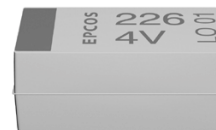


Construction

- Polar tantalum capacitors with solid electrolyte
- Conventional Ta-MnO₂ technology
- Flame-retardant plastic case (UL 94 V-0)
- Optionally tinned or gold-plated terminals


Features

- Outstanding reliability
- High volumetric efficiency
- Excellent solderability
- Stable temperature and frequency characteristics
- Low leakage current, low dissipation factor
- Low self-inductance
- High resistance to shock and vibration
- Suitable for use without series resistor
(recommended operating voltage see “General Technical Information”, page 111, 4.4)
- Very low failure rate
- Operating temperature up to 150°C

Applications

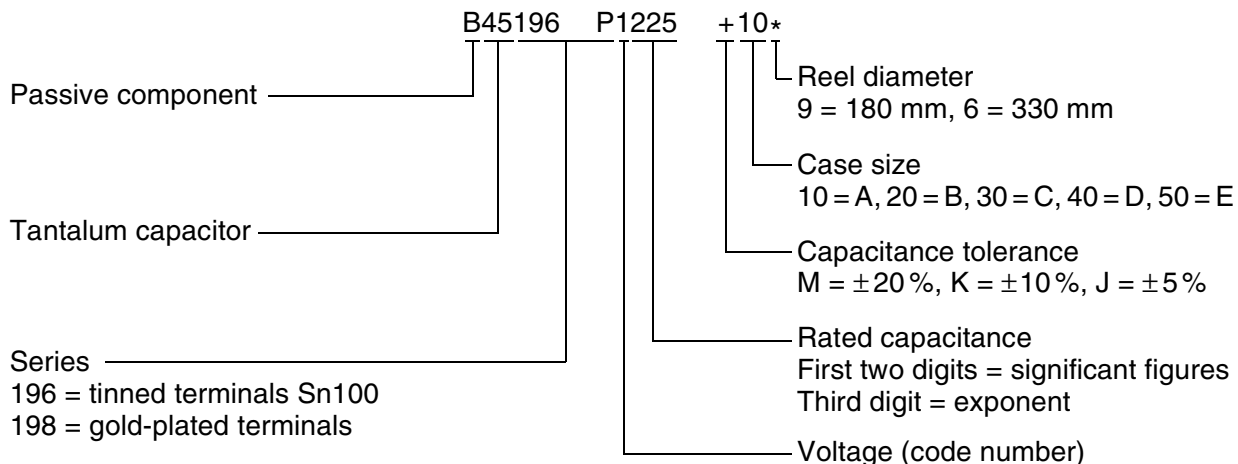
- Automotive electronics (safety applications e.g. airbag, ABS or motor management)
- Measuring and control engineering
- Medical engineering
- DC/DC converters
- Telecommunications (e.g. mobile phones, private branch exchanges)
- Data processing (e.g. laptops, main frames)

Soldering

Suitable for reflow soldering (IR and vapor phase) and wave soldering

Delivery mode

Taped and reeled in accordance with IEC 60286-3

Ordering code structure



Specifications and characteristics in brief

For characteristic curves see “General Technical Information”, page 107 ff.

| | Performance | |
|--|---|---------------------|
| Series | B45196P | B45198P |
| Technology | Ta-MnO ₂ | Ta-MnO ₂ |
| Terminals | Tinned | Gold-plated |
| Rated voltage V_R (up to 85 °C) | 4 ... 50 Vdc | |
| Rated capacitance C_R | 0,10 ... 150 μ F | |
| Capacitance tolerance | $\pm 10\%$, $\pm 20\%$ $\pm 5\%$ (on request) | |
| Operating temperature | – 55 ... + 125 °C | |
| Failure rate | At 40 °C; $\leq V_R$, $R_S \geq 3 \Omega/V$ (1 fit = $1 \cdot 10^{-9}$ failures/h) | |
| $C_R \cdot V_R \leq 330 \mu F \cdot V$ | $\leq 0,8$ fit | |
| $C_R \cdot V_R > 330 \mu F \cdot V$ | $\leq 2,5$ fit | |
| Service life | > 500 000 h | |
| Leakage current (V_R , 5 min, 20 °C) | 10 nA/ μ C | |
| Detail specification (tinned terminals) | CECC 30801-801/-802 | |
| IEC climatic category | To IEC 60068-1 55/125/56 (– 55/+ 125 °C; 56 days damp heat test) | |

For performance types, individual tests are carried out under more extreme conditions, supplementary to the tests specified by CECC.

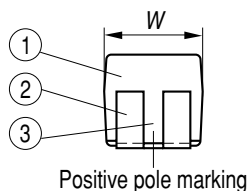
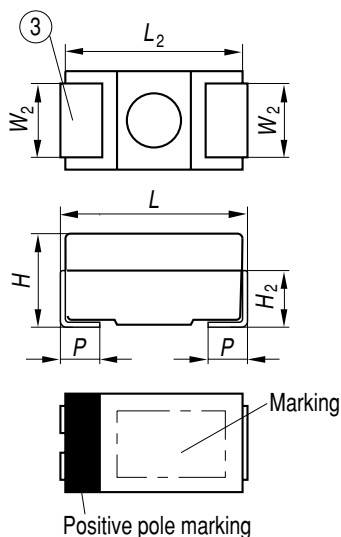
Examples:

| | |
|--------------------------|---|
| Damp heat | 85 (+2) °C, 85 ... 90 % relative humidity |
| Rapid temperature change | 100 cycles, – 55 °C/+ 125 °C, 30 min. |
| Surge voltage | 10^4 charge cycles |
| Impulse test | 10^6 cycles |

Types B45196P can be operated at temperatures up to 150 °C (under development: 175 °C).

Maximum working voltage at 150 °C: 0,5 V_R

Details for this operating condition must be agreed upon between supplier and customer.

Dimensional drawing


Positive pole marking

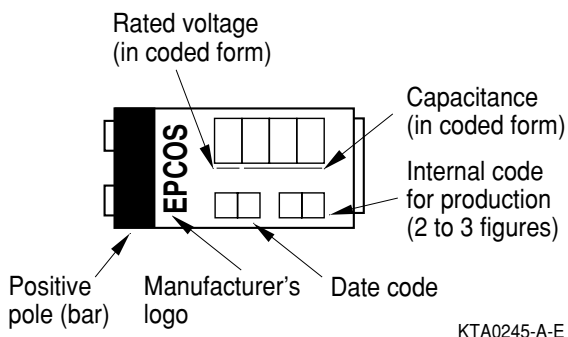
KTA0254-9-E

- ① Encapsulation: molded epoxy resin
- ② NiFe; tinned surface Sn100 or gold-plated
- ③ Reduced slot length for case size A

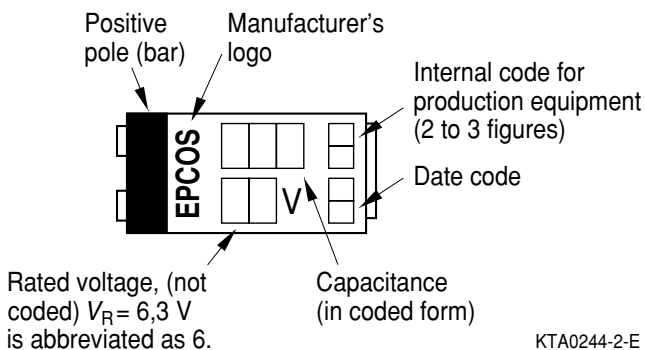
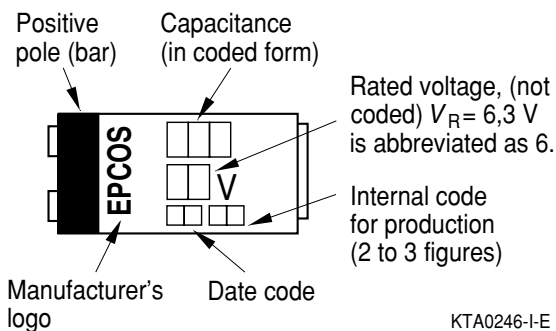
| Case size | Dimensions in mm (inches) | | | | | | |
|-----------|------------------------------------|------------------------------------|------------------------------------|---------------|------------------------------|---------------|----------------------------|
| | L | W | H | L_2 typ. | $W_2 \pm 0,1$ $\pm(,004)$ | H_2 typ. | $p \pm 0,3$ $\pm(,012)$ |
| A (10) | $3,2 \pm 0,2$ (,126 \pm ,008) | $1,6 \pm 0,2$ (,063 \pm ,008) | $1,6 \pm 0,2$ (,063 \pm ,008) | 3,0 (,118) | 1,2 (,047) | 1,0 (,039) | 0,8 (,031) |
| B (20) | $3,5 \pm 0,2$ (,138 \pm ,008) | $2,8 \pm 0,2$ (,110 \pm ,008) | $1,9 \pm 0,2$ (,075 \pm ,008) | 3,3 (,130) | 2,2 (,087) | 1,2 (,047) | 0,8 (,031) |
| C (30) | $6,0 \pm 0,3$ (,236 \pm ,012) | $3,2 \pm 0,3$ (,126 \pm ,012) | $2,5 \pm 0,3$ (,098 \pm ,012) | 5,8 (,228) | 2,2 (,087) | 1,5 (,059) | 1,3 (,051) |
| D (40) | $7,3 \pm 0,3$ (,287 \pm ,012) | $4,3 \pm 0,3$ (,169 \pm ,012) | $2,8 \pm 0,3$ (,110 \pm ,012) | 7,1 (,280) | 2,4 (,094) | 1,6 (,062) | 1,3 (,051) |
| E (50) | $7,3 \pm 0,3$ (,287 \pm ,012) | $4,3 \pm 0,3$ (,169 \pm ,012) | $4,1 \pm 0,3$ (,157 \pm ,012) | 7,1 (,280) | 2,4 (,094) | 1,6 (,062) | 1,3 (,051) |

Marking

Case size A



Case size B



Case sizes C, D, E

Voltage coding for case size A

| | | | | | | | | |
|---------------|---|-----|----|----|----|----|----|----|
| Rated voltage | 4 | 6,3 | 10 | 16 | 20 | 25 | 35 | 50 |
| Code letter | G | J | A | C | D | E | V | T |

Capacitance coding

| | |
|-------------------|--|
| 1st and 2nd digit | Capacitance in pF |
| 3rd digit | Multiplier: 4 = 10^4 pF 5 = 10^5 pF 6 = 10^6 pF 7 = 10^7 pF |

Date coding

| Year | Month | |
|----------|--------------|---------------|
| M = 2000 | 1 = January | 7 = July |
| N = 2001 | 2 = February | 8 = August |
| P = 2002 | 3 = March | 9 = September |
| R = 2003 | 4 = April | O = October |
| S = 2004 | 5 = May | N = November |
| T = 2005 | 6 = June | D = December |

In addition to the year and month of manufacture, the stamp includes another two or three figures which internally allow us an assignment to production equipment.

Overview of available types

| Series | B45196P, tinned terminals B45198P, gold-plated terminals | | | | | | | | | | | | | | |
|----------------------------|---|-----|---|----|---|----|---|----|---|----|---|----|---|----|---|
| V_R (Vdc) up to 85 °C | 4 | 6,3 | | 10 | | 16 | | 20 | | 25 | | 35 | | 50 | |
| C_R (µF) ¹⁾ | | | | | | | | | | | | | | | |
| 0,10 | | | | | | | | | | | | | A | A | |
| 0,15 | | | | | | | | | | | | | A | B | |
| 0,22 | | | | | | | | | | | | | A | B | |
| 0,33 | | | | | | | | | | | | | A | B | |
| 0,47 | | | | | | | | | | A | | A | B | C | |
| 0,68 | | | | | | | | A | A | A | | B | C | | |
| 1,0 | | | | | A | A | A | A | A | B | C | D | | | |
| 1,5 | | | | A | A | A | B | B | C | D | | | | | |
| 2,2 | | | A | A | A | B | B | C | D | | | | | | |
| 3,3 | A | A | A | A | B | B | C | C | D | | | | | | |
| 4,7 | A | A | A | B | B | C | C | C | D | D | | | | | |
| 6,8 | A | A | B | A | B | B | C | C | C | D | D | | | | E |
| 10 | A | B | A | B | B | C | C | C | C | D | D | | | | E |
| 15 | A | B | B | C | B | C | C | C | D | D | E | | | | |
| 22 | B | C | B | C | C | C | D | D | D | E | | | | | |
| 33 | B | C | C | D | D | D | | | | | | | | | |
| 47 | C | C | D | C | D | D | | | | | | | | | |
| 68 | C | D | C | D | D | | | | | | | | | | |
| 100 | D | D | D | | | | | | | | | | | | |
| 150 | D | D | E | | | | | | | | | | | | |

■ Upon request

1) Additional ratings upon request

Technical data and ordering codes

| V_R up to 85°C (up to 125°C) [up to 150°C] | C_R | Case size | $\tan \delta_{\max}$ (20°C, 120 Hz) | $I_{lk, \max}$ (20°C, V_R , 5 min) | Z_{\max} (20°C, 100 kHz) | Ordering code 1) Tinned terminals |
|---|-------|-----------|---|--|----------------------------------|--|
| Vdc | μF | | | μA | Ω | |
| 4 | 3,3 | A | 0,045 | 0,5 | 5,9 | B45196P0335+10* |
| (2,5) | 4,7 | A | 0,045 | 0,5 | 4,6 | B45196P0475+10* |
| [2] | 6,8 | A | 0,045 | 0,5 | 3,9 | B45196P0685+10* |
| | 10 | A | 0,045 | 0,5 | 2,9 | B45196P0106+10* |
| | 10 | B | 0,045 | 0,5 | 2,7 | B45196P0106+20* |
| | 15 | A | 0,045 | 0,6 | 2,7 | B45196P0156+10* |
| | 15 | B | 0,045 | 0,6 | 2,6 | B45196P0156+20* |
| | 22 | B | 0,045 | 0,9 | 1,8 | B45196P0226+20* |
| | 22 | C | 0,045 | 0,9 | 1,7 | B45196P0226+30* |
| | 33 | B | 0,045 | 1,3 | 1,5 | B45196P0336+20* |
| | 33 | C | 0,045 | 1,3 | 1,5 | B45196P0336+30* |
| | 47 | C | 0,045 | 1,9 | 1,1 | B45196P0476+30* |
| | 68 | C | 0,045 | 2,7 | 0,9 | B45196P0686+30* |
| | 68 | D | 0,045 | 2,7 | 0,8 | B45196P0686+40* |
| | 100 | D | 0,06 | 4,0 | 0,6 | B45196P0107+40* |
| | 150 | D | 0,06 | 6,0 | 0,6 | B45196P0157+40* |

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = ± 20 %, K = ± 10 % (J = ± 5 % upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

| V_R up to 85°C (up to 125°C) [up to 150°C] Vdc | C_R μF | Case size | $\tan \delta_{\max}$ (20°C, 120 Hz) | $I_{k, \max}$ (20°C, V_R , 5 min) μA | Z_{\max} (20°C, 100 kHz) Ω | Ordering code ¹⁾ Tinned terminals |
|--|----------------------------|--------------|---|--|--|---|
| 6,3 (4) [3,2] | 2,2 | A | 0,045 | 0,5 | 6,5 | B45196P1225+10* |
| | 3,3 | A | 0,045 | 0,5 | 4,6 | B45196P1335+10* |
| | 4,7 | A | 0,045 | 0,5 | 3,6 | B45196P1475+10* |
| | 6,8 | A | 0,045 | 0,5 | 2,9 | B45196P1685+10* |
| | 6,8 | B | 0,045 | 0,5 | 2,7 | B45196P1685+20* |
| | 10 | A | 0,045 | 0,6 | 2,7 | B45196P1106+10* |
| | 10 | B | 0,045 | 0,6 | 2,1 | B45196P1106+20* |
| | 15 | B | 0,045 | 0,9 | 1,8 | B45196P1156+20* |
| | 15 | C | 0,045 | 1,0 | 1,7 | B45196P1156+30* |
| | 22 | B | 0,045 | 1,4 | 1,5 | B45196P1226+20* |
| | 22 | C | 0,045 | 1,4 | 1,3 | B45196P1226+30* |
| | 33 | C | 0,045 | 2,1 | 1,1 | B45196P1336+30* |
| | 47 | C | 0,045 | 3,0 | 0,8 | B45196P1476+30* |
| | 47 | D | 0,045 | 3,0 | 0,8 | B45196P1476+40* |
| | 68 | C | 0,045 | 4,3 | 0,8 | B45196P1686+30* |
| 68 | D | 0,045 | 4,3 | 0,6 | B45196P1686+40* | |
| 100 | D | 0,06 | 6,3 | 0,6 | B45196P1107+40* | |
| 150 | D | 0,06 | 9,5 | 0,5 | B45196P1157+40* | |

Upon request

1) Replace 196P by 198P for gold-plated terminals
+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)
* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

| V_R up to 85°C (up to 125°C) [up to 150°C] Vdc | C_R μF | Case size | $\tan \delta_{\max}$ (20°C, 120 Hz) | $I_{k, \max}$ (20°C, V_R , 5 min) μA | Z_{\max} (20°C, 100 kHz) Ω | Ordering code ¹⁾ Tinned terminals |
|--|----------------------------|--------------|---|--|--|---|
| 10 (6,3) [5] | 1,5 | A | 0,045 | 0,5 | 6,5 | B45196P2155+10* |
| | 2,2 | A | 0,045 | 0,5 | 4,6 | B45196P2225+10* |
| | 3,3 | A | 0,045 | 0,5 | 3,6 | B45196P2335+10* |
| | 4,7 | A | 0,045 | 0,5 | 2,9 | B45196P2475+10* |
| | 4,7 | B | 0,045 | 0,5 | 2,7 | B45196P2475+20* |
| | 6,8 | A | 0,045 | 0,7 | 2,7 | B45196P2685+10* |
| | 6,8 | B | 0,045 | 0,7 | 2,1 | B45196P2685+20* |
| | 10 | B | 0,045 | 1,0 | 1,8 | B45196P2106+20* |
| | 10 | C | 0,045 | 1,0 | 1,7 | B45196P2106+30* |
| | 15 | B | 0,045 | 1,5 | 1,5 | B45196P2106+20* |
| | 15 | C | 0,045 | 1,5 | 1,4 | B45196P2156+30* |
| | 22 | C | 0,045 | 2,2 | 1,1 | B45196P2226+30* |
| | 33 | D | 0,045 | 3,3 | 0,8 | B45196P2336+40* |
| | 47 | C | 0,045 | 4,7 | 0,8 | B45196P2476+30* |
| | 47 | D | 0,045 | 4,7 | 0,6 | B45196P2476+40* |
| | 68 | D | 0,045 | 6,8 | 0,6 | B45196P2686+40* |
| 100 | D | 0,06 | 10 | 0,6 | B45196P2107+40* | |
| 150 | E | 0,06 | 15 | 0,5 | B45196P2157+50* | |
| 16 (10) [8] | 1,0 | A | 0,030 | 0,5 | 6,5 | B45196P3105+10* |
| | 1,5 | A | 0,045 | 0,5 | 5,2 | B45196P3155+10* |
| | 2,2 | A | 0,045 | 0,5 | 4,3 | B45196P3225+10* |
| | 3,3 | A | 0,045 | 0,6 | 3,4 | B45196P3335+10* |
| | 3,3 | B | 0,045 | 0,6 | 3,0 | B45196P3335+20* |
| | 4,7 | B | 0,045 | 0,8 | 2,1 | B45196P3475+20* |
| | 6,8 | B | 0,045 | 1,1 | 1,8 | B45196P3685+20* |
| | 6,8 | C | 0,045 | 1,1 | 1,7 | B45196P3685+30* |
| | 10 | C | 0,045 | 1,6 | 1,4 | B45196P3106+30* |
| | 15 | C | 0,045 | 2,4 | 1,1 | B45196P3156+30* |
| | 22 | C | 0,045 | 3,6 | 1,0 | B45196P3226+30* |
| | 22 | D | 0,045 | 3,6 | 0,8 | B45196P3226+40* |
| | 33 | D | 0,045 | 5,3 | 0,7 | B45196P3336+40* |
| | 47 | D | 0,045 | 7,5 | 0,6 | B45196P3476+40* |

■ Upon request

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

| V_R up to 85°C (up to 125°C) [up to 150°C] Vdc | C_R μF | Case size | $\tan \delta_{max}$ (20°C, 120 Hz) | $I_{k, max}$ (20°C, V_R , 5 min) μA | Z_{max} (20°C, 100 kHz) Ω | Ordering code ¹⁾ Tinned terminals |
|--|----------------------|--------------|--|---|---|---|
| 20 (13) [10] | 0,68 | A | 0,030 | 0,5 | 7,8 | B45196P4684+10* |
| | 1,0 | A | 0,030 | 0,5 | 5,9 | B45196P4105+10* |
| | 1,5 | A | 0,045 | 0,5 | 5,2 | B45196P4155+10* |
| | 2,2 | B | 0,045 | 0,5 | 3,6 | B45196P4225+20* |
| | 3,3 | B | 0,045 | 0,7 | 2,7 | B45196P4335+20* |
| | 4,7 | B | 0,045 | 1,0 | 1,9 | B45196P4475+20* |
| | 4,7 | C | 0,045 | 1,0 | 1,7 | B45196P4475+30* |
| | 6,8 | C | 0,045 | 1,4 | 1,3 | B45196P4685+30* |
| | 10 | C | 0,045 | 2,0 | 1,1 | B45196P4106+30* |
| | 15 | C | 0,045 | 3,0 | 1,0 | B45196P4156+30* |
| 25 (16) [12,5] | 15 | D | 0,045 | 3,0 | 0,9 | B45196P4156+40* |
| | 22 | D | 0,045 | 4,4 | 0,7 | B45196P4226+40* |
| | 33 | D | 0,045 | 6,6 | 0,6 | B45196P4336+40* |
| | 0,47 | A | 0,030 | 0,5 | 8,5 | B45196P5474+10* |
| | 0,68 | A | 0,030 | 0,5 | 6,5 | B45196P5684+10* |
| | 1,0 | A | 0,030 | 0,5 | 5,2 | B45196P5105+10* |
| | 1,5 | B | 0,045 | 0,5 | 4,2 | B45196P5155+20* |
| | 2,2 | B | 0,045 | 0,6 | 3,0 | B45196P5225+20* |
| | 3,3 | C | 0,045 | 0,9 | 2,0 | B45196P5335+30* |
| | 4,7 | C | 0,045 | 1,2 | 1,6 | B45196P5475+30* |
| 6,8 | 6,8 | C | 0,045 | 1,7 | 1,4 | B45196P5685+30* |
| | 6,8 | D | 0,045 | 1,7 | 1,1 | B45196P5685+40* |
| | 10 | C | 0,045 | 2,5 | 1,1 | B45196P5106+30* |
| | 10 | D | 0,045 | 2,5 | 0,9 | B45196P5106+40* |
| | 15 | D | 0,045 | 3,8 | 0,7 | B45196P5156+40* |
| | 22 | D | 0,045 | 5,5 | 0,6 | B45196P5226+40* |

1) Replace 196P by 198P for gold-plated terminals

+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)

* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

| V_R up to 85°C (up to 125°C) [up to 150°C] Vdc | C_R μF | Case size | $\tan \delta_{\max}$ (20°C, 120 Hz) | $I_{k, \max}$ (20°C, V_R , 5 min) μA | Z_{\max} (20°C, 100 kHz) Ω | Ordering code ¹⁾ Tinned terminals |
|--|----------------------------|--------------|---|--|--|---|
| 35 (23) [17,5] | 0,10 | A | 0,030 | 0,5 | 28 | B45196P6104+10* |
| | 0,15 | A | 0,030 | 0,5 | 23 | B45196P6154+10* |
| | 0,22 | A | 0,030 | 0,5 | 15 | B45196P6224+10* |
| | 0,33 | A | 0,030 | 0,5 | 11 | B45196P6334+10* |
| | 0,47 | A | 0,030 | 0,5 | 10 | B45196P6474+10* |
| | 0,47 | B | 0,030 | 0,5 | 8,0 | B45196P6474+20* |
| | 0,68 | B | 0,030 | 0,5 | 5,5 | B45196P6684+20* |
| | 1,0 | B | 0,030 | 0,5 | 4,4 | B45196P6105+20* |
| | 1,5 | C | 0,045 | 0,6 | 3,3 | B45196P6155+30* |
| | 2,2 | C | 0,045 | 0,8 | 2,2 | B45196P6225+30* |
| | 3,3 | C | 0,045 | 1,2 | 1,7 | B45196P6335+30* |
| | 4,7 | C | 0,045 | 1,7 | 1,3 | B45196P6475+30* |
| | 4,7 | D | 0,045 | 1,7 | 1,0 | B45196P6475+40* |
| | 6,8 | D | 0,045 | 2,4 | 0,9 | B45196P6685+40* |
| 10 | D | 0,045 | 3,5 | 0,7 | B45196P6106+40* | |
| 15 | E | 0,045 | 5,3 | 0,5 | B45196P6156+50* | |
| 22 | E | 0,045 | 7,7 | 0,5 | B45196P6226+50* | |
| 50 (33) [25] | 0,10 | A | 0,030 | 0,5 | 27 | B45196P7104+10* |
| | 0,15 | B | 0,030 | 0,5 | 22 | B45196P7154+20* |
| | 0,22 | B | 0,030 | 0,5 | 15 | B45196P7224+20* |
| | 0,33 | B | 0,030 | 0,5 | 11 | B45196P7334+20* |
| | 0,47 | C | 0,030 | 0,5 | 6,5 | B45196P7474+30* |
| | 0,68 | C | 0,030 | 0,5 | 5,5 | B45196P7684+30* |
| | 1,0 | C | 0,030 | 0,5 | 3,3 | B45196P7105+30* |
| | 1,5 | D | 0,045 | 0,8 | 2,8 | B45196P7155+40* |
| | 2,2 | D | 0,045 | 1,1 | 2,0 | B45196P7225+40* |
| | 3,3 | D | 0,045 | 1,7 | 1,1 | B45196P7335+40* |
| | 4,7 | D | 0,045 | 2,4 | 0,9 | B45196P7475+40* |
| 6,8 | E | 0,045 | 3,4 | 0,5 | B45196P7685+50* | |
| 10 | E | 0,045 | 5,0 | 0,5 | B45196P7106+50* | |

Upon request

1) Replace 196P by 198P for gold-plated terminals
+ Code letter for capacitance tolerance: M = $\pm 20\%$, K = $\pm 10\%$ (J = $\pm 5\%$ upon request)
* Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

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