Panasonic SD Memory Offers the High Reliability Demanded for Industrial/automatic Use

High Reliability and Panasonic Controller Technology

Data Programming and Erase Endurance
- Measuring SD Memory Life
  - Static wear testing confirms write data, including fixed data. The test results are the basis for comparing the writing performance and maximum usual life.
  - After determining writing performance performance, the life of the products is confirmed. A life of 100,000 cycles is confirmed for products such as SDHC Memory Cards.

Data Retention
- The Panasonic memory subjected to high temperatures for 2000 hours exhibits good retention performance, with no data loss. This feature is confirmed through production testing.

Intelligent Data Writing
- Dispersion of Writing Stress to NAND Flash Memory
  - Intelligent data writing disperses the writing stress to NAND flash memory, reducing SD power consumption.

Power Failure Robustness
- Protects saved data and device
  - Panasonic's algorithms minimise data damage in the event of a power interruption. Even in the event that an error is generated, the controller can correct the data, resulting in the device being able to continue operation when power is restored, preventing errors from reaching the entire SD memory area.

Secure Storage
- Features high endurance against static electricity, magnetism, and X-rays.

Temperature Resistance
- Can be used under the following conditions: -40 to +85 °C
  - Suitable for industrial use and is operable over the full range of storage temperatures from -40 to +85 °C.
  - Meets the specifications for harsh environments, including vehicles and machinery.

Electrostatic Resistance
- According to the JEITA EN 61000-4-2 standard: 8 kV (Air discharge) / 4 kV (Contact discharge)
  - Panasonic memory adheres to high electrostatic discharge protection standards for industrial use.

Impact Resistance
- Panasonic memory is designed to withstand impact and vibration to meet industrial standards.

Magnetic Resistance
- Data is protected from magnetic forces. The product is suitable for environments with strong magnetic fields.

Water Resistance
- Panasonic memory is designed to withstand water exposure and humidity for industrial use.

Built-in Fuse
- The built-in fuse protects against excess current and shuts off the power supply in case of excess current.
  - Panasonic memory features a built-in fuse that automatically cuts off the power supply in case of excess current.
  - It also prevents the SD Memory Card from overheating or igniting.

Applications by Model

SD Memory Card Roadmap

- SDHC Memory Card
- SDXC Memory Card
- UHS-I Memory Card
- UHS-II Memory Card

- What is UHS-I?
  - UHS-I (Ultra High Speed I) is a speed specification for SD Memory Cards that was established in 2010. It features a maximum bus interface speed of up to 104 MB/s. It also provides enhanced SD design assets and offers enhanced speeds. Three different modes (DDR50, SDR50 and SDR104) have been standardized for the UHS-I specification.

- Speed Specification and Performance of SD Memory Cards

<table>
<thead>
<tr>
<th>Year</th>
<th>Max. 22 MB/s</th>
<th>Max. 45 MB/s</th>
<th>Max. 95 MB/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2004</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2005</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2006</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2007</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2008</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2009</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2010</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Max. 22 MB/s</th>
<th>Max. 45 MB/s</th>
<th>Max. 95 MB/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2004</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2005</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2006</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2007</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2008</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2009</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
<tr>
<td>2010</td>
<td>25 MB/s</td>
<td>50 MB/s</td>
<td>104 MB/s</td>
</tr>
</tbody>
</table>

What is UHS-II?
- UHS-II is an SD memory card specification that was established in 2014. It features a maximum bus interface speed of up to 2.5 GB/s and is compliant with the UHS-II standard. It provides enhanced speeds and improved performance over UHS-I cards.

Product Precautions
- SDHC Memory cards can be used with SDXC host products. SDHC memory cards cannot be used with products that are solely compliant with SDXC cards.
- SDXC memory cards can be used only with SDXC host products. SDXC memory cards cannot be used with SD host products. Check if the label on the SDXC logo indicates SDXC. The label indicates the SDXC logo is solely for SDXC host products.
- The SD Memory Card is intended for use in computer peripheral devices and embedded systems. Consult with Panasonic to evaluate suitability for applications that require a high degree of reliability (uses that may have a serious impact on human lives, such as in customer power or aerospace infrastructure applications.)

Customer Support
- 1-15, Matsuo-cho, Kadoma, Osaka, 571-8504, Japan
- http://panasonic.net/avc/sdcard/industrial_sd/
### Performance Specifications

#### Model
- **RP-SDFD4G**
- **RP-SDFD8G**
- **RP-SDFD16G**

#### Flash Memory
- Multi-Level Cell (MLC) NAND Flash Memory

#### Ver.
- Ver. 3.01 (UHS-I Compliant)

#### Speed Class
- SD Speed Class 10, UHS Speed Class 1

#### Transfer Rate (Max)*
- Read: 90 MB/s
- Write: 12 MB/s

#### Operating Temperature
- -40 to +85°C

#### Size
- 32.0 x 24.0 mm

#### Functions
- Static Wear Levelling, Intelligent Data Writing, Recovery Function from Power Failure, Refresh Function

---

#### Model
- **RP-SMKC04**
- **RP-SMKC08**
- **RP-SMKC16**

#### Flash Memory
- Multi-Level Cell (MLC) NAND Flash Memory

#### Ver.
- Ver. 3.01 (No UHS-I Compliant)

#### SD Physical Specification Speed Class
- SD Speed Class 4

#### Transfer Rate (Max)*
- Read: 22 MB/s
- Write: 20 MB/s

#### Operating Temperature
- -40 to +85°C

#### Size
- 18.0 x 12.2 mm

#### Functions
- Static Wear Levelling, Intelligent Data Writing, Recovery Function from Power Failure, Refresh Function

---

#### Model
- **RP-SDFP04G**
- **RP-SDFP08G**
- **RP-SDFP16G**

#### Flash Memory
- Single-Level Cell (SLC) NAND Flash Memory

#### Ver.
- Ver. 3.01 (UHS-I Compliant)

#### SD Physical Specification Speed Class
- SD Speed Class 6

#### Transfer Rate (Max)*
- Read: 22 MB/s
- Write: 12 MB/s

#### Operating Temperature
- -40 to +85°C

#### Size
- 32.0 x 24.0 mm

#### Functions
- Static Wear Levelling, Intelligent Data Writing, Recovery Function from Power Failure, Refresh Function

---

#### Model
- **RP-SVBC04**
- **RP-SVBC16**

#### Flash Memory
- Multi-Level Cell (MLC) NAND Flash Memory

#### Controller
- SD Controller (Semiconductor Mounting Type)

#### Environment Specifications (Comon to all models)

#### Applicable EMC Standards
1) VCCI Class B (Option B)
2) FCC Part 15 Class B (Verification)
3) EC Directive 89/336/EEC
4) AS/NZS CISPR Pub22: 2006

#### RoHS Directive Compatibility
- Compliant

---

* Panasonic industrial/automotive use SD memory has a unique Panasonic function that reports data such as bad blocks, writing cycles, and the SD memory internal connection status.

* A separate B-to-B support system also allows Panasonic to offer consultation concerning customisation upon customer request.