microSD Card

Datasheet

NOV. 25, 2010

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PRODUCT DESCRIPTION

Apacer microSD Memory Card is designed specifically for MicroSD Card applications that put a premium on small form factor with lower power. The MicroSD memory card is functionally compatible with the SD memory card but is smaller in dimensions. The MicroSD Memory Card 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 memory Card offers, in addition to the MicroSD card interface, an alternate communication protocol that is based on the SPI standard.

The MicroSD 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 MicroSD 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 MicroSD card meets SDA (SD card Association) Specifications. This document gives a general overview of the MicroSD Memory Card architecture. A detailed description can be found in "MicroSDA Specifications ".

The MicroSD 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 MicroSD 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 MicroSD 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 MicroSD Memory Card host interface supports regular Multimedia Card operation as well. In other words, Multimedia Card forward compatibility was kept. Actually the main difference between MicroSD Memory 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.

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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

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1.0 ELECTRICAL INTERFACE

1.1 Card Architecture
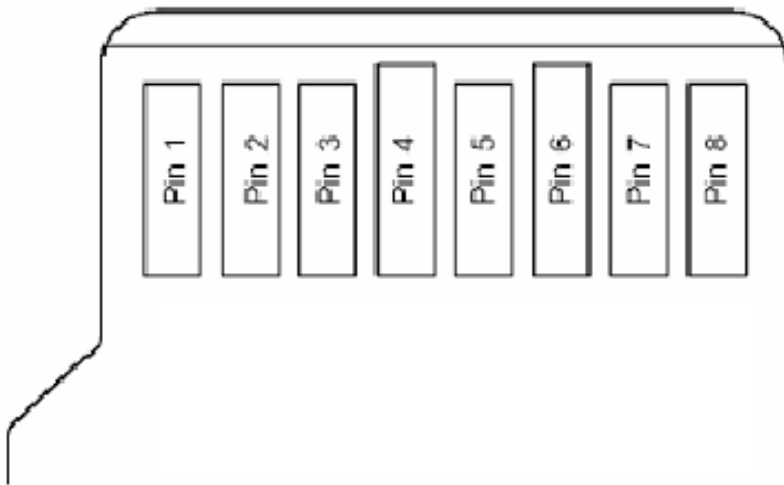
1.2 Pin Assignment

Pin	SD Mode		SPI Mode	
	Name	**Description**	**Name**	**Description**
1	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

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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	PARMETER	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	^{O}C
T_{OP}	Operation temperature	-25 ~ 85	^{O}C

3.0 ENVIRONMENTAL SPECIFICATION

Item	Specification
Temperature	Operation: -25℃ ~ 85℃ Storage: -40℃ ~ 85℃ Junction temperature : max. 90℃ for 5 minutes
Bending	10N
Torque	+/- 2.5 degree
Drop test	1.5m free fall

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4.0 PHYSICAL DIMENSIONS

PHYSICAL MECHANICAL OUTLINE:

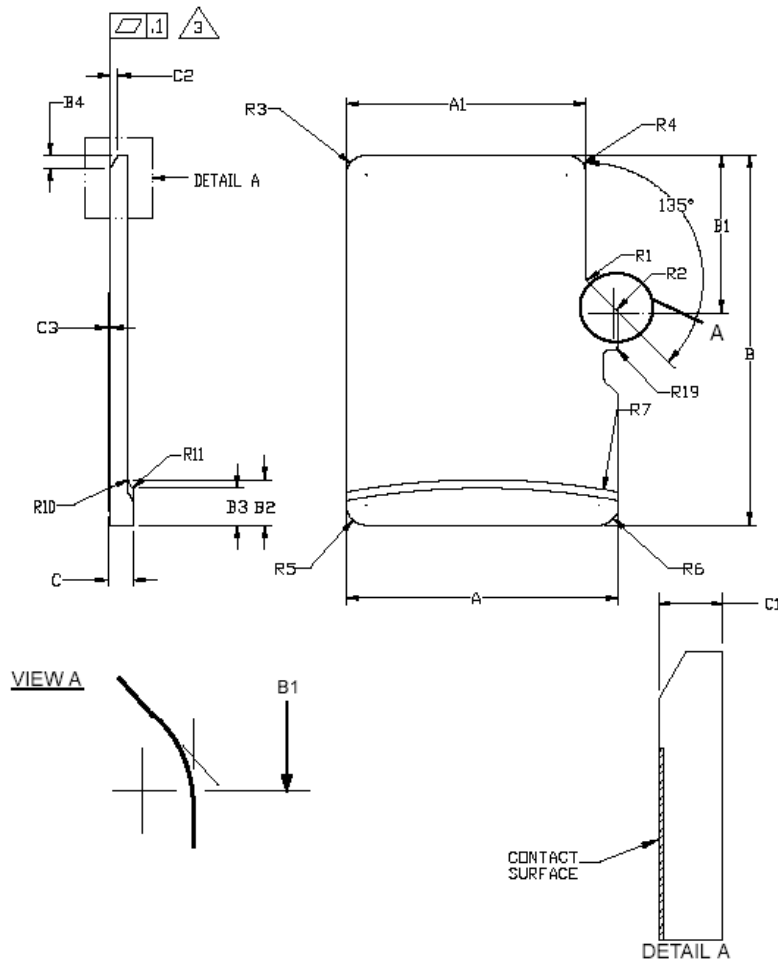| Dimensions Card Package	11mmx15mm Min. 10.9mmx14.9mm Max.11.1mmx15.1mm
Thickness	1.0mm +/- 0.1mm
Surface	Plain (except contact area)
Edges	Smooth edges
Inverse insertion	Protection on right corner (top view)

Figure 1: Mechanical Description: Top View

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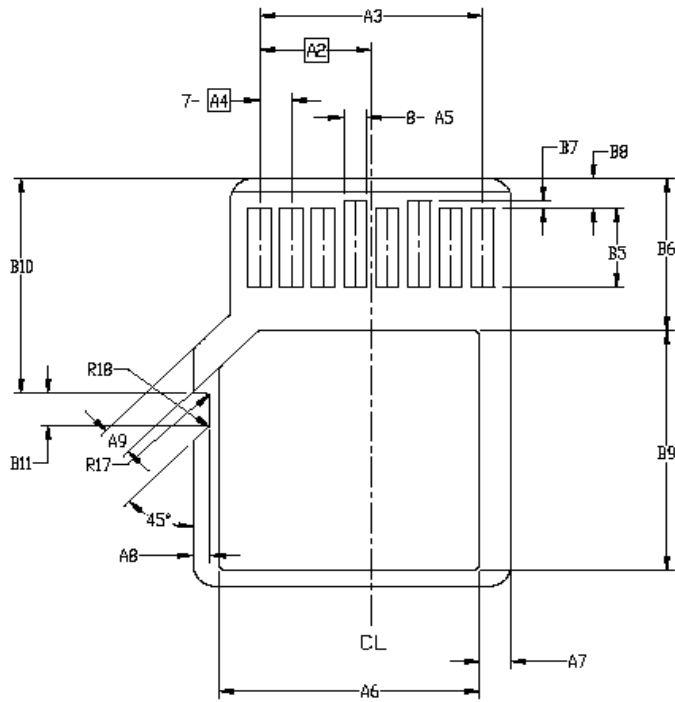
Figure 2: Mechanical Description: Bottom View
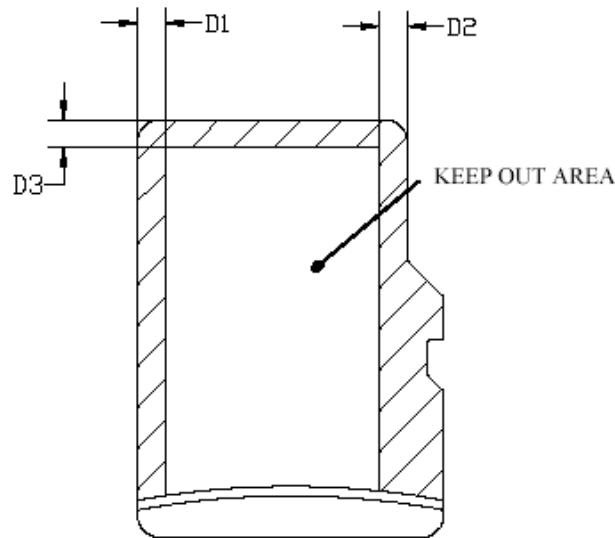
Figure 3: Mechanical Description: Keep Out Area

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SYMBOL	COMMON DIMENSIONS			NOTE
	MIN	NOM	MAX	
A	10.90	11.00	11.10	
A1	9.60	9.70	9.80	
A2	-	3.85	-	BASIC
A3	7.60	7.70	7.80	
A4	-	1.10	-	BASIC
A5	0.75	0.80	0.85	
A6	-	-	8.50	
A7	0.90	-	-	
A8	0.60	0.70	0.80	
A9	0.80	-	-	
B	14.90	15.00	15.10	
B1	6.30	6.40	6.50	
B2	1.64	1.84	2.04	
B3	1.30	1.50	1.70	
B4	0.42	0.52	0.62	
B5	2.80	2.90	3.00	
B6	5.50	-	-	
B7	0.20	0.30	0.40	
B8	1.00	1.10	1.20	
B9	-	-	9.00	
B10	7.80	7.90	8.00	
B11	1.10	1.20	1.30	
C	0.90	1.00	1.10	
C1	0.60	0.70	0.80	
C2	0.20	0.30	0.40	
C3	0.00	-	0.15	
D1	1.00	-	-	
D2	1.00	-	-	
D3	1.00	-	-	
R1	0.20	0.40	0.60	
R2	0.20	0.40	0.60	
R3	0.70	0.80	0.90	
R4	0.70	0.80	0.90	
R5	0.70	0.80	0.90	
R6	0.70	0.80	0.90	
R7	29.50	30.00	30.50	
R10	-	0.20	-	
R11	-	0.20	-	
R17	0.10	0.20	0.30	
R18	0.20	0.40	0.60	
R19	0.05	-	0.20	

Notes:

1. DIMENSIONING AND TOLERANCING PER
   ASME Y14.5M-1994.

2. DIMENSIONS ARE IN MILLIMETERS.

3. COPLANARITY IS ADDITIVE TO C1 MAX
   THICKNESS.

Micro-Sized SD Package: Dimensions

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5.0 PRODUCT INFORMATION

Capacity	P/N
512MB	AP512MCSD
1GB	AP1GMCSD
2GB	AP2GMCSD
4GB Class2	AP4GMCSH2
8GB Class2	AP8GMCSH2
16GB Class2	AP16GMCSH2
32GB Class2	AP32GMCSH2
4GB Class4	AP4GMCSH4
8GB Class4	AP8GMCSH4
16GB Class4	AP16GMCSH4
32GB Class4	AP32GMCSH4

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.

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6.0 Revision history

Revision	Date	History	Remark
1.0	05/17/2006	Release	
1.1	04/20/2008	Add 4G/8G	
1.2	05/20/2009	Add 16G	
1.3	02/02/2010	Revise PN	
1.4	04/02/2010	Revise PN	
1.5	11/25/2010	Revise PN	

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