First Cortex-M0 fromToshiba is optimised for Smart Meters

ECN Europe

Toshiba Electronics Europe [1] has debuted a 32-bit RISC microcontroller built around the ARM Cortex-M0 processor core. The TMPM061 is also Toshiba's first Cortex-M0 device specifically designed for smart metering applications; it allows designers to replace the conventional two-chip analogue front end (AFE) and processor approach to smart meter design with a single IC.

[2]ARM's smallest processor, the ARM Cortex-M0 delivers exceptionally small silicon area, low power and minimal code footprint, making it ideal for smart meter designs. Toshiba has used this core for its new microcontroller's main CPU, while deploying an on-board DSP power calculation engine to simplify smart meter power measurement. The power calculation engine can calculate active energy, reactive energy and power factor as well as monitoring voltage and frequency fluctuation. Flexibility is enhanced as the basic energy use calculation function can be updated and modified by the developer as necessary.

As well as the power calculation engine the TMPM061 offers a variety of on-board functions that will minimise the component count of smart meter designs. These include a three-channel, high-precision 24-bit Delta-Sigma analogue-to-digital converter (ADC), a 10-bit ADC and a temperature-compensated real-time clock (RTC). The Delta-Sigma ADC supports simultaneous sampling at up to 6kHz and has a SINAD (signal-to-noise and distortion ratio) that is suitable for a residential meter.

Toshiba is providing the TMPM061 with up to 128Kbytes of on-chip Flash ROM and 8Kbytes of available on-chip RAM. Additional on-board peripherals include a 9-channel, 16-bit timer, a controller for directly driving an LCD display, a temperature sensor, a voltage detection circuit and a watchdog timer. Integrated

connectivity comprises a 5-channel general-purpose serial interface (selectable between UART mode and synchronous mode) and a serial bus interface. The latter offers a choice of I2C bus mode or synchronous mode operation.

The TMPM061FWFG is supplied in a 14mm x 14mm 100-pin LQFP package and will operate with input voltages from 1.8V to 3.6V. Maximum operating frequency is 16MHz. Four standby modes (IDLE, SLOW, SLEEP, STOP) ensure minimum power consumption for a range of conditions.

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