

DA9210

12A multi-phase DC-DC buck converter

The DA9210 is a synchronous 12 A step-down converter typically supplying high current processor core rails in smartphones, tablets, Ultrabooks™, automotive, and embedded applications. The DA9210 is also suitable for powering high-end FPGAs.

The benefits of the DA9210 quad-phase buck converter include: low-profile <1 mm, 0.47 μH inductors; high efficiency over wide load conditions; and low level output ripple. The buck is capable of delivering up to 12 A continuous output current at an output voltage range of 0.3 V to 1.57 V.

The latest multi-core processors transition from sleep to full load mode in microseconds: the DA9210 has a load transient response of 10 A/μs that exceeds these most demanding requirements.

The input voltage range of 2.8 V to 5.5 V makes it suitable for use in single-cell Li-Ion battery applications or in applications powered by standard 5 V or USB power supplies. Two DA9210s can be used in parallel to deliver 24 A output current, suitable for the highest performing processors, such as those utilizing multiple ARM Cortex A15™ cores. Phase-shedding delivers higher efficiency at lower load currents by disabling phases when necessary.

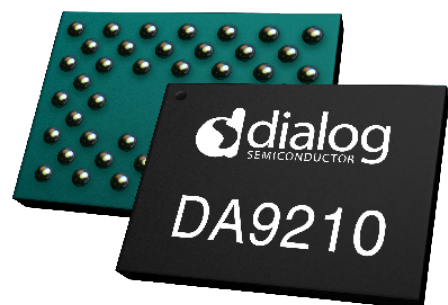
The DA9210 point-of-load remote-sensing feature ensures maximum accuracy while supporting multiple PCB routing scenarios without loss of performance. The highly-integrated design removes the need for external switching FETs or Schottky diodes.

A programmable soft-start feature is available to limit the supply inrush current. This is achieved by controlling the slew-rate of the output during start-up of the rail.

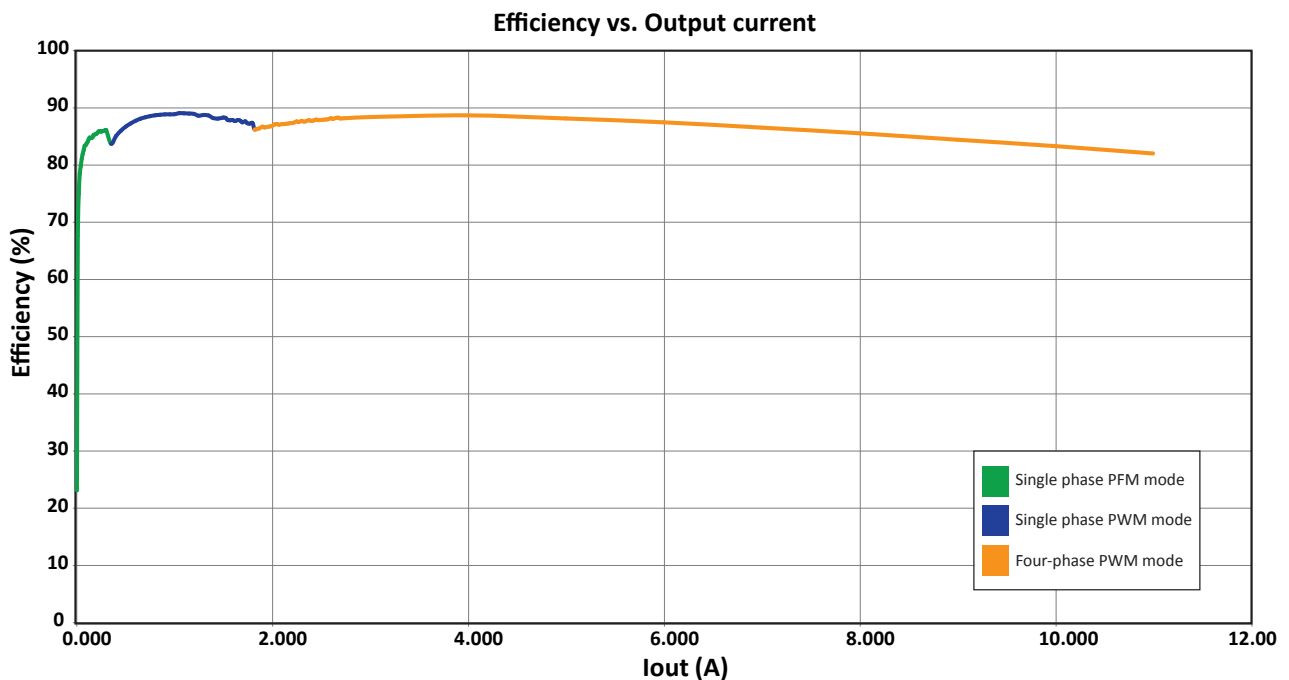
Dynamic Voltage Scaling (DVS) supports adaptive adjustment of the supply voltage dependent on the processor load. The DA9210 offers three control options for DVS: direct register write through the communication interface (I²C or SPI compatible), a dedicated DVS control interface, or by using a GPIO.

For increased system reliability the DA9210 has integrated over-temperature and over-current protection. To allow the processor to manage the regulator load, 'Power-Good and Over-Current' signals informs the processor when the buck voltage is out of range or if the current exceeds a programmable limit.

The DA9210 sub-PMIC is designed to operate seamlessly with Dialog system PMICs such as DA9061, DA9062, and DA9063. It is also available in automotive grade to AEC-Q100 Grade 3 (DA9210-A).



*4 mm x 3 mm WLCSP consumer and
42 BGA 5.6 mm x 4.8 mm 0.8 mm pitch
automotive package options*



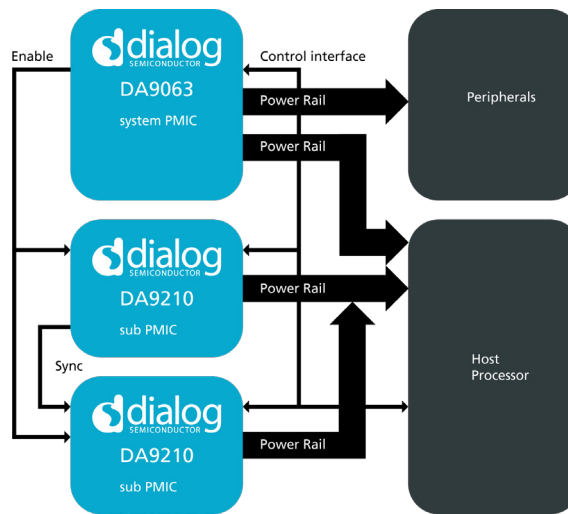
DA9210 high efficiency achieved through phase-shedding. $V_{in}=3.6\text{ V}$, $V_{out}=1.0\text{ V}$

Features

- ▶ 2.8 V to 5.5 V input voltage
- ▶ 0.3 V to 1.57 V output voltage
- ▶ 12 A output current
- ▶ 24 A output current in parallel configuration
- ▶ 3 MHz nominal switching frequency
 - Enables use of low-profile inductors
- ▶ Output voltage accuracy $\pm 2.5\%$
- ▶ Dynamic Voltage Scaling (DVS)
- ▶ Automatic phase-shedding
- ▶ Integrated power switches
- ▶ Remote-sensing at point-of-load
- ▶ Adjustable soft-start
- ▶ Power-Good and Over-Current signal
- ▶ Interfaces:
 - I²C and SPI
 - Dedicated DVS
 - GPIO
- ▶ -40 °C to +125 °C junction temperature operation
- ▶ Regulator supervision with automatic under- and over-voltage protection
- ▶ Coin cell/super-capacitor backup charger
- ▶ Automotive AEC-Q100 Grade 3 option (DA9210-A), package 42 BGA 0.8 mm pitch

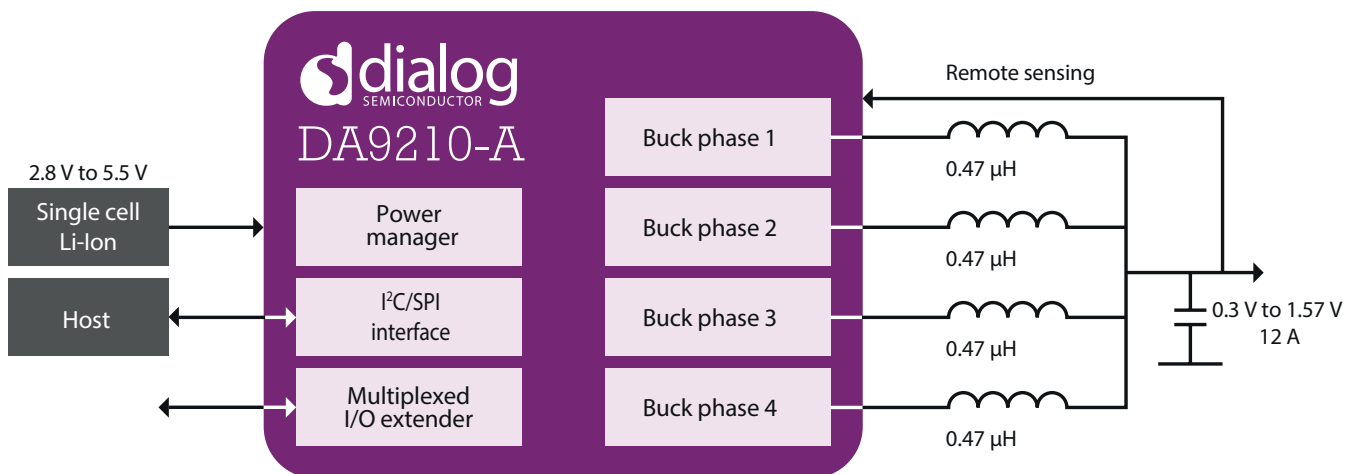
Typical applications

- ▶ High performance multi-core system-on-chip (SoC) applications
- ▶ Smartphones
- ▶ Mobile phones
- ▶ Ultrabooks™
- ▶ Tablet PCs
- ▶ In-car infotainment/dashboard
- ▶ Portable navigation devices
- ▶ Full-scale integrated cockpits
- ▶ Heads-up displays (HUDs)
- ▶ Telematics
- ▶ TV and media players
- ▶ Embedded industrial systems



DA9210 system diagram

Block diagram



Dialog Semiconductor Worldwide Sales Offices - www.dialog-semiconductor.com

email: 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

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Phone: +1 408 845 8500

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Phone: +886 281 786 222

Hong Kong
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China (Shenzhen)
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