# Supercapacitor Backup Power Supply with Active Cell Balancing Reference Design

(ACTIVE) PMP9766

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## Key Document

- PMP9766 Test Results (PDF 429 KB)
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Supercapacitor Backup Power Supply with Active Cell Balancing Reference Design

Fully assembled board (shown above) developed for testing and performance validation only, not available for sale.

## Description

This reference design describes a backup power circuit which addresses instantaneous protection against power interruptions by using a buck-boost converter and two stacked supercapacitors. The implementation is based on a completely integrated TPS63020 buck-boost converter circuit enabling a small total solution size. The design also provides an active cell balancing circuit. This configuration has been tested with a full test report and operation explanation.

## Features

- No glitches at the automatic transition from main power to backup power operation
- Active cell balancing
- Backup-capacitor type and size are selectable to meet backup power needs
- Up to 15 Watt output power
- Small and high efficiency single converter solution
- Support of pulsed loads connected to a weak supply

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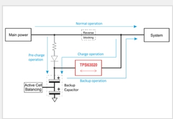
## Schematic/Block Diagram

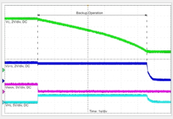
Quickly understand overall system functionality.




Download Schematic

## Test Data

Get results faster with test and simulation data that's been verified.

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## Design Files

Download ready-to-use system files to speed your design process. Get Viewer.

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## Bill of Materials (BOM)

Find the complete list of components in this reference design.

Download BOM

## Parametrics

| | PMP9766 |
|---|---|
| Vin (Min) (V) | 3 |
| Vin (Max) (V) | 5 |
| Vout (Nom) (V) | 3.3 |
| Iout (Max) (A) | .5 |
| Output Power (W) | 1.65 |
| Isolated/Non-isolated | Non-isolated |
| Input Type | DC |
| Topology | Buck Boost- Integrated Switch |

## TI Devices (3)

Order samples, get tools and find more information on the TI products in this reference design.

| Part Number | Name | Product Family | Sample & Buy | Design Kits & Evaluation Modules |
|---|---|---|---|---|
| LP2998 | DDR Termination Regulator | Power Management | Sample & Buy | View Design Kits & Evaluation Modules |
| TPS25940A | 18V, 5A, 42mΩ eFuse with Integrated Reverse Current Protection and DevSleep Support | Hot Swap Control, Protection and Monitoring | Not Available | View Design Kits & Evaluation Modules |
| TPS63020 | High Efficiency Single Inductor Buck-Boost Converter with 4A Switch | Converter (Integrated Switch) | Sample & Buy | View Design Kits & Evaluation Modules |

## CAD/CAE symbols

| Part # | Package \| Pins | CAD File (.bxl) | STEP Model (.stp) |
|---|---|---|---|
| LP2998 | SOIC (D) \| 8 | Download | Download |
| | HSOP (DDA) \| 8 | Download | Download |
| TPS63020 | VSON (DSJ) \| 14 | Download | - |

Texas Instruments and Accelerated Designs Inc. have collaborated together to provide TI customers with schematic symbols and PCB layout footprints for TI products.

**Step 1:** Download and install the Ultra Librarian software ZIP: 62MB

**Step 2:** Download the Symbol and Footprint .bxl file.

- read more -

## Technical Documents

### Application notes (1)

| Title | Abstract | Type | Size (KB) | Date | Views |
|---|---|---|---|---|---|
| High-Efficiency Backup Power Supply | Read Abstract | PDF | 218 | 11 Dec 2014 | 384 |

### User guides (1)

| Title | Abstract | Type | Size (KB) | Date | Views | TI Recommends |
|---|---|---|---|---|---|---|
| PMP9766 Test Results | | PDF | 429 | 22 Sep 2015 | 113 | ✓ |

### Design files (5)

| Title | Abstract | Type | Size (KB) | Date | Views |
|---|---|---|---|---|---|
| PMP9766 Gerber | | ZIP | 330 | 29 Sep 2015 | 17 |
| PMP9766 PCB (3D) | | PDF | 382 | 29 Sep 2015 | 12 |
| PMP9766 PCB | | PDF | 308 | 29 Sep 2015 | 15 |
| PMP9766 BOM | | PDF | 101 | 29 Sep 2015 | 27 |
| PMP9766 Schematic | | PDF | 429 | 29 Sep 2015 | 79 |

## Related Tools & Software

### Reference Designs (2)

| Name | Part Number | Tool Type |
|---|---|---|
| Backup Power Solution Using Supercap with TPS61030 for Data Concentrator Circuit Reference Design | PMP9755 | TI Designs |
| High-Efficiency Backup Power Supply Reference Design | PMP9761 | TI Designs |

### Applications

- Other PLC
- Solid State Drive (SSD): Enterprise

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