RoHS Compliant

USB Flash Drive

EH353 Product Specifications

December 21, 2015

Version 1.2
FEATURES:

- **USB3.0 Super Speed compatible, and backward compatible with USB2.0 & USB1.1 interfaces**
  - USB3.0 max. transfer rate: 5.0 Gbps
  - Backward compatible with 480Mbps & 12 Mbps
- **Capacity**
  - SLC: 256, 512 MB
  - 1, 2, 4, 8, 16, 32 GB
  - MLC: 8, 16, 32, 64 GB
- **Performance***
  - **SLC**
    - Sustained read: up to 80 MB/s
    - Sustained write: up to 70 MB/s
  - **MLC**
    - Sustained read: up to 195 MB/s
    - Sustained write: up to 95 MB/s
- **Flash Management**
  - Built-in hardware ECC
  - Power saving implemented
- **Temperature Ranges**
  - Operating:
    - Standard: 0°C to 70°C
    - Extended: -40°C to 85°C
  - Storage: -40°C to 85°C
- **Power Consumption (typical)***
  - Operating voltage: 5V
    - **SLC**
      - Active mode: 225 mA
      - Idle mode: 65 mA
    - **MLC**
      - Active mode: 275 mA
      - Idle mode: 80 mA
- **RoHS Compliant**
- **USB Bus-Powered Capability**
- **NAND Flash Type:** SLC/MLC
- **Dimensions:** 59.0 x 18.4 x 9.1, unit: mm

*Performance and power consumption addressed here vary from configurations and platforms.
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1. General Description

Apacer USB3.0 Handy FLASH Drive EH353 is ultra high-performance flash disk drive designed offering portable storage solutions or external memory expansion. This new generation USB flash drive is compatible with the latest USB specification – USB3.0 Super Speed, with a maximum transfer rate of 5.0 Gbps. The connector is backward employable with USB2.0 and USB1.1 interfaces as well. With compliance with USB3.0 specification, this USB drive can deliver up to 195 MB/s outstanding performance. Reliability wise, the USB comes with built-in hardware ECC to ensure data integrity. This product is well suited for portable flash storage applications while operating at minimal power consumption.

1.1 Performance-Optimized USB Controller

1.1.1 Power Saving Implemented
The internal controller of the USB model is designed with power saving implementations, allowing the device to operate at low power consumption.

1.1.2 Program RAM Architect
The internal Program RAM implementation allows the host to upgrade firmware codes anytime when needed.

1.1.3 Error Correction Code (ECC)
The UFD utilizes 1-bit Error Detection Code (EDC) and Error Correction Code (ECC)
## 2. General Specifications

### 2.1 SLC

<table>
<thead>
<tr>
<th>Interface</th>
<th>Performance* (MB/s)</th>
<th>256MB</th>
<th>512MB</th>
<th>1GB</th>
<th>2GB</th>
<th>4GB</th>
<th>8GB</th>
<th>16GB</th>
<th>32GB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Read</td>
<td>60</td>
<td>60</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Write</td>
<td>10</td>
<td>21</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>65</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td>-40°C to 85°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption*</td>
<td>Active: 225 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Idle: 65 mA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTBF</td>
<td></td>
<td>1,000,000 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

### 2.2 MLC

<table>
<thead>
<tr>
<th>Interface</th>
<th>Performance*</th>
<th>8GB</th>
<th>16GB</th>
<th>32GB</th>
<th>64GB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Read</td>
<td>95</td>
<td>195</td>
<td>190</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>Write</td>
<td>28</td>
<td>55</td>
<td>49</td>
<td>95</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td>-40°C to 85°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption*</td>
<td>Active</td>
<td>165</td>
<td>270</td>
<td>265</td>
<td>275</td>
</tr>
<tr>
<td></td>
<td>Idle</td>
<td>75</td>
<td>85</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>MTBF</td>
<td></td>
<td>1,000,000 hours</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Results may vary from flash configurations or host system settings.
3. Absolute Maximum Rating

*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**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required power supply</td>
<td>4.5-5.5V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0°C to 70°C (standard)</td>
</tr>
<tr>
<td></td>
<td>-40°C to 85°C (extended)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-40°C to 85°C</td>
</tr>
</tbody>
</table>
4. Physical Dimensions

![Physical Dimensions Diagram]

Unit: mm
5. Product Ordering Information

5.1 Product Code Designations

- **AP**
- **HA**
- **XXX**
- **X**
- **G**
- **0**
- **CG**
- **-**
- **X**
- **TX**

**Flash Type**
- T: Toshiba SLC
- TM: Toshiba MLC

**G: RoHS Compliant**

**Temperature**
- C: Commercial Temperature
- E: Extended Temperature

**PCB Version**

**Model Name**
- G= EH353 Orange Housing
- K=EH353 Black Housing

**Solution Version**

**Capacities**
- 256M = 256MB
- 512M = 512MB
- 001G = 1GB
- 002G = 2GB
- 004G = 4GB
- 008G = 8GB
- 016G = 16GB
- 032G = 32GB

**USB Flash Drive**

**Apacer Product Code**

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Rev. 1.2
5.2 Valid Combinations

5.2.1 EH353 (SLC)

- Orange Housing

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Standard</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>256MB</td>
<td>APHA256MAG0CG-2T</td>
<td>APHA256MA0EG0-2T</td>
</tr>
<tr>
<td>512MB</td>
<td>APHA512MAG0CG-2T</td>
<td>APHA512MA0EG0-2T</td>
</tr>
<tr>
<td>1GB</td>
<td>APHA001GAG0CG-2T</td>
<td>APHA001GAG0EG0-2T</td>
</tr>
<tr>
<td>2GB</td>
<td>APHA002GAG0CG-2T</td>
<td>APHA002GAG0EG0-2T</td>
</tr>
<tr>
<td>4GB</td>
<td>APHA004GAG0CG-2T</td>
<td>APHA004GAG0EG0-2T</td>
</tr>
<tr>
<td>8GB</td>
<td>APHA008GAG0CG-2T</td>
<td>APHA008GAG0EG0-2T</td>
</tr>
<tr>
<td>16GB</td>
<td>APHA016GAG0CG-2T</td>
<td>APHA016GAG0EG0-2T</td>
</tr>
<tr>
<td>32GB</td>
<td>APHA032GAG0CG-2T</td>
<td>APHA032GAG0EG0-2T</td>
</tr>
</tbody>
</table>

- Black Housing

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Standard</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>256MB</td>
<td>APHA256MAK0CG-2T</td>
<td>APHA256MAK0EG0-2T</td>
</tr>
<tr>
<td>512MB</td>
<td>APHA512MAK0CG-2T</td>
<td>APHA512MAK0EG0-2T</td>
</tr>
<tr>
<td>1GB</td>
<td>APHA001GAK0CG-2T</td>
<td>APHA001GAK0EG0-2T</td>
</tr>
<tr>
<td>2GB</td>
<td>APHA002GAK0CG-2T</td>
<td>APHA002GAK0EG0-2T</td>
</tr>
<tr>
<td>4GB</td>
<td>APHA004GAK0CG-2T</td>
<td>APHA004GAK0EG0-2T</td>
</tr>
<tr>
<td>8GB</td>
<td>APHA008GAK0CG-2T</td>
<td>APHA008GAK0EG0-2T</td>
</tr>
<tr>
<td>16GB</td>
<td>APHA016GAK0CG-2T</td>
<td>APHA016GAK0EG0-2T</td>
</tr>
<tr>
<td>32GB</td>
<td>APHA032GAK0CG-2T</td>
<td>APHA032GAK0EG0-2T</td>
</tr>
</tbody>
</table>
5.2.2 EH353 (MLC)

- **Orange Housing**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Standard</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>8GB</td>
<td>APHA008GAG0CG-2TM</td>
<td>APHA008GAG0EG-2TM</td>
</tr>
<tr>
<td>16GB</td>
<td>APHA016GAG0CG-2TM</td>
<td>APHA016GAG0EG-2TM</td>
</tr>
<tr>
<td>32GB</td>
<td>APHA032GAG0CG-2TM</td>
<td>APHA032GAG0EG-2TM</td>
</tr>
<tr>
<td>64GB</td>
<td>APHA064GAG0CG-2TM</td>
<td>APHA064GAG0EG-2TM</td>
</tr>
</tbody>
</table>

- **Black Housing**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Standard</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>8GB</td>
<td>APHA008GAK0CG-2TM</td>
<td>APHA008GAK0EG-2TM</td>
</tr>
<tr>
<td>16GB</td>
<td>APHA016GAK0CG-2TM</td>
<td>APHA016GAK0EG-2TM</td>
</tr>
<tr>
<td>32GB</td>
<td>APHA032GAK0CG-2TM</td>
<td>APHA032GAK0EG-2TM</td>
</tr>
<tr>
<td>64GB</td>
<td>APHA064GAK0CG-2TM</td>
<td>APHA064GAK0EG-2TM</td>
</tr>
</tbody>
</table>
## Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Official release</td>
<td>07/24/2015</td>
</tr>
<tr>
<td>1.1</td>
<td>• Modified performance and power consumption data for MLC models.</td>
<td>09/17/2015</td>
</tr>
<tr>
<td></td>
<td>• Updated valid combinations for SLC and MLC models.</td>
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</tr>
<tr>
<td>1.2</td>
<td>• Revised mechanical specifications</td>
<td>12/21/2015</td>
</tr>
</tbody>
</table>
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