

S29AL004D

4 Megabit (512 K x 8-Bit/256 K x 16-Bit)
CMOS 3.0 Volt-only Boot Sector Flash Memory



Data Sheet

ADVANCE
INFORMATION

Distinctive Characteristics

Architectural Advantages

- **Single power supply operation**
 - 2.7 to 3.6 volt read and write operations for battery-powered applications
- **Manufactured on 200nm process technology**
 - Compatible with 320nm Am29LV400B and MBM29LV400T/BC
- **Flexible sector architecture**
 - One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and seven 64 Kbyte sectors (byte mode)
 - One 8 Kword, two 4 Kword, one 16 Kword, and seven 32 Kword sectors (word mode)
 - Supports full chip erase
- **Unlock Bypass Program Command**
 - Reduces overall programming time when issuing multiple program command sequences
- **Top or bottom boot block configurations available**
- **Embedded Algorithms**
 - Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors
 - Embedded Program algorithm automatically writes and verifies data at specified addresses
- **Compatibility with JEDEC standards**
 - Pinout and software compatible with single-power supply Flash
 - Superior inadvertent write protection
- **Sector Protection features**
 - A hardware method of locking a sector to prevent any program or erase operations within that sector
 - Sectors can be locked in-system or via programming equipment
 - Temporary Sector Unprotect feature allows code changes in previously locked sectors

Performance Characteristics

- **High performance**
 - Access times as fast as 70 ns
- **Ultra low power consumption (typical values at 5 MHz)**
 - 200 nA Automatic Sleep mode current
 - 200 nA standby mode current
 - 9 mA read current
 - 20 mA program/erase current
- **Cycling Endurance: 1,000,000 cycles per sector typical**
- **Data Retention: 20 years typical**

Package Options

- **48-ball FBGA**
- **48-pin TSOP**
- **44-pin SO**

Software Features

- **Data# Polling and toggle bits**
 - Provides a software method of detecting program or erase operation completion
- **Erase Suspend/Erase Resume**
 - Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation

Hardware Features

- **Ready/Busy# pin (RY/BY#)**
 - Provides a hardware method of detecting program or erase cycle completion
- **Hardware reset pin (RESET#)**
 - Hardware method to reset the device to reading array data