Power Management ICs

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Fujitsu's power management ICs—providing refined high reliability and performance.

Ready to meet a wide range of needs with our comprehensive lineup.

The requirements for today's electronic devices are ever smaller size, higher capabilities, and lower power consumption. Fujitsu offers a wide range of power management ICs that feature low-power consumption, low-voltage operation, multi-channel, high-efficiency, built-in FET regulator ICs, low-power consumption, and high-precision voltage detection reset ICs, and low-temperature-resistant power-switching ICs.

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SEEDS and NEEDS.
Fujitsu’s Power Management ICs are designed by the advanced technologies with semiconductor design, process, system and the application. For various solutions such as personal computer, cellular phone, communication network, digital TV, digital still camera, and DVC. Our products are required as the key products, and we are developing high quality, high performance and user friendly products.

### Notebook computer power management IC
- General-purpose DC/DC converter
  - MB3782
  - MB3800
  - MB39A135
  - MB39A136
- For rechargeable batteries (For charging control)
  - MB3874
  - MB39A114
  - MB39A113
  - MB39A112
  - MB39A126
  - MB39A125
  - MB39A129
  - MB3887
  - MB3879
  - MB3898
- Monitoring of power supply voltage
  - MB3771
  - MB3773
  - MB3793
- Power management switch
  - MB3841
  - MB3842
  - MB3845

### Mobile phone power management IC
- Li-ion battery
- MB39C018
- DC/DC converter with bypass FET
  - MB39C011f
- Base band
- VOUT
- Antenna
- ON/OFF control
- Output voltage control
- Power amplifier

### Portable device power management IC (GPS/PND/PMP)
- DC/DC converter with SW FET
  - MB39C014
  - MB39C015
- 1cell-Li-ion battery
- Charger
- LCD panel
- Boost
- Invert
- Backlight driver
- Solution Chip
- Switch
- MB39C015
- MB39C018
- MB39C011f
- For 4cell
- Down 3.3V
- Down 1.8V

### IP telephone power management IC
- MB39C011A
- 3.3V
- 1.2V
- 2.5V
- 5V
- LED
- MEMORY
- Call control CPU
- Audio CODEC DSP
- LAN controller
- DDR
- White LED
- MB39A136
- 12V
- 24V
- 3.3V
- 5V
- 1.2V
- 1.8V
- I/O Core
- System LSI
- Flash memory

### Game machines power management IC
- MB39A116A
- 12V
- 3.3V
- 5V
- I/O power supply
- Core power supply
- LSI
- CPU
- ASIC (CPU, DRAM, BUS, CPU perimeter, ID)
- 1.8V
- 1.2V
- DDR
- ROM (Flash)
- LAN1394

### Printer power management IC
- MB39A116A
- 24V
- 5.0V
- 12V
- 3.3V
- I/O power supply
- Core power supply
- LSI
- CPU
- ASIC (CPU, DRAM, BUS, CPU perimeter, ID)
- 1.8V
- 1.2V
- DDR
- ROM (Flash)
- LAN1394

PND: Personal Navigation Device, PMP: Portable Media Player
General-purpose DC/DC Converter

Used in a wide range of power supplies, such as those for LCD backlights, car navigation systems, audio systems, games, portable devices, etc.

**Lineup of DC/DC Converter**

Fujitsu provides various power management ICs. The output channel is from 1 output to 8 output. And the input voltage is from 1.7V to 25V.

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**MB39A135: Nch/Nch Synchronous Rectification 1-channel DC/DC Buck Converter IC**

**Package: TSSOP16**

**Description**

MB39A135 is a Current mode Nch/Nch synchronous rectification 1-channel DC/DC buck converter IC. This IC has realized the high-speed response, high efficiency and low ripple voltage by a current mode system. The ceramic condenser is able to use. This product is the best for the downsizing of a set, by the adoption of the small coil of high frequency operation and the small package.

**Features**

- Wide range of power supply voltage: 4.5V to 25V
- Selectable fixed PWM mode or automatic PFM/PWM mode
- High frequency operation: 100kHz to 1.0MHz
- Any output voltage setting by external resistor
- Requires no flyback diode
- Built-in soft-start circuit
- Supporting ceramic condensers

**Application**

- Digital TV, Digital AV devices etc.

**MB39C011A: Nch/Pch Synchronous Rectification 2-channel DC/DC Buck Converter IC**

**Package: TSSOP16**

**Description**

MB39C011A is a PWM-type Nch/Pch synchronous rectification 2-channel DC/DC buck converter IC. The power-supply voltage range of this product is wide, and it can support using ceramic condensers.

**Features**

- Wide range of power supply voltage: 4.5V to 17V
- Selectable fixed PWM mode or automatic PFM/PWM mode
- High frequency operation: 250kHz to 2.6MHz
- Any output voltage setting by external resistor
- Requires no flyback diode
- Built-in soft-start circuit
- Supporting ceramic condensers

**Application**

- For various electronic devices including digital AV devices

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**MB39A136: Nch/Nch Synchronous Rectification 2-channel DC/DC Buck Converter IC**

**Package: TSSOP24**

**Description**

MB39A136 is a Current mode Nch/Nch synchronous rectification 2-channel DC/DC buck converter IC. This IC has realized the high-speed response, high efficiency and low ripple voltage by a current mode system. The ceramic condenser is able to use. This product is the best for the downsizing of a set, by the adoption of the small coil of high frequency operation and the small package.

**Features**

- Wide range of power supply voltage: 4.5V to 25V
- Selectable fixed PWM mode or automatic PFM/PWM mode
- High frequency operation: 100kHz to 1.0MHz
- Any output voltage setting by external resistor
- Requires no flyback diode
- Built-in soft-start circuit/Built-in soft-stop circuit
- Substantial protective functions

**Application**

- Digital TV, Digital AV devices etc.

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**MB39A112: 3ch DC/DC Buck Converter IC**

**Package: TSSOP20**

**Description**

MB39A112 is a PWM-type 3-channel DC/DC buck converter IC. This IC is capable of implementing an efficient high frequency DC/DC converter.

**Features**

- Wide range of power supply voltage: 7V to 25V
- High frequency operation: 250kHz to 2.6MHz
- Any output voltage setting by external resistor
- Built-in soft-start circuit
- Supporting ceramic condensers

**Application**

- IP-STB, Surveillance camera, ADSL Modem etc.
### DC/DC Converter with SW FET

Internal power supply suited to portable devices such as mobile phones, PDAs and DSCs, DVD players and hard disk drives.

#### MB39C014: 3.2MHz/2MHz, Output Current 800mA(max), 1-channel DC/DC Buck Converter IC

**Package:** SON10

**Description**
- MB39C014 is a PWM-type 1-channel DC/DC buck converter IC. The selection of operation frequency is possible at 3.2MHz or 2MHz. This IC has realized the high-speed response, high efficiency and low ripple voltage by a current mode system. This product has built-in phase-compensation circuit and soft-start circuit, contributes to the reduction in total area including external parts.

**Features**
- High efficiency: 96% (max)
- Input voltage range: 2.5V to 5.5V
- Operating frequency: 2.0MHz or 3.2MHz
- Output current range: 0.45V to 3.6V
- Package: SON10

**Application**
- Surveillance camera, photograph printer etc.
- Portable device such as 1seg TV & Radio etc.
- DVD Recorder, Hard Disk Recorder etc.

#### MB39C015: Output Current 800mA(max), 1-channel DC/DC Buck Converter IC built-in Voltage Detection

**Package:** QFN24

**Description**
- MB39C015 is a 2-channel DC/DC buck converter IC built-in detection voltage. This IC has realized the high-speed response, high efficiency and low ripple voltage by a current mode system. A power supply starting sequence can be constituted using a voltage detection circuit and a soft-start circuit.

**Features**
- High efficiency: 96% (max)
- Input voltage range: 2.5V to 5.5V
- Output voltage range: 0.45V to 3.6V
- Output current (DC/DC): 800mA(max)
- Operating frequency: 2.0MHz
- Package: QFN24

**Application**
- Portable device, DVD recorder
- IP-Phone, Equipment of PLC etc.

#### DC/DC Converter for RF PA

#### MB39C018: 1-channel DC/DC Buck Converter IC built-in Bypass FET

**Package:** QFN24

**Description**
- MB39C018 is a 1-channel DC/DC buck converter IC for RF Power Amplifier. This IC has realized the high-speed response, high efficiency and low ripple voltage by a current mode system. Output Current realizes large current(max.800mA).

**Features**
- High efficiency: 96% (max)
- Input voltage range: 2.5V to 5.5V
- Operating frequency: 2.0MHz
- Output current range: 0.8V to 5.5V
- Output current (DC/DC): 800mA(max)
- Built-in Switching FET, Bypass FET(max.1A)

**Application**
- Power Amplifier for the 3G Cellular Phones

### Lineup of General-purpose DC/DC Converter

**Table:**

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels</th>
<th>Operating frequency (MHz)</th>
<th>Output voltage range (V)</th>
<th>Power supply voltage (V)</th>
<th>Switching FET</th>
<th>Topology</th>
<th>Package</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB39C104</td>
<td>1</td>
<td>2.0, 2.2 (Fixed)</td>
<td>2.5</td>
<td>+2.5 ±5.5</td>
<td>800</td>
<td>0.3</td>
<td>0.2</td>
<td>SON10</td>
</tr>
<tr>
<td>MB39C105</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>+2.5 ±5.5</td>
<td>800/1k</td>
<td>0.3</td>
<td>0.2</td>
<td>QFN24</td>
</tr>
</tbody>
</table>

### Lineup of DC/DC Converter with SW FET

**Table:**

<table>
<thead>
<tr>
<th>Model</th>
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<td>MB39C014</td>
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<td>2</td>
<td>+2.5 ±5.5</td>
<td>800/1k</td>
<td>0.3</td>
<td>0.2</td>
<td>QFN24</td>
</tr>
</tbody>
</table>

**Diagram:**

Application circuit example

**DC/DC Converter with SW FET**

Internal power supply suited to portable devices such as mobile phones, PDAs and DSCs, DVD players and hard disk drives.

**Lineup of DC/DC Converter for RF PA**

**Table:**

<table>
<thead>
<tr>
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<th>Number of channels</th>
<th>Operating frequency (MHz)</th>
<th>Output voltage range (V)</th>
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<th>Switching FET</th>
<th>Topology</th>
<th>Package</th>
<th>Remarks</th>
</tr>
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<tr>
<td>MB39C014</td>
<td>1</td>
<td>2.0, 2.2 (Fixed)</td>
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<td>800</td>
<td>0.3</td>
<td>0.2</td>
<td>SON10</td>
</tr>
</tbody>
</table>

**DC/DC Converter for RF PA**

**Diagram:**

Application circuit example

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<th>Topology</th>
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<td>800</td>
<td>0.3</td>
<td>0.2</td>
<td>SON10</td>
</tr>
<tr>
<td>MB39C015</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>+2.5 ±5.5</td>
<td>800/1k</td>
<td>0.3</td>
<td>0.2</td>
<td>QFN24</td>
</tr>
</tbody>
</table>
MB39A123: 6ch DC/DC Converter IC with Synchronous Rectification

**Description**
MB39A123 is a 6-channel DC/DC converter IC using pulse width modulation (PWM), and it is suitable for up conversion, down conversion, and up/down conversion.

**Features**
- Supports for step-down with synchronous rectification
- Negative voltage output (inverting amplifier)
- Low voltage start-up: 1.7V
- Support for the output voltage of 1.0V
- Support for control and soft-start of each channel
- Oscillation frequency range: 200kHz to 2.0MHz
- Package: BCC48++, LQFP48

**Application**
- Digital still camera
- Digital video camera
- Surveillance camera

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**Lineup of DC/DC Converter for DSC/DVC**

<table>
<thead>
<tr>
<th>Model</th>
<th>Number of channels</th>
<th>Operating oscillation frequency</th>
<th>Power supply voltage</th>
<th>Efficiency voltage accuracy</th>
<th>Package</th>
<th>Topology</th>
<th>FET compatible</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB3785A</td>
<td>4</td>
<td>1000</td>
<td>+5.0V to +10V</td>
<td>±1</td>
<td>LQFP48</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A102</td>
<td>4</td>
<td>1500</td>
<td>+2.5V to +11V</td>
<td>±1</td>
<td>BCC102, TSSOP36</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A103</td>
<td>4</td>
<td>1500</td>
<td>+1.7V to +11V</td>
<td>±1</td>
<td>BCC102, TSSOP36</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A115</td>
<td>4</td>
<td>2000</td>
<td>+2.5V to +11V</td>
<td>±1</td>
<td>TSSOP58</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A105</td>
<td>5</td>
<td>2000</td>
<td>+1.7V to +11V</td>
<td>±1</td>
<td>BCC104, TSSOP36</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A115</td>
<td>5</td>
<td>2000</td>
<td>+1.7V to +11V</td>
<td>±1</td>
<td>BCC104, TSSOP36</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39C306</td>
<td>6</td>
<td>800</td>
<td>+2.5V to +12V</td>
<td>±1</td>
<td>LQFP54</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A102</td>
<td>6</td>
<td>1000</td>
<td>+1.7V to +8V</td>
<td>±1</td>
<td>LQFP48, BCC48</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39A123</td>
<td>6</td>
<td>2000</td>
<td>+1.7V to +11V</td>
<td>±1</td>
<td>LQFP48, BCC48</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
<tr>
<td>MB39C306</td>
<td>8</td>
<td>800</td>
<td>+1.8V to +12V</td>
<td>±1</td>
<td>LQFP54</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
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<tr>
<td>MB39A123</td>
<td>8</td>
<td>1500</td>
<td>+2.0V to +6V</td>
<td>±1</td>
<td>FRGA102</td>
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<td>Available</td>
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<tr>
<td>MB39B306</td>
<td>7</td>
<td>1500</td>
<td>+2.0V to +5V</td>
<td>±1</td>
<td>FRGB306</td>
<td>Buck/Buck</td>
<td>Available</td>
<td>–</td>
</tr>
</tbody>
</table>

*Explanation of a functional Display (ex.)*
- 1ch: Loading number of channels
- 2ch: Buck-conv.
- 3ch: Invert-conv.
- 4ch: Built-in switching FET
- 5ch: Over-temperature protection circuit
- 6ch: Built-in switching FET
- 7ch: Overvoltage protection circuit
- 8ch: Maximum load current per one channel
- 9ch: Short-circuit protection
- 10ch: Low-voltage protection circuit

**Notes**
- Explanation of a functional Display (ex.)
- Available
- Individual channel control, soft-start function, support for external input short-circuit detection
- Low-voltage operation possible
- Individual channel control, soft-start function, support for external input short-circuit detection
- Low-voltage operation possible, synchronous rectification
- Individual channel control, soft-start function, support for external input short-circuit detection
- Low-voltage operation possible, synchronous rectification
- Individual channel control, soft-start function, support for external input short-circuit detection
- Synchronous rectification, external synchronization support possible
- Built-in on/off sequence circuit, synchronous rectification
- Built-in on/off sequence circuit, synchronous rectification
- Built-in on/off sequence circuit, synchronous rectification

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**Application circuit example**

Used in portable products such as digital still cameras and digital video cameras.

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**MB39C308: 7-channel DC/DC converter IC built-in Switching FET**

**Description**
MB39C308 is a 7-channel DC/DC converter IC with two buck converter circuits, two boost converter circuits, a inverter circuit, two buck boost converter circuits. CH1 to CH6 channels adopt the current mode built-in the phase compensation circuit. Highly effective in a high frequency can be achieved in all channel with built-in switching FETs. Also, MB39C308 is able to reduce the number of parts, as the two channel series regulator is built-in in this IC. The MB39C308 is suitable for power supply of high performance portable instruments powered by a 1-cell Li-Ion rechargeable battery.

**Features**
- Control function of DC/DC converter
- All 7 channels with built-in Switching FETs
- Current mode: Buck-conv., C-modes, Buck-conv., Invert-conv.
- Built-in the output setting resistors(CH1 to 3,6,7)
- Built-in in the output setting resistors(DD1 to 3,6)
- Oscillation frequency range: 1.5MHz
- Individual channel control, soft-start function, support for external input short-circuit detection
- Built-in the output setting resistors(CH1 to 7)
- Built-in on/off sequence circuit(CH1 to 7)
- LDO control function
- Voltage mode: Invert-convresion(CH5)
- Oscillation frequency range: 200kHz to 2.0MHz
- Package: BCC48++, LQFP48

**Application**
- Digital still camera
- Digital video camera
- Surveillance camera

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**MB39C309: 7-channel DC/DC converter IC built-in Switching FET**

**Description**
MB39C309 is a 7-channel DC/DC converter IC with two buck converter circuits, two boost converter circuits, a inverter circuit, two buck boost converter circuits. CH1 to CH6 channels adopt the current mode built-in the phase compensation circuit. Highly effective in a high frequency can be achieved in all channel with built-in switching FETs.

**Features**
- Control function of DC/DC converter
- All 7 channels with built-in Switching FETs
- Current mode: Buck-conv., C-modes, Buck-conv., Invert-conv.
- Built-in the output setting resistors(CH1 to 3,6,7)
- Built-in in the output setting resistors(DD1 to 3,6)
- Oscillation frequency range: 1.5MHz
- Individual channel control, soft-start function, support for external input short-circuit detection
- Built-in the output setting resistors(CH1 to 7)
- Built-in on/off sequence circuit(CH1 to 7)
- LDO control function
- Voltage mode: Invert-convresion(CH5)
- Oscillation frequency range: 200kHz to 2.0MHz
- Package: BCC48++, LQFP48

**Application**
- Digital still camera
- Digital video camera
- Surveillance camera

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**DC/DC Converter for DSC/DVC**

Used in portable products such as digital still cameras and digital video cameras.
Used in various applications, such as wireless LAN.

**Features**
- Internal conformity (LPIA)
- Current mode topology with I2C interface available
- Power supply voltage monitor
- Voltages other than 4.2V optionally available
- Built-in protection function
- Built-in high-precision current detection amplifier (1%)
- Input voltage range: 5.5V to 12.6V

**Application**
- Ultra Mobile PC (UMPC)
- Mobile Internet Device (MID)
- Mobile equipment

**Power supply voltage monitor**

**Lineup of Power Management Switches**

**For Rechargeable Batteries (for charging control)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Operating voltage (Max)</th>
<th>Power supply voltage (Max)</th>
<th>Accuracy (Max)</th>
<th>Package</th>
<th>Typology</th>
<th>I2C Compatible</th>
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</thead>
<tbody>
<tr>
<td>MB3876</td>
<td>500</td>
<td>±0.8</td>
<td>±0.8</td>
<td>SOP16</td>
<td>Black</td>
<td>Available</td>
</tr>
<tr>
<td>MB3877</td>
<td>500</td>
<td>±0.8</td>
<td>±0.8</td>
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<td>SOP16</td>
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</tr>
</tbody>
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<td>±0.8</td>
<td>SOP16</td>
<td>Black</td>
<td>Available</td>
</tr>
</tbody>
</table>

**Package: FBGA208**

**Description**
- LPIA (Low Power Intel Architecture)

**Features**
- Support for LPIA platform
- Current mode topology
- Soft start function
- Output current (Max)

**Application**
- Used in notebook computers with power management functions.
Package Lineup

<table>
<thead>
<tr>
<th>Package Series</th>
<th>SOP8</th>
<th>SOP16</th>
<th>SOP20</th>
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</thead>
<tbody>
<tr>
<td>Body Size</td>
<td>Lead Pitch</td>
<td>Body Size</td>
<td>Lead Pitch</td>
</tr>
<tr>
<td>3.94 x 2.01 x 0.8 mm</td>
<td>1.27 mm</td>
<td>3.94 x 2.01 x 0.8 mm</td>
<td>1.27 mm</td>
</tr>
</tbody>
</table>

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<th>SSOP16</th>
<th>SSOP20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Size</td>
<td>Lead Pitch</td>
<td>Body Size</td>
<td>Lead Pitch</td>
</tr>
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<td>4.20 x 5.01 x 0.8 mm</td>
<td>0.65 mm</td>
<td>4.20 x 5.01 x 0.8 mm</td>
<td>0.65 mm</td>
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</table>

<table>
<thead>
<tr>
<th>Package Series</th>
<th>TSSOP16</th>
<th>TSSOP20</th>
<th>TSSOP24</th>
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<tbody>
<tr>
<td>Body Size</td>
<td>Lead Pitch</td>
<td>Body Size</td>
<td>Lead Pitch</td>
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<tr>
<td>3.10 x 3.10 x 0.8 mm</td>
<td>0.65 mm</td>
<td>3.10 x 3.10 x 0.8 mm</td>
<td>0.65 mm</td>
</tr>
</tbody>
</table>

Evaluation Board

We provide evaluation boards to allow evaluation of devices.

- Example: MB39C015 evaluation board
- Example: MB39C015 connection diagram

The details shown above may change without notice. Please contact our sales division for inquiries.

Product Search

Product search can be performed from the following homepage.

URL: http://www.fujitsu.com/global/service/microelectronics/product/assp/

- Search by the end products.
  It can search from the end products.
- Search by the keyword.
  The product containing the specified keyword can be searched.
- Search by the product number and product specification.
  A product can be searched from product number and product specification.

RoHS Compliance Information

Lead (Pb) Free Version

The LSI products of Fujitsu with "E1" are compliant with RoHS Directive, and has observed the standard of lead, cadmium, mercury, Hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE).

A product whose part number has trailing characters "E1" is RoHS compliant.

For detailed electric properties and operating conditions, refer to the data sheet of each product.