

TOSHIBA

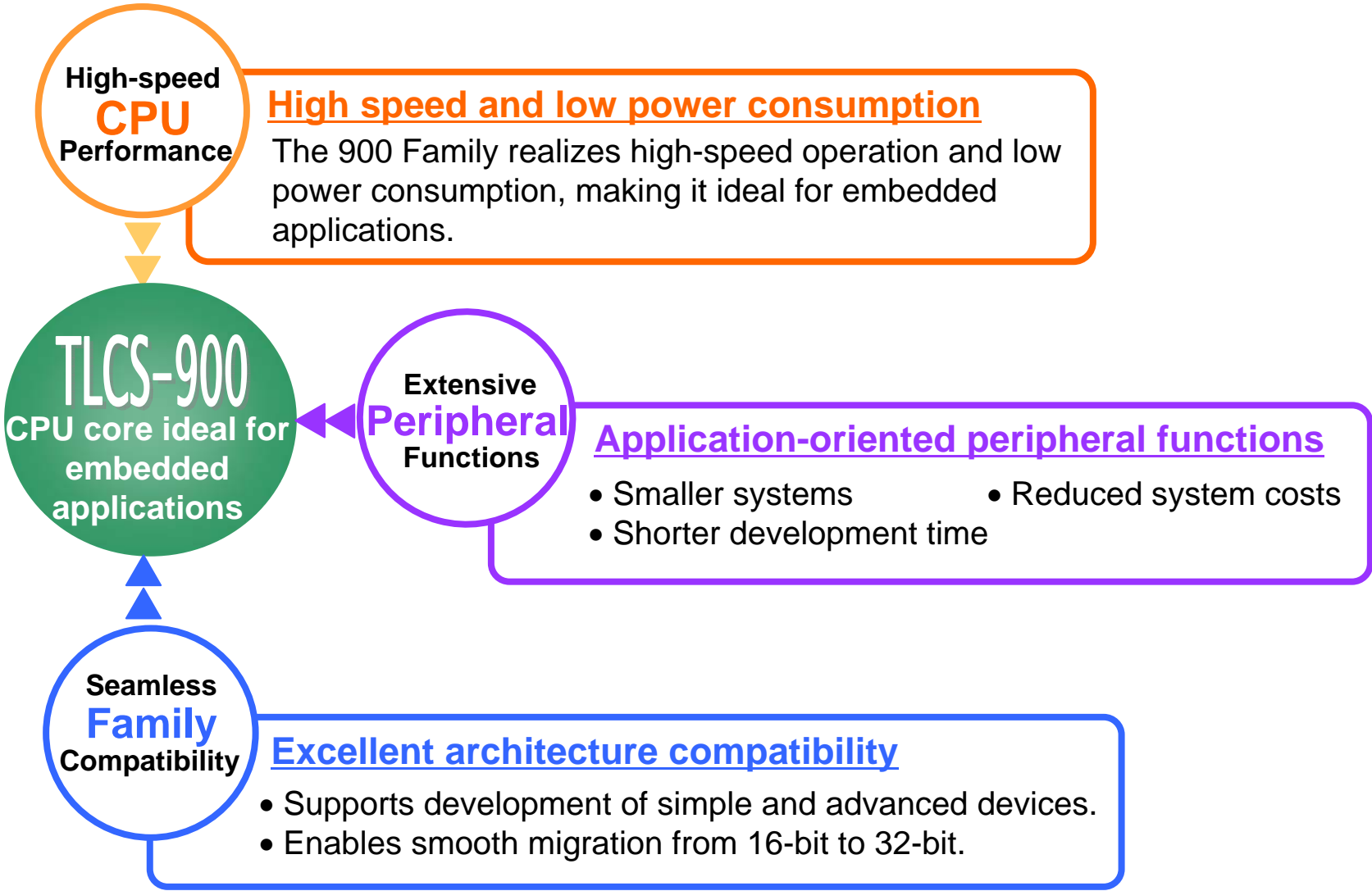
Leading Innovation >>>

Microcontrollers **Introduction to TLC900 Family** **Microcontrollers**

October 2007
Rev.1.4

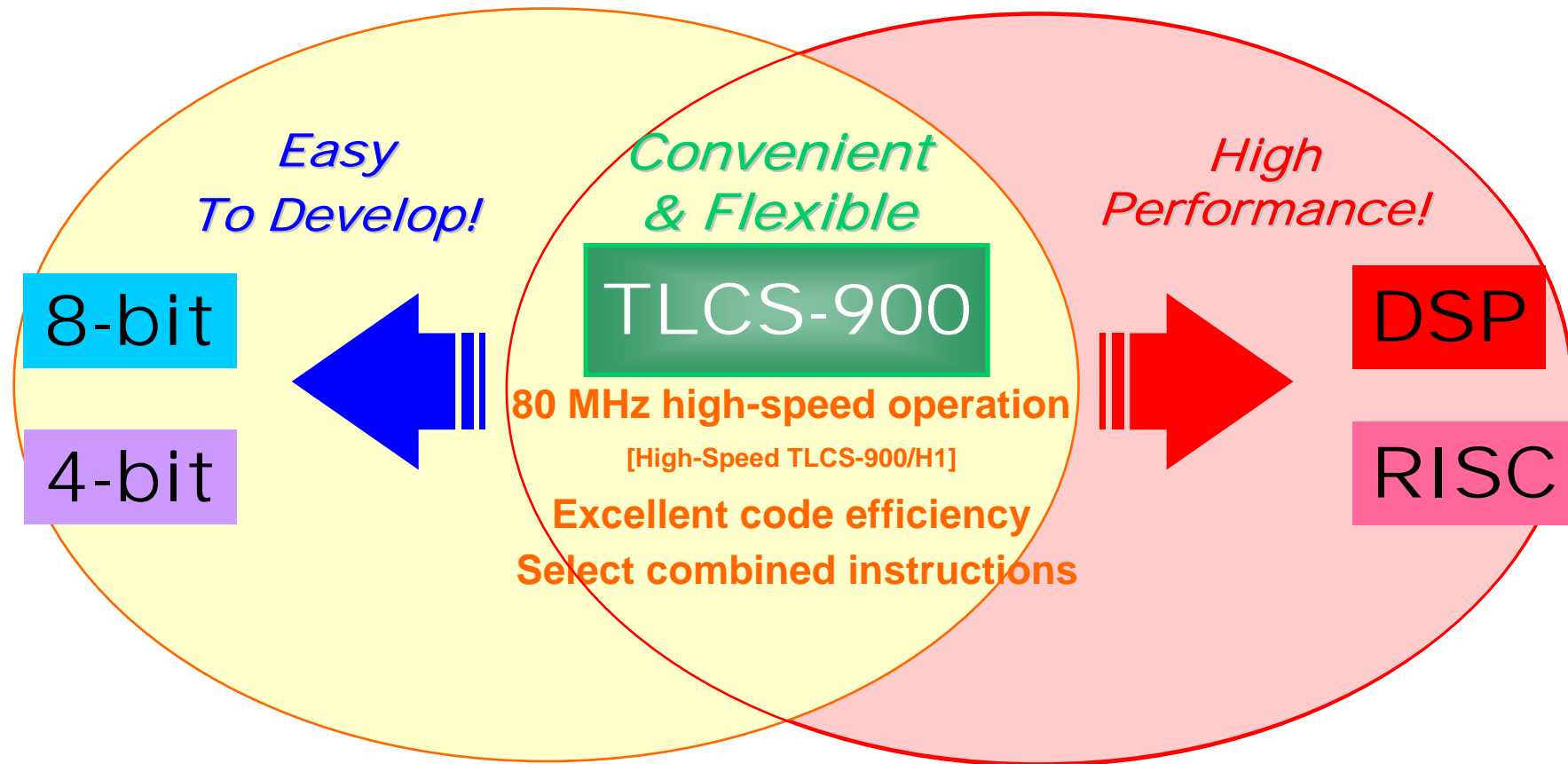
TOSHIBA CORPORATION
Semiconductor Company

Features of TLCS-900 Family



High-Speed CPU Performance

The 900 Family features high-speed operation and low power consumption as well as excellent usability, making it ideal for embedded applications.



Extensive Peripheral Functions

Rich peripheral functions

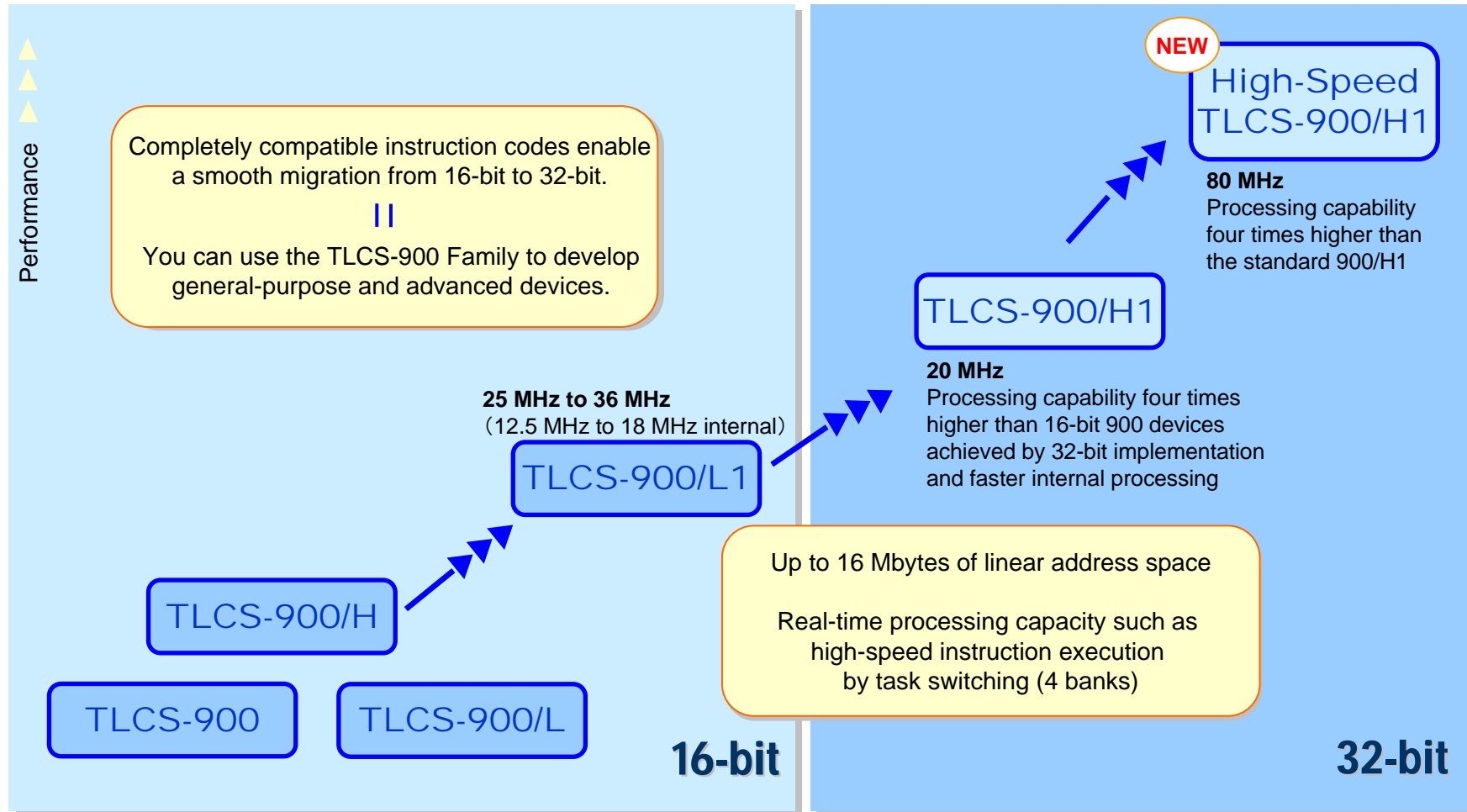
- Analog functions:
 - Multiplier, PLL, A/DC, D/AC
- Communications control:
 - CAN, USB, SPI, I²C, I²S
- Memory control:
 - NANDFC, SDRAMC, memory expansion
- Display control:
 - LCDC (color)

Differentiating technologies

- Touch screen I/F
 - Captures data from peripherals.
- SDRAM controller
 - Can execute programs.
- Software IP
 - Speech synthesis (Text To Speech), Handwriting recognition

Reduced system costs
Smaller systems
Shorter development time

Seamless Family Compatibility



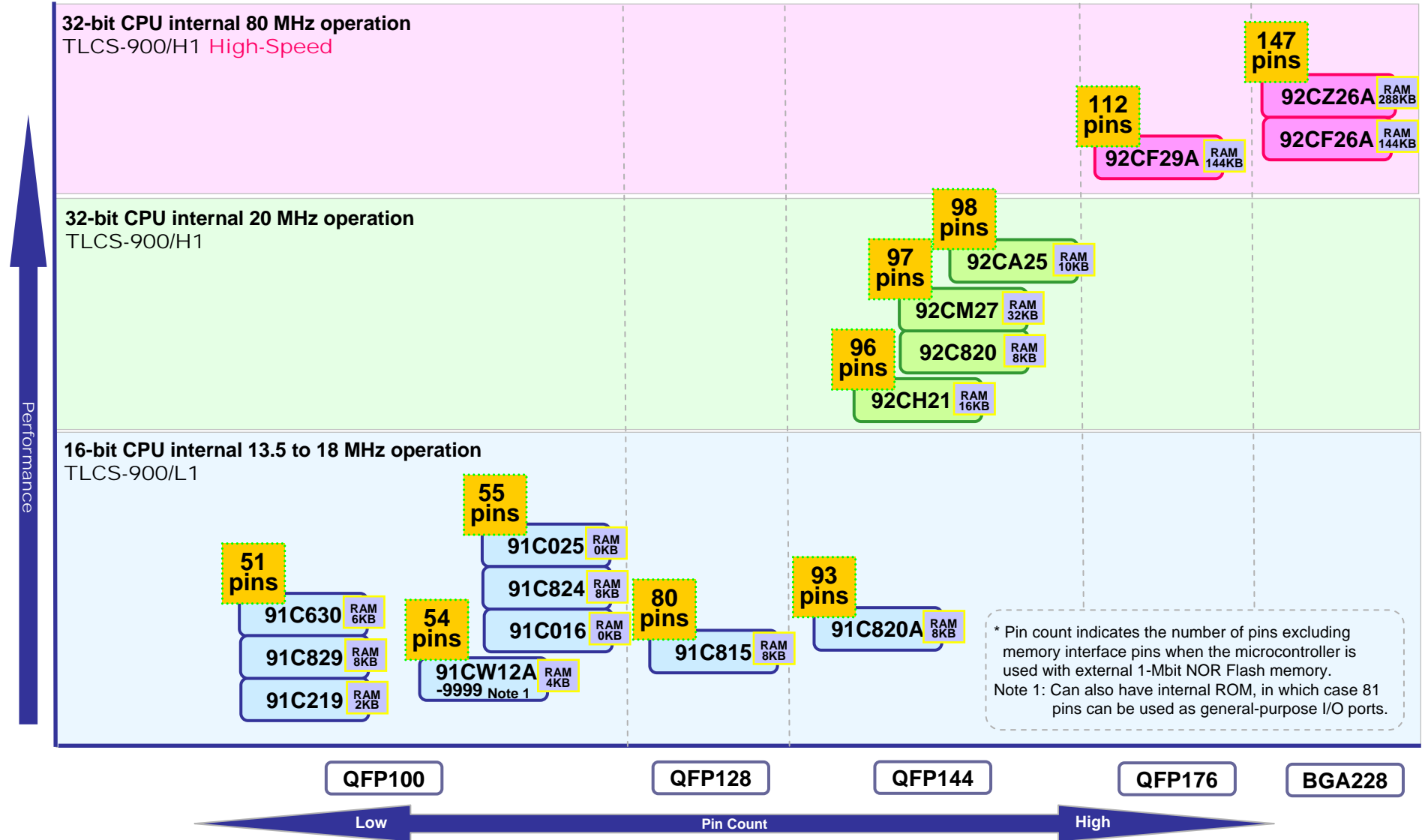
I/O Port Pin Count in ROMless Microcontrollers

Series

32-bit CPU internal 80 MHz operation
TLCS-900/H1 High-Speed

32-bit CPU internal 20 MHz operation
TLCS-900/H1

16-bit CPU internal 13.5 to 18 MHz operation
TLCS-900/L1



TMP92CA25FG



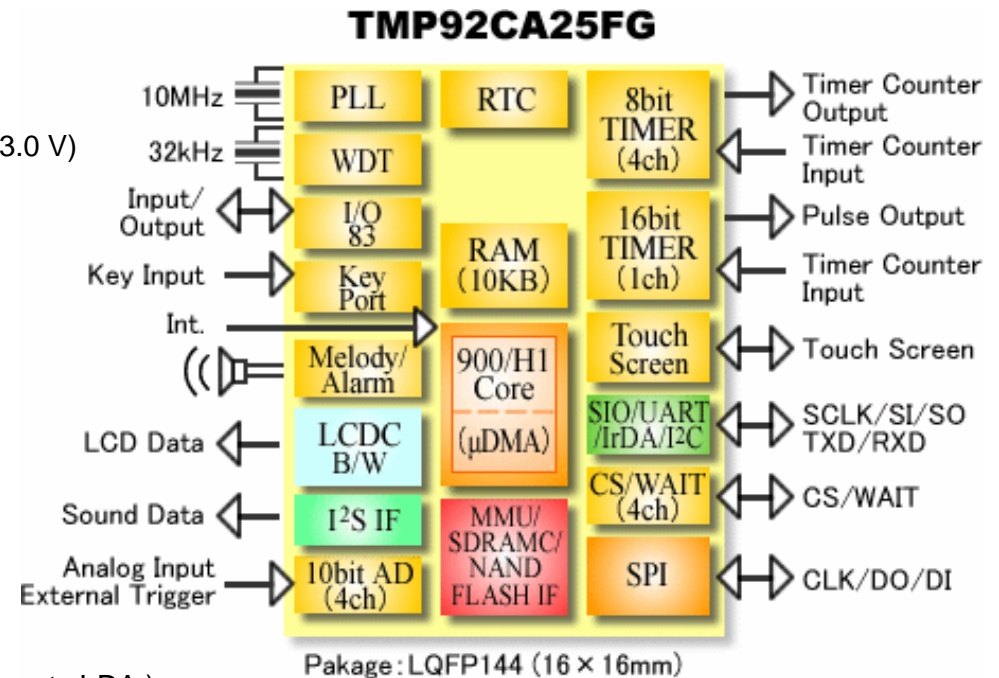
32-bit microcontroller with monochrome LCD controller and NAND Flash ROM interface

● **TLCS-900/H1 CPU core**

- Operating voltage : 3.0 to 3.6 V
- Minimum instruction execution time: 50 ns (internal 20 MHz/ 3.0 V)

● **Built-in Functions**

- SPI* (SD card) : 1 channel
- SDRAM controller : Up to 512 Mbits (display & program execution)
- LCD controller : 1 channel
- NAND Flash ROM interface : 2 channels (128M x 2)
- I²S interface : 1 channel
- 10-bit AD converter : 4 channels
- RTC : 1 channel
- 8-bit timer : 4 channels
- 16-bit timer : 1 channel
- SIO/UART/IrDA1.0/I²C : 1 channel (One of the channels supports IrDA.)
- Watchdog timer : 1 channel
- Touch screen interface : 1 channel
- Memory management unit (MMU) : Up to 512 Mbytes



Memory Size

Part Number	ROM	RAM
TMP92CA25FG	N/A	10 Kbytes

* SPI : Serial Peripheral Interface

TMP92CZ26AXBG



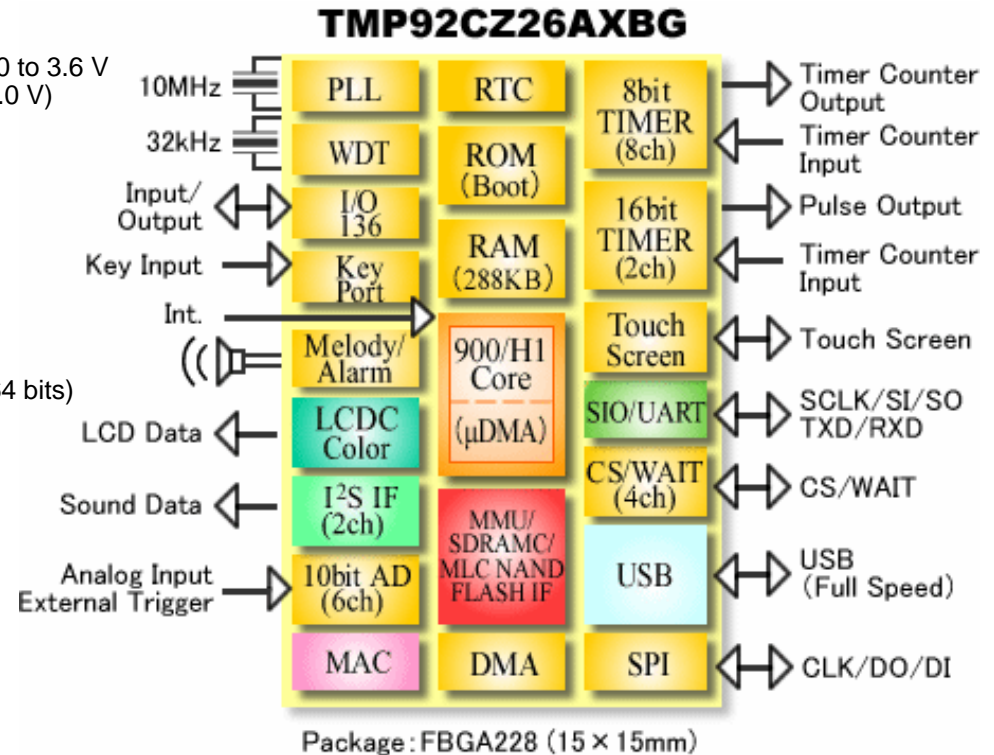
32-bit microcontroller with 0.18um process 900/H1 core and large-capacity RAM, capable of operating at 80 MHz (four times faster than existing 900/H1 products)

● **TLCS-900/H1 CPU Core (0.18 um)**

- Operating voltage : Internal 1.4 to 1.6 V, I/O 3.0 to 3.6 V
- Minimum instruction execution time : 12.5 ns (internal 80 MHz/3.0 V)
- Power-saving features : Clock gear
Dual clocks
Standby modes

● **Built-in Functions**

- Color LCD controller : 1 channel
(16M-/64K-/4096-/256-color, TFT/STN)
- MLC/SLC NAND Flash ROM interface: 2 channels (128M x 2)
- MAC (multiply-accumulate unit) : 1 channel (32 x 32 + 64 = 64 bits)
- USB (full-speed) device controller : 1 channel
- SDRAM controller : Up to 512 Mbits
- I²S interface : 2 channels
- 10-bit AD converter : 6 channels
- DMA controller : 6 channels
- SPI (SD card) : 1 channel
- RTC : 1 channel
- 8-bit timer : 8 channels
- 16-bit timer : 2 channels
- SIO/UART : 1 channel
- Watchdog timer : 1 channel
- Touch screen interface : 1 channel
- Memory management unit (MMU) : Up to 3.1 Gbytes



Product Lineup

Part Number	ROM	RAM
TMP92CZ26AXBG	8 Kbytes (Boot)	288 Kbytes
TMP92CF26AXBG	8 Kbytes (Boot)	144 Kbytes

TMP92CF29AFG



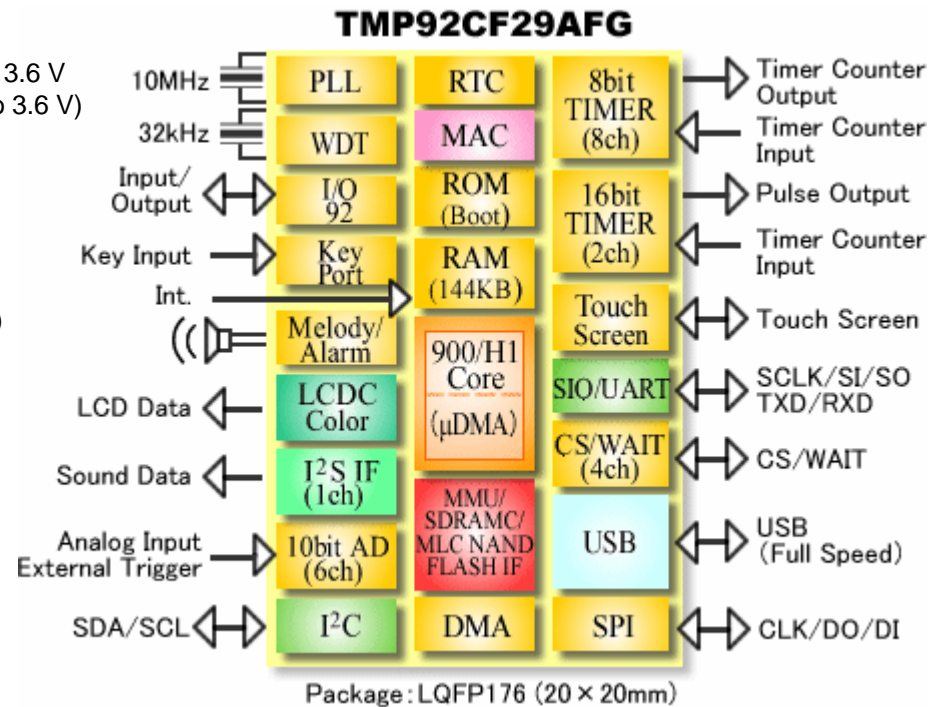
High-speed advanced 32-bit microcontroller with large capacity RAM and color LCD controller capable of operating at 80MHz

● **TLCS-900/H1 CPU Core (0.18 um)**

- Operating voltage : Internal 1.4 to 1.6 V, I/O 3.0 to 3.6 V
- Minimum instruction execution time : 12.5 ns (internal 80 MHz/3.0 to 3.6 V)

● **Built-in Functions**

- Color LCD controller : 1 channel (64K-/4096-/256-color, TFT/STN)
- MLC/SLC NAND Flash ROM interface: 2 channels (128M × 2)
- MAC (multiply-accumulate unit) : 1 channel (32 × 32 + 64 = 64 bits)
- USB (full-speed) device controller : 1 channel
- SDRAM controller : Up to 512 Mbits
- I²S interface : 1 channel
- 10-bit AD converter : 6 channels
- DMA controller : 6 channels
- SPI* (SD card) : 1 channel
- RTC : 1 channel
- 8-bit timer : 8 channels
- 16-bit timer : 2 channels
- SIO/UART : 2 channels
- Watchdog timer : 1 channel
- Touch screen interface : 1 channel
- Memory management unit (MMU) : Up to 2.1 Gbytes



Memory Size

Part Number	ROM	RAM
TMP92CF29AFG	8 Kbytes (Boot)	144 Kbytes

* SPI : Serial Peripheral Interface

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