Integrated Power Application Controllers® (PAC™) for Brushless DC and Permanent Magnet Synchronous Motors

Compact system-on-chip devices in a single IC for AC-powered applications
Maximize Space and Power in High-Voltage White Goods

As consumers demand more power- and space-efficient home appliances, designers are turning to Power Application Controllers (PAC) from Qorvo to achieve those goals. Qorvo’s PAC family of products are fully-optimized, highly integrated system-on-chip devices with a programmable motor controller and driver in a single IC, enabling highly efficient and compact solutions which help meet efficiency and ENERGY STAR® requirements.

Qorvo offers the most compact solutions for brushless DC (BLDC) and permanent magnet synchronous motors (PMSM) with AC supply, with the lowest standby current of any integrated solution. The company has the only integrated 600 V IC with a FLASH-based MCU, 600 V gate drivers, 600 V DC/DC and signal conditioning into one small QFN package.

By combining these features in a single IC, Qorvo enables the smallest footprint, reduces bill of material and lowers costs. These PAC solutions are powering some of the world’s largest white goods brands.

PAC Application Solutions

The PAC5xxx portfolio offers the most efficient, microcontroller-based motor controllers on the market, suitable for home appliances, power tools, garden tools, industrial automation, medical equipment, drones and remote-control vehicles and other applications. As part of Qorvo’s complete range of battery- and AC-powered motor control and drive solutions, the PAC5xxx family also enables IoT connected devices when coupled with Qorvo’s low-power, wireless Bluetooth® Low Energy solutions.

Key features include:

- High integration that enables small size, low cost and high-performance drive
- Integrated 50 MHz Arm® Cortex®-M0 or 150 MHz Arm® Cortex®-M4F MCUs
- Integrated, configurable power management up to 600 V supply input; support for flyback and buck topologies
- Integrated high-side and low-side gate drivers
- Ultra-low standby power consumption of 8 µA
- Flexible and configurable power and temperature monitoring to build a more reliable motor control system
- Integrated 3 differential and 4 single-ended programmable-gain amplifiers (PGAs) for voltage and current sensing

This system block diagram illustrates the very high degree of integration in the Qorvo PAC5556, which supports high-voltage applications.
Lower Costs and Faster Time-to-Market

The PAC5xxx family’s efficient and highly configurable system architecture helps designers work faster and lowers the cost of creating AC motor control and drive solutions for a new generation of white goods and other AC-powered equipment.

The Qorvo PAC eco-system also enables faster time-to-market, by more than 50%, by providing customers with hardware, software, evaluation tools, and third-party design partners and production tools. IEC and UL Class B pre-certified firmware speeds system-level certification.

White Goods/Composer, Fans, AC Power Tools

Qorvo high-voltage PAC family of ICs for offline AC-powered equipment and power tools

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package (mm)</th>
<th>MCU</th>
<th>ID</th>
<th>Power Management</th>
<th>Gate Drivers</th>
<th>Signal Conditioning</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAC5250</td>
<td>10x10 57L</td>
<td>50 MHz Arm® Cortex®-M0 32 KB FLASH, 8 KB SRAM 10b 1 MSPS ADC UART/SPI I2C</td>
<td>2 @ 3.3 V 13 @ 3.3 V/5 V 10 @ 5 V</td>
<td>600 V Flyback DC/DC Core, IO, Analog LDOs</td>
<td>3 HS: 600 V @ 0.5/0.25A 3 LS: 1A</td>
<td>3 Diff PGA 4 Single PGA</td>
<td>White Goods, AC Fans, AC Power Tools</td>
</tr>
<tr>
<td>PAC5253</td>
<td>8x8 43L</td>
<td>50 MHz Arm® Cortex®-M0 32 KB FLASH, 8 KB SRAM 10b 1 MSPS ADC UART/SPI I2C</td>
<td>1 @ 3.3 V 9 @ 3.3 V/5 V 10 @ 5 V</td>
<td>600 V Flyback DC/DC Core, IO, Analog LDOs</td>
<td>3 HS: 600 V @ 0.5/0.25A 3 LS: 1A</td>
<td>3 Diff PGA 4 Single PGA</td>
<td>White Goods, AC Fans, AC Power Tools</td>
</tr>
<tr>
<td>PAC5255</td>
<td>10x10 57L</td>
<td>50 MHz Arm® Cortex®-M0 32 KB FLASH, 8 KB SRAM 10b 1 MSPS ADC UART/SPI I2C</td>
<td>2 @ 3.3 V 13 @ 3.3 V/5 V 10 @ 5 V</td>
<td>600 V Flyback DC/DC Core, IO, Analog LDOs</td>
<td>3 HS: 600 V @ 0.5/0.25A 3 LS: 1A</td>
<td>3 Diff PGA 4 Single PGA</td>
<td>White Goods, AC Fans, AC Power Tools</td>
</tr>
<tr>
<td>PAC5256</td>
<td>10x10 52L</td>
<td>50 MHz Arm® Cortex®-M0 32 KB FLASH, 8 KB SRAM 10b 1 MSPS ADC UART/SPI I2C</td>
<td>5 @ 3.3 V 12 @ 3.3 V/5 V 10 @ 5 V</td>
<td>600 V Buck DC/DC Core, IO, Analog LDOs</td>
<td>3 HS: 600 V @ 0.5/0.25A 3 LS: 1A</td>
<td>3 Diff PGA 4 Single PGA</td>
<td>White Goods, AC Fans, AC Power Tools</td>
</tr>
<tr>
<td>PAC5556</td>
<td>10x10 52L</td>
<td>150 MHz Arm® Cortex®-M0 32 KB FLASH, 32 KB SRAM 12b 1 MSPS ADC UART/SPI I2C 3xUSART I2C, QEP</td>
<td>13 @ 3.3 V 10 @ 5 V</td>
<td>600 V Buck DC/DC Core, IO, Analog LDOs</td>
<td>3 HS: 600 V @ 0.5/0.25A 3 LS: 1A</td>
<td>3 Diff PGA 4 Single PGA</td>
<td>High-Performance White Foods</td>
</tr>
</tbody>
</table>

Qorvo’s innovative power management solutions deliver a highly efficient, flexible platform for high performance, high reliability and high integration in motor control. Our scalable core platforms are used for charging, powering and embedded digital control systems for end applications in the industrial, commercial and consumer equipment markets.

For more information about our modular PMICs, visit:
www.qorvo.com/products/power-management/intelligent-motor-controllers