


**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**

- 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)
- Low ESR

**Applications**

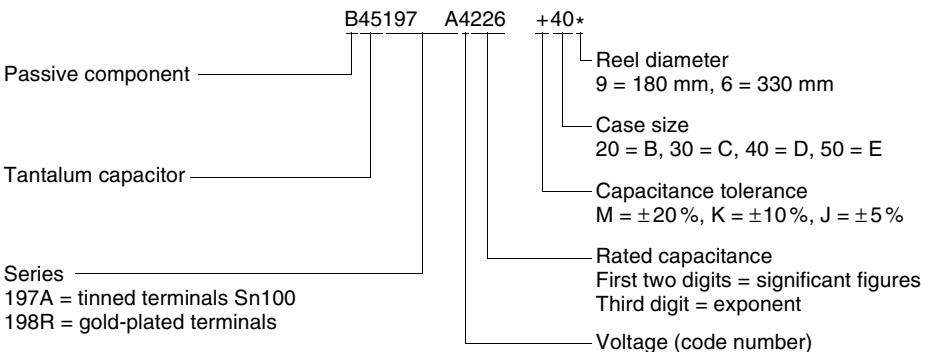
- Telecommunications (e.g. mobile phones, private branch exchanges)
- Data processing (e.g. laptops, main frames)
- Measuring and control engineering (e.g. voltage regulators)
- Automotive electronics (e.g. navigation systems)
- Medical engineering
- DC/DC converters

**Soldering**

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

**Delivery mode**

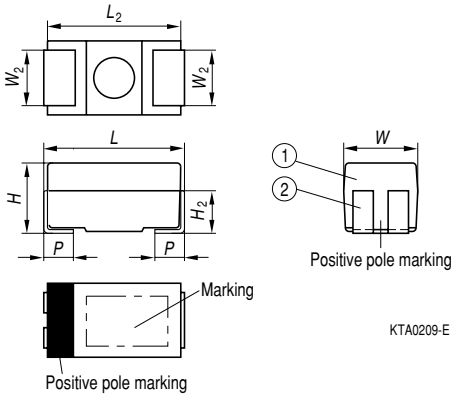
Taped and reeled in accordance with IEC 60286-3

**Ordering code structure**



**Specifications and characteristics in brief**

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

	SpeedPower, Low ESR	
Series	B45197A	B45198R
Technology	Ta-MnO <sub>2</sub>	Ta-MnO <sub>2</sub>
Terminals	Tinned	Gold-plated
Rated voltage $V_R$ (up to 85 °C)	6,3 ... 50 Vdc	
Rated capacitance $C_R$	0,47 ... 1000 $\mu$ 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	
$C_R \cdot V_R > 330 \mu F \cdot V$	$\leq 12$ fit	
$C_R \cdot V_R > 330 \mu F \cdot V$	$\leq 24$ fit (refer to series B4519*H, “HighCap”)	
Service life	> 500 000 h	
Leakage current ( $V_R$ , 5 min, 20 °C)	10 nA/ $\mu$ C	
$ESR_{max}$ (20 °C, 100 kHz)	100 ... 2500 m $\Omega$	
Detail specification (tinned terminals)	CECC 30801-805	
IEC climatic category	To IEC 60068-1 55/125/56 (-55/+125 °C; 56 days damp heat test)	

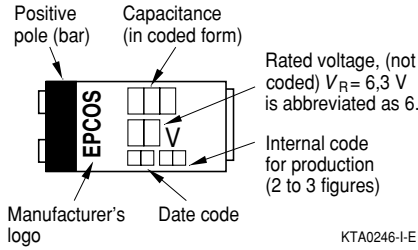
**Dimensional drawing**


- ① Encapsulation: molded epoxy resin
- ② NiFe; tinned surface Sn100 or gold-plated

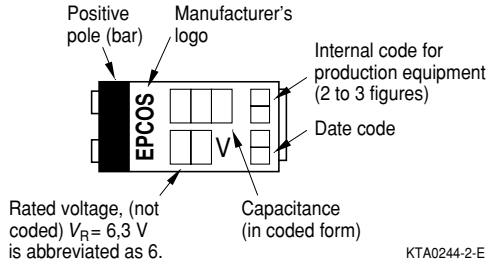
Case size	Dimensions in mm (inches)						
	<i>L</i>	<i>W</i>	<i>H</i>	<i>L</i> <sub>2</sub> typ.	<i>W</i> <sub>2</sub> ± 0,1 ±(,004)	<i>H</i> <sub>2</sub> typ.	<i>p</i> ± 0,3 ±(,012)
B (20)	3,5 ± 0,2 (,138±,008)	2,8 ± 0,2 (,110±,008)	1,9 ± 0,2 (,075±,008)	3,3 (,130)	2,2 (,087)	1,2 (,047)	0,8 (,031)
C (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)

Marking

Case size B



Case sizes C, D, E



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	B45197A, tinned terminals B45198R, gold-plated terminals															
$V_R$ (Vdc) up to 85 °C	6,3		10		16		20		25		35		50			
$C_R$ ( $\mu$ F) <sup>1)</sup>																
0,47													B			
0,68													B			
1,0													B			
1,5										B			B			
2,2								B		B			B			
3,3						B		B		B			C			
4,7				B		B		B		B	C		D		D	
6,8				B		B		B	C	B	C		D	E	D	E
10		B		B	C	B	C	B	C		C		D	E		E
15		B		B	C	B	C		C		D		D	E		
22		B	C	B	C		C		D		D	E	D	E		
33		B	C	B	C		C	D	D	E	D	E		E		
47		B	C	B	C	D	C	D	D	E	D	E		E		
68		B	C	D	C	D	C	D	E	D	E		E			
100		C	D	C	D	E	D	E		E						
150		D	E	D	E		D	E								
220		D	E	D	E		E									
330		D	E	D	E											
470		D	E		E											
680		E														
1000		E														

Upon request

1) Additional ratings upon request

**Technical data and ordering codes**

$V_R$ up to 85°C (up to 125°C) Vdc	$C_R$  $\mu\text{F}$	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{k, \max}$ (20°C, $V_R$ , 5 min) $\mu\text{A}$	$ESR_{\max}^{1)}$ (20°C, 100 kHz) m $\Omega$	$I_{ac}$ (20°C, 100 kHz) A	Ordering code <sup>2)</sup>  Tinned terminals
6,3 (4)	10	B	0,06	0,6	1000	0,29	B45197A1106+20*
	15	B	0,06	0,9	700	0,33	B45197A1156+20*
	22	B	0,06	1,4	600	0,35	B45197A1226+20*
	22	C	0,06	1,4	375	0,54	B45197A1226+30*
	33	B	0,06	2,1	600	0,35	B45197A1336+20*
	33	C	0,06	2,1	350	0,56	B45197A1336+30*
	47	B	0,06	3,0	500	0,41	B45197A1476+20*
	47	C	0,06	3,0	325	0,58	B45197A1476+30*
	68	B	0,06	4,3	500	0,41	B45197A1686+20*
	68	C	0,06	4,3	400	0,52	B45197A1686+30*
	68	D	0,06	4,3	175	0,93	B45197A1686+40*
	100	C	0,08	6,3	150	0,86	B45197A1107+30*
	100	D	0,08	6,3	125	1,10	B45197A1107+40*
	150	D	0,08	9,5	100	1,22	B45197A1157+40*
	150	E	0,08	9,5	100	1,28	B45197A1157+50*
	220	D	0,08	14	100	1,22	B45197A1227+40*
	220	E	0,08	14	100	1,28	B45197A1227+50*
	330	D	0,12	21	100	1,22	B45197A1337+40*
	330	E	0,08	21	100	1,28	B45197A1337+50*
	470	D	0,15	30	150	1,0	B45197A1477+40*
470	E	0,12	30	100	1,28	B45197A1477+50*	
680	E	0,15	43	100	1,28	B45197A1687+50*	
1000	E	0,15	63	100	1,28	B45197A1108+50*	

Upon request

1) Other values upon request

2) Replace 197A by 198R 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) Vdc	$C_R$  μF	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, $V_R$ , 5 min) μA	$ESR_{\max}^{1)}$ (20°C, 100 kHz) mΩ	$I_{ac}$ (20°C, 100 kHz) A	Ordering code <sup>2)</sup>  Tinned terminals
10 (6,3)	4,7	B	0,06	0,5	1500	0,24	B45197A2475+20*
	6,8	B	0,06	0,7	1200	0,27	B45197A2685+20*
	10	B	0,06	1,0	1200	0,27	B45197A2106+20*
	10	C	0,06	1,0	400	0,52	B45197A2106+30*
	15	B	0,06	1,5	900	0,31	B45197A2156+20*
	15	C	0,06	1,5	400	0,52	B45197A2156+30*
	22	B	0,06	2,2	800	0,31	B45197A2226+20*
	22	C	0,06	2,2	375	0,54	B45197A2226+30*
	33	B	0,06	3,3	650	0,36	B45197A2336+20*
	33	C	0,06	3,3	375	0,54	B45197A2336+30*
	47	B	0,08	4,7	650	0,36	B45197A2476+20*
	47	C	0,06	4,7	300	0,61	B45197A2476+30*
	47	D	0,06	4,7	200	0,87	B45197A2476+40*
	68	C	0,06	6,8	250	0,66	B45197A2686+30*
	68	D	0,06	6,8	150	1,00	B45197A2686+40*
	100	C	0,08	10	250	0,66	B45197A2107+30*
	100	D	0,08	10	100	1,22	B45197A2107+40*
	100	E	0,08	10	100	1,28	B45197A2107+50*
	150	D	0,08	15	100	1,22	B45197A2157+40*
	150	E	0,08	15	100	1,28	B45197A2157+50*
	220	D	0,10	22	100	1,22	B45197A2227+40*
	220	E	0,08	22	100	1,28	B45197A2227+50*
	330	D	0,12	33	150	1,0	B45197A2337+40*
	330	E	0,10	33	100	1,28	B45197A2337+50*
470	E	0,12	47	100	1,28	B45197A2477+50*	

1) Other values upon request

2) Replace 197A by 198R 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) Vdc	$C_R$  $\mu\text{F}$	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, $V_R$ , 5 min) $\mu\text{A}$	$ESR_{\max}^{1)}$ (20°C, 100 kHz) m $\Omega$	$I_{ac}$ (20°C, 100 kHz) A	Ordering code <sup>2)</sup>  Tinned terminals
16 (10)	3,3	B	0,06	0,5	2000	0,21	B45197A3335+20*
	4,7	B	0,06	0,8	1500	0,24	B45197A3475+20*
	6,8	B	0,06	1,1	1200	0,27	B45197A3685+20*
	10	B	0,06	1,6	800	0,31	B45197A3106+20*
	10	C	0,06	1,6	450	0,49	B45197A3106+30*
	15	B	0,06	2,4	800	0,33	B45197A3156+20*
	15	C	0,06	2,4	400	0,52	B45197A3156+30*
	22	C	0,06	3,5	350	0,56	B45197A3226+30*
	33	C	0,06	5,3	300	0,61	B45197A3336+30*
	33	D	0,06	5,3	200	0,87	B45197A3336+40*
	47	C	0,06	7,5	300	0,61	B45197A3476+30*
	47	D	0,06	7,5	175	0,93	B45197A3476+40*
	68	C	0,06	11	250	0,66	B45197A3686+30*
	68	D	0,06	11	150	1,0	B45197A3686+40*
	68	E	0,06	11	150	1,05	B45197A3686+50*
	100	D	0,08	16	150	1,0	B45197A3107+40*
	100	E	0,08	16	100	1,28	B45197A3107+50*
	150	D	0,10	24	150	1,0	B45197A3157+40*
	150	E	0,08	24	100	1,28	B45197A3157+50*
220	E	0,10	35	100	1,28	B45197A3227+50*	

1) Other values upon request

2) Replace 197A by 198R for gold-plated terminals

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



$V_R$ up to 85°C (up to 125°C) Vdc	$C_R$  $\mu\text{F}$	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, $V_R$ , 5 min) $\mu\text{A}$	$ESR_{\max}^{1)}$ (20°C, 100 kHz) $\text{m}\Omega$	$I_{ac}$ (20°C, 100 kHz) A	Ordering code <sup>2)</sup>  Tinned terminals
20 (13)	2,2	B	0,06	0,5	1500	0,24	B45197A4225+20*
	3,3	B	0,06	0,7	1300	0,26	B45197A4335+20*
	4,7	B	0,06	0,9	1000	0,29	B45197A4475+20*
	6,8	B	0,06	1,4	1000	0,29	B45197A4685+20*
	6,8	C	0,06	1,4	475	0,48	B45197A4685+30*
	10	B	0,06	2,0	1000	0,29	B45197A4106+20*
	10	C	0,06	2,0	450	0,49	B45197A4106+30*
	15	C	0,06	3,0	400	0,52	B45197A4156+30*
	22	D	0,06	4,4	200	0,87	B45197A4226+40*
	33	D	0,06	6,6	200	0,87	B45197A4336+40*
	33	E	0,06	6,6	200	0,91	B45197A4336+50*
	47	D	0,06	9,4	250	0,77	B45197A4476+40*
	47	E	0,06	9,4	150	1,05	B45197A4476+50*
	68	D	0,06	14	300	0,71	B45197A4686+40*
	68	E	0,06	14	200	0,91	B45197A4686+50*
100	E	0,08	20	150	1,05	B45197A4107+50*	
25 (16)	1,5	B	0,06	0,5	1500	0,24	B45197A5155+20*
	2,2	B	0,06	0,6	1200	0,27	B45197A5225+20*
	3,3	B	0,06	0,8	1200	0,27	B45197A5335+20*
	4,7	B	0,06	1,2	1000	0,29	B45197A5475+20*
	4,7	C	0,06	1,2	525	0,46	B45197A5475+30*
	6,8	B	0,06	1,7	1000	0,29	B45197A5685+20*
	6,8	C	0,06	1,7	500	0,47	B45197A5685+30*
	10	C	0,06	2,5	450	0,49	B45197A5106+30*
	15	D	0,06	3,8	230	0,81	B45197A5156+40*
	22	D	0,06	5,5	230	0,81	B45197A5226+40*
	22	E	0,06	5,5	230	0,85	B45197A5226+50*
	33	D	0,06	8,3	230	0,81	B45197A5336+40*
	33	E	0,06	8,3	200	0,91	B45197A5336+50*
	47	D	0,06	12	250	0,77	B45197A5476+40*
	47	E	0,06	12	200	0,91	B45197A5476+50*
	68	E	0,06	17	200	0,91	B45197A5686+50*

1) Other values upon request

2) Replace 197A by 198R 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) Vdc	$C_R$  $\mu\text{F}$	Case size	$\tan \delta_{\max}$ (20°C, 120 Hz)	$I_{lk, \max}$ (20°C, $V_R$ , 5 min) $\mu\text{A}$	$ESR_{\max}^{1)}$ (20°C, 100 kHz) $\text{m}\Omega$	$I_{ac}$ (20°C, 100 kHz) A	Ordering code <sup>2)</sup>  Tinned terminals
35 (23)	0,47	B	0,04	0,5	2500	0,18	B45197A6474+20*
	0,68	B	0,04	0,5	2500	0,18	B45197A6684+20*
	1,0	B	0,04	0,5	2000	0,21	B45197A6105+20*
	1,5	B	0,06	0,5	2000	0,21	B45197A6155+20*
	2,2	B	0,06	0,8	2000	0,21	B45197A6225+20*
	3,3	C	0,06	1,2	550	0,45	B45197A6335+30*
	4,7	D	0,06	1,6	300	0,71	B45197A6475+40*
	6,8	D	0,06	2,4	300	0,71	B45197A6685+40*
	6,8	E	0,06	2,4	300	0,74	B45197A6685+50*
	10	D	0,06	3,5	260	0,76	B45197A6106+40*
	10	E	0,06	3,5	260	0,80	B45197A6106+50*
	15	D	0,06	5,3	260	0,76	B45197A6156+40*
	15	E	0,06	5,3	260	0,80	B45197A6156+50*
	22	D	0,06	7,7	260	0,76	B45197A6226+40*
	22	E	0,06	7,7	260	0,80	B45197A6226+50*
	33	E	0,06	12	260	0,80	B45197A6336+50*
47	E	0,06	16	230	0,85	B45197A6476+50*	
50 (33)	4,7	D	0,06	2,4	300	0,71	B45197A7475+40*
	6,8	D	0,06	3,4	400	0,61	B45197A7685+40*
	6,8	E	0,06	3,4	300	0,74	B45197A7685+50*
	10	E	0,06	5,0	300	0,74	B45197A7106+50*

1) Other values upon request

2) Replace 197A by 198R 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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