PSOC™ Edge E82 Microcontrollers

The Next Generation of Low-Power Microcontrollers with Graphics

The PSOC™ Edge E8 series of Arm® Cortex®-M microcontrollers feature high-performance, low-power, secured MCUs with integrated ML hardware acceleration, designed specifically for enabling efficient and responsive ML compute applications in edge devices. These MCUs are ideal for a variety of consumer and industrial applications including HMI, smart home, wearables, robotics, and other smart connected IoT products. In addition, PSOC™ Edge is supported by a rich set of enablement with the industry-recognized ModusToolbox™ software including integration with the DEEPCRAFT™ Studio AI solution and its off-the shelf ML models.

The PSOC™ Edge E82 microcontrollers are based on high-performance Arm® Cortex®-M55, including Helium DSP support, and also a low-power Arm® Cortex®-M33 paired with Infineon's ultra-low power NNLite hardware accelerator. They also integrate 2.5D graphics accelerators and display interfaces, while featuring always-on acoustic activity detection and wake word detection efficient HMI operations and extended battery life. The PSOC™ Edge E82 is well-suited for applications requiring advanced graphic capabilities with low-power requirements. The low-power 2.5D graphics processing unit (GPU) supports up to 1024x768 resolution and also features MIPI-DSI/DBI interfaces.

Power Performance Efficiency and Next-Gen ML Acceleration
- Multi-domain architecture for high-performance and fine-grained power optimization
- High-performance Arm® Cortex®-M55 CPU with Helium DSP
- Low-power Arm® Cortex®-M33 with FPU and DSP, and NNLite for low power AI/ML hardware acceleration

Advanced HMI Interfaces
- Audio multi-microphone interface for far-field applications
- Keyword spotting and Wake word detection
- 2.5D GPU with up to 1024x768 resolution and MIPI-DSI/DBI interfaces

State-of-the-art Security
- Lockstep secured enclave in low-power always-on domain
- Infineon Edge Protect Category 4/Platform Security Architecture (PSA) Level 4
- Off-the-shelf trusted Firmware-M enablement and Mbed-TLS for crypto operations

Ease-of-use for developers
- ModusToolbox™ software
  - Comprehensive collection of multi-platform tools and software libraries
  - Includes board support packages (BSPs), peripheral driver library (PDL), and middleware
- End-to-end ML solution with DEEPCRAFT™ Edge AI software and tools

For more information visit PSOC™ Edge E82

Key features

32-Bit MCU Subsystems
- Up to 400MHz Arm® Cortex®-M55 with Helium DSP
- Up to 200MHz Arm® Cortex®-M33

Machine Learning
- Infineon's NNLite for low-power AI/ML
- End-to-end ML with DEEPCRAFT™

Memory and SoC Integration
- High-capacity memory
- Ultra-low power RRAM
- Rich peripherals to reduce system cost
- Integrated low-power analog sub-system

Security
- Up to EPC4/PSA L4

HMI
- Keyword spotting and wake word
- detection
- Low-power graphics, up to 1024x768, 2.5D GPU, MIPI-DSI/DBI

Packages
- WLB-154, BGA-220

Operating Temperature
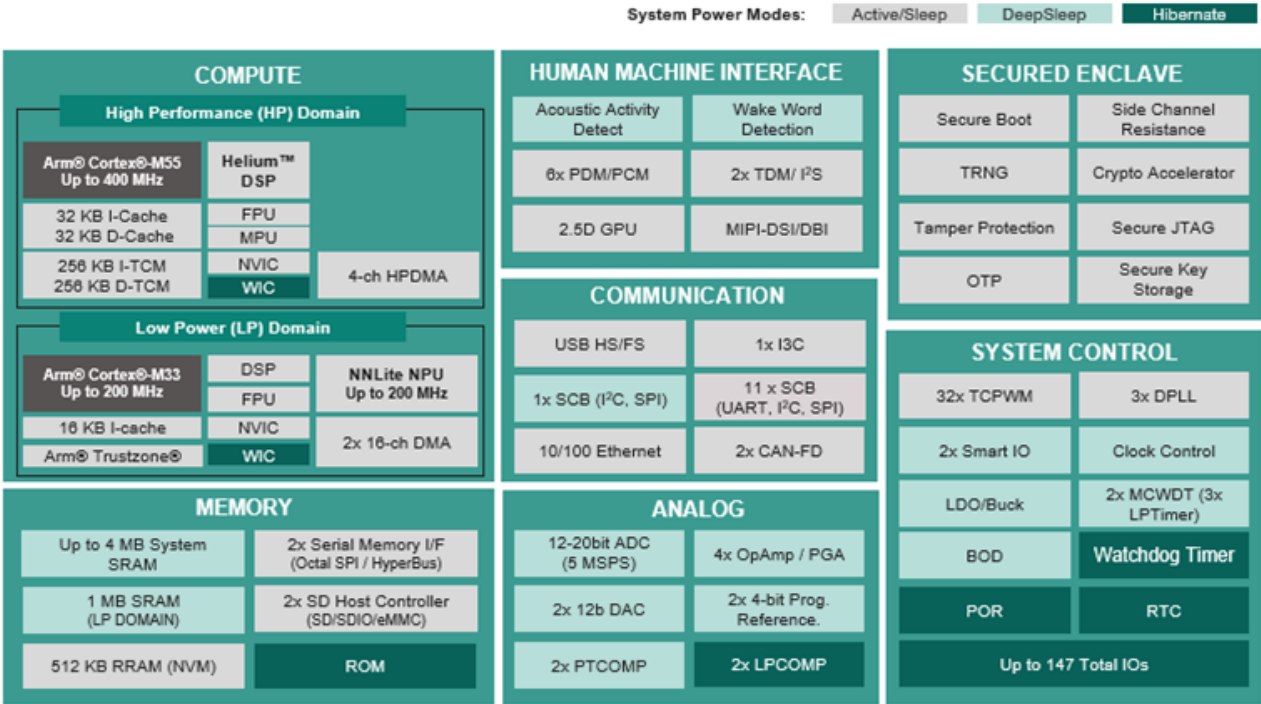- Ta: -20 to 70°C, -40 to 105°C

Target applications

- HMI
- Smart Home
- Wearables
- Robotics
- Security Camera

Block Diagram

System Power Modes: Active/Sleep | DeepSleep | Hibernate

COMPUTE

High Performance (HP) Domain

Arm® Cortex®-M55 Up to 400 MHz	Helium™ DSP
32 KB I-Cache 32 KB D-Cache	FPU
	MPU
256 KB I-TCM 256 KB D-TCM	NVIC
	WIC	4-ch HPDMA

Low Power (LP) Domain

Arm® Cortex®-M33 Up to 200 MHz	DSP	NNLite NPU Up to 200 MHz
	FPU	
16 KB I-cache	NVIC	2x 16-ch DMA
Arm® Trustzone®	WIC	

MEMORY

Up to 4 MB System SRAM	2x Serial Memory I/F (Octal SPI / HyperBus)
1 MB SRAM (LP DOMAIN)	2x SD Host Controller (SD/SDIO/eMMC)
512 KB RRAM (NVM)	ROM

HUMAN MACHINE INTERFACE

Acoustic Activity Detect	Wake Word Detection
6x PDM/PCM	2x TDM/ I²S
2.5D GPU	MIPI-DSI/DBI

COMMUNICATION

USB HS/FS	1x I3C
1x SCB (I²C, SPI)	11 x SCB (UART, I²C, SPI)
10/100 Ethernet	2x CAN-FD

ANALOG

12-20bit ADC (5 MSPS)	4x OpAmp / PGA
2x 12b DAC	2x 4-bit Prog. Reference.
2x PTCOMP	2x LPCOMP

SECURED ENCLAVE

Secure Boot	Side Channel Resistance
TRNG	Crypto Accelerator
Tamper Protection	Secure JTAG
OTP	Secure Key Storage

SYSTEM CONTROL

32x TCPWM	3x DPLL
2x Smart IO	Clock Control
LDO/Buck	2x MCWDT (3x LPTimer)
BOD	Watchdog Timer
POR	RTC
Up to 147 Total IOs	

Orderable Part Numbers and Kits

Kit	Function	Part Number
PSOC™ Edge E84 Evaluation Kit	General purpose evaluation kit for PSOC™ Edge with full function integration of all interfaces	KIT_PSE84_EVAL
PSOC™ Edge E84 AI Kit	Low-cost kit with multiple sensors for evaluation of AI capabilities and fast prototyping	KIT_PSE84_AI

Part Number	Package	Max Frequency	RRAM	Total SRAM	Ethernet and CAN	Security	Temp (Ta)
PSE822GOS2DFNC4T	WLB-154	400 MHz	512kB	5MB	-	PSA L2	-20 to 70 °C
PSE823GOS2DBZC4	BGA-220	400 MHz	512kB	5MB	Yes	PSA L2	-20 to 70 °C
PSE823GOS2DBZQ3	BGA-220	400 MHz	512kB	5MB	Yes	PSA L2	-40 to 105 °C

Additional parts can be found on Infineon.com/PSOCEdgeE82

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