POWER MANAGEMENT APPLICATIONS
Cypress leverages its state-of-the-art semiconductor design, production, system and application technology to develop high-performance power management ICs (PMIC) with advanced and ease-of-use functions. These PMICs are integral for a variety of digital appliances, including notebook PCs, smartphones and other mobile terminals, digital TVs and digital cameras.

IC LINEUP OF PMICS AND DRIVERS
Cypress’s power management ICs cover a vast range of specifications, with one to six output channels and an input voltage range between 0.3V to 25V.
DC/DC CONTROLLERS

MB39C504: HIGH EFFICIENCY 1-CHANNEL BUCK DC/DC CONTROLLER IC

Three space-saving, programmable power-supply lines with easy power sequence design.

MB39C504 produce high power supply required by system on chips (SoC) and microcontrollers. The product can control heavy current, input voltage of max. 25V and max. 20A, within ±1% of the reference voltage and ±0.3% of the load regulation, and produce a 40μA or lower consumption current stand-by maintaining the voltage output at the system stand-by. In addition, MB39C504 family consists of three products: the MB39C502 with voltages of 0.7V to 2.0V, the MB39C503 with 2.4V to 3.5V and the MB39C504 with 5.0V.

FEATURES

• VIN input voltage range: 5.4V to 25V
• Output voltage range: fixed 5V
• Internal 5V I/O with switchover
• High accurate reference voltage: ±1%
• Automatic transition for PFM/PWM
• Current mode architecture with internal compensation circuit

APPLICATIONS

• Factory automation
• Home appliances
• Multi-function printer
• Networking systems
• Notebook PC
• STB
• Surveillance camera

FEATURES

• VIN input voltage range: 5.4V to 25V
• Output voltage range: fixed 5V
• Internal 5V I/O with switchover
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• Current mode architecture with internal compensation circuit

APPLICATIONS

• Factory automation
• Home appliances
• Multi-function printer
• Networking systems
• Notebook PC
• STB
• Surveillance camera

LINEUP OF DC/DC CONTROLLERS

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels (ch)</th>
<th>Switching frequency (max) kHz</th>
<th>Power supply voltage (V)</th>
<th>Reference voltage accuracy %</th>
<th>Package</th>
<th>Topology</th>
<th>FET compatible</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB3800</td>
<td>1</td>
<td>1000</td>
<td>±1.8 to ±1.5</td>
<td>±6</td>
<td>SOP8</td>
<td>SCP</td>
<td>Available</td>
<td></td>
</tr>
<tr>
<td>MB39A130A</td>
<td>1</td>
<td>600</td>
<td>±6.5 to ±25</td>
<td>±1.5</td>
<td>TSSOP16</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39A135A</td>
<td>1</td>
<td>1000</td>
<td>±6.5 to ±25</td>
<td>±1</td>
<td>TSSOP16</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39C502</td>
<td>1</td>
<td>800</td>
<td>±6.0 to ±25</td>
<td>±1</td>
<td>QFN16</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39C503</td>
<td>1</td>
<td>800</td>
<td>±6.0 to ±25</td>
<td>±1</td>
<td>QFN16</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39A136</td>
<td>2</td>
<td>1000</td>
<td>±6.5 to ±25</td>
<td>±1</td>
<td>TSSOP24</td>
<td>Available</td>
<td></td>
<td></td>
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<tr>
<td>MB39A138</td>
<td>2</td>
<td>310/465</td>
<td>±6.0 to ±26</td>
<td>±1</td>
<td>TSSOP24</td>
<td>Available</td>
<td></td>
<td></td>
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<tr>
<td>MB39C011A</td>
<td>2</td>
<td>2600</td>
<td>±6.5 to ±17</td>
<td>±1</td>
<td>QFP16</td>
<td>Available</td>
<td></td>
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<tr>
<td>MB39A112</td>
<td>3</td>
<td>2600</td>
<td>&gt;7.0 to ±25</td>
<td>±1</td>
<td>QFP20</td>
<td>Available</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1: Recommended  ■: Possible with the addition of outside parts.
DC/DC CONVERTERS

MB39C031 - PROGRAMMABLE 2-CHANNEL BUCK DC/DC CONVERTER + 1-CHANNEL LDO WITH I2C INTERFACE

Three space-saving, programmable power-supply lines with easy power sequence design

The MB39C031 is a programmable power-management IC that consists of a 2-channel Buck DC/DC converter and a 1-channel LDO. The voltage, soft-start time and on-off functions of the output can be easily controlled using the I2C interface. The design can be changed using software, without re-designing the PCB. Each channel has a “Power-Good” function, so it’s possible to set the start-up shutdown sequence of the power line using hardware. This IC is suitable for systems that require three power supplies.

FEATURES

- Power supply voltage range: 2.5V to 5.5V
- Output voltage range / Maximum output current
  - DCDC1: 1.0V to 1.3V (20mV step) max 1.4A (DC)
  - DCDC2: 1.2V to 1.95V (50mV step) max 0.6A (DC)
  - LDO: 2.8V, 2.85V, 3.0V, 3.3V max 0.25A (DC)
- Each channel has a selectable preset voltage
- Adjustable soft-start time range: 0.9ms to 14.3ms (0.9ms step)
- DC/DC operating frequency: 3MHz
- I2C interface (output voltage change, soft-start time setting, on/off control)
- Selectable automatic PFM/PWM transition mode or PWM-fixed mode
- Protection: UVLO, over-current, over-temperature

APPLICATIONS

- Data storage devices
- Image and sound output equipment
- Network equipment
- Various terminals

EASY DESIGNSIM™ TOOL
QFN28

LINEUP OF DC/DC CONVERTER WITH LDO

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels</th>
<th>Switching frequency (max) kHz</th>
<th>Power supply voltage (V)</th>
<th>Output voltage range (V)</th>
<th>Pin name</th>
<th>FET</th>
<th>Output current (max) (mA)</th>
<th>Package</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td>MB39C022 (Common)</td>
<td>1</td>
<td>2000</td>
<td>+2.5 to +5.5</td>
<td>DCDC 0.8 to 4.5</td>
<td>Internal</td>
<td>600</td>
<td>-</td>
<td>SON10</td>
<td></td>
</tr>
<tr>
<td>MB39C022G</td>
<td>1</td>
<td>2000</td>
<td>+2.5 to +5.5</td>
<td>DCDC 0.8 to 4.5</td>
<td>Internal</td>
<td>600</td>
<td>-</td>
<td>SON10</td>
<td></td>
</tr>
<tr>
<td>MB39C022J</td>
<td>1</td>
<td>2000</td>
<td>+2.5 to +5.5</td>
<td>DCDC 0.8 to 4.5</td>
<td>Internal</td>
<td>600</td>
<td>-</td>
<td>SON10</td>
<td></td>
</tr>
<tr>
<td>MB39C022N</td>
<td>1</td>
<td>2000</td>
<td>+2.5 to +5.5</td>
<td>DCDC 0.8 to 4.5</td>
<td>Internal</td>
<td>600</td>
<td>-</td>
<td>SON10</td>
<td></td>
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</table>

LINEUP OF DC/DC CONVERTER WITH I2C INTERFACE

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels</th>
<th>Switching frequency (max) kHz</th>
<th>Power supply voltage (V)</th>
<th>Output voltage range (V)</th>
<th>Pin name</th>
<th>FET</th>
<th>Output current (max) (mA)</th>
<th>Package</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>Internal</td>
<td>1600</td>
<td>Buck</td>
<td>-</td>
<td>QFN28</td>
<td></td>
</tr>
<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>LDO</td>
<td>600</td>
<td>Buck</td>
<td>-</td>
<td>QFN28</td>
<td></td>
</tr>
<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>DCDC1</td>
<td>1.0 to 1.3</td>
<td>Internal</td>
<td>1200</td>
<td>Buck</td>
<td>-</td>
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<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>DCDC2</td>
<td>1.2 to 1.95</td>
<td>Internal</td>
<td>1200</td>
<td>Buck</td>
<td>-</td>
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<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>LDO</td>
<td>600</td>
<td>Buck</td>
<td>-</td>
<td>QFN28</td>
<td></td>
</tr>
<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>LDO</td>
<td>600</td>
<td>Buck</td>
<td>-</td>
<td>QFN28</td>
<td></td>
</tr>
<tr>
<td>MB39C031</td>
<td>1</td>
<td>3000</td>
<td>+2.3 to +5.5</td>
<td>LDO</td>
<td>600</td>
<td>Buck</td>
<td>-</td>
<td>QFN28</td>
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</table>
ENERGY HARVESTING PMICS

What is Energy Harvesting?
Energy harvesting is the process of collecting (“harvesting”) minute amounts of energy from the surrounding environment—including light and vibration—and converting this energy to electricity. Among potential applications, energy harvesting is expected to be used as a power source in sensor nodes for wireless sensor networks. The technology will lead to longer battery lives for portable devices. Energy harvesting will also contribute to battery-free technologies in areas such as energy management for homes and buildings, helping reduce carbon emissions.

Ultra-low-power management for battery-less sensor nodes
The MB39C811 integrates a dual, full-wave bridge rectifier and a low-loss, high-efficiency buck convertor for energy harvesting. This power management IC is optimized for high output impedance energy sources such as piezoelectric transducers. The MB39C811 has eight preset output voltage and covers the continuous output current up to 100mA.

LOWEST START-UP VOLTAGE: 0.35V
Maximum Power Point Tracking (MPPT)
The MB39C831 is a high efficiency, synchronous rectification boost DC/DC converter that can charge a Li-ion battery with a single solar cell and a multi-junction solar cell or thermoelectric generator (TEG). The DC/DC converter can extract the maximum power point (MP) of the power source and safely charge a Li-ion battery with the protection function. The MB39C831 can start up from 0.35V and operates at very low voltage. As such it is suitable for various applications that have a single solar cell.
MB39C604: HIGH-POWER LED DRIVER IC

High-power 50W, suitable for universal input voltage and wide-range output power

The MB39C604 is a PSR-type LED driver IC for LED lighting. The stability of the LED current is regulated by controlling the current of the transformer without the photo coupler. MB39C604 is used for a wide range of applications, such as general LED lighting (bulb, tube, down light, ceiling light, etc), for residential and commercial property, wireless-controlled lighting by remote control and sensor using PWM-dimming function, and high-wattage LED lighting for street and high-bay lights.

**LINEUP OF ENERGY HARVESTING PMICS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels (ch)</th>
<th>Switching frequency (max) kHz</th>
<th>Power supply voltage (V)</th>
<th>Quiescent current (μA)</th>
<th>Topology</th>
<th>Selectable output voltages (V)</th>
<th>Package</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB39C811</td>
<td>1</td>
<td>1500 (PWM)</td>
<td>+0.3 to +4.75</td>
<td>32°</td>
<td>-</td>
<td>3.0, 3.3, 3.6, 4.1, 4.5, 5.0</td>
<td>SOP8</td>
<td>AC/DC, flyback topology, PSR-type, over-voltage protection, over-current protection, output short-circuit protection, PSR</td>
</tr>
<tr>
<td>MB39C831</td>
<td>1</td>
<td>1000</td>
<td>+0.3 to +4.75</td>
<td>32°</td>
<td>-</td>
<td>1.5, 1.8, 2.5, 3.3, 3.6, 4.1, 4.5, 5.0</td>
<td>SOP8</td>
<td>AC/DC, flyback topology, PSR-type, over-voltage protection, over-current protection, output short-circuit protection, PSR</td>
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</tbody>
</table>

**LINEUP OF LED DRIVERS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels (ch)</th>
<th>Switching frequency (max) kHz</th>
<th>AC input V (AC)</th>
<th>Power supply voltage (V)</th>
<th>Output for LED (W)</th>
<th>SW FIT</th>
<th>Package</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>MB39C604</td>
<td>1</td>
<td>20 to 133</td>
<td>85 to 265</td>
<td>9 to 20</td>
<td>5 to 30</td>
<td>External</td>
<td>SOP8</td>
<td>AC/DC, flyback topology, PSR-type, over-voltage protection, over-current protection, output short-circuit protection, PSR</td>
</tr>
<tr>
<td>MB39C605</td>
<td>1</td>
<td>30 to 133</td>
<td>110 to 230</td>
<td>9 to 20</td>
<td>5 to 30</td>
<td>External</td>
<td>SOP8</td>
<td>AC/DC, flyback topology, PSR-type, over-voltage protection, over-current protection, output short-circuit protection, PSR</td>
</tr>
</tbody>
</table>
CYPRESS® EASY DESIGNSIM™ WEB-BASED DESIGN SIMULATION TOOL

The Cypress Easy DesignSim tool is a comprehensive design simulation for power-circuit designers. With the SIMPLIS simulator, this online tool enables designers to automatically select suitable parts for printed circuit boards according to the input/output voltages and load current parameters. The Easy DesignSim tool also enables designers to quickly display several operational waveforms such as load-transient response, startup, shutdown and efficiency.

INTRODUCTION

The power-supply circuit requires external electrical components such as capacitors, resistors, inductors, and MOSFETs. It is time-consuming even for experienced engineers to select the external components and verify their operation to ensure that they meet the required specifications. To reduce the time and effort required for selecting peripheral components, many power management ICs now integrate peripheral components, such as MOSFETs and voltage setting resistors.

The Easy DesignSim tool offers an easy-to-use online simulation environment that enables power design engineers to quickly select the necessary parts and easily design the power-supply circuit. The online design simulation service is optimized for Cypress's products and is the result of a collaborative venture between Cypress and Transim Technology Corp., whose online design simulator has been adopted around the world. Table 1 lists the application parts as of April 2014.

FEATURES

By using the Easy DesignSim tool, power design engineers can easily select peripheral components associated with the input/output, which can otherwise create problems in power circuit design.

- Schematic creation:
  - Performs automatic calculation of the parameters for the parts that the user can select from a list of commercially available parts. Users can also input parameters directly.

- High-speed simulation:
  - Easily displays the load transient response characteristics necessary for evaluating the power-supply-circuit operation. Also displays waveforms at the time of startup/shutdown, the AC analysis for confirming the feedback circuit-oscillation margins, and an efficiency graph that shows the conversion efficiency of the power supply.

- BOM (Bill of Materials) list:
  - Displays a parts list. Users can select a part name and the list displays an estimated price for it from selected parts distributors. Users can buy the parts online from some distributors.

- BOM (Bill of Materials) list:
  - Shows the configurations, parts list, circuit diagram, and simulation waveforms, which are downloadable as a PDF file.

USING EASY DESIGNSIM

Using the MB39C022 series as an example, below are the features of the Easy DesignSim tool. The MB39C022 Series consists of a 1-channel buck DC/DC converter and a 1-channel LDO regulator. This PMIC, which is packaged in a small SO10, also has a built-in low-noise LDO, making it suitable for the power supplies used on RF, PLL, and analog circuits. The easy-to-use IC is optimized for electronic devices with an analog digital mixed circuit.

The following seven steps show how to use Easy DesignSim with the MB39C022. (Fig. 1)

1. Log in and register
2. Select the product
3. Set the operating parameters
4. Set the simulation parameters and the start analysis
5. Verify the simulation results
6. Review the BOM list
7. Get a Summary, download a PDF, and save the settings

FIG1: How to use Easy Design SIM

Table 1 Application parts As of June 2016

<table>
<thead>
<tr>
<th>Energy Harvesting PMICs</th>
<th>Family</th>
<th>Chip</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultra Low Power Buck PMIC for Solar and Vibrations</td>
<td>MB39C811, S6AE101A, S6AE102A, S6AE103A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultra Low Voltage Boost PMIC for Solar and Thermal</td>
<td>MB39C831</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For LED Lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input 200V correspondence</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>MB39C6041xs listed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input 100V correspondence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39C604 isolated, MB39C605</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Charge Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC/DC Converter IC for Charging Li-ion Battery</td>
<td>MB39A134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Mobile terminal, Portable device</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8MHz Buck-Boost DC/DC Converter IC</td>
<td>MB39C326</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2ch DC/DC + 1ch LDO + PC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39C031</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1ch DC/DC + 1ch Low noise LDO+POR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MB39C022G (LDO 3.3V), MB39C022I, MB39C022J</td>
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<td></td>
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<td>MB39C0222G (LDO 2.8V), MB39C022JN</td>
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<td></td>
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<tr>
<td>MB39C022G (LDO 1.8V)</td>
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<tr>
<td>MB39C0224 (LDO 1.5V)</td>
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<tr>
<td>S6ADF412A, S6ADF413A, MB39C007, MB39C013</td>
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<tr>
<td>MB39C014</td>
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</tbody>
</table>
Verifying waveform behavior

Conventionally, without the Easy DesignSim, a circuit designer calculates the operation waveform with a pen on his/her desk and tests the circuit with an evaluation board. With the Easy DesignSim, which is an online tool, the waveform of the power supply circuit is automatically calculated so that the operation of confirming the circuit can be performed very easily. Moreover, the Easy DesignSim provides the maximum of five simulation waveforms which a designer can use to verify the operation (Fig. 4).

- **Load response characteristics (Transient):**
  - Displays the output voltage change when the load current is changed.
- **Startup/Shutdown waveform (Startup/Shutdown):**
  - Displays the waveform at the time of startup and shutdown can be checked.

- **AC Analysis:**
  - Displays the oscillation margin for the circuit.
- **Efficiency:**
  - For products with an external FET, the Easy DesignSim displays a graph by using formulas. For products with built-in FETs, the Easy DesignSim displays a measured waveform.
- **DC Analysis (Steady-State):**
  - Users can check the operation waveform at each node of the power supply circuit.

Figure 4 Waveforms
(a) Load response
(b) Startup waveform
(c) AC Analysis
(d) Efficiency waveform

Bom list display

The Easy DesignSim displays the BOM list of selected parts for every parts distributor. It also displays the sample price of distributor’s parts and the BOM cost of sample’s price. For some distributors, customers may be able to purchase the electronic components online. (Fig. 5)

Figure 5 BOM List

Figure 6 Summary Report and “Save” button

Output Summary and Design Saving

The Easy DesignSim displays input/output setting conditions, parameters of the parts, and a graphical representation of the results. Users can output the summary to a downloadable PDF file. Moreover, users can save the operation conditions of the simulation and the Circuit Parts Parameter. If necessary, the simulation can be reproduced by opening the saved parameters set from a tab on the screen. (Fig. 6)

Future Deployment

Recent electronic devices require smaller size, higher performance, and further reduction of power consumption. In addition, due to higher integration of the IC, switching power supply circuits must be provided with lower operation voltage for the ASIC core and faster load transient response characteristics against the increased load current. Cypress focuses on the development of power management ICs, which realize lower power consumption, faster load transient response, and more multichannels.

Cypress continues to enrich its service in order to help customers design power management ICs with the Easy DesignSim and at the same time, continue to enhance the Easy DesignSim. Easy DesignSim™ is a trademark of Cypress Semiconductor Corp.

You can start to use the Easy DesignSim from the Cypress homepage:
Homepage >> Products >> Power Management ICs >> Easy DesignSim

Note: Cypress has verified the simulation results, based on the actual measurement; however, operation of the device based on this simulation tool is not guaranteed. It is advised that circuit designers confirm operations with the actual applications.
### Table of Power Management ICS

<table>
<thead>
<tr>
<th>Model</th>
<th>Function</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB39A134</td>
<td>3.0 to 3.4V (±45%), Power supply voltage monitor, Dual-system watchdog timer</td>
<td></td>
</tr>
<tr>
<td>MB39C604</td>
<td>3.0 to 3.4V, Charge, Harvesting, Energy</td>
<td></td>
</tr>
<tr>
<td>MB39C811</td>
<td>3.0 to 3.4V, DC/DC Converter, LDO</td>
<td></td>
</tr>
<tr>
<td>S6AP413A</td>
<td>3.0 to 3.4V, DC/DC Converter</td>
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</tr>
<tr>
<td>S6AP412A</td>
<td>3.0 to 3.4V, DC/DC Converter</td>
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<tr>
<td>DCDC1</td>
<td>3.0 to 3.4V, DC/DC Converter</td>
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<td>DCDC2</td>
<td>3.0 to 3.4V, DC/DC Converter</td>
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<tr>
<td>DCDC3</td>
<td>3.0 to 3.4V, DC/DC Converter</td>
<td></td>
</tr>
</tbody>
</table>

**Product Brochure**

1. **Product Brochure**
2. **Table of Power Management ICS**
3. **Lineup of Power Voltage Monitoring Applications**
   - **Model**: MB39A134, MB39C604, MB39C811, S6AP413A, S6AP412A, DCDC1, DCDC2, DCDC3
   - **Function**: Charge, Harvesting, Energy, DC/DC Converter, LDO
   - **Remarks**: Dual-system watchdog timer, Power supply voltage monitor

**Datasheet**

- **Number of channels (ch)**
- **Output voltage (V)**
- **Output voltage accuracy (%)**
- **Maximum output current (mA) **
- **Feedback frequency (MHz)**
- **Oscillation frequency (MHz)**
- **FET compatible**
- **FET (internal)**
- **Output voltage (V)**
- **Frequency**
- **Datasheet**
- **Evaluation board**
Cypress provides a variety of evaluation boards. MB39C015 evaluation board

The details shown above may change without notice. Please contact the Cypress sales division for current information.
ABOUT CYPRESS

Cypress delivers high-performance, mixed-signal, programmable solutions that provide customers with rapid time-to-market and exceptional system value. Cypress offerings include the flagship PSoC® 1, PSoC 3 and PSoC 5 programmable system-on-chip families and derivatives, CapSense® touch sensing and TrueTouch® solutions for touchscreens. Cypress is the world leader in USB controllers, including the high-performance West Bridge® solution that enhances connectivity and performance in multimedia handsets. Cypress is also the world leader in SRAM memories. Cypress serves numerous markets including consumer, mobile handsets, computation, data communications, automotive, industrial and military. Cypress trades on the NASDAQ Global Select Market under the ticker symbol CY. Visit Cypress online at www.cypress.com.