

**Precision Analog Microcontroller, 12-Bit Analog Input/Output with I3C Interface, Arm Cortex-M33****FEATURES**

- ▶ Analog input/output
- ▶ Multichannel, 12-bit, 2MSPS ADC
  - ▶ Up to 16 external channels
  - ▶ On-chip die temperature monitor
  - ▶ AVDD, IOVDD0/1/2, DVDD, VDDVADC power monitor channels
  - ▶ VDAC voltage monitor channels
  - ▶ Single-ended modes
  - ▶ 0V to VREF analog input range
- ▶ 12-bit voltage output DACs
  - ▶ 0V to 2.5V/VDDVDAC voltage output
  - ▶ Support 30mA source current and 10mA sink current
- ▶ On-chip low-drift voltage reference, 1.25V or 2.5V
  - ▶ Buffered 1.25V or 2.5V output
- ▶ 4 voltage comparators
- ▶ Microcontroller
  - ▶ 32-bit Arm Cortex-M33 core, 32-bit RISC architecture, FPU
  - ▶ Serial wire port supports code download and debug
- ▶ Clocking options
  - ▶ 16MHz on-chip oscillator
  - ▶ 240MHz PLL output with programmable divider
  - ▶ External clock source
- ▶ Memory
  - ▶ 2× 1024kB independent Flash/EE memories
    - ▶ 10,000-cycle Flash/EE endurance
    - ▶ 2× 256KB support 100K cycles Flash/EE endurance
    - ▶ 10-year Flash/EE retention
  - ▶ 512kB SRAM with ECC
- ▶ Software triggered, in circuit reprogrammability via MDIO or I<sup>2</sup>C
- ▶ On-chip peripherals
  - ▶ 2× UART, 3× SPI, 3× I<sup>2</sup>C, 1× QSPI serial input/output
  - ▶ 2× I3C supporting legacy I<sup>2</sup>C static address mode
  - ▶ Multilevel voltage (3.3V, 1.8V, 1.2V) GPIOs
  - ▶ MDIO target up to 10MHz
  - ▶ 5 general-purpose timers
  - ▶ Wake-up timer (WUTs)
  - ▶ Watchdog timers (WDTs)
  - ▶ 32-element PLA
  - ▶ 16-bit PWM
  - ▶ 10 external Interrupts
- ▶ Power
  - ▶ Multiple supplies: 3.3V for voltage DACs and ADCs, and 3.3V, 1.8V, or 1.2V for digital inputs/outputs
  - ▶ Flexible operating modes for low-power applications
  - ▶ POR and BOR
- ▶ Packages and temperature range
  - ▶ 3.5mm × 4.5mm, 0.4mm pitch, 90-ball WLCSP
  - ▶ Fully specified for T<sub>A</sub> = -40°C to +105°C (T<sub>J</sub> ≤ +125°C) operation
- ▶ Tools
  - ▶ Low-cost, quick start development system
  - ▶ Full third-party support

**APPLICATIONS**

- ▶ Optical networking 400G/800G/1.6T and higher frequency modules
- ▶ Industrial control, automation, and instrumentation systems

For more information about the ADuCM451, contact [InfoOpticalNetwork@analog.com](mailto:InfoOpticalNetwork@analog.com).

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