

# K53-66

TANTALUM SOLID-ELECTROLYTE CAPACITOR

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AZHYAR.673546.005 TU

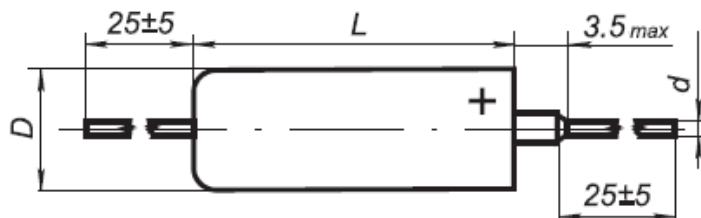
Capacitors are suitable for application in direct current and ripple current circuits. Capacitors are available in all-climate version. Hermetically-sealed design



## MAIN PARAMETERS

| Name   | Value  |
|--|--|
| Rated voltage, V                             | 6.3...50   |
| Rated capacitance, $\mu\text{F}$             | 0.22...1 000   |
| Capacitance tolerance (20°C, 50 Hz), %       | $\pm 10$ ; $\pm 20$ ; $\pm 30$                           |
| Maximum operating temperature $T_{env}$ , °C | +125 for $U_R = 6.3...20$ V<br>+85 for $U_R = 32...50$ V |
| Minimal operating temperature $T_{env}$ , °C | -60  |

## CAPASITOR PHYSICAL CONFIGURATION



| Case code | Dimensions, mm                      |         |         | Mass, g |
|-----------|-------------------------------------|---------|---------|---------|
|           | D, mm                               | L, mm   | d, mm   |         |
| A         | 3.2 <sup>+0.5</sup> <sub>-0.1</sub> | 7.5±0.3 | 0.6±0.1 | 1.0     |
| B         | 4 <sup>+0.5</sup> <sub>-0.1</sub>   | 10±0.3  | 0.6±0.1 | 1.2     |
| C         | 4 <sup>+0.5</sup> <sub>-0.1</sub>   | 13±0.3  | 0.6±0.1 | 1.8     |
| D         | 7 <sup>+0.5</sup> <sub>-0.1</sub>   | 12±0.3  | 0.8±0.1 | 4.5     |
| E         | 7 <sup>+0.5</sup> <sub>-0.1</sub>   | 16±0.3  | 0.8±0.1 | 6.0     |

## CAPACITORS CASE CODE

| C <sub>R</sub> , μF | U <sub>R</sub> , V |     |     |     |     |     |     |
|---------------------|--------------------|-----|-----|-----|-----|-----|-----|
|                     | 6.3                | 10  | 16  | 20  | 32  | 40  | 50  |
| 0.22                |                    |     |     | A   | A   | A   | A   |
| 0.33                |                    |     |     | A   | A   | A   | A   |
| 0.47                |                    |     |     | A   | A   | A   | A   |
| 0.68                | A                  | A   | A   | A   | A   | A   | A   |
| 1                   | A                  | A   | A   | A   | A   | A   | A   |
| 1.5                 | A                  | A   | A   | A   | A   | A   | A   |
| 2.2                 | A                  | A   | A   | A   | A   | A   | A,B |
| 3.3                 | A                  | A   | A   | A   | A   | A   | B   |
| 4.7                 | A                  | A   | A   | A   | A   | A   | B   |
| 6.8                 | A                  | A   | A   | A   | A   | A,B | B,C |
| 10                  | A                  | A   | A   | A   | A,B | B   | C   |
| 15                  | A                  | A   | A   | A,B | B   | B,C | C,D |
| 22                  | A                  | A   | A   | B   | B   | C   | D,E |
| 33                  | A                  | A,B | A,B | B   | B,C | C,D | E   |
| 47                  | A,B                | B   | B   | B,C | C   | D   | E   |
| 68                  | B                  | B   | B   | C,D | C,D | D,E | E   |
| 100                 | B                  | B,C | B,C | D   | D,E | E   |     |
| 150                 | B,C                | C,D | C,D | D,E | E   | E   |     |
| 220                 | C,D                | D   | D   | E   | E   |     |     |
| 330                 | D                  | D,E | D,E | E   | E   |     |     |
| 470                 | D,E                | E   | E   |     |     |     |     |
| 680                 | E                  | E   | E   |     |     |     |     |
| 1000                | E                  | E   |     |     |     |     |     |

## CAPACITORS RELIABILITY

| Reliability Operation modes   | Minimal nonfailure operating time, $t_{\lambda}$ , hours | Capacitor failure rate, $\lambda$ , 1/hour, max |
|---|--|---|
| Maximum-permissible mode ( $U_R$ , $T_{env}=85^{\circ}\text{C}$ )                                     | 30 000   | $5 \times 10^{-7}$                              |
| Maximum-permissible mode ( $0.7U_R$ , $T_{env}=125^{\circ}\text{C}$ ) $U_R=6.3...20\text{ V}$         | 10 000   | $10^{-5}$                                       |
| Light mode ( $U_R$ , $T_{env}=70^{\circ}\text{C}$ )   | 50 000   | $5 \times 10^{-8}$                              |
| Light mode ( $0.2-0.7U_R$ , $T_{env}=70^{\circ}\text{C}$ )  | 120 000  | $5 \times 10^{-9}$                              |
| Light mode ( $0.2-0.7U_R$ , $T_{env}=60^{\circ}\text{C}$ )  | 200 000  | $5 \times 10^{-9}$                              |
| Storageability<br>Gamma-rated time of capacitor storageability $T_{cy}$ at $\gamma=97\%$ , years, min | 25   |   |

## CAPACITOR ELECTRIC PARAMETERS VALUE WHEN DELIVERED

| $U_R$ , V | $C_R$ , $\mu\text{F}$ | $\text{tg } \delta$ , %, $20^{\circ}\text{C}$ , 50 Hz, max | $I_{LEAK}$ , $\mu\text{A}$ , $20^{\circ}\text{C}$ , after 60 sec., max | $Z$ , Ohm, $20^{\circ}\text{C}$ , 10kHz, max |
|-----------|-----------------------|--|--|--|
| 6.3       | 0.68                  | 6  | 1.04   | •  |
| 6.3       | 1                     | 6  | 1.06   | •  |
| 6.3       | 1.5                   | 6  | 1.09   | •  |
| 6.3       | 2.2                   | 6  | 1.13   | •  |
| 6.3       | 3.3                   | 6  | 1.20   | 44   |
| 6.3       | 4.7                   | 6  | 1.29   | 38   |
| 6.3       | 6.8                   | 6  | 1.42   | 28   |
| 6.3       | 10                    | 6  | 1.63   | 25   |
| 6.3       | 15                    | 6  | 1.94   | 14   |
| 6.3       | 22                    | 8  | 2.38   | 12.5   |
| 6.3       | 33                    | 8  | 3.07   | 7.9  |
| 6.3       | 47                    | 8  | 3.96   | 7.3  |
| 6.3       | 68                    | 8  | 5.28   | 7.0  |
| 6.3       | 100                   | 8  | 7.30   | 6.8  |
| 6.3       | 150                   | 15   | 10.45  | 6.4  |
| 6.3       | 220                   | 15   | 13.86  | 5.6  |
| 6.3       | 330                   | 15   | 20.79  | 4.8  |
| 6.3       | 470                   | 20   | 29.61  | 3.2  |
| 6.3       | 680                   | 20   | 42.84  | 2.8  |
| 6.3       | 1 000                 | 25   | 63.00  | 1.9  |

| $U_R, V$ | $C_R, \mu F$ | $tg \delta, \%, 20^\circ C, 50 Hz, max$ | $I_{LEAK}, \mu A, 20^\circ C, after 60 sec., max$ | $Z, Ohm, 20^\circ C, 10kHz, max$ |
|----------|--------------|---|---|----------------------------------|
| 10       | 0.68         | 6                                       | 1.06  | •                                |
| 10       | 1            | 6                                       | 1.10  | •                                |
| 10       | 1.5          | 6                                       | 1.15  | •                                |
| 10       | 2.2          | 6                                       | 1.22  | 50                               |
| 10       | 3.3          | 6                                       | 1.33  | 38                               |
| 10       | 4.7          | 6                                       | 1.47  | 28                               |
| 10       | 6.8          | 6                                       | 1.68  | 25                               |
| 10       | 10           | 6                                       | 2.00  | 14                               |
| 10       | 15           | 6                                       | 2.50  | 12.5                             |
| 10       | 22           | 6                                       | 3.20  | 7.9                              |
| 10       | 33           | 6                                       | 4.30  | 7.3                              |
| 10       | 47           | 6                                       | 5.70  | 5.4                              |
| 10       | 68           | 8                                       | 7.80  | 4.8                              |
| 10       | 100          | 8                                       | 11.00   | 4.0                              |
| 10       | 150          | 15                                      | 15.00   | 3.5                              |
| 10       | 220          | 15                                      | 22.00   | 3.2                              |
| 10       | 330          | 15                                      | 33.00   | 2.8                              |
| 10       | 470          | 15                                      | 47.00   | 1.6                              |
| 10       | 680          | 20                                      | 68.00   | 1.4                              |
| 10       | 1 000        | 25                                      | 100.00  | 1.2                              |
| 16       | 0.68         | 6                                       | 1.10  | •                                |
| 16       | 1            | 6                                       | 1.16  | •                                |
| 16       | 1.5          | 6                                       | 1.24  | •                                |
| 16       | 2.2          | 6                                       | 1.35  | 48                               |
| 16       | 3.3          | 6                                       | 1.52  | 38                               |
| 16       | 4.7          | 6                                       | 1.75  | 28                               |
| 16       | 6.8          | 6                                       | 2.08  | 25                               |
| 16       | 10           | 6                                       | 2.60  | 14                               |
| 16       | 15           | 6                                       | 3.40  | 12.5                             |
| 16       | 22           | 6                                       | 4.52  | 7.9                              |
| 16       | 33           | 6                                       | 6.28  | 7.3                              |
| 16       | 47           | 8                                       | 8.52  | 5.4                              |
| 16       | 68           | 8                                       | 10.88   | 4.8                              |
| 16       | 100          | 8                                       | 16.00   | 4.0                              |
| 16       | 150          | 15                                      | 24.00   | 3.5                              |

| $U_R, V$ | $C_R, \mu F$ | $\text{tg } \delta, \%, 20^\circ C, 50 \text{ Hz, max}$ | $I_{LEAK}, \mu A, 20^\circ C, \text{ after } 60 \text{ sec., max}$ | $Z, \text{ Ohm}, 20^\circ C, 10\text{kHz, max}$ |
|----------|--------------|---|--|---|
| 16       | 220          | 15  | 35.20  | 3.2   |
| 16       | 330          | 20  | 52.80  | 2.8   |
| 16       | 470          | 20  | 75.20  | 1.6   |
| 16       | 680          | 25  | 108.80   | 1.4   |
| 20       | 0.22         | 6   | 1.04   | •   |
| 20       | 0.33         | 6   | 1.06   | •   |
| 20       | 0.47         | 6   | 1.09   | •   |
| 20       | 0.68         | 6   | 1.13   | •   |
| 20       | 1            | 6   | 1.20   | •   |
| 20       | 1.5          | 6   | 1.30   | 60  |
| 20       | 2.2          | 6   | 1.44   | 42  |
| 20       | 3.3          | 6   | 1.66   | 31  |
| 20       | 4.7          | 6   | 1.94   | 25  |
| 20       | 6.8          | 6   | 2.36   | 15.5  |
| 20       | 10           | 6   | 3.00   | 12.5  |
| 20       | 15           | 6   | 4.00   | 8.5   |
| 20       | 22           | 6   | 5.40   | 7.3   |
| 20       | 33           | 8   | 7.60   | 5.4   |
| 20       | 47           | 8   | 10.40  | 4.8   |
| 20       | 68           | 8   | 13.60  | 3.2   |
| 20       | 100          | 8   | 20.00  | 2.8   |
| 20       | 150          | 8   | 30.00  | 1.6   |
| 20       | 220          | 15  | 44.00  | 1.4   |
| 20       | 330          | 15  | 66.00  | 1.2   |
| 32       | 0.22         | 6   | 1.07   | •   |
| 32       | 0.33         | 6   | 1.10   | •   |
| 32       | 0.47         | 6   | 1.15   | •   |
| 32       | 0.68         | 6   | 1.21   | •   |
| 32       | 1            | 6   | 1.32   | 60  |
| 32       | 1.5          | 6   | 1.48   | 48  |
| 32       | 2.2          | 6   | 1.70   | 35  |
| 32       | 3.3          | 6   | 2.05   | 28  |
| 32       | 4.7          | 6   | 2.50   | 18  |
| 32       | 6.8          | 6   | 3.17   | 14  |
| 32       | 10           | 6   | 4.20   | 9.5   |

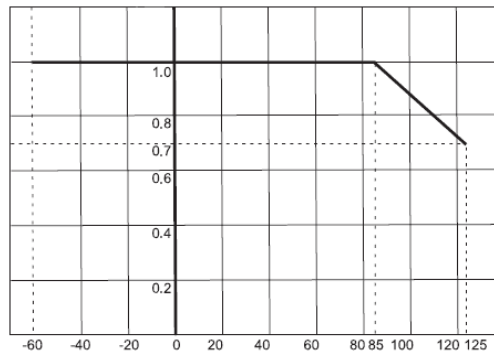
| U <sub>R</sub> , V | C <sub>R</sub> , μF | tg δ, %, 20°C, 50 Hz, max | I <sub>LEAK</sub> , μA, 20°C, after 60 sec., max | Z, Ohm, 20°C, 10kHz, max |
|--------------------|---------------------|---------------------------|--|--------------------------|
| 32                 | 15                  | 6                         | 5.80   | 8.0                      |
| 32                 | 22                  | 8                         | 8.04   | 6.0                      |
| 32                 | 33                  | 8                         | 10.56  | 5.1                      |
| 32                 | 47                  | 8                         | 15.04  | 3.2                      |
| 32                 | 68                  | 8                         | 21.76  | 2.8                      |
| 32                 | 100                 | 8                         | 32.00  | 1.6                      |
| 32                 | 150                 | 8                         | 48.00  | 1.4                      |
| 32                 | 220                 | 15                        | 70.10  | 1.2                      |
| 32                 | 330                 | 15                        | 105.60   | 1.0                      |
| 40                 | 0.22                | 6                         | 1.08   | •                        |
| 40                 | 0.33                | 6                         | 1.13   | •                        |
| 40                 | 0.47                | 6                         | 1.18   | •                        |
| 40                 | 0.68                | 6                         | 1.27   | •                        |
| 40                 | 1                   | 6                         | 1.40   | 60                       |
| 40                 | 1.5                 | 6                         | 1.60   | 44                       |
| 40                 | 2.2                 | 6                         | 1.88   | 32                       |
| 40                 | 3.3                 | 6                         | 2.32   | 21                       |
| 40                 | 4.7                 | 6                         | 2.88   | 16                       |
| 40                 | 6.8                 | 6                         | 3.72   | 11                       |
| 40                 | 10                  | 6                         | 5.00   | 9.0                      |
| 40                 | 15                  | 6                         | 7.00   | 6.5                      |
| 40                 | 22                  | 8                         | 9.80   | 5.1                      |
| 40                 | 33                  | 8                         | 13.20  | 4.8                      |
| 40                 | 47                  | 15                        | 18.80  | 3.2                      |
| 40                 | 68                  | 15                        | 27.20  | 2.8                      |
| 40                 | 100                 | 15                        | 40.00  | 1.6                      |
| 40                 | 150                 | 15                        | 60.00  | 1.4                      |
| 50                 | 0.22                | 6                         | 1.11   | •                        |
| 50                 | 0.33                | 6                         | 1.16   | •                        |
| 50                 | 0.47                | 6                         | 1.23   | •                        |
| 50                 | 0.68                | 6                         | 1.34   | 75                       |
| 50                 | 1                   | 6                         | 1.50   | 60                       |
| 50                 | 1.5                 | 6                         | 1.75   | 44                       |
| 50                 | 2.2                 | 6                         | 2.10   | 32                       |
| 50                 | 3.3                 | 6                         | 2.65   | 21                       |

| $U_R, V$ | $C_R, \mu F$ | $tg \delta, \%, 20^\circ C, 50 Hz, max$ | $I_{LEAK}, \mu A, 20^\circ C, after 60 sec., max$ | $Z, Ohm, 20^\circ C, 10kHz, max$ |
|----------|--------------|---|---|----------------------------------|
| 50       | 4.7          | 6                                       | 3.35  | 16                               |
| 50       | 6.8          | 6                                       | 4.40  | 11                               |
| 50       | 10           | 6                                       | 6.00  | 9.0                              |
| 50       | 15           | 6                                       | 8.50  | 6.5                              |
| 50       | 22           | 8                                       | 11.00   | 5.1                              |
| 50       | 33           | 8                                       | 16.50   | 4.8                              |
| 50       | 47           | 15                                      | 23.50   | 3.2                              |
| 50       | 68           | 15                                      | 34.00   | 2.8                              |

• – Value is not normalized

### VOLTAGE VERSUS TEMPERATURE

$$\frac{U_T}{U_R}$$



$T, ^\circ C$

### EXAMPLE OF REFERENCE DESIGNATION FOR ORDERING

CAPACITOR K53-66 "A" – 6.3V – 4.7 $\mu$ F  $\pm$ 20% AZHYAR.673546.005 TU