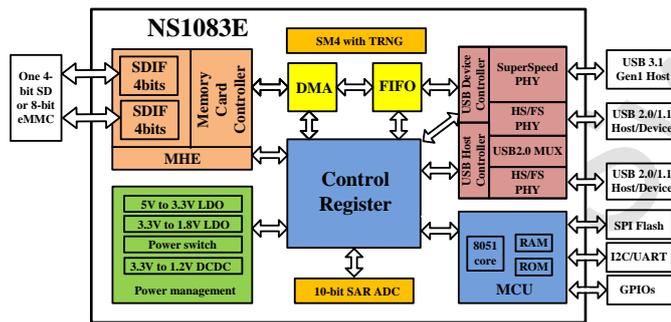# NS1083E USB 3.0 Flash Card Controller with SM4

Introduction

NS1083E is a high-performance USB 3.0 Flash Card controller with SM4 encryption. SM4 is a block cipher used in the Chinese National Standard. NS1083E supports data encryption and decryption using SM4 standard, with an integrated true random number generator (TRNG). On one side, NS1083E connects with up to two USB interfaces such as Type-A, Type-C, and Apple Lightning Interface. NS1083E is fully in compliance with Apple MFi Specification, supporting MFi USB Role Switch and iAP2 protocols such as EA Native Transport, Device Powered, and App Launch. On another side, NS1083E connects with one 4-bit flash media card, such as Secure Digital (SD) and microSD (T-Flash); or one 8-bit flash card such as eMMC.

Block Diagram

Highlights

- Support SM4 data encryption and decryption using SM4 standard, with no compromise in Read or Write performance for SD card operating in UHS-I SDR104. The encryption key can be generated by an integrated true-random number generator (TRNG).

- Two low-power USB 2.0 Host specifically optimized for smartphone applications. Each USB 2.0 transceiver can be configured to either USB 2.0/1.1 Host or USB 2.0/1.1 device. An integrated USB 2.0 MUX enables data selection from one of the USB 2.0 transceivers.

Features

- Support USB 3.0 Specification Rev 1.0

- Support USB Specification Rev 2.0, host and device.

- Support USB Mass Storage Class, Bulk-Only Transport

- Support USB 3.0 U0/U1/U2/U3 (P0/P1/P2/P3) and USB 2.0 L0/L1/L2 power saving modes.

- SM4 data encryption and decryption.

- True random number generator (TRNG).

- Support Apple MFi Accessory Interface Specification.

- Support Apple Accessory iAP2 protocol, featuring EA Native Transport, Device Powered, and APP launch.

- Support Apple MFi USB Role Switch.

- Support Apple and USB BC1.2 charging detection.

- Detection of maximum supply current from a USB port or a power adapter at 500mA, 1.0A, 1.5A, 2.1A, 2.4A; and capable of charging iDevice at 0.5/1.0/2.1/2.4A.

- SD card read and write frequencies can be configured independently from 15 to 96MHz for up to 9 levels.

- Support Secure Digital v1.0/v1.1/v2.0 SDHC/SDXC (Capacity up to 2TB).

- Support Secure Digital v3.0 UHS-I (Ultra High Speed)SDR12/SDR25/SDR50/DDR50/SDR104.

- Support eMMC specification v4.5 HS200 mode.

- Spread Spectrum Clocking (SSC) for flash media card to help minimize EMI.

- Support SPI, I2C, UART communication.

- Support firmware booting from SPI Flash.

- Support firmware upgrade to SPI Flash either from PC or from smartphone.

- On-chip power switch for supplying SD card power.

- High efficiency 3.3V to 1.2V DC-DC regulator.

- On-chip 5V to 3.3V and 3.3V to 1.8V regulators.

- On-chip 10-bit 50kHz SAR ADC.

- Package available in 48 pin 6x6 (RoHS) QFN.