Ultra-Low-Voltage Boost PMIC, Maximum Power Point Tracking

The MB39C831 is a highly efficient, synchronous rectification boost DC/DC converter that can charge a Li-ion battery with a single or multiple solar cells, or with a Thermal Electric Generator (TEG). The DC/DC converter can extract the maximum power point (MPP) of the power source and safely charge the Li-ion battery using the protection function.

The MB39C831 operates through a range of very low voltages and can start up with a voltage of 0.35V. The chip is particularly well-suited for applications that are driven from a single solar cell.

### FEATURES
- Input Voltage Range: 0.30V to 4.75V
- Lowest Start-Up Voltage: 0.35V
- Selectable Output Voltages: 3.0V, 3.3V, 3.6V, 4.1V, 4.5V, 5.0V
- Quiescent Current (Constant Voltage Mode): 32µA (No Load)
- Input Peak Current Limit: 200mA
- Maximum Power Point Tracking (MPPT)
- Over Voltage/Current Protection for Charger
- Power-Save Mode
- QFN40: 6.0mm × 6.0mm × 0.85mm (Pin pitch 0.5mm)

### ITEM CONDITIONS MIN TYP MAX UNIT

<table>
<thead>
<tr>
<th>ITEM</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Start-Up Voltage</td>
<td>VDD (Ta=25°C)</td>
<td>-</td>
<td>0.35</td>
<td>0.50</td>
<td>V</td>
</tr>
<tr>
<td>VDD Input Voltage</td>
<td>VDD</td>
<td>0.3</td>
<td>-</td>
<td>4.75</td>
<td>V</td>
</tr>
<tr>
<td>Output Voltage Select</td>
<td>MPPT_ENA=L S[2:0]=0h-5h</td>
<td>3.0</td>
<td>-</td>
<td>5.0</td>
<td>V</td>
</tr>
<tr>
<td>Quiescent Current</td>
<td>Battery Charging Mode</td>
<td>-</td>
<td>41</td>
<td>82</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td>Constant Voltage Mode</td>
<td>-</td>
<td>32</td>
<td>64</td>
<td>µA</td>
</tr>
<tr>
<td>Operating Ambient Temperature</td>
<td>Ta</td>
<td>-40</td>
<td>-</td>
<td>+85</td>
<td>°C</td>
</tr>
</tbody>
</table>

Note: The Green IT Award is a Japanese prize.
**BLOCK DIAGRAM**

- **Photovoltaic Cell**
- **Light**
- **Vibration**
- **Thermal**
- **Radio Wave**

**Power Generation Device**
- Solar Cells
- Peltier
- Electromagnetic Induction

**PMIC**
- MB39C831
- (Boost)

**Sensing & CPU**
- Sensor
- MCU Memory

**RF**
- ZigBee GP
- Bluetooth LE
- 2.4GHz, 920MHz

**Power Generation Part**
**Control & Wireless Part**

**SYSTEM DIAGRAM**

**Energy Source**
- Light
- Vibration
- Thermal
- Radio Wave

**Power Source**

- **Power Generation from Solar Cells**
- **Power Generation from a Thermal Electric Generator**

**APPLICATIONS**
- Solar Energy Harvesting
- Thermal Energy Harvesting
- Cell Phones
- eBooks
- Electronic Dictionaries
- Wireless Sensor Nodes

**WEB DESIGN SIMULATION SERVICE**

Web Design Simulation Service
http://www.spansion.com/easydesignsim

**STARTER KIT**

- Sensor
- LCD
- MCU: FM3

**DIMENSIONS**

- 83mm x 56mm

**Power Source**

- **Solar Energy Harvesting**
- **Thermal Energy Harvesting**
- **Cell Phones**
- **eBooks**
- **Electronic Dictionaries**
- **Wireless Sensor Nodes**