

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 mm² surface mount package, minimizing external components count and PCB area.

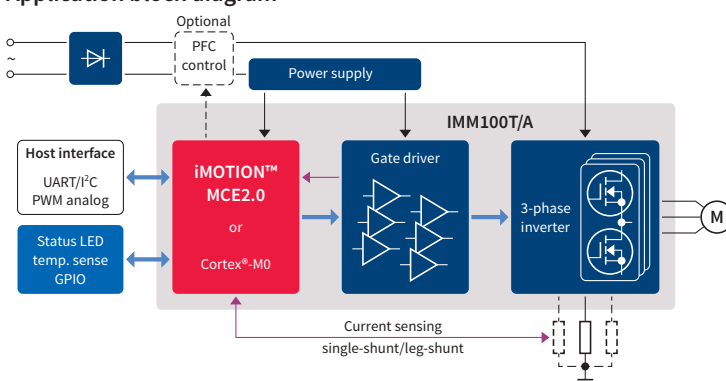
Infineon’s field-proven Motion Control Engine (MCE) implements sensorless Field Oriented Control (FOC) with single or leg-shunt current feedback and uses space vector PWM with sinusoidal signals to achieve the highest energy efficiency. Additionally, IMM100 can take over the boost Power Factor Correction (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_{DS(on)}
- > IMM10xT/A-046M – output rating: 600 V/1.4 Ω R_{DS(on)}
- > IMM10xT/A-056M – output rating: 600 V/0.95 Ω R_{DS(on)}

Application block diagram



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 mm² package

Target applications

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



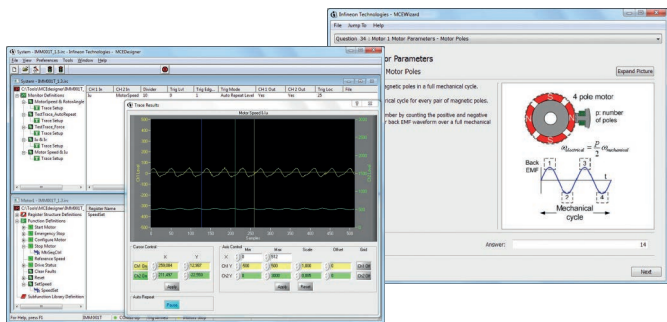
iMOTION™ tools

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.

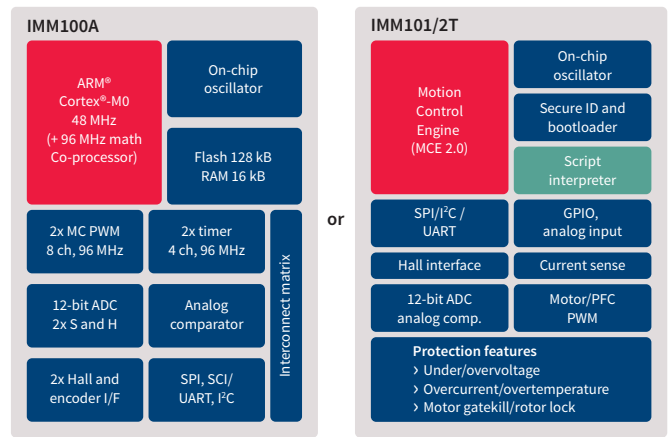
iMOTION™ script enables adding system-level features to “T”-variant devices

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

3-phase gate driver

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 _{DS(on)} | MCE 2.0 | 3-phase inverter | PowerQFN 12 x 12 mm ² |
| IMM101T-046M | 600 V/1.4 Ω R _{DS(on)} | MCE 2.0 | 3-phase inverter | PowerQFN 12 x 12 mm ² |
| IMM101T-056M | 600 V/0.95 Ω R _{DS(on)} | MCE 2.0 | 3-phase inverter | PowerQFN 12 x 12 mm ² |
| IMM102T-015M | 500 V/6 Ω R _{DS(on)} | MCE 2.0 | 3-phase inverter + PFC | PowerQFN 12 x 12 mm ² |
| IMM102T-046M | 600 V/1.4 Ω R _{DS(on)} | MCE 2.0 | 3-phase inverter + PFC | PowerQFN 12 x 12 mm ² |
| IMM102T-056M | 600 V/0.95 Ω R _{DS(on)} | MCE 2.0 | 3-phase inverter + PFC | PowerQFN 12 x 12 mm ² |
| IMM100A-015M | 500 V/6 Ω R _{DS(on)} | ARM® Cortex®-M0 | Programmable device | PowerQFN 12 x 12 mm ² |
| IMM100A-046M | 600 V/1.4 Ω R _{DS(on)} | ARM® Cortex®-M0 | Programmable device | PowerQFN 12 x 12 mm ² |
| IMM100A-056M | 600 V/0.95 Ω R _{DS(on)} | ARM® Cortex®-M0 | Programmable device | PowerQFN 12 x 12 mm ² |

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