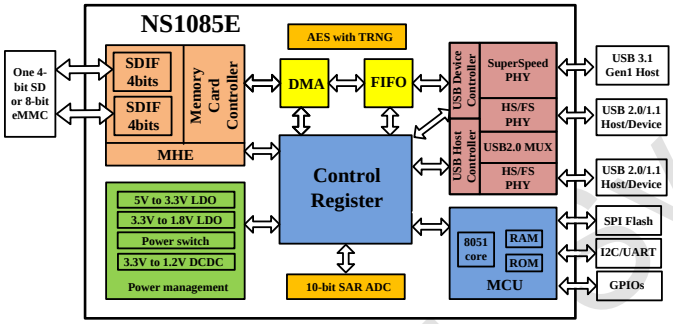
NS1085E USB Controller with AES

Introduction

NS1085E is a high-performance USB 3.0 Flash Card controller with AES encryption. It 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. It also supports USB OTG and Android Open Accessory (AOA) Protocol 2.0. On one side, NS1085E connects with up to two USB interfaces such as Type-A, Type-C, and Apple Lightning Interface. On the other side, it connects with one 4-bit flash media card, such as Secure Digital (SD)andmicroSD (T-Flash); or one 8-bit flash card such as eMMC.

Block Diagram



Highlights

- Support AES 256-bit/128-bit data encryption and decryption using XTS, ECB, CBC, or CFB mode, with no compromise in performance of SD 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.
- Support AOA Protocol 2.0, allowing USB accessory built with NS1085E to support USB accessory mode, which powers the USB bus and communicates with Android phone simultaneously.

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.
- AES 256-bit/128-bit XTS/ECB/CBC/CFB mode.
- 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 Android Open Accessory (AOA) Protocol 2.0.
- 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 or SD card.
- Support firmware upgrade to SPI Flash or SD card either from PC or from iDevice.
- Support high reliability operation with two copies of the firmware image stored in SPI Flash or SD card.
- 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.

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