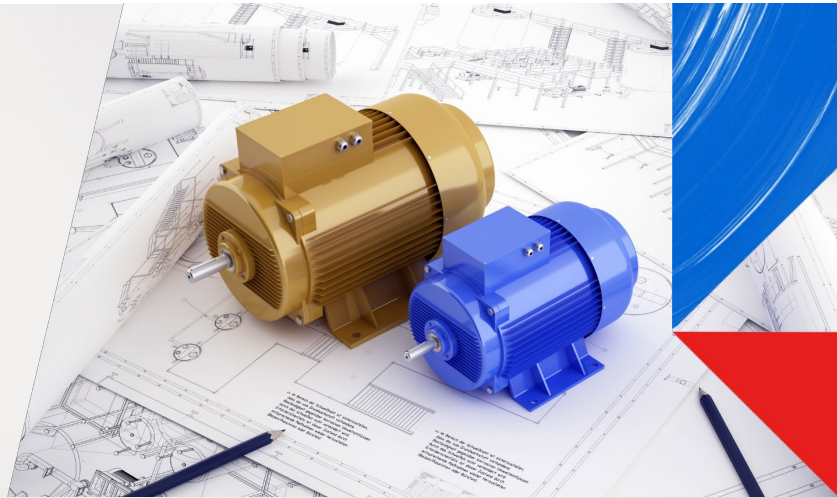


Motor Control Solutions



Efficient, Reliable and Performant

Toshiba offers an extensive portfolio of semiconductor devices for simple to sophisticated motor applications with special focus on efficiency, reliability and performance. Toshiba motor control solutions help to avoid system heating, improve motor drive performance and reduce both system size and cost. Including Toshiba's innovative technologies they unleash the full capabilities of motor applications and create key differentiators.

Applications

- Industrial automation
- Robots / Cobots
- Automated Guided Vehicles
- eMobility
- Power tools
- Home appliances

Features

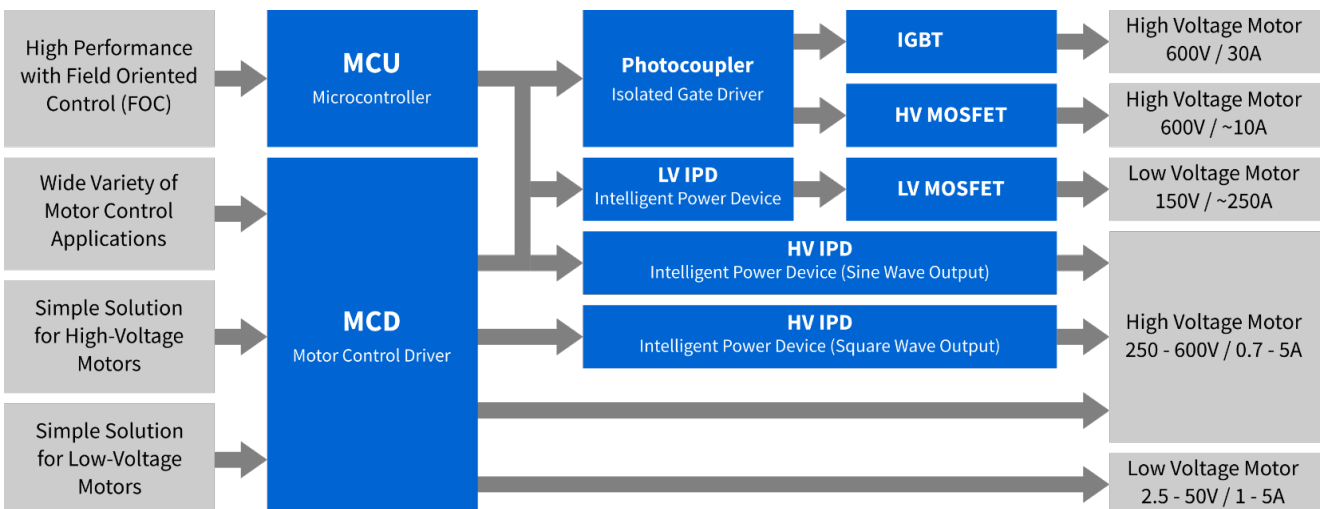
- Devices for simple to high performance motor control solution
- For brushed, brushless DC and stepping motors
- For low-, medium- and high-voltage motors
- Microcontrollers, motor drivers, IGBTs, MOSFETs, IPDs and photocouplers

Advantages

- Toshiba's original technologies
- Advanced silicon manufacturing processes
- Wide line-up of small packages
- Easy design-in
- Reduced BOM

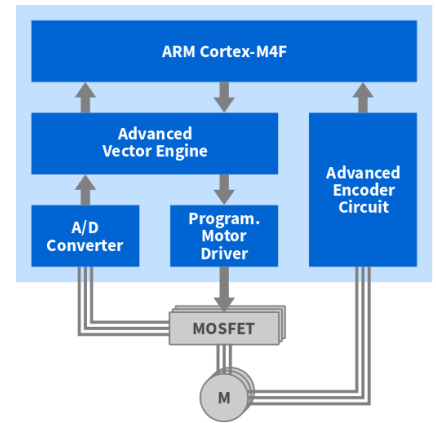
Benefits

- High efficiency motor control
- Low power = low heat generation
- Improved drive performance
- Low development effort
- Fast time to market
- Reduced system size and cost



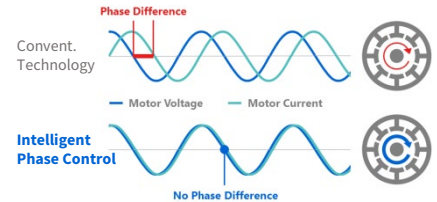
Microcontrollers (MCU) provide high performance FOC

Toshiba's ARM® Cortex®-M4F powered microcontrollers feature dedicated hardware accelerators for multi-axis Field Oriented Control: The Advanced Vector Engine is a high-performance coprocessor for vector and current related calculations, Programmable Motor Drivers (PMD) generate 3-phase PWM motor control outputs and the Advanced Encoder Circuits precisely acquire the motor positions. Toshiba's hardware accelerators off-load the main CPU up to 70%, enable high-speed and low-vibration motor operation and relieve the system designer from developing complex motor control software.



Motor Control Drivers (MCD) enable closed-loop control

Toshiba Motor Control Drivers (MCD) provide high efficient and low-power motor control. Toshiba's Intelligent Phase Control technology for BLDC motors ensures lowest power dissipation at all rotation speeds and eliminates the need to develop complicated phase adjustment software. The Active Gain Control (AGC) technology for Stepping Motors significantly reduces power and heat generation by automatically adjusting the motor current to the actual load torque.

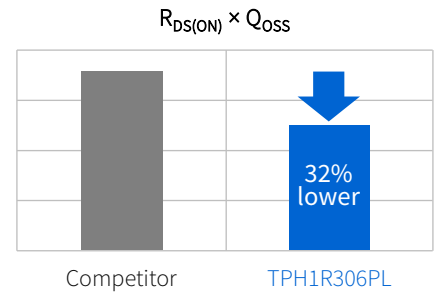
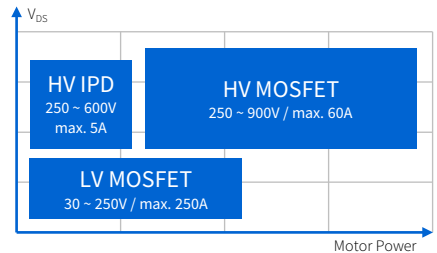


HV and LV MOSFETs feature lowest on-resistance

Fabricated in Toshiba's proprietary state-of-the-art single epitaxial DTMOS process, the 4th generation of super-junction 600V – 650V MOSFET devices feature lowest on-resistance and high efficient switching. The line-up with integrated high-speed body diodes is most suitable for motor inverter applications.

Toshiba LV MOSFET devices manufactured in the latest 9th generation of Toshiba's proprietary trench MOS process (U-MOS) provide highest efficiency under all load conditions. They are specified for high junction temperatures up to +175°C and provide lowest resistance per die area. Having an excellent Q_{OSS} performance the devices meet one of the most relevant design targets for motor applications.

Toshiba High Voltage Intelligent Power Devices (HV-IPD) are 3-phase motor driver ICs designed with 250V, 500V or 600V IGBTs or MOSFETs. They integrate high-side and low-side drivers with safety functions like thermal shut-down, over-current and under-voltage protection. Low profile Surface Mounted Devices (SMD) packages combined with the latest silicon manufacturing process allow compact system designs.



Industry-leading photocouplers

Toshiba's photocoupler line-up features optical isolated IGBT / MOSFET gate drivers, transistor and high speed IC couplers as well as isolation amplifiers. The devices are equipped with high-performance infrared LEDs enabling long lifetime and low power dissipation. They provide high noise immunity and high reliability up to 125°C.

Toshiba offers a wide range of packages with reinforced insulation that are compliant with major international safety standards.

