

SF32LB57x

big.LITTLE Arm Cortex-M33 STAR-MC1@240MHz/24MHz, 1968 CoreMark
2.5D GPU, 592KB SRAM, BT/BLE 5.3

Product Brief

Key Features

- Bluetooth MCU with multi-core Arm Cortex-M33 STAR-MC1 up to 240MHz/24MHz, 1968 CoreMark, 740 DMIPS, suitable for both feature-rich graphical HMI and ultra-low power sensor hub operation
- ePicasso™3.0 2.5D GPU, support blending, rotation, scaling and projection
- eZip™3.0 image decoder, support both eZip lossless format and JPEG lossy format, support image and animation
- Dual-mode BT6.3, EDR2 sensitivity of -95dBm, BLE 1Mbps sensitivity of -100dBm and Rx power of 2.0mA@3.8V
- HiFi audio ADC/DAC for audio playback and bluetooth call
- 592KB on-chip SRAM, support (SiP) OPI-PSRAM, interfaces for NOR, NAND, and eMMC
- Support lithium battery power supply, integrated charging and 2 × LDOs(3.3V) output, Max.charging current 400mA; Max. load current 150mA×2
- QFN/BGA package, support up to 58 GPIOs

Applications

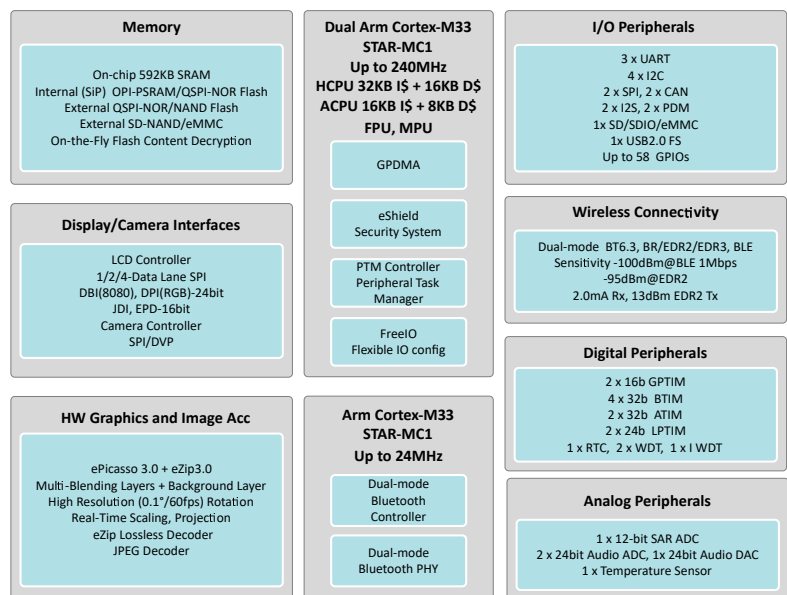
- Wearable devices
- Smart HMI device
- ePaper portable device
- Smart home appliance

SF32LB57x is a family of highly integrated high-performance MCUs for ultra-low power AIoT scenarios. It adopts a big.LITTLE architecture based on Cortex-M33 STAR-MC1 processor, and is embedded with 2.5D GPU, dual-mode BT6.3, and audio codec. SF32LB57x can be used for a wide variety of applications such as smart wearables, smart HMI devices, and smart home, etc.

The big core system contains dual Cortex-M33 STAR-MC1 processors, each can operate at up to 240MHz for 984 CoreMark. The little core system serves as Bluetooth controller at high energy efficiency of 4.8uA/CoreMark. This architecture delivers no-compromise user experience of both high performance computing required for feature-rich graphical HMI and ultra-low power sensor hub operation.

The 2.5D GPU, at up to 240MHz, supports multi-layer alpha blending, rotation, scaling, projection, and conversion of various common graphic formats. eZip™3.0 supports both lossless and lossy compressed graphics file, saving memory bandwidth and storage capacity. The LCD controller can support interfaces of 8080/QSPI/RGB/EPD/JDI at a full-screen refresh frame rate up to 60fps, and support Always-On Display.

The world-class dual-mode BT6.3 transceiver has a maximum Tx power of 13dBm at EDR2 mode and Rx power of 2.0mA@3.8V, and the sensitivity reaches -100dBm (1Mbps) for BLE and -95dBm for EDR2.



CPU and Memory

- High Performance System (HPSYS)
 - Dual Arm Cortex-M33 STAR-MC1 Core
 - Clock up to 240MHz, adjustable, 1968 CoreMark
 - HCPU: 32KB(2-way) I\$ + 16KB(4-way) D\$
 - ACPU: 16KB(2-way) I\$ + 8KB(4-way) D\$
 - SRAM: 512KB (All Retention SRAM)
 - CoreMark power: 23uA/MHz @3.8V
 - Single Precision Floating Point Unit (FPU)
 - Memory Protection Unit (MPU)
- Ultra Low-Power System (LPSYS)
 - Arm Cortex-M33 STAR-MC1
 - Clock up to 24MHz, adjustable
 - SRAM: 80KB (All Retention SRAM)

Wireless Connectivity

- Dual-mode BT6.3, support BLE Audio, LR
- Sensitivity: -100dBm (BLE/1Mbps), -107.5dBm (BLE/125Kbps), -96dBm (BR), -95dBm (EDR2)
- Max. Tx power: 13dBm (EDR2/3), 17dBm (BR/BLE)
- Rx peak current (BR): 2.0mA@3.8V

Audio

- 1×HiFi 24-bit Audio DAC, 109dB SNR
- 2×HiFi 24-bit Audio ADC, 97dB SNR

Graphics and Display

- 2.5D GPU—ePicasso™3.0
 - Support rotation, scale, projection and mirror
 - Max. resolution: 2048×2048
 - RGB color format: RGB888, RGB565, aRGB8888, aRGB8565
 - Other color formats: L8/4, G8/4/2, A8/4/2, YUV
 - Support Multiple alpha blending mode
- General Decompression Accelerator – eZip™3.0
 - Support lossless eZip and eZip-A animation
 - Support lossy JPEG and MJPEG animation
 - Concatenated operation with ePicasso™3.0
- LCD Controller
 - Support 8080, SPI/Dual-SPI/Quad-SPI, DPI/RGB, JDI, 8/16bit-EPD(ePaper) interface
- Camera Controller DCMI

- Support DVP, SPI/Dual-SPI/Quad-SPI interface

Memory Interface

- Support (SiP) OPI-PSRAM, interface up to 144MHz
- Support (SiP) QSPI-NOR Flash, up to 96MHz
- 3×MPI(QSPI), support NOR, NAND, QPI-PSRAM
- 2×SD/SDIO, support SD3.0, SDIO3.0, eMMC

Others

- DMA
 - Generic DMA, support link list mode
- Security
 - AES, HASH and CRC hardware accelerators
 - True random number generator (TRNG)
 - eShield security architecture
 - PSA Certified Level 1
- Timers
 - 2×16b GPTIM, 4×32b BTIM, 2×32b ATIM
 - 2×24b LPTIM, 1×PWM
 - 1×RTC
 - 2×24b WDT, 1×IWDI
- Analog Peripherals
 - 1×12-bit general purpose SAR ADC, 12 channels
 - 1×Temperature sensor
- I/O Peripherals
 - Up to 58 GPIOs
 - support FreeIO config
 - 3×UART, 4×I²C, 2×SPI
 - 2×I²S, 2×PDM
 - 1×USB2.0 FS, 2×CAN
 - Peripheral Task Machine (PTM)
- Power Management
 - High-efficiency buck and low-power LDO
 - 2 × LDOs(3.3V) output, Max. current 150mA×2
 - Sleep current: 2.8uA@3.8
 - Built-in 400mA lithium battery linear charger, supporting 4.2V-4.45V full voltage
 - VBAT voltage range: 3.0V-4.7V
 - VBUS voltage range: 4.5V-5.5V

Package

- QFN68L, 7mm×7mm, lithium battery, 46 GPIOs