



**Tantalum Chip Capacitors**

**B45196H, B45198H**

**HighCap**



**Construction**

- Polar tantalum capacitors with solid electrolyte
- Conventional Ta-MnO<sub>2</sub> technology
- Flame-retardant plastic case (UL 94 V-0)
- Optionally tinned or gold-plated terminals

**Features**

- Ultra-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)

**Applications**

- Telecommunications (e.g. mobile phones, private branch exchanges)
- Data processing (e.g. laptops, main frames)
- Measuring and control engineering (e.g. voltage regulators)
- Automotive electronics
- Medical engineering
- DC/DC converters

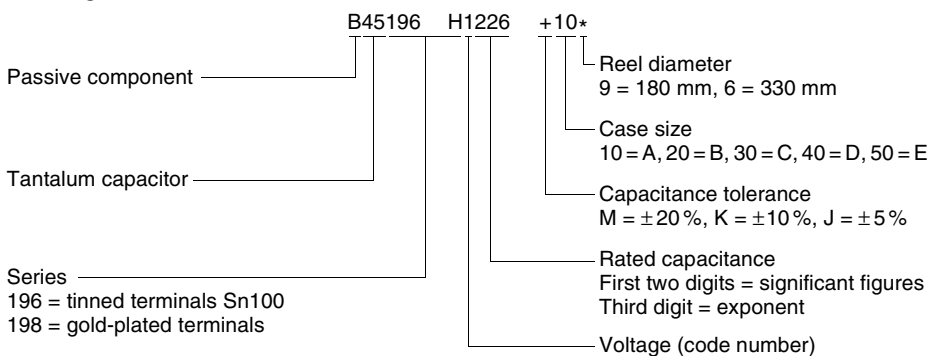
**Soldering**

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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**SMD**

**Specifications and characteristics in brief**

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

	HighCap	
Series	B45196H	B45198H
Technology	Ta-MnO <sub>2</sub>	Ta-MnO <sub>2</sub>
Terminals	Tinned	Gold-plated
Rated voltage $V_R$ (up to 85 °C)	4 ... 50 Vdc	
Rated capacitance $C_R$	0,15 ... 1500 $\mu$ 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)	
$C_R \cdot V_R \leq 330 \mu F \cdot V$	$\leq 8$ fit	
$C_R \cdot V_R > 330 \mu F \cdot V$	$\leq 24$ fit	
Service life	> 500 000 h	
Leakage current ( $V_R$ , 5 min, 20 °C)	10 nA/ $\mu$ C	
Detail specification (tinned terminals)	CECC 30801-802	
IEC climatic category	To IEC 60068-1 55/125/56 (-55/+125 °C; 56 days damp heat test)	

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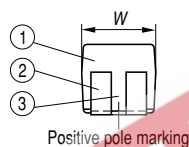
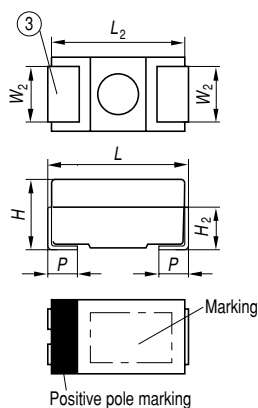
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Dimensional drawing



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



Tantalum Chip Capacitors

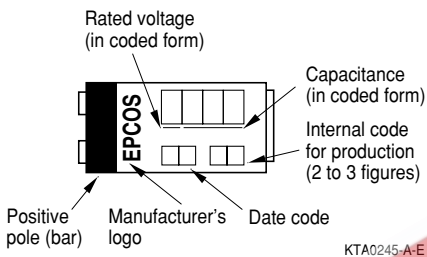
B45196H, B45198H

HighCap

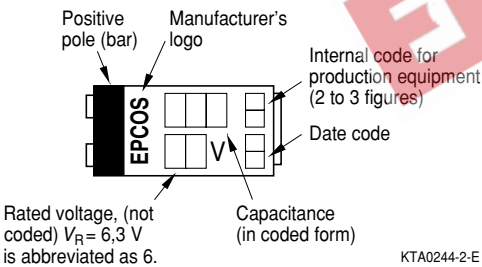
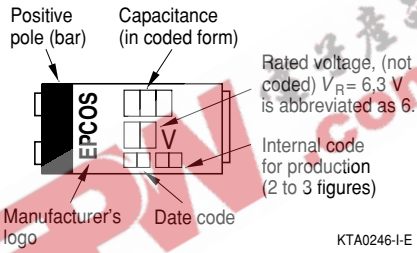


Marking

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 <sup>4</sup> pF 5 = 10 <sup>5</sup> pF 6 = 10 <sup>6</sup> pF 7 = 10 <sup>7</sup> pF 8 = 10 <sup>8</sup> 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	B45196H, tinned terminals B45198H, gold-plated terminals													
$V_R$ (Vdc) up to 85°C	4	6,3	10	16	20	25	35	50						
$C_R$ (μF) <sup>1)</sup>														
0,15										A				
0,22										A				
0,33														
0,47								A		B				
0,68								A						
1,0						A		A						
1,5					A	A		B		C				
2,2				A	A	A		B		C				
3,3			A	A	A	B		B						
4,7		A	A	A	A	B	B	C						
6,8	A	A	A	A	B	B	B	C	C	D	E			
10	A	A	A	B	A	B	B	C	C	C	E			
15	A	A	B	A	B	B	C	C	C	D	E			
22	A	B	A	B	A	B	C	B	C	C	D	D	E	
33	A	B	A	B	C	B	C	C	C	D	D	E	E	
47	A	B	C	B	C	B	C	C	D	D	E	D	E	E
68	B	C	B	C	C	D	C	D	D	E	E			
100	B	C	B	C	D	C	D	D	E	E				
150	C	D	C	D	C	D	E	D	E					
220	C	D	C	D	E	D	E	E						
330	C	D	E	D	E	D	E							
470	D	E	D	E	E									
680	D	E	E	E	E									
1000	E	E												
1500	E													

Upon request

1) Additional ratings upon request



Tantalum Chip Capacitors

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Technical data and ordering codes

$V_R$ up to 85°C (up to 125°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 <sup>1)</sup> Tinned terminals
4 (2,5)	6,8	A	0,06	0,5	6,0	B45196H0685+10*
	10	A	0,06	0,5	4,5	B45196H0106+10*
	15	A	0,06	0,6	4,0	B45196H0156+10*
	22	A	0,08	0,9	3,5	B45196H0226+10*
	22	B	0,06	0,9	3,0	B45196H0226+20*
	33	A	0,08	1,3	3,0	B45196H0336+10*
	33	B	0,06	1,3	2,5	B45196H0336+20*
	47	A	0,10	1,9	2,8	B45196H0476+10*
	47	B	0,06	1,9	2,3	B45196H0476+20*
	47	C	0,06	1,9	1,6	B45196H0476+30*
	68	B	0,06	2,7	1,8	B45196H0686+20*
	68	C	0,06	2,7	1,5	B45196H0686+30*
	100	B	0,08	4,0	1,6	B45196H0107+20*
	100	C	0,08	4,0	1,4	B45196H0107+30*
	150	C	0,08	6,0	1,3	B45196H0157+30*
	150	D	0,08	6,0	0,8	B45196H0157+40*
	220	C	0,15	8,8	1,2	B45196H0227+30*
	220	D	0,08	8,8	0,8	B45196H0227+40*
	330	C	0,15	13	1,2	B45196H0337+30*
	330	D	0,10	13	0,9	B45196H0337+40*
	330	E	0,08	13	0,8	B45196H0337+50*
	470	D	0,10	19	0,9	B45196H0477+40*
	470	E	0,08	19	0,6	B45196H0477+50*
	680	D	0,12	27	0,9	B45196H0687+40*
680	E	0,12	27	0,6	B45196H0687+50*	
1000	E	0,15	40	0,6	B45196H0108+50*	
1500	E	0,15	60	0,6	B45196H0158+50*	

Upon request

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



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SMD

$V_R$ up to 85°C (up to 125°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)	4,7	A	0,06	0,5	5,5	B45196H1475+10*
	6,8	A	0,06	0,5	4,5	B45196H1685+10*
	10	A	0,06	0,6	4,0	B45196H1106+10*
	15	A	0,06	0,9	3,8	B45196H1156+10*
	15	B	0,06	0,9	3,0	B45196H1156+20*
	22	A	0,08	1,4	3,0	B45196H1226+10*
	22	B	0,06	1,4	2,5	B45196H1226+20*
	33	A	0,10	2,1	2,8	B45196H1336+10*
	33	B	0,06	2,1	2,2	B45196H1336+20*
	33	C	0,06	2,1	1,6	B45196H1336+30*
	47	B	0,06	3,0	2,0	B45196H1476+20*
	47	C	0,06	3,0	1,5	B45196H1476+30*
	68	B	0,08	4,3	1,8	B45196H1686+20*
	68	C	0,06	4,3	1,4	B45196H1686+30*
	100	B	0,12	6,3	1,6	B45196H1107+20*
	100	C	0,08	6,3	1,2	B45196H1107+30*
	100	D	0,08	6,3	0,8	B45196H1107+40*
	150	C	0,08	9,5	1,3	B45196H1157+30*
	150	D	0,08	9,5	0,8	B45196H1157+40*
	220	C	0,10	14	1,2	B45196H1227+30*
	220	D	0,08	14	0,8	B45196H1227+40*
	220	E	0,12	14	0,8	B45196H1227+50*
	330	D	0,08	21	0,8	B45196H1337+40*
	330	E	0,08	21	0,6	B45196H1337+50*
	470	D	0,15	30	0,9	B45196H1477+40*
	470	E	0,08	30	0,6	B45196H1477+50*
	680	E	0,15	43	0,6	B45196H1687+50*
	1000	E	0,15	63	0,6	B45196H1108+50*

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 \* 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) 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)	3,3	A	0,06	0,5	5,5	B45196H2335+10*
	4,7	A	0,06	0,5	4,5	B45196H2475+10*
	6,8	A	0,06	0,7	4,0	B45196H2685+10*
	10	A	0,06	1,0	3,8	B45196H2106+10*
	10	B	0,06	1,0	3,0	B45196H2106+20*
	15	A	0,06	1,5	3,2	B45196H2156+10*
	15	B	0,06	1,5	2,5	B45196H2156+20*
	22	A	0,08	2,2	3,2	B45196H2226+10*
	22	B	0,06	2,2	2,3	B45196H2226+20*
	22	C	0,06	2,2	1,6	B45196H2226+30*
	33	B	0,06	3,3	2,0	B45196H2336+20*
	33	C	0,06	3,0	1,5	B45196H2336+30*
	47	B	0,08	4,7	1,6	B45196H2476+20*
	47	C	0,06	4,7	1,4	B45196H2476+30*
	68	C	0,06	6,8	1,2	B45196H2686+30*
	68	D	0,06	6,8	0,8	B45196H2686+40*
	100	C	0,08	10	1,2	B45196H2107+30*
	100	D	0,08	10	0,8	B45196H2107+40*
	150	C	0,10	15	1,0	B45196H2157+30*
	150	D	0,08	15	0,8	B45196H2157+40*
	150	E	0,08	15	0,8	B45196H2157+50*
	220	D	0,10	22	0,8	B45196H2227+40*
	220	E	0,08	22	0,6	B45196H2227+50*
	330	D	0,12	33	0,9	B45196H2337+40*
	330	E	0,10	33	0,6	B45196H2337+50*
	470	E	0,12	47	0,6	B45196H2477+50*
680	E	0,15	68	0,6	B45196H2687+50*	

Upon request

1) Replace 196H by 198H 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) 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
16 (10)	2,2	A	0,06	0,5	6,5	B45196H3225+10*
	3,3	A	0,06	0,5	5,0	B45196H3335+10*
	4,7	A	0,06	0,8	4,0	B45196H3475+10*
	6,8	A	0,06	1,1	3,8	B45196H3685+10*
	6,8	B	0,06	1,1	3,0	B45196H3685+20*
	10	A	0,06	1,6	3,0	B45196H3106+10*
	10	B	0,06	1,6	2,5	B45196H3106+20*
	15	B	0,06	2,4	2,3	B45196H3156+20*
	15	C	0,06	2,4	1,6	B45196H3156+30*
	22	B	0,06	3,5	2,6	B45196H3226+20*
	22	C	0,06	3,5	1,5	B45196H3226+30*
	33	C	0,06	5,3	1,4	B45196H3336+30*
	47	C	0,06	7,5	1,4	B45196H3476+30*
	47	D	0,06	7,5	0,8	B45196H3476+40*
	68	C	0,06	11	1,2	B45196H3686+30*
	68	D	0,06	11	0,8	B45196H3686+40*
	100	D	0,08	16	0,8	B45196H3107+40*
	100	E	0,08	16	0,8	B45196H3107+50*
	150	D	0,10	24	0,9	B45196H3157+40*
	150	E	0,08	24	0,6	B45196H3157+50*
220	E	0,10	35	0,9	B45196H3227+50*	

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20 (13)	1,5	A	0,06	0,5	8,0	B45196H4155+10*
	2,2	A	0,06	0,5	6,0	B45196H4225+10*
	3,3	A	0,06	0,7	4,0	B45196H4335+10*
	4,7	A	0,06	0,9	3,5	B45196H4475+10*
	4,7	B	0,06	0,9	3,0	B45196H4475+20*
	6,8	B	0,06	1,4	2,5	B45196H4685+20*
	10	B	0,06	2,0	2,3	B45196H4106+20*
	10	C	0,06	2,0	1,6	B45196H4106+30*
	15	C	0,06	3,0	1,5	B45196H4156+30*
	22	C	0,06	4,4	1,4	B45196H4226+30*
	33	C	0,06	6,6	1,5	B45196H4336+30*
	33	D	0,06	6,6	0,8	B45196H4336+40*
	47	D	0,06	9,4	0,8	B45196H4476+40*
	47	E	0,06	9,4	0,8	B45196H4476+50*
	68	D	0,06	14	0,9	B45196H4686+40*
	68	E	0,06	14	0,8	B45196H4686+50*
100	E	0,08	20,0	0,8	B45196H4107+50*	
25 (16)	1,0	A	0,04	0,5	8,0	B45196H5105+10*
	1,5	A	0,06	0,5	7,0	B45196H5155+10*
	2,2	A	0,06	0,6	7,0	B45196H5225+10*
	3,3	B	0,06	0,8	4,0	B45196H5335+20*
	4,7	B	0,06	1,2	3,2	B45196H5475+20*
	6,8	B	0,06	1,7	2,8	B45196H5685+20*
	6,8	C	0,06	1,7	2,0	B45196H5685+30*
	10	C	0,06	2,5	1,6	B45196H5106+30*
	15	C	0,06	3,8	1,5	B45196H5156+30*
	22	C	0,06	5,5	1,4	B45196H5226+30*
	22	D	0,06	5,5	0,8	B45196H5226+40*
	33	D	0,06	8,3	0,8	B45196H5336+40*
	33	E	0,06	8,3	0,8	B45196H5336+50*
	47	D	0,06	12	0,8	B45196H5476+40*
	47	E	0,06	12	0,8	B45196H5476+50*
	68	E	0,06	17	0,9	B45196H5686+50*

Upon request

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35 (23)	0,47	A	0,04	0,5	11	B45196H6474+10*
	0,68	A	0,04	0,5	8,0	B45196H6684+10*
	1,0	A	0,04	0,5	7,0	B45196H6105+10*
	1,5	B	0,06	0,5	6,0	B45196H6155+20*
	2,2	B	0,06	0,8	4,0	B45196H6225+20*
	3,3	B	0,06	1,2	3,5	B45196H6335+20*
	4,7	C	0,06	1,6	2,0	B45196H6475+30*
	6,8	C	0,06	2,4	1,8	B45196H6685+30*
	10	C	0,06	3,5	1,6	B45196H6106+30*
	15	D	0,06	5,3	0,8	B45196H6156+40*
	22	D	0,06	7,7	0,8	B45196H6226+40*
	22	E	0,06	7,7	0,8	B45196H6226+50*
	33	E	0,06	12	0,8	B45196H6336+50*
	47	E	0,06	16	0,9	B45196H6476+50*
50 (33)	0,15	A	0,04	0,5	22	B45196H7154+10*
	0,22	A	0,04	0,5	18	B45196H7224+10*
	0,47	B	0,04	0,5	9,0	B45196H7474+20*
	1,5	C	0,06	0,8	4,4	B45196H7155+30*
	2,2	C	0,06	1,1	3,2	B45196H7225+30*
	6,8	D	0,06	3,4	0,8	B45196H7685+40*
	6,8	E	0,06	3,4	0,8	B45196H7685+50*
	10	E	0,06	5,0	0,8	B45196H7106+50*
15	E	0,06	7,5	0,9	B45196H7156+50*	

Upon request

1) Replace 196H by 198H 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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