

The Universal Storage Solution

SanDisk's storage products are high capacity, solid-state, non-volatile Flash memory products which comply with PC Card ATA and/or IDE industry standards. SanDisk offers five distinct Flash data storage product lines: the PC Card ATA FlashDisk series, the CompactFlash™ (CF™) series, the IDE FlashChip series, the Flash ChipSet series, and the IDE FlashDrive series. All these products share SanDisk's proprietary 512 Byte sector erase Flash memory chips, and intelligent controller.

SanDisk products are compatible with virtually all of today's computing and communications systems, including operating systems such as DOS, Windows, Windows 95, OS/2, NEC OS, DOS V, GEOS, PSOS and Apple System 7. And there's no need to license special Flash file systems.

Supporting both 3.3V and 5V operation, SanDisk products provide the design flexibility to meet specific needs.

Flash data storage outstrips all other memory technologies for compatibility, ruggedness, reliability, capacity, smaller size and low power consumption. And SanDisk has the enabling technology to design those requirements into today's industrial, consumer, computing and communications applications.

PC Card ATA FlashDisk Series

SanDisk's FlashDisk products, used in storage, data backup and data transport applications, are the highest-capacity removable PC Card ATA cards currently available. Type II FlashDisks range in capacity from 2 to 85 MB. SanDisk's Type III cards offer capacities of 110 and 175 MB.

Systems that support the SanDisk FlashDisk cards today will be able to access future SanDisk cards built with the latest Flash technology without having to update or change host software.

CompactFlash Series

The CompactFlash memory card's matchbook size, 32 Mbit technology and half-ounce weight make it the world's first ultra-small removable data storage system. Its compact size, ruggedness, and low-power, single-supply 3.3V features make

the CompactFlash card ideal for a range of current and next-generation, small-form-factor consumer applications such as digital cameras, cellular phones, PDAs, personal communicators, pagers and audio recorders.

IDE FlashChip

The SanDisk IDE FlashChip is the world's first single chip storage solution with Flash memory and an IDE controller. Available in 2 or 4 MB capacities, the IDE FlashChip provides a rugged, reliable, ultra-small and easy-to-interface storage system for small electronic products such as cellular phones, audio recorders, industrial recorders, PDAs and pagers. The standard IDE interface simplifies product design, resulting in shorter time to market, lower cost, and higher quality end products.

Flash ChipSet

The SanDisk Flash ChipSet lowers host system cost while delivering 2, 4, or 10 MB of non-volatile memory. The Flash ChipSet's low power requirements, intelligent power management, broad compatibility, and 32 Mbit

technology make possible a new wave of electronic products that are lighter, smaller, and less expensive. Flash ChipSet's proven reliability is based on the same patented technology used in all SanDisk products.

IDE FlashDrive Series

SanDisk's FlashDrives in 1.3" and 1.8" form factors are targeted at applications that require embedded data storage. As such, IDE FlashDrives are ideal for mobile computers, communication devices and other embedded systems that require low power, high resistance to shock and vibration, instant access to data and complete plug and play compatibility with IDE rotating disk drives. IDE FlashDrives feature capacities ranging between 4 and 140 MB.

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SanDisk 





CompactFlash

PC Card ATA
and True IDE Mode



Type II FlashDisk

PC Card ATA
and True IDE Mode



Type III FlashDisk

PC Card ATA
and True IDE Mode

Interface

System Performance (Notes 1 & 2)

Start-up Time

Sleep to Write	2.5 msec max.	2.5 msec max.	2.5 msec max.
Sleep to Read	2.0 msec max.	2.0 msec max.	2.0 msec max.
Reset to Ready	50 msec typical, 400 msec max.	50 msec typical, 400 msec max.	50 msec typical, 400 msec max.

Data Transfer Rate to/from Flash

4.0 MB/sec burst

4.0 MB/sec burst

3.0 MB/sec burst

Data Transfer Rate to/from Host

6.0 MB/sec burst

6.0 MB/sec burst

6.0 MB/sec burst

Delay Active to Sleep

Programmable

Programmable

Programmable

Controller Overhead Command to DRQ

<1.25 msec

<1.25 msec

<1.25 msec

Power Requirements (Note 1)

DC Input Voltage

Commercial	5V ± 10%, 3.3V ± 5%	5V ± 10%, 3.3V ± 5%	5V ± 10%, 3.3V ± 5%
Industrial	5V ± 5%	5V ± 5%	5V ± 5%

Typical Power Dissipation (Notes 3 & 4)

Sleep	200 µA (3.3V) 500 µA (5V)	200 µA (3.3V) 500 µA (5V)	200 µA (3.3V) 500 µA (5V)
Read	32-45 mA (3.3V) 46-75 mA (5V)	32-45 mA (3.3V) 46-75 mA (5V)	32-50 mA (3.3V) 46-90 mA (5V)
Write	32-60 mA (3.3V) 46-90 mA (5V)	32-60 mA (3.3V) 46-90 mA (5V)	32-60 mA (3.3V) 46-110 mA (5V)

Environmental Specifications

Temperature

Operating Commercial	0 - 60°C	0 - 60°C	0 - 60°C
Operating Industrial	-40 - 85°C (5V)	-40 - 85°C (5V)	-40 - 85°C (5V)
Non-Operating Commercial	-25 - 85°C	-25 - 85°C	-25 - 85°C
Non-Operating Industrial	-50 - 100°C (5V)	-50 - 100°C (5V)	-50 - 100°C

Humidity

Operating	8 - 95%, non-condensing	8 - 95%, non-condensing	8 - 95%, non-condensing
Non-Operating	8 - 95%, non-condensing	8 - 95%, non-condensing	8 - 95%, non-condensing

Acoustic Noise (at 1 meter)

0 dB

0 dB

0 dB

Vibration

Operating	15 G peak to peak max.	15 G peak to peak max.	15 G peak to peak max.
Non-Operating	15 G peak to peak max.	15 G peak to peak max.	15 G peak to peak max.

Shock

Operating	2000 G max.	1000 G max.	1000 G max.
Non-Operating	2000 G max.	1000 G max.	1000 G max.

Reliability and Maintenance

MTBF (Mean Time Between Failures)

> 1,000,000 hours

1,000,000 hours

1,000,000 hours

Preventive Maintenance

None

None

None

Data Reliability

<1 non-recoverable error in 10¹⁴ bits read

<1 non-recoverable error in 10¹⁴ bits read

<1 non-recoverable error in 10¹⁴ bits read

Physical Specifications

	CompactFlash	CF Adapter	Type II FlashDisk	Type III FlashDisk
Length	1.433 in (36.4 mm)	3.370 in (85.6 mm)	3.370 ± .008 in (85.6 ± 0.20 mm)	3.370 ± .008 in (85.6 ± 0.20 mm)
Width	1.685 in (42.8 mm)	2.126 in (54.0 mm)	2.126 ± .004 in (54.0 ± 0.10 mm)	2.126 ± .004 in (54.0 ± 0.10 mm)
Thickness (Body)	0.130 in (3.30 mm)	0.1968 in (5.0 mm)	.1968 in (5.0 mm max.)	.413 in (10.5 mm max.)
Thickness (Removable Edge)	0.155 in (3.94 mm)	N/A	N/A	N/A
Weight	0.40 oz (11.4 g)	1.16 oz (33 g)	1.16 oz (33g), 1.34 oz (38g), 1.52 oz (43g) max.	3.2oz (90g) max.

Ordering Information

Order Model

SDCFBX-YY-ZZZ CompactFlash

SDP3BX-YY-ZZZ-DD

SDP3BX-YY-ZZZ-DD

SDCF-03 CF Adapter (See Note 5)

Where X:	I	Industrial temp. grade	Standard temp. grade	I	Industrial temp. grade	Standard temp. grade	I	Industrial temp. grade	Standard temp. grade
YY:	2	2.0 MB		2	2.0 MB	10 10.4 MB	110	110.1 MB	
	4	4.0 MB		4	4.0 MB	20 20.9 MB	175	175.3 MB	
	10	10.4 MB		6	6.0 MB	40 41.9 MB			
	15	15.0 MB		8	8.0 MB	85 85.1 MB			
ZZZ:	101	Standard		101	Standard		101	Standard	
DD:				00	Standard		00	Standard	
				S1	With Protective Sleeve				

Note 1: All values quoted are typical at ambient temperature and nominal supply voltage unless otherwise stated.

Note 2: All performance timing assumes the controller is in the default (i.e., fastest) mode.

Note 3: Sleep mode currently is specified under the condition that all card inputs are static CMOS levels and in a "Not Busy" operating state.

Flash ChipSet

PC Card ATA
and True IDE Mode



2.5 msec max.
2.0 msec max.
50 msec typical,
400 msec max.
4.0 MB/sec burst
6.0 MB/sec burst
Programmable
<1.25 msec

5V ± 10%, 3.3V ± 5%
5V ± 5%

200 µA (3.3V) 500 µA (5V)
32-45 mA (3.3V) 46-75 mA (5V)
32-60 mA (3.3V) 46-90 mA (5V)

0 - 70°C
-40 - 85°C (5V)
-25 - 85°C
-50 - 100°C (5V)

8 - 95%, non-condensing
8 - 95%, non-condensing
0 dB

N/A
N/A

N/A
N/A

1,000,000 hours
None
<1 non-recoverable error in 10¹⁴ bits read

Controller Package: 100 pin TQFP
LCC Package: 28 pad LCC
Module Package: SIMM LCC

1.3" FlashDrive

IDE



2.5 msec max.
2.0 msec max.
50 msec typical,
400 msec max.
4.0 MB/sec burst
6.0 MB/sec burst
Programmable
<1.25 msec

5V ± 10%, 3.3V ± 5%
5V ± 5%

200 µA (3.3V) 500 µA (5V)
32-45 mA (3.3V) 46-75 mA (5V)
32-60 mA (3.3V) 46-90 mA (5V)

0 - 60°C
-40 - 85°C
-25 - 85°C
-50 - 100°C (5V)

8 - 95%, non-condensing
8 - 95%, non-condensing
0 dB

15 G peak to peak max.
15 G peak to peak max.

1000 G max.
1000 G max.

> 1,000,000 hours
None
<1 non-recoverable error in 10¹⁴ bits read

1.71 in (43.5 mm)
2.0 in (50.8 mm)
0.413 in (10.5 mm)
N/A
1.3 oz (38 grams)

1.8" FlashDrive

IDE



2.5 msec max.
2.0 msec max.
50 msec typical,
400 msec max.
4.0 MB/sec burst
6.0 MB/sec burst
Programmable
<1.25 msec

5V ± 10%, 3.3V ± 5%
5V ± 5%

200 µA (3.3V) 500 µA (5V)
32-45 mA (3.3V) 46-75 mA (5V)
32-60 mA (3.3V) 46-90 mA (5V)

0 - 60°C
-40 - 85°C
-25 - 85°C
-50 - 100°C (5V)

8 - 95%, non-condensing
8 - 95%, non-condensing
0 dB

15 G peak to peak max.
15 G peak to peak max.

1000 G max.
1000 G max.

> 1,000,000 hours
None
<1 non-recoverable error in 10¹⁴ bits read

3.0 in (76.2 mm)
2.0 in (50.8 mm)
0.38 in (9.6 mm)
N/A
1.6 oz (45 grams)

IDE FlashChip

PC Card ATA
and True IDE Mode



2.5 msec typical
2.0 msec typical
50 msec typical,
400 msec typical
4.0 MB/sec burst
6.0 MB/sec burst
Programmable
<1.25 msec max.

5V ± 10%, 3.3V ± 5%
5V ± 5%

200 µA (3.3V) 500 µA (5V)
32-45 mA (3.3V) 46-75 mA (5V)
32-60 mA (3.3V) 46-90 mA (5V)

0 - 70°C
-40 - 85°C (5V)
-25 - 85°C
-50 - 100°C (5V)

8 - 95%, non-condensing
8 - 95%, non-condensing
0 dB

15 G peak to peak max.
15 G peak to peak max.

1000 G max.
1000 G max.

> 1,000,000 hours
None
<1 non-recoverable error in 10¹⁴ bits read

SDFCSB-2 2MB LCC and Controller
SDFCSB-4 4MB LCC and Controller
SDFCSB-10 10MB Module and Controller

SDIBTX-YY-ZZZ

	Industrial temp. grade	Standard temp. grade
4	4.0 MB	
10	10.4 MB	
20	21.4 MB	
40	42.8 MB	
60	62.9 MB	
101	Standard	

SDIBX-YY-ZZZ

	Industrial temp. grade	Standard temp. grade
4	4.0 MB	
10	10.4 MB	
20	20.9 MB	
40	41.9 MB	
80	83.9 MB	
140	140.8 MB	
101	Standard	

SDFCB-2
SDFCB-4

Note 4: The currents specified show the bounds of programmability of the product.

Note 5: CF interface surface mount header and ejector may be ordered from 3M Company. To order, call: 1-800-225-5373.

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