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Datasheet: SSD SATA 6Gbps Controller AS2258

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Contents

1. Foreword

This document has been produced by ASolid Technology Co., Ltd., should the company modifies the contents of this specification, it will be re-released with an identifying change of release date and an increase in revision number as follows:

Revision mn.xy, where:

- mn the first two digit are incremented for major changes of substance, e.g., functional changes.
- xy the second two digits are incremented when minor changes have been incorporated into the specification, i.e., enhancements, corrections, updates, etc.

2. Statement of Scope

This Data Book describes the main features and the applications of SSD SATA 6Gbps Controller AS2258. For more details, please contact service.asolid@asolid-tek.com directly.

3. General Description

AS2258 SSD SATA 6Gbps Controller is designed for Solid-State Drive (SSD) related NAND Flash storage devices with full support for the latest high-speed and large-capacity NAND Flash requirements, including Toggle NAND and ONFI NAND. All ASolid AS2258 series flash modules, either for commercial or industrial use, are integrated with RAM and SMART without mechanical moving parts, which allows it to deliver optimal vibration-free and low-power consumption performances. By leveraging ASolid's optimized wear-leveling algorithm and Low Density Parity Check (LDPC) of Error Correction Code (ECC) circuitry, the AS2258 provides superior wear-leveling, buffer management and data reading reliability performances, and effectively lengthen the flash lifespan by acting as a search engine for the neighboring flash units. Also, the design of 16-pins on the AS2258 can be used for independent programming of input/output applications, as well as the default controller settings such as DRAM frequency, flash type and SATA speed settings. These advanced designs have made AS2258 a competitive SSD controller solution to simplify the migration to production process and hence shorten design-to-market cycles for better profitability.

3.1. Feature

- Host interface:
  - AC coupling for transmitter and receiver
  - Compliant with SATA Revision 3.2
  - Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
  - Embedded BIST function for SATA PHY for low cost mass production
  - Self-calibrated and embedded termination resistor at transmitter
  - Support power management
  - Support expanded register for SATA protocol 48 bits addressing mode
- Flash interface support:
  - Built-in 2-channel NAND flash interface controller
  - Support both 1.2V and 1.8V flash
  - UP to 16 flash chip selection and 8-bit flash IO access
- NAND flash support:
  - Support Low Density Parity Check (LDPC) code

- Support 2D and 3D SLC/MLC/TLC NAND type flash
- Support flash with 8KB/16KB page architecture
- Support four-plane operation
- Support Toggle Mode flash
- Support ONFI3.0/ONFI2.3/ONFI2.2/ONFI2.1/ONFI2.0 flash
- Support ONFI4.0 interface
  - SDR up to mode 5
  - NV-DDR up to mode 5
  - NV-DDR2 up to mode 7
  - NV-DDR3 up to mode 8

- Architecture
  - Built-in 32-bit microcontroller
  - Built-in voltage detector
  - Built-in UART function
  - Support JTAG interface
  - Support GPIO
  - Support I2C interface
  - Enhanced ESD design
- Power save implementation
  - Partial mode
  - Slumber mode
  - DevSleep mode
- Operating temperature
  - Commercial grade: 0℃ ~ 70℃
  - Industrial grade: -40℃ ~ +80℃
- Package
  - Support LFBGA (9 x 9 mm) 169-ball package
  - Lead-free and RoHS compliant

3.2. AS2258 Function Block Diagram

The following diagram is the internal block diagram of AS2258.

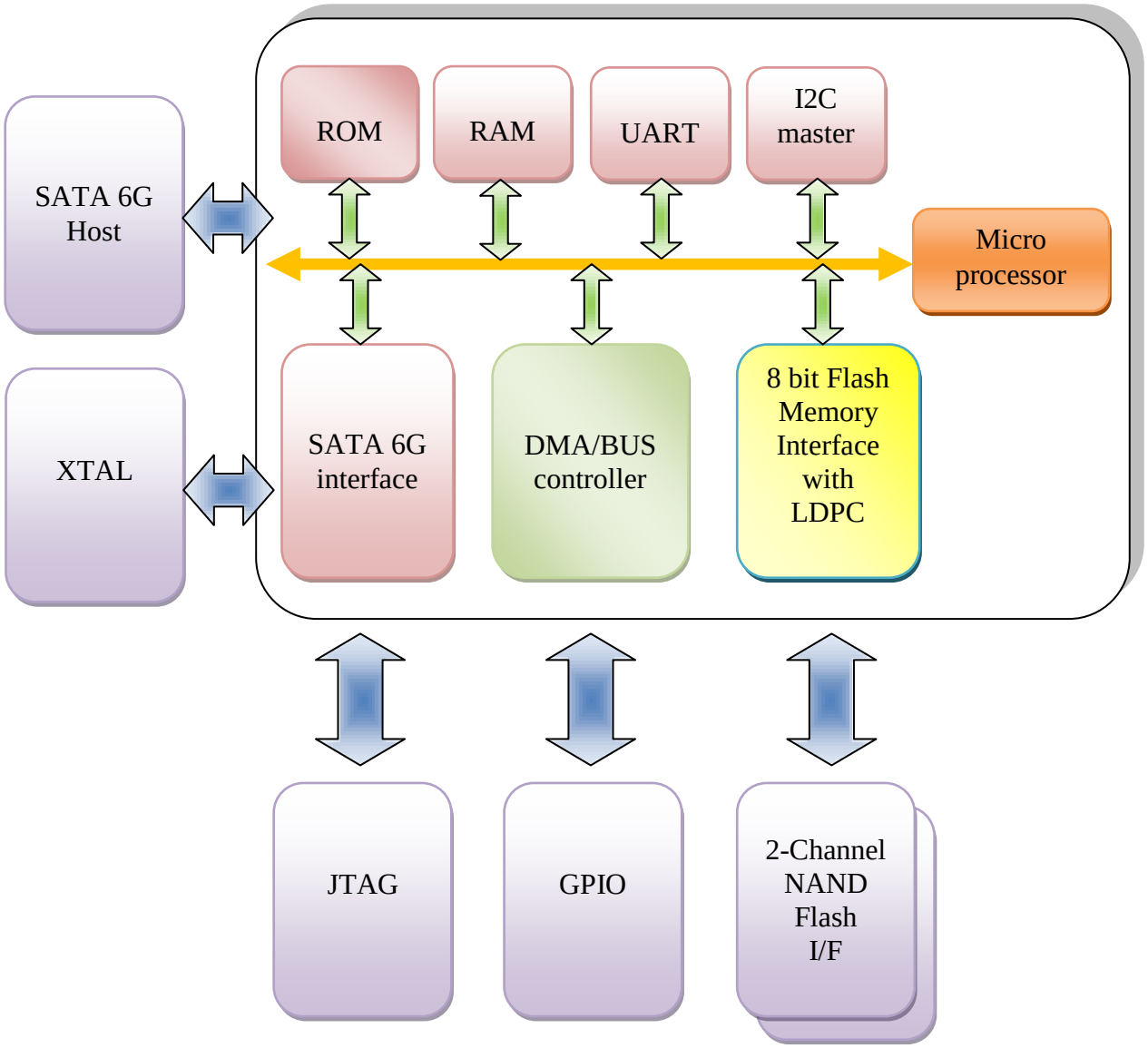

Figure 4-1 AS2258 Function Block Diagram