



Nuvoton NuMicro™ Family

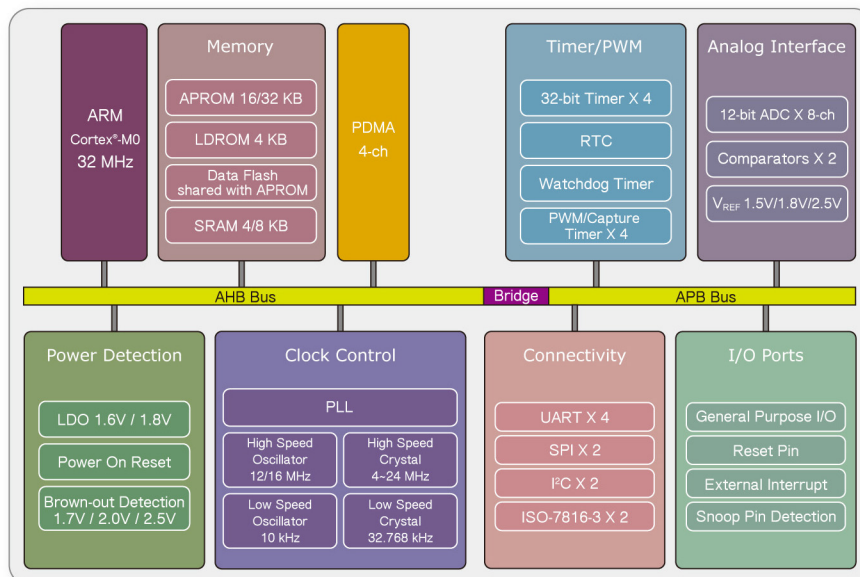
# NuMicro™ Nano102 Base Series



Ultra-Low Power ARM® Cortex®-M0 MCU for  
Battery-powered Devices Equipped With General Purpose

## Applications

- ◆ Wearable Device
- ◆ Portable Medical Device
- ◆ Mobile Payment Smart Card Reader
- ◆ Motion Gaming
- ◆ IPTV Remote Control
- ◆ Smart Home Appliances
- ◆ Alarm and Security Monitoring
- ◆ Zigbee Smart Energy AMR
- ◆ Portable GPS Data Logger
- ◆ Electronic Shelf Label
- ◆ IoT Device



## Selection Guide

Part No.	Flash (Kbytes)	SRAM (Kbytes)	Data Flash (Kbytes)	ISP ROM (Kbytes)	I/O	Timer (32-bit)	Connectivity			Comp.	PWM (16-bit)	ADC (12-bit)	RTC	IRC 10 KHz / 12 MHz / 16 MHz	PDMA	LCD	ISO- 7816-3*	ICP ISP IAP	Package	Operating Temp Range(°C)
							UART*	SPI	I²C											
NuMicro™ Nano102 Base Series (Ultra-Low Power)																				
NANO102ZB1AN	16	4	Configurable	4	27	4	2+1	2	2	2	4	2	√	√	4	-	1	√	QFN33	-40 to +85
NANO102ZC2AN	32	8	Configurable	4	27	4	2+1	2	2	2	4	2	√	√	4	-	1	√	QFN33	-40 to +85
NANO102LB1AN	16	4	Configurable	4	40	4	2+2	2	2	2	4	7	√	√	4	-	2	√	LQFP48	-40 to +85
NANO102LC2AN	32	8	Configurable	4	40	4	2+2	2	2	2	4	7	√	√	4	-	2	√	LQFP48	-40 to +85
NANO102SC2AN	32	8	Configurable	4	56	4	2+2	2	2	2	4	7	√	√	4	-	2	√	LQFP64*	-40 to +85

\*Marked in the table (2+2) means 2 UART+ 2 ISO-7816 UART  
\*ISO-7816 UART supports half duplex mode

LQFP64\*: 7x7mm

Contact us: NuMicro@nuvoton.com

## ❖ Features of NuMicro™ Nano102 Base Series

### ◆ Core

- ARM® Cortex®-M0 core running up to 32 MHz
- 24-bit system tick timer
- Single-cycle 32-bit hardware multiplier
- NVIC for 32 interrupt inputs, each with four levels of priority
- Serial Wire Debug (SWD) interface and two watch points/four breakpoints

### ◆ Ultra-low Power

- Single power supply: 1.8V ~ 3.6V
- Normal mode: 150 uA/MHz at 12 MHz
- Idle mode: 65 uA/MHz at 12 MHz
- Power-down mode:
  - 1.5 uA (RTC on, RAM retention)
  - 0.65 uA (RTC off, RAM retention)
- Wake-up time: less than 3.5 us

### ◆ Memory

- 16/32 Kbytes Flash memory for program memory (APROM)
- 4 Kbytes Flash memory for loader memory (LDRAM)
- 512 bytes page erase for Flash memory
- 4/8 Kbytes embedded SRAM
- Configurable Data Flash (shared with APROM)

### ◆ Clock Control

- 12/16 MHz internal RC oscillator
  - ±2% deviation at - 40°C ~ +85°C, 1.8V ~ 3.6V
  - ±1% deviation at - 40°C ~ +85°C, 1.8V ~ 3.6V by 32.768 kHz crystal oscillator auto calibration
- 10 kHz internal RC oscillator for Watchdog timer and Wake-up
- 4 ~ 24 MHz external crystal oscillator input for precise timing operation
- 32.768 kHz external crystal oscillator input for RTC function and low power system operation
- On-chip PLL, up to 64 MHz for high performance system operation

### ◆ Timers

- Four sets of 32-bit timers with 24-bit up-timer and one 8-bit pre-scale counter
- Counter auto reload
- Watchdog timer with 8-bit selectable time-out period
- Event counter and pulse width capture mode

### ◆ Peripheral DMA

- 4 channels PDMA for peripheral timer, UARTs, SPIs, ADC, CRC

### ◆ CRC

- CRC-CCITT, CRC-8, CRC-16, and CRC-32

### ◆ RTC

- Supports software compensation
- RTC counter, calendar counter and alarm
- 80 bytes backup register with snoop pin detection
- Supports 1, 1/2, 1/4, 1/8, 1/16 Hz clock output

### ◆ PWM/Capture

- 4 channels 16-bit PWM and 16-bit digital capture timers
- Dead-zone generator for complementary paired PWM

### ◆ ADC

- 8 channels 12-bit SAR ADC up to 1.5 MSPS
- 1.5V/1.8V/2.5V voltage reference
- On-chip temperature sensor

### ◆ ACMP

- Up to two analog comparators

### ◆ Communication Interfaces

- Four UARTs, (2 UARTs up to 1 Mbit/s with flow control) and 9600 baud rate at 32 kHz, Low Power mode
- Two SPIs, up to 32 MHz (Master), 16 MHz (Slave)
- Two I<sup>2</sup>Cs, up to 1 Mbit/s
- Two ISO7816-3 (Smart card interface), supporting UARTs function
- RS485, LIN, IrDA (SIR) function

### ◆ Wake-up Sources

- RTC, WDT, I<sup>2</sup>C, Timer, UARTs, SPIs, BOD, GPIOs, ACMPs

### ◆ Brown-out Detector

- Three levels: 1.7V/2.0V/2.5V
- Brown-out interrupt and reset option

### ◆ GPIOs

- Up to 56 general-purpose GPIO pins
- Three I/O modes: Push-Pull output, Open-Drain output, Input only with high impedance
- All inputs with Schmitt trigger
- All I/O pins can be configured as interrupt source with edge/level setting
- Input 5V tolerance

### ◆ Built-in LDO for Wide Operating Voltage Range

- 1.8V to 3.6V

### ◆ Operating Temperature

- - 40°C ~ +85°C

### ◆ Reliability

- ESD HBM pass 8kV, EFT > ± 4kV

### ◆ Code Security and Series number

- 96-bit unique ID
- 128-bit unique customer ID

### ◆ Packages (RoHS)

- QFN33 (5x5mm)
- LQFP48 (7x7mm)
- LQFP64 (7x7mm)