



Tantalum Chip Capacitors

B45196P, B45198P

Performance – High Reliability 150°C



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)

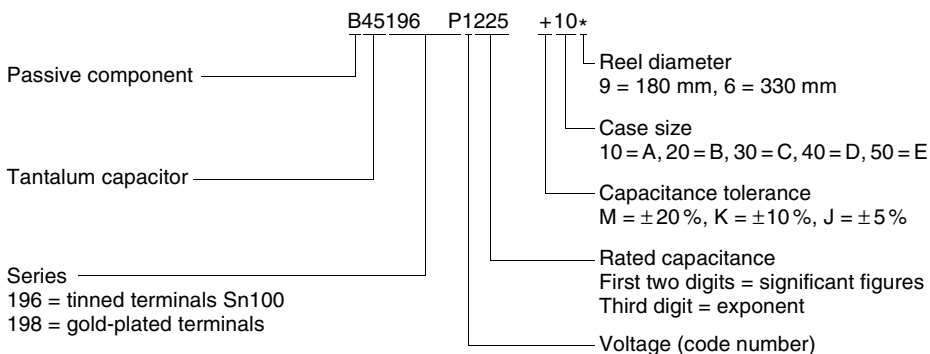
Soldering

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





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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.



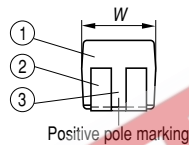
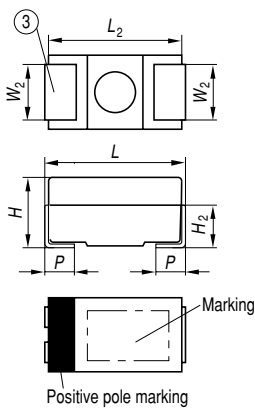
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Dimensional drawing



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 ± 0,1 ±(.004)	H ₂ typ.	p ± 0,3 ±(.012)
A (10)	3,2 ± 0,2 (.126±.008)	1,6 ± 0,2 (.063±.008)	1,6 ± 0,2 (.063±.008)	3,0 (.118)	1,2 (.047)	1,0 (.039)	0,8 (.031)
B (20)	3,5 ± 0,2 (.138±.008)	2,8 ± 0,2 (.110±.008)	1,9 ± 0,2 (.075±.008)	3,3 (.130)	2,2 (.087)	1,2 (.047)	0,8 (.031)
C (30)	6,0 ± 0,3 (.236±.012)	3,2 ± 0,3 (.126±.012)	2,5 ± 0,3 (.098±.012)	5,8 (.228)	2,2 (.087)	1,5 (.059)	1,3 (.051)
D (40)	7,3 ± 0,3 (.287±.012)	4,3 ± 0,3 (.169±.012)	2,8 ± 0,3 (.110±.012)	7,1 (.280)	2,4 (.094)	1,6 (.062)	1,3 (.051)
E (50)	7,3 ± 0,3 (.287±.012)	4,3 ± 0,3 (.169±.012)	4,1 ± 0,3 (.157±.012)	7,1 (.280)	2,4 (.094)	1,6 (.062)	1,3 (.051)



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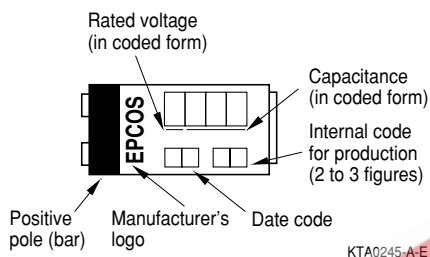
B45196P, B45198P

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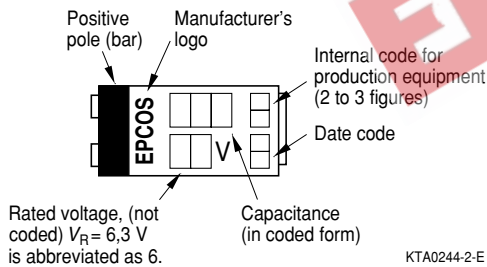
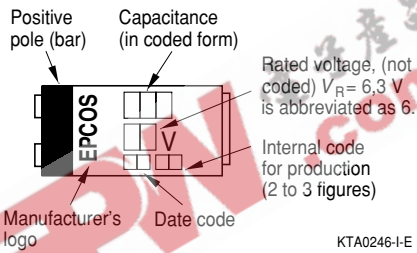


Marking

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.



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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		B		C	
1,0				A	A	A		B		C	
1,5			A	A	A	B		C		D	
2,2		A	A	A	B	B		C		D	
3,3	A	A	A	A	B	B		C		D	
4,7	A	A	A	B	B	C		C	D	D	
6,8	A	A	B	A	B	B	C	C	D	D	E
10	A	B	A	B	B	C		C	D	D	E
15	A	B	B	C	B	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	D							
150	D	D	E								

Upon request

1) Additional ratings upon request



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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)	$I_{k, \max}$ (20°C, V_R , 5 min)	Z_{\max} (20°C, 100 kHz)	Ordering code ¹⁾
Vdc	μF			μA	Ω	Tinned terminals
4 (2,5) [2]	3,3	A	0,045	0,5	5,9	B45196P0335+10*
	4,7	A	0,045	0,5	4,6	B45196P0475+10*
	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



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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)	$I_{lk, max}$ (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
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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)	$I_{lk, max}$ (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*
16 (10) [8]	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*
	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 = ± 20%, K = ± 10% (J = ± 5% upon request)
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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*
	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*
25 (16) [12,5]	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	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 = ± 20%, K = ± 10% (J = ± 5% upon request)
 * Code number for reel diameter: 9 = 180 mm, 6 = 330 mm



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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)	$I_{lk, max}$ (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 = ± 20%, K = ± 10% (J = ± 5% upon request)
 * Code number for reel diameter: 9 = 180 mm, 6 = 330 mm

Herausgegeben von EPCOS AG

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Published by EPCOS AG

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