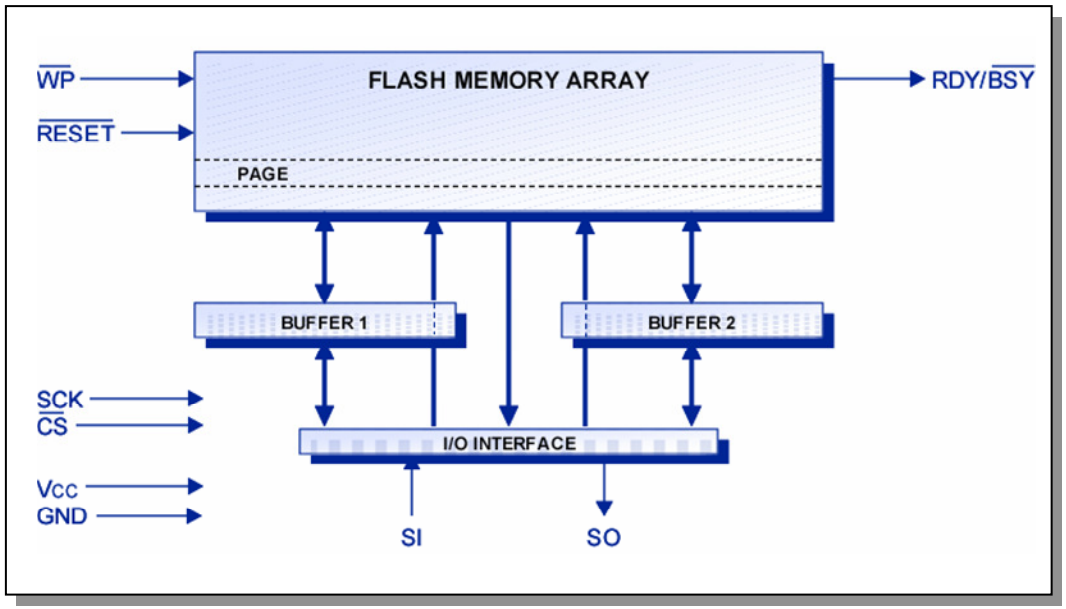
Serial DataFlash®

Full Featured Page Erase, Byte Alterable, SPI Serial Flash

AT45DBxxx SERIES

- Very Granular Architecture
  - Array is made up of small pages (256, 512, or 1024 bytes)
- Flexible Erase Sizes
  - Erase a single page, a block of 8 pages, or a complete sector
- On-Chip, Independently Accessible SRAM Buffers
  - Same size as a Flash page
- Advanced Protection and Security Features

- JEDEC Standard Mfg. and Device ID Read
- Very Fast Clock Rates
  - 66MHz
- Very Small Pb-Free Packages Options
  - 8-lead SOIC and MLF
- 100,000 Program/Erase Cycles



NEW IN THE AT45DBxxx "D" GENERATION

- **AT45DBxxxD Has Increased Performance and New Features**
  - **Clock frequency improved from 20MHz to 66MHz**
  - **Fast chip-select setup time (5ns)**
  - **Software and hardware controlled individual sector protection**
  - **Individual sector lockdown (ROM)**
    - **Any sector can be made read only**
  - **128-byte security register**
  - **JEDEC standard Manufacturer and Device ID Read**
  - **Additional read commands**
  - **Improved endurance (100,000 program/erase cycles)**
- **Smaller package options**

  Narrow-body (150 mil)
  - **8-lead SOIC - 1Mbit thru 8Mbit**
  - **8-land MLF – 1Mbit thru 32Mbit**

  Wide body (209 mil)
  - **8-lead SOIC – 1Mbit thru 32Mbit**
  - **8-land MLF – 1Mbit thru 32Mbit, CASON for 32 + 64Mbit**

AT45DBxxx SECTOR PROTECTION

- Sector Protection Is Very Important for Code Storage
- Stripped Down Serial Flash Has Stripped Down Sector Protection
  - Only allows you to protect portions of the memory array (1/8, 1/4, 1/2 or all) starting from sector 0.

- Atmel's AT45DBxxx Gives You Flexibility!
  - You can protect any sector within the array independently
  - Great for bottom boot systems
  - It remembers which sectors are to be protected
    - No need to redefine after power cycles
  - There's two ways to protect the memory
    - Hardware controlled via the WP# pin
    - Software controlled using commands

SECTOR NUMBER															
0a	0b	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
X	X	X	–	–	X	X	X	–	–	–	–	–	X	–	X	X

Sector Protection Register

16M (AT45DB161D) – 4096 Pages

AT45DBxxx SECURE SECTOR LOCKDOWN

- More and More Applications Require Secure Code/Data Storage
  - The code and/or data must be “tamper proof” and not changeable
  - Some parallel Flash devices dedicate fixed lockable areas of memory
- Stripped Down Serial Flash Isn’t Secure
  - No on-chip method of securely locking the memory from changes
- New AT45DBxxx Devices Provide Flexible Lockdown Capabilities
  - Any sector can be individually locked for ultimate flexibility
  - Once locked, a sector becomes read-only (ROM) and cannot be unlocked
  - Sector locking is permanent, so the memory can’t be hacked
    - Power cycles don’t affect the locking

SECTOR NUMBER															
0a	0b	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
x	x	x	–	–	x	x	x	–	–	–	–	–	x	–	x	x

Sector Lockdown Register

AT45DBxxx SECURITY REGISTER

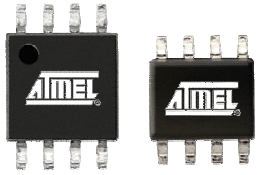
- Help Protect Against System Cloning By Using a Security Register
  - Parallel Flash devices have them, so why not a serial Flash?
- New AT45DBxxx Devices Incorporate a 128-Byte Security Register
- The Security Register Is Divided into Two Portions
  - First 64 bytes are user programmable
  - Last 64 bytes are factory programmed by Atmel
    Each device will contain a unique identifier
- The Security Register Is Also Secure!
  - The first 64 bytes are one-time programmable (OTP), so it can't be hacked
- Eliminate a Dallas Semi 1-Wire Serial Number Device (save $0.40)
- And No, You Don't Get This with Stripped Down Serial Flash

SECURITY REGISTER	
64 BYTES	64 BYTES
One-Time User Programmable	Atmel Programmed with a Unique Identifier

AT45DBxxx — TINY PACKAGES, BIG MEMORY

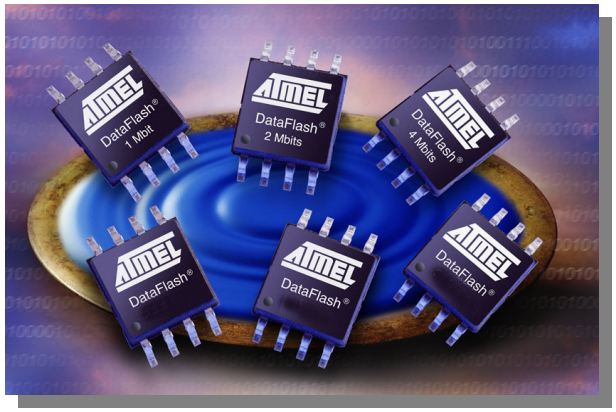
- **Atmel's AT45DBxxx Has 8-Lead Solutions With Upgrade Paths**
  - **8-lead SOIC (both 150-mil and 200-mil)**
  - **8-contact MLF and CASON (footprint compatible with 8-lead SOICs)**

8-Lead SOIC (EIAJ – 200-mil)

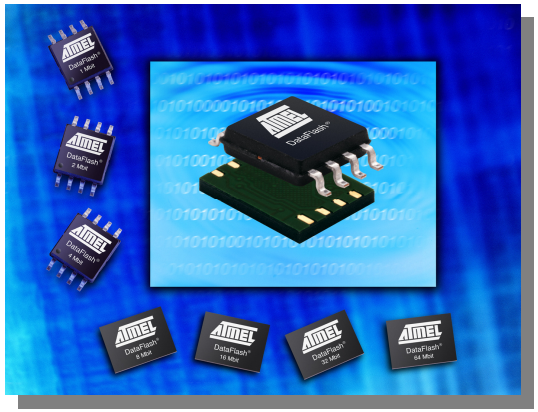


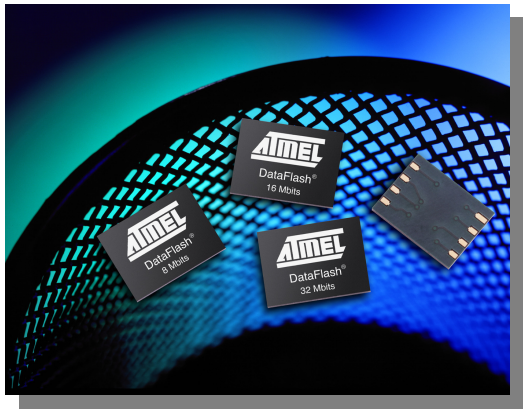
8-Lead SOIC (JEDEC – 150-mil)

- **AT45DBxxxD Upgrade Path from 1M to 64M in the 8-Lead Footprint!**



8-Lead SOIC (EIAJ)





8-Contact CASON

Available 8-Lead Densities Today

1M, 2M, 4M, 8M, 16M, 32M, 64M