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RoHS Compliant

USB Flash Drive

AH321 Specifications

November 26, 2015

Version 1.9



Apacer
Access the best

Apacer Technology Inc.

1F, No.32, Zhongcheng Rd., Tucheng Dist., New Taipei City, Taiwan, R.O.C

Tel: +886-2-2267-8000

Fax: +886-2-2267-2261

www.apacer.com

USB Handy Flash Drive AP-HAxxxXX13XG-XX



FEATURES:

- **USB2.0 High-Speed and USB1.1 Full-Speed compatible interface**
- **Capacity**
 - For SLC: 128, 256, 512 MB
1, 2, 4, 8, 16, 32 GB
 - For MLC: 4, 8, 16, 32, 64 GB
- **Performance***
 - Sustained read: up to 34 MB/s
 - Sustained write: up to 22 MB/s
- **Flash Management**
 - Implements advanced wear-leveling algorithms to substantially increase longevity of flash media
 - ECC
- **Temperature Ranges**
 - Operating:
Standard: 0°C to 70°C
Extended: -40°C to 85°C
 - Storage: -40°C to 85°C
- **Power Consumption (typical)**
 - Active mode: 185 mA
 - Idle mode: 65 mA
 - Operating voltage: 5V
- **RoHS Compliant**
- **Dimensions:** 53.30 x 18.80 x 8.00, unit: mm
- **EMC:** FCC, CE

* The results for performance and power consumption addressed here may vary in real world platforms.

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1. General Description

Apacer's USB FLASH Drive (UFD) is a high performance flash disk drive designed offering portable storage solutions. UFDs can be plugged into a standard USB 2.0 connector commonly found in desktops, portable computers and even enterprise PC systems. Apacer's UFDs have an efficient built-in microcontroller and file management firmware that ensures ideal performance, functionality and reliability. This product is well suited for portable flash storage applications while operating at minimal power consumption.

1.1 Performance-optimized USB Controller

The heart of an UDM is the USB controller, which translates standard USB signals to the flash media and controls the data in/out between the controller itself and the flash media. This proprietary USB controller is specifically designed to attain high data throughput from host to flash.

1.1.1 Error Correction Code (ECC)

The UDM uses BCH Error Detection Code (EDC) and Error Correction Code (ECC) algorithms which correct up to 24 random single-bit errors for each 1024-byte block of data.

1.1.2 Wear-Leveling

Flash memory can be erased a limited number of times. In a typical application, and especially if a file system is used, specific pages are constantly updated (e.g., the page that contains the FAT, registry, etc.). Without any special handling, these pages would wear out more rapidly than other pages, reducing the lifetime of the entire flash. To overcome this inherent deficiency, Apacer's USB-Disk Module (UDM) uses wear-leveling algorithm. This wear-leveling algorithm ensures that consecutive writes of a specific sector are not written physically to the same page in the flash. This distributes flash media usage evenly across all pages, thereby maximizing flash lifetime. The wear-leveling mechanism provides write/erase cycles for reliable data storage over an extended period.

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2. General Specifications

Interface	High-speed USB2.0 compliant; backward compatible with USB 1.1
Performance*	SLC: up to 34 MB/s (read); 22 MB/s (write) MLC: up to 33 MB/s (read); 16 MB/s (write)
Temperature	0 to 70°C
Shock	Half sine wave 40 G, 11ms / Square wave 100 G, 6ms
EMC	FCC, CE
MTBF	2,000,000 hours (SLC) / 1,000,000 (MLC)

*Results may vary from flash configurations or host system settings.

2.1 Performance Specifications – SLC

Capacity	256 MB	512 MB	1 GB	2 GB	4 GB	8 GB	16 GB	32 GB
Performance								
Sustained read (MB/s)	31	31	32	34	28	32	34	31
Sustained write (MB/s)	10	15	19	19	21	15	22	21

Note: results may vary depending on flash configurations or host system settings

2.2 Performance Specifications – MLC

Capacity	4 GB	8 GB	16 GB	32 GB	64 GB
Performance					
Sustained read (MB/s)	32	32	33	33	29
Sustained write (MB/s)	10	10	14	16	10

Note: results may vary depending on flash configurations or host system settings

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3. Electrical Specifications

Caution: Absolute Maximum Stress Ratings – Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.

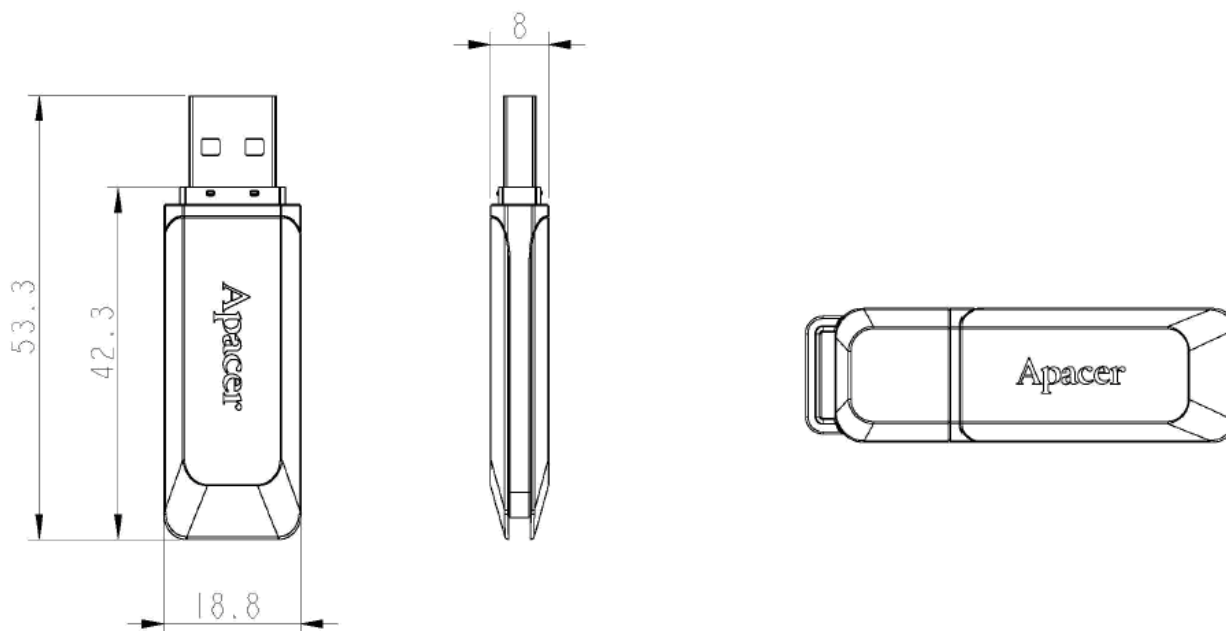
Table: Absolute Stress Rating

Parameters	Conditions
Ambient temperature	0 to 70°C
Storage temperature	-40 to 85°C
Required power supply	4.5-5.5V
Input power (VDD)	-0.3V (min.) to 5.5V (max.)
Voltage on any pin except VDD with respect to GND	-0.3V (min.) to VDD + 0.3V (max.)

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4. Physical Dimensions



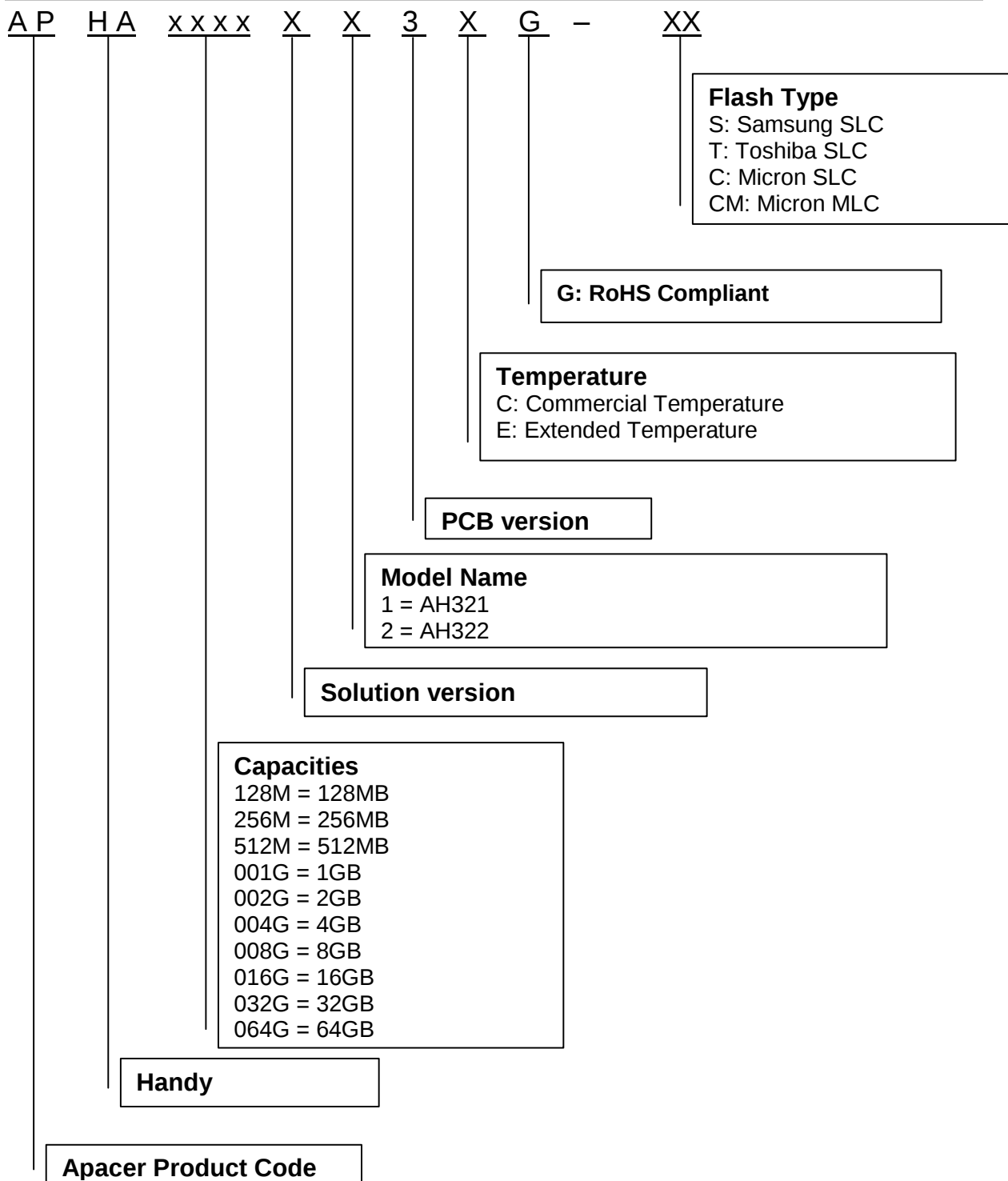
Unit:mm
Tolerance:±0.2mm

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5. Product Ordering Information

5.1 Product Code Designations



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5.2 Valid Combinations

5.2.1 AH322 (SLC)

Capacity	Standard	Extended
128 MB	APHA128MR13CG-2T	APHA128MT13EG-2T
256 MB	APHA256MR13CG-2T	APHA256MT13EG-2T
512 MB	APHA512MR13CG-2T	APHA512MT13EG-2T
1 GB	APHA001GR13CG-2T	APHA001GT13EG-2T
2 GB	APHA002GR13CG-2T	APHA002GT13EG-2T
4 GB	APHA004GR13CG-2T	APHA004GT13EG-2T
8 GB	APHA008GR13CG-2T	APHA008GT13EG-2T
16 GB	APHA016GR13CG-2T	APHA016GT13EG-2T
32 GB	APHA032GR13CG-2T	APHA032GT13EG-2T

5.2.2 AH322 (MLC)

Capacity	Standard	Extended
4 GB	APHA004GR13CG-CM	APHA004GT13EG-CM
8 GB	APHA008GR13CG-CM	APHA008GT13EG-CM
16 GB	APHA016GR13CG-CM	APHA016GT13EG-CM
32 GB	APHA032GR13CG-CM	APHA032GT13EG-CM
64 GB	APHA064GR13CG-CM	APHA064GT13EG-CM

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Revision History

Revision	Description	Date
1.0	Official Release	August 11 th , 2011
1.1	Updated Product Ordering Information	June 20 th , 2012
1.2	Updated Product Ordering Information - contents relating to extended temperature are removed	July 2 nd , 2012
1.3	Updated read/write performance due to change in NAND flash use Updated addresses of Taiwan headquarter and the office in India	July 30 th , 2013
1.4	Added performance tables	June 4 th , 2014
1.5	Added SLC extended temperature models	October 17 th , 2014
1.6	Updated Product Ordering Information	November 17 th , 2014
1.7	Updated Product Ordering Information	February 17 th , 2015
1.8	Added storage temperature	November 11 th , 2015
1.9	Added 64GB support	November 26 th , 2015

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Global Presence

Taiwan (Headquarters)

Apacer Technology Inc.
Apacer Technology Inc.
1F., No.32, Zhongcheng Rd., Tucheng Dist.,
New Taipei City 236, Taiwan R.O.C.
Tel: 886-2-2267-8000
Fax: 886-2-2267-2261
amtsales@apacer.com

U.S.A.

Apacer Memory America, Inc.
46732 Lakeview Blvd., Fremont, CA 94538
Tel: 1-408-518-8699
Fax: 1-510-249-9568
sa@apacerus.com

Japan

Apacer Technology Corp.
5F, Matsura Bldg., Shiba, Minato-Ku
Tokyo, 105-0014, Japan
Tel: 81-3-5419-2668
Fax: 81-3-5419-0018
jpservices@apacer.com

Europe

Apacer Technology B.V.
Science Park Eindhoven 5051 5692 EB Son,
The Netherlands
Tel: 31-40-267-0000
Fax: 31-40-267-0000#6199
sales@apacer.nl

China

Apacer Electronic (Shanghai) Co., Ltd
Room D, 22/FL, No.2, Lane 600, Jieyun Plaza,
Tianshan RD, Shanghai, 200051, China
Tel: 86-21-6228-9939
Fax: 86-21-6228-9936
sales@apacer.com.cn

India

Apacer Technologies Pvt Ltd,
Unit No.201, "Brigade Corner", 7th Block Jayanagar,
Yediyur Circle, Bangalore – 560082, India
Tel: 91-80-4152-9061
Fax: 91-80-4170-0215
sales_india@apacer.com