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## PMICs Power Next-Gen Automotive AI SoCs

Dialog Semiconductor's DA914X-A is a family of extremely efficient, high-current, automotive-grade, stepdown dc-dc converters. According to the company, the DA914X-A buck converters deliver unprecedented current levels, up to 40 A, which represents a significantly better alternative to power solutions that require a combination of a power controller and discrete FETs.

The DA914X-A devices integrate power FETs and all required control logic into a monolithic device. Few external components are required for operation, enabling extremely low system BoM costs and solution footprints below 170 $mm^2$. The devices are said to be extremely power efficient, reducing the thermal design challenges of powering complex automotive SoCs with very high current requirements. This makes the product line well suited for powering graphics or AI embedded processors used in machine learning and vision applications for next generation autonomous vehicles.

The DA914X-A family currently includes two devices. The DA9141-A operates as a single-channel, quad-phase buck converter, delivering up to, 40-A output current. The DA9142-A operates as a single-channel, dual-phase buck converter, delivering up to, 20-A output current. All devices have an input voltage range of 2.8 V to 5.5 V and an output voltage range of 0.3 V to 1.3 V, making them suitable for a wide variety of low power systems.

"As electronics in automobiles continue to demand higher performance heterogeneous processing capability, the requirement for cost effective, space saving power solutions becomes more and more critical," said Tom Sandoval, senior vice president, GM Automotive Business Segment, Dialog Semiconductor. "The DA914X PMIC family of products offers automotive customers market leading high current power delivery solutions for multi-core automotive SoCs with embedded high-performance graphics or AI processor cores."

The DA914X-A products include several key features to meet the needs of today's complex automotive electronics systems. First, multi-phase operation delivers better transient performance, lower losses, better efficiency, optimized thermal dissipation, and minimized ripple current and voltages when compared to a single-phase architecture. Multiphase operation also enables lower PCB costs and smaller components with lower overall heights for low profile applications. The design also provides the flexibility to optimally place the inductors and capacitors close to the point of load.

Other features include remote sensing, which guarantees the highest accuracy and supports multiple PCB routing scenarios without loss of performance; and fully programmable soft start, which limits the inrush current from the input to give a slope-controlled output voltage. Another is dynamic voltage control (DVC), which enables adaptive adjustment of the supply voltage dependent on the load. This increases efficiency when the downstream circuitry enters low power or idle mode, resulting in power savings. Finally, configurable GPIOs support a range of features including $I^2C$, DVC and Power Good indicator.

The DA914X-A devices are AEC-Q100 Grade 1 qualified and are available in a 4.5-mm x 7.0-mm, 0.6-mm pitch 60-pin FC-BGA package. Industrial and commercial-grade versions are also available. For more information on this new product family, see the DA9141, DA9141-a, DA9142 and DA9142-a pages.


*Fig. 1. The DA914X-A devices are power efficient, reducing the thermal design challenges of powering complex automotive SoCs with very high current requirements. This makes the product line well suited for powering graphics or AI embedded processors used in machine learning and vision applications for next generation autonomous vehicles.*

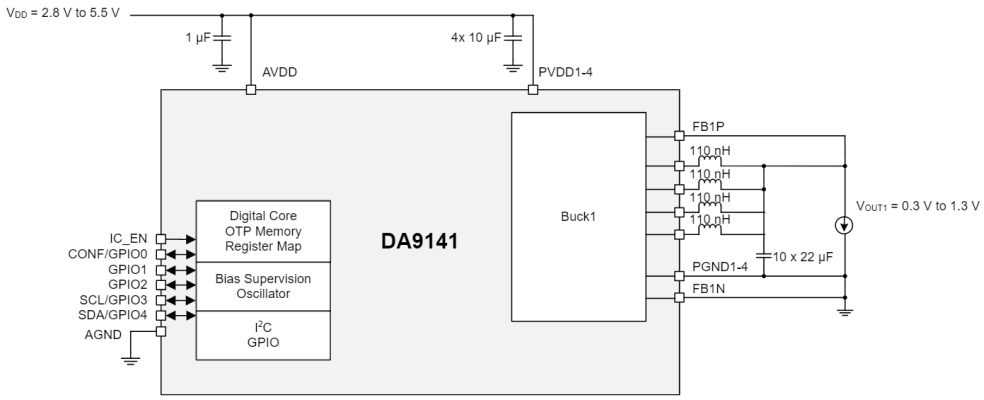


*Fig.2. The DA9141 is a high efficiency, high-current, quad-phase, buck converter with integrated switching FET's. The device can drive loads up to 40 A and is well suited for powering high-performance AI/graphics processor cores in today's complex SoCs. The device has an input voltage range of 2.8 V to 5.5 V and an output voltage range of 0.3 V to 1.3 V, making it suitable for a wide variety of low voltage systems. The DA-9141 is commercial grade, while the DA9141-A is an automotive-grade version of this IC.*

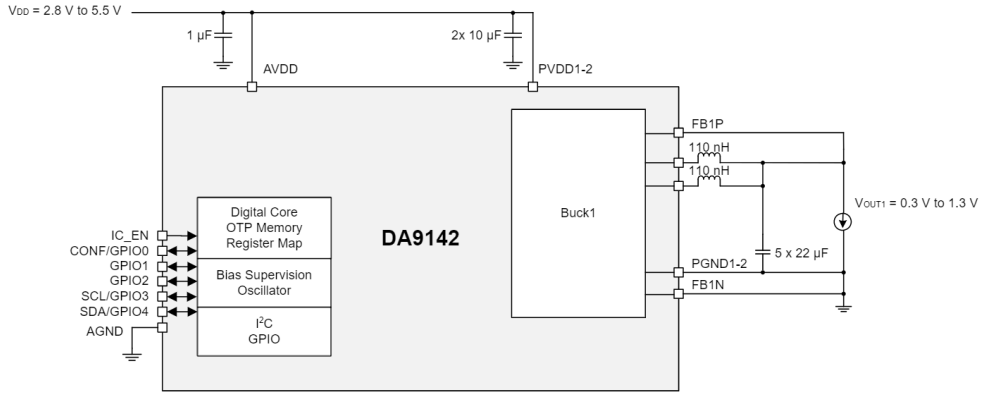


*Fig.3. The DA9142 is a high efficiency, high current, dual-phase, buck converter with integrated switching FETs. The device can drive loads up to 20 A and is well suited for powering high-performance AI/graphics processor cores in today's complex SoCs. The device has an input voltage range of 2.8 V to 5.5 V and an output voltage range of 0.3 V to 1.3 V, making it suitable for a wide variety of low-voltage systems. The DA-9142 is commercial grade, while the DA9142-A is an automotive-grade version of this IC.*