ADuCM4050
Ultra Low Power Microcontroller
10× Lower System-Level Power Using the SensorStrobe Mechanism

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62°F
16°C

EEMBC ULPMark™-CP Score* (3 V):
189

At Analog Devices, we make technologies that sense, measure, interpret, and connect—bridging the physical and digital worlds to form the foundation of the Internet of Things. Our technologies are designed to maximize system-level intelligence and reliability, enabling applications where the quality and integrity of data and insights are mission critical. The brain of the connected solution—processors—combines hardware and advanced algorithms to interpret data to deliver intelligence, functionality, and localized decision making for IoT solutions. The ADuCM4050 offers class leading, ultra low power active and hibernate modes for IoT applications where power consumption, security, and robustness are key requirements. System power can be optimized with digital sensors and ultra low power transceivers using SensorStrobe™ technology in the ADuCM4050.

Features

▶ Up to 52 MHz ARM® Cortex®-M4F with FPU and MPU
▶ Power
  • Active mode dynamic current: 41 µA/MHz (typical)
  • Flexi™ mode (core in sleep, peripherals active): 400 µA (typical)
  • Hibernate (with SRAM retention): 0.65 µA (typical)
  • Shutdown (RTC optional): 50 nA (typical)
  • Shutdown (fast wake-up): 0.20 µA (typical)
  • Built-in power management including optional buck converter for improved efficiency
  • Single-supply operation (V_{BAT}): 1.74 V to 3.6 V
▶ ADC
  • 12-bit, 1.8 MSPS SAR ADC for housekeeping functions
  • Built-in power monitoring capability
▶ Memory
  • 512 kB of embedded flash memory with ECC
  • 128 kB of configurable system SRAM with parity
  • Up to 124 kB of SRAM retained in hibernate mode
  • 4 kB of cache memory to reduce active power when executing from flash
▶ Security
  • Hardware crypto accelerator supporting AES-128, AES-256, SHA-256, HMAC, protected key store, and key wrap/unwrap
  • Support for ECB, CBC, CTR, CBC-MAC, CCM, and CCM*
  • True random number generator (TRNG)
  • User code protection for protecting customer IP software
  • Prevents repurposing the part with secure software upgrade via UART

▶ Digital peripherals
  • Three SPI interfaces with hardware flow control to enable glueless interface to sensors, radios, and converters
  • I²C and two UART interfaces
  • SPORT for natively interfacing with converters and radios
  • Programmable GPIOs (44 in LFCSP and 51 in WLCSP)
  • Three general-purpose timers with PWM support
  • One RGB timer
  • One RTC for keeping wall clock time
  • One FLEX_RTC with four SensorStrobe outputs for precise time-synchronized sampling of external sensors
  • Programmable beeper
  • 27-channel DMA controller—dedicated DMA channels for each peripheral
  • Flexible interrupt sources for wake-up from hibernate
  • Four external interrupts, two UARTs, and two RTCs
▶ Packages and operating range
  • 64-lead LFCSP and 72-ball WLCSP
  • 64-lead package is pin-for-pin compatible with ADuCM3027 and ADuCM3029 microcontrollers
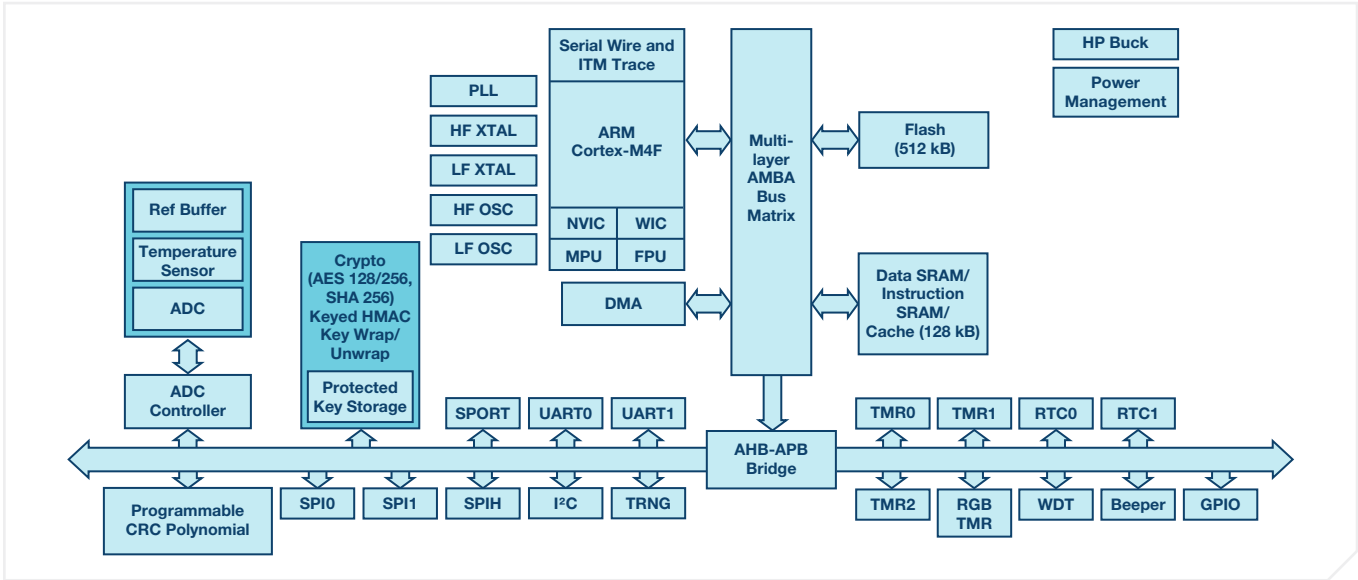 • Industrial temperature range

Target IoT Applications Include:

▶ Smart health
▶ Smart city
▶ Smart building
▶ Smart factory
▶ Smart agriculture
▶ Smart energy

*More information available at www.eembc.org.

Visit **analog.com/ADuCM4050**

Functional Block Diagram

Products

Generic Part Number	Production Part Number[1]	Reel Info	Description	Package (Code)	Range[2]
ADuCM4050	ADuCM4050BCBZ-RL	13"	ULP ARM Cortex-M4F with 512 kB embedded flash	72-ball WLCSP (CB-72-3)	−40°C to +85°C
	ADuCM4050BCBZ-R7	7"			
	ADuCM4050BCPZ	Individual	ULP ARM Cortex-M4F with 512 kB embedded flash	64-lead LFCSP (CP-64-17)	−40°C to +85°C
	ADuCM4050BCPZ-RL	13"			
	ADuCM4050BCPZ-R7	7"			

[1]Z = RoHS compliant part.
[2]Referenced temperature is ambient temperature. The ambient temperature is not a specification. See Operating Conditions on Page 12 of data sheet for T_J (junction temperature) specification, which is the only temperature specification.

Evaluation Board

Model	Description	Price	RoHS
EV-COG-AD4050LZ	Evaluation kit for ADuCM4050 LFCSP package	$50.00	Yes
EV-COG-AD4050WZ	Evaluation kit for ADuCM4050 WLCSP package	$100.00	Yes
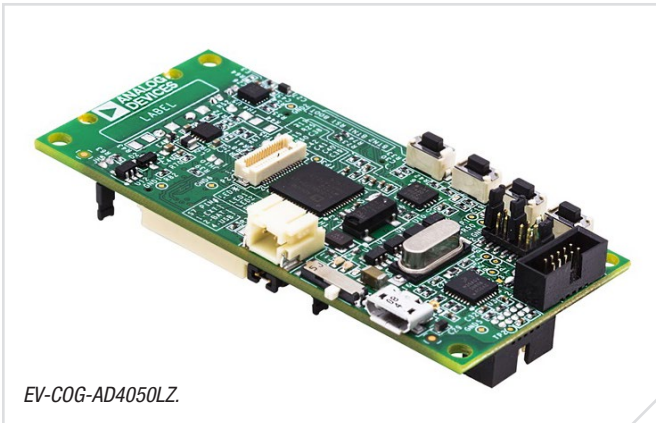
EV-COG-AD4050LZ.

Tools Support

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