

Secure Digital Card

SD Card 2.0

JAN. 16, 2013

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APXXXXSDXXX/APXXXXSDHCX

FEATURES:

- **Fully compatible with SD Card standard specification:**
 - SD Memory Card Specifications, Part 1, Physical Layer Specification, Version 2.0
 - SD Memory Card Specifications, Part 2, File System Specification, Version 2.0
 - SD Memory Card Specifications, Part 3, Security Specification, version 2.0
- **Support SPI Mode**
- **Memory capacity: more than 2GB~32GB**
- **Operation voltage: 2.7 ~ 3.6V**
- **Temperature Ranges: -25°C to 85°C for operating commercial**
- **Variable clock rate 0 - 50MHz, up to 25 MB/sec interface speed (using 4 parallel data lines)**
- **Correction of memory field errors**
- **Card Removal during read operation will never harm the content**
- **Copyright Protection Mechanism – Complies with highest security of SDMI standard**
- **Write Protect feature using mechanical switch**
- **Built-in write protection features (permanent and temporary)**
- **Comfortable erase mechanism**
- **Password Protection of cards (Lock_unlock function)**
- **Physical Dimensions**
 - 24mm x 32mm x 2.1mm
- **Speed Class:**
 - Class2 (2MB/sec minimum performance)
 - Class4 (4MB/sec minimum performance)
 - Class6 (6MB/sec minimum performance)
 - Class10 (10MB/sec minimum performance)

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PRODUCT DESCRIPTION

Apacer SD2.0 Memory Card is designed specifically for SD2.0 Card applications that put a premium on small form factor with lower power. All device and interface configuration data are (such as maximum frequency, card identification, etc.) stored on the card. For compatibility with existing controllers, the SD2.0 memory Card offers, in addition to the SD2.0 card interface, an alternate communication protocol that is based on the SPI standard.

The SD2.0 Memory Card 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.

The SD2.0 Card is data storage Memory Card. It 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 SD2.0 card meets SDA (SD card Association) Specifications. This document gives a general overview of the SD2.0 Memory Card architecture. A detailed description can be found in "SDA Specifications".

The SD2.0 Memory Card is a memory card that is specifically designed to meet the security, capacity, performance and environment requirements inherent in newly emerging audio and video consumer electronic devices. The SD2.0 Memory Card will include a copyright protection mechanism that complies with the security of the SDMI standard and will be faster and capable for higher Memory capacity. The SD2.0 Memory Card security system uses mutual authentication and a "new cipher algorithm" to protect from illegal usage of the card content. 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.

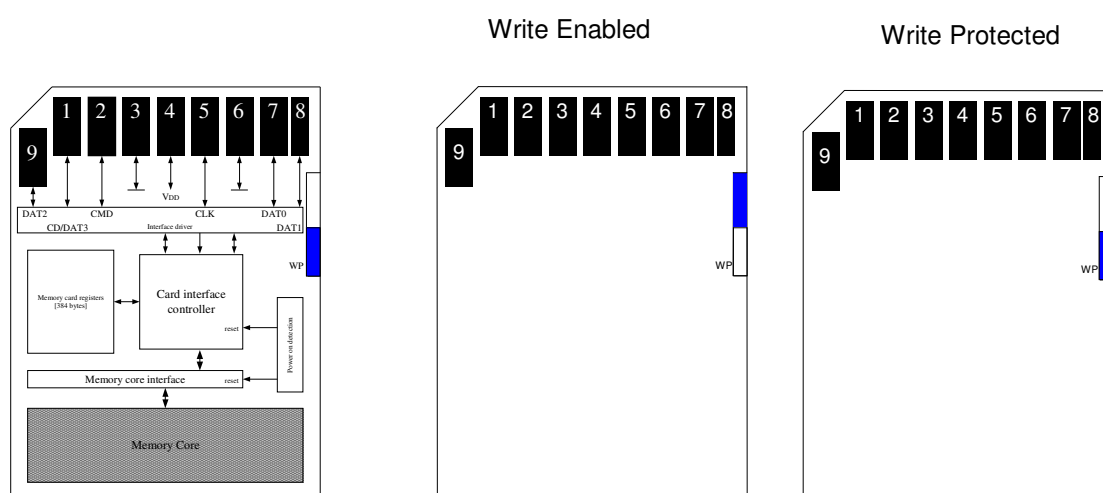
The SD2.0 Memory Card communication is based on an advanced 9-pin interface (Clock, Command, 4xData and 3xPower lines) designed to operate in at maximum operating frequency of 50MHz of and low voltage range.

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1.0 ELECTRICAL INTERFACE

1.1 Card Architecture



1.2 Pin Assignment

Pin	SD Mode		SPI Mode	
	Name	Description	Name	Description
1	CD/DAT3	Card detect/Data line[Bit 3]	CS	Chip select
2	CMD	Command/Response	DI	Data in
3	VSS1	Supply voltage ground	VSS	Supply voltage ground
4	VDD	Supply voltage	VDD	Supply voltage
5	CLK	Clock	SCLK	Clock
6	VSS2	Supply voltage ground	VSS2	Supply voltage ground
7	DAT0	Data line[Bit 0]	DO	Data out
8	DAT1	Data line[Bit 1]	Reserved	
9	DAT2	Data line[Bit 2]	Reserved	

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2.0 ELECTRICAL SPECIFICATION

Absolute Maximum Ratings (Permanent device damage may occur if absolute maximum ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the optional sections of this datasheet. Exposure to absolute maximum rating conditions for extended periods may affect reliability.)

Operating Conditions

SYMBOL	PARAMETER	RATING	UNITS
V _{CC}	Power supply voltage	2.7 ~ 3.6	V
V _{SS}	Supply voltage ground	0	V
T _{STG}	Storage temperature	-40 ~ 85	°C
T _{OP}	Operation temperature	-25 ~ 85	°C

3.0 ENVIRONMENTAL SPECIFICATION

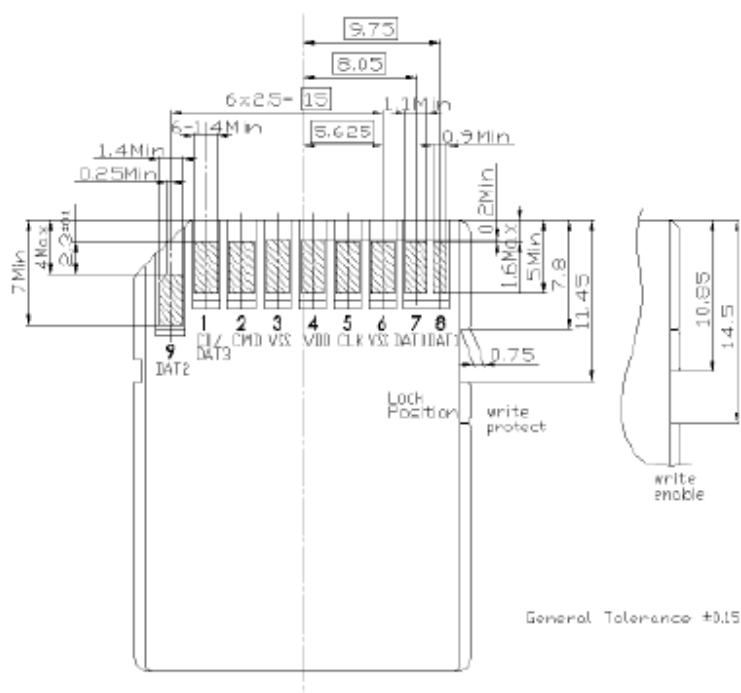
Item	Specification
Temperature	Operation: -25°C ~ 85°C Storage: -40°C ~ 85°C Junction temperature : max. 90°C for 5 minutes
Moisture & Corrosion	Operation: 25°C / 95% rel. humidity Storage: 40°C / 93% rel. humidity/500h Salt water spray: 3% NaCl/35°C ; 24hrs acc. MIL STD 1009
Bending	10N
Torque	+/- 2.5 degree
Drop test	1.5m free fall
ESD at contact pad	+/- 4 KV
ESD at card body	+/- 8 KV
Min. moving force of WP	40 gf (write protect switch; WP)
WP switch cycles	Min. 1000 cycles (@slide force 0.4N to 5N)

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4.0 PHYSICAL DIMENSIONS

PHYSICAL MECHANICAL OUTLINE:

Dimensions Card Package	24mmx32mm Min. 23.9mmx31.9mm Max.24.1mmx32.1mm
Thickness	2.1mm +/- 0.15mm
Surface	Plain (except contact area)
Edges	Smooth edges



5.0 PRODUCT INFORMATION

Capacity	P/N
2GB 60X	AP2GSD60
4GB Class4	AP4GSDHC4
8GB Class4	AP8GSDHC4
16GB Class4	AP16GSDHC4
32GB Class4	AP32GSDHC4
4GB Class6	AP4GSDHC6
8GB Class6	AP8GSDHC6
16GB Class6	AP16GSDHC6
8GB Class10	AP8GSDHC10
16GB Class10	AP16GSDHC10
32GB Class10	AP32GSDHC10

Note: Valid combinations are those products in mass production or will be in mass production. Consult your Apacer sales representative to confirm availability of valid combinations and to determine availability of new combinations.

6.0 REVISION HISTORY

Revision	Date	History	Remark
1.0	10/12/2006	Release	
1.1	04/02/2010	Revise PN	
1.2	11/12/2010	Revise PN	
1.3	02/10/2011	Revise FEATURES	
1.4	01/16/2013	Revise PN	