AEM Auto Grade SMD Fuses

AEM Marketing

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1. Safety demand of automotive

2. AEM SMD fuses’ features

3. Typical applications
1.1 Auto electronics growth

>> One reason: automotive gets more electric modules, for information, internet, smart control.

Source: IEK.
Another reason: E-vehicle’s ratio gets high. And electronics ratio of E-vehicle is higher than fuel vehicle.

Source: Estimate according to Technavio’s motor market forecast.
1.2 Over current protection----SMD fuses

>> Every module would possibly have short-circuit fault under certain condition.

>> For manufacture or contract space, SMD fuses are in demand.
1.3 Safety of protect components

>> The component should be safe before and after acting.

1. Before acting
   * reliability

2. Acting
   * safety

3. After acting
   * Cut off circuit
Content

1. Safety demand of automotive

2. AEM SMD fuses’ features

3. Typical applications
2.1 AEM auto-grade SMD fuses

- Factory: TS16949 recognized
- Products: pass reliability test, refer to AEC Q200

<table>
<thead>
<tr>
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<th>Ceramic</th>
<th>Wire-in-air</th>
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</table>
| 0603 (1608) | QF0603F 0.5~6A  
QF0603H 1~8A |                      |
| 1206 (3216) | QF1206F 0.5~8A  
QF1206H 1~8A  
Plan: higher current | QA1206F 1.5~15A      |
| 2410 (6125) |                      | QA2410F 0.5~20A      |
2.2 AEM ceramic-fuse structure

**AEM Ceramic**

**Element on surface**

**AEM Advantages:**
- Buried element---safer after open
- No overcoat---high reliability
- Temperature---up to 150°C
2.3 AEM wire-in-air structure

**AEM Structure**

- Body
- Straight element

**Soldering connection**

- Cap
- Element
- Soldering

**AEM Advantages:**

- Straight fuse: low dispersion
- No terminal-cap: no drop risk
- No inner soldering: 100% Pb free
2.4 High reliability (before acting)

**Environment related tests:**

- High temperature operating life  ✓
- High/low temperature storage  ✓
- Biased humidity  ✓
- Thermal shock  ✓

...  ✓

**Mechanic related tests:**

- Mechanical vibration  ✓
- Mechanical shock  ✓
- Board flex  ✓

...  ✓
AEM products are well sealed

**AEM Ceramic**

- Ceramic Fuse Ceramic

**Element on Surface**

- Element Substrate
  - Overcoat protection

**AEM Wire-in-air**

- Body Fuse Body

**Another structure**

- Tube Element Tube
2.5 AEM fuse’s safety (acting/after acting)

**Fuse construction**

- Competitors
  - Overcoat
  - Fuse
  - Termination

- Substrate

**Fusing moment**

- AEM Ceramic
  - Body
  - Fuse
  - Termination

- AEM Wire-in-air
  - Space
  - Fuse
  - Termination

- Safe

- Safe
AEM fuses: Buried element

AEM Advantages:
AEM remains the same after acting, comparing to other typical products.

Other structure: element on surface
Under extreme condition test: 400A/ 450V

AEM

Another
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3.1 Battery Management System

>> 12V in: 1206/2410

>> Voltage line or balance line: 0603/1206
3.2 USB charger

Typical USB application

There is one fuse in the 12V DC in and another fuse in the 5V out for short circuit protection.
3.3 Panel

Typical Panel application

The fuse is always used in the power input.
Thanks!