# The Breakthrough of Mobile Memory

Apacer microSD is designed specifically for microSD cards applications that put a premium on small form factor with lower power. The microSD cards are functionally compatible with the SD memory card but is smaller in dimensions. The microSD cards can be inserted into a passive SD Memory Card Adapter and operate as an SD Memory card. All technical drafts follow DIN ISO standard. All device and interface configuration data are (such as maximum frequency, card identification, etc.) stored on the card. For compatibility with existing controllers, the microSD cards offer, in addition to the microSD cards interface, an alternate communication protocol that is based on the SPI standard.

Apacer microSD includes an intelligent controller that manages interfaced protocols and data storage and retrieval as well as Error Correction Code (ECC) algorithms, defect handling and diagnostics, power management and Content Protection for recordable media related functions.

Apacer microSD is integrated with controller & NAND type Flash memory with serial & random access capability. The device is designed for cameras, smart phones, digital recorders, MP3 players, PDAs, electronic toys, etc. The Apacer microSD card meets SDA (SD card Association) Specifications. This document gives a general overview of the microSD cards. A detailed description can be found in “SDA Specifications “.

Apacer microSD is specifically designed to meet the security, capacity, performance and environment requirements inherent in newly emerging audio and video consumer electronic devices. The microSD cards include a copyright protection mechanism that complies with the security of the SDMI standard and are faster and capable for higher capacity. The microSD cards security system uses mutual authentication and a "new cipher algorithm" to protect from illegal usage of the card content.

## Applications

- Smart phone
- Tablet PC
- Other devices with microSD slot

A none secured access to the user‘s own content is also available. The physical form factor, pin assignment and data transfer protocol are forward compatible with the multimedia card with some additions.
Apacer microSD host interface supports regular multimedia card operation as well. In other words, multimedia card forward compatibility was kept. Actually the main difference between microSD card and multimedia card is the initialization process.

**Speed Class**

Class 2 - Are more than or equal to 2 MB/sec performance.
Class 4 - Are more than or equal to 4 MB/sec performance.
Class 6 - Are more than or equal to 6 MB/sec performance.
Class 10 - Are more than or equal to 10 MB/sec performance.

High Capacity microSD Memory Cards shall support Speed Class Specification and have performance more than or equal to Class 2.

Note that the unit of performance [MB/sec] indicates 1000x1000 [Byte/sec] while the unit of data size [MB] indicates
1024x1024 [Byte]. This is because the maximum SD Bus speed is specified by the maximum SD clock frequency (25
[MB/sec] = 25000000 [Byte/sec] at 50 MHz) and data size is based

## Features:

- Supports SD System Specification Version 3.0
- Supports SDHC up to 32 GB
- Applicable for smart phones other devices with microSD card slot.
- ECC

# General Product Specifications

| Specifications | | |
|---|---|---|
| Interface | microSD Specification Version 2.0 | |
| Interface speed | Class 4 | |
| Capacity* | 8GB-32GB | |
| Form Factor | SDHC | |
| Operating Voltage | 2.7V to 3.6V | |
| Dimensions | (L)15 x (W)11 x (H) 1 mm | |
| Temperature | Operating | -25°C to 85°C |
| | Storage | -40°C to 85°C |
| Humidity | Operating: RH=93% under 25°C non-condensing | |
| | Storage: RH=93% under 40°C non-condensing | |
| Durability | Minimum 10,000 insertion/removal cycles | |
| Warranty | Limited product lifetime warranty | |
| Certifications | RoHS, CE, FCC, VCCI, RCM | |

*Unformatted. Theoretically, 1GB=1,000,000,000 Bytes. Under operating systems, the capacity might appear to be less than the theoretical capacity because the calculation in OS is based on 1 GB = 1024 MB / 1MB =1024KB and a minority of the capacity is reserved for maintenance purposes.

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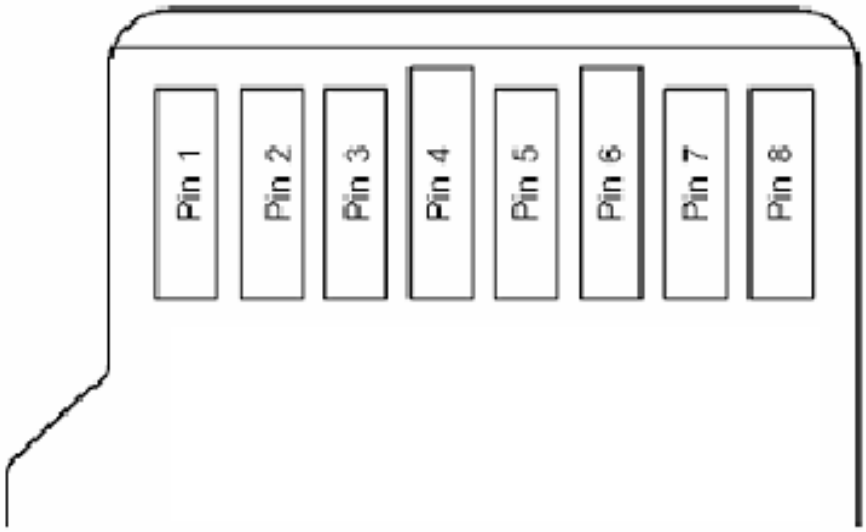
# Electrical Interface

- **Card Architecture**




- **Pin Assignment**

| Pin | SD Mode | | SPI Mode | |
|---|---|---|---|---|
| | **Name** | **Description** | **Name** | **Description** |
| **1** | *DAT2* | Data Line [Bit 2] | *RSV* | *Reserved* |
| **2** | *CD/DAT3* | Card Detect/ Data Line [Bit 3] | *CS* | Chip Select (neg true) |
| **3** | *CMD* | Commend/ Response | *DI* | Data In |
| **4** | *VDD* | Supply voltage | *VDD* | Supply voltage |
| **5** | *CLK* | Clock | *SCLK* | Clock |
| **6** | *VSS* | Supply voltage ground | *VSS* | Supply voltage ground |
| **7** | *DAT0* | Data line [Bit 0] | *DO* | Data out |
| **8** | *DAT1* | Data line [Bit 1] | *RSV* | *Reserved* |

## Physical Dimensions

- **Physical Mechanical Outline**

| | |
|---|---|
| Dimensions Card Package | 11mmx15mm<br>Min. 10.9mmx14.9mm<br>Max.11.1mmx15.1mm |
| Thickness | 1.0mm +/- 0.1mm |
| Surface | Plain (except contact area) |
| Edges | Smooth edges |
| Inverse insertion | Protection on right corner (top view) |

## Ordering Information

| Speed | Capacity | P/N |
|---|---|---|
| Class4 | 8GB | AP8GMCSH4-X |
| | 16GB | AP16GMCSH4-X |
| | 32GB | AP32GMCSH4-X |

# Revision History

| Version | Description | Date |
|---|---|---|
| 1.0 | Release | 2006/05/17 |
| 1.1 | Add 4G/8G | 2008/04/20 |
| 1.2 | Add 16G | 2009/05/20 |
| 1.3 | Revise PN | 2010/02/02 |
| 1.4 | Revise PN | 2010/04/02 |
| 1.5 | Revise PN | 2010/11/25 |
| 1.6 | Revise PN | 2011/06/14 |
| 1.7 | Revise PN | 2012/03/23 |
| 1.8 | Revise PN | 2013/01/16 |
| 1.9 | Revise PN | 2015/09/24 |
| 2.0 | Revise Temperature | 2015/12/21 |
| 2.1 | Revise Temperature | 2017/12/08 |
| 2.2 | Revise PN | 2019/05/28 |
| 2.3 | Revise Dimension Content and Added durability | 2019/12/10 |
| 2.4 | Revise Specification Format | 2020/02/19 |

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