

# Type AXLH -40 °C to +150 °C

## High Temperature Axial Leaded Aluminum Electrolytic Capacitors

HIGH PERFORMANCE AXIAL LEADED ALUMINUM ELECTROLYTIC CAPACITORS



Type AXLH capacitors are a new generation of high performance aluminum electrolytic capacitors rated up to 2000 hours at 150 °C. They are designed for applications that place high demands on a capacitor. The capacitor's outstanding features include low ESR, low leakage current, a long shelf life and a high ripple current capability.

### Highlights

- 150 °C Operating Temperature
- Up to 28 Amps RMS Continuous Ripple Current
- Capacitance Range: 470 µF to 4700 µF
- High Vibration Resistance
- Very Long Shelf Life
- Low Leakage Current

### Specifications

|                                                 |                                                                                                                                                                |      |      |      |      |         |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|------|---------|
| Capacitance Range (100 Hz/+20 °C)               | 470 to 4700 µF                                                                                                                                                 |      |      |      |      |         |
| Capacitance Tolerance (100 Hz/+20 °C)           | -10/+30%                                                                                                                                                       |      |      |      |      |         |
| Rated Voltage                                   | 25, 40, 63 Vdc                                                                                                                                                 |      |      |      |      |         |
| Operating Temperature                           | -40 °C to +150 °C                                                                                                                                              |      |      |      |      |         |
| Leakage Current (at 20°C)                       | I = 0.003 CV +4.0 µA; after 5 minutes at rated voltage<br>I = leakage current in µAmps<br>C = rated capacitance in µF<br>V = rated DC Working voltage in Volts |      |      |      |      |         |
| Ripple Current vs. Frequency Correction Factors | Frequency (Hz)                                                                                                                                                 | 100  | 300  | 1000 | 5000 | 100 kHz |
|                                                 | Ripple Current Correction Factor                                                                                                                               | 0.35 | 0.57 | 0.8  | 1    | 1.04    |
| Shelf Life                                      | (+105 °C/0 Vdc): 5000 hours<br>(+40 °C/0 Vdc): 10 years                                                                                                        |      |      |      |      |         |
| Standard                                        | IEC 60384-4 long life grade 40/125/56                                                                                                                          |      |      |      |      |         |
| RoHS Compliant                                  |                                                                                                                                                                |      |      |      |      |         |

### Part Numbering System

AXLH

Type

222

Capacitance

222 = 2200 µF

P

Capacitance Tolerance

P = -10/+30%

025

Voltage Code

025 = 25 Vdc

040 = 40 Vdc

063 = 63 Vdc

E

Case Dia.Code

E = 20 mm

D

Case

Length Code

D = 27 mm

H = 35 mm

L = 43 mm

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|                                 |            |                                                                                                                                                                                                                                                                                           |
|---------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Load Life Test                  | Test       | Mount the capacitor on a heat sink with a low thermal resistance path. Apply the maximum rated voltage for 2000 hrs at +150°C with the +150°C maximum ripple current applied to the capacitor. After the test, measure the capacitance, ESR, and DCL at +20°C.                            |
|                                 | ΔC         | Capacitance will be within ±15% of the initial value                                                                                                                                                                                                                                      |
|                                 | ESR        | ESR will be less than 2 times the initial value                                                                                                                                                                                                                                           |
|                                 | DCL        | The leakage current will be within the specified value                                                                                                                                                                                                                                    |
|                                 | Appearance | No electrolyte leakage or other visible damage. The markings will be legible.                                                                                                                                                                                                             |
| Vibration Test                  | Test       | Clamp the case to the test fixture.<br>Frequency range is 10 - 2000 Hz. Amplitude of 1.5mm or 20 g acceleration.<br>Duration of test is 22 hours in each of three directions.<br>After the test, measure the capacitance at +20°C.                                                        |
|                                 | ΔC         | Capacitance change from the initial measurement must not exceed 5%.                                                                                                                                                                                                                       |
|                                 | Appearance | No electrolyte leakage or other visible damage.                                                                                                                                                                                                                                           |
| Surge Voltage Test              | Test       | Subject the capacitor to 1000 surge voltage cycles at +150°C. For each cycle, apply 1.15 times the rated voltage for 30 seconds followed by no voltage for 5 min. and 30 seconds. The time constant for charging is 0.1 seconds. After one to two hours, measure the capacitance and esr. |
|                                 | ΔC         | Capacitance change from the initial measurement must not exceed 15%.                                                                                                                                                                                                                      |
|                                 | ESR        | The ESR will be < 2x initial value.                                                                                                                                                                                                                                                       |
|                                 | Appearance | No electrolyte leakage or other visible damage.                                                                                                                                                                                                                                           |
| Storage at Low Temperature Test | Test       | Subject the capacitor to 72 hours at -55°C. After 16 hours at room temperature, measure the capacitance and DCL.                                                                                                                                                                          |
|                                 | ΔC         | Capacitance change from the initial measurement must not exceed 10%.                                                                                                                                                                                                                      |
|                                 | DCL        | Leakage current will meet the initial specification.                                                                                                                                                                                                                                      |
|                                 | Appearance | No electrolyte leakage or other visible damage. The markings are to be legible.                                                                                                                                                                                                           |
| Charge and Discharge Test       | Test       | Subject the capacitor to 1 million charge/discharge cycles at +20°C. For each cycle, apply the rated voltage for 0.5 seconds using a 0.1 second charge/discharge time constant. After the test, the following will apply;                                                                 |
|                                 | ΔC         | Capacitance will be within ±10% of the initial value.                                                                                                                                                                                                                                     |
|                                 | Appearance | No electrolyte leakage or other visible damage.                                                                                                                                                                                                                                           |

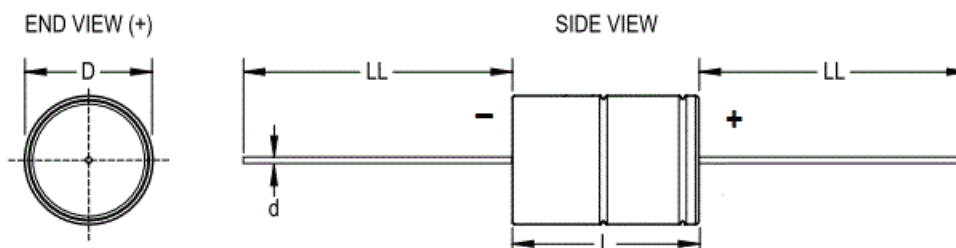
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## High Temperature Axial Leaded Aluminum Electrolytic Capacitors

### Ratings

| Rated Capacitance<br>100Hz/+20°C<br>(μF) | Capacitance Tolerance<br>(%) | VDC | Cornell Dubilier<br>Part Number | Case Size<br>D x L<br>(mm) | Max. ESR<br>100 Hz/+20°C<br>(mΩ) | Max. ESR<br>100 kHz/+20°C<br>(mΩ) | Rated<br>Ripple Current<br>≥ 5kHz/+125°C<br>(A) | Maximum<br>Ripple Current<br>≥ 5kHz/+125°C<br>(A) |
|------------------------------------------|------------------------------|-----|---------------------------------|----------------------------|----------------------------------|-----------------------------------|-------------------------------------------------|---------------------------------------------------|
| 2200                                     | -10/+30                      | 25  | AXLH222P025ED                   | 20 x 27                    | 50                               | 25                                | 7.1                                             | 9.1                                               |
| 3300                                     | -10/+30                      | 25  | AXLH332P025EH                   | 20 x 35                    | 34                               | 17                                | 8.9                                             | 11.3                                              |
| 4700                                     | -10/+30                      | 25  | AXLH472P025EL                   | 20 x 43                    | 25                               | 13                                | 10.3                                            | 13.1                                              |
| 1500                                     | -10/+30                      | 40  | AXLH152P040ED                   | 20 x 27                    | 57                               | 22                                | 7.3                                             | 9.3                                               |
| 2200                                     | -10/+30                      | 40  | AXLH222P040EH                   | 20 x 35                    | 41                               | 17                                | 8.9                                             | 11.2                                              |
| 2700                                     | -10/+30                      | 40  | AXLH272P040EL                   | 20 x 43                    | 32                               | 13                                | 10.1                                            | 12.8                                              |
| 470                                      | -10/+30                      | 63  | AXLH471P063ED                   | 20 x 27                    | 125                              | 32                                | 5.5                                             | 7.0                                               |
| 680                                      | -10/+30                      | 63  | AXLH681P063EH                   | 20 x 35                    | 87                               | 23                                | 6.9                                             | 8.7                                               |
| 900                                      | -10/+30                      | 63  | AXLH901P063EL                   | 20 x 43                    | 67                               | 18                                | 8.1                                             | 10.2                                              |

### Outline Drawings & Dimensions Table



| Size Code | Dimensions in mm |      |        |     | Approximate Weight<br>(grams) |
|-----------|------------------|------|--------|-----|-------------------------------|
|           | D                | L    | d      | LL  |                               |
|           | ± 0.5            | ± 1  | ± 0.03 | ± 2 |                               |
| ED        | 20               | 26.5 | 1      | 40  | 13                            |
| EH        | 20               | 34.5 | 1      | 40  | 20                            |
| EL        | 20               | 42.5 | 1      | 40  | 24                            |

Note: Bend leads at least 3.5 mm from the case.

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## High Temperature Axial Leaded Aluminum Electrolytic Capacitors

### Heat-Sinked Ratings

| Cornell Dubilier<br>Part Number | Max.<br>ESR 5-100 kHz<br>125-150°C<br>(mΩ) | Maximum Ripple Current * |                       |                       |
|---------------------------------|--------------------------------------------|--------------------------|-----------------------|-----------------------|
|                                 |                                            | ≥ 5 kHz/+125°C<br>(A)    | ≥ 5 kHz/+140°C<br>(A) | ≥ 5 kHz/+150°C<br>(A) |
| AXLH222P025ED                   | 10.6                                       | 22.2                     | 14                    | 6.3                   |
| AXLH332P025EH                   | 7.8                                        | 25.8                     | 16.3                  | 7.3                   |
| AXLH472P025EL                   | 6.4                                        | 28.5                     | 18                    | 8.1                   |
| AXLH152P040ED                   | 10                                         | 22.8                     | 14.4                  | 6.5                   |
| AXLH222P040EH                   | 7.9                                        | 25.7                     | 16.2                  | 7.3                   |
| AXLH272P040EL                   | 6.7                                        | 27.9                     | 17.6                  | 7.9                   |
| AXLH471P063ED                   | 17.5                                       | 17.3                     | 10.9                  | 4.9                   |
| AXLH681P063EH                   | 13                                         | 20                       | 12.7                  | 5.7                   |
| AXLH901P063EL                   | 10.6                                       | 22.2                     | 14                    | 6.3                   |

\* When the capacitor is mounted to a heat-sink using low thermal resistance path.

### Capacitor Markings

#### Marking

-- CDM ++  
AXLH222P025ED  
2200 uF 25VDC  
160603

#### Description

Logo, Polarity Marks  
CDE Part Number  
Capacitance, Rated Voltage (VDC)  
Date Code (Year, Week), Batch Number

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