

Digital Signal Controller Accelerates DSP Performance for Time-Critical Control Applications

Designed to deliver faster deterministic performance in time-critical control applications, [Microchip Technology's](#) dsPIC33CK digital signal controllers (DSCs) have expanded context selected registers to reduce interrupt latency and new, faster instruction execution to accelerate digital signal processor (DSP) routines. This dsPIC33CK single-core family complements the recently announced dsPIC33CH dual-core family based on the same core.* According to the company, system designers looking for digital signal processing power with the design simplicity of a microcontroller (MCU) can now utilize this new family of 16-bit DSCs.

With 100-MIPS performance, the core delivers almost double the performance of previous single-core dsPIC DSCs, making it ideally suited for motor control, digital power and other applications requiring sophisticated algorithms such as automotive sensors and industrial automation. It has been designed specifically for controlling multiple sensorless, brushless motors running field-oriented control algorithms and power factor correction.

The new DSCs are also designed to ease functional safety certification required by many automotive, medical and appliance applications where safe operation and shutdown in failure situations are critical. The devices include integrated functional safety features for safety-critical designs such as RAM built-in self-test (BIST) for checking RAM health and functionality; deadman timer for monitoring the health of application software through periodic timer interrupts within a specified timing window; dual watchdog timers (WDT); flash error correction code (ECC); brown-out reset (BOR); power-on reset (POR); and fail safe clock monitor (FSCM) (see the figure).

"Microchip's 16-bit DSCs are highly efficient with minimal delay or latency into the system, and this new core is our best yet," said Joe Thomsen, vice president of Microchip's MCU16 business unit. "The feature set and performance make the dsPIC33CK family ideal for time-critical functions such as controlling the precise speed or rotation of a motor, as well as safety-critical functions to ease functional safety certification and ensure dependable operation."

The dsPIC33CK family features a CAN-FD communication bus to support new automotive communication standards. It comes with a high level of analog integration including high-speed ADCs (3.5 MSPS), analog comparators with DACs, and operational amplifiers, enabling motor control applications with smaller footprints and lower bill of material costs. The DSCs include a 250-ps resolution PWM which is ideal for advanced digital power topologies. Live update of firmware (with up to 2 × 128 KB blocks) is also offered to support high-availability systems, especially important for digital power supplies.

The dsPIC33CK is available in eight package variants. The 28-pin dsPIC33CK32MP202 is priced at \$1.34 each in high volume. Variants include packages from 28 to 80 pins and as small as 5 x 5 mm. Memory sizes range from 32 to 256 KB of Flash. The dsPIC33CK Curiosity development board will be available in November for \$39.99 each. The dsPIC33CK PIMs for the MCLV-2 and MCHV-2/3 motor control development platforms are available now for \$25.00 each. The dsPIC33CK PIM for use with Explorer 16/32 boards is available now for \$25.00 each. The Digital Power Starter Kit will be available in October for \$129.99.

For additional information, visit the dsPIC33CK single-core digital signal controllers [page](#) .

**For more on the dual-core dsPIC33CH family, see "[Dual-Core Digital Signal Controller Eases Code Development By Separate Design Teams](#)," How2Power Today, July 2018.*



dsPIC33CK256MP508

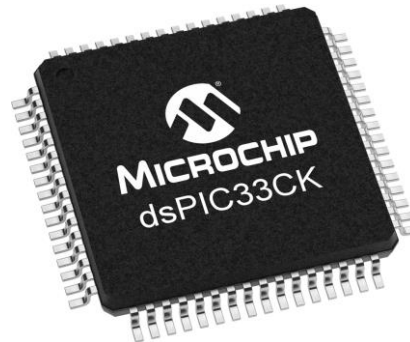
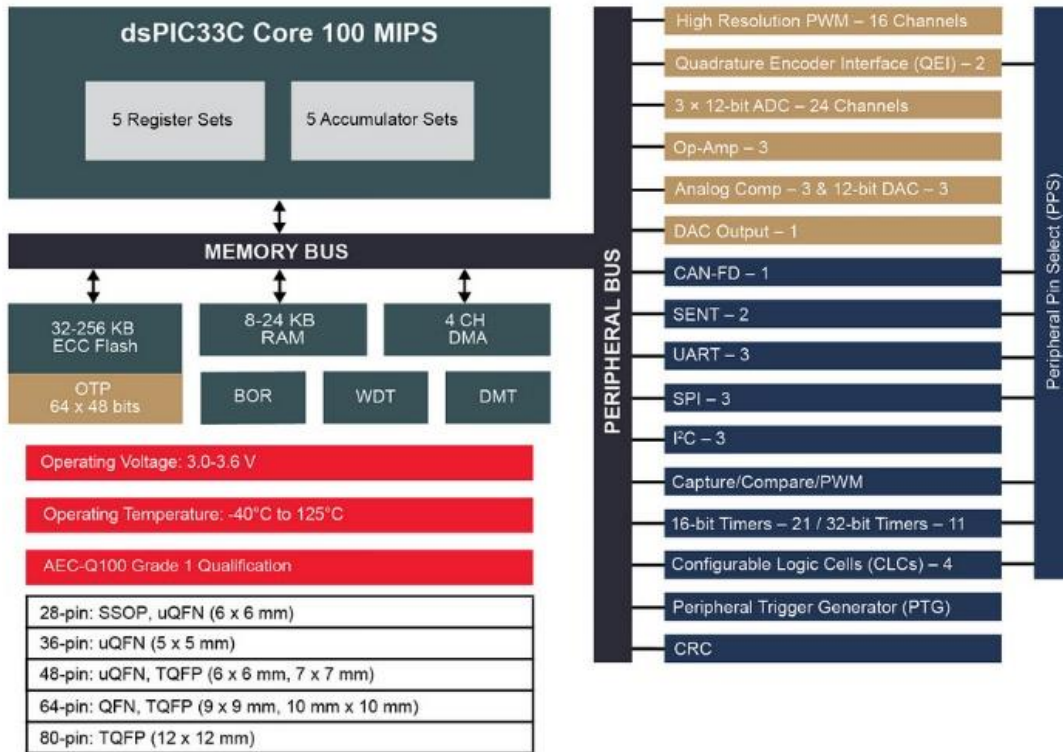


Figure. The dsPIC33CK is Microchip's highest performance single-core DSC in an ultra-small package.