

CA45 Chip Tantalum Capacitors.

Features

Solid tantalum chip capacitors designed and manufactured with the demanding requirements of surface mount technology in mind. There are A,B,C,D four case codes. They have lower ESR Compared with the dipped tantalum capacitors .The product compatible with automatic pick and place equipment. Suitable for military equipment and computer ,ceil telephone and other electronic products. Meets the requirements of EIA 535BAAC and QC300801 , Q/YHC.45-01 standard.

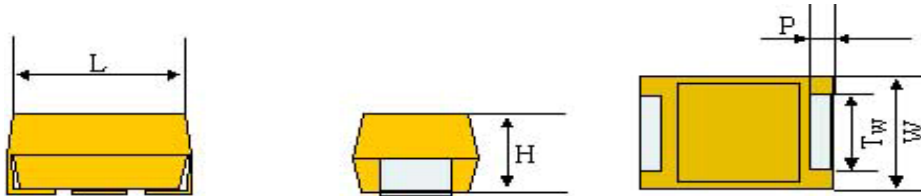
General Characteristics

- I. Operating temperature: $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$ (above 85°C ,use derated voltage).
- II. Capacitance Tolerance: $\pm 20\%, \pm 10\%$.
- III. Capacitance Range: $0.1\mu\text{F} \sim 100\mu\text{F}$.
- IV. Voltage Rating: $4\text{V} \sim 35\text{V}$.
- V. DC leakage current(20°C): $I_0 < = 0.01C_R U_R$ or $0.5\mu\text{A}$ (whichever is greater) .
- VI. Dissipation factor (20°C): see table 1.
- VII. Temperature performance: see table 1.
- VIII. Climatic category: 55/125/21.
- IX. Life test: 2000 hours.
- X. Reliability: 2% per 1000h at 85°C with 0.10/V series impedance 60% confidence level.

Table 1

| Cap. (μF) | Capacitance Change (%) | | | Max D.F (%) | | | | Max DCL (μA) | |
|---------------------------|---------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|------------------------|---------------------------|------------------------|
| | -55°C | $+85^{\circ}\text{C}$ | $+125^{\circ}\text{C}$ | -55°C | $+20^{\circ}\text{C}$ | $+85^{\circ}\text{C}$ | $+125^{\circ}\text{C}$ | $+85^{\circ}\text{C}$ | $+125^{\circ}\text{C}$ |
| ≤ 1.0 | | | | 6 | 4 | 6 | 6 | | |
| 1.5~68 | -10 | +10 | +12 | 8 | 6 | 8 | 8 | $10 I_0$ | $12 I_0$ |
| ≥ 100 | | | | 10 | 8 | 10 | 10 | | |

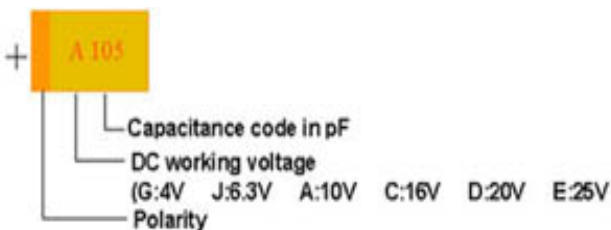
Exterior Dimension



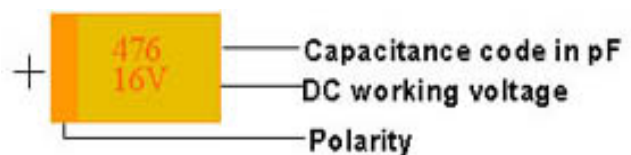
| CASE | EIA/IECQ | L | W | H | P | T_W |
|------|----------|---------|---------|---------|---------|---------|
| A | 3216 | 3.2-0.2 | 1.6-0.2 | 1.6-0.2 | 0.8-0.3 | 1.2-0.1 |
| B | 3528 | 3.5-0.2 | 2.8-0.2 | 1.9-0.2 | 0.8-0.3 | 2.2-0.1 |
| C | 6032 | 6.0-0.3 | 3.2-0.3 | 2.5-0.3 | 1.3-0.3 | 2.2-0.1 |
| D | 7343 | 7.3-0.3 | 4.3-0.3 | 2.8-0.3 | 1.3-0.3 | 2.4-0.1 |

Marking Specification

A Size 10V 105



B,C,D Size 16V 476



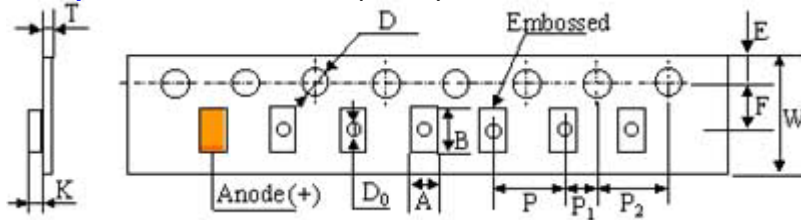
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Rating And Case Code

| C (μ F) DC (V) | 0.1~ 0.33 | 0.47 | 0.68 | 1 | 1.5 | 2.2 | 3.3 | 4.7 | 6.8 | 10 | 15 | 22 | 33 | 47 | 68 | 100 |
|-------------------|--------------|------|------|----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|
| 4 | | | | | | A | A | A | BA | BA | B | CB | C | DC | DC | DC |
| 6.3 | | | | | A | A | A | BA | BA | BA | CB | CB | DC | DC | DC | DC |
| 10 | | | | A | A | A | BA | BA | BA | CB | C | C | DC | DC | D | D |
| 16 | | | A | A | A | BA | BA | B | CB | CB | C | DC | D | D | D | |
| 20 | | A | A | A | B | B | B | CB | C | DC | D | D | D | | | |
| 25 | A | A | A | BA | B | B | CB | C | DC | DC | D | D | | | | |
| 35 | A | BA | B | B | C | C | C | DC | D | D | | | | | | |

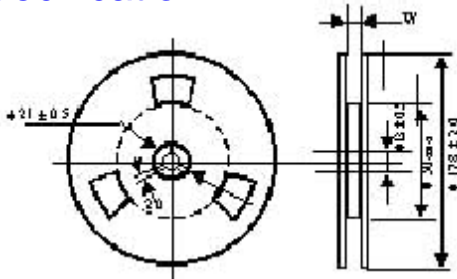
Black is standard range, red is extended range.

Carrier Tape Dimension (mm)



| Case Code | W | F | E | P | P1 | P2 | D | D ₀ | T | A | B | K |
|-----------|------|------|------|------|------|------|------|----------------|-------|------|------|------|
| | -0.3 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | 0.1 | (min) | ±0.03 | ±0.2 | ±0.2 | ±0.2 |
| A | 8 | 3.5 | 1.75 | 4 | 2 | 4 | φ1.5 | φ1.0 | 0.2 | 1.9 | 3.5 | 1.9 |
| B | 8 | 3.5 | 1.75 | 4 | 2 | 4 | φ1.5 | φ1.0 | 0.3 | 3.3 | 3.8 | 2.1 |
| C | 12 | 5.5 | 1.75 | 8 | 2 | 4 | φ1.5 | φ1.0 | 0.3 | 3.7 | 6.4 | 3 |
| D | 12 | 5.5 | 1.75 | 8 | 2 | 4 | φ1.5 | φ1.0 | 0.3 | 4.8 | 7.7 | 3.3 |

Reel specification



| Case size | W | Qty/reel (178mm) |
|-----------|----------------------------------|------------------|
| A、B | 8.4 ^{+1.5} ₀ | 2000 |
| C、D | 12.4 ⁺² ₀ | 500 |

How To Order (CA45 106 M 035 D T)

| CA45 | 106 | M | 035 | D | T |
|--------------------------|--|------------------|--|--|---------------------------------|
| Type | Capacitance | Tolerance | DC voltage | Case Size | Packaging |
| Chip Tantalum Capacitors | 105 10X10 ⁵ (pF) This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow. | K=-10% M=-20% | Rated voltage 4V=004 6.3V=006 10V=010 16V=016 25V=025 35V=035 50V=050 | A:3.2*1.6 B:3.5*2.8 C:6.0*3.2 D:7.3*4.3 | T= Tape and reel B=bulk pack |

CA45 Chip Tantalum Capacitors.

CA45 Rating And Part Number Performance

| Cap. (F) | Case Size | YHC Part Nubmer | DC Leakage A +25°C Max | DF % +25°C 120Hz Max | ESR Ω +25°C 100khz Max | Cap. (F) | Case Size | YHC Part Nubmer | DC Leakage A +25°C Max | DF % +25°C 120Hz Max | ESR Ω +25°C 100khz Max |
|---------------|--------------|--------------------|------------------------------------|----------------------------------|------------------------------------|---------------|--------------|--------------------|------------------------------------|----------------------------------|------------------------------------|
|---------------|--------------|--------------------|------------------------------------|----------------------------------|------------------------------------|---------------|--------------|--------------------|------------------------------------|----------------------------------|------------------------------------|

4 Volt Rating at +85°C (2.5Volt Rating at +125°C)

| | | | | | |
|-----|---|--------------|-----|---|-----|
| 2.2 | A | CA45225M004A | 0.5 | 6 | 8 |
| 3.3 | A | CA45335M004A | 0.5 | 6 | 8 |
| 4.7 | A | CA45475M004A | 0.5 | 6 | 8 |
| 6.8 | A | CA45685M004A | 0.5 | 6 | 6 |
| 6.8 | B | CA45685M004B | 0.5 | 6 | 6 |
| 10 | A | CA45106M004A | 0.5 | 6 | 6 |
| 10 | B | CA45106M004B | 0.5 | 6 | 3.5 |
| 15 | B | CA45156M004B | 0.6 | 6 | 3.5 |
| 22 | B | CA45226M004B | 0.9 | 6 | 3.5 |
| 22 | C | CA45226M004C | 0.9 | 6 | 1.8 |
| 33 | C | CA45336M004C | 1.3 | 6 | 1.8 |
| 47 | C | CA45476M004C | 1.9 | 6 | 1.8 |
| 68 | C | CA45686M004C | 2.7 | 6 | 1.6 |
| 68 | D | CA45686M004D | 2.7 | 6 | 0.8 |
| 100 | C | CA45107M004C | 4 | 8 | 1.2 |
| 100 | D | CA45107M004D | 4 | 8 | 0.8 |

10 Volt Rating at +85°C (6.3 Volt Rating at +125°C)

| | | | | | |
|-----|---|--------------|-----|---|-----|
| 1 | A | CA45105M010A | 0.5 | 4 | 8 |
| 1.5 | A | CA45155M010A | 0.5 | 6 | 8 |
| 2.2 | A | CA45225M010A | 0.5 | 6 | 8 |
| 3.3 | A | CA45335M010A | 0.5 | 6 | 6 |
| 3.3 | B | CA45335M010B | 0.5 | 6 | 6 |
| 4.7 | A | CA45475M010A | 0.5 | 6 | 6 |
| 4.7 | B | CA45475M010B | 0.5 | 6 | 3.5 |
| 6.8 | A | CA45685M010A | 0.7 | 6 | 6 |
| 6.8 | B | CA45685M010B | 0.7 | 6 | 3.5 |
| 10 | B | CA45106M010B | 1 | 6 | 3.5 |
| 10 | C | CA45106M010C | 1 | 6 | 1.8 |
| 15 | C | CA45156M010C | 1.5 | 6 | 1.8 |
| 22 | C | CA45226M010C | 2.2 | 6 | 1.8 |
| 33 | C | CA45336M010C | 3.3 | 6 | 1.8 |
| 33 | D | CA45336M010D | 3.3 | 6 | 0.8 |
| 47 | C | CA45476M010C | 4.7 | 6 | 1.2 |
| 47 | D | CA45476M010D | 4.7 | 6 | 0.8 |
| 68 | D | CA45686M010D | 6.8 | 6 | 0.8 |
| 100 | D | CA45107M010D | 10 | 8 | 0.7 |

6 Volt Rating at +85°C (4 Volt Rating at +125°C)

| | | | | | |
|-----|---|--------------|-----|---|-----|
| 1.5 | A | CA45155M006A | 0.5 | 6 | 8 |
| 2.2 | A | CA45225M006A | 0.5 | 6 | 8 |
| 3.3 | A | CA45335M006A | 0.5 | 6 | 8 |
| 4.7 | A | CA45475M006A | 0.5 | 6 | 6 |
| 4.7 | B | CA45475M006B | 0.5 | 6 | 6 |
| 6.8 | A | CA45685M006A | 0.5 | 6 | 6 |
| 6.8 | B | CA45685M006B | 0.5 | 6 | 3.5 |
| 10 | A | CA45106M006A | 0.6 | 6 | 4 |
| 10 | B | CA45106M006B | 0.6 | 6 | 3.5 |
| 15 | B | CA45156M006B | 0.9 | 6 | 3.5 |
| 15 | C | CA45156M006C | 0.9 | 6 | 1.8 |
| 22 | B | CA45226M006B | 1.3 | 6 | 3.5 |
| 22 | C | CA45226M006C | 1.3 | 6 | 1.8 |
| 33 | C | CA45336M006C | 2 | 6 | 1.8 |
| 33 | D | CA45336M006D | 2 | 6 | 1.8 |
| 47 | C | CA45476M006C | 2.8 | 6 | 1.6 |
| 47 | D | CA45476M006D | 2.8 | 6 | 0.8 |
| 68 | C | CA45686M006C | 4.1 | 6 | 1.2 |
| 68 | D | CA45686M006D | 4.1 | 6 | 0.8 |
| 100 | C | CA45107M006C | 6 | 8 | 1.2 |
| 100 | D | CA45107M006D | 6 | 8 | 0.8 |

16 Volt Rating at +85°C (10 Volt Rating at +125°C)

| | | | | | |
|------|---|--------------|------|---|-----|
| 0.68 | A | CA45684M016A | 0.5 | 4 | 10 |
| 1 | A | CA45105M016A | 0.5 | 4 | 10 |
| 1.5 | A | CA45155M016A | 0.5 | 6 | 8 |
| 2.2 | A | CA45225M016A | 0.5 | 6 | 6 |
| 2.2 | B | CA45225M016B | 0.5 | 6 | 6 |
| 3.3 | A | CA45335M016A | 0.5 | 6 | 6 |
| 3.3 | B | CA45335M016B | 0.5 | 6 | 3.5 |
| 4.7 | B | CA45475M016B | 0.75 | 6 | 3.5 |
| 6.8 | B | CA45685M016B | 1.1 | 6 | 3.5 |
| 6.8 | C | CA45685M016C | 1.1 | 6 | 1.9 |
| 10 | B | CA45106M016B | 1.6 | 6 | 3.5 |
| 10 | C | CA45106M016C | 1.6 | 6 | 1.8 |
| 15 | C | CA45156M016C | 2.4 | 6 | 1.8 |
| 22 | C | CA45226M016C | 3.5 | 6 | 1.6 |
| 22 | D | CA45226M016D | 3.5 | 6 | 0.8 |
| 33 | D | CA45336M016D | 5.3 | 6 | 0.8 |
| 47 | D | CA45476M016D | 7.5 | 6 | 0.8 |
| 68 | D | CA45686M016D | 10.8 | 6 | 0.7 |

CA45 Chip Tantalum Capacitors.

CA45 Rating And Part Number Performance

| Cap. (F) | Case Size | YHC Part Nubmer | DC Leakage A +25°C Max | DF %@ +25°C 120Hz Max | ESR Ω +25°C 100khz Max | Cap. (F) | Case Size | YHC Part Nubmer | DC Leakage A +25°C Max | DF %@ +25°C 120Hz Max | ESR Ω +25°C 100khz Max |
|---------------|--------------|--------------------|------------------------------------|-----------------------------------|------------------------------------|---------------|--------------|--------------------|------------------------------------|-----------------------------------|------------------------------------|
|---------------|--------------|--------------------|------------------------------------|-----------------------------------|------------------------------------|---------------|--------------|--------------------|------------------------------------|-----------------------------------|------------------------------------|

20 Volt Rating at +85°C (13 Volt Rating at +125°C)

| | | | | | |
|------|---|--------------|------|---|-----|
| 0.47 | A | CA45474M020A | 0.5 | 4 | 12 |
| 0.68 | A | CA45684M020A | 0.5 | 4 | 12 |
| 1 | A | CA45105M020A | 0.5 | 4 | 10 |
| 1.5 | B | CA45155M020B | 0.5 | 6 | 8 |
| 2.2 | B | CA45225M020B | 0.5 | 6 | 3.5 |
| 3.3 | B | CA45335M020B | 0.66 | 6 | 3.5 |
| 4.7 | B | CA45475M020B | 0.94 | 6 | 3.5 |
| 4.7 | C | CA45475M020C | 0.94 | 6 | 2.4 |
| 6.8 | C | CA45685M020C | 1.36 | 6 | 1.9 |
| 10 | C | CA45106M020C | 2 | 6 | 1.8 |
| 10 | D | CA45106M020D | 2 | 6 | 1.5 |
| 15 | D | CA45156M020D | 3 | 6 | 1 |
| 22 | D | CA45226M020D | 4.4 | 6 | 0.8 |
| 33 | D | CA45336M020D | 6.6 | 6 | 0.8 |

35 Volt Rating at +85°C (22 Volt Rating at +125°C)

| | | | | | |
|------|---|--------------|------|---|-----|
| 0.1 | A | CA45104M035A | 0.5 | 4 | 20 |
| 0.15 | A | CA45154M035A | 0.5 | 4 | 19 |
| 0.22 | A | CA45224M035A | 0.5 | 4 | 18 |
| 0.33 | A | CA45334M035A | 0.5 | 4 | 15 |
| 0.47 | A | CA45474M035A | 0.5 | 4 | 14 |
| 0.47 | B | CA45474M035B | 0.5 | 4 | 8 |
| 0.68 | B | CA45684M035B | 0.5 | 4 | 6.5 |
| 1 | B | CA45105M035B | 0.5 | 4 | 5 |
| 1.5 | C | CA45155M035C | 0.5 | 6 | 4.5 |
| 2.2 | C | CA45225M035C | 0.77 | 6 | 3.5 |
| 3.3 | C | CA45335M035C | 1.2 | 6 | 2.5 |
| 4.7 | C | CA45475M035C | 1.6 | 6 | 2.5 |
| 4.7 | D | CA45475M035D | 1.6 | 6 | 1.5 |
| 6.8 | D | CA45685M035D | 2.4 | 6 | 1.3 |
| 10 | D | CA45106M035D | 3.5 | 6 | 1 |

25 Volt Rating at +85°C (16 Volt Rating at +125°C)

| | | | | | |
|------|---|--------------|------|---|-----|
| 0.33 | A | CA45334M025A | 0.5 | 4 | 15 |
| 0.47 | A | CA45474M025A | 0.5 | 4 | 14 |
| 0.68 | A | CA45684M025A | 0.5 | 4 | 10 |
| 1 | A | CA45105M025A | 0.5 | 4 | 8 |
| 1 | B | CA45105M025B | 0.5 | 4 | 5 |
| 1.5 | B | CA45155M025B | 0.5 | 6 | 5 |
| 2.2 | B | CA45225M025B | 0.6 | 6 | 4.5 |
| 3.3 | B | CA45335M025B | 0.82 | 6 | 2.5 |
| 3.3 | C | CA45335M025C | 0.82 | 6 | 2.5 |
| 4.7 | C | CA45475M025C | 1.2 | 6 | 2.4 |
| 6.8 | C | CA45685M025C | 1.7 | 6 | 1.9 |
| 6.8 | D | CA45685M025D | 1.7 | 6 | 1.9 |
| 10 | C | CA45106M025C | 2.5 | 6 | 1.5 |
| 10 | D | CA45106M025D | 2.5 | 6 | 1.5 |
| 15 | D | CA45156M025D | 3.7 | 6 | 1 |
| 22 | D | CA45226M025D | 6 | 6 | 0.8 |

CA45 Chip Tantalum Capacitors.

Component Characteristics

I. Capacitance Capacitance is measured at 120HZ, less than 1.0 volts rms, at 25°C.

Capacitance increases with increasing temperature.

II. DC leakage current (DCL) DC leakage current is the current that, after a five minute charging period, flows through a capacitor when voltage is measured at 25°C with full rated DC voltage applied to the capacitor through a 1000 ohm resistor in series with the capacitor. DC current increases with increasing temperature.

III. DC leakage current (DCL) Dissipation factor is measured at 120HZ up to 1.0 volt rms maximum. DF increases with increasing frequency.

IV. Temperature stability

| Step No. | TEMP. | CAPACITANCE | DCL | DF |
|----------|--------|----------------------------|---------------------------|-----------------------|
| 1 | +25°C | Within specified tolerance | Within original limit | Within original limit |
| 2 | -55°C | Within -10% initial value | N/A | Within original limit |
| 3 | +25°C | Within -5% initial value | Within original limit | Within original limit |
| 4 | +85°C | Within -10% initial value | Within 10X original limit | See table 1 |
| 5 | +125°C | Within -12% initial value | Within 12X original limit | See table 1 |
| 6 | +25°C | Within -5% initial value | Within original limit | Within original limit |

V. Temperature cycle -55°C, room temperature, 125°C, 5 cycles 30min, Post test performance:

- Capacitance---within $\pm 5\%$ initial value
- DC Leakage---within initial limit
- DF--- within initial limit

VI. Life test 2000 hours, +85°C, rated voltage or 2000 hours, +125°C, 2/3 rated voltage, post test performance:

- Capacitance---within $\pm 10\%$ initial value
- DC Leakage---within 200% initial limit
- DF--- within 150% initial limit

VIII. Surge voltage 85°C, 1.15 rated voltage measurement is done after 1000 cycles of 0.5 minutes on 5.5 minutes off with 1000 Ω of series resistance. Post test performance:

- Capacitance---within $\pm 10\%$ initial value
- Leakage---within initial limit
- DF--- within initial limit

X. Solvent resistance Solution: isopropyl alcohol, solution temp: 20-25°C. The specimen shall be completely immersed in the solution for 1 min. and the marking shall be rubbed with a brush 10 times. The above cycle will be applied 3 times and then the marking shall be examined visually. post test performance:

- Capacitance---within initial limit
- DC Leakage---within initial limit
- DF--- within initial limit
- physical---Marking must be legible

XI. Solderability Solder temperature: $230 \pm 5^\circ\text{C}$, immersion times (solder): 3 ± 0.5 sec, Immersion in flux 5-10 sec, .The specimen shall be immersed completely, post test performance: The dipped portion of the termination is at least 95% covered by a new solder coating.