Overview

KEMET’s A957 is an electrolytic capacitor module with outstanding electrical performance and high ripple current. This device contains a bank of ALF70 Aluminum Electrolytic Capacitors mounted on high current designed PCB. These assembled parts are housed by a plastic case and heat sunk by a casted aluminum plate.

Benefits

• Capacitor bank ready to fit into application
• Eliminates the use of voltage sharing resistors
• Capacitor Bank with heat-sink included
• Long life, up to 18,000 hours at +85°C (V_R, I_R applied)
• Extremely high ripple current
• Low ESL
• Outstanding electrical performance

Applications

The KEMET A957 is an electrolytic capacitor module, designed mainly for applications, like Solar Inverters, Motor Drives, and Pulsed Power.

Part Number System

<table>
<thead>
<tr>
<th>A</th>
<th>957</th>
<th>AL</th>
<th>132</th>
<th>M</th>
<th>800</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Aluminum</td>
<td>Size Code</td>
<td>Capacitance Code (µF)</td>
<td>Tolerance</td>
<td>Rated Voltage (VDC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electrolytic Capacitor Module</td>
<td>See Dimension Table</td>
<td>First two digits represent significant figures. Third digit specifies number of zeros.</td>
<td>M = ±20%</td>
<td>700 = 700 V</td>
</tr>
</tbody>
</table>
## Performance Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Performance Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacitance Range</td>
<td>560 – 1,800 µF</td>
</tr>
<tr>
<td>Rated Voltage</td>
<td>700 – 1,200 VDC</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>−40 to +85°C</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>−55 to +85°C</td>
</tr>
<tr>
<td>Capacitance Tolerance</td>
<td>±20% at 100 Hz/+20°C</td>
</tr>
<tr>
<td>Operational Lifetime</td>
<td>Rated Voltage and Ripple Current at +85°C (hours)</td>
</tr>
<tr>
<td></td>
<td>18,000</td>
</tr>
<tr>
<td>Shelf Life</td>
<td>2,000 hours at +85°C or 30,000 hours at +40°C 0 VDC</td>
</tr>
<tr>
<td>Leakage Current</td>
<td>$I = 0.006 CV or 6,000 µA (whichever is smaller)$</td>
</tr>
<tr>
<td></td>
<td>( C = \text{rated capacitance (µF)}, \ V = \text{rated voltage (VDC)} ). Voltage applied for 5 minutes at +20°C.</td>
</tr>
<tr>
<td>Vibration Test Specifications</td>
<td>0.35 mm displacement amplitude or 5 G maximum acceleration. Vibration applied for three directions 0.5-hour sessions at 10 – 55 Hz.</td>
</tr>
<tr>
<td>Standards</td>
<td>IEC 60384-4 long life grade 40/85/56</td>
</tr>
</tbody>
</table>

## Surge Voltage

<table>
<thead>
<tr>
<th>Test Condition</th>
<th>Voltage (VDC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 30 second surge followed by a no load period of 330 seconds, 1,000 cycles at +85°C</td>
<td>700 800 900 1,000 1,100 1,200</td>
</tr>
<tr>
<td></td>
<td>770 880 990 1,100 1,210 1,320</td>
</tr>
</tbody>
</table>

## Test Method & Performance

### Endurance Life Test

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>+85°C</td>
</tr>
<tr>
<td>Test Duration</td>
<td>2,000 hours</td>
</tr>
<tr>
<td>Ripple Current</td>
<td>Rated ripple current specified in table</td>
</tr>
<tr>
<td>Voltage</td>
<td>The sum of DC voltage and the peak AC voltage must not exceed the rated voltage of the capacitor</td>
</tr>
</tbody>
</table>

**Performance**

- The following specifications will be satisfied when the capacitor is tested at +20°C:
  - Capacitance Change: Within 10% of the initial value
  - Equivalent Series Resistance: Does not exceed 150% of the initial value
  - Leakage Current: Does not exceed leakage current limit
**Dimensions – Millimeters**

### Module Top View

![Module Top View Diagram](image1)

### Module Side View

![Module Side View Diagram](image2)

### PCB Top View (Without Capacitors)

![PCB Top View Diagram](image3)

<table>
<thead>
<tr>
<th>Size Code</th>
<th>Dimensions</th>
<th>Approximate Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>± 0.5</td>
<td>± 0.5</td>
</tr>
</tbody>
</table>

Recommended Terminal Screws:

- Slotted Head Hex Screw (M5 x 0.8, 10.0 mm length, 2.0 maximum torque)
- Socket Head Steel Screw (M5 x 0.8, 10.0 mm length, 6.0 maximum torque)
- Stainless Steel Washer should be used
Shelf Life

The capacitance, ESR and impedance of a capacitor will not change significantly after extended storage periods, however, the leakage current will very slowly increase. KEMET products are particularly stable and allow a shelf life in excess of three years at 40°C. See sectional specification under each product for specific data.

Re-Age (Reforming) Procedure

Apply the rated voltage to the capacitor at room temperature for a period of one hour, or until the leakage current has fallen to a steady value below the specified limit. During re-aging, a maximum charging current of twice the specified leakage current or 5 mA (whichever is greater) is suggested.

Reliability

Estimated field failure rate:

<table>
<thead>
<tr>
<th>Size Codes</th>
<th>Estimated field failure rate ≤ (ppm)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL</td>
<td>1.20</td>
</tr>
</tbody>
</table>

(*Failures per year/produced number of capacitors per year)

The expected failure rate for this capacitor module range is based on field experience for single capacitors with structural similarity.

Environmental Compliance

All Part Numbers in this datasheet are Reach and RoHS compliant and Halogen-Free.

As an environmentally conscious company, KEMET is working continuously with improvements concerning the environmental effects of both our capacitors and their production.

In Europe (RoHS Directive) and in some other geographical areas such as China, legislation has been put in place to prevent the use of some hazardous materials, such as lead (Pb), in electronic equipment. All products in this catalog are produced to help our customers’ obligations to guarantee their products and fulfill these legislative requirements. The only material of concern in our products has been lead (Pb), which has been removed from all designs to fulfill the requirement of containing less than 0.1% of lead in any homogeneous material. KEMET will closely follow any changes in legislation worldwide and makes any necessary changes in its products, whenever needed.

Some customer segments such as medical, military, and automotive electronics may still require the use of lead in electrode coatings. To clarify the situation and distinguish products from each other, a special symbol is used on the packaging labels for RoHS compatible capacitors.

Due to customer requirements, there may appear additional markings such as lead-free (LF) or lead-free wires (LFW) on the label.
Table 1 – Ratings & Part Number Reference

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Rated Capacitance</th>
<th>Size Code</th>
<th>Case Size</th>
<th>Ripple Current</th>
<th>ESR Maximum</th>
<th>Impedance Maximum</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(VDC)</td>
<td>100 Hz 20°C (µF)</td>
<td>100 Hz 85°C (A)</td>
<td>10 kHz 85°C (A)</td>
<td>100 Hz 20°C (mΩ)</td>
<td>10 kHz 20°C (mΩ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>1,800</td>
<td>15.20</td>
<td>84</td>
<td>43</td>
<td>A957AL182M700S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>1,300</td>
<td>13.20</td>
<td>114</td>
<td>66</td>
<td>A957AL132M800S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>1,000</td>
<td>11.93</td>
<td>209</td>
<td>150</td>
<td>A957AL102M900S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000</td>
<td>910</td>
<td>10.46</td>
<td>484</td>
<td>421</td>
<td>A957AL911M1K0S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,100</td>
<td>620</td>
<td>11.19</td>
<td>214</td>
<td>149</td>
<td>A957AL621M1K1S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,200</td>
<td>560</td>
<td>10.65</td>
<td>241</td>
<td>166</td>
<td>A957AL561M1K2S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Module ambient temperature

Marking

- KEMET Logo
- Rated Capacitance, Tolerance
- Rated Voltage
- Batch Number – Year, Calendar Week, Serial Number
- Negative Terminal
- Positive Terminal
- Part Number
- Product Type
- Casted Aluminum Plate /Heat-sink
- Negative Polarity Indication
Construction

Detailed Cross Section

- Insulating End Disc
- Polarity Stripe (−)
- Aluminum Can
- Wound Element Tabs
- Termination Pin (+)
- Termination Pin (−)
- Tab Connection to Terminal
- Margin
- Rubber Seal
- Rubber Seal
- Aluminum Can
- Insulating Sleeve
- Insulating Sleeve
- Paper Spacer Impregnated with Electrolyte (First Layer)
- Cathode Aluminum Foil, Etched (Second Layer)
- Paper Spacer Impregnated with Electrolyte (Third Layer)
- Anode Aluminum Foil, Etched, Covered with Aluminum Oxide (Fourth Layer)
- Tab Connection to Terminal
**Construction Data**

The manufacturing process begins with the anode foil being electrochemically etched to increase the surface area and then "formed" to produce the aluminum oxide layer. Both the anode and cathode foils are then interleaved with absorbent paper and wound into a cylinder. During the winding process, aluminum tabs are attached to each foil to provide the electrical contact.

The winding is assembled to the capacitor Al-can and to the Al-lid. The can is filled with electrolyte and the winding is impregnated during a vacuum treatment. The capacitor is sealed. Throughout the process, all materials inside the housing must be maintained at the highest purity and be compatible with the electrolyte.

Each capacitor is aged and tested before being packed. The purpose of aging is to repair any damage in the oxide layer and thus reduce the leakage current to a very low level. Aging is carried out at elevated temperature and is accomplished by applying voltage to the device while carefully controlling the supply current. The process takes between 2 and 20 hours, depending on voltage rating.

Damage to the oxide layer can occur due to a variety of reasons:
- Slitting of the anode foil after forming
- Attaching the tabs to the anode foil
- Minor mechanical damage caused during winding

The following tests are applied for each individual capacitor.

**Electrical:**
- Leakage current
- Capacitance
- ESR
- Tan Delta

**Mechanical/Visual:**
- Pull strength test of wire terminals
- Print detail
- Box labels
- Packaging, including packed quantity
Disclaimer

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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

KEMET requires its products to be packaged and shipped on pallets. This is because KEMET’s products are specifically designed to be packed onto pallets during shipment. If for any reason, the products are removed from pallets by the shipping party and shipped to the end customer, then additional external protection is required. In this instance, an external box with two carton layers and an upwards orientation sticker must be used by the shipping party, with the empty space filled with filling material, and afterwards sealing the box. If this packing and packaging guideline is not followed by the shipping party, the shipping party, and not KEMET, will be held responsible for any packaging, packing and/or product damages upon delivery of the products to the end customer. KEMET hereby disclaims any liability for damages to the products or otherwise that have been, or threaten to be, inflicted, result from or are in any way related to the packaging, packing or damage by the shipping party in contravention of the packing and packaging guidelines herein.