

TENTATIVE TOSHIBA MOS DIGITAL INTEGRATED CIRCUIT SILICON GATE MOS

## 128-MBIT, 256-MBIT CMOS NAND E<sup>2</sup>PROM with Flash Controller

### Flash Disk with Protection and Security-Enabling Features

#### DESCRIPTION

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

#### FEATURES

- TC58C128A/TC58C256A require TrueFFS<sup>TM</sup> software which is supported by M-Systems.
- TrueFFS<sup>TM</sup> 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  
V<sub>cc</sub>=2.7V to 3.6V
- Dual voltage power supply support  
V<sub>ccq</sub>=2.7V to 3.6V or  
V<sub>ccq</sub>=1.65V to 1.95V (TC58C128A only)
- Deep Power-Down mode for reduced power consumption

Current (Typical):

- Active: 25mA
- Deep Power-Down: 10μA

- Package

TSOP148-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<sup>TM</sup> and TrueFFS<sup>TM</sup> are trademarks of M-Systems

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## 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**