

# i.MX 7ULP

ULTRA LOW POWER PLATFORM FOR PORTABLE  
APPLICATIONS



EXTERNAL USE



SECURE CONNECTIONS  
FOR A SMARTER WORLD

# ULP Family: Market Opportunity in Power Efficiency

- 6QuadPlus
- 6Quad
- 6DualPlus
- 6Dual
- 6DualLite
- 6Solo
- 6SoloX
- 6SoloLite
- 6SLL
- 6UltraLite
- 6ULL

ARM® v7-A

**i.MX 8 series** → M4  
Advanced Graphics and Performance

**i.MX 8M series** → M4  
Advanced Audio and Video

**i.MX 8X series** → M4  
BOM and Energy Efficiency

**i.MX 7** → M4  
Flexible Efficient Connectivity

**i.MX 7ULP** → M4  
Ultra Low Power with Graphics



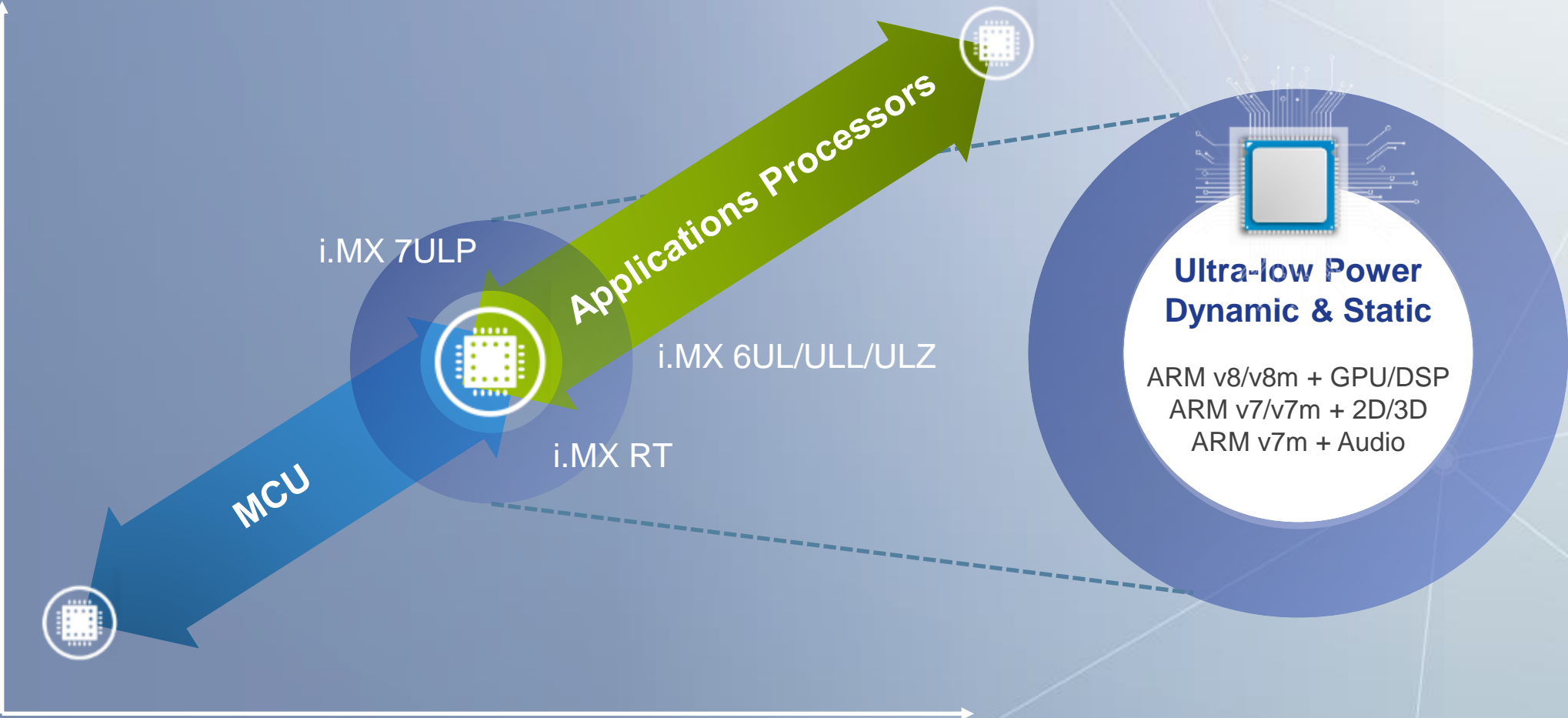
ARM® v8-A  
(32-Bit / 64-Bit)

ARM® v7-A  
(32-Bit)



# SCALABILITY OF EMBEDDED PROCESSING

## THE NEW NORMAL



# HETEROGENEOUS PROCESSING: PROVIDING SOLUTIONS TO MARKET CHALLENGES



## OFFLOAD TASKS

Right core for the  
task



## OPTIMIZE POWER

Power gate  
maximum amount of  
silicon



## INCREASE SECURITY

Allocate H/W  
access to silicon



## RICH GRAPHICS

3D/2D based  
rich UIs

# i.MX 7ULP Key Highlights



Bringing together

**Apps Processor performance** and **MCU Low Power**



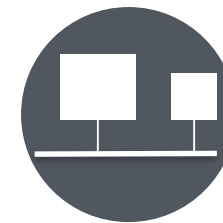
## Ultra Low Power

- **FDSOI**
  - Effective control of the transistor channel through biasing
- **High Performance/mW** extending battery life for portable devices.
- **Performance on Demand** with fast wake up times



## Efficient 3D & 2D Graphics

- **GC7000 nanoULTRA**
  - OpenGL ES 2.0/1.1
  - OpenVG 1.1
- **GC320 2D** Composition
  - Offloads tasks from 3D GPU
  - Stretch/Shrinking, rotation, GUI processing

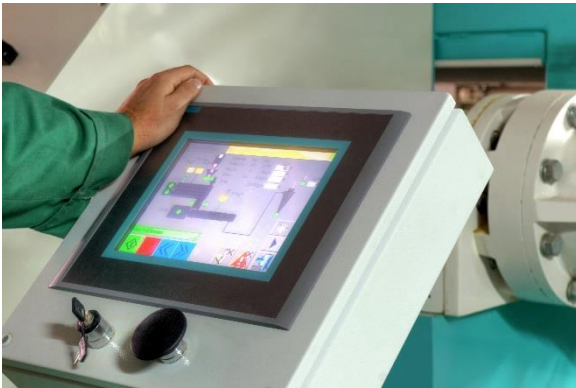
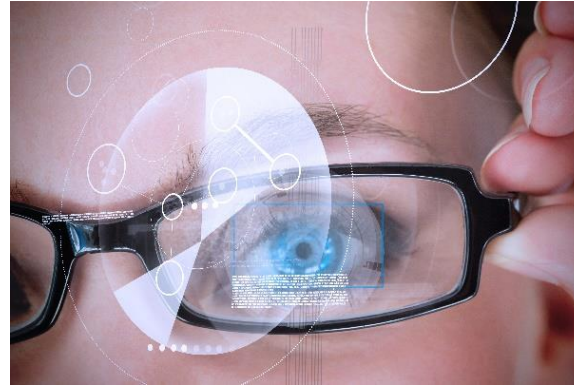


## Heterogeneous Domain Computing

- **Multiple software execution:**
  - Powerful processing using **Cortex-A7** and Neon co-processor
  - Real-time performance through **Cortex-M4**
- **System integrity and security**
  - Resource Domain Controller
  - Fast Low Power Boot
  - Safe Recovery of Application domain

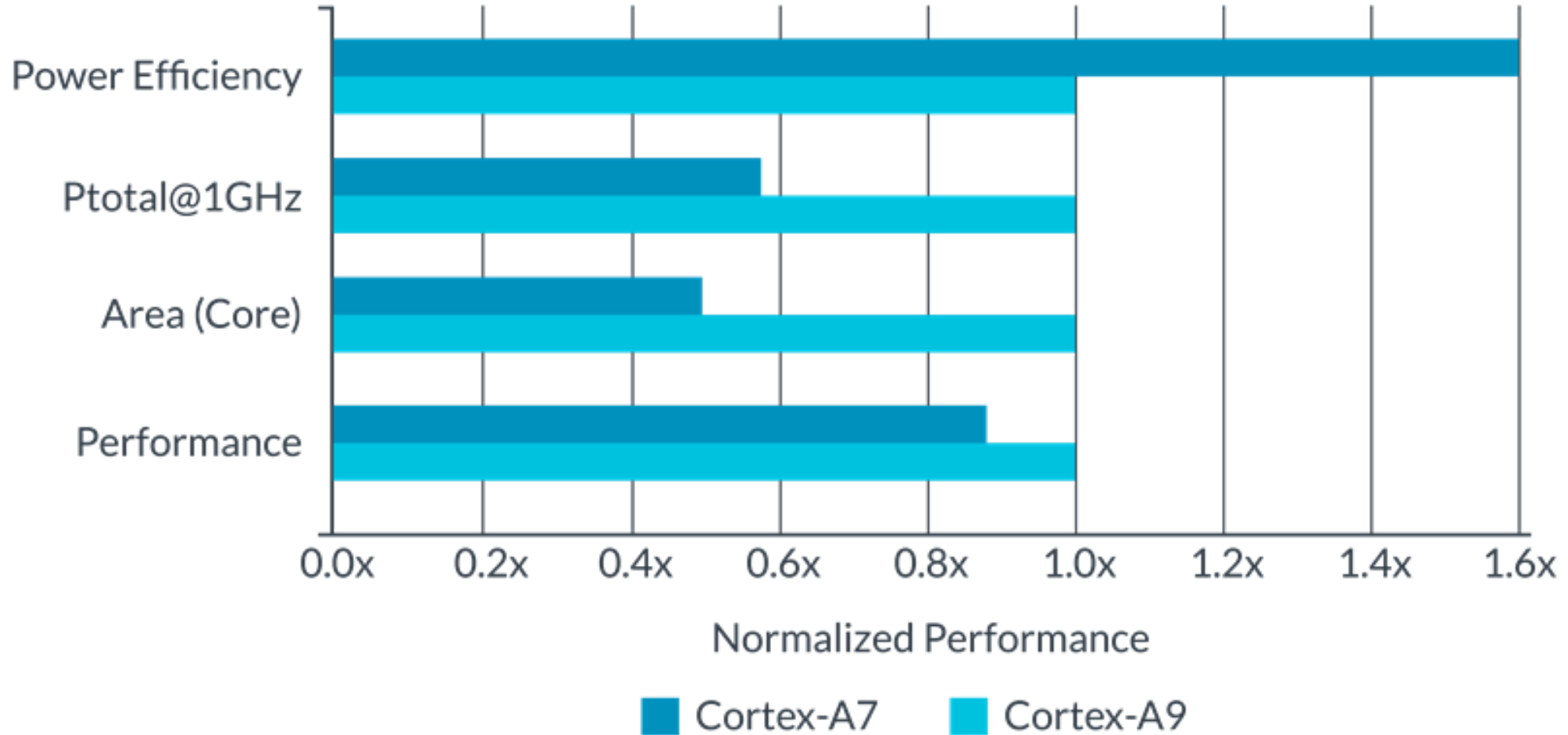


# Target Applications



- Wearables
- Home Control
- Portable Healthcare
- Portable Printing
- Gaming Accessories
- General Embedded Control
- IoT Edge

# Cortex-A7 enables power efficiency



# i.MX 7ULP Applications Processor

## Specifications:

### CPU:

- Cortex-A7 @ 720MHz
- Cortex-M4 @ 200MHz

**Process:** 28nm FD-SOI

### Package:

- 14x14 393BGA, 0.5mm pitch: **Consumer & Industrial**
- 10x10 361BGA, 0.5mm pitch: **Consumer Only**

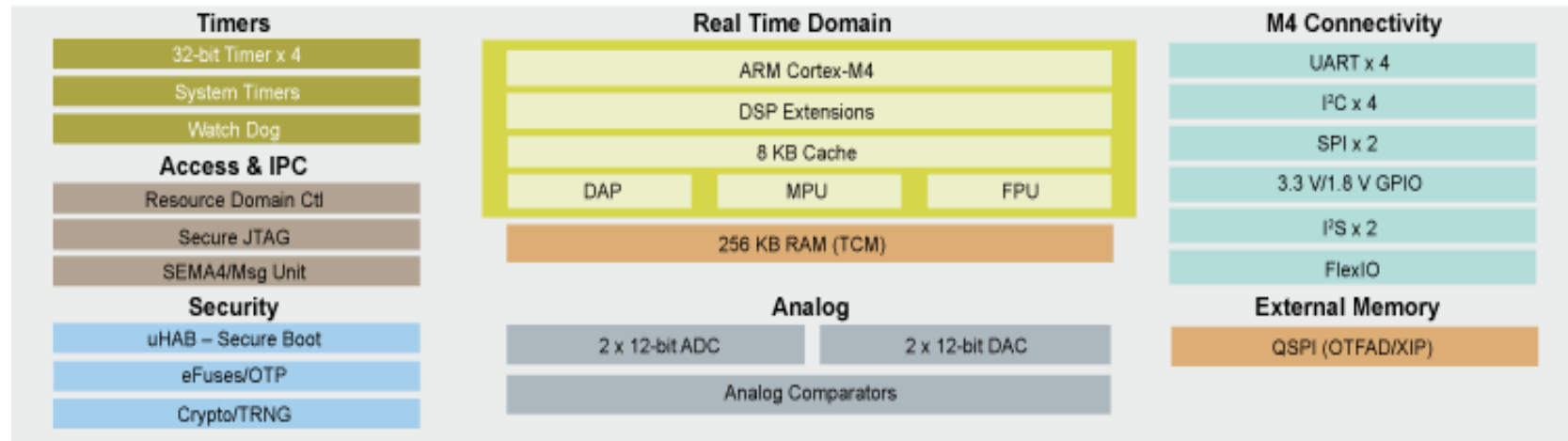
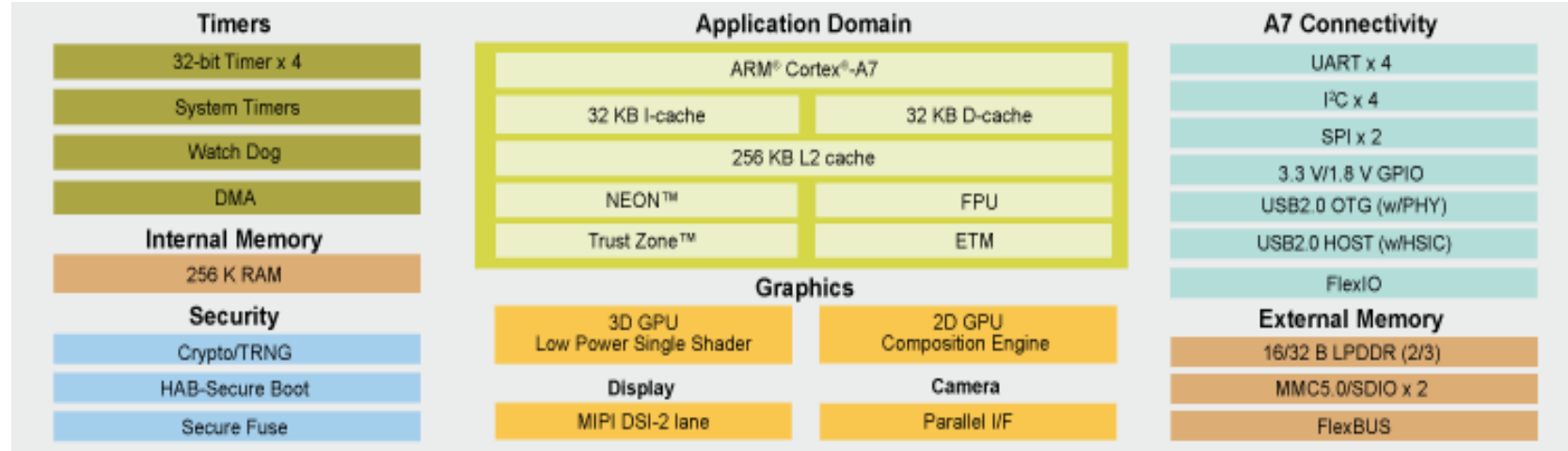
### Temp Range (junction):

Industrial: -40C to +105C

Consumer: 0C to +95C

## Key Features:

- Graphics
  - GC7000 nanoULTRA GPU: OpenGL 2.0 / OpenVG
  - GC320 Composition Engine
- Ultra Low Power
  - Independent Real-time domain
  - Ultra Low Run Current
- Memory options
  - QSPI (on the fly decryption)
  - 32-bit LPDDR2/3 @380MHz
  - eMMC 5.0 /SD3.0
- Connectivity
  - USB HS OTG with PHY
  - USB HS HOST HSIC
  - I2C X 8, SPI X 4, UART X 8, SDIO X 2, I2S X 2
- Security
  - High Assurance Boot
  - Crypto Acceleration: AES-128/256, SHA-1, SHA-224, SHA-256
  - RNG and Tamper Detection





# 28nm FD SOI

- **Power – Performance Benefits**

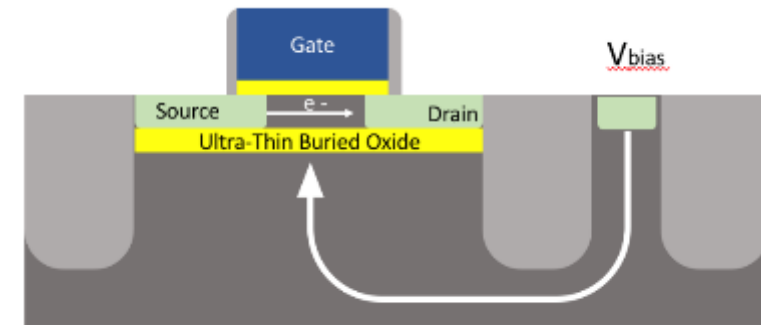
- Improved electrostatics enables **shorter gate lengths**
- Reduced device parasitics
- Device back bias allows for **lower V<sub>dd</sub>** while maintaining performance
- **Device tuning** with back biasing to compensate process variation

- **Analog Integration and Performance Benefits**

- Higher gain, better matching and lower 1/f noise
- Gate first integration removes density rules for precision analog

- **Better SER and Latchup Immunity**

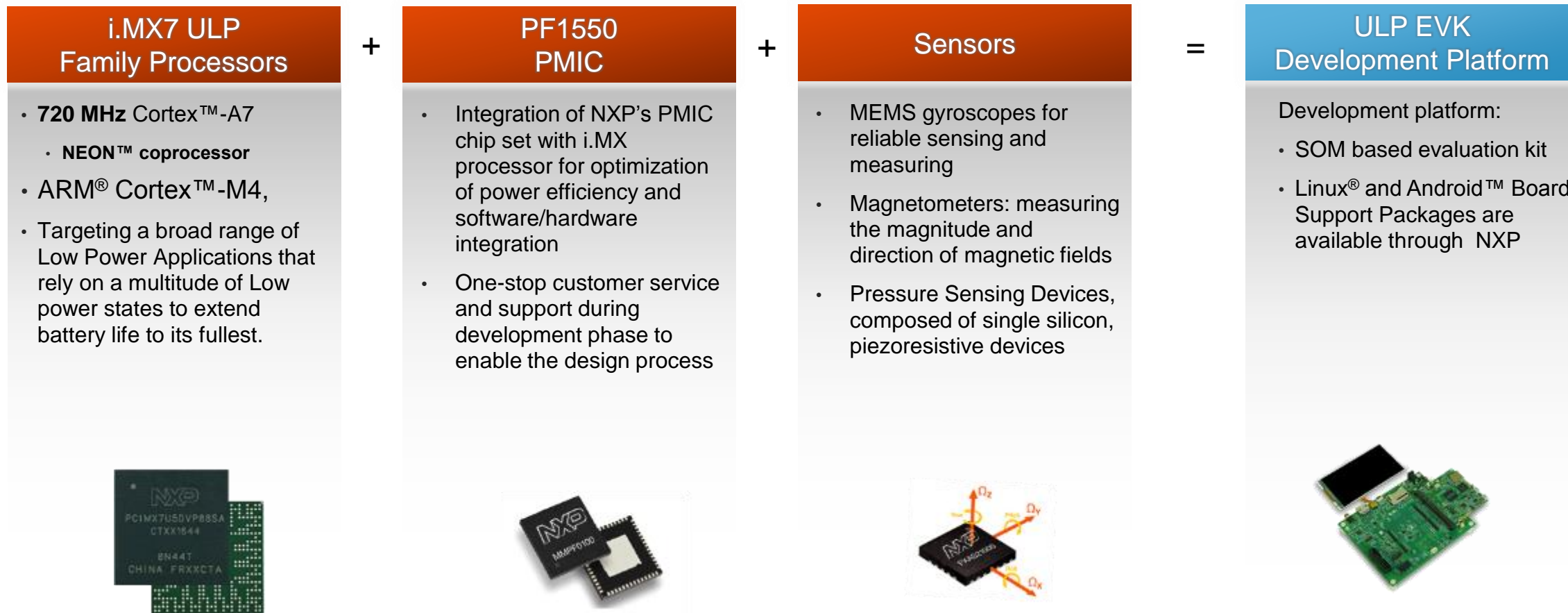
- **10-100x better** SER performance versus 28nm bulk alternatives
- Thin buried oxide layer makes device immune to latchup



*Body Biasing: Faster when required and more energy efficient when performance isn't as critical*



# NXP Complete Solutions



A Single Solution for Streamlined Performance

# i.MX WiFi & Bluetooth Strategy

3 companies partnering to deliver world-class solutions for connected products



Leading Micro-processor Solutions with i.MX products

+



Industry leader for WiFi & Bluetooth IC

+



#1 market share for WiFi & Bluetooth modules

- Out-of-box processor and wireless connectivity for Linux and Android based systems
- Wi-Fi (802.11bgn, abgn, abgn/ac) & Bluetooth Smart Ready Options



# i.MX 7ULP SOM Based Platform

- Enables fast use case evaluation through quick builds of customized base boards.
- Allows customers to leverage the critical features of SOM design including DDR and PMIC design/layout.
- Design Files provided
  - Schematics
  - Layout
  - BOM



# Part Numbers: i.MX 7ULP Family

All parts are orderable now and shipment is expected to start in Jun 2019 (Consumer) /Q3 2019 (Industrial)

Part number	Qual tier	Package	Main CPU	On-chip SRAM	Real-time companion CPU	Real-time companion CPU: Tightly-coupled memory	2D & 3D GPU	I <sup>2</sup> S	SPI	UART	I <sup>2</sup> C	USB	Temperature range
MCIMX7U5DVP07SC	Consumer	MAPBGA 393	ARM Cortex-A7 720 MHz	256 KB	ARM Cortex-M4 200 MHz	256 KB	Y	4	4	8	8	USB 2.0 OTG +PHY, USB 2.0 Host +HSIC	0-95°C
MCIMX7U5DVK07SC	Consumer	VFBGA 361	ARM Cortex-A7 720 MHz	256 KB	ARM Cortex-M4 200 MHz	256 KB	Y	4	4	8	8	USB 2.0 OTG +PHY, USB 2.0 Host +HSIC	0-95°C
MCIMX7U3DVK07SC	Consumer	VFBGA 361	ARM Cortex-A7 720 MHz	256 KB	ARM Cortex-M4 200 MHz	256 KB	-	4	4	8	8	USB 2.0 OTG +PHY, USB 2.0 Host +HSIC	0-95°C
MCIMX7U5CVP06SC	Industrial	MAPBGA 393	ARM Cortex-A7 650 MHz	256 KB	ARM Cortex-M4 200 MHz	256 KB	Y	4	4	8	8	USB 2.0 OTG +PHY, USB 2.0 Host +HSIC	-40-105°C
MCIMX7U3CVP06SC	Industrial	MAPBGA 393	ARM Cortex-A7 650 MHz	256 KB	ARM Cortex-M4 200 MHz	256 KB	-	4	4	8	8	USB 2.0 OTG +PHY, USB 2.0 Host +HSIC	-40-105°C





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