

CHIP TANTALUM CAPACITOR LOW ESR - SMD

FEATURES

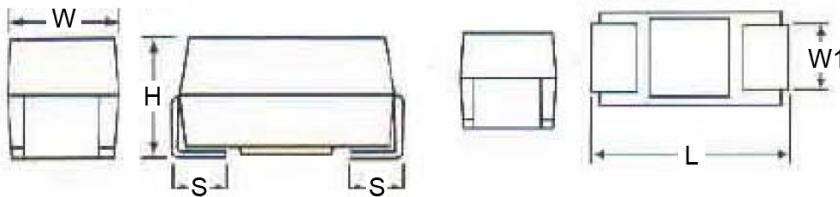
- Operating temperature Range: $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$ ($>80^{\circ}\text{C}$ with rated volted darating)
- Laser-markec Case
- Capacitance tolerance: $\pm 20\%$; $\pm 10\%$ (for special order)
- DC leakage at 25°C : $10^{-6} \leq 0.01 \text{ Cr}$ or 0.5 Ma (Whichever is greater)
- Dimensions rated voltage and nominal capacitance Please see Table 1 & 2 and Figure 1

INTRODUCTION

The TS20L Series is low ESR tantalum chip capacitor suitable

For SMT electric board used for telecommunication computer camcorder and mobile phone set and so on

Low ESR value conform with EIA535BAAC size: Tape and Reeled per EIA481-1



| case | L | W | H | S | W1 |
|------|---------|---------|---------|---------|---------|
| S | 2.0+0.2 | 1.3-0.2 | 1.2+0.2 | 0.5+0.3 | 1.2+0.1 |
| A | 3.2+0.2 | 1.6-0.2 | 1.6+0.2 | 0.8-0.3 | 1.2+0.1 |
| B | 3.5+0.2 | 2.8+0.2 | 1.8+0.2 | 0.8+0.3 | 2.2+0.1 |
| C | 6.0+0.3 | 3.2+0.3 | 2.5+0.3 | 1.3+0.3 | 2.2+0.1 |
| D | 7.3+0.3 | 4.3+0.3 | 2.8+0.3 | 1.3+0.3 | 2.4+0.1 |
| E | 7.3+0.3 | 4.3+0.3 | 4.0+0.3 | 1.3+0.3 | 2.4+0.1 |

ELECTROLYTE CHARACTERISTICS OF TS20L TANTALUM CHIP CAPACITOR

| Capacitance (μF) | Case Size | (U_a @ $+25^{\circ}\text{C}$ Max) DC Leakage | DF (%) @ 25°C @120Hz (Max) | ESR (Ω) @ 25°C @100KHZ (Max) |
|--|--------------|--|--|---|
| 4Volt Rating at $+85^{\circ}\text{C}$ (2.7Volt Rating $+125^{\circ}\text{C}$) | | | | |
| 3.3 | A | 0.5 | 6.0 | 4.0 |
| 4.7 | A | 0.5 | 6.0 | 3.5 |
| 6.8 | A | 0.5 | 6.0 | 3.0 |
| 10 | B | 0.5 | 6.0 | 1.2 |
| 10 | A | 0.5 | 6.0 | 2.0 |
| 10 | S | 0.6 | 6.0 | 6.0 |
| 15 | B | 0.6 | 6.0 | 1.2 |
| 15 | A | 0.6 | 6.0 | 1.5 |
| 22 | C | 0.9 | 6.0 | 0.5 |
| 22 | B | 0.9 | 6.0 | 0.6 |
| 22 | A | 0.9 | 6.0 | 1.5 |
| 33 | C | 1.3 | 6.0 | 0.5 |
| 33 | B | 1.3 | 6.0 | 0.5 |
| 33 | A | 1.3 | 6.0 | 3.0 |
| 47 | C | 1.9 | 6.0 | 0.5 |
| 47 | B | 1.9 | 6.0 | 0.5 |
| 47 | A | 1.9 | 12.0 | 2.0 |
| 68 | D | 2.7 | 6.0 | 0.2 |
| 68 | C | 2.7 | 6.0 | 0.25 |
| 68 | B | 2.7 | 6.0 | 2.0 |
| 100 | D | 4.0 | 8.0 | 0.2 |
| 100 | C | 4.0 | 8.0 | 0.2 |
| 100 | B | 4.0 | 10 | 0.6 |
| 150 | D | 6.0 | 8.0 | 0.15 |
| 150 | C | 6.0 | 8.0 | 0.3 |
| 220 | D | 8.8 | 8.0 | 0.15 |
| 330 | D | 13.2 | 8.0 | 0.15 |
| 470 | E | 18.8 | 8.0 | 0.15 |
| 470 | D | 18.8 | 8.0 | 0.15 |

| Capacitance (μF) | Case Size | (U_a @ $+25^{\circ}\text{C}$ Max) DC Leakage | DF (%) @ 25°C @120Hz (Max) | ESR (Ω) @ 25°C @100KHZ (Max) |
|--|--------------|--|--|---|
| 6.3Volt Rating at $+85^{\circ}\text{C}$ (4Volt Rating $+125^{\circ}\text{C}$) | | | | |
| 2.2 | A | 0.5 | 6.0 | 6.0 |
| 3.3 | A | 0.5 | 6.0 | 6.0 |
| 4.7 | A | 0.5 | 6.0 | 3.5 |
| 6.8 | B | 0.5 | 6.0 | 1.2 |
| 6.8 | A | 0.5 | 6.0 | 2.0 |
| 6.8 | S | 0.5 | 6.0 | 8.0 |
| 10 | B | 0.6 | 6.0 | 1.0 |
| 10 | A | 0.6 | 6.0 | 2.0 |
| 10 | S | 0.6 | 8.0 | 6.0 |
| 15 | C | 0.9 | 6.0 | 0.6 |
| 15 | B | 0.9 | 6.0 | 0.7 |
| 15 | A | 0.9 | 6.0 | 2.0 |
| 22 | C | 1.4 | 6.0 | 0.5 |
| 22 | B | 1.4 | 6.0 | 0.6 |
| 22 | A | 1.4 | 6.0 | 3.0 |
| 33 | C | 2.0 | 6.0 | 0.3 |
| 33 | B | 2.0 | 6.0 | 0.6 |
| 33 | A | 2.0 | 12.0 | 2.0 |
| 47 | D | 2.9 | 6.0 | 0.22 |
| 47 | C | 2.9 | 6.0 | 0.25 |
| 47 | B | 2.9 | 6.0 | 2.0 |
| 68 | D | 4.1 | 6.0 | 0.2 |
| 68 | C | 4.1 | 6.0 | 0.2 |
| 100 | D | 6.0 | 8.0 | 0.15 |
| 100 | C | 6.0 | 8.0 | 0.3 |
| 150 | D | 9.0 | 8.0 | 0.15 |
| 150 | C | 9.0 | 8.0 | 0.3 |
| 220 | E | 13.2 | 8.0 | 0.15 |
| 220 | D | 13.2 | 8.0 | 0.15 |
| 330 | E | 19.8 | 8.0 | 0.15 |
| 330 | D | 19.8 | 8.0 | 0.15 |
| 470 | E | 28.2 | 10.0 | 0.1 |

CHIP TANTALUM CAPACITOR LOW ESR - SMD

| Capacitance (μ F) | Case Size | (μ a@+25°C Max) DC Leakage | DF (%) @25°C @120Hz (Max) | ESR (Ω) @25°C @100KHZ (Max) |
|---|--------------|------------------------------------|---------------------------------|--|
| 10Volt Rating at +85°C(7.0Volt Rating+125°C) | | | | |
| 1.5 | A | 0.5 | 6.0 | 6.0 |
| 2.2 | A | 0.5 | 6.0 | 6.0 |
| 3.3 | A | | 6.0 | 4.0 |
| 4.7 | B | 0.5 | 6.0 | 1.5 |
| 4.7 | A | 0.5 | 6.0 | 3.0 |
| 4.7 | S | 0.5 | 8.0 | 8.0 |
| 6.8 | B | 0.7 | 6.0 | 1.2 |
| 6.8 | A | 0.7 | 6.0 | 3.0 |
| 10.0 | C | 1.0 | 6.0 | 0.6 |
| 10.0 | B | 1.0 | 6.0 | 0.8 |
| 10.0 | A | 1.0 | 6.0 | 2.0 |
| 15.0 | C | 1.5 | 6.0 | 0.5 |
| 15.0 | B | 1.5 | 6.0 | 0.7 |
| 15.0 | A | 1.5 | 8.0 | 4.0 |
| 22.0 | C | 2.2 | 6.0 | 0.4 |
| 22.0 | B | 2.2 | 6.0 | 0.7 |
| 33.0 | D | 3.3 | 6.0 | 0.25 |
| 33.0 | C | 3.3 | 6.0 | 0.3 |
| 33.0 | B | 3.3 | 6.0 | 2.0 |
| 47.0 | D | 4.7 | 6.0 | 0.22 |
| 47.0 | C | 4.7 | 6.0 | 0.3 |
| 68.0 | D | 6.8 | 6.0 | 0.2 |
| 68.0 | C | 6.8 | 6.0 | 0.3 |
| 100.0 | D | 10.0 | 8.0 | 0.15 |
| 100.0 | C | 10.0 | 8.0 | 0.3 |
| 150.0 | E | 15.0 | 8.0 | 0.15 |
| 150.0 | D | 15.0 | 8.0 | 0.15 |
| 220.0 | E | 22.0 | 8.0 | 0.15 |
| 220.0 | D | 22.0 | 8.0 | 0.15 |
| 330.0 | E | 33.0 | 10.0 | 0.10 |
| 20Volt Rating at +85°C(13Volt Rating+125°C) | | | | |
| 0.68 | A | 0.5 | 4.0 | 8.0 |
| 1.0 | A | 0.5 | 4.0 | 5.5 |
| 1.5 | A | 0.5 | 6.0 | 4.5 |
| 2.2 | B | 0.5 | 6.0 | 1.5 |
| 2.2 | A | 0.5 | 6.0 | 4.0 |
| 3.3 | B | 0.7 | 6.0 | 1.3 |
| 3.3 | A | 0.7 | 6.0 | 4.0 |
| 4.7 | C | 1.0 | 6.0 | 0.6 |
| 4.7 | B | 1.0 | 6.0 | 1.0 |
| 4.7 | A | 1.0 | 6.0 | 3.5 |
| 6.8 | C | 1.4 | 6.0 | 0.6 |
| 6.8 | B | 1.4 | 6.0 | 1.0 |
| 10.0 | C | 2.0 | 6.0 | 0.5 |
| 10.0 | B | 2.0 | 6.0 | 1.0 |
| 15.0 | D | 3.0 | 6.0 | 0.36 |
| 15.0 | C | 3.0 | 6.0 | 0.4 |
| 22.0 | D | 4.4 | 6.0 | 0.3 |
| 22.0 | C | 4.4 | 6.0 | 0.4 |
| 33.0 | D | 6.6 | 6.0 | 0.25 |
| 33.0 | C | 6.6 | 6.0 | 0.4 |
| 47.0 | D | 9.4 | 6.0 | 0.2 |
| 68.0 | E | 13.6 | 6.0 | 0.2 |
| 68.0 | D | 13.6 | 8.0 | 0.2 |
| 100.0 | E | 20.0 | 8.0 | 0.15 |

| Capacitance (μ F) | Case Size | (μ a@+25°C Max) DC Leakage | DF (%) @25°C @120Hz (Max) | ESR (Ω) @25°C @100KHZ (Max) |
|--|--------------|------------------------------------|---------------------------------|--|
| 16Volt Rating at +85°C (10Volt Rating +125°C) | | | | |
| 1.0 | A | 0.5 | 4.0 | 6.0 |
| 1.5 | A | 0.5 | 6.0 | 6.0 |
| 2.2 | A | 0.5 | 6.0 | 4.0 |
| 2.2 | S | 0.5 | 8.0 | 20.0 |
| 3.3 | A | 0.5 | 6.0 | 4.0 |
| 3.3 | B | 0.5 | 6.0 | 2.0 |
| 4.7 | B | 0.8 | 6.0 | 1.5 |
| 4.7 | A | 0.8 | 6.0 | 3.0 |
| 6.8 | C | 1.1 | 6.0 | 0.8 |
| 6.8 | B | 1.1 | 6.0 | 1.2 |
| 6.8 | A | 1.1 | 6.0 | 3.0 |
| 10.0 | C | 1.6 | 6.0 | 0.6 |
| 10.0 | B | 1.6 | 6.0 | 0.8 |
| 15.0 | C | 2.4 | 6.0 | 0.4 |
| 15.0 | B | 2.4 | 6.0 | 0.8 |
| 22.0 | D | 3.6 | 6.0 | 0.25 |
| 22.0 | C | 3.6 | 6.0 | 0.35 |
| 33.0 | D | 5.3 | 6.0 | 0.25 |
| 33.0 | C | 5.3 | 6.0 | 0.3 |
| 47.0 | D | 7.5 | 6.0 | 0.2 |
| 47.0 | C | 7.5 | 6.0 | 0.55 |
| 68.0 | D | 10.9 | 6.0 | 0.15 |
| 100.0 | E | 16.0 | 8.0 | 0.15 |
| 100.0 | D | 16.0 | 8.0 | 0.15 |
| 150.0 | E | 24.0 | 8.0 | 0.15 |

| 25Volt Rating at +85°C (17Volt Rating +125°C) | | | | |
|--|---|------|-----|------|
| 0.33 | A | 0.5 | 4.0 | 10.0 |
| 0.47 | A | 0.5 | 4.0 | 9.0 |
| 0.68 | A | 0.5 | 4.0 | 6.0 |
| 1.0 | B | 0.5 | 4.0 | 2.0 |
| 1.0 | A | 0.5 | 4.0 | 4.0 |
| 1.5 | B | 0.5 | 6.0 | 1.5 |
| 1.5 | A | 0.5 | 6.0 | 5.0 |
| 2.2 | C | 0.6 | 6.0 | 1.2 |
| 2.2 | B | 0.6 | 6.0 | 2.2 |
| 3.3 | C | 0.9 | 6.0 | 1.2 |
| 3.3 | B | 0.9 | 6.0 | 2.0 |
| 4.7 | C | 1.2 | 6.0 | 0.6 |
| 4.7 | B | 1.2 | 6.0 | 1.0 |
| 6.8 | C | 1.7 | 6.0 | 0.6 |
| 10.0 | D | 2.5 | 6.0 | 0.4 |
| 10.0 | C | 2.5 | 6.0 | 0.6 |
| 15.0 | D | 3.8 | 6.0 | 0.4 |
| 15.0 | C | 3.8 | 6.0 | 0.9 |
| 22.0 | D | 5.5 | 6.0 | 0.4 |
| 33.0 | E | 8.3 | 6.0 | 0.3 |
| 33.0 | D | 8.3 | 6.0 | 0.4 |
| 47.0 | E | 11.8 | 6.0 | 0.3 |

CHIP TANTALUM CAPACITOR LOW ESR - SMD

| Capacitance (μ F) | Case Size | (μ a@+25°C Max) DC Leakage | DF (%) @25°C @120Hz (Max) | ESR (Ω) @25°C @100KHZ (Max) |
|--|--------------|------------------------------------|---------------------------------|--|
| 35Volt Rating at +85°C(23Volt Rating+125°C) | | | | |
| 0.1 | A | 0.5 | 4.0 | 10.0 |
| 0.15 | A | 0.5 | 4.0 | 6.0 |
| 0.22 | A | 0.5 | 4.0 | 6.0 |
| 0.33 | A | 0.5 | 4.0 | 6.0 |
| 0.47 | B | 0.5 | 4.0 | 2.5 |
| 0.47 | A | 0.5 | 4.0 | 4.0 |
| 0.68 | B | 0.5 | 4.0 | 2.5 |
| 0.68 | A | 0.5 | 4.0 | 6.0 |
| 1.0 | B | 0.5 | 4.0 | 2.0 |
| 1.0 | A | 0.5 | 4.0 | 6.0 |
| 1.5 | C | 0.5 | 6.0 | 2.5 |
| 1.5 | B | 0.5 | 6.0 | 3.0 |
| 2.2 | C | 0.8 | 6.0 | 1.5 |
| 2.2 | B | 0.8 | 6.0 | 2.5 |
| 3.3 | C | 1.2 | 8.0 | 0.8 |
| 3.3 | B | 1.2 | 6.0 | 2.0 |
| 4.7 | D | 1.7 | 6.0 | 0.7 |
| 4.7 | C | 1.7 | 6.0 | 0.7 |
| 6.8 | D | 2.4 | 6.0 | 0.5 |
| 6.8 | C | 2.4 | 6.0 | 0.9 |
| 10.0 | D | 3.5 | 6.0 | 0.4 |
| 10.0 | C | 3.5 | 6.0 | 1.2 |
| 15.0 | E | 5.3 | 6.0 | 0.3 |
| 15.0 | D | 5.3 | 6.0 | 0.35 |
| 22.0 | E | 7.7 | 6.0 | 0.3 |
| 22.0 | D | 7.7 | 6.0 | 0.4 |

| Capacitance (μ F) | Case Size | (μ a@+25°C Max) DC Leakage | DF (%) @25°C @120Hz (Max) | ESR (Ω) @25°C @100KHZ (Max) |
|--|--------------|------------------------------------|---------------------------------|--|
| 50Volt Rating at +85°C (30Volt Rating +125°C) | | | | |
| 0.1 | A | 0.5 | 4.0 | 10.0 |
| 0.15 | B | 0.5 | 4.0 | 10.0 |
| 0.15 | A | 0.5 | 4.0 | 10.0 |
| 0.22 | B | 0.5 | 4.0 | 10.0 |
| 0.33 | B | 0.5 | 4.0 | 2.5 |
| 0.47 | C | 0.5 | 4.0 | 1.8 |
| 0.47 | B | 0.5 | 4.0 | 2.0 |
| 0.68 | C | 0.5 | 4.0 | 1.6 |
| 0.68 | B | 0.5 | 4.0 | 3.0 |
| 1.0 | C | 0.5 | 4.0 | 1.6 |
| 1.5 | D | 0.8 | 6.0 | 1.0 |
| 1.5 | C | 0.8 | 6.0 | 1.5 |
| 2.2 | D | 1.1 | 6.0 | 0.8 |
| 2.2 | C | 1.1 | 6.0 | 1.5 |
| 3.3 | D | 1.7 | 6.0 | 0.8 |
| 4.7 | D | 2.4 | 6.0 | 0.6 |
| 6.8 | E | 3.5 | 6.0 | 0.5 |