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## **STM32C0 MCU series**

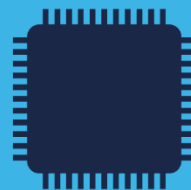
**Entry level 32-bit MCU  
for cost-sensitive applications**





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Your next 8-bit MCU is a 32-bit



It's called STM32C0!



# Introducing the STM32C0 ST's most affordable 32-bit MCU

Streamline costs without comprising performance



## Affordability

Helps you reduce costs thanks to an attractive price point and an optimized BOM



## Reliability

Benefits from proven STM32 quality & reliability



## Continuity

Consistent pinout with STM32G0  
Shares same technological platform



# STM32 MCU and MPU portfolio



 MPU

**STM32MP1**  
Up to 1 GHz Cortex-A7  
209 MHz Cortex-M4

 High Perf MCUs

**STM32F2**  
Up to 398 CoreMark  
120 MHz Cortex-M3

**STM32F4**  
Up to 608 CoreMark  
180 MHz Cortex-M4

**STM32F7**  
1082 CoreMark  
216 MHz Cortex-M7

**STM32H5**  
Up to 1023 CoreMark  
250 MHz Cortex-M33

**STM32H7**  
Up to 3224 CoreMark  
Up to 550 MHz Cortex -M7  
240 MHz Cortex -M4

 Mainstream MCUs

**STM32F3**  
245 CoreMark  
72 MHz Cortex-M4

**STM32G4**  
569 CoreMark  
170 MHz Cortex-M4

*Mixed-signal MCUs*

**STM32C0**  
114 CoreMark  
48MHz Cortex M0+

**STM32F0**  
106 CoreMark  
48 MHz Cortex-M0

**STM32G0**  
142 CoreMark  
64 MHz Cortex-M0+

**STM32F1**  
177 CoreMark  
72 MHz Cortex-M3

 Ultra-low Power MCUs

**STM32L0**  
75 CoreMark  
32 MHz Cortex-M0+

**STM32L4**  
273 CoreMark  
80 MHz Cortex-M4

**STM32L4+**  
409 CoreMark  
120 MHz Cortex-M4

**STM32L5**  
443 CoreMark  
110 MHz Cortex-M33

**STM32U5**  
651 CoreMark  
160 MHz Cortex-M33

 Wireless MCUs

**STM32WL**  
162 CoreMark  
48 MHz Cortex-M4  
48 MHz Cortex-M0+

**STM32WB**  
216 CoreMark  
64 MHz Cortex-M4  
32 MHz Cortex-M0+

**STM32WBA**  
407 CoreMark  
100 MHz Cortex-M33

 Latest product generation     Radio co-processor only

More than 60,000 customers  
Over 10 billion STM32 shipped since 2007



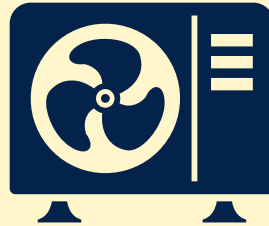
# Perfect fit for applications typically served by 8-bit/16-bit MCUs

## Smart homes



Fridges  
Ovens  
Coffee machines

## Industrial devices

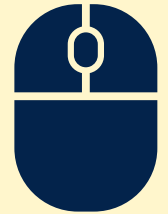


Industrial pumps  
Fan control  
Circuit breakers

## Consumer devices



Smoke detectors  
Fire detectors  
Alarms



PC peripherals  
& accessories

# Affordability

## Attractive price point

Most cost-effective STM32 MCU



## Compact

9 tiny packages down to:

- 3 x 3 mm 20-pin QFN
- WLCSP12
- 8-pin SO8N



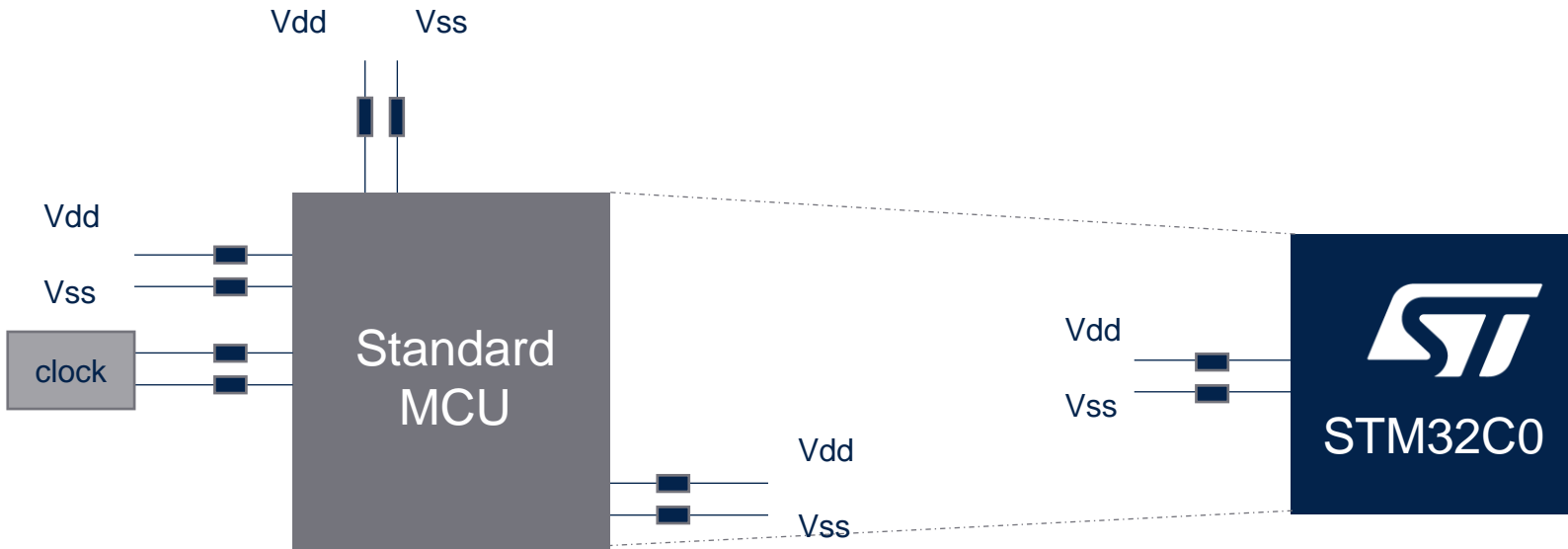
## Reduced BOM costs

- Smallest package: max I/O count
- Fewer surrounding components:
  - accurate internal high-speed clock 1% RC
  - only one power supply pair



# Optimized BOM cost

The STM32C0 series lets designers do more with less



- Smaller package: **fewer surrounding components**
- Platform optimized with **1 power supply pair only**
- Embedded **high-speed clock with high accuracy**

# Compact Multiple packages



Easy handling

S08N  
TSSOP-20  
LQFP32/ 48



Low thickness and tiny

20-pin UFQFPN 3 x 3 mm  
28/32/48-pin UFQFPN



Lowest thickness, tiniest form factor

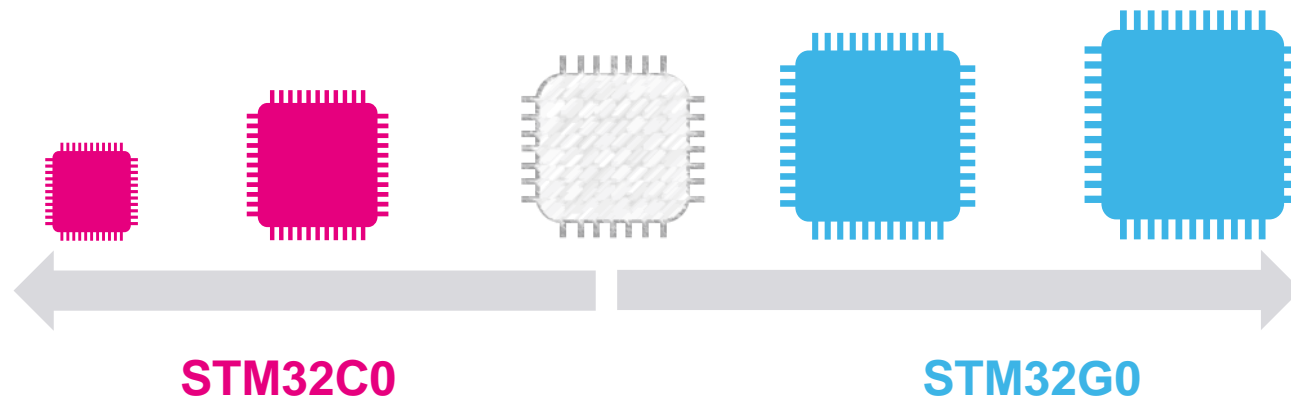
WLCSP12  
1.70 x 1.42 mm

9  
packages



# The STM32 Continuum

The STM32C0 series uses the same 90nm technology as the STM32G0, ensuring high quality standards



- Arm® Cortex® -M0+ running at 48MHz
- Delivers 44DMIPS instruction throughput with 114CoreMark performance
- Continuum with STM32G0 series
  - Consistent pinout
  - Same IP platform
  - Same technology platform

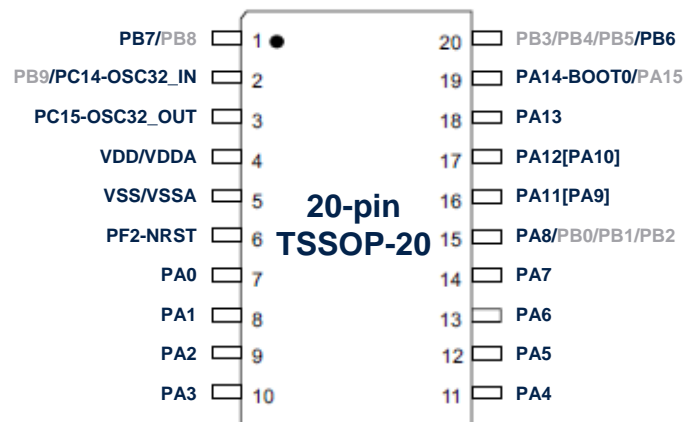
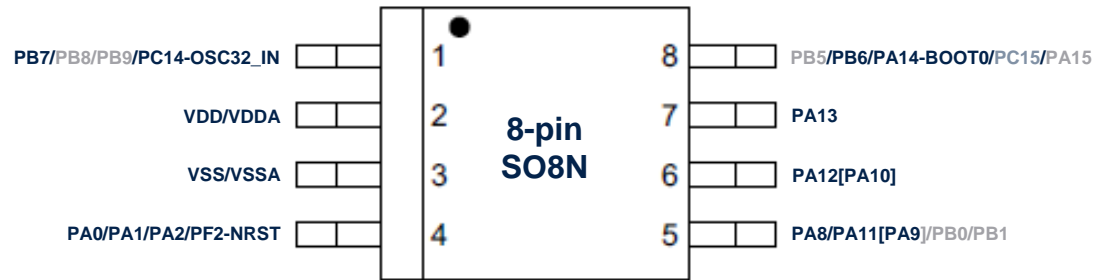


**Safe in deliveries:** 10-year longevity program  
Renewed commitment every year



# Easy porting with STM32G0

Consistent pinout with STM32G0 leaves room for future product upgrades



Consistent I/O footprint

Common pin location for alternate functions & system

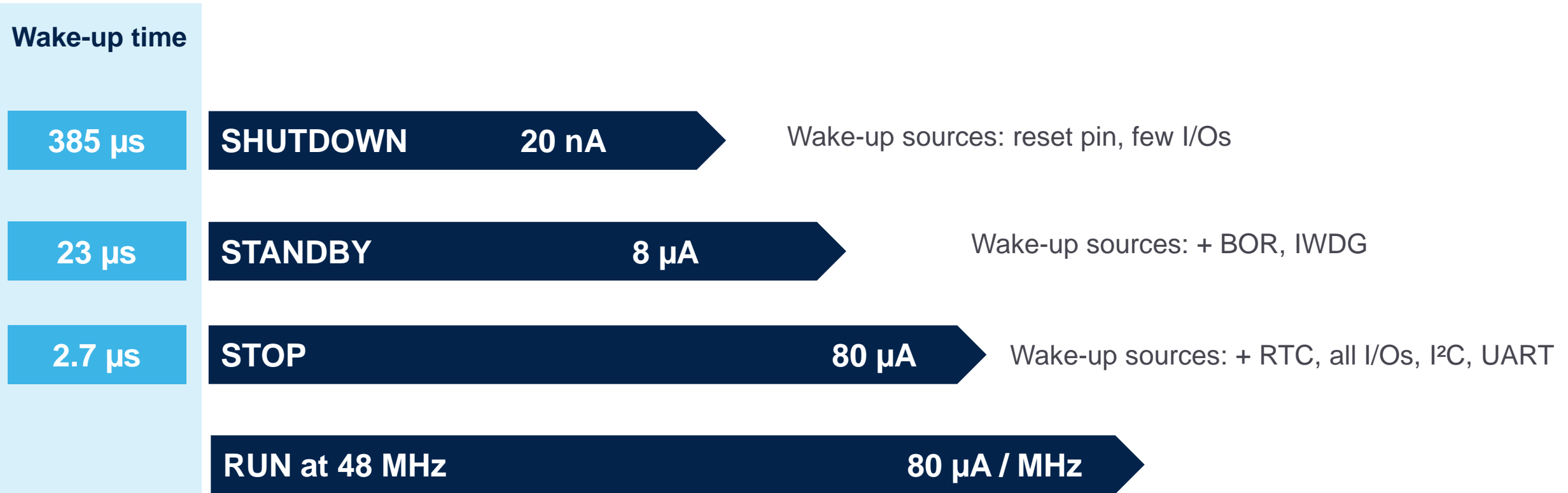
Maximum I/O ratio vs pin count

Common signals on STM32C011 and STM32G031

Legend: common signals - STM32G031 only - STM32C011 only

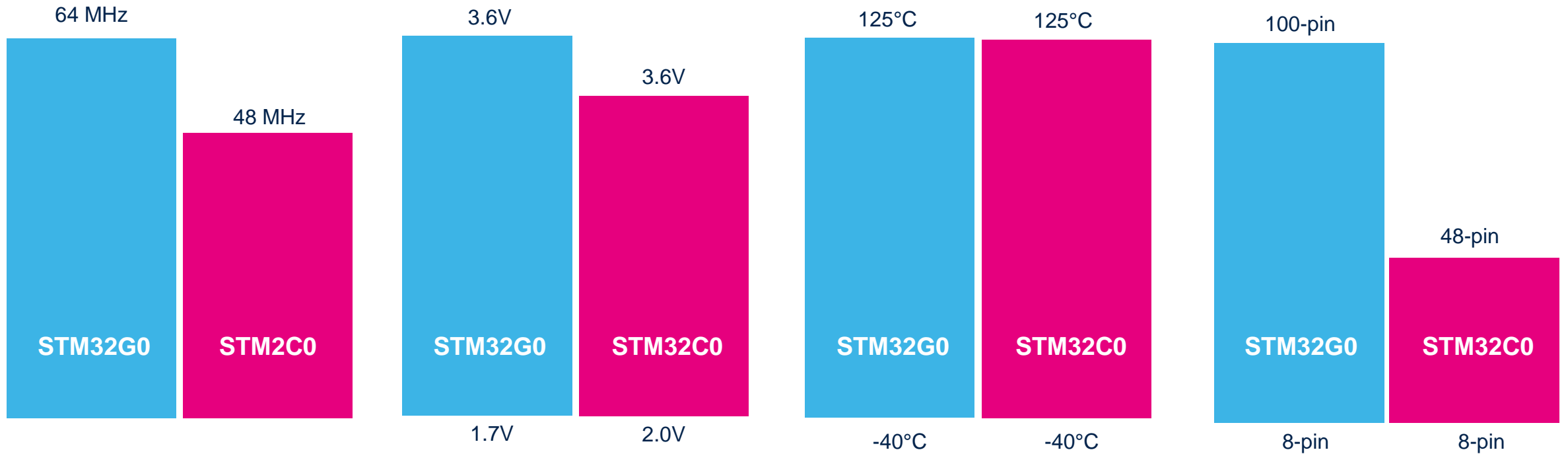
# Low-power modes for better efficiency

## Excellent dynamic consumption



Conditions: 25°C,  $V_{DD} = 3V$

# Performance benchmark STM32C0 & STM32G0



Frequency

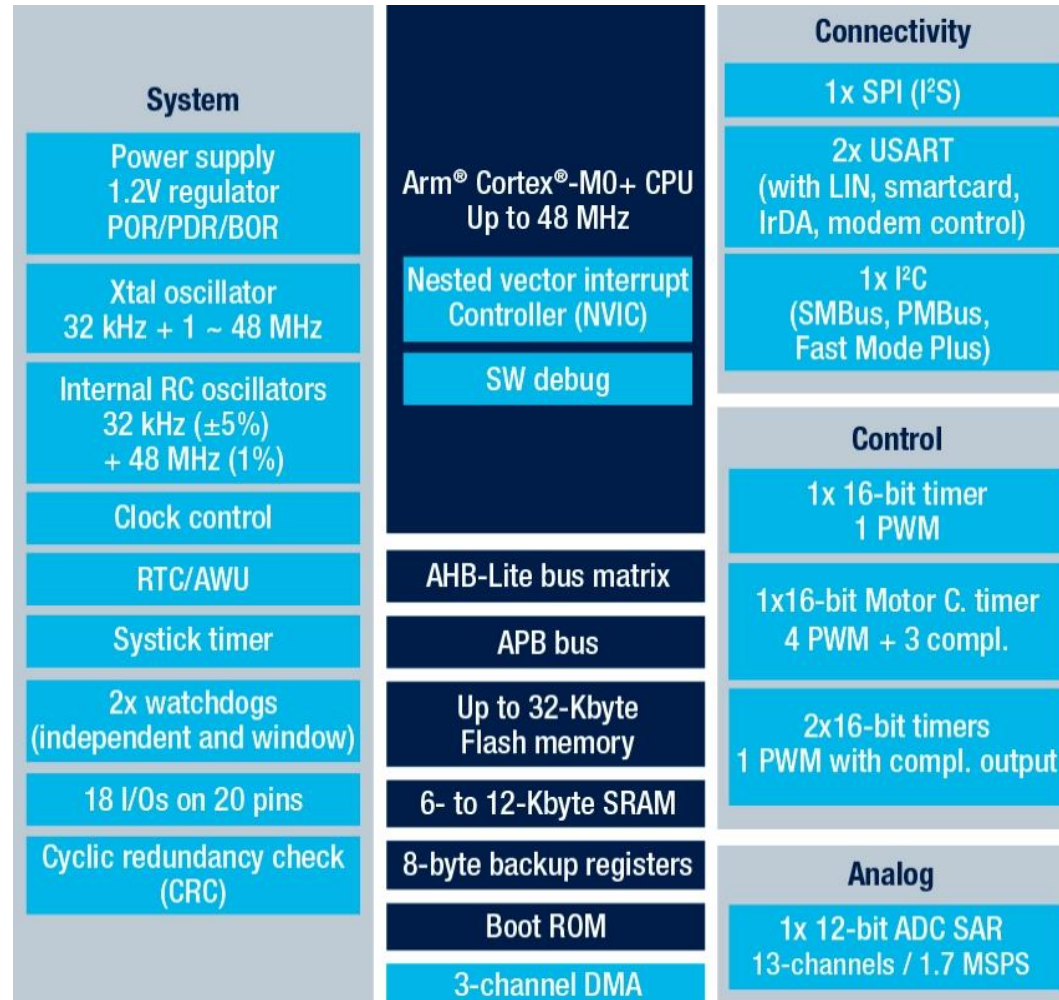
Voltage

Temperature

Package

# STM32C011 / C031 block diagram

- 32-bit Arm® Cortex® -M0+ core
- 2 to 3.6V power supply
- I/O ports maximization
- One supply pair
- 1% internal clock
- All clock sources
  - Low speed 32 kHz
  - High speed
  - Internal / external
- Direct memory access (DMA)



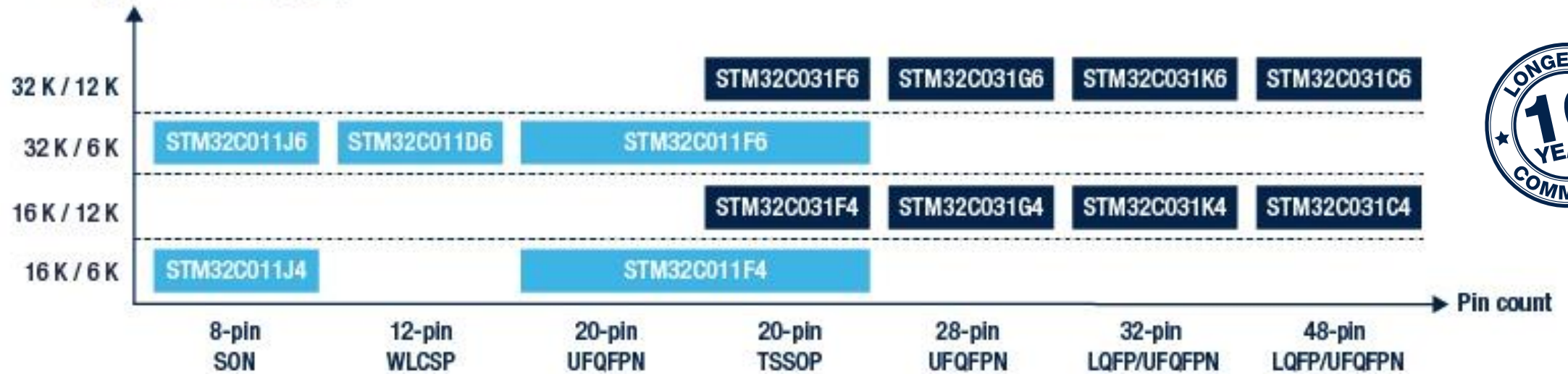
- Timers 16-bit with Motor Control feature
- Communication peripherals incl.
  - 2 x USART
- Real-time clock
- 12-bit ultra-fast ADC
- Safety features
- Excellent dynamic consumption 80µA/MHz
- SRAM size:
  - STM32C011: 6 Kbytes
  - STM32C031: 12 Kbytes



# STM32C0 portfolio

Same feature-set, different RAM size and packages

Flash memory size / RAM size (bytes)



Legend: ■ STM32C011 ■ STM32C031

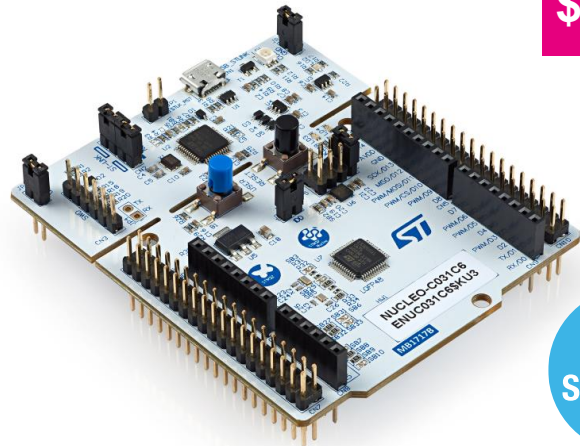




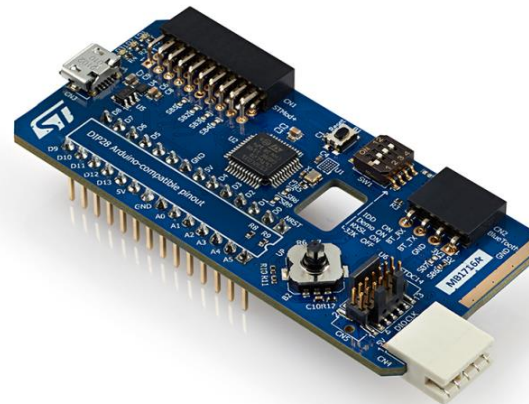
# Development tools for the STM32C0 series

Speed-up evaluation, prototyping, and design

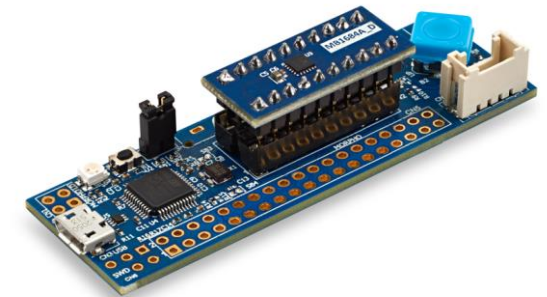
\$10.32



\$17



\$11



STM32 Nucleo with C031

Prototyping QFP48  
NUCLEO-C031C6

Discovery kit for C031

Mini evaluation board  
Full voltage range 2.0 ~ 3.6 V  
Standalone, fast STLINK-V3MINIE

STM32C0316-DK

Discovery kit for C011

Ready to use wired sample  
Daughter board QFN20/DIP20  
STM32C0116-DK

*Recommended resell price (RRP)*

# Leveraging STM32Cube software suite

Software tools



Embedded software



Complemented with  
Microsoft Azure RTOS

STM32  
CubeMX

Configuration

STM32  
CubeIDE

Development

STM32  
CubeProgrammer

Programming

STM32  
CubeMonitor

Monitor



STM32  
CubeMCU Packages

Packages

Github

User application

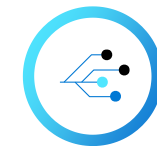
Middleware

Drivers

Expansions

STM32  
CubeExpansion

## Azure RTOS



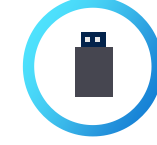
Azure RTOS ThreadX  
Real-time operating system



Azure RTOS FileX  
FAT file system, fault tolerant



Azure RTOS NetX/NetX Duo  
TCP/IP stacks



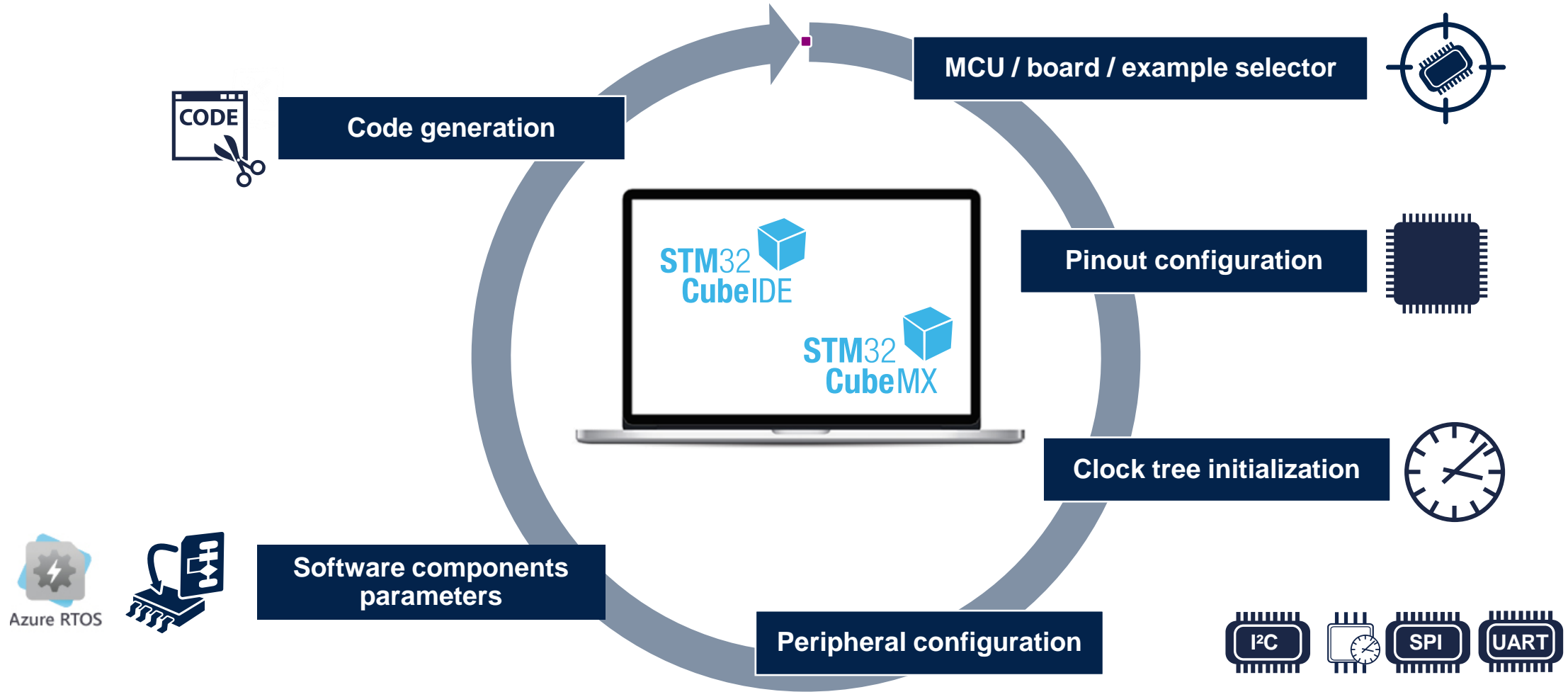
Azure RTOS USBX  
USB stack, host, and device

Free-of-charge production license





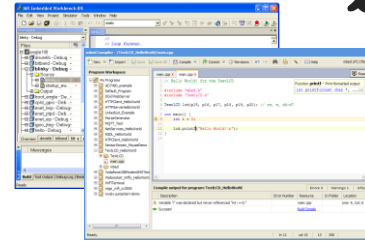
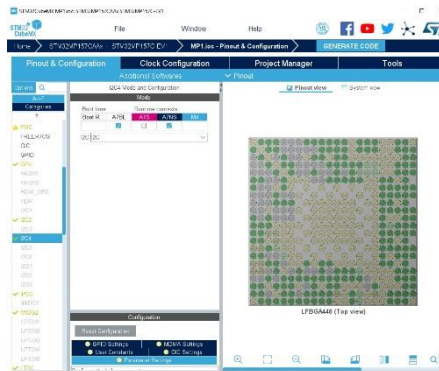
# STM32Cube configuration tool





# Software tools for STM32C0

## Complete support of Arm® Cortex®-M0+ architecture



### STM32CubeMX

**Graphical tool  
for easy configuration**

- Configure and generate code
- Peripherals and middleware configuration

### IDEs Compile and debug

**Simple,  
powerful solutions**

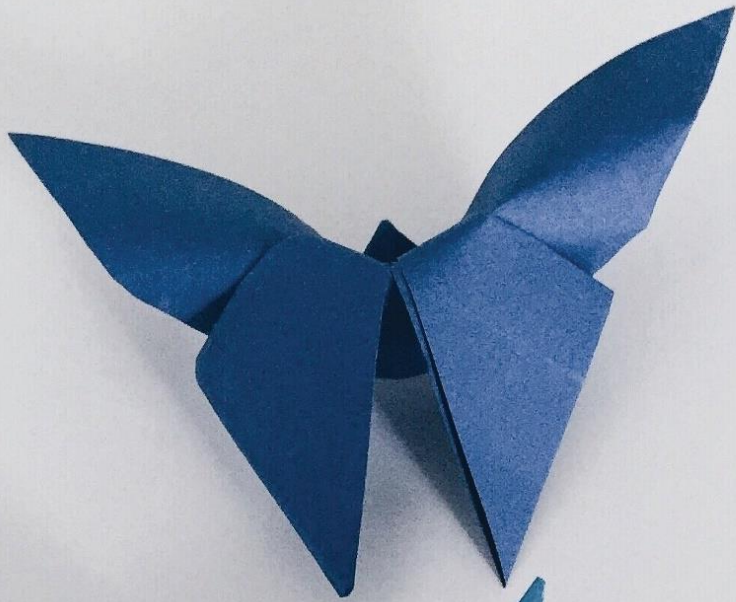
- Partners IDE (Arm® Keil®) **FREE**
- IDE based on Eclipse **FREE**
- RTOS aware debug

### STM32 programming & monitoring tools

**STM32CubeProg  
STM32CubeMonitor**

- Device and memory configuration
- Program the application
- Monitor variables at runtime

# Releasing your creativity



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[@ST\\_World](#)



[community.st.com](#)



[www.st.com/stm32c0](#)



[wiki.st.com/stm32mcu](#)



[github.com/stm32-hotspot](#)



[www.st.com/mcu-developer-zone](#)



# Our technology starts with You

Find out more at [www.st.com/STM32C0](http://www.st.com/STM32C0)

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