TENTATIVE TOSHIBA MOS DIGITAL INTEGRATED CIRCUIT SILICON GATE MOS

# 128-MBIT, 256-MBIT CMOS NAND E$^2$PROM with Flash Controller

# Flash Disk with Protection and Security-Enabling Features

## DESCRIPTION

TC58C128A and TC58C256A is a member of DiskOnChip™ flash disk products, which contains monolithic 128-Mbit and 256-Mbit NAND E$^2$PROM and flash controller. It is fully compatible with DiskOnChip™ Millennium Plus (MD2811-D16-V3Q18, MD3831-D16-V3Q18, MD2811-D32-V3 MD3831-D32-V3) of M-Systems

## FEATURES

- TC58C128A/TC58C256A require TrueFFS™ software which is supported by M-Systems.
- TrueFFS™ technology for full hard disk emulation
- 16MByte(TC58C128A)/32MByte (TC58C256A) with device cascading option for up to 64MByte/ 128MByte
- NAND-based flash technology which enables high density and small die size
- Programmable eXecute In Place (XIP) Boot Block (1KB)
- Asynchronous Boot mode to boot CPUs that wake up in burst mode/ (TC58C128A only)
- Data integrity with Reed-Solomon-based Error Detection Code/Error Correction Code (EDC/ECC)
- Configurable interface: simple SRAM-like or multiplexed A/D interface (TC58C128A only)
- Low-voltage power supply

  Vcc=2.7V to 3.6V
- Dual voltage power supply support

  Vccq=2.7V to 3.6V or
  Vccq=1.65V to 1.95V (TC58C128A only)
- Deep Power-Down mode for reduced power consumption

  Current (Typical):
  - Active: 25mA
  - Deep Power-Down: 10µA
- Package

  TSOPI48-P-1220-0.50: TC58C128AFT/AFTI, TC58C256AFT/AFTI

  P-TFBGA69-0912A3(A): TC58C1287AXB, TC58C256AXB

### Performance

| | 32MByte (TC58C256A) | 16MByte (TC58C128A) |
|---|---|---|
| Burst read/write | 20 MB/sec | 13.3 MB/sec |
| Sustained read | 3 MB/sec | 1.4 MB/sec |
| Sustained write | 1.5 MB/sec | 0.55 MB/sec |

Note: DiskOnChip™ and TrueFFS™ are trademarks of M-Systems

## Protection and Security-Enabling Features

- Unique Identification (UID) number
- User-configurable One Time Programmable (OTP) area
- Two configurable write and read-protected partitions for data and boot code
- Two levels of hardware data and code protection:
  Protection Key and LOCK# signal
  Protected Bad Block Table

## Boot Capability

- Programmable Boot Block (1KByte) with XIP capability to replace boot ROM
- Download Engine (DE) for automatic download of boot code from Programmable Boot Block
- Boot capabilities:
  - CPU initialization
  - Platform initialization
  - OS boot

## Applications

- Internet set-top boxes, interactive TVs, web browsers
- WBT, thin clients, network computers
- PDAs and smart handsets
- Embedded systems
- Routers, switches, networking equipment
- Point of sale (POS) terminals, industrial PCs

## TrueFFS™ Software

- Full hard-disk read/write emulation for transparent file system management
- Identical software for all DiskOnChip™ capacities
- M-Systems provide patented methods to extend flash lifetime, including:
  - Dynamic virtual mapping
  - Dynamic and static wear-leveling
- TrueFFS™ is supporting for major OS environments, including:
  - Windows CE
  - Linux
  - VxWorks
  - Windows Embedded NT 4.0
  - BE
  - PSOS+
  - QNX
  - Symbian
  - LynxOS
  - ATI Nucleus
  - DOS
- M-Systems support for OS-less environments
- 8KB memory window

**Note: TrueFFS™ is trademark of M-Systems**