i.MX 7ULP

ULTRA LOW POWER PLATFORM FOR PORTABLE APPLICATIONS



EXTERNAL USE

SECURE CONNECTIONS FOR A SMARTER WORLD

Downloaded from Arrow.com.

ULP Family: Market Opportunity in Power Efficiency



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

ARM® v7-A

M4

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

ARM® v8-A
(32-Bit / 64-Bit)

i.MX 7 → M4
Flexible Efficient Connectivity

ARM® v7-A
(32-Bit)

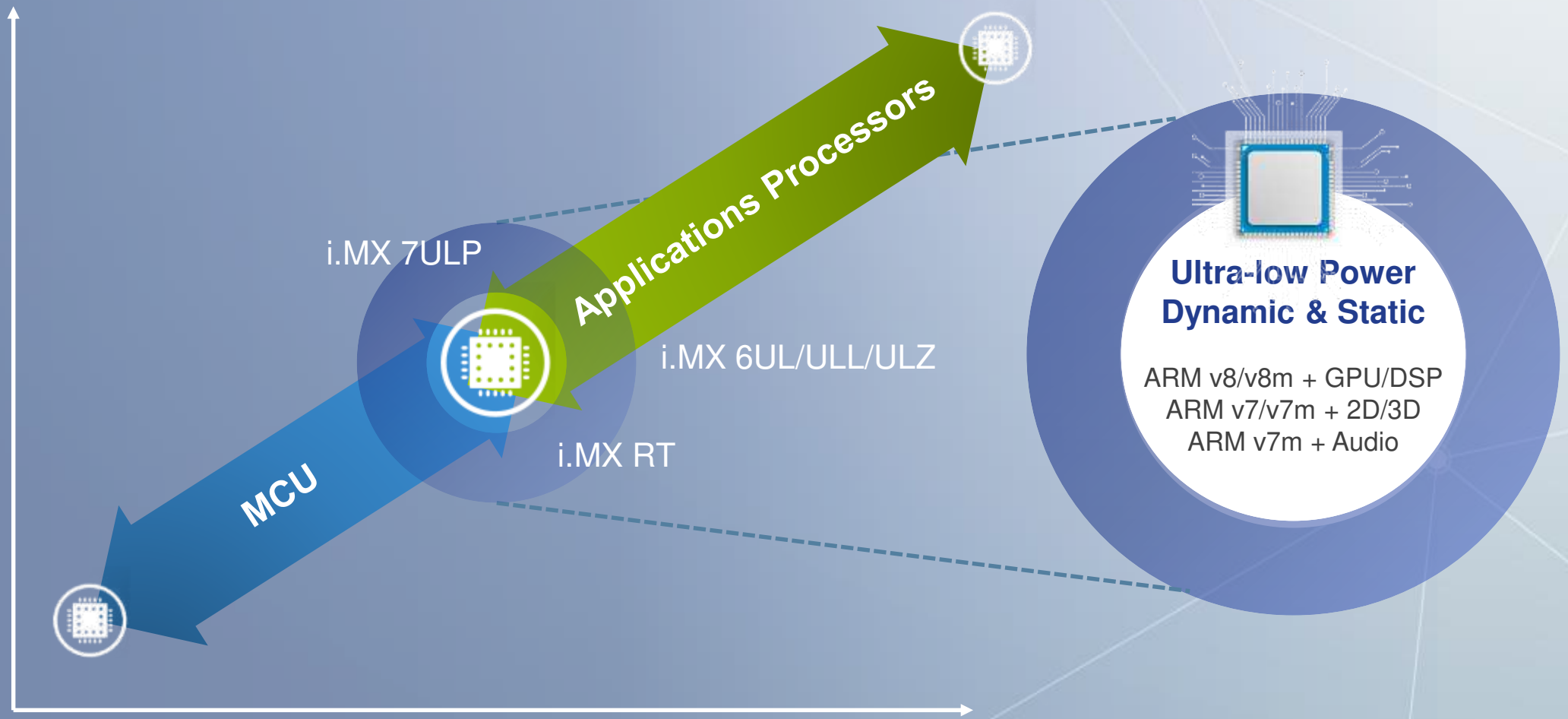
i.MX 7ULP → M4
Ultra Low Power with Graphics



Downloaded from Arrow.com.

SCALABILITY OF EMBEDDED PROCESSING

THE NEW NORMAL



Downloaded from Arrow.com.

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

Downloaded from Arrow.com.

i.MX 7ULP Key Highlights



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



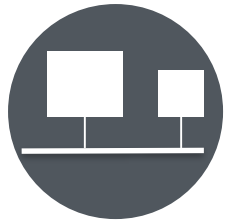
Ultra Low Power

- **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



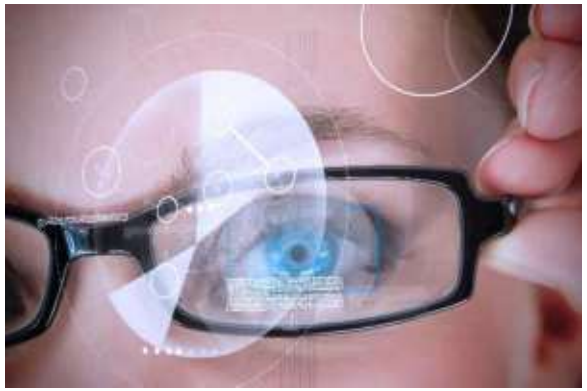
Heterogeneous Domain Computing

- **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

Downloaded from Arrow.com.

Target Applications







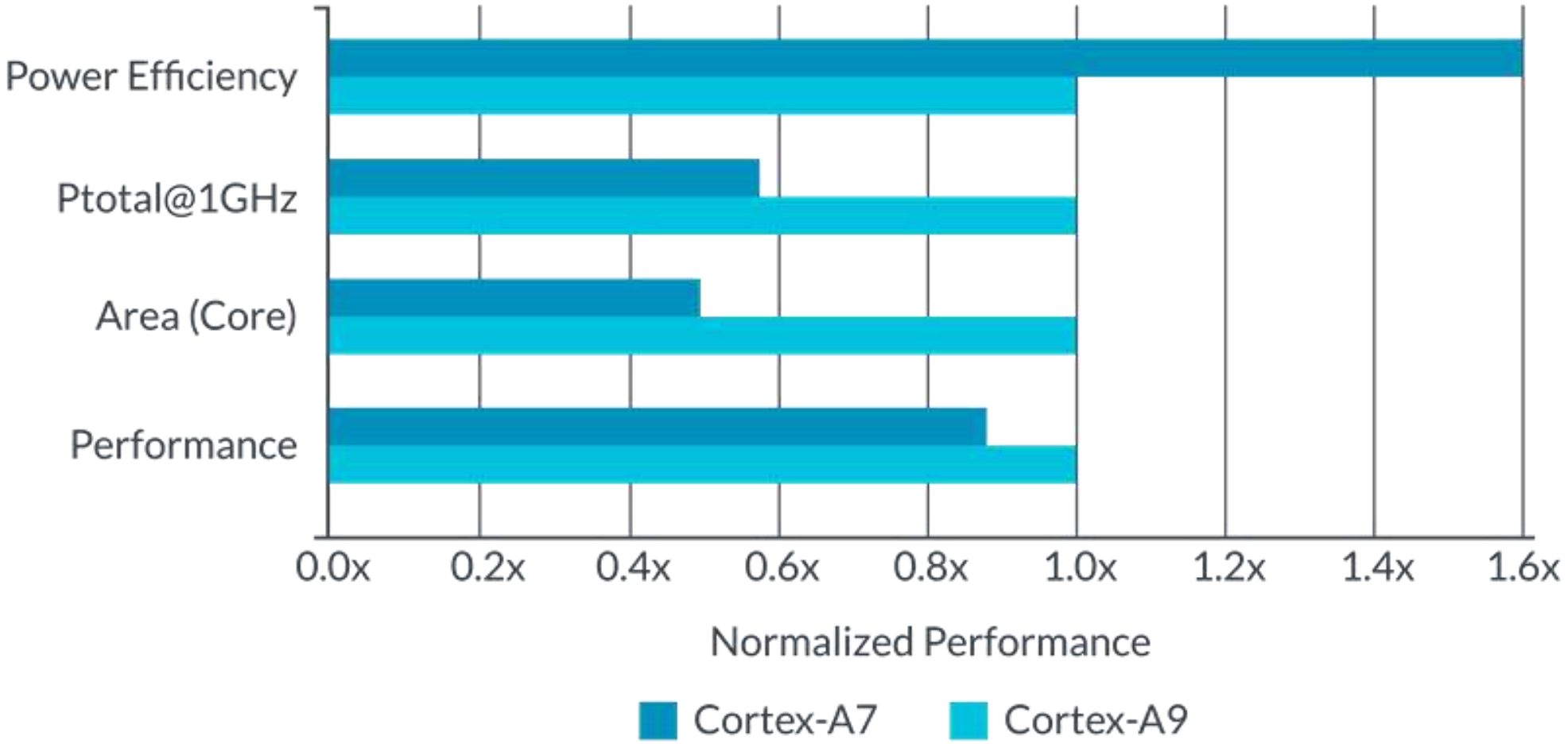




- Wearables
- Home Control
- Portable Healthcare
- Portable Printing
- Gaming Accessories
- General Embedded Control
- IoT Edge

Downloaded from Arrow.com.

Cortex-A7 enables power efficiency



Source: Arm.com

Downloaded from Arrow.com.

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**

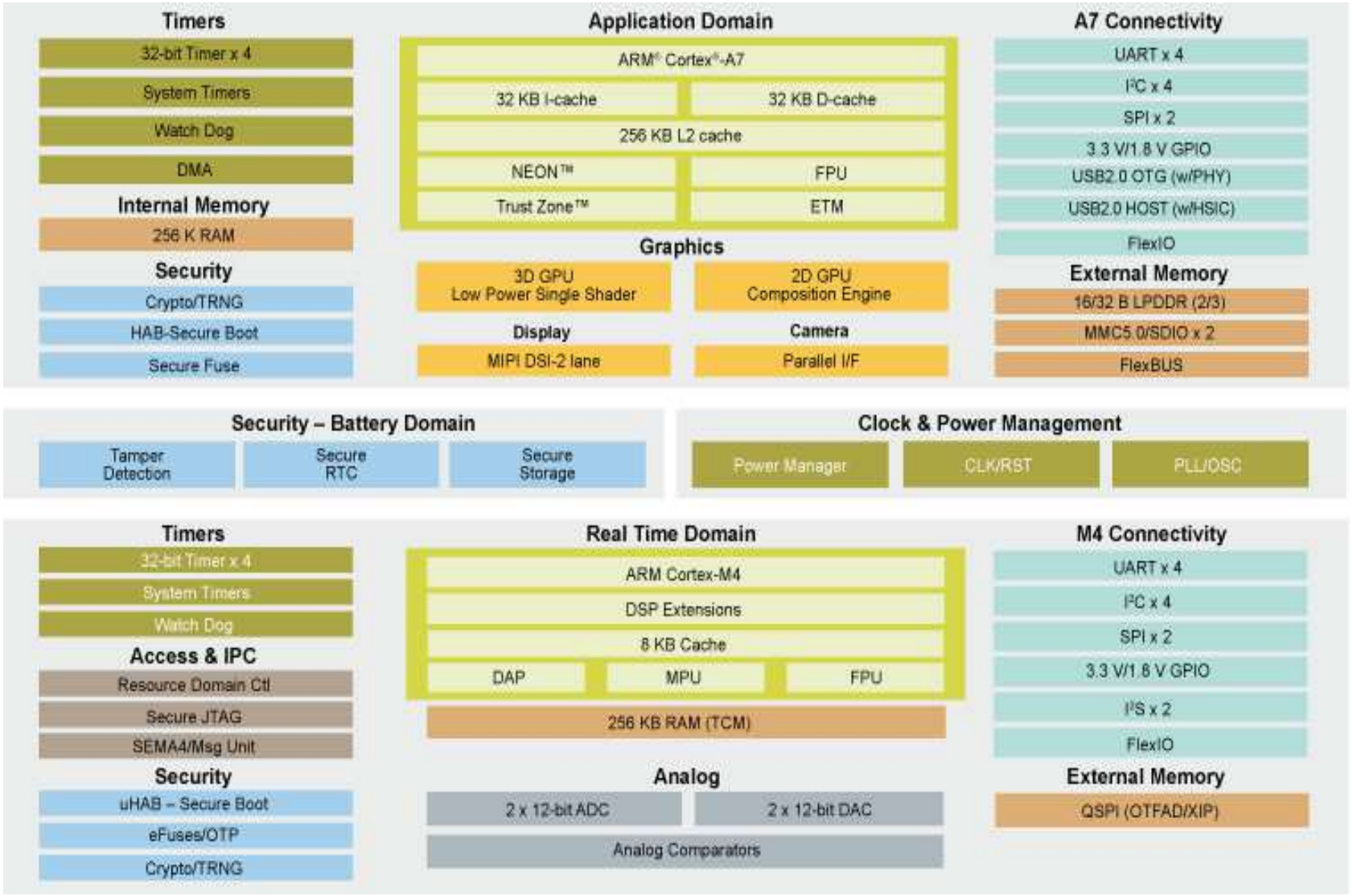
Temp Range (junction):

Industrial: -40C to +105C

Consumer: 0C to +95C

Key Features:

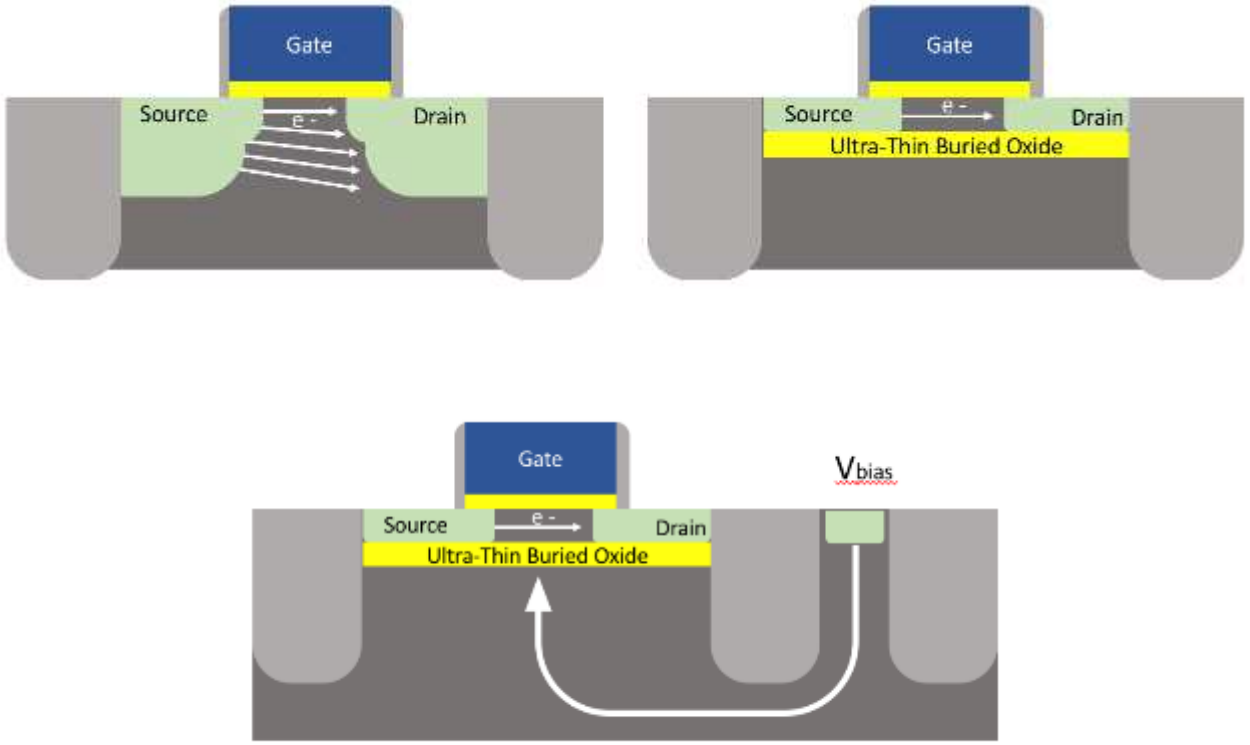
- Graphics
  - GC7000 nanoULTRA GPU: OpenGL 2.0 / OpenVG
  - GC320 Composition Engine
- Ultra Low Power
  - Independent Real-time domain
  - Ultra Low Run Current
- Memory options
  - QSPI (on the fly decryption)
  - 32-bit LPDDR2/3 @380MHz
  - eMMC 5.0 /SD3.0
- Connectivity
  - USB HS OTG with PHY
  - 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



Downloaded from Arrow.com.

28nm FD SOI

- **Power – Performance Benefits**
  - Improved electrostatics enables **shorter gate lengths**
  - Reduced device parasitics
  - Device back bias allows for **lower Vdd** 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*

Downloaded from Arrow.com.

NXP Complete Solutions

i.MX7 ULP Family Processors

- **720 MHz** Cortex™-A7
  - **NEON™ coprocessor**
- ARM® Cortex™-M4,
- Targeting a broad range of Low Power Applications that rely on a multitude of Low power states to extend battery life to its fullest.



+

PF1550 PMIC

- Integration of NXP's PMIC chip set with i.MX processor for optimization of power efficiency and software/hardware integration
- One-stop customer service and support during development phase to enable the design process



+

Sensors

- MEMS gyroscopes for reliable sensing and measuring
- Magnetometers: measuring the magnitude and direction of magnetic fields
- Pressure Sensing Devices, composed of single silicon, piezoresistive devices



=

ULP EVK Development Platform

Development platform:

- SOM based evaluation kit
- Linux® and Android™ Board Support Packages are available through NXP



A Single Solution for Streamlined Performance

Downloaded from Arrow.com.

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

Downloaded from Arrow.com.

i.MX 7ULP SOM Based Platform

- Enables fast use case evaluation through quick builds of 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



Downloaded from Arrow.com.

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	I²S	SPI	UART	I²C	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

Downloaded from Arrow.com.



SECURE CONNECTIONS
FOR A SMARTER WORLD

Downloaded from Arrow.com.