DA9217 / DA9220

### High-Performance DC-DC up to 6 A (DA9217) / 3 A (DA9220)

The DA9217 / DA9220 family of DC-DC Buck Converters is optimized for the supply of CPUs, GPUs, and DDR memory rails in smartphones, tablets, FPGAs, and other portable applications. The fast load transient response and load regulation are optimized for the latest generation of multi-core application processors.

Features	Benefits	Applications
• 2.5 V to 5.5 V input voltage • 0.3 V to 1.9 V output voltage • Automatic phase shedding (DA9217) • 4 MHz nominal switching frequency • ±1 % accuracy (static) • ±5 % accuracy (dynamic) • I²C compatible interface (FM+) • Programmable GPIOs • Adjustable soft-start • Voltage, current, and temperature supervision • -40 °C to +85 °C temperature range • Package: 24WLCSP 2.5 mm x 1.7 mm (0.4 mm pitch)	• Integrated power switches • Dynamic voltage control (DVC) • Provision of power directly at the point of load (granular power) • High efficiency over a wide output range • Differential remote sensing • Small height components	• Smartphones • Tablet PCs • Infotainment • Ultrabooks™ • WiFi-modules • Game consoles

Device Information

Part	Phases	Rails	Current	Package
DA9217	2	1	6A	24WLCSP
DA9220	1	2	2x 3 A	24WLCSP

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Efficiency Diagram DA9217

DA9217 Efficiency at VOUT = 1.0 V
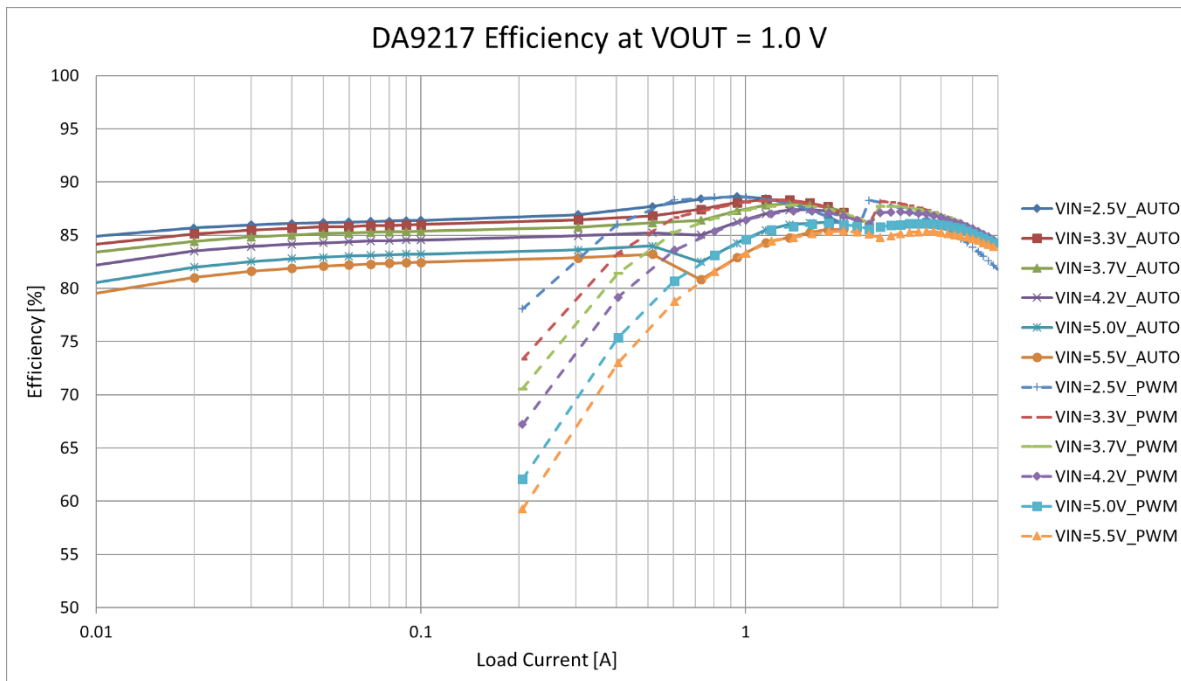
DA9217 operates as a dual-phase buck converter, delivering up to 6 A output current. The output voltage is programmable from 0.3 V to 1.9 V in 10 mV increments. The input voltage range of 2.5 V to 5.5 V makes it suitable for a wide variety of low-voltage systems, including all Li-Ion battery powered applications. To guarantee the highest accuracy and to support multiple PCB routing scenarios without loss of performance, a remote differential sensing capability is implemented.

A programmable soft start-up limits the inrush current from the input node and secures a slope-controlled activation of the rail. The dynamic voltage control (DVC) supports adaptive adjustment of the supply voltage depending on the processor load through a software communication interface. DA9217 features integrated over-temperature and over-current protection for increased system reliability without the need for external sensing components. For the implementation of multi-rail PMICs the configurable I^{2}C address of DA9217 enables multiple instances to be placed in the application, each directly located at its point-of-load (granular power). The output voltage can be automatically powered-up with an individual delay from the assertion of IC_EN towards an individual start-up voltage, pre-determined via OTP, and selected via PCB routing. In the same way the output rail is powered-down with an individual delay from the release of the IC_EN signal. A variant of DA9217 offers a dedicated control port for low power operation in combination with a fixed I^{2}C slave address.
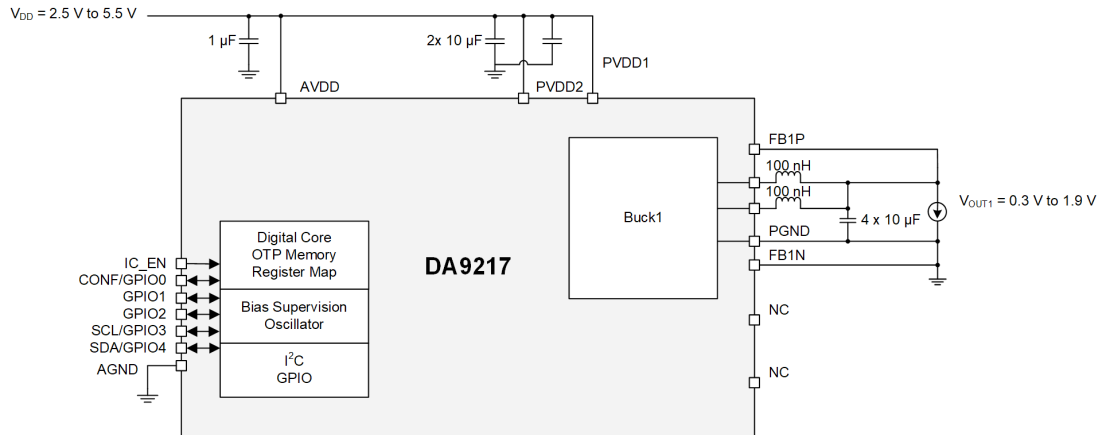
Efficiency Diagram DA9220
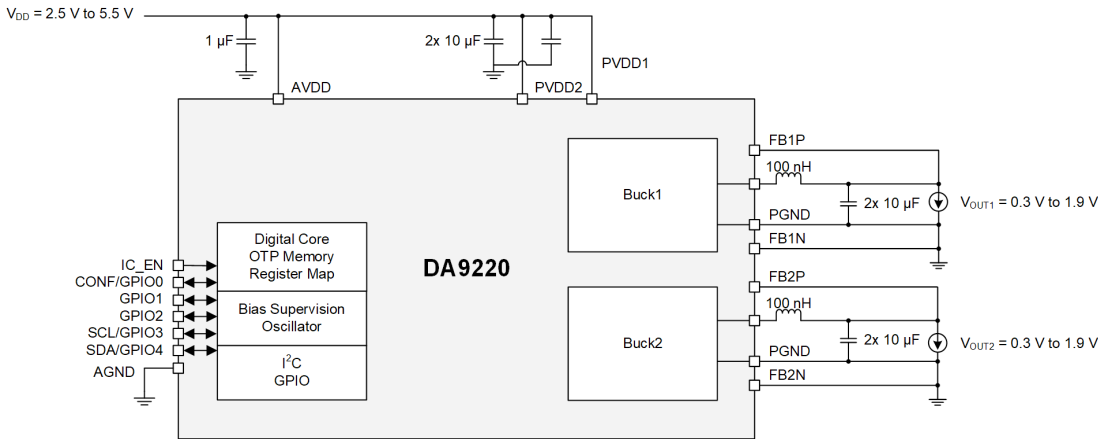

DA9220 Efficiency at VOUT = 1.0 V
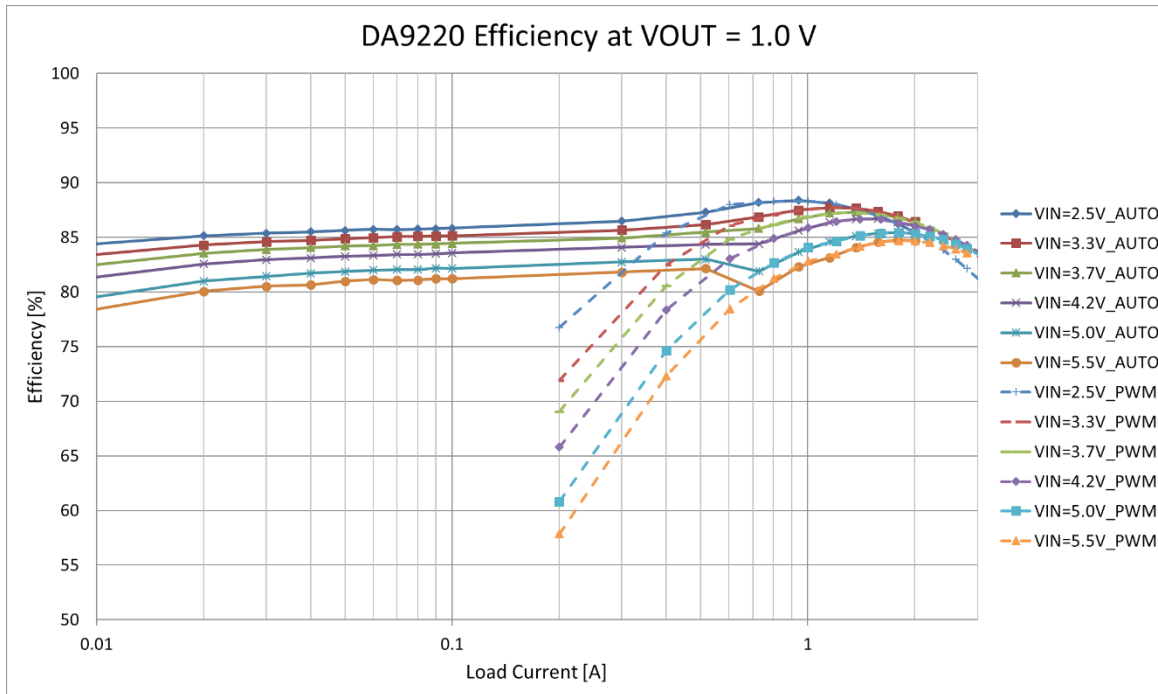
DA9220 integrates two buck converters, each delivering up to 3 A output current. The output voltage is programmable from 0.3 V - 1.9 V in 10 mV increments. The input voltage range of 2.5 V – 5.5 V makes it suited for a wide variety of low voltage systems, including all Li-Ion battery powered application. To guarantee the highest accuracy and to support multiple PCB routing scenarios without loss of performance, a remote differential sensing capability is implemented for each rail generated by DA9220.

A programmable soft start-up limits the inrush current from the input node and secures a slope controlled activation of the rail. The Dynamic Voltage Control (DVC) supports adaptive adjustment of the supply voltage depending on the processor load through a software communication interface. DA9220 feature integrated over-temperature and over-current protection for increased system reliability without the need for external sensing components. For the implementation of multi-rail PMICs the configurable I2C address of DA9220 enables up to three instances to be placed in the application, each directly located at its point-of-load (granular power). The output rails of DA9220 can be automatically powered up with an individual delay from the assertion of IC_EN towards configurable start-up voltages, pre-determined in OTP and selected via PCB routing. In the same way the rails are powered-down with individual delay from the release of the IC_EN signal. One DA9220 variant offers a dedicated hardware control port for low power operation (in combination with a fixed I2C slave address). Applications that require a high temperature warning flag are supported via the DA9220 variant without PCB configurable settings.

Simplified Schematic DA9217

V_{DD} = 2.5 V to 5.5 V

1 µF — AVDD
2x 10 µF — PVDD2
PVDD1

DA9217

Digital Core
OTP Memory
Register Map

Bias Supervision
Oscillator

I^2C
GPIO

IC_EN
CONF/GPIO0
GPIO1
GPIO2
SCL/GPIO3
SDA/GPIO4
AGND

Buck1

FB1P
100 nH
100 nH
PGND
FB1N
4 x 10 µF
V_{OUT1} = 0.3 V to 1.9 V
NC
NC

Simplified Schematic DA9220

V_{DD} = 2.5 V to 5.5 V

1 µF — AVDD
2x 10 µF — PVDD2
PVDD1

DA9220

Digital Core
OTP Memory
Register Map

Bias Supervision
Oscillator

I^2C
GPIO

IC_EN
CONF/GPIO0
GPIO1
GPIO2
SCL/GPIO3
SDA/GPIO4
AGND

Buck1

FB1P
100 nH
PGND
FB1N
2x 10 µF
V_{OUT1} = 0.3 V to 1.9 V

Buck2

FB2P
100 nH
PGND
FB2N
2x 10 µF
V_{OUT2} = 0.3 V to 1.9 V

Dialog Semiconductor Worldwide Sales Offices

www.dialog-semiconductor.com   email:info@diasemi.com

United Kingdom
Phone: +44 1793 757700

Korea
Phone: +82 2 3469 8200

Hong Kong
Phone: +852 3769 5200

The Netherlands
Phone: +31 73 640 88 22

Germany
Phone: +49 7021 805-0

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Phone: +81 3 5769 5100

North America
Phone: +1 408 845 8500

China (Shanghai)
Phone: +86 21 5424 9058

Singapore
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Taiwan
Phone: +886 281 786 222

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