

## DA9053

### Flexible high power system PMIC with 1.8 A switching USB power manager

**DA9053 is a quad-buck PMIC with supply domain flexibility to support a wide range of application processors, associated peripherals, and user interface functions. Combining a dual input switched-mode USB-compatible charger, full power-path management, four bucks, ten linear regulators, and support for multiple sleep modes: the DA9053 offers an energy-optimised solution suitable for portable handheld, wireless, industrial, and infotainment applications.**

The high-efficiency Li-Ion/Polymer switching charger supports precise current/voltage charging as well as pre-charge and USB modes without processor interaction. During charging, the die temperature is thermally regulated enabling high-capacity batteries to be rapidly charged at currents up to 1.8 A with minimum thermal impact. USB suspend mode operation is supported and, for robustness, the power inputs are protected against over-voltage conditions.

The autonomous power-path controller seamlessly detects and manages energy flow between an AC adaptor, USB cable, and battery while maintaining USB power specification compliance. The internally-generated system power rail supports power scenarios such as instant-on with a fully discharged battery. A reverse-protected backup battery charger is also integrated into the power-path function.

Controlled by a programmable digital power manager, the 14 user-programmable switched/linear regulators can be configured to meet the start-up sequence, voltage, and timing requirements for most applications. The power manager includes supply-rail qualification and system reset management. For optimal processor energy-per-task performance, Dynamic Voltage Scaling (DVS) is available on up to five supply domains. Dialog's patented SmartMirror™ dynamic biasing is implemented on all linear regulators.

An integrated 10-channel general purpose ADC includes support for a touch screen controller with pen down detect, programmable high/low thresholds, an integrated current source for resistive measurements, and system voltage monitoring with a programmable low-voltage warning. The ADC has 8-bit resolution in auto-mode and 10-bit resolution in manual conversion mode.



*VFPGA 7 mm x 7 mm, 0.5 mm pitch and  
VFPGA 11 mm x 11 mm, 0.8 mm pitch  
package, consumer and automotive grade  
options*

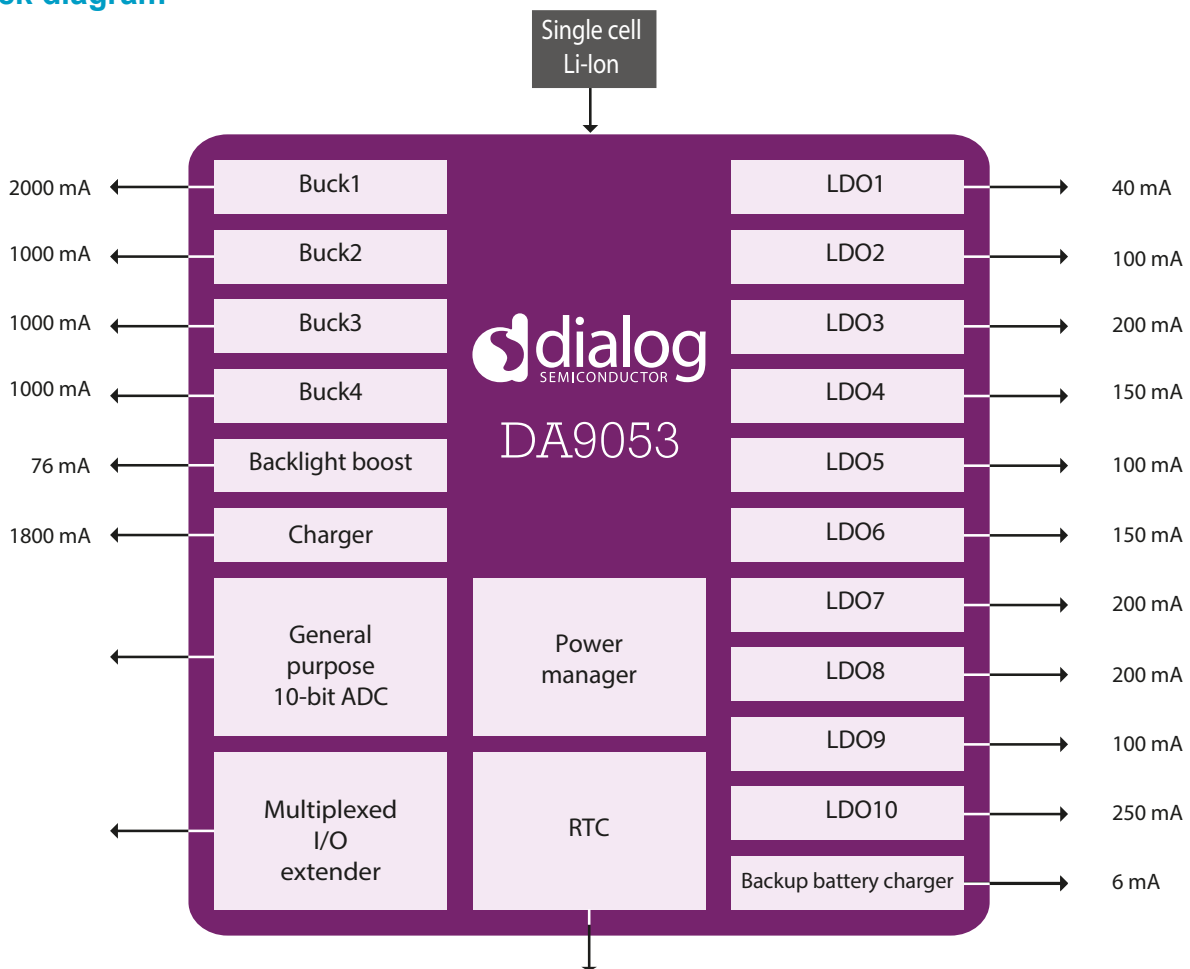
## Features

- ▶ Switched DC/USB charger with power-path management
- ▶ Four buck converters (three with DVS) 0.5 V to 2.5 V, up to 2 A
- ▶ Ten programmable high PSRR LDOs
- ▶ Low power backup charger 1.1 V to 3.1 V, up to 6 mA
- ▶ 32 kHz Real Time Clock (RTC) with alarm wake-up
- ▶ 10-channel general purpose ADC with touch screen interface with pen down detect
- ▶ High-voltage boost for white LED driver
- ▶ Sixteen flexible GPIO pins for enhanced wakeup and peripheral control
- ▶ 2-wire and 4-wire control interfaces
- ▶ System watchdog function
- ▶ -40 °C to +125 °C junction temperature operation
- ▶ Automotive AEC-Q100 Grade 3 option

## Typical applications

- ▶ Mobile internet devices
- ▶ Tablet PCs
- ▶ Personal navigation devices
- ▶ Consumer and in-vehicle infotainment devices
- ▶ IoT devices

## Block diagram



## Generated supply domains

Regulator	Supplied voltage	Supplied max. current	External component	Notes
BUCKCORE	0.5 V to 2.075 V ±3 % accuracy	2000 mA	2.2 µH	DVS, 2 MHz, 25 mV steps, DVS ramp with controlled slew rate, pull-down resistor
BUCKPRO	0.5 V to 2.075 V ±3 % accuracy	1000 mA	2.2 µH	DVS, 2 MHz, 25 mV steps, DVS ramp with controlled slew rate, pull-down resistor
BUCKPERI	0.95 V to 2.525 V ±3 % accuracy	1000 mA	2.2 µH	2 MHz, 50/100 mV steps
BUCKMEM	0.95 V to 2.525V ±3 % accuracy	1000 mA	2.2 µH	DVS, 2 MHz, 25 mV steps, DVS ramp with controlled slew rate, pull-down resistor
LDO1	0.6 V to 1.8 V ±3 % accuracy	40 mA	1.0 µF	High PSRR, low noise LDO, 50 mV steps
LDO2	0.6 V to 1.8 V ±3 % accuracy	100 mA	1.0 µF	DVS, digital LDO, 25 mV steps, DVS with controlled slew rate
LDO3	1.725 V to 3.3 V ±3 % accuracy	200 mA	2.2 µF	DVS, digital LDO, 25 mV steps, DVS with controlled slew rate
LDO4	1.725 V to 3.3 V ±3 % accuracy	150 mA	2.2 µF	Digital LDO, 25 mV steps, optional hardware control via GPI
LDO5	1.2 V to 3.6 V ±3 % accuracy	100 mA	1.0 µF	Digital LDO, 50 mV steps, optional hardware control via GPI
LDO6	1.2 V to 3.6 V ±3 % accuracy	150 mA	2.2 µF	High PSRR, low noise, 50 mV steps
LDO7	1.2 V to 3.6 V ±3 % accuracy	200 mA	2.2 µF	High PSRR, low noise, 50 mV steps
LDO8	1.2 V to 3.6 V ±3 % accuracy	200 mA	2.2 µF	High PSRR, low noise, 50 mV steps
LDO9	1.25 V to 3.6 V ±1 % accuracy	100 mA	1.0 µF	High PSRR, low noise, 50 mV steps, optional hardware control via GPI
LDO10	1.2 V to 3.6 V ±3 % accuracy	250 mA	2.2 µF	High PSRR, low noise, 50 mV steps

### Dialog Semiconductor Worldwide Sales Offices - [www.dialog-semiconductor.com](http://www.dialog-semiconductor.com)

email: [info@diasemi.com](mailto:info@diasemi.com)

United Kingdom  
Phone: +44 1793 757700

The Netherlands  
Phone: +31 73 640 88 22

Japan  
Phone: +81 3 5425 4567

Singapore  
Phone: +65 648 499 29

Korea  
Phone: +82 2 3469 8200

Germany  
Phone: +49 7021 805-0

North America  
Phone: +1 408 845 8500

Taiwan  
Phone: +886 281 786 222

Hong Kong  
Phone: +852 3769 5200

China (Shenzhen)  
Phone: +86 755 2981 3669  
China (Shanghai)  
Phone: +86 21 5424 9058

This publication provides outline information only, which unless agreed by Dialog Semiconductor may not be used, applied or reproduced for any purpose, or be regarded as a representation relating to products. Please refer to Dialog standard supply terms on the company website ([www.dialog-semiconductor.com](http://www.dialog-semiconductor.com)).

© Dialog Semiconductor 2015. All rights reserved. DA9053 PB 2v0