

# SMD Aluminum Hybrid Electrolytic Capacitors

## AHC Series



### FEATURES

- Low ESR
- High Ripple Current Resistance
- 125°C, 4000 hours
- RoHS compliant

### APPLICATIONS

- Commercial/Industrial power supply applications requiring high capacitance in energy-dense, in small-volume packages with a low ESR

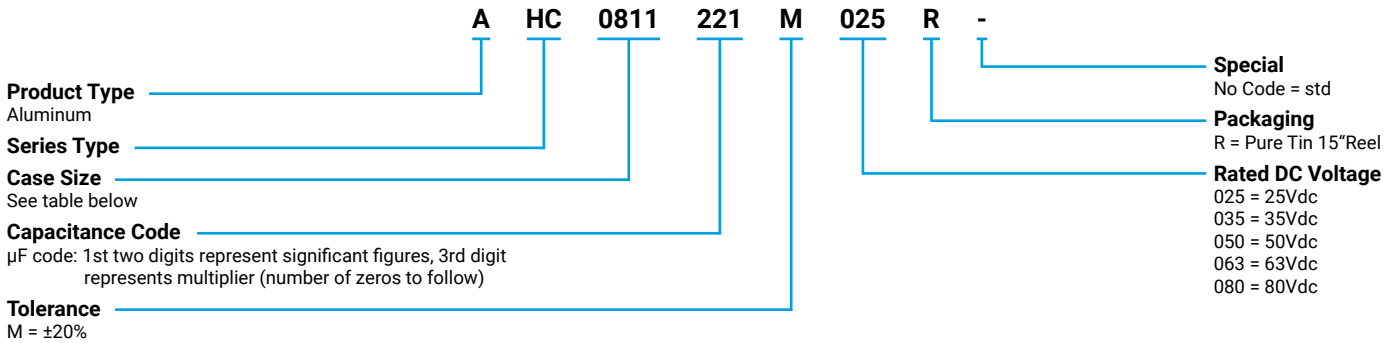


LEAD-FREE  
LEAD-FREE COMPATIBLE  
COMPONENT



RoHS  
COMPLIANT

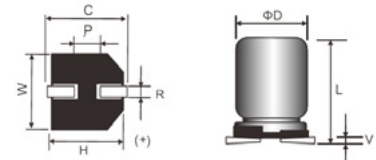
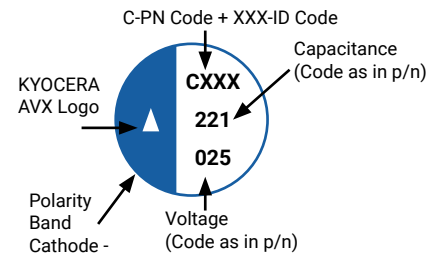
### HOW TO ORDER



### CASE DIMENSIONS millimeters (inches)

| Code | D±0.50<br>(0.020) | L±0.50<br>(0.020) | W±0.20<br>(0.008) | H±0.20<br>(0.008) | C±0.20<br>(0.008) | R                              | P±0.30<br>(0.012) | V max           |
|------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------------------|-------------------|-----------------|
| 0609 | 6.30<br>(0.248)   | 9.30<br>(0.366)   | 6.60<br>(0.260)   | 6.60<br>(0.260)   | 7.30<br>(0.287)   | 0.50 - 0.80<br>(0.020 - 0.031) | 2.00<br>(0.080)   | 0.30<br>(0.012) |
| 0811 | 8.00<br>(0.315)   | 11.50<br>(0.453)  | 8.30<br>(0.327)   | 8.30<br>(0.327)   | 9.00<br>(0.354)   | 0.70 - 1.10<br>(0.028 - 0.043) | 3.20<br>(0.126)   | 0.30<br>(0.012) |
| 0812 | 8.00<br>(0.315)   | 12.00<br>(0.472)  | 8.30<br>(0.327)   | 8.30<br>(0.327)   | 9.00<br>(0.354)   | 0.70 - 1.10<br>(0.028 - 0.043) | 3.20<br>(0.126)   | 0.30<br>(0.012) |
| 1012 | 10.00<br>(0.394)  | 12.50<br>(0.492)  | 10.30<br>(0.406)  | 10.30<br>(0.406)  | 11.00<br>(0.433)  | 0.70 - 1.30<br>(0.028 - 0.051) | 4.50<br>(0.177)   | 0.30<br>(0.012) |

### MARKING



### TECHNICAL SPECIFICATIONS

|                                    |   |  |
|------------------------------------|---|--|
| <b>Category Temperature Range:</b> | -55°C to + 125°C                                  |  |
| <b>Capacitance Range:</b>          | At 20°C, 120Hz                                    | 15µF to 470µF  |
| <b>Capacitance Tolerance:</b>      | At 20°C, 120Hz                                    | ±20%   |
| <b>Dissipation Factor (%)</b>      | Measurement Frequency: 120Hz at 20°C              | Please see the ratings and part number reference table below |
| <b>Leakage Current:</b>            | After 2 minutes at rated working voltage at 20°C* | $I \leq 0.01CV$ or 3µA, whichever is greater                 |

\* Note: In the case of an anomalous reading, re-measure the leakage current after following voltage treatment:  
Voltage treatment: DC rated voltage to be applied to the capacitors for 120 minutes at 125°C.

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### CAPACITANCE AND RATED VOLTAGE RANGE (FIGURES DENOTES CASE SIZE)

| Capacitance |      | Rated Voltage DC (V <sub>R</sub> ) |      |      |      |      |
|-------------|------|------------------------------------|------|------|------|------|
| μF          | Code | 25V                                | 35V  | 50V  | 63V  | 80V  |
| 15          | 150  |                                    |      |      | 0609 |      |
| 22          | 220  |                                    |      | 0609 | 0609 |      |
| 33          | 330  |                                    |      | 0609 |      |      |
| 47          | 470  |                                    | 0609 | 0811 |      | 0812 |
| 68          | 680  |                                    | 0609 |      |      |      |
| 100         | 101  | 0609                               |      |      |      |      |
| 220         | 221  | 0811                               | 1012 |      |      |      |
| 470         | 471  | 1010,1012                          |      |      |      |      |

Released ratings

### RATINGS & PART NUMBER REFERENCE

| Part No.        | Case Size | Capacitance (μF) | Rated Voltage (V) | DCL Max. (μA) | DF Max. (%) | ESR Max. @ 100kHz (mΩ) | 100kHz RMS Current (mA)/125°C |
|-----------------|-----------|------------------|-------------------|---------------|-------------|------------------------|-------------------------------|
| <b>25 Volt</b>  |           |                  |                   |               |             |                        |                               |
| AHC0609101M025R | 0609      | 100              | 25                | 25            | 12          | 30                     | 1400                          |
| AHC0811221M025R | 0811      | 220              | 25                | 55            | 12          | 27                     | 1600                          |
| AHC1010471M025R | 1010      | 470              | 25                | 117.5         | 12          | 20                     | 2000                          |
| AHC1012471M025R | 1012      | 470              | 25                | 117.5         | 12          | 25                     | 2300                          |
| <b>35 Volt</b>  |           |                  |                   |               |             |                        |                               |
| AHC0609470M035R | 0609      | 47               | 35                | 16.5          | 12          | 60                     | 900                           |
| AHC0609680M035R | 0609      | 68               | 35                | 23.8          | 12          | 40                     | 1200                          |
| AHC1012221M035R | 1012      | 220              | 35                | 77            | 12          | 30                     | 1800                          |
| <b>50 Volt</b>  |           |                  |                   |               |             |                        |                               |
| AHC0609220M050R | 0609      | 22               | 50                | 11            | 12          | 90                     | 900                           |
| AHC0609330M050R | 0609      | 33               | 50                | 16.5          | 12          | 40                     | 1100                          |
| AHC0811470M050R | 0811      | 47               | 50                | 23.5          | 12          | 35                     | 1100                          |
| <b>63 Volt</b>  |           |                  |                   |               |             |                        |                               |
| AHC0609150M063R | 0609      | 15               | 63                | 9.5           | 12          | 100                    | 800                           |
| AHC0609220M063R | 0609      | 22               | 63                | 13.9          | 12          | 80                     | 800                           |
| <b>80 Volt</b>  |           |                  |                   |               |             |                        |                               |
| AHC0812470M080R | 0812      | 47               | 80                | 37.6          | 12          | 40                     | 1000                          |

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5RMS with DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

### FREQUENCY COEFFICIENT OF PERMISSIBLE RIPPLE CURRENT

| Frequency   | 120Hz ≤ F(Hz) < 1K | 1K ≤ F(Hz) < 10K | 10K ≤ F(Hz) < 100K | 100K(Hz) ≤ F |
|-------------|--------------------|------------------|--------------------|--------------|
| Coefficient | 0.05               | 0.30             | 0.70               | 1.00         |

### QUALIFICATION TABLE

| Test                          | AHC series (Temperature range -55°C to +125°C)   |                    |                                       |
|-------------------------------|--|--------------------|---------------------------------------|
|                               | Condition  | Characteristics    |                                       |
| Endurance                     | The following specifications shall be satisfied when the capacitors are restored to normal temperature after storing them for 2000 hours under no-load at 125±2°C. The rated voltage with ripple current is applied for 4000 hours at 125°C. | Visual Examination | no visible damage                     |
|                               |  | ΔC/C               | ≠ ±30% of the initial limit           |
|                               |  | DF                 | ≠ 200% of the initial specified limit |
|                               |  | ESR                | ≠ 200% of the initial specified limit |
|                               |  | DCL                | ≠ Initial specified limit or less     |
| Humidity Resistance (On-Load) | The following specifications shall be satisfied when the rated voltage is applied for 2000 hours at 85±2°C and 85 to 90% RH.   | Visual Examination | ≠ no visible damage                   |
|                               |  | ΔC/C               | ≠ ±30% of the initial limit           |
|                               |  | DF                 | ≠ 200% of the initial specified limit |
|                               |  | ESR                | ≠ 200% of the initial specified limit |
|                               |  | DCL                | ≠ Initial specified limit or less     |

# SMD Aluminum Hybrid Electrolytic Capacitors

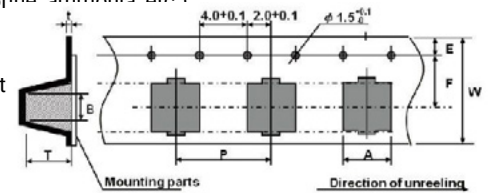
## AHC Series

### REFLOW

|                             |                              |
|-----------------------------|------------------------------|
| Peak Temperature            | 260°C, 10 sec. max.          |
| Preheat Temperature         | 150°C to 180°C, 90 sec. max. |
| Duration at 200°C or higher | 60 sec. max.                 |
| Duration at 230°C or higher | 40 sec. max.                 |
| Reflow Number               | Twice or less                |

### STORAGE

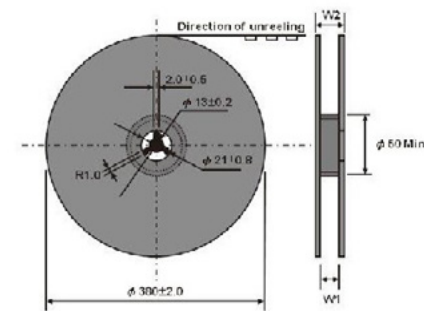
- It is recommended to keep capacitors between the ambient temperatures of 5°C to 35°C (If between 35 to 85°C, it should be less than three months), and the relative humidity of 75% or below.
- Confirm that the environment does not have any of the following conditions:
  - Damp conditions such as water, saltwater spray, or oil spray or fumes. High humidity or humidity condensation situations.
  - In an atmosphere filled with toxic gasses (such as hydrogen sulfide, sulfurous acid, nitrous acid, chlorine ammonia, etc.)
  - Being exposed to direct sunlight, ozone, ultraviolet ray, or radiation.
  - Being exposed to acidic or alkaline solutions.
  - Under severe conditions where vibration and / or mechanical shock exceed the applicable ranges of t
- Storage time:
  - Before unseal: within 1 year after delivery
  - After seal: within 1 month from opening



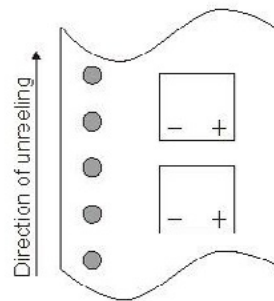
### PACKAGE TAPE DIMENSIONS units (mm)

| Size Code | A±0.20 | B±0.20 | W±0.30 | F±0.10 | E±0.10 | P±0.10 | t±0.10 | T±0.20      |
|-----------|--------|--------|--------|--------|--------|--------|--------|-------------|
| 0609      | 7.0    | 7.0    | 16.0   | 7.5    | 1.75   | 12.0   | 0.4    | 10.0        |
| 0811      | 8.7    | 8.7    | 24.0   | 11.5   | 1.75   | 16.0   | 0.4    | 12.0        |
| 0812      | 8.7    | 8.7    | 24.0   | 11.5   | 1.75   | 16.0   | 0.4    | 13.0        |
| 1012      | 10.7   | 10.7   | 24.0   | 11.5   | 1.75   | 16.0   | 0.4    | 13.0 - 13.5 |

### REEL



### POLARITY



### DIMENSIONS units (mm)

| Size Code | W1±1.00 | W2±1.00 | Qty./Reel |
|-----------|---------|---------|-----------|
| 0609      | 18.0    | 22.0    | 800       |
| 0811      | 26.0    | 31.0    | 500       |
| 0812      | 26.0    | 31.0    | 500       |
| 1012      | 26.0    | 31.0    | 500       |