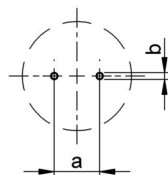
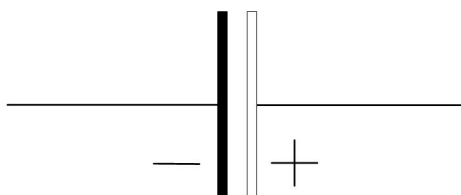


**A Dimensions: [mm]**

|                                              |             |
|----------------------------------------------|-------------|
| <b>D <math>\pm 0.5</math></b>                | <b>13.0</b> |
| <b>P <math>\pm 0.5</math></b>                | <b>5.0</b>  |
| <b>L <math>\pm t</math></b>                  | <b>20.0</b> |
| <b>t</b>                                     | <b>1.5</b>  |
| <b>Pin <math>\varnothing \pm 0.02</math></b> | <b>0.6</b>  |
| <b>a</b>                                     | <b>5.0</b>  |
| <b>b</b>                                     | <b>0.9</b>  |

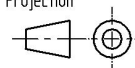
**B Recommended hole pattern: [mm]****C Schematic:****D1 Electrical Properties:**

| Properties                | Test conditions |                     | Value | Unit          | Tol.       |
|---------------------------|-----------------|---------------------|-------|---------------|------------|
| <b>Capacitance</b>        | 0.25V; 120Hz    | C                   | 2700  | $\mu\text{F}$ | $\pm 20\%$ |
| <b>Rated voltage</b>      |                 | $U_R$               | 16    | V (DC)        | max.       |
| <b>Leakage current</b>    | after 1 min.    | $I_{\text{Leak}}$   | 432   | $\mu\text{A}$ | max.       |
| <b>Dissipation factor</b> | 120 Hz          | DF                  | 15    | %             | typ.       |
| <b>Ripple current</b>     | 120Hz @105°C    | $I_{\text{ripple}}$ | 1080  | mA            | max.       |

**E General information:**

|                                           |                                            |
|-------------------------------------------|--------------------------------------------|
| Aluminium Electrolytic Capacitors         |                                            |
| Storage Conditions:                       | 35°C, <45% RH                              |
| Operating Temperature:                    | -40 °C bis +105 °C                         |
| Load Life:                                | 2000 h @ +105°C / 16 V (DC)                |
| Test conditions of Electrical Properties: | 20°C, 33% RH; if not specified differently |
| FIT according to                          | separate documentation                     |

Projection



Würth Elektronik eiSos GmbH & Co. KG  
 EMC & Inductive Solutions  
 Max-Eyth-Str. 1  
 74638 Waldenburg  
 Germany  
 Tel. +49 (0) 79 42 945 - 0  
 www.we-online.com  
 eiSos@we-online.com

DESCRIPTION

## WCAP-ATG5 Aluminum Electrolytic Capacitors

Order.- No.

**860020378022**

Size: 13.0 x 20.0



SIZE

A4

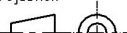


Component Marking:

| Print                | Description                                           |
|----------------------|-------------------------------------------------------|
| 1 <sup>st</sup> Line | Capacitance value: 2700 µF & Rated voltage: 16 V (DC) |
| 2 <sup>nd</sup> Line | WCAP-ATG5 & max. operating temperature +105°C         |
| 3 <sup>rd</sup> Line | Datecode: YWW                                         |
| 4 <sup>th</sup> Line | VENT marking                                          |

D2 Multiplier for Ripple Current vs. Frequency:

| C [µF]/ Frequency [Hz] | 60 (50) | 120  | 400  | 1000 | 10000 | 50000-100000 |
|------------------------|---------|------|------|------|-------|--------------|
| C ≤ 10                 | 0.80    | 1.00 | 1.30 | 1.45 | 1.65  | 1.70         |
| 10 < C ≤ 100           | 0.90    | 1.00 | 1.23 | 1.36 | 1.48  | 1.53         |
| 100 < C ≤ 1000         | 0.10    | 1.00 | 1.16 | 1.25 | 1.35  | 1.38         |
| 1000 < C               | 0.11    | 1.00 | 1.11 | 1.17 | 1.25  | 1.28         |

|     |            |     |         |                                                                                                                                                                                                                                                                          |  |                                                                              |                                                                                                                                                              |                               |
|-----|------------|-----|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
|     |            |     |         | <div>Projection</div>                                                                                                                                                               |  | <div>DESCRIPTION</div> <div>WCAP-ATG5 Aluminum Electrolytic Capacitors</div> |                                                                                                                                                              |                               |
|     |            |     |         |                                                                                                                                                                                                                                                                          |  |                                                                              |                                                                                                                                                              |                               |
|     |            |     |         | <div>Würth Elektronik eiSos GmbH &amp; Co. KG</div> <div>EMC &amp; Inductive Solutions</div> <div>Max-Eyth-Str. 1</div> <div>74638 Waldenburg</div> <div>Germany</div> <div>Tel. +49 (0) 79 42 945 - 0</div> <div>www.we-online.com</div> <div>eiSos@we-online.com</div> |  | <div>Order.- No.</div> <div>860020378022</div> <div>Size: 13.0 x 20.0</div>  | <div><div>COMPLIANT<br/>RoHS&amp;REACH<br/>WÜRTH ELEKTRONIK</div></div> | <div>SIZE</div> <div>A4</div> |
| 1.0 | 2014-11-11 | SSt | PSL     |                                                                                                                                                                                                                                                                          |  |                                                                              |                                                                                                                                                              |                               |
| REV | DATE       | BY  | CHECKED |                                                                                                                                                                                                                                                                          |  |                                                                              |                                                                                                                                                              |                               |

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H Soldering Specifications:



H4: Classification Wave Soldering Profile:



H5: Classification Wave Profile

| Profile Feature                                                                                                                                                                                                                                                                                       | Pb-Free Assembly                           | Sn-Pb Assembly                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------|
| Preheat <ul style="list-style-type: none"><li>- Temperature Min (<math>T_{smin}</math>)</li><li>- Temperature Typical (<math>T_{stypical}</math>)</li><li>- Temperature Max (<math>T_{smax}</math>)</li><li>- Time (<math>t_s</math>) from (<math>T_{smin}</math> to <math>T_{smax}</math>)</li></ul> | 100°C<br>120°C<br>130°C<br>70 seconds      | 100°C<br>120°C<br>130°C<br>70 seconds      |
| $\Delta$ preheat to max Temperature                                                                                                                                                                                                                                                                   | 150°C max.                                 | 150°C max.                                 |
| Peak temperature ( $T_p$ )                                                                                                                                                                                                                                                                            | 250°C - 260°C                              | 235°C - 260°C                              |
| Time of actual peak temperature ( $t_p$ )                                                                                                                                                                                                                                                             | max. 10 seconds<br>max. 5 second each wave | max. 10 seconds<br>max. 5 second each wave |
| Ramp-down rate <ul style="list-style-type: none"><li>- Min</li><li>- Typical</li><li>- Max</li></ul>                                                                                                                                                                                                  | ~ 2 K/s<br>~ 3.5 K/s<br>~ 5 K/s            | ~ 2 K/s<br>~ 3.5 K/s<br>~ 5 K/s            |
| Time 25°C to 25°C                                                                                                                                                                                                                                                                                     | 4 minutes                                  | 4 minutes                                  |

refer to EN 61760-1:2006

## I Cautions and Warnings:

The following conditions apply to all goods within the product series of **WCAP-ATG5** of Würth Elektronik eiSos GmbH & Co. KG:

### 1.1 Polarity

An Aluminum Electrolytic Capacitor has a polarity. In operation this polarity needs to be considered and adhered. Reverse voltage can damage or destroy an Aluminum Electrolytic Capacitor. This can finally lead to a malfunction. If the polarity in a circuit will be switched or possibly can be reversed, the usage of a non-polar capacitor shall be applied. The polarity of an Aluminum Electrolytic Capacitor is for THT radial types marked like following. The terminal with shorter lead wire marks the negative terminal. On the sleeve the negative terminal is marked with a color band and thereon are minus signs given. For further details see technical drawing on A1 dimensions in this datasheet.

### 1.2 Overvoltage

Avoid any overvoltage and do not apply a continuous overvoltage. If an overvoltage is applied to the capacitor, the leakage current can increase drastically. The applied working voltage is not allowed to exceed the rated working voltage of the specific capacitor.

### 1.3 Operating Temperature

The capacitor shall not be operated above the operating temperature, which is stated within this datasheet of the specific capacitor. The achievable lifetime of the capacitor is correlating to the applied temperature. In order to achieve the maximum lifetime, the capacitor should be operated by the lowest possible temperature conditions within the application.

### 1.4 Ripple Current

The applied ripple current shall not exceed the specified maximum ripple current of the capacitor. If a higher ripple current is applied as permitted, it can cause excessive heat generation and higher temperature inside the capacitor. This happens due to pole change effects, if ripple current is applied to the capacitor. This can result in damage or lifetime shortage of the capacitor and may cause deterioration. Electrolytic capacitors are regularly not designed for usage in AC applications and ripple current is applied / based due to parasitic effects on DC signal. Please see electrical specification within this datasheet for maximum allowed ripple current.

### 1.5 Charge and Discharge

Frequent and quick charge / discharge cycles may generate heat inside the capacitor. In worst case this can cause a decrease of capacitance, an increase of leakage current or breakdown. Applications with rapid charge and discharge cycles should be avoided. For assistance with your application please consult our technical support.



### 1.6 Vent

On most Aluminum Electrolytic Types types, a predetermined breaking point is given on the top of the component, which is the so called vent. The vent is there to assure a possible pressure relief and to avoid that the capacitor can explode due to internal pressure, which can occur by applying reverse voltage or a too high ripple current. A space of at least 3mm above the vent is recommended, in order to assure the full function of the vent. If less space is present the vent may be cannot operate correctly / completely.

### 1.7 Sleeve

The sleeve material consists of PVC (polyvinyl-chloride). If excessive heat is applied to the sleeve (e.g. soldering process, etc.) the sleeve may crack or deform. If the capacitor will be exposed to xylene, toluene or likewise and will be afterwards heated, the sleeve may crack or deform. The sleeve does not assure any electrical insulation. It is to avoid to use / place the product on a spot where electrical insulation is needed. To assure electrical insulation, especially to the case of capacitor, further actions need to be taken.

### 1.8 Storage Conditions

The storage conditions for a capacitor are recommended to be 5 °C up to 35 °C and less than 75 % rel. humidity. Do not expose the capacitor to environments with hazardous gas, ozone, ultraviolet rays or any kind of radiation. Avoid any contact of the capacitor with direct sunshine, saltwater, spray of water or types of oil during storage.. If a capacitor is stored for a long time without applying voltage or storage conditions of 35 °C or above and more than 75 % relative humidity, the leakage current may increase. The leakage current will return to normal level when applying the rated voltage to the capacitor before use. If the capacitor was stored for more than 6 months, it is recommended to apply DC working voltage to the capacitor for 30 minutes through a 1 kΩ protective series resistor. All products shall be used before the end of the period of 12 months based on the product date code, if not a 100 % solderability cannot be guaranteed. The capacitance tolerance as specified within the datasheet is only valid on the date of delivery.

### 1.9 Wave Soldering

The detailed soldering instruction is given within Soldering Specification in this datasheet. During wave soldering only the pins / terminals should have contact with hot solder bath / wave. Assure that no direct contact of capacitor body with hot solder bath / wave or any other component will happen. Soldering must be done from the opposite PCB side where capacitor body is placed.

|     |            |    |         |                |  |                                                        |
|-----|------------|----|---------|----------------|--|--------------------------------------------------------|
|     |            |    |         | Projection<br> |  | DESCRIPTION                                            |
|     |            |    |         |                |  | <b>WCAP-ATG5 Aluminum Electrolytic Capacitors</b>      |
|     |            |    |         |                |  | Order.- No.                                            |
|     |            |    |         |                |  | <b>860020378022</b>                                    |
|     |            |    |         |                |  | Size: 13.0 x 20.0                                      |
|     |            |    |         |                |  | COMPLIANT<br><b>RoHS&amp;REACH</b><br>WÜRTH ELEKTRONIK |
|     |            |    |         |                |  | SIZE                                                   |
|     |            |    |         |                |  | A4                                                     |
| 1.0 | 2014-11-11 | SS | PSL     |                |  |                                                        |
| REV | DATE       | BY | CHECKED |                |  |                                                        |

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### I Cautions and Warnings (3):

The following conditions apply to all goods within the product series of **WCAP-ATG5** of Würth Elektronik eiSos GmbH & Co. KG:

#### 1.16 Emergency Case

In case of excessive pressure within the capacitor the vent may operate and release this pressure. In case of vent operation gas becomes visible, when the component is in operation. If so, directly turn off the application and disconnect it from the power source. If the application will not be turned off, a possible short circuit of capacitor or a short circuit due to bridging of liquefied gas can possibly damage the circuit and in worst case the application may be dramatically damaged.

Do not stay or position body or face above or in direction of the vent, because in the event of any vent operation, the releasing gas temperature may have over 100 °C.

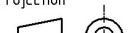
In case of contact with the electrolyte on skin, wash the skin immediately with soap and water. If the eyes will get in contact with the releasing gas, immediately wash the eyes with water. Whether the gas was inhaled, directly use gargle.

#### 1.17 Disposal

Please contact your local responsible or organization for proper disposal of capacitor.

Also take care to be compliant in order to your local governmental law and restrictions. In case incineration, it should be done with more than 800 °C. Lower temperatures at incineration can result in toxic gases (e.g. chlorine). To avoid any explosion of capacitor, punch holes into the can or crush the capacitor before incineration.



|     |            |     |         |                                                                                                                                                                                                                                                                          |  |                                                   |                                                                                       |      |
|-----|------------|-----|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------------------------------|---------------------------------------------------------------------------------------|------|
|     |            |     |         | <div>Projection</div>                                                                                                                                                               |  | DESCRIPTION                                       |                                                                                       |      |
|     |            |     |         |                                                                                                                                                                                                                                                                          |  | <b>WCAP-ATG5 Aluminum Electrolytic Capacitors</b> |                                                                                       |      |
|     |            |     |         | <div>Würth Elektronik eiSos GmbH &amp; Co. KG</div> <div>EMC &amp; Inductive Solutions</div> <div>Max-Eyth-Str. 1</div> <div>74638 Waldenburg</div> <div>Germany</div> <div>Tel. +49 (0) 79 42 945 - 0</div> <div>www.we-online.com</div> <div>eiSos@we-online.com</div> |  | Order.- No.                                       |  | SIZE |
| 1.0 | 2014-11-11 | SSt | PSL     |                                                                                                                                                                                                                                                                          |  | <b>860020378022</b>                               |                                                                                       | A4   |
| REV | DATE       | BY  | CHECKED |                                                                                                                                                                                                                                                                          |  | Size: 13.0 x 20.0                                 |                                                                                       |      |

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## Important Notes:

The following conditions apply to all goods within the product range of Würth Elektronik eiSos GmbH & Co. KG:

### 1. General Customer Responsibility

Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact it is up to the customer to evaluate, where appropriate to investigate and decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not.

### 2. Customer Responsibility related to Specific, in particular Safety-Relevant Applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications.

In certain customer applications requiring a very high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

Therefore, customer is cautioned to verify that data sheets are current before placing orders. The current data sheets can be downloaded at [www.we-online.com](http://www.we-online.com).

### 3. Best Care and Attention

Any product-specific notes, cautions and warnings must be strictly observed. Any disregard will result in the loss of warranty.

### 4. Customer Support for Product Specifications

Some products within the product range may contain substances which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case the field sales engineer or the internal sales person in charge should be contacted who will be happy to support in this matter.

### 5. Product R&D

Due to constant product improvement product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard inform about minor and major changes. In case of further queries regarding the PCN, the field sales engineer or the internal sales person in charge should be contacted. The basic responsibility of the customer as per Section 1 and 2 remains unaffected.



### 6. Product Life Cycle

Due to technical progress and economical evaluation we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this we cannot guarantee that all products within our product range will always be available. Therefore it needs to be verified with the field sales engineer or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered.

The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

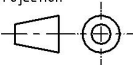
### 7. Property Rights

All the rights for contractual products produced by Würth Elektronik eiSos GmbH & Co. KG on the basis of ideas, development contracts as well as models or templates that are subject to copyright, patent or commercial protection supplied to the customer will remain with Würth Elektronik eiSos GmbH & Co. KG.

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### 8. General Terms and Conditions

Unless otherwise agreed in individual contracts, all orders are subject to the current version of the "General Terms and Conditions of Würth Elektronik eiSos Group", last version available at [www.we-online.com](http://www.we-online.com).

|     |            |     |         |                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                                                                                                                                                                                                                                                                     |
|-----|------------|-----|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     |            |     |         | <div>Projection</div>                                                                                                                                                                                                                                               |                              | <div>DESCRIPTION</div> <div>WCAP-ATG5 Aluminum Electrolytic Capacitors</div> <div>Order.- No.<br/><b>860020378022</b></div> <div> <b>COMPLIANT</b><br/><b>RoHS&amp;REACH</b><br/>WÜRTH ELEKTRONIK</div> <div>SIZE<br/>A4</div> |
|     |            |     |         |                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                                                                                                                                                                                                                                                                     |
|     |            |     |         | <div>Würth Elektronik eiSos GmbH &amp; Co. KG</div> <div>EMC &amp; Inductive Solutions</div> <div>Max-Eyth-Str. 1</div> <div>74638 Waldenburg</div> <div>Germany</div> <div>Tel. +49 (0) 79 42 945 - 0</div> <div><a href="http://www.we-online.com">www.we-online.com</a></div> <div><a href="mailto:eiSos@we-online.com">eiSos@we-online.com</a></div> |                              |                                                                                                                                                                                                                                                                                                                     |
|     |            |     |         |                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                                                                                                                                                                                                                                                                     |
|     |            |     |         |                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                                                                                                                                                                                                                                                                     |
| 1.0 | 2014-11-11 | SSt | PSL     |                                                                                                                                                                                                                                                                                                                                                          |                              |                                                                                                                                                                                                                                                                                                                     |
| REV | DATE       | BY  | CHECKED |                                                                                                                                                                                                                                                                                                                                                          | <div>Size: 13.0 x 20.0</div> |                                                                                                                                                                                                                                                                                                                     |

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