

## ACTH Series

- Feature: Low ESR, Surface mounting, Reduced height, Wide temperature range
- Suitable for DC-DC converters, voltage regulators and decoupling applications
- Rate voltage: 2~25Vdc.
- Endurance: 1000hrs at 125°C
- RoHS Compliant



### Specifications

| Item                       | Conditions                                                                                                                                                                                                               | Characteristics                                                                                                                                    |                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Category Temperature Range |                                                                                                                                                                                                                          | -55 to +125 °C                                                                                                                                     |                                                                                                                  |
| Rated Voltage Range        |                                                                                                                                                                                                                          | 2 to 25Vdc                                                                                                                                         |                                                                                                                  |
| Capacitance Tolerance      | at 20°C, 120Hz                                                                                                                                                                                                           | ±20 % (M) ; Y : +10 ~ -35% ; K : ±10 %                                                                                                             |                                                                                                                  |
| Leakage Current            | at 20°C after 2 minutes                                                                                                                                                                                                  | $I \leq 0.1CV$ (2V.DC to 2.5V.DC)<br>$I \leq 0.3CV$ (16V.DC to 25V.DC)<br>I : Leakage Current(μA), C : Rated Capacitance(μF), V : Rated Voltage(V) |                                                                                                                  |
| Surge Voltage              | 15 to +35°C                                                                                                                                                                                                              | Rated voltage × 1.25 (2 V.DC to 16 V.DC)<br>Rated voltage × 1.15 (20 V.DC to 25 V.DC)                                                              |                                                                                                                  |
| Dissipation Factor (tanδ)  | at 20°C , 120Hz                                                                                                                                                                                                          | ≤ 0.1                                                                                                                                              |                                                                                                                  |
| Endurance                  | 125°C, rated voltage applied, 1000 hrs.                                                                                                                                                                                  | Appearance                                                                                                                                         | No significant damage                                                                                            |
|                            |                                                                                                                                                                                                                          | Capacitance Change                                                                                                                                 | ±20% of the initial value                                                                                        |
|                            |                                                                                                                                                                                                                          | Dissipation Factor                                                                                                                                 | ≤ 200% of the initial specified value                                                                            |
|                            |                                                                                                                                                                                                                          | Leakage Current                                                                                                                                    | within the initial specified value                                                                               |
| Damp Heat, Steady State    | 60°C, 90 to 95%RH, 500 hrs.                                                                                                                                                                                              | Appearance                                                                                                                                         | No significant damage                                                                                            |
|                            |                                                                                                                                                                                                                          | Capacitance Change                                                                                                                                 | (2V.DC to 2.5V.DC)+70%, -20% of the initial value<br>(16V.DC to 25V.DC) +60%, -20% of the initial value          |
|                            |                                                                                                                                                                                                                          | Dissipation Factor                                                                                                                                 | ≤ 200% of the initial specified value                                                                            |
|                            |                                                                                                                                                                                                                          | Leakage Current                                                                                                                                    | 2 V.DC to 2.5 V.DC within the initial specified value<br>10 V.DC to 25 V.DC ≤300% of the initial specified value |
| Surge Voltage              | The capacitors shall be subjected to 1000 cycles each consisting of charge with the surge voltages, 125% rated voltage, at 15~35°C for 30 seconds through a protective resistor(R=1KΩ)and discharge for 5min 30 seconds. | Appearance                                                                                                                                         | No significant damage                                                                                            |
|                            |                                                                                                                                                                                                                          | Capacitance Change                                                                                                                                 | ±10% of the initial value                                                                                        |
|                            |                                                                                                                                                                                                                          | Dissipation Factor                                                                                                                                 | within the initial specified value                                                                               |
|                            |                                                                                                                                                                                                                          | Leakage Current                                                                                                                                    | within the initial specified value                                                                               |
| Solderability              | Pb-free solder<br>Around 25% rosin melted ethanol or isopropylalcohol<br>Temperature : 245 ± 5 °C<br>Immersing time : 2 ± 0.5 s                                                                                          | More than 95% of outer terminal surface to be covered                                                                                              |                                                                                                                  |
| Resistance to Solvents     | Solvent : isopropylalcohol<br>Immersing time : 30 ± 5 s<br>Room temperature                                                                                                                                              | No significant damage and marking readable                                                                                                         |                                                                                                                  |

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Standard Ratings

| WV(VDC) |       | Cap(μF)@120Hz | tanδ Max.<br>@120Hz | Leakage<br>Current<br>Max. (μA) | ESR Max.<br>(mΩ)<br>@100kHz | Ripple Current<br>(A r.m.s)<br>@100kHz | Part No.        |
|---------|-------|---------------|---------------------|---------------------------------|-----------------------------|----------------------------------------|-----------------|
| 105°C   | 125°C |               |                     |                                 |                             |                                        |                 |
| 2       | 1.6   | 330           | 0.1                 | 66.0                            | 9                           | 6.3                                    | ACTH2R0S331E09  |
|         |       | 330           | 0.1                 | 66.0                            | 9                           | 6.3                                    | ACTH2R0S331E09Y |
|         |       | 330           | 0.1                 | 66.0                            | 6                           | 7.5                                    | ACTH2R0S331E06  |
| 2.5     | 2     | 330           | 0.1                 | 82.5                            | 9                           | 6.3                                    | ACTH2R5S331E09  |
|         |       | 330           | 0.1                 | 82.5                            | 9                           | 6.3                                    | ACTH2R5S331E09Y |
|         |       | 330           | 0.1                 | 82.5                            | 6                           | 7.5                                    | ACTH2R5S331E06  |
|         |       | 330           | 0.1                 | 82.5                            | 4.5                         | 8.5                                    | ACTH2R5S331E04  |
| 16      | 16    | 47            | 0.1                 | 225.6                           | 40                          | 3.2                                    | ACTH160S470E40  |
|         |       | 56            | 0.1                 | 268.8                           | 40                          | 3.2                                    | ACTH160S560E40  |
| 25      | 25    | 15            | 0.1                 | 112.5                           | 40                          | 3.2                                    | ACTH250S150E40  |
|         |       | 33            | 0.1                 | 247.5                           | 40                          | 3.2                                    | ACTH250S330E40  |

| Temperature Compensation Multipliers for Ripple Current |          |                 |                  |           |
|---------------------------------------------------------|----------|-----------------|------------------|-----------|
| Temperature                                             | T ≤ 45°C | 45°C < T ≤ 85°C | 85°C < T ≤ 105°C | 125°C < T |
| 2 V.DC to 2.5 V.DC                                      | 1.0      | 0.7             | 0.25             | 0.25      |
| 16 V.DC to 25 V.DC                                      | 1.0      | 0.8             | 0.5              | 0.25      |

PRODUCT IDENTIFICATION

|         |               |             |             |            |                                |
|---------|---------------|-------------|-------------|------------|--------------------------------|
| ACTH    | 2R0           | S           | 471         | E06        |                                |
| Product | Rated Voltage | Case Height | Capacitance | ESR        | Suffix for special code        |
|         | 2R0: 2.0V     | S:1.9mm     | 471=470μF   | E06: 6mΩ   | Y: Capacitance +10 ~ -35%      |
|         |               |             |             | E04: 4.5mΩ | K: Capacitance ±10%            |
|         |               |             |             |            | Blank space: Capacitance ±20 % |

DIMENSIONS AND MARKING

| Case size | L       | WA      | WB      | H       | P       |
|-----------|---------|---------|---------|---------|---------|
| S         | 7.3±0.3 | 4.3±0.3 | 2.4±0.2 | 1.9±0.3 | 1.3±0.2 |

