

Fact sheet

Reference design for auxiliary water pump

Automotive 3-phase motor drive offering minimal BOM and PCB size

The reference design targeting auxiliary water pump applications in the thermal management system provides an optimized layout to accelerate development. The reference design is optimized in terms of thermal performance and EMC and provides a minimal BOM. The main components used in the reference design are:

- › **TLE9879QXW40:** This device is part of the Embedded Power IC family, a System-on-Chip for BLDC motor control applications. It integrates an industry standard Arm® Cortex®-M3 core along with a LIN transceiver, a 3-phase bridge driver and a power supply.
- › **IAUC60N04S6N031H:** This is a 40 V MOSFET in 5x6 SS08 package, using Infineon's leading OptiMOS™-6 technology. It offers cost efficiency for low and mid power drive applications. Moreover, it provides sizably reduced PCB size due to enhanced routing for bridge applications.
- › **IPZ40N04S5-3R1:** This component is an OptiMOS™ 5 40 V in S308 package and it combines leading power MOSFET technology with 3.3 x 3.3 mm leadless power package for very compact and robust automotive system solutions. It enables very small and efficient system designs with minimal $R_{DS(on)}$ down to 2.8 mΩ.

The reference design includes layout and schematic files in an Altium project, along with comprehensive support documents like the reference design guide, including design considerations, thermal analysis, EMC measurements and a detailed board description. In addition, example software is available in the Software Development Kit (SDK).

Key benefits

- › **Reduced time to market** - Our reference design for auxiliary water pump reduces design complexities by providing recommendation for parts and layout. Moreover, it is a PCB-based design which takes less time in assembling a circuit in comparison to a lead frame solution. The detailed design considerations help you to speed up the overall development process and enable a fast track to market.
- › **Minimal BOM and reduced PCB size** - Due to the highly integrated Embedded Power IC device and OptiMOS™-6 40 V MOSFET in sTOLL package, providing an ultra-small footprint, reference design offers minimal BOM and reduced PCB size.
- › **State-of-the-art components designed for long service life** - The reference design is equipped with the best-in-class components with trusted Infineon quality sustaining product longevity.
- › **Scalability of the device** - Scalability of the Embedded Power IC device enables customers to extend the platform approach up to 1 kW.



Figure: Reference design for auxiliary water pump

Key features

- › Up to 140 W power capability for 12V auxiliary water pump applications
- › Optimized BOM and PCB size (55mmx55mm)
- › Optimized thermal behavior
- › SWD port for debug connection
- › Enables LIN communication
- › High-temperature FR4 PCB with 1oz, 4-layer Copper
- › Single-side component mounting
- › Extensive documentation including
 - ✓ reference design guide
 - ✓ layout files
 - ✓ schematics
 - ✓ getting started guide
 - ✓ EMC measurement report
 - ✓ thermal analysis
 - ✓ example software

 [Reference design guide preview](#)

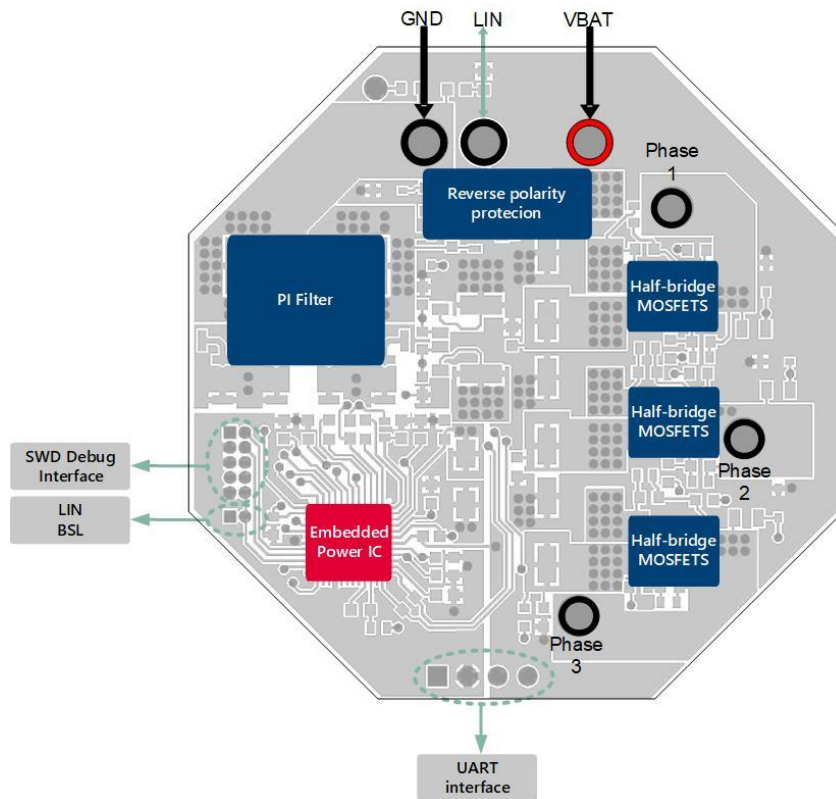
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Reference design for 100W auxiliary water pump

Automotive 3-phase motor drive offering minimal BOM and PCB size

Block Diagram



Parametrics Table

Parametrics	REF_WATERPUMP100W
Input Type	DC
P_{out} (max)	140 W
Qualification of the devices	Automotive
Supply Voltage (min - max)	$7.0\text{ V} \leq 12.0\text{ V} \leq 18.0\text{ V}$
Target Application	Auxiliary water pump
Topology	3-phase full-bridge

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