

# i.MX 8M NANO FAMILY



The i.MX 8M Nano family of applications processors provide affordable performance for smart, connected, power-efficient devices requiring graphics, vision, voice control, intelligent sensing and general-purpose processing.

## **SCALABLE, VERSATILE, AFFORDABLE**

### **Design once, scale your performance**

- Quad-, dual- or single- core Arm® Cortex®-A53 offerings enables scalable processing in a pin-compatible package.
- Optional 3D GPU for applications requiring higher levels of graphics performance (HMI).
- Cortex-M7 for heterogenous multicore processing to enable MCU-like functions or low-power processing.
- Pin-compatible package enables you to build one hardware design that supports both the i.MX 8M Nano and i.MX 8M Mini applications processors; add performance and features as your product requires.

### **Versatile, optimized system design**

- NXP built and proven reference designs are available in a size-optimized form, enabled with latest software, and accessible on [nxp.com](http://nxp.com) to help get you started, fast.
- System designs offer high-speed LPDDR4 memory for optimized performance and power, or DDR4 and DDR3L memory for optimized system cost.

### **Power efficiency**

- Delivered advanced 14LPC FinFET process, the device is optimized for high performance operation and low thermal system cost. The Cortex-A cores can be powered off while the Cortex-M7 subsystem performs low-power, real-time system monitoring.

### **Longevity of supply**

- Backed by NXP's product longevity program to ensure a stable supply of product for your embedded design.

**HIGH-PERFORMANCE COMPUTE**

- 1x, 2x or 4x Arm Cortex-A53 cores running at speeds up to 1.5 GHz per core
- 1x Arm Cortex-M7 running at speeds up to 750 MHz, enables heterogenous multicore processing
- Resource domain controller enables secure allocation of resources to either Cortex-A53 or Cortex-M7 cores

**SYSTEM CONNECTIVITY**

- \*MIPI-DSI (4-lanes) for display
- MIPI-CSI (4-lanes) for camera input
- Multiple SDIO interfaces to enable flexibility in supporting boot, expansion and connectivity (Wi-Fi®)
- Gigabit Ethernet (with IEEE® 1588, EEE and AVB support) and USB 2.0

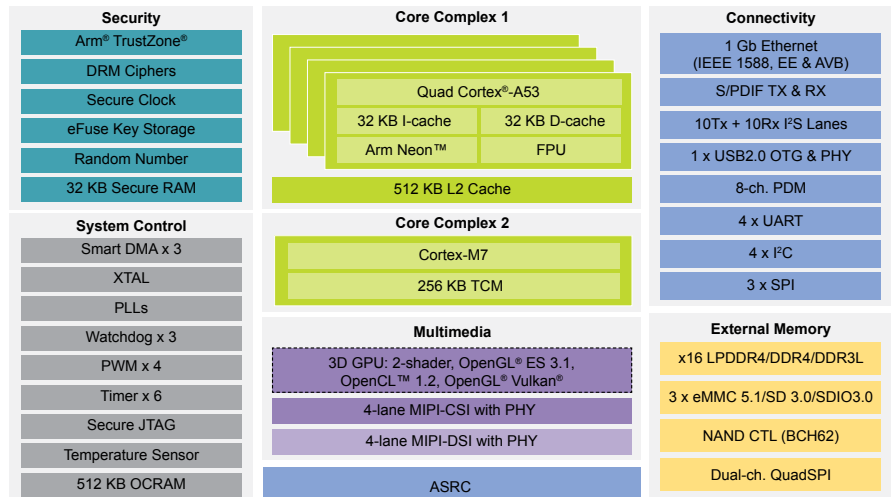
**GRAPHICS FOR HMI**

- \*3D GPU with OpenGL® ES 3.1 and Vulkan® support enables graphical UI (e.g. Android™)
- \*MIPI-DSI enables single display output for human machine interface

**ADVANCED AUDIO PROCESSING**

- Supports at least 20 channels of high-fidelity audio playback
  - 10Tx + 10Rx external I²S lanes
  - 8-channel PDM DMIC support
  - Hardware asynchronous sample rate conversion (ASRC)

**i.MX 8M NANO FAMILY BLOCK DIAGRAM**



Not Available on the i.MX 8M Nano Lite and Nano UltraLite    Not Available on the i.MX 8M Nano UltraLite

**i.MX 8M NANO FAMILY: KEY FEATURES AND DIFFERENTIATION**

	i.MX 8M Nano UltraLite	i.MX 8M Nano Lite	i.MX 8M Nano
<b>Multicore Processing</b>	1x/2x/4x Cortex-A53 (1.4GHz)	1x/2x/4x Cortex-A53 (1.4GHz/1.5GHz)	
		Cortex-M7 (750MHz)	
<b>Display</b>	No MIPI-DSI	4-lane MIPI-DSI with PHY	
<b>GPU</b>	No GPU	No GPU	3D GPU: 2-shader, OpenGL® ES 3.1, OpenCL 1.2, OpenGL® Vulkan®
<b>Software</b>	Linux, FreeRTOS®	Linux, Android, FreeRTOS®	
<b>Package Size</b>	11x11 0.5mm de-pop package	14x14 0.5mm de-pop package	

**INTELLIGENCE AT THE EDGE**

- Depending on the performance needs and complexity of your neural network, run your optimized model on either the Cortex-A53, Cortex-M7 or general purpose GPU (supports OpenCL™ 1.2)
  - Use NXP's extensive [eIQ™ software suite](#) to help realize and implement your machine learning needs
- Leverage the latest voice control solutions that support reliable voice control in noisy environments without using a DSP

**SYSTEM DESIGN OPTIMIZATION**

- Pin-compatible package options provide design flexibility
- 14 x 14 0.5 mm and 11 x 11 0.5 mm packages designed for maximum feature enablement with 6 layer board design and no microvias
  - Pin compatibility with the i.MX 8M Mini provides drop-in scalable product performance
  - 8-channel DMIC support for direct connection of PDM microphones (no CODEC) enables system cost savings

**Leverage NXP's system design expertise**

- Our expert engineers have defined package options that simplify your hardware design and provide overall system cost benefit depending on the application
- Reference hardware designs using different memory types are available to help get you started fast
- Comprehensive software support
  - \*Android, Linux and FreeRTOS® developed, tested and supported by NXP and partner commercial operating systems (Voice, ML, audio framework). Benefit from extensive years of BSP development on i.MX applications processors from NXP and its partners.
    - eIQ™ software suite
    - Windows 10 IoT Core
    - Third party voice and UI solutions
    - Pins tool for i.MX application processors
    - Benefit from the extensive i.MX software ecosystem
    - Industrial and consumer qualified
- Industrial (-40 °C to 105 °C Tj) device options support always-on applications operating in harsh environments
- For more cost-sensitive, higher-performing applications, consumer device options (0 °C to 95 °C Tj) and faster core speeds are available

**\*Features not available on the i.MX 8M Nano UltraLite**

**PIN COMPATIBLE i.MX 8M MINI AND NANO - DIFFERENTIATED FEATURES**

	<b>i.MX 8M Mini</b>	<b>i.MX 8M Nano</b>
<b>Primary Arm Core</b>	1 x or 2 x or 4 x Cortex®-A53 up to 1.8 GHz	1 x or 2 x or 4 x Cortex-A53 up to 1.5 GHz
<b>Secondary Arm Core</b>	1 x Cortex-M4F up to 400 MHz	1 x Cortex-M7 up to 750 MHz
<b>DDR Interface</b>	x16/x32 LPDDR4/DDR4/DDR3L	x16 LPDDR4/DDR4/DDR3L
<b>Audio</b>	5 x SAI (12Tx + 16Rx external I <sup>2</sup> S lanes) up to 49.152 MHz BCLK; DSD512	5 x SAI (10Tx + 10Rx external I <sup>2</sup> S lanes) up to 49.152 MHz BCLK; DSD512; ASRC
<b>GPU</b>	2D GPU, 3D GPU (1x shader, OpenGL® ES 2.0)	3D GPU (2x shader, OpenGL®ES 3.1, OpenCL 1.2, Vulkan)
<b>Video Decode Acceleration</b>	1080p60 H.265, H.264, VP8, VP9	None
<b>Video Encode Acceleration</b>	1080p60 H.264, VP8	None
<b>Display</b>	1 x MIPI-DSI	1 x MIPI-DSI
<b>Camera</b>	1 x MIPI-CSI	1 x MIPI-CSI
<b>Connectivity</b>	1 x PCIe 2.0, 3 x SDIO/eMMC, 2 x USB 2.0, 1 x GbE	3 x SDIO/EMMC, 1 x USB 2.0, 1 x GbE

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