

# Power Management ICs



## Introduction

Today's electronic devices make life better for families and society. In particular, the advent of smart devices with network connectivity holds great promise for making lives more efficient and more comfortable.

But these devices have a downside in terms of their environmental impact. Generally speaking, more devices consume more power and, in many cases, the more features a device has, the less energy efficient it is.

Fortunately, improvements in power management make it possible to have full-featured devices that are energy efficient and eco-friendly.

Fujitsu is a leader in environmentally-friendly power management technology through its lineup of Power Management ICs (PMICs), including DC/DC converters, charger ICs, and power monitoring and reset ICs. These highly efficient devices feature low power consumption, compact design, reduced external components, and effective control techniques for fast transient response and lower output voltage.

Fujitsu also offers evaluation boards and a web-based simulation tool, Easy DesignSim™, to simplify power management design and reduce development time.

In short, Fujitsu's diversified PMIC lineup meets customer requirements for a broad range of applications.



## Power Management ICs Line-Up

### DC/DC Converters

Fujitsu DC/DC converters provide an eco-friendly technology for many digital appliances ranging from PCs, cellular phones and other mobile terminals to digital TVs, digital cameras and DVCs.

For these converters, Fujitsu has focused on developing the switching regulators to achieve highly efficient, fast transient response and low power consumption.

The Fujitsu DC/DC converters combine state-of-the-art semiconductor design and production technology, system technology and application technology. Fujitsu offers one-channel through multi-channels DC/DC converters with high performance, advanced functions and user friendliness.

### Features

- High efficiency
- Fast transient response
- Low power consumption
- Varied product lineup
- One channel to multi-channels

### Battery-Charger ICs

With the proliferation of mobile devices, users are demanding higher performance, greater efficiency, reduced power consumption and longer battery life.

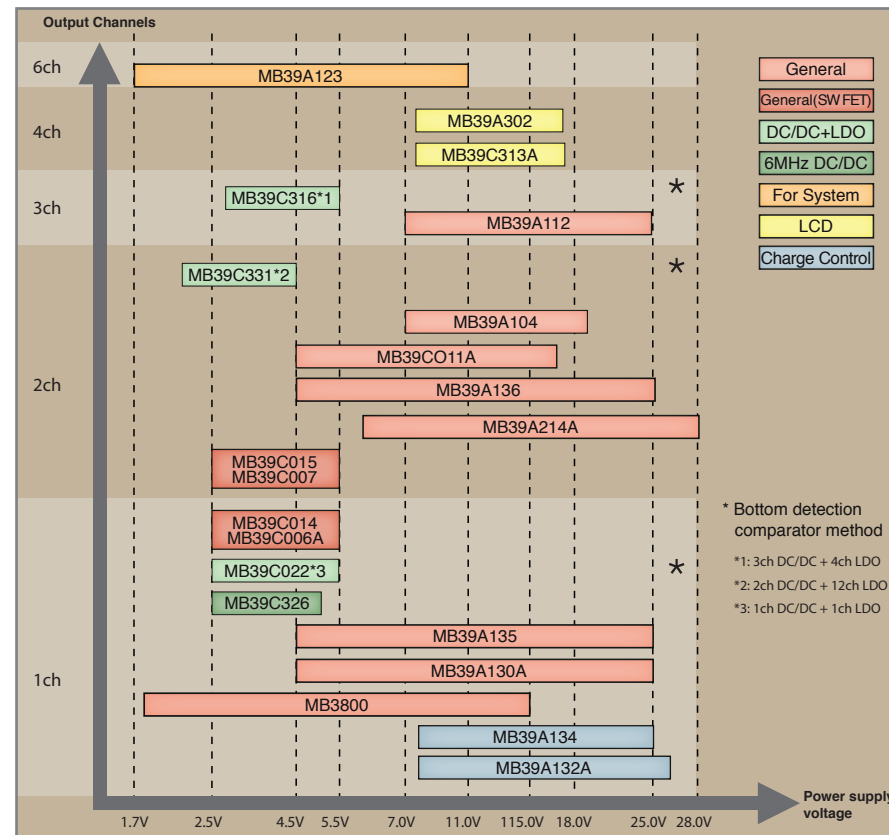
Fujitsu meets these needs with its battery-charger ICs. The devices use a synchronous-rectification topology adopting Pulse Width Modification (PWM) to charge Li-ion batteries, which are used in devices such as notebook PCs. Fujitsu charger ICs safely and efficiently charge the battery by separately controlling the charge voltage and current, and by using the synchronous-rectification DC/DC converter topology.

An AC adapter-detection comparator, which is independent of the DC/DC converter control block, can control the source supplying the voltage to the system. The battery-charger IC supports a wide input voltage range, enables low current consumption in standby mode, and can precisely control the charge voltage and current, making the device perfect for the built-in Li-ion battery charger.

### Features

- Safe and efficient battery charging
- High charge voltage precision
- Support for 2-/3-/4-cell battery pack
- Various protect functions
- Built-in AC adapter detection function
- Low power consumption

### DC/DC Converter and Battery-Charger ICs line-up



### Power Monitoring and Reset ICs

Fujitsu's power-monitoring IC monitors the voltage level of one or two power supplies (+5V and an optional voltage) in a microprocessor or memory chip.

If the circuit's power supply deviates more than a specified amount, the IC generates a reset signal to the microprocessor, protecting data from accidental erasure. Using this IC in a microcontroller system can provide it with a fail-safe function.

Function Classification	MB3773	MB3771	MB3790	MB3793
Power monitoring	✓	✓	✓	✓
Power-On reset	✓	✓	✓	✓
Watchdog timer	✓	-	-	✓
Battery backup	-	-	✓	-

### Features

- Precision voltage detection
- Monitors the voltage of one or two power supplies
- Minimal number of external components
- Low power dissipation
- Watchdog timer (according to products)

### New Featured Product

#### 6MHz buck-boost DC/DC converter: MB39C326

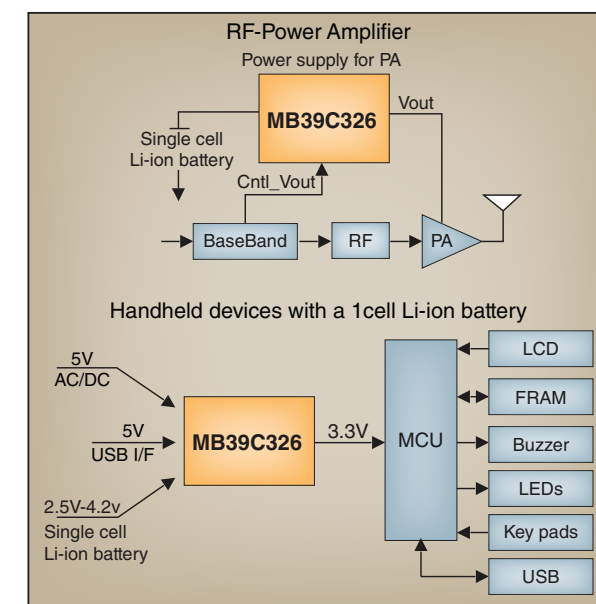
The highly efficient MB39C326 6MHz Synchronous Buck Boost DC/DC converter is designed to power mobile devices that use a single-cell Li-ion battery and radio frequency power amplifiers (RFPAs). The DC/DC converter switches at a higher frequency (6MHz) than conventional converters on the market. The higher switching frequency is more efficient and permits the use of a smaller inductor, reducing the overall board space of the power management circuits by as much as half.

The buck-boost functionality of the Fujitsu MB39C326 helps prolong battery life and efficiency. By switching automatically between a buck operation (stepping down the voltage) when the battery is fully charged and a boost operation (stepping up the voltage) as the battery is discharged, the MB39C326

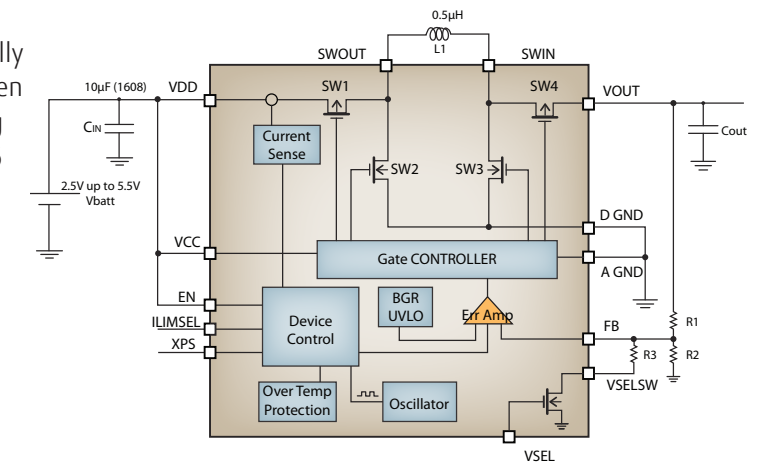
maximizes the overall operating voltage from the lithium battery while providing a stable power supply to the power amplifier. The result is a more consistent voltage level and a device that can operate longer on a single charge.

### Applications

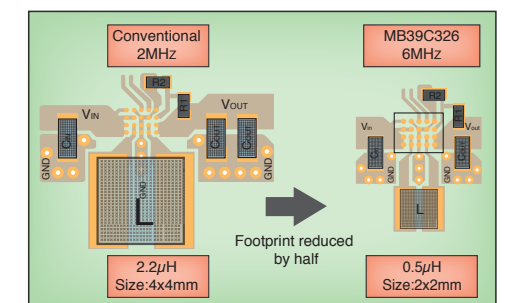
- Mobile phones, PDAs and handheld devices
- Radio frequency power amplifiers powered by a single-cell Li-ion battery
- PC cards and USB dongles with RF transceivers
- Medical handheld devices



MB39C326 Application Examples



MB39C326 Block Diagram



MB39C326 Design Benefit

Try **Easy DesignSim** now at  
<http://us.fujitsu.com/semi/easydesignsim>  
**PMIC Design Simulation Tool**



**Select Product**

Select the target devices for your design



**Set Parameters**

Set the input/output voltage, load current, etc.



**Create Schematic Selection**

Calculate the peripheral components and make a schematic based on the set parameters



**Simulate Characteristics**

Simulate and analyze the AC or DC characteristics



**Create Bill of Materials**

Create the BOM, and save your design

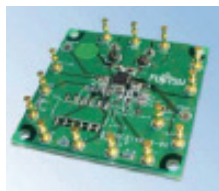
## Design Tool

### Description

The Fujitsu Easy DesignSim™ is a comprehensive online design simulation and support solution for design engineers working with Fujitsu's extensive line of power management ICs. The tool simplifies the process of designing circuit diagrams for power supplies. It automatically calculates key power parameters and simulates the operation of the power supply online.

### Evaluation Boards

Fujitsu Semiconductor provides evaluation boards for users to evaluate the company's semiconductor devices.



### Features

- Free design simulator
- Makes it easy to build a power design for DC/DC controllers and converters
- Can automatically select and edit the peripheral components
- Can simulate the various characteristics of power rails
- Provides Bill of Material from the database of electronics vendors
- Design can be saved to your computer

