The bq29700 EVM is a complete evaluation system for the bq297xy family of second-level protectors. The EVM includes one bq29700-based circuit module.

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1 Features

• bq29700-based circuit module
• Link to support documentation

1.1 Ordering Information

Table 1. Ordering Information

<table>
<thead>
<tr>
<th>EVM Part Number</th>
<th>Chemistry</th>
<th>Configuration</th>
<th>Capacity</th>
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</thead>
<tbody>
<tr>
<td>bq29700EVM-610</td>
<td>Li-Ion</td>
<td>1-Series Cell</td>
<td>Any</td>
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</tbody>
</table>
2 bq29700-Based Circuit Module

The bq29700-based circuit module is a complete and compact example solution of a bq29700 battery protection IC. The circuit module includes one bq29700 IC, charge and discharge FETs, and all other onboard components necessary to use and interface with the protector. The circuit module connects directly across the battery.

2.1 Circuit Module Connections

Contacts on the circuit module provide the following connections:

- Direct connection to the cell: Cell+, Cell–
- The system load and charger connect across Pack+ and Pack–

2.2 Pin Descriptions

<table>
<thead>
<tr>
<th>PIN NAME</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell–</td>
<td>Cell negative terminal</td>
</tr>
<tr>
<td>Cell+</td>
<td>Cell positive terminal</td>
</tr>
<tr>
<td>Pack–</td>
<td>Load or charger negative terminal</td>
</tr>
<tr>
<td>Pack+</td>
<td>Load or charger positive terminal</td>
</tr>
</tbody>
</table>

3 bq29700 Circuit Module Schematic

This section contains information on the schematic for the bq29700 implementation.

3.1 Charge and Discharge FETs

The bq29700 protector has the capability to control low-side charge and discharge FETs. These FETs have been included on the EVM board module. Test points TP4 and TP5 have been provided to allow for easy gate-to-source measurements.

NOTE: TP4 and TP6 test points are swapped on the A version of the EVM silk screen. TP4 should be DOUT and TP6 should be V–.
4 Circuit Module Physical Layouts and Bill of Materials

This section contains the board layout, bill of materials, and assembly drawings for the bq29700 circuit module.

4.1 Board Layout

This section shows the dimensions, PCB layers, and assembly drawing for the bq29700 module.

Figure 2. Top Assembly

Figure 3. Top Layer

Figure 4. Bottom Layer
4.2 Bill of Materials

Table 2. Bill of Materials

<table>
<thead>
<tr>
<th>Designator</th>
<th>Quantity</th>
<th>Value</th>
<th>Description</th>
<th>Package Reference</th>
<th>Part Number</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB1</td>
<td>1</td>
<td></td>
<td>Printed Circuit Board</td>
<td></td>
<td>PWR610</td>
<td>Any</td>
</tr>
<tr>
<td>C1</td>
<td>1</td>
<td>0.1 µF</td>
<td>CAP, CERM, 0.1µF, 50V, ±10%, X7R, 0603</td>
<td>0603</td>
<td>GRM188R71H104KA93D</td>
<td>MuRata</td>
</tr>
<tr>
<td>J1, J2</td>
<td>2</td>
<td></td>
<td>Terminal Block, 6A, 3.5mm Pitch, 2-Pos, TH</td>
<td>7.0 x 8.2 x 6.5 mm</td>
<td>ED555/2DS</td>
<td>On-Shore Technology</td>
</tr>
<tr>
<td>Q1, Q2</td>
<td>2</td>
<td>25 V</td>
<td>MOSFET, N-CH, 25V, 5A, SON 2x2 mm</td>
<td>SON 2x2 mm</td>
<td>CSD16301Q2</td>
<td>Texas Instruments</td>
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<tr>
<td>R1</td>
<td>1</td>
<td>330</td>
<td>RES, 330 ohm, 5%, 0.063W, 0402</td>
<td>0402</td>
<td>CRCW0402330RJNED</td>
<td>Vishay-Dale</td>
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<tr>
<td>R2</td>
<td>1</td>
<td>2.2 kΩ</td>
<td>RES, 2.2 kohm, 5%, 1/16W, 0402</td>
<td>0402</td>
<td>CRCW04022K20JNED</td>
<td>Vishay Dale</td>
</tr>
<tr>
<td>R3, R4</td>
<td>2</td>
<td>5.1 MΩ</td>
<td>RES, 5.1 Mohm, 5%, 1/16W, 0402</td>
<td>0402</td>
<td>RC1005J515CS</td>
<td>Samsung Electromechanics</td>
</tr>
<tr>
<td>TP1</td>
<td>1</td>
<td>Red</td>
<td>Test Point, Miniature, Red, TH</td>
<td>Red Miniature Test point</td>
<td>5000</td>
<td>Keystone</td>
</tr>
<tr>
<td>TP2, TP3,</td>
<td>5</td>
<td>Black</td>
<td>Test Point, Miniature, Black, TH</td>
<td>Black Miniature Test point</td>
<td>5001</td>
<td>Keystone</td>
</tr>
<tr>
<td>TP4, TP5,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U1</td>
<td>1</td>
<td></td>
<td>Li-Ion/Li Polymer Battery Protection IC, DSE0006A</td>
<td>DSE0006A</td>
<td>bq29700DSE</td>
<td>Texas Instruments</td>
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</tbody>
</table>

4.3 bq29700 Circuit Module Performance Specification Summary

This section summarizes the performance specifications of the bq29700 circuit module.

Performance Specification Summary

<table>
<thead>
<tr>
<th>Specification</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage Pack+ to Pack−</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Charge and discharge current</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>A</td>
</tr>
</tbody>
</table>

5 EVM Hardware and Software Setup

This section describes how to connect the different components of the bq29700 EVM. Figure 5 shows how to connect the bq29700 circuit module to the cell and system load or charger.
Figure 5. bq29700 Circuit Module Connection to Cell and System Load/Charger
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EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 0 V to 18 V and the output voltage range of (N/A).

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User’s Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 60°C. The EVM is designed to operate properly with certain components above 60°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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