**Power Management**

**Product Selector Guide**

<table>
<thead>
<tr>
<th>Product Family</th>
<th>Part Number</th>
<th># of Channels</th>
<th>Vin Range</th>
<th>Vout Range</th>
<th>Iout Max (per Channel)</th>
<th>Efficiency</th>
<th>Accuracy</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step-down DC/DC converters</td>
<td>MB39A13x</td>
<td>1, 2</td>
<td>4.5V - 28V</td>
<td>0.7V and above</td>
<td>20A</td>
<td>96%</td>
<td>±0.72%</td>
<td>Synchronous rectification PFM/PWM High efficiency</td>
</tr>
<tr>
<td>Step-down DC/DC converters with internal FET</td>
<td>MB39C0xx</td>
<td>1, 2</td>
<td>2.5V - 5.5V</td>
<td>0.45V - 4.5V</td>
<td>800mA</td>
<td>96%</td>
<td>±4.0%</td>
<td>High efficiency Small package PFM/PWM</td>
</tr>
<tr>
<td>Multi-channel DC/DC converters</td>
<td>MB39A1xx</td>
<td>3 and above</td>
<td>1.7V - 25V</td>
<td>1.0V and above</td>
<td>4.5A</td>
<td>96%</td>
<td>±1.0%</td>
<td>Synchronous rectification Individual channel control</td>
</tr>
<tr>
<td>Inductor built-in micro DC/DC converters</td>
<td>XCL20x</td>
<td>1</td>
<td>2V - 6V</td>
<td>0.8V - 4V</td>
<td>600mA</td>
<td>85%</td>
<td>±2.0%</td>
<td>Ultra small: 2.5mm x 2mm x 1mm PFM/PWM</td>
</tr>
<tr>
<td>Step-up DC/DC converters</td>
<td>XC637x</td>
<td>1</td>
<td>0.65V - 20V</td>
<td>1.5V - 30V</td>
<td>700mA</td>
<td>93%</td>
<td>±2.0%</td>
<td>Internal FET option PFM/PWM</td>
</tr>
<tr>
<td>Step-down DC/DC converters</td>
<td>XC92xx</td>
<td>1</td>
<td>1.8V - 25V</td>
<td>0.8V - 15V</td>
<td>5A</td>
<td>95%</td>
<td>±1.5%</td>
<td>Internal FET option PFM/PWM</td>
</tr>
<tr>
<td>Step-up/down DC/DC converters</td>
<td>XC9303</td>
<td>1</td>
<td>2V - 10V</td>
<td>2.0V - 6.0V</td>
<td>800mA</td>
<td>84%</td>
<td>±2.0%</td>
<td>Synchronous rectification topology PFM/PWM</td>
</tr>
<tr>
<td>Low Drop Out regulators</td>
<td>XB108x</td>
<td>1</td>
<td>0.5V - 28V</td>
<td>0.7V - 18.0V</td>
<td>3A</td>
<td>Varies</td>
<td>±1.0%</td>
<td>Over 30 products in the family Dropout voltage (@100mA) as low as 15mV</td>
</tr>
<tr>
<td>Multi-channel DC/DC converters</td>
<td>XC95xx</td>
<td>2, 3</td>
<td>0.9 - 10V</td>
<td>0.9 - 30.0V</td>
<td>1.5A</td>
<td>95%</td>
<td>±1.5%</td>
<td>Various combinations of step-up/down DC/DC regulators, LDOs, voltage detector and charge pump</td>
</tr>
</tbody>
</table>

**Why Symmetry?**

Let us know your input & output voltages and current requirements. We can recommend high efficiency and low cost optimized solutions to power your circuit.

Ask us about Torex Energy Star parts and Fujitsu Eco device solutions that offer:
- High efficiency
- Small packaging
- Reduced external components
- Ultra fast transient response
- Low voltage output

**Your requirements**

- Li-ion battery
- Battery charger
  - 5.0V @ 1.2A
  - 3.3V @ 1.5A
  - 2.5V @ 1.0A
  - 1.8V @ 0.8A
  - 1.5V @ 0.3A
  - 1.2V @ 0.4A

**Our Solution**

- Li-ion battery
- Ag112
  - 5.0V @ 1.2A
  - 3.3V @ 1.5A
  - 2.5V @ 1.0A
  - 1.8V @ 0.8A
  - 1.5V @ 0.3A
  - 1.2V @ 0.4A
- MB39A102 Vin - 2.5V to 11V BCC32P (5 x 5mm)
- XC6220 LDO USP-6C (2 x 1.8mm)
- XC6220 LDO USP-6C (2 x 1.8mm)
### Battery Chargers

**Product Selector Guide**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type</th>
<th>Input Voltage Range</th>
<th>Output Voltage</th>
<th>Max Output Current</th>
<th>Features</th>
</tr>
</thead>
</table>
| MB39A119    | One to four cell Li-ion     | 8V - 25V            | 4.2V/cell      | 4A*               | Intelligent charging profile  
|             |                             |                     |                |                   | Built-in 2 mode constant current control  
|             |                             |                     |                |                   | Built-in off time control function  
|             |                             |                     |                |                   | High accuracy (< ±0.5%) charge control  
|             |                             |                     |                |                   | High efficiency  
|             |                             |                     |                |                   | *Max output current depends on external FET |
| MB39A132A   | Two to four cell Li-ion     | 8V - 25V            | 4.0V, 4.2V or 4.35V/cell | 4A*               |                                                                    |
| MB39A134    | Two to four cell Li-ion     | 8V - 25V            | 4.2V or 4.1V/cell | 3A*               |                                                                    |
| Ag112-1     | Single cell Li-ion & Li-Po | 9V - 36V            | 4.1V or 4.2V   | 1500mA            | Intelligent 'top-up' float charge  
|             |                             |                     |                |                   | Battery reversal protection  
|             |                             |                     |                |                   | Charge condition indicator outputs  
|             |                             |                     |                |                   | Temperature compensation  
|             |                             |                     |                |                   | High accuracy (<1%) charge voltage (Ag112)  
|             |                             |                     |                |                   | Ready to use modules  
|             |                             |                     |                |                   | Only one external low cost capacitor required |
| Ag112-2     | Two cell Li-ion & Li-Po     | 9V - 36V            | 8.2V or 8.4V   | 1200mA            |                                                                    |
|             |                             | 12V - 36V           |                | 1500mA            |                                                                    |
| Ag112-3     | Three cell Li-ion & Li-P    | 12V - 36V           | 12.3V or 12.6V | 900mA             |                                                                    |
|             |                             | 14V - 36V           |                | 1200mA            |                                                                    |
| Ag102       | Sealed lead acid            | 9V - 36V            | 12V            | 1.2Ah to 7Ah      |                                                                    |
| XC6801      | Single Li-ion cell          | 4.25V - 6V          | 4.2V           | 500mA             | Accuracy: ±0.7%  
|             |                             |                     |                |                   | Automatic recharge  
|             |                             |                     |                |                   | Charge status output pin  
|             |                             |                     |                |                   | Trickle charge voltage : 2.9V ±3%  
|             |                             |                     |                |                   | Industrial temperature support |
| XC6802      | Single Li-ion cell          | 4.25V - 6V          | 4.2V           | 800mA             |                                                                    |

### Charging Characteristics

**Charge Profile for Sealed Lead Acid Charger (Ag102)**

- **Constant Current (Bulk Charge)**
- **Two Stage Constant Voltage (Absorption Charge)**
- **Pulsed (Float Charge)**
- **Battery Capacity Threshold**
- **Charge Voltage**
- **Charge Current**
- **Charging Time**

**Charge Profile for Lithium-Ion Chargers**

- **Charging Voltage**
- **Constant Current**
- **Stop Charging**
- **Time**