

# IOTUESDAY INTRODUCTION TO RENESAS SYNERGY

19 APRIL 2016

# COMPANY PROFILE:

## RENESAS ELECTRONICS CORPORATION

---

- **Operations started: 1st April, 2010**

### Headquarters

- Toyosu Foresia, Tokyo, Japan
- President & CEO: Tetsuya Tsurumaru

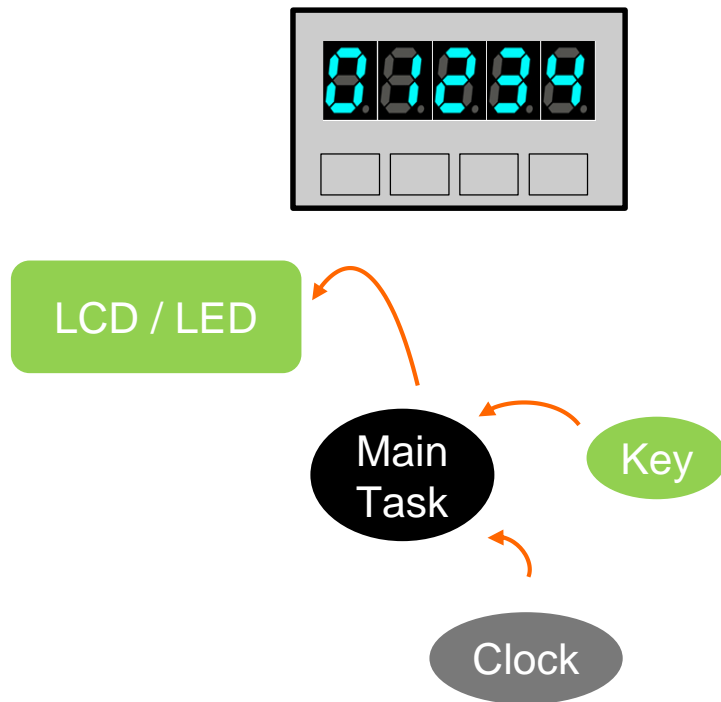
### Number of Employees

- 21,100 employees  
(consolidated basis – as of Mar 2015)
- 6B\$ Revenue
- N°1 MCU supplier
- **Major Operations**
  - Research, development, design, manufacture, sale and servicing of semiconductor products

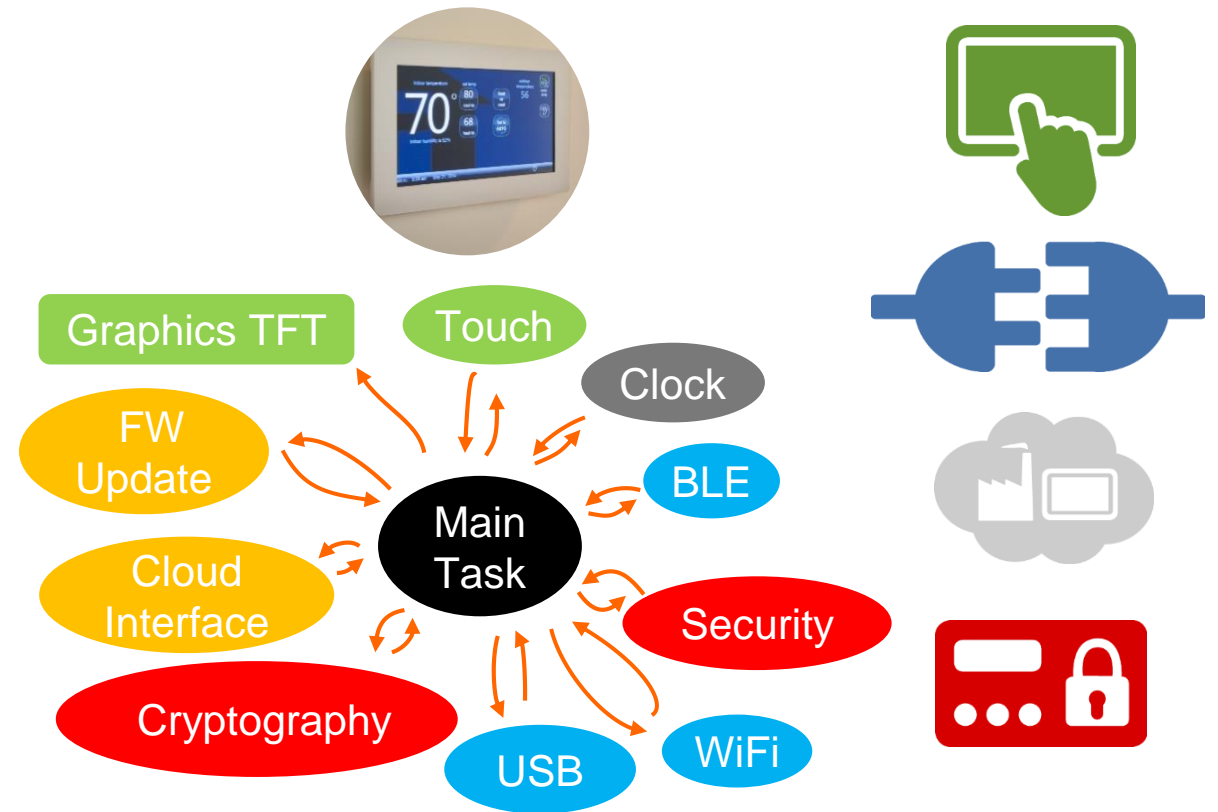


# EMBEDDED SYSTEMS HAVE CHANGED

## Legacy Embedded System



## Connected Embedded System



# CHALLENGES WITH IOT & EMBEDDED SYSTEMS DEVELOPMENT

## Technical Challenges



### Connectivity & Security



### Integration & Low-Power



### Easier Reuse & Scale



## Commercial Challenges



### Time to Market



### Total Cost of Ownership



### Barriers to Entry



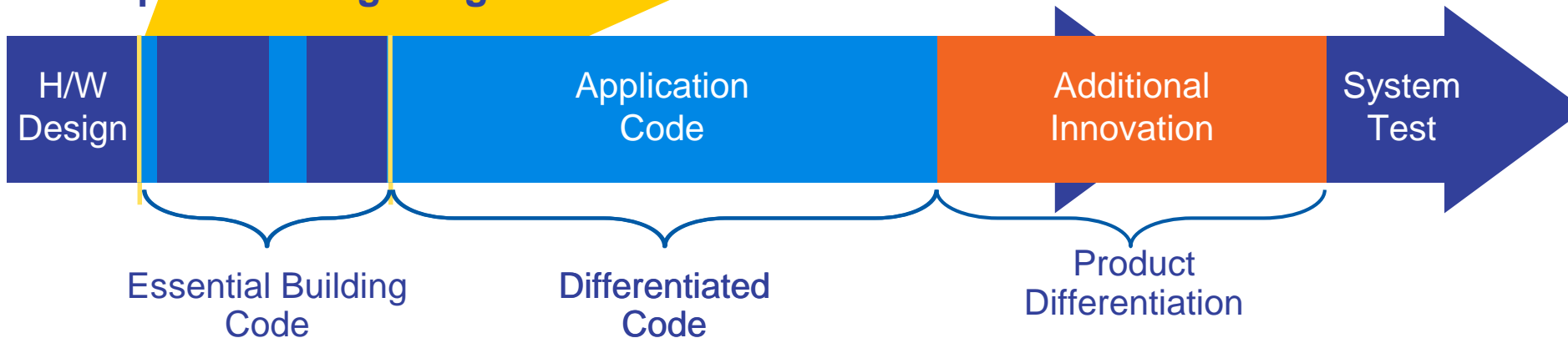
**Synergy Platform will help your customers solve those challenges.**

# DEVELOPERS NEED TO REDUCE DEVELOPMENT TIME

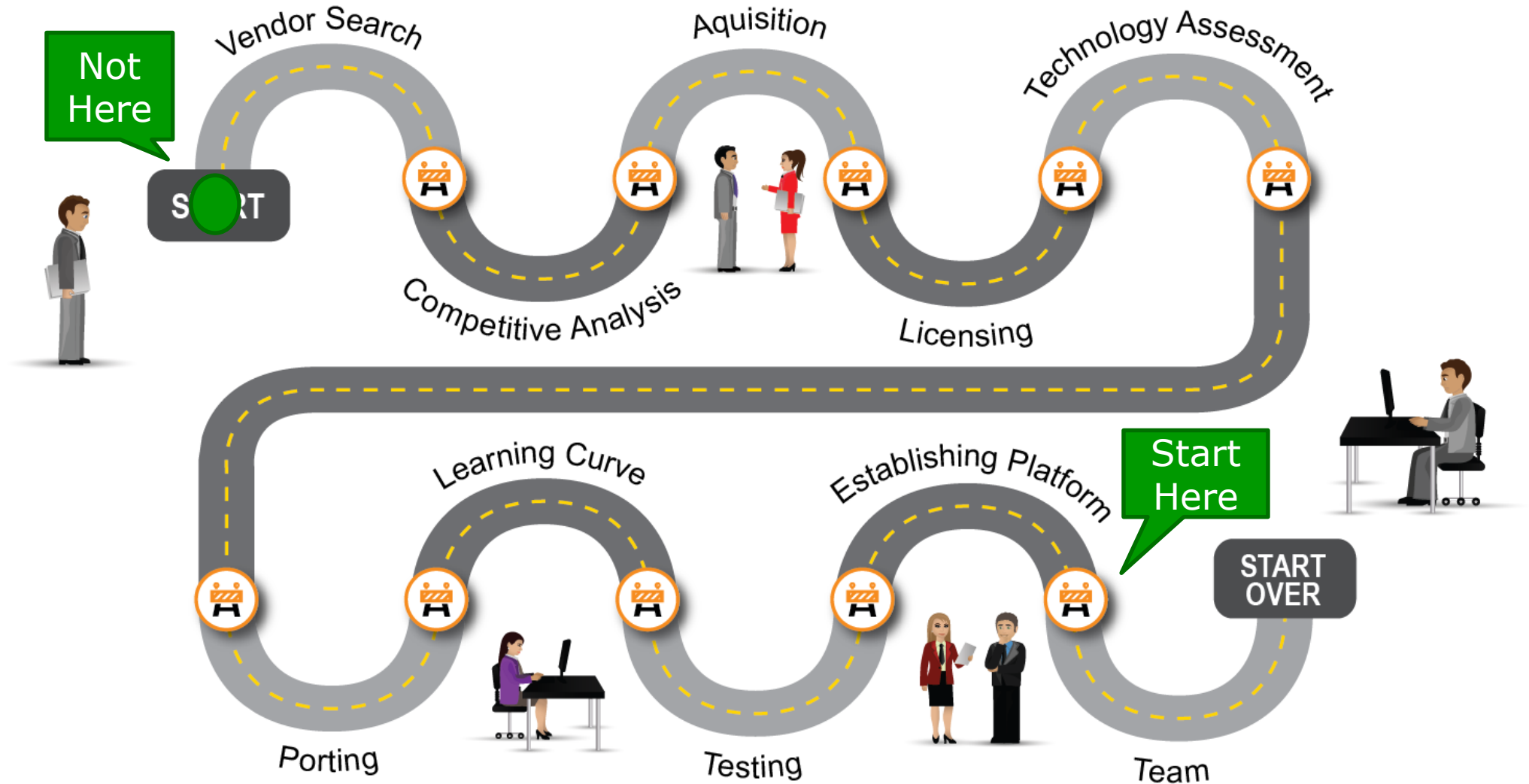
## Traditional Development



## Development Using Integrated Platform



# DEVELOPERS NEED TO GET STARTED QUICKLY AND EASILY

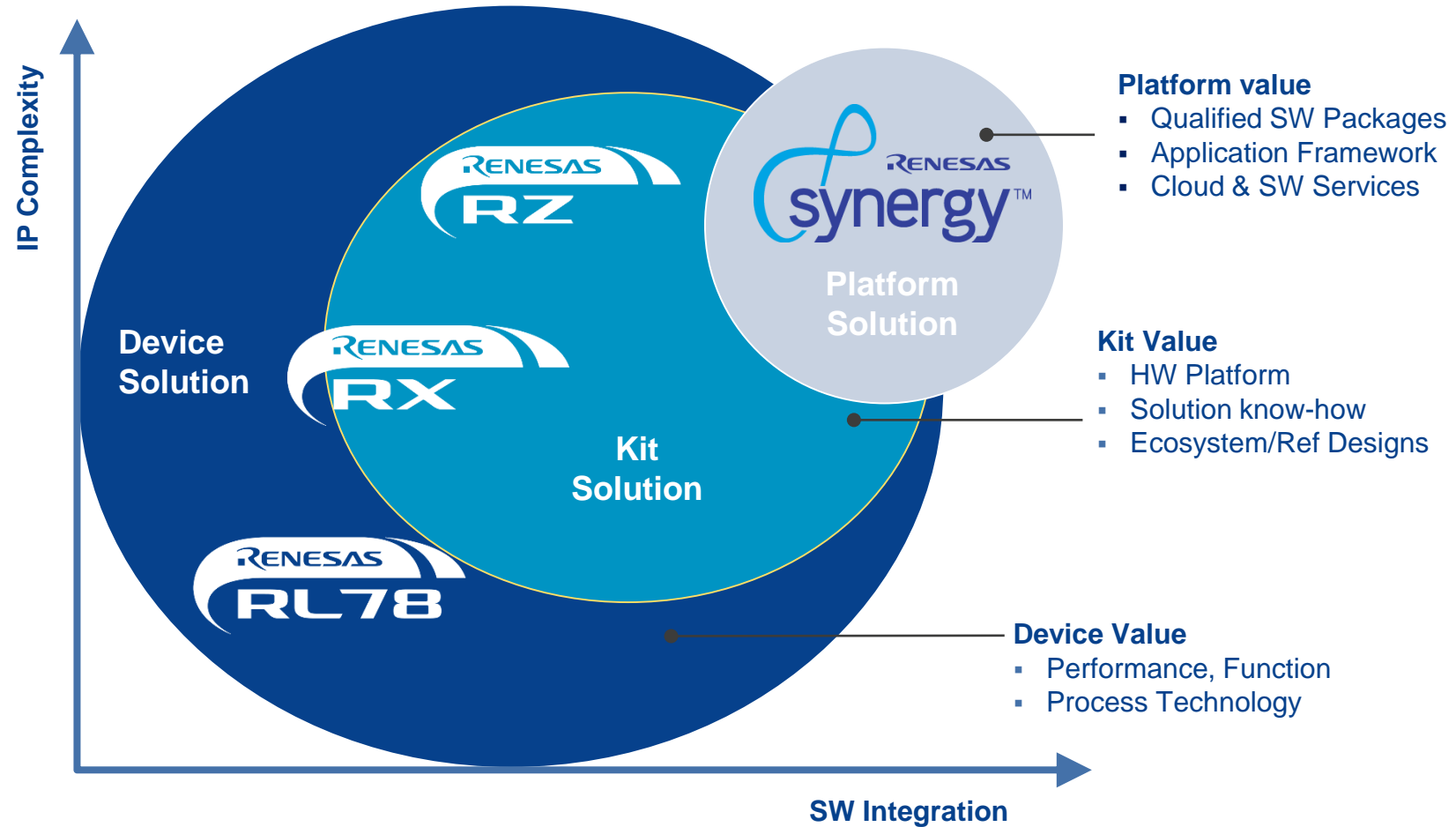


# HOW DOES SYNERGY PLATFORM ADDRESS THESE NEEDS?





# RENESAS MCU/MPU SOLUTIONS

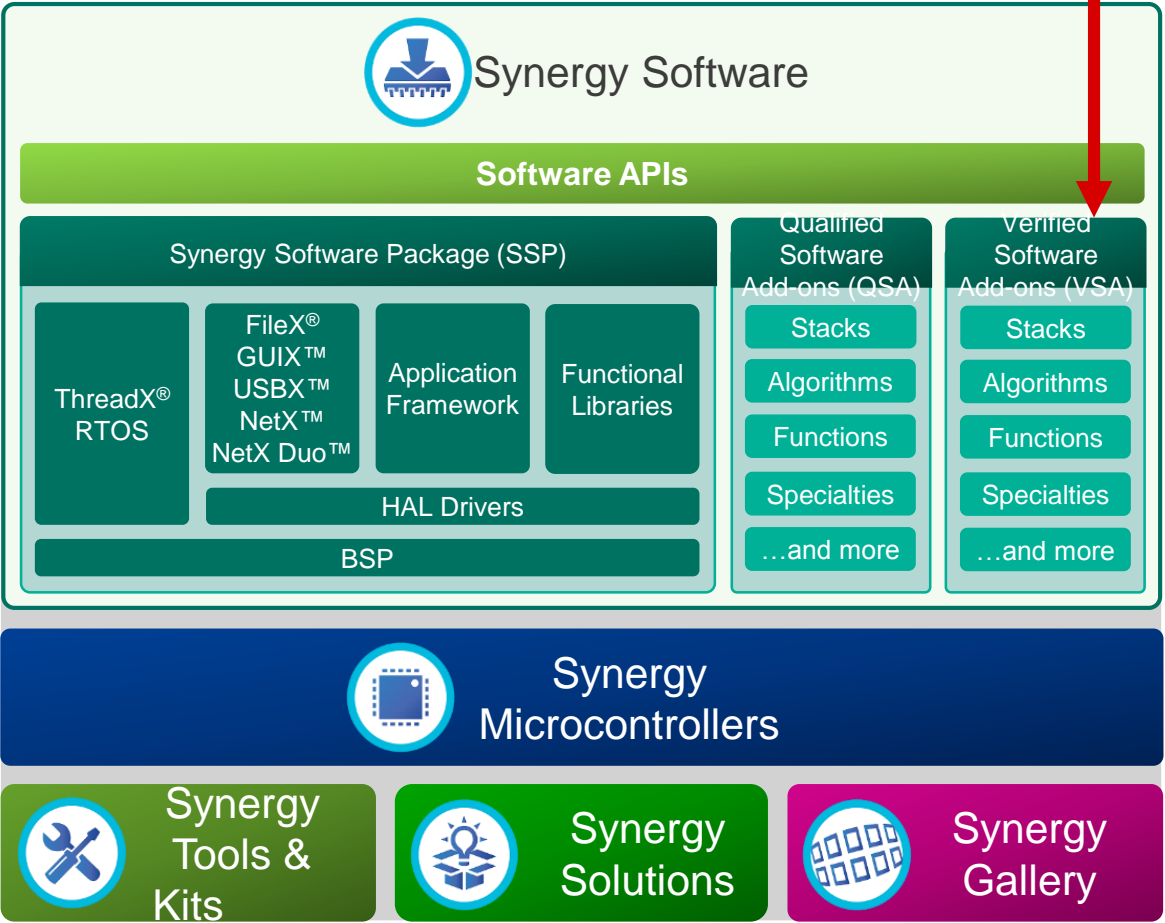
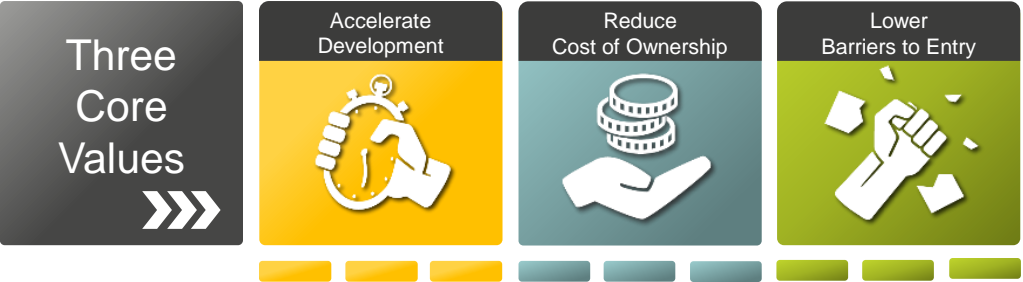




# FIRST TO INTRODUCE AN IOT PLATFORM FOR EMBEDDED DESIGNERS



A complete and qualified platform that **accelerates** embedded development, inspiring **innovation** and enabling **differentiation**.



The World's First Qualified Embedded MCU Software Platform.

# RENESAS SYNERGY™ SOFTWARE PLATFORM

Redefining embedded development

## ThreadX® RTOS

Coordinates, schedules, and monitors all tasks within the system.

## Stacks & Middleware

Complex capabilities modularized, optimized, and integrated.

## Synergy Software

### Software APIs

### Synergy Software Package (SSP)

ThreadX® RTOS

FileX®

USBX™

GUIX™

NetX™ and NetX Duo™

Application Framework

Functional Libraries

Hardware Abstraction Layer (HAL) Drivers

Board Support Package (BSP)

### Add-Ons

Qualified Software Add-Ons (QSA)

Verified Software Add-Ons (VSA)

## Board Support Package

Connects the application to the physical hardware.

## Hardware Abstraction Layer

Efficient drivers for peripherals and system services.

## Software APIs

Standard interface to lower level components. Abstracts dependencies, ensures portability, and accelerates product development.

## Libraries

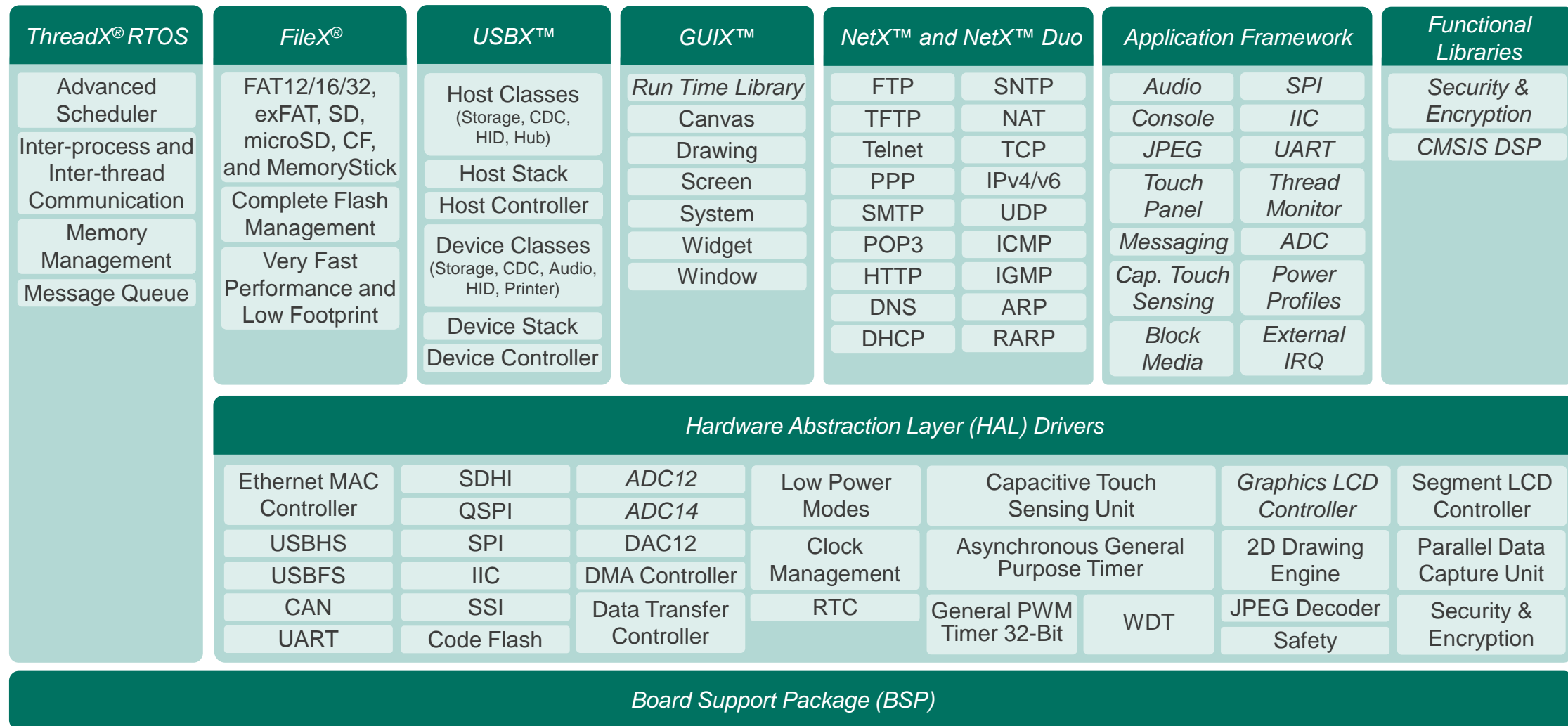
Specialized software for DSP, touch, security, safety, and more.

## Application Framework

Links the RTOS and middleware to the HAL.



## Synergy Software Package (SSP)



**Qualified Renesas Synergy Software package guarantees operation.**

# IT'S A QUALIFIED PLATFORM - A COMMERCIAL GRADE PRODUCT

## Best Practices

### Software Development Life Cycle (SDLC):

- Renesas SDLC guideline document
- Requirements & Traceability
- Coding Standards
- Design Descriptions
- Code Reviews and Unit Test Development
- Continuous Integration and Integration Reports
- Release Process & Management

## Software Data Sheet

### For Synergy Software Package (SSP) on multiple hardware platforms:

- Published and maintained on Renesas.com website
- Specs and performance metrics tested and documented
- Benchmarks, code size, context switch times, latencies, execution times, cyclical testing, fault tolerance and more.
- Basis of SSP warranty

## Industry Standards

### Well-respected standards for software development:

- MISRA C:2012 – Guidelines for the Use of the C Language in Critical Systems
- ISO/IEC/IEEE 12207 – Software life cycle processes
- CERT 2<sup>nd</sup> Edition – C Programming Language Secure Coding Standard
- Testing artifacts available for process certification - TUV, UL

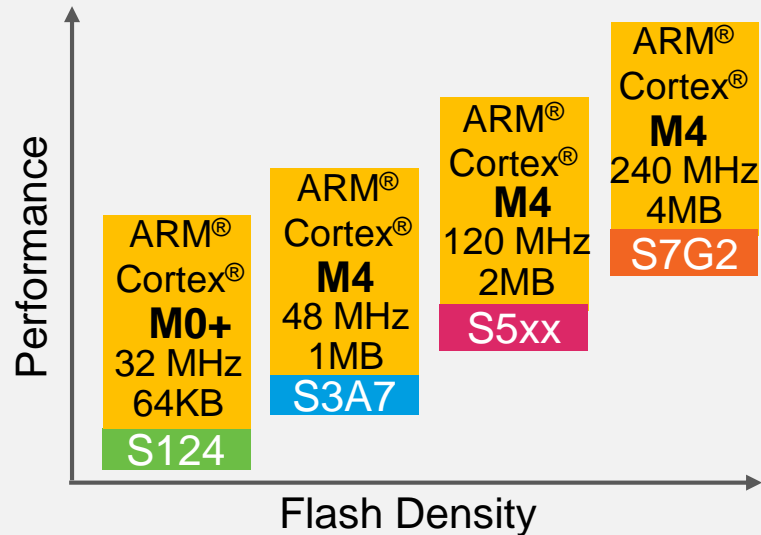
## Software Quality Assurance (SQA)

### Professional software:

- Renesas SQA document – Software Quality Assurance Plan
- Requirements traceability throughout development
- Documented processes
- SQA metrics & process artifacts available to customers
- Test plans, test suites, reports, software quality handbook

# RENESAS SYNERGY™ MICROCONTROLLERS

## Technology



### Process:

S7 & S5 → 40nm, 2.7V-3.6V  
S3 & S1 → 130nm, 1.6V-5.5V

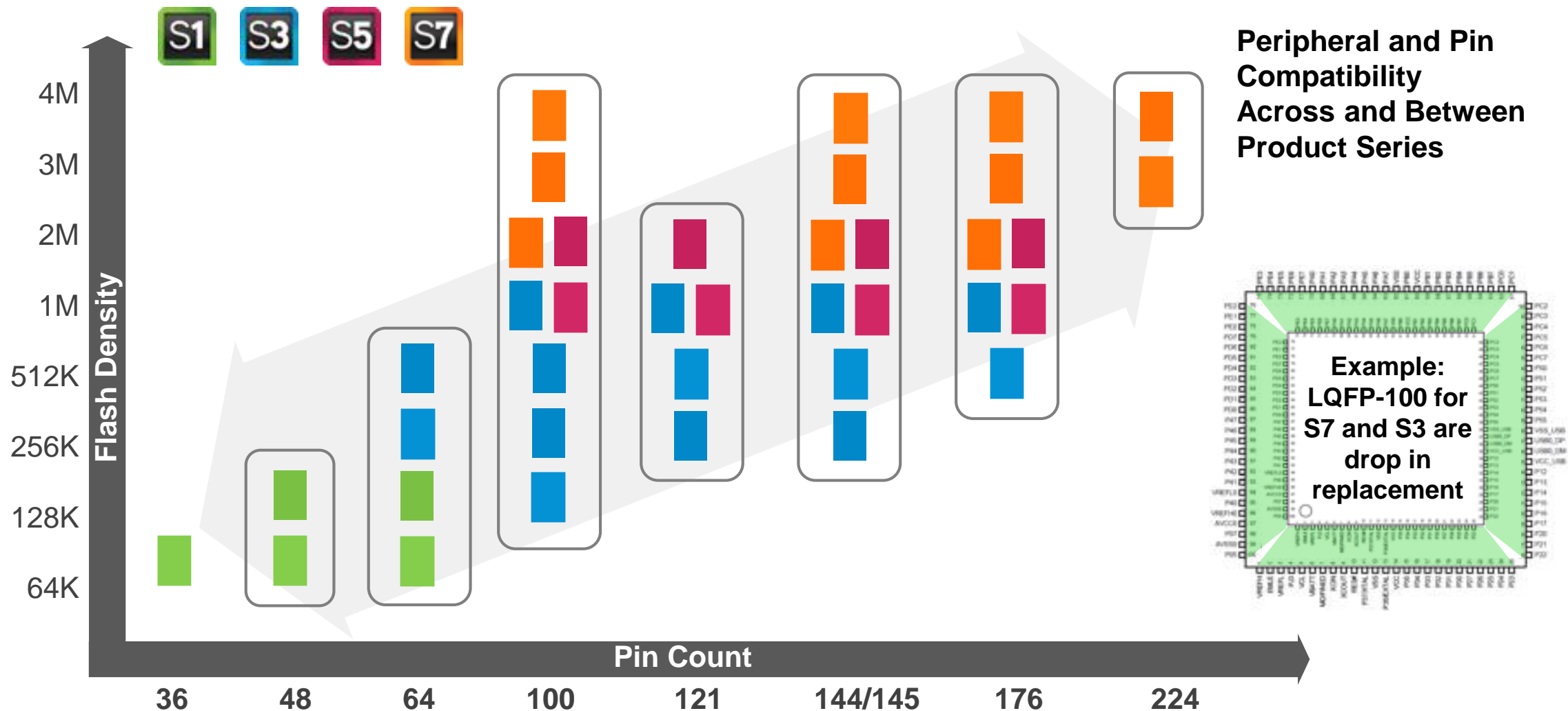
### Operating temperature range:

-40°C to 105°C

## Four Microcontroller Series



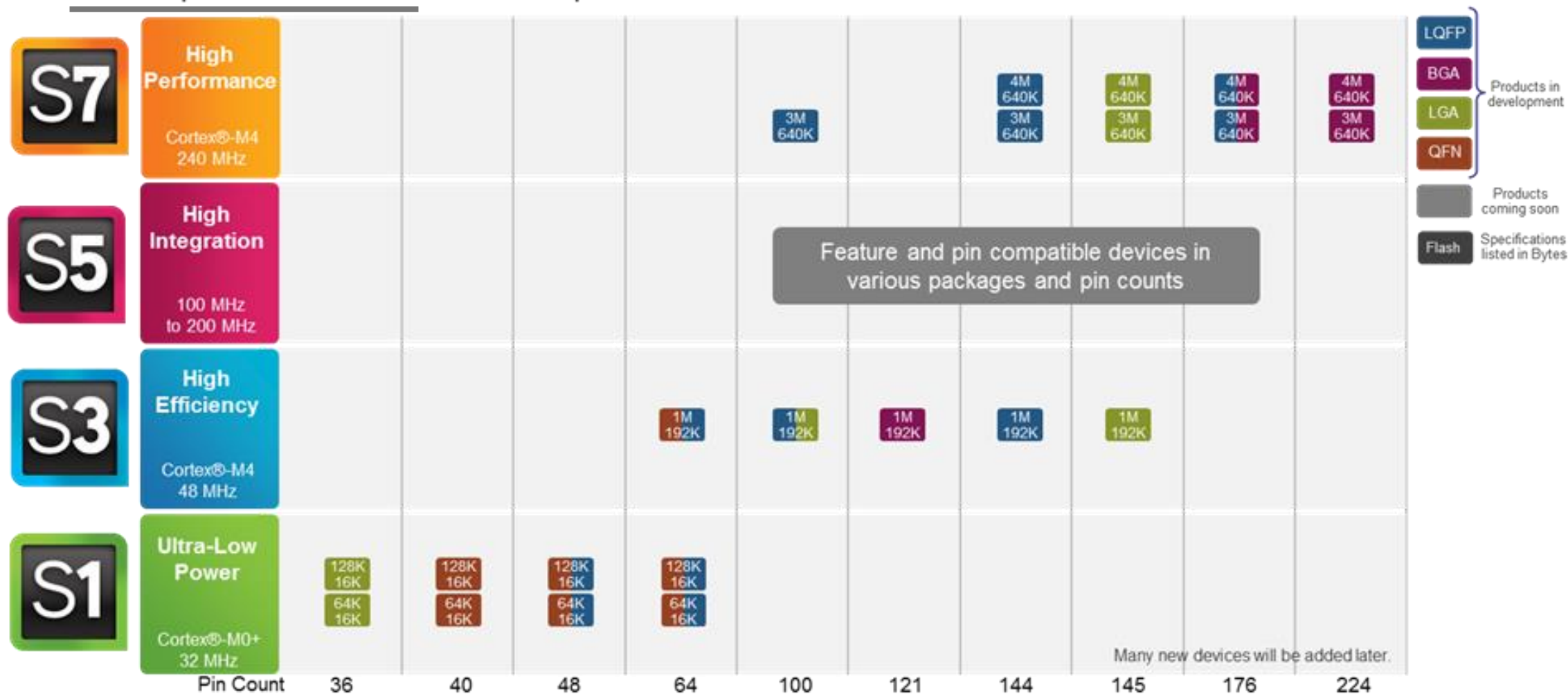
# MICROCONTROLLER PORTFOLIO





# Renesas Synergy™ MCU - Packages

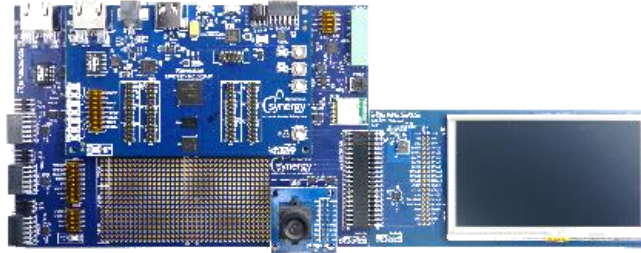
Pin Compatible Products: Initial Lineup



© 2016 Renesas Electronics Corporation. All rights reserved.



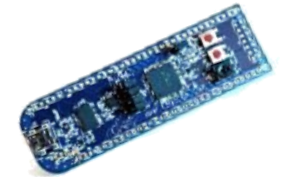
# RENESAS SYNERGY™ KITS








**Development Kit**



**Starter Kit**



**Promotion Kit**

	DK	SK	PK
<b>Purpose</b>	Full Synergy Project Prototyping	Synergy Introduction and First Steps	Experience Synergy Platform
<b>MCU Pin Access</b>	All Pins	Most Pins	Some Pins
<b>Expandability</b>	Expansion & PMOD™ Connectors	Arduino™ & PMOD™ Connectors	Typically USB
<b>SSP Qualification Basis</b>	Yes	Yes	No
<b>BLE Connectivity</b>	Yes	Yes	Yes
<b>On-board J-Link Debugger</b>	Yes	Yes	Yes
<b>Part Number</b>	 DK-S7G2,  DK-S3A7,  DK-S124	 SK-S7G2	 PK-S124

# SUMMARY

- **Lowers TCO**
  - Total cost of ownership
- **Scalable**
  - A Platform that scales across the portfolio and to your needs
- **Efficient**
  - We've done the ground work so you can accelerate your development process and focus on inventing
- **Qualified**
  - Pre-integrated and tested software assures predictable behavior

