NuMicro® M2354 Security Microcontroller

▶ NuMicro® M2354 Series MCU based on Arm® Cortex®-M23 core

The NuMicro® M2354 Series is a secure microcontroller powered by 96 MHz Arm® Cortex®-M23® CPU with Arm® TrustZone® technology, designed for security-critical applications in servers, IoT, and edge devices. It features up to 1024 KB dual-bank Flash Memory and 256 KB SRAM. Power consumption is optimized at 89.3 µA/MHz (LDO) and 39.6 µA/MHz (DC-DC), with standby mode as low as 2 µA. In Deep Power-Down mode, it consumes only 0.5 µA with V_{BAT} and can go as low as 0.1 µA without V_{BAT}. A wide range of power management modes helps extend battery life for long-term IoT operation. With built-in hardware root of trust, secure boot, and cryptographic acceleration, the M2354 delivers robust protection against IoT threats.
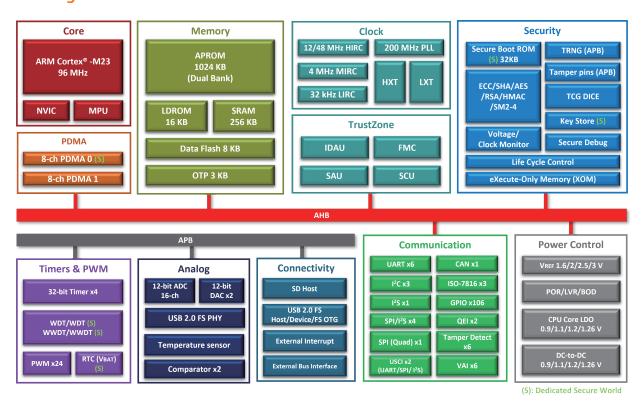
▶ Key Features

- Secure boot with TCG DICE in ROM code, supporting ECC P-521
- NuSMP2.0 : PSA Level 3 / SESIP Level 3 compliant
- Supports WLCSP49 small package

▶ Package

Flash Memory/ SRAM (KBytes)				
1024/256	M2354CJFAE	M2354LJFBE	M2354SJFBE	M2354KJFBE
Package	WLCSP49 (3.455x3.725mm)	LQFP48 (7x7mm)	LQFP64 (7x7mm)	LQFP128 (14x14mm)

▶ Block Diagram

Core
- ARM Cortex® -M23 96 MHz
- NVIC
- MPU

PDMA
- 8-ch PDMA 0 (S)
- 8-ch PDMA 1

Memory
- APROM 1024 KB (Dual Bank)
- LDROM 16 KB
- SRAM 256 KB
- Data Flash 8 KB
- OTP 3 KB

Clock
- 12/48 MHz HIRC
- 200 MHz PLL
- 4 MHz MIRC
- HXT
- LXT
- 32 kHz LIRC

TrustZone
- IDAU
- FMC
- SAU
- SCU

Security
- Secure Boot ROM (S) 32KB
- TRNG (APB)
- ECC/SHA/AES /RSA/HMAC /SM2-4
- Tamper pins (APB)
- TCG DICE
- Key Store (S)
- Voltage/ Clock Monitor
- Secure Debug
- Life Cycle Control
- eXecute-Only Memory (XOM)

AHB

APB

Timers & PWM
- 32-bit Timer x4
- WDT/WDT (S) WWDT/WWDT (S)
- PWM x24
- RTC (V_BAT) (S)

Analog
- 12-bit ADC 16-ch
- 12-bit DAC x2
- USB 2.0 FS PHY
- Temperature sensor
- Comparator x2

Connectivity
- SD Host
- USB 2.0 FS Host/Device/FS OTG
- External Interrupt
- External Bus Interface

Communication
- UART x6
- CAN x1
- I²C x3
- ISO-7816 x3
- I²S x1
- GPIO x106
- SPI/I²S x4
- QEI x2
- SPI (Quad) x1
- Tamper Detect x6
- USCI x2 (UART/SPI/ I²S)
- VAI x6

Power Control
- V_REF 1.6/2/2.5/3 V
- POR/LVR/BOD
- CPU Core LDO 0.9/1.1/1.2/1.26 V
- DC-to-DC 0.9/1.1/1.2/1.26 V

(S): Dedicated Secure World

▶ Support for Development

Item	Name	Features
IDE & Compiler	Keil NDK IAR EMARM NuEclipse	NuMicro® M2354 Series is supported by Keil and IAR's. NuEclipse is Nuvoton's proprietary IDE which integrates SDCC with free license.
Debugger & Programmer	Nu-Link2-Me Nu-Link-Pro Nu-Link2-Pro	Debugging, online programming, offline programming (optional), VCOM port, ISP Firmware upgrade.
Board Software Package	NuMicro BSP	The BSP mainly includes the device drivers, library, sample codes and documents.

▶ Evaluation board

- Part No. NuMaker-M2354KJB
- Quick Start

▶ Applications

- Smart meter
- Smart city facilities
- Digital currency verification
- Device with RoT demands
- Smart home appliances

▶ Product Selection Guide

Part No.	System			Memory				Timer		Analog		Connectivity							Display
	Operating Voltage (min) (V)	Operating Temperature (°C)	GPIO	LDROM Flash (KB)	APROM Flash (KB)	SRAM (KB)	PDMA (ch)	Timer (32-bit)	PWM (16-bit)	EADC (12-bit)	ACMP	LPUART	ISO-7816	I²C	Quad SPI	SPI/ I²S	I²S	USCI	ComSeg LCD
M2354LJFBE	1.7~3.6	-40~105	40	16	1024	256	16	4	24	11	2	6	2	3	1	3	1	1	-
M2354SJFBE	1.7~3.6	-40~105	50	16	1024	256	16	4	24	16	2	6	3	3	1	4	1	2	8x13
M2354KJFBE	1.7~3.6	-40~105	106	16	1024	256	16	4	24	16	2	6	1	3	1	4	1	2	8x40
M2354CJFAE	1.7~3.6	-40~105	41	16	1024	256	16	4	24	16	2	6	1	3	-	4	1	1	-

For more details, please visit https://www.nuvoton.com/products/microcontrollers/arm-cortex-m23-mcus/m2354-series/

video - M2354   M2354 Series   eStore - M2354

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