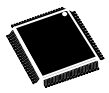
STM32F446xC/E

Arm® Cortex®-M4 32-bit MCU+FPU, 225 DMIPS, up to 512 KB Flash/128+4 KB RAM, USB OTG HS/FS, seventeen TIMs, three ADCs and twenty communication interfaces

Datasheet - production data

Features

- Core: Arm® 32-bit Cortex®-M4 CPU with FPU, Adaptive real-time accelerator (ART Accelerator) allowing 0-wait state execution from Flash memory, frequency up to 180 MHz, MPU, 225 DMIPS/1.25 DMIPS/MHz (Dhrystone 2.1), and DSP instructions
- Memories
  - 512 Kbytes of Flash memory
  - 128 Kbytes of SRAM
  - Flexible external memory controller with up to 16-bit data bus: SRAM, PSRAM, SDRAM/LPSDR SDRAM, NOR/NAND Flash memories
  - Dual mode QuadSPI interface
- LCD parallel interface, 8080/6800 modes
- Clock, reset and supply management
  - 1.7 V to 3.6 V application supply and I/Os
  - POR, PDR, PVD and BOR
  - 4 to 26 MHz crystal oscillator
  - Internal 16 MHz factory-trimmed RC (1% accuracy)
  - 32 kHz oscillator for RTC with calibration
  - Internal 32 kHz RC with calibration
- Low power
  - Sleep, Stop and Standby modes
  - V_{BAT} supply for RTC, 20×32 bit backup registers plus optional 4 KB backup SRAM
- 3×12-bit, 2.4 MSPS ADC: up to 24 channels and 7.2 MSPS in triple interleaved mode
- 2×12-bit D/A converters
- General-purpose DMA: 16-stream DMA controller with FIFOs and burst support
- Up to 17 timers: 2x watchdog, 1x SysTick timer and up to twelve 16-bit and two 32-bit timers up to 180 MHz, each with up to four IC/OC/PWM or pulse counter
- Debug mode
  - SWD and JTAG interfaces
  - Cortex®-M4 Trace Macrocell™



LQFP64 (10 × 10 mm)
LQFP100 (14 × 14 mm)
LQFP144 (20 x 20 mm)

UFBGA144 (7 x 7 mm)
UFBGA144 (10 x 10 mm)

WLCSP 81

- Up to 114 I/O ports with interrupt capability
  - Up to 111 fast I/Os up to 90 MHz
  - Up to 112 5 V-tolerant I/Os
- Up to 20 communication interfaces
  - SPDIF-Rx
  - Up to 4 × I^2C interfaces (SMBus/PMBus)
  - Up to four USARTs and two UARTs (11.25 Mbit/s, ISO7816 interface, LIN, IrDA, modem control)
  - Up to four SPIs (45 Mbits/s), three with muxed I^2S for audio class accuracy via internal audio PLL or external clock
  - 2 x SAI (serial audio interface)
  - 2 × CAN (2.0B Active)
  - SDIO interface
  - Consumer electronics control (CEC) I/F
- Advanced connectivity
  - USB 2.0 full-speed device/host/OTG controller with on-chip PHY
  - USB 2.0 high-speed/full-speed device/host/OTG controller with dedicated DMA, on-chip full-speed PHY and ULPI
  - Dedicated USB power rail enabling on-chip PHYs operation throughout the entire MCU power supply range
- 8- to 14-bit parallel camera interface up to 54 Mbytes/s
- CRC calculation unit
- RTC: subsecond accuracy, hardware calendar
- 96-bit unique ID

Table 1. Device summary

Reference	Part numbers
STM32F446xC/E	STM32F446MC, STM32F446ME, STM32F446RC, STM32F446RE, STM32F446VC, STM32F446VE, STM32F446ZC, STM32F446ZE.