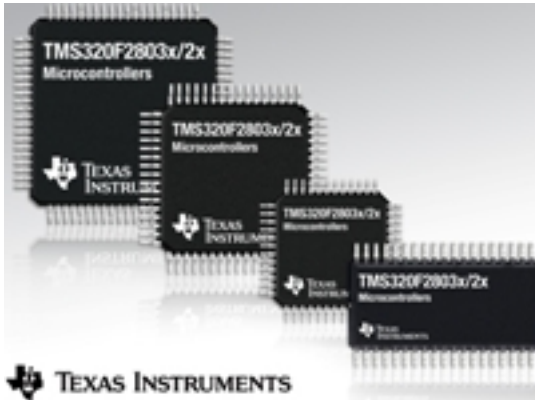


Microcontrollers Employ a Hardware Control Law Accelerator to Assist the CPU



TEXAS INSTRUMENTS Offloading high-speed control algorithms from the main TMS320C28x CPU, Texas Instruments' Piccolo Series MCUs frees the CPU to handle I/O and feedback loop metrics via its control law accelerator (CLA) design. The units provide 32-bit real-time control in solar power micro-inverters, LED lighting, white good appliances and hybrid automotive batteries. The IEC 60730-standardized components utilize enhanced pulse width modulators (ePWM) to support frequency modulation down to 150 pico-seconds; 128 KB Flash memory, on-chip 12-bit ADC at 4.6 msp/s, and 40 MHz to 60 MHz variations. The microcontrollers present on-chip oscillators operating at 10 MHz each with ± 1 percent accuracy, triple redundancy with on-chip self-test, a single 3.3 V supply with internal regulator down to 1.9 V while providing brown-out protection and power-on reset, and code compatibility with C2000 devices. Peripherals include communications protocols, analog comparators, and general-purpose I/Os. Texas Instruments Piccolo microcontrollers bring the benefits of 32-bit real-time control to applications that could not previously afford advanced power electronics. For example, in a variable frequency air conditioning unit, washing machine or refrigerator, a single Piccolo MCU can precisely control two electric three-phase motors and perform power factor correction calculations to improve the efficiency of the load, making the best use of the utility's power. Piccolo MCUs help bring LED technology to street lighting applications, which can offer up to 50 percent higher energy efficiency compared to traditional high pressure sodium lamps. Piccolo based systems offer intelligent current control and easy system networking to bring down system complexity and cost of managing color mixing and temperature. The MCU also enables power line communications, allowing cities to pinpoint power outages and centrally manage and adjust lighting based on time of day, traffic or weather conditions.

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