

## Product brief

# iMOTION™ IMM100

## Fully integrated Smart IPM for BLDC motor control

iMOTION™ IMM100 is a series of fully integrated Smart IPMs implementing sensorless Field Oriented Control (FOC) of a Permanent Magnet Synchronous Motor (PMSM). The combination of the iMOTION™ Motion Control Engine (“T”- variants) with the gate driver and six MOSFETs offers a complete motor drive system in a compact 12 x 12 mm<sup>2</sup> surface mount package, minimizing external components count and PCB area.

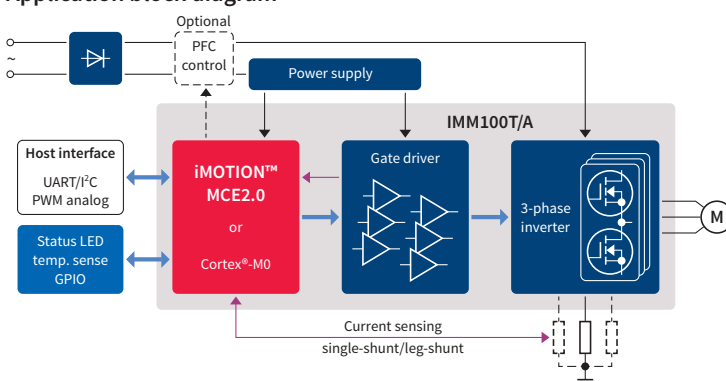
Infineon’s field-proven Motion Control Engine (MCE) implements sensorless Field Oriented Control (FOC) with single or leg-shunt current feedback and uses space vector PWM with sinusoidal signals to achieve the highest energy efficiency. Additionally, IMM100 can take over the boost Power Factor Correction (PFC) control. Powerful PC tools like MCEWizard and MCEDesigner reduce the implementation effort for a variable speed drive to a simple configuration of the MCE for the respective motor, complemented by script engine for more system-level flexibility. Alternatively, “A”- variants of IMM100 offer full flexibility of running own motor control software on ARM® Cortex®-M0 core, while taking additional advantage of the complete hardware integration.

The integrated gate driver provides the bootstrap capability, adds signal filtering and offers several hardware protection mechanisms, e.g. dead-time insertion and shoot-through prevention, overcurrent, over-/undervoltage protection and fault reporting.

The IMM100 series does not require a heatsink and addresses motor drives with a rated output power up to 30 W/60 W/80 W with 600 V maximum DC blocking voltage.

- > IMM10xT/A-015M – output rating: 500 V/6 Ω R<sub>DS(on)</sub>
- > IMM10xT/A-046M – output rating: 600 V/1.4 Ω R<sub>DS(on)</sub>
- > IMM10xT/A-056M – output rating: 600 V/0.95 Ω R<sub>DS(on)</sub>

### Application block diagram



[www.infineon.com/iMOTION](http://www.infineon.com/iMOTION)

### Key benefits

- > Lowest BOM cost
  - Controller, gate driver plus MOSFET power stage
  - Single shunt current feedback
  - Integrated bootstrap diodes
  - No heatsink required
- > iMOTION™ Motion Control Engine available in “T”- variants
  - No programming required
  - Sensorless Field Oriented Control
  - Low loss space vector PWM
  - Multiple motor support
  - Flexible host interface options
  - Optional boost PFC control
- > Industry-standard ARM® Cortex®-M0 available in “A”- variants
  - 128 kB flash, 16 kB RAM
  - 48 MHz CPU/96 MHz peripheral clock
  - Dedicated motor control blocks
- > Integrated protection features
  - Over-/undervoltage
  - Over-current, over-temperature
  - Dead time, shoot through
  - Rotor lock protection
- > PowerQFN 12 x 12 mm<sup>2</sup> package

### Target applications

- > Fans, pumps
- > Home appliances
- > Ceiling fans
- > ... any other BLDC drive



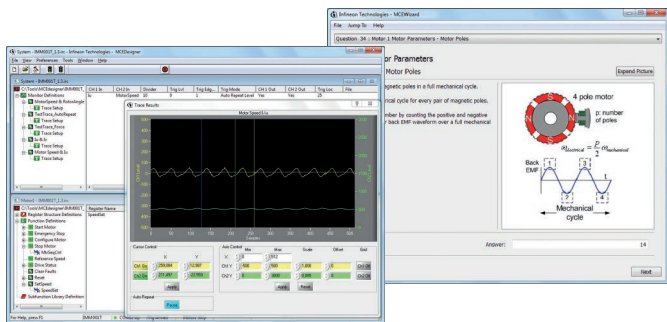
iMOTION™ tools

MCEWizard helps to create the initial motor configuration by guiding the developer through several self-explanatory questions.

MCEDesigner is used to load the motor parameter sets and fine-tune them to best meet the application requirements.

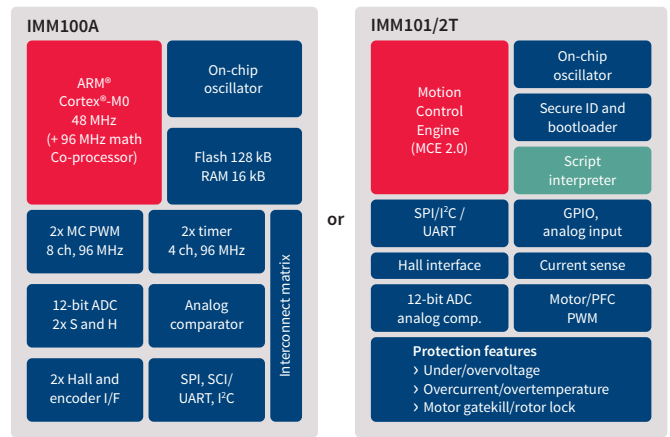
iMOTION™ script enables adding system-level features to “T”-variant devices

**MCEWizard**  
Generates drive control parameters from motor and hardware specifications



**MCEDesigner**  
Drive tuning software tool with trace features to adjust and observe internal variables

IMM100 series overview



**Integrated gate driver**

- > Bootstrap functionality
- > Undervoltage lockout
- > Fault reporting
- > Integrated minimum deadtime
- > Shoot-through prevention

**Integrated power stage MOSFETS**

- > 500 V/6 Ω
- > 600 V/1.4 Ω
- > 600 V/0.95 Ω

Ordering information

Product	MOSFET power stage	MCE 2.0/ARM® Cortex®	Features	Package
IMM101T-015M	500 V/6 Ω R <sub>DS(on)</sub>	MCE 2.0	3-phase inverter	PowerQFN 12 x 12 mm <sup>2</sup>
IMM101T-046M	600 V/1.4 Ω R <sub>DS(on)</sub>	MCE 2.0	3-phase inverter	PowerQFN 12 x 12 mm <sup>2</sup>
IMM101T-056M	600 V/0.95 Ω R <sub>DS(on)</sub>	MCE 2.0	3-phase inverter	PowerQFN 12 x 12 mm <sup>2</sup>
IMM102T-015M	500 V/6 Ω R <sub>DS(on)</sub>	MCE 2.0	3-phase inverter + PFC	PowerQFN 12 x 12 mm <sup>2</sup>
IMM102T-046M	600 V/1.4 Ω R <sub>DS(on)</sub>	MCE 2.0	3-phase inverter + PFC	PowerQFN 12 x 12 mm <sup>2</sup>
IMM102T-056M	600 V/0.95 Ω R <sub>DS(on)</sub>	MCE 2.0	3-phase inverter + PFC	PowerQFN 12 x 12 mm <sup>2</sup>
IMM100A-015M	500 V/6 Ω R <sub>DS(on)</sub>	ARM® Cortex®-M0	Programmable device	PowerQFN 12 x 12 mm <sup>2</sup>
IMM100A-046M	600 V/1.4 Ω R <sub>DS(on)</sub>	ARM® Cortex®-M0	Programmable device	PowerQFN 12 x 12 mm <sup>2</sup>
IMM100A-056M	600 V/0.95 Ω R <sub>DS(on)</sub>	ARM® Cortex®-M0	Programmable device	PowerQFN 12 x 12 mm <sup>2</sup>

Published by  
Infineon Technologies AG  
81726 Munich, Germany

© 2019 Infineon Technologies AG.  
All Rights Reserved.

Please note!

THIS DOCUMENT IS FOR INFORMATION PURPOSES ONLY AND ANY INFORMATION GIVEN HEREIN SHALL IN NO EVENT BE REGARDED AS A WARRANTY, GUARANTEE OR DESCRIPTION OF ANY FUNCTIONALITY, CONDITIONS AND/OR QUALITY OF OUR PRODUCTS OR ANY SUITABILITY FOR A PARTICULAR PURPOSE. WITH REGARD TO THE TECHNICAL SPECIFICATIONS OF OUR PRODUCTS, WE KINDLY ASK YOU TO REFER TO THE RELEVANT PRODUCT DATA SHEETS PROVIDED BY US. OUR CUSTOMERS AND THEIR TECHNICAL DEPARTMENTS ARE REQUIRED TO EVALUATE THE SUITABILITY OF OUR PRODUCTS FOR THE INTENDED APPLICATION.

WE RESERVE THE RIGHT TO CHANGE THIS DOCUMENT AND/OR THE INFORMATION GIVEN HEREIN AT ANY TIME.

Additional information

For further information on technologies, our products, the application of our products, delivery terms and conditions and/or prices, please contact your nearest Infineon Technologies office ([www.infineon.com](http://www.infineon.com)).

Warnings

Due to technical requirements, our products may contain dangerous substances. For information on the types in question, please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by us in a written document signed by authorized representatives of Infineon Technologies, our products may not be used in any life-endangering applications, including but not limited to medical, nuclear, military, life-critical or any other applications where a failure of the product or any consequences of the use thereof can result in personal injury.