

# Numonyx™ 1 Gb SLC NAND flash memory

Small die size increases storage—and offers security, higher performance and longevity



## MORE STORAGE IN A SMALLER DIE SIZE

Numonyx™ 1 Gb SLC NAND enables increased data storage within a smaller die size for applications such as mobile phones, digital TV, set top boxes and digital still cameras.

For today's applications that require cost-effective density, transitioning from NOR flash memory to NAND is a great move. NAND flash memory enables greater data storage within a smaller die size for applications such as mobile phones, digital TV, set top boxes and digital still cameras. Innovations from Numonyx in NAND SLC 48nm memory push the benefits of NAND beyond cost-effective capacity, adding greater security, high performance and product longevity.

## Security, performance and longevity

Numonyx™ 1 Gb SLC NAND, built on 48nm process technology, delivers the cost-effective advantages that NAND is known for, plus it supports secure blocks, faster throughput time and easy migration to 1 bit ECC (Error Correction Code) for longer memory life.

## Secure blocks protect data

Whether you need to protect data from malicious attack or protect applications from being modified unintentionally, Numonyx 1 Gb SLC NAND delivers security advantages to keep data safe. In Numonyx 1 Gb SLC NAND, an extra 128 Kbytes One-Time Programmable (OTP) block ensures data stored on it cannot be modified or corrupted.

Numonyx delivers a customized command set sequence to the system designers (under non-disclosure agreement (NDA)) to enable designers to program and read the OTP area.

Once programming is complete, the designer programs a second customized command set sequence to permanently lock the 128 Kbytes OTP area.

If an application requires more secure space, the designer can expand the OTP storage area to include the Zero block, using a different access method, to double the secure storage capacity to 256 Kbytes.

Once locked, the OTP and Zero areas are accessible for read operations only, protecting against intentional attacks, such as those from hackers, or unintentional overwrites.

## Faster throughput

Numonyx 1 Gb SLC NAND is built on 48nm lithography to deliver leading throughput time and improve performance for many of today's applications.

Compared to 90nm NAND on an x8 bus, Numonyx 1 Gb NAND on 48 nm doubles the number of MB that can be read per second from 13 MB/s to 26 MB/s (see Figure 1). At 48nm, Numonyx 1 Gb SLC NAND program operations move four times faster and erase operations are eight times faster than 90nm devices.

New cache read throughput, delivered by double RAM cache, increases read throughput to 38 MB/s .

This performance improvement enables designers to increase page size from 512 bytes to 2 Kbytes and improves application cycle time

during read and program operations. The end result—more powerful applications and a better user experience.

**Extend memory life with easy migration to 1 bit ECC**

Designers implementing an ECC to extend memory life can easily migrate to Numonyx 1 Gb SLC NAND, which is delivered with the standard ECC option of 1 bit per each 528 bytes of address space. No software upgrades or hardware changes are needed for ASICs or controllers that require 1 bit ECC. This provides a cost effective, high-performance technology migration path, especially for those applications that cannot manage more than one bit ECC.

**Conclusion**

Designers looking for high-quality and reliable non-volatile memories for applications requiring higher density, performance and longevity can look to Numonyx 1 Gb SLC NAND. In addition to the cost benefits of NAND, Numonyx 1 Gb SLC NAND in 48nm lithography offers OTP security features to protect against malicious and unintentional data access, faster performance through advanced lithography and easy migration for applications requiring 1 bit ECC.

Performance trend, NAND SLC technology, x8 bus

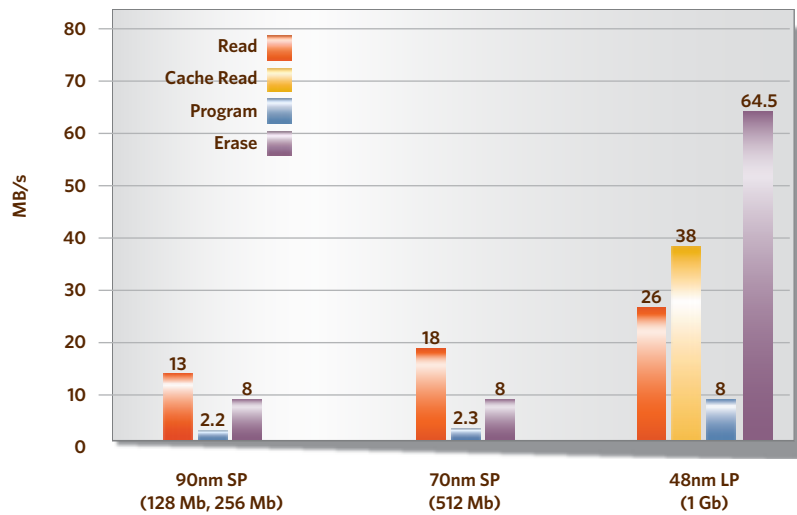


Figure 1. NAND performance on an x8 bus.

Performance trend, NAND SLC technology, x16 bus

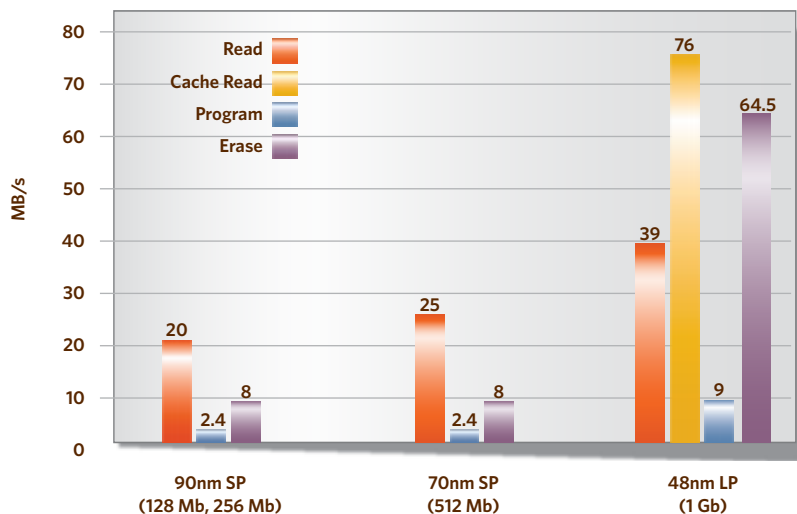


Figure 2. Compared to 90nm NAND on an x8 bus (see Figure 1), Numonyx 1 Gb NAND on 48 nm doubles the number of MB that can be read per second.