ULTRACAPACITORS

WIND APPLICATION BRIEF

Increasing Wind Reliability and Reducing the Maintenance Cost of Wind Assets. Maxwell Technologies' ultracapacitor cells and modules operate in over 30,000 wind turbines worldwide and have a proven track record of superior reliability in the failsafe operation of wind turbines. Maxwell's ultracapacitors provide burst power for the wind turbine's electric pitch control system to optimize wind turbine output and ensure rotor speed remains within a safe operating range. With an operating temperature range of –40 to 65°C (–40 to 149°F) and the ability to perform hundreds of thousands of cycles*, Maxwell ultracapacitors can operate under a wide temperature range and eliminate the significant maintenance cost associated with battery service and replacement.

Stabilizing the Grid. As an increased amount of global power is generated by intermittent wind energy, energy storage resources must be put into place to stabilize the grid. Maxwell ultracapacitor energy storage provides fast-response for voltage stabilization and frequency regulation. Maxwell collaborates with utilities, wind asset owners, and systems integrators alike to design the most valuable, project-specific ultracapacitor solutions.

Maxwell's 16 V modules and 160 V module are ideal for use in wind applications.

Features and Benefits

- Significantly reduces lifetime system maintenance costs
- Delivers high performance in nearly all weather conditions
- Virtually eliminates site visits to change out batteries
- Provides the most cost-effective, minimal maintenance backup power solution
- Provides up to 15 year lifetime*

*Applicable in certain operating conditions. See datasheet for details. Actual results may vary.

Maxwell TECHNOLOGIES
Enabling Energy's Future™

ULTRACAPACITORS

WIND APPLICATION BRIEF

Ultracapacitors

Ultracapacitors are also known as electric double layer capacitors (EDLC), or supercapacitors. Ultracapacitors are alternative energy storage devices which store energy by electrostatically (physically) separating positive and negative charges. This is in contrast to batteries, which store energy via chemical reaction. The lack of chemical reaction within permits ultracapacitors to be charged and discharged up to hundreds of thousands of cycles* (compared with hundreds or thousands of charge/discharge cycles in batteries) and at a faster rate than batteries.

All Maxwell ultracapacitors can be rapidly charged and discharged over and over again, at the same rate, making them one of the most energy-efficient, environmentally friendly, and cost-effective ways to store energy.

Background

Maxwell Technologies is the global leader in ultracapacitor technology and is helping to change the way energy is used and stored. Our ultracapacitor products provide energy storage and power delivery solutions for applications in an array of industries, including automotive, heavy transportation, renewable energy, backup power, wireless communications and consumer and industrial electronics.

Available in a range of component cells and modules, our ultracapacitor products bring new levels of efficiency and power to everything from consumer electronics to hybrid vehicles and renewable energy sources. Maxwell's ultracapacitors ensure an ideal solution for virtually any application for up to hundreds of thousands of recharge cycles or 15 years life.*

Our proprietary electrode technology and global manufacturing facilities allow us to deliver unsurpassed value to our customers, while tailoring performance to specific applications.

Specifications

	16 V Small Cell Module	16 V Module	75 V Module	160 V Module
Capacitance	58 F	500 F	94 F	5.8 F
Voltage	16 V	16 V	75 V	160 V
Projected DC Life at 25°C	10 years	10 years	15 years	10 years

Product sizes not to scale.
*Applicable in certain operating conditions. See datasheets for details. Actual results may vary.

Maxwell Technologies, Inc.
Global Headquarters
3888 Calle Fortunada
San Diego, CA 92123
USA
Tel: +1 (858) 503-3300
Fax: +1 (858) 503-3301

Maxwell Technologies SA
Route de Montena 65
CH-1728 Rossens
Switzerland
Tel: +41 (0)26 411 85 00
Fax: +41 (0)26 411 85 05

Maxwell Technologies, GmbH
Leopoldstrasse 244
80807 Münich
Germany
Tel: +49 (0)89 4161403 0
Fax: +49 (0)89 4161403 99

Maxwell Technologies Shanghai Trading Co., Ltd
Unit A2BC, 12th Floor
Huarun Times Square
500 Zhangyang Road, Pudong
Shanghai 200122, P.R. China
Phone: +86 21 3852 4000
Fax: +86 21 3852 4099

Maxwell Technologies Korea Co., Ltd
Room 1524, D-Cube City Office Tower, 15F
#662 Gyeongin-Ro, Guro-Gu,
Seoul, Korea 152-706
Phone: +82 10 4518 9829

Document number: 3001016-EN.1 maxwell.com

Maxwell TECHNOLOGIES
Enabling Energy's Future™