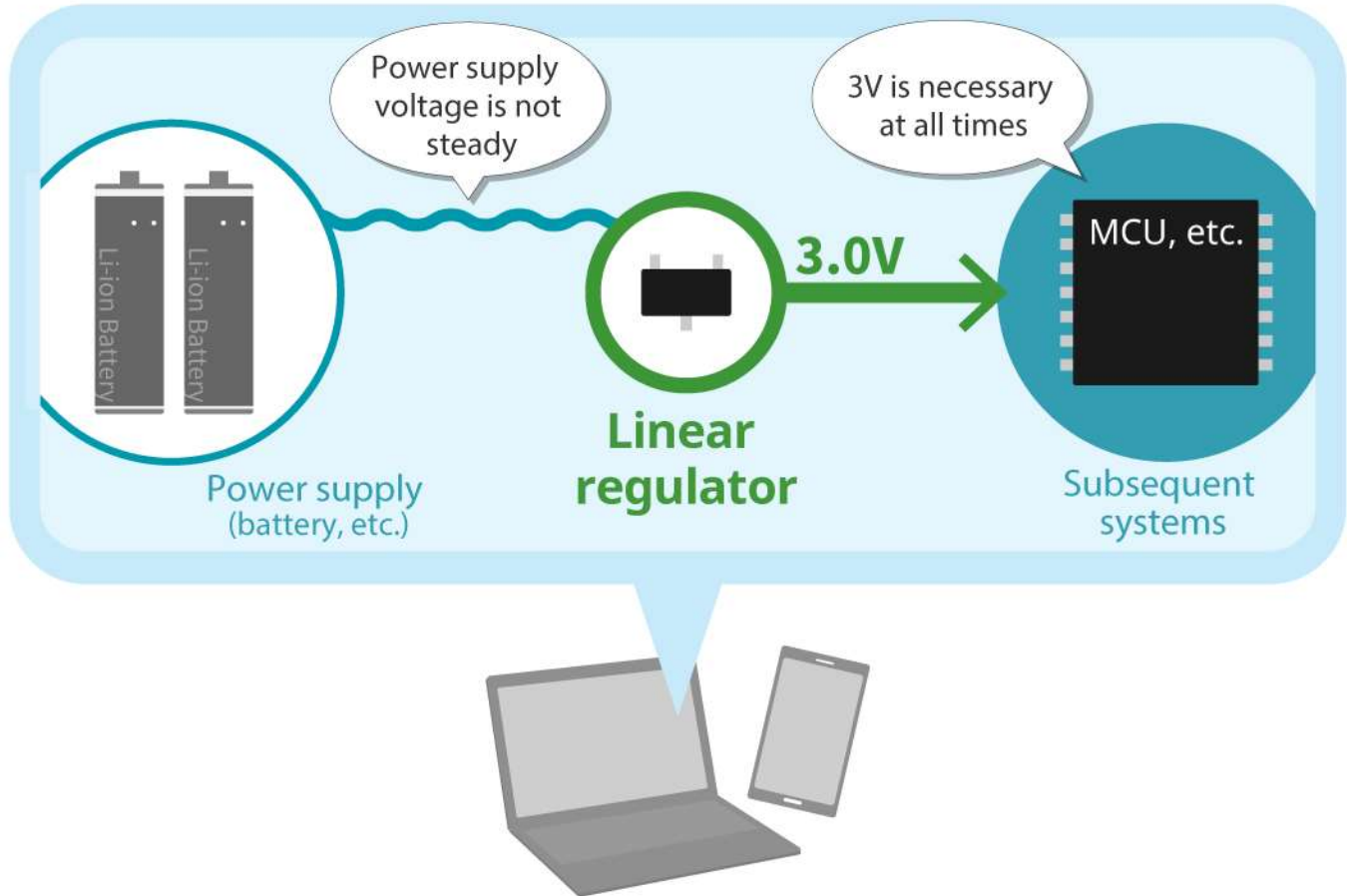
The following offers a straightforward description of the basic role and features of a linear regulator and how it is used.

Linear regulator Selection table

1. Basic role of a linear regulator

In electronic devices, a linear regulator creates the necessary voltage for subsequent systems mainly from the power supplied by the battery. A linear regulator can output a lower steady voltage from the input voltage.

- **Graphic representation of the roles of a linear regulator in electronic devices**



*Microcontroller(MCU)...A processor for controlling electronic devices. A microcontroller operates according to input signals as the brain of electronic devices.

✓ **Linear regulator long sellers**

16V input, ultra-low power
consumption

Series name

S-812C
(75mA)

For more details ▼

6.5V input, ultra-low power
consumption

Series name

S-1206
(250mA)

For more details ▼

50V high-voltage input

Series name

S-1142C/D
(200mA)

For more details ▼

2. Linear regulator features

An understanding of linear regulator features is indispensable to its correct use. Its representative features are described below.

Capable of outputting a steady voltage (= low-noise voltage)

A linear regulator can output the required steady voltage without being impacted by changes* in the input voltage. The low-noise output voltage of a linear regulator makes it ideally suited to supplying voltage to sensor modules or other devices susceptible to noise.

(*Changes that are within the operation voltage range of a linear regulator)

Needs few external components

ICs generally need external components (such as resistors or capacitors).

A linear regulator needs at most two external components: an input capacitor and an output capacitor. The small number of required external components simplifies the design of external components and the power supply circuit to enable a simple power supply circuit configuration.

When the potential difference between input and output voltage is large, heat build-up also increases

When the difference between input and output voltage (potential difference between input and output voltage) is large, heat build-up becomes a problem.

→ [For a detailed description, refer to “What is heat loss?”](#)

For that reason, a linear regulator is best suited to low-power applications.

3. Cases that require use of a linear regulator

So when should a linear regulator be used? The following are representative cases.

- When the operation voltage of subsequent systems is low

A linear regulator is able to provide subsequent systems with an ideal voltage when its power supply voltage is higher than the operation voltage of subsequent systems.

- When a steady power supply is required

MCUs, sensors and other components generally require a steady voltage for normal operation and this is where the linear regulator comes in.

It is not unusual for external factors or for a single component in an electronic device to cause fluctuations in the voltage or generate noise. These are the factors that prevent normal operation of MCUs, sensors or other components, and which could cause them to fail in the worst case scenario.

The use of a linear regulator at the front-end of components that need a steady voltage or are susceptible to noise will enable constant and safe operation at a steady voltage.

✓ 3 series of representative LDO regulators

Noise countermeasures
through high ripple
rejection

Series name

S-1335
(150mA)

For more details ▼

Available in a square
ultra small 0.8mm
package

Series name

S-1313
(200mA)

For more details ▼

36V high-input voltage
and a small high-heat
dissipating package

Series name

S-1212
(250mA)

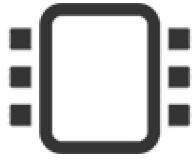
For more details ▼

> [Operating principle and configuration of a linear regulator](#)

> [Introduction of ABLIC Linear Regulator](#)

- > [Operating principle and configuration of a linear regulator](#)
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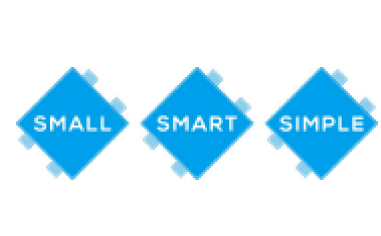
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