xG26笛二屠骚帻濰泼瘤SoC
帳厰⌒溢赳蘱曉爏耔縋雁甐

2025
tech t▶lks
WEBINAR SERIES

SILICON LABS
xG26

MG26 PG26 骼 B26 囨 IoT 顆垟齺瘤幕瓱骼字伎

艰祿祿扁骚縺獱囻幕瓱嶦秋蘜

缙族匏

MG26二纖

優厭瘤**Matter**覣夭甌栬

MG26儵铯爺忼

- **Largest combination of Flash and RAM**
  - Future proofs deployed devices as specifications like Matter evolve over time
  - Eliminates the need for external flash for OTA updates
  - Enables Concurrent Multiprotocol for Zigbee and Thread end devices
- **Rich peripheral set with large number of GPIOs enables better system integration**
  - Up to 64 GPIOs and 4 dedicated analog pins expand the applications that can be supported with a single chip
  - LCD driver supporting up to 288 segments
- **High performance compute**
  - The tri-core device has a 78MHz M33 application core and dedicated cores for both the radio and security subsystems
  - AI/ML accelerator further offloads compute intensive tasks for machine learning – more RAM enables more complex ML applications
- **Robust RF performance provide long-range and reliable communication**
  - Best-in-class RF performance for reliable RF communication without the need for an external FEM (Front End Module)
- **Robust Security protects the data and the device**
  - Secure Vault High is designed for PSA Level 3 and protects against local and remote attacks
- **Low power enables smaller batteries and provides longer battery life**
  - Low active and sleep current enable ability to run on coin cell batteries and provide battery life measured in years
- **Pin compatible with MG24 SoCs and Modules**
  - Pin compatible options allow easy migration for devices that need more memory and ML capabilities

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MG26

matter · zigbee · THREAD · Bluetooth® · Proprietary

6x6 QFN48 (32 GPIO)
6x6 QFN48 (28 GPIO + 4 AIN)
8x8 QFN68 (49 GPIO)
8x8 QFN68 (45 GPIO + 4 AIN)
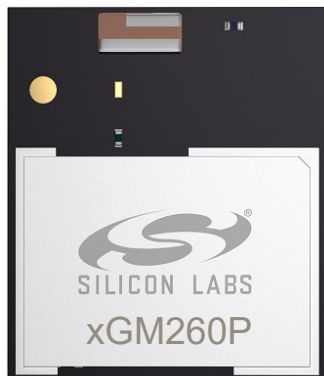**7x7 BGA136 (64 GPIO + 4 AIN)**

巌廃勖爺忼

- **Large Flash and RAM**
  - Enables more features and applications
  - Future proofs product

- **High GPIO Count**
  - Allows for better system integration
  - Up 64 GPIO & 4 analog in

- **Concurrent Multiprotocol Support**
  - Zigbee & Thread CMP for end devices

- **Secure Vault™ High**
  - Designed for PSA Level 3
  - Protects the data and the device

- **Segment LCD Driver**
  - Simplified UI design and BOM consolidation
  - Up to 288 segments

- **AI/ML Accelerator**
  - 8x faster and 6x lower power
  - Large RAM improves audio inferencing

- **PLFRCO**
  - Eliminates need for 32 KHz crystal

- **Advanced Sensing**
  - 20-bit ADC with 16-bit ENOB

- **Package and Firmware Compatible with MG24**
  - Migration path to more Flash and RAM
  - 6x6 QFN48

譄壇勤柽

- **High Performance Radio**
  - Up to +19.5 dBm TX
  - -105.4 dBm sensitivity @ 250 kbps (802.15.4)
  - -97.6 dBm RX @ BLE 1 Mbps
  - -105.9 dBm RX @ 125 kbps GFSK

- **Efficient ARM® Cortex®-M33**
  - 78 MHz
  - Up to 3200 kB Flash
  - Up to 512 kB RAM

- **Low Power**
  - 5.9 mA TX @ 0 dBm
  - 6.2 mA RX (802.15.4)
  - 5.4 mA RX (BLE 1 Mbps)
  - 19.5 mA TX @ +10 dBm
  - 1.4 µA EM2 sleep
  - 53.9 µA/MHz (Coremark)

- **Wide Operating Range**
  - 1.71 to 3.8 volts
  - +125ºC operating temperature

- **Multiple Protocol Support**
  - Matter, Thread, Zigbee, Bluetooth (1M/2M/LR), Bluetooth mesh, Proprietary, DMP and CMP

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MGM260P – 忔肽頡窬瘤 **2.4 GHz** 榴爍⌒剪剗乱咂偉迖罄巂

xGM260P

matter · zigbee

Bluetooth® · THREAD

12.9 x 15.0 mm (29 GPIO)

巌廃勖爺忔

- **Large Memory**
  - Up to 512kB RAM
  - Up to 3200kB Flash

- **Concurrent Multiprotocol Support**
  - Zigbee & Thread CMP for end devices

- **Faster Inferencing with AI/ML Accelerator**
  - 8x faster and 6x lower power
  - Large RAM improves audio inferencing

- **Secure Vault™ High**
  - Designed for PSA Level 3
  - Protects the data and the device

- **PLFRCO**
  - Eliminates need for 32 KHz crystal

- **Advanced Sensing**
  - 16-bit ADC

- **Easy migration path to xG26 SoCs**
  - Pin Compatible with xGM240P Module

- **Certifications**
  - Reduced development time and cost
  - Shielded, Fully Certified
  - FCC, IC, CE, MIC, KCC

謓壇夐柽

- **High Performance Radio**
  - -98.3 dBm RX @ BLE 1 Mbps
  - -106.1 dBm RX @ 802.15.4
  - Up to +20 dBm output power

- **Efficient ARM® Cortex®-M33**
  - Operating Frequency: Up to 78 MHz

- **Low Power**
  - 5.7 mA RX current @1 Mbps
  - 6.8 mA @ 0 dBm TX current
  - 19.4 mA @ +10 dBm TX current
  - 1.4 µA EM2 sleep current
  - 59.3 µA/MHz (EM0)

- **Wide Operating Range**
 - 1.8 to 3.8 volts
  - -40ºC to +125ºC operating temperature

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艰祿祿扁瘤**2.4GHz SoC**乩唖纝又

|	*x*G12	*x*G21	*x*G24	*x*G26
Protocols				
Frequency Bands	2.4 GHz, Sub-GHz	2.4 GHz	2.4 GHz	2.4 GHz
Core	Cortex-M4 (40 MHz)	Cortex-M33 (80 MHz)	Cortex-M33 (78 MHz)	Cortex-M33 (78 MHz)
Max Flash	1024 kB	1024 kB	1536 kB	3200 kB
Max RAM	256 kB	96 kB	256 kB	512 kB
Security	Secure Vault - Base	Secure Vault - Mid Secure Vault - High	Secure Vault - Mid Secure Vault - High	Secure Vault - Mid Secure Vault - High
Rx Sensitivity (15.4)	-102.7 dBm	-104.3 dBm	-105.4 dBm	-105.4 dBm
Rx Sensitivity (BLE 1Mbps)	-94.8 dBm	-97.1 dBm	-97.6 dBm	-97.6 dBm
Active Current (CoreMark)	85 µA/MHz	50,9 µA/MHz	49.1 µA/MHz	53.9 µA/MHz
Sleep Current (EM2, 16 kB ret)	1.5 µA	4.5 µA	1.3 µA	1.4 µA
TX Current @ +0 dBm (2.4 GHz)	9.5 mA	9.9 mA	5.0 mA	5.9 mA
TX Current @ +10 dBm (2.4 GHz)	34 mA	34.9 mA	19.1 mA	19.5 mA
TX Current @ +20 dBm (2.4 GHz)	131 mA	186.5 mA	156.8 mA	152.7 mA
RX Current (802.15.4)	12.5 mA	9.4 mA	5.1 mA	6.2 mA
RX Current (BLE 1 Mbps)	10.9 mA	8.8 mA	4.4 mA	5.4 mA
Serial Peripherals	USART, I2C	USART, I2C	USART, EUSART, I2C	USART, EUSART, I2C
Analog Peripherals	12-bit ADC, ACMP, VDAC	12-bit ADC, ACMP	20-bit ADC, ACMP, VDAC	20-bit ADC, ACMP, VDAC
Other	PCTN, LESENSE	Die Temp Sensor	Die Temp Sensor	Die Temp Sensor, Segment LCD
Operating Voltage	1.8 V to 3.8 V	1.71 V to 3.8 V	1.71 V to 3.8 V	1.71 V to 3.8 V
Package	7x7 QFN48 (31 GPIO) 8x8 QFN68 (46 GPIO) 8x8 BGA125 (65 GPIO)	4x4 QFN32 (20 GPIO)	5x5 QFN40 (26 GPIO) 6x6 QFN48 (32 GPIO) 6x6 QFN48 (28 GPIO + 4 AIN)	6x6 QFN48 (32 GPIO) 6x6 QFN48 (28 GPIO + 4 AIN) 8x8 QFN68 (49 GPIO) 8x8 QFN68 (45 GPIO + 4 AIN) 7x7 BGA136 (64 GPIO + 4 AIN)

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剩儤壚匐譯，DYNAMIC MULTIPROTOCOL, DMP
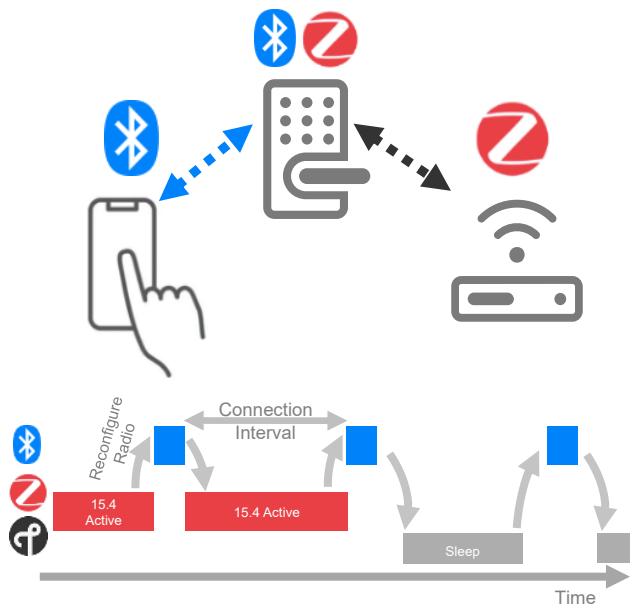
- Time-sliced operation of two protocols (such as BLE and Zigbee)
- Enables direct phone connectivity
  - Enhanced UI for commissioning, etc.

帶厓壚匐譯，CONCURRENT MULTIPROTOCOL, CMP
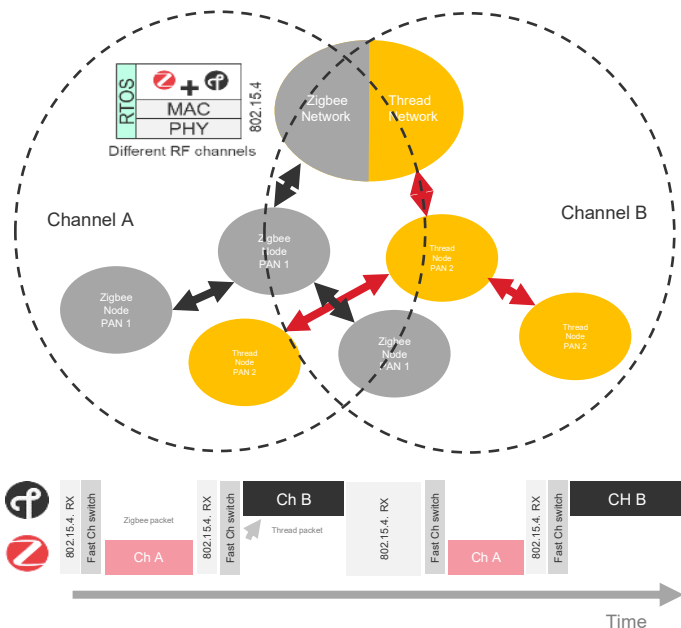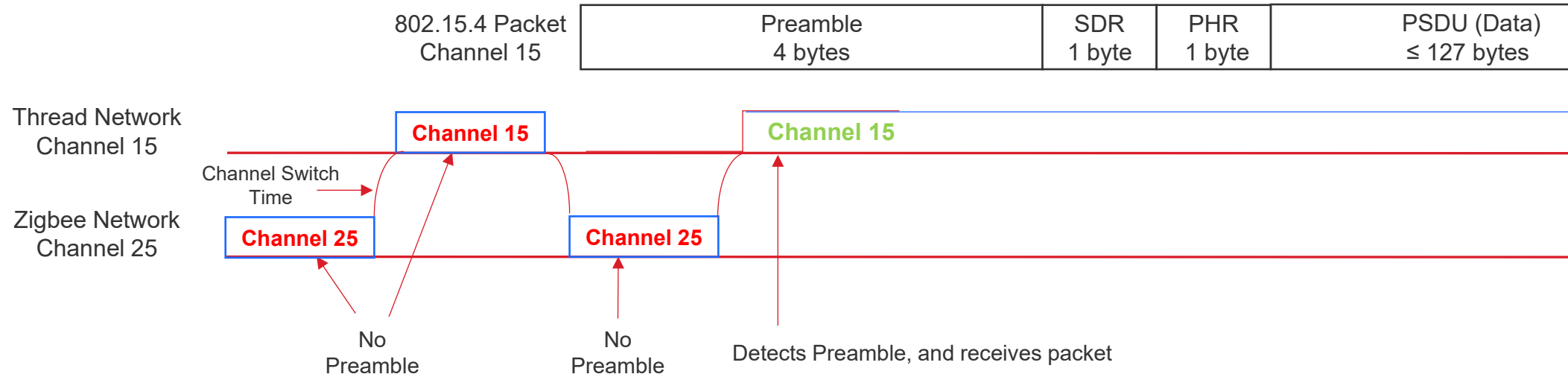

- Concurrent operation of Zigbee and Thread
  - Operation is on the same or different (Fast Channel switching) channels
- HW based Fast Channel switching
  - CMP with Concurrent Listening
    - Zigbee and Thread are on different channels
    - Supported on MG21, MG24 for gateways and hubs (NCP/RCP)
    - Supported on MG26 gateways and hubs as well as end devices (SoC)

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帶厓壚匋譯磻仳

| | | 802.15.4 Packet
Channel 15 | Preamble
4 bytes | SDR
1 byte | PHR
1 byte | PSDU (Data)
≤ 127 bytes |

Thread Network
Channel 15

Channel 15 (box)   Channel 15 (green)

Channel Switch Time

Zigbee Network
Channel 25

Channel 25 (box)   Channel 25 (box)

No Preamble   No Preamble   Detects Preamble, and receives packet

- **Device switches between channels**
- **When a valid 802.15.4 preamble is detected**
  - Stays on channel to receive the entire packet
  - Checks to see if it is a valid packet for the network and device
  - Transmits acknowledgement (if required)
- **Switches to the next channel and repeats the process**

CMP Blog for more information

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MG26乩呸讵族忙缱

- **The MG26 family is Silicon Labs' highest performance wireless SOC for Series 2**
- **Leads the market with combination of best-in-class link budget, Flash, RAM, and GPIOs**
  - Removes the need of external Flash for Matter
  - Large number of GPIOs and rich peripherals enable better system integration
  - Enables more complex applications
  - Reduces BOM cost and PCB area
- **The tri-core device offloads security and radio critical tasks while freeing up the M33 for customer apps**
- **ML accelerator enables faster inferencing at lower power and large RAM enables more ML applications**
- **Secure Vault High provides support for industry-leading PSA Level 3 certification**
- **Best-in-class RF performance for reliable RF communication**
- **Low active and sleep current enable coin cell batteries and provide battery life measured in years**
- **Pin compatibility with MG24 and MGM240P enables migration to more memory and ML capabilities**
  - xG26 6x6 QFN48 is pin compatible with xG24 QFN48
  - xGM260P module is pin compatible with xGM240P module

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PG26二纖

儽錯伏剞翹鮥嘆壚壖譿擰抵

- **Large combination of Flash and RAM to meet the needs of more challenging applications**
  - Allows for more complex AI/ML algorithms and larger customer applications
- **Rich peripheral set with large number of GPIOs enables better system integration**
  - Up to 64 GPIOs + 4 additional analog only pins reduces the need for external components
  - Integrated LCD driver to support up to 288 segments
- **High performance, multi-core compute platform improved efficiency**
  - 80MHz Cortex-M33 core to meet demanding real time processing needs
  - Additional security core for isolation and to ensure more cycles remain for customer application
- **Firmware compatible with other Series 2 MCUs**
  - Simplifies designs for connected and non-connected products
  - Package compatibility for 2.4GHz and Sub-GHz wireless SoC options

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PG26 – 骚忦肽皾撺抿暵壚 **GPIO** ⌒ 溢赳暵塹晜瘤幕旺雁氈

PG26
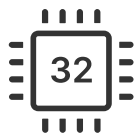
32-Bit MCU

6x6 QFN48 (28 GPIO + 4 AIN)

8x8 QFN68 (48 GPIO + 4 AIN)

7x7 BGA136 (64 GPIO + 4 AIN)

崴廃勛爺忦

- **Large Flash and RAM**
  - Enables more features and applications

- **High GPIO Count**
  - Allows for better system integration
  - Up 64 GPIO & 4 analog in

- **Faster Inferencing with AI/ML Accelerator**
  - 8x faster and 6x lower power
  - Large RAM improves audio inferencing

- **Segment LCD Driver**
  - Simplified UI design and BOM consolidation
  - Up to 288 segments

- **Secure Vault™ High**
  - Upgraded security over Series 0 and Series 1
  - Consistent across wired and wireless platforms

- **Package and Firmware Compatible with PG28**
  - Migration path to more Flash and RAM

- **Software Compatible with xG2x Wireless SoCs**
  - Easy migration to wireless support

譿壇勷桎

- **Ultra Low Power**
  - 42.8 µA/MHz EM0 @ 80 Mhz[1]
  - 1.4 µA EM2 with 16 kB RAM

- **Efficient ARM® Cortex®-M33**
  - Operating Frequency: Up to 80 MHz
  - Up to 512 kB RAM and 3200 kB Flash

- **Low Power Peripherals**
  - 4 x EUSART, 3 x USART (7 x UART), 4 x I2C
  - 16-bit ADC
  - 2x 12-bit VDAC, 2x ACMP
  - Temperature sensor +/- 1.5°C

- **Wide Operating Range**
  - 1.71 to 3.8 volts
  - +125ºC operating temperature

1 - 80 MHz HFRCO, CPU running CoreMark loop from Flash

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MVP – 瞪阅发醐壆珅褛，AI/ML 砬廉刿迠褛

- **Matrix processor accelerates ML inferencing**
  - Multi-dimensional array operations
  - Handles real and complex data
  - Offloads MCU
- **Up to 8x faster inferencing over Cortex-M**
  - Lower latency
- **Up to 6x lower power for inferencing**
  - Longer battery life
- **MVP Math Library**
  - Can be used for non-ML applications

Sensors
Acceleration,
Temperature,
Current/Voltage

Microphones
Analog or Digital

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MVP

Event Detection

Camera
Low resolution imaging

AI/ML 砬廉刿迠褛孟獶骚攞瘟轼给窜曺褛嬺两捹珅

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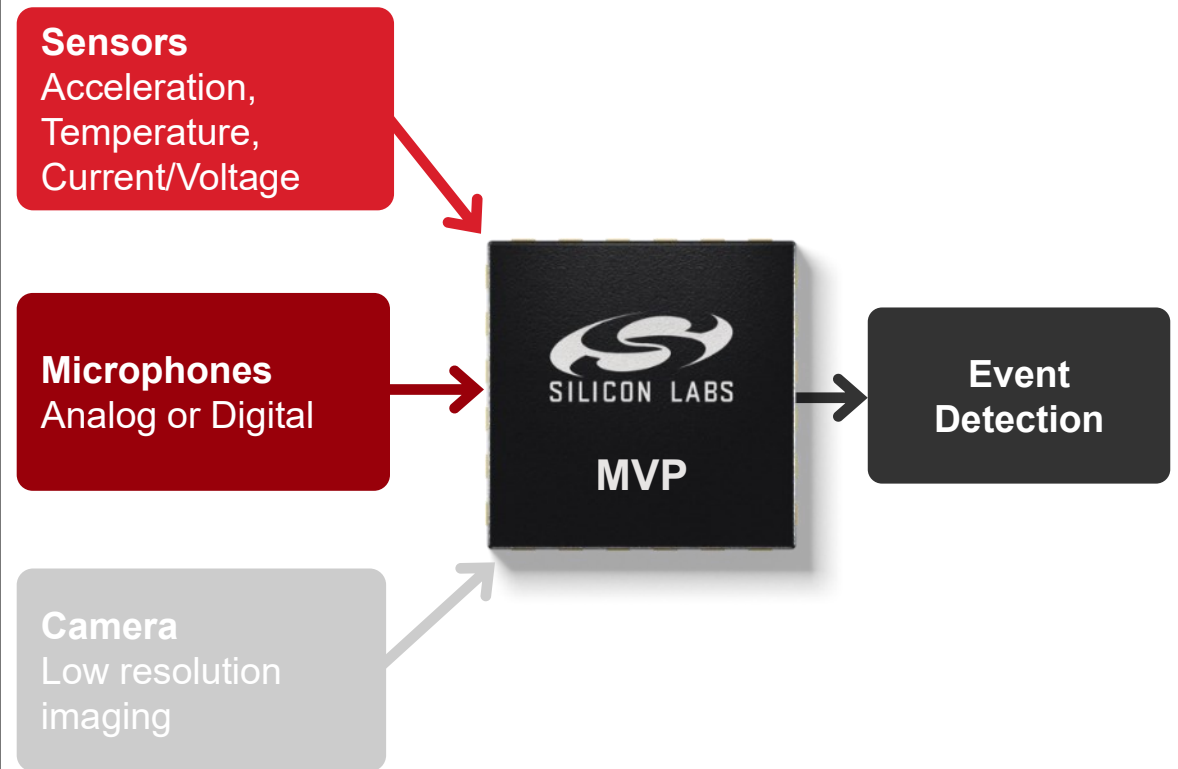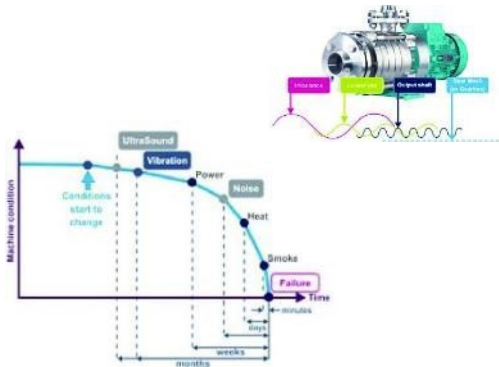
Typical/recommended Resource needs with ML applications in Order of Magnitudes

RAM: 64kB	RAM: 128kB	RAM: 256kB	RAM: 256kB
Ops/s: 5M-40M	Ops/s: 40M-100M	Ops/s: 50M-500M	Ops/s: 200M-1.5G w /hardware accelerator

SENSOR

AUDIO

VOICE

VISION

Signal Processing (time series, low-rate data)

- Predictive/Preventative Maintenance
- Anomaly detection (e.g. air quality, abnormal usage, leak detection)
- Condition based monitoring – machine health, Cold chain monitoring, Battery monitoring
- Bio-signal analysis -healthcare and medical (e.g., pulse detection, EKG)
- Accelerometer use-cases e.g., fall detection, pedometer, step counting
- Agricultural use-cases (e.g. cow health)

Audio Pattern Matching

- Security applications e.g., Glass break, scream, shot detection
- Cough detection
- Machine malfunction detection
- Breath monitoring

Voice Commands

- 10 words command set for smart appliance
- Wake-word detection (Always-On voice)
- Smart device voice control
- Voice assistant

Low-resolution vision

- Wake-up on object detection (always-on)
- Presence detection
- People counting, people-flow counting
- Movement detection
- Smart city monitoring (e.g. Parking spot)
- Fingerprint matching

MG26 increased RAM means higher resolution, bigger ML models and more accuracy

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Secure Vault™ - 籭爣籽綻謴壇掑作優靐瘤嬲優闼托

Base	Mid	High	Feature
✓	✓	✓	True Random Number Generator
✓	✓	✓	Crypto Engine
✓	✓	✓	Secure Application Boot
—	VSE / HSE	HSE	Secure Engine
—	✓	✓	TrustZone
—	✓	✓	Secure Boot with RTSL
—	✓	✓	Secure Debug with Lock/Unlock
—	Optional	✓	DPA Countermeasures
—	—	✓	Anti-Tamper
—	—	✓	Secure Attestation
—	—	✓	Secure Key Management
—	—	✓	Advanced Crypto

**BG26
MG26
PG26
xGM260P**

S E S I P™ 2   psacertified™ level two

S E S I P™ 3   psacertified™ level three

Designing Secure IoT Devices

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PG26乱呷讵族忱纔

A more general-purpose Series 2 MCU

- Larger memory options and more GPIOs to address a broader number of possible applications

AI/ML Hardware Accelerator to improve latency and efficiency

- 8x faster inferencing at 6x lower power while maintaining compatibility with other MVP enabled families

Firmware and package compatibility with other Series 2 Wireless SoCs and MCUs

- Directly compatible with MG26 and BG26 wireless SoCs while maintaining firmware compatibility to all Series 2 EFR Products

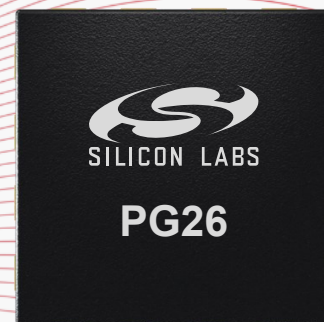Multi-Core architecture allows for optimized applications and security without compromise

- Isolated security sub-system and core provides best in class security and ensures more MCU cycles are available for customer applications
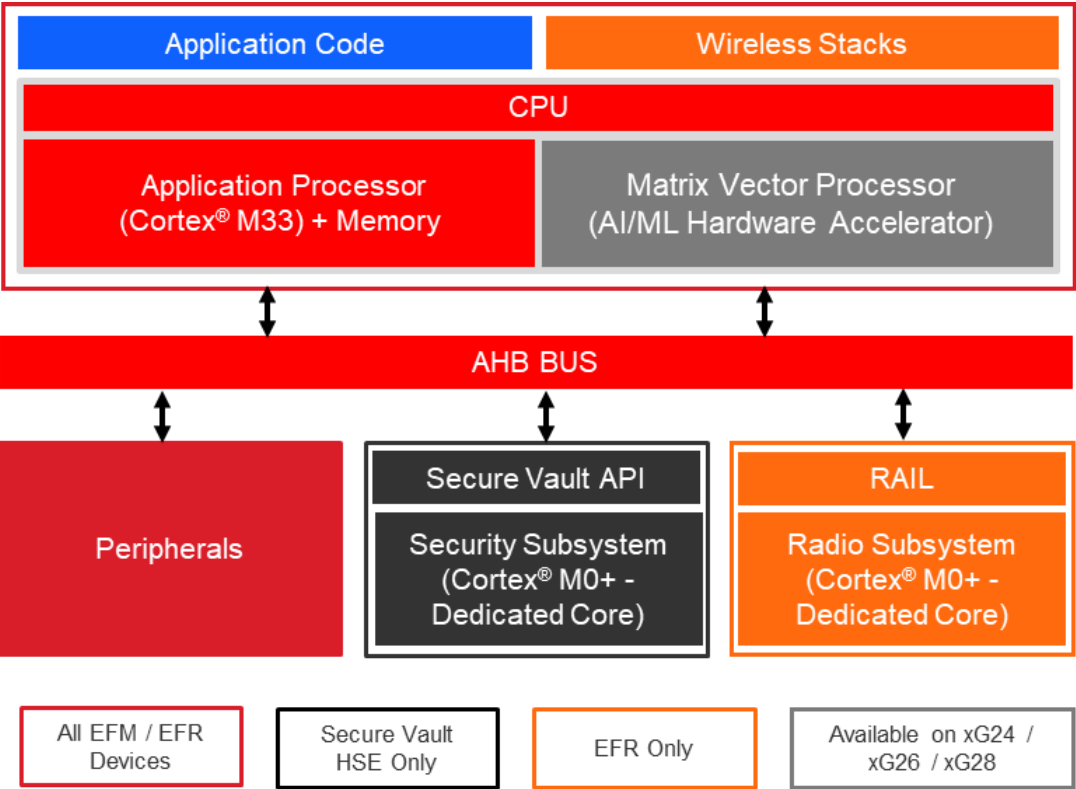
xG26

霈发偺辞爧籽绲幕瓩瘤**SoC**厠厐帐厥

EFM吭EFR粼準屠霖发爝籽綰厕庌瘤墟充梀觋天敺栌

Diagram (left)

Application Code | **Wireless Stacks**

CPU

Application Processor (Cortex® M33) + Memory | **Matrix Vector Processor (AI/ML Hardware Accelerator)**

AHB BUS

Peripherals

Secure Vault API

Security Subsystem (Cortex® M0+ - Dedicated Core)

RAIL

Radio Subsystem (Cortex® M0+ - Dedicated Core)

Legend:
- All EFM / EFR Devices
- Secure Vault HSE Only
- EFR Only
- Available on xG24 / xG26 / xG28

1- EFR32 devices only 2- Secure Vault Hardware Secure Element (HSE) Only

Right column

- **Multi-core architecture gives design flexibility and optimization across EFM and EFR platforms**
  - Dedicated application, radio[1], and security[2] cores share system burden for better resource utilization
- **Common development platform for connected and non-connected products**
  - Simplicity Studio gives developers a common development platform for entire product portfolio
- **Common Security and AI/ML subsystems**
  - Allows for design consistency independent of connectivity needs
- **Footprint and firmware compatibility between EFM and EFR families**
  - Simplified SKU management and code base development lowers development cost and complexity

	BG	MG	FG	ZG	SG	PG
xG21	✓	✓				
xG22	✓	✓				✓
xG23			✓	✓	✓	✓
xG24	✓	✓				
xG25			✓			
xG26	✓	✓				✓
xG27	✓	✓				
xG28			✓	✓	✓	✓
EFR Device Families						**EFM**

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匮击酞矼**xG26**辞�廁厏

Dev Board

- 1x Development board
  - ‣ On-board debugger
  - ‣ Signal breakouts
  - ‣ On-board sensors
  - ‣ 20-bit ADC
  - ‣ AI/ML hardware accelerator

Explorer kit

- 1x Explorer board
  - ‣ mikroBUS socket
  - ‣ Qwiic connector

Part Number	Description
xG26-DK2608A	xG26 +10 dBm Dev Kit
xG26-EK2709A	xG26 +10 dBm Explorer Kit
PG26-EK2711A	MCU, QFN68 Explorer Kit
MGM260P-EK2713A	xGM260 +20 dBm Explorer Kit

Pro kits

- 1x radio board
- 1 x WSTK main board
  - ‣ Modular development platform
  - ‣ Advanced development
  - ‣ RF measurements
  - ‣ Energy profiling
  - ‣ External device debug
  - ‣ Ethernet for large network test*
  - ‣ Segment LCD*

Part Number	Description
xG26-PK6028A	xG26 +10 dBm Pro Kit
PG26-PK2505A	MCU, BGA136 Pro Kit

Radio Board kits

- 1x radio board
  - ‣ Uses existing WSTK boards
  - ‣ Uses existing software tools

Part Number	Description
xG26-RB4120A	8x8 QFN68, +10 dBm Radio Board
xG26-RB4121A	8x8 QFN68, +20 dBm Radio Board
XG26-RB4118A	7x7 BGA136, +10 dBm Radio Board
MGM260P-RB4350A	xGM260P +10 dBm Radio Board
MGM260P-RB4351A	xGM260P +20 dBm Radio Board

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