**TYPES OF SD/FLASH MEMORY CARDS**

**SLC Single Level Cell BEST QUALITY**

**MLC Multi Level Cell GOOD QUALITY**

**TLC Triple Level Cell LOW QUALITY**

**Single-level cell** (**SLC**) and**multi-level cell** (**MLC**) Flash memory are similar in their design.

**MLC** Flash devices cost less and allow for higher storage density.  
**SLC** Flash devices provide faster write performance and greater reliability, even at temperatures above the operating range of **MLC** Flash devices.

These factors make **SLC** Flash a good fit in embedded systems, while**MLC** flash makes it possible to create affordable mobile devices with large amounts of data storage.

In order to select the right Flash memory for an application, it is important to analyze the how it will be used.

For example, product developers integrating memory into a portable barcode reader will most likely need **SLC** Flash since performance and durability are important.  
On the other hand, a company building a portable media player will need the low cost and high density of **MLC** to price their device competitively.

***SLC*** Flash is used in commercial and industrial applications that require high performance and long-term reliability.   
Some applications include industrial grade Compact Flash cards or Solid State Drives (SSDs).

***MLC*** Flash is used in consumer applications that do not require long term reliability such as consumer grade USB Flash drives, portable media players, and Compact Flash cards.

The read speeds between **SLC** and **MLC** are comparable. Reading the level of the Flash cell compares the threshold voltage using a voltage comparator. Thus, the architecture change does not affect sensing.  
In general, the read speeds of Flash are determined by which controller is used.

The endurance of **SLC** Flash is 10x more than **MLC** Flash.  
The endurance of **MLC** Flash decreases due to enhanced degradation of the substrate.  
This is a main reason why ***SLC*** Flash is considered industrial grade Flash and ***MLC*** Flash is considered consumer grade Flash.

Higher temperatures cause more leakage in the cells. Combined with the increased sensitivity required to differentiate between the levels, this leakage will cause the sensors to read the wrong level.  
As a result, the operating temperature of **MLC** spans only the commercial range.  
Leakage is not significant in **SLC** Flash and thus, it can operate in an industrial temperature range.

Then, it is important to evaluate what type of Flash memory your system needs.

If performance and durability are essential for your system, **SLC** Flash incorporated.  
If low cost and high density are essential, **MLC** Flash is the right choice.

The high-performance ***MLC*** technology with ***three bits per cell,*** is commonly referred to as ***Triple Level Cell*** (***TLC***), which uses eight states.