



**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)

**Applications**

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

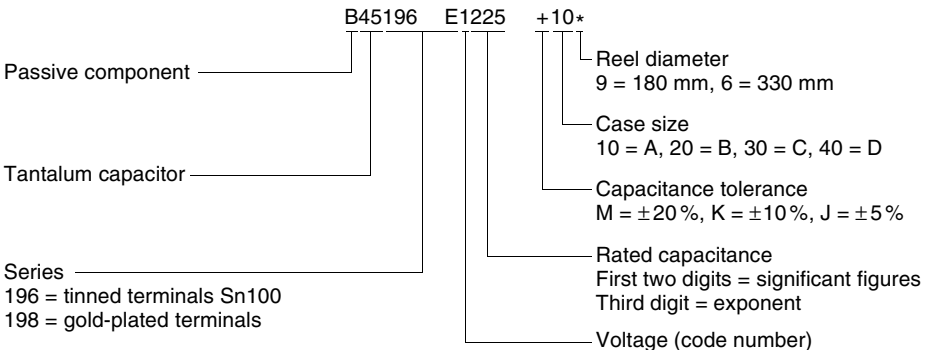
**Soldering**

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

**Delivery mode**

Taped and reeled in accordance with IEC 60286-3

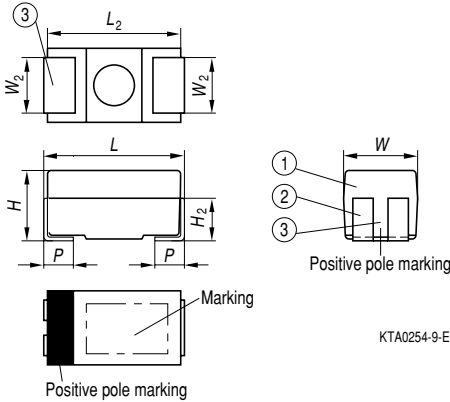
**Ordering code structure**




**Specifications and characteristics in brief**

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

	Standard	
Series	B45196E	B45198E
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 $C_R$	0,10 ... 100 $\mu$ 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)	
$C_R \cdot V_R \leq 330 \mu\text{F} \cdot \text{V}$	$\leq 3$ fit	
$C_R \cdot V_R > 330 \mu\text{F} \cdot \text{V}$	$\leq 10$ fit	
Service life	> 500 000 h	
Leakage current ( $V_R$ , 5 min, 20 °C)	10 nA/ $\mu$ C	
Detail specification (tinned terminals)	CECC 30801-801	
IEC climatic category	To IEC 60068-1 55/125/56 (-55/+125 °C; 56 days damp heat test)	

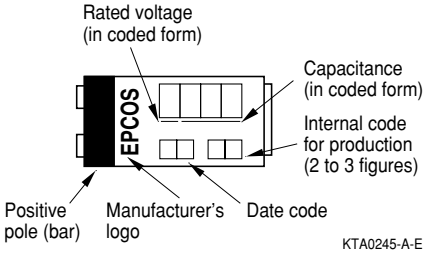
**Dimensional drawing**


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

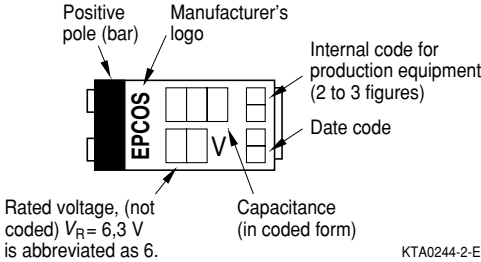
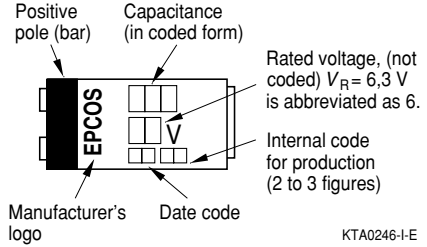
Case size	Dimensions in mm (inches)						
	$L$	$W$	$H$	$L_2$ typ.	$W_2 \pm 0,1$ $\pm(,004)$	$H_2$ typ.	$p \pm 0,3$ $\pm(,012)$
A (10)	$3,2 \pm 0,2$ (,126±,008)	$1,6 \pm 0,2$ (,063±,008)	$1,6 \pm 0,2$ (,063±,008)	3,0 (,118)	1,2 (,047)	1,0 (,039)	0,8 (,031)
B (20)	$3,5 \pm 0,2$ (,138±,008)	$2,8 \pm 0,2$ (,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)

Marking

Case size A



Case size B



Case sizes C, D

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

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	B45196E, tinned terminals B45198E, gold-plated terminals							
$V_R$ (Vdc) up to 85°C	4	6,3	10	16	20	25	35	50
$C_R$ (μF)								
0,10							A	A
0,15							A	B
0,22							A	B
0,33							A	B
0,47						A	B	C
0,68					A	A	B	C
1,0				A	A		B	C
1,5			A	A		B	C	D
2,2		A	A		B	B	C	D
3,3	A	A		B	B	C	C	D
4,7	A		B	B	C	C	D	D
6,8		B	B	C	C	D	D	
10	B	B	C	C		D	D	
15	B	C	C		D	D		
22	C	C		D	D			
33	C		D	D				
47		D	D					
68	D	D						
100	D							

**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) $\mu\text{A}$	$Z_{\max}$ (20°C, 100 kHz) $\Omega$	Ordering code <sup>1)</sup>  Tinned terminals
4 (2,5)	3,3	A	0,06	0,5	9,0	B45196E0335+10*
	4,7	A	0,06	0,5	7,0	B45196E0475+10*
	10	B	0,06	0,5	4,5	B45196E0106+20*
	15	B	0,06	0,6	3,5	B45196E0156+20*
	22	C	0,06	0,9	2,4	B45196E0226+30*
	33	C	0,06	1,3	2,0	B45196E0336+30*
	68	D	0,06	2,7	1,1	B45196E0686+40*
6,3 (4)	100	D	0,08	4,0	0,8	B45196E0107+40*
	2,2	A	0,06	0,5	10	B45196E1225+10*
	3,3	A	0,06	0,5	7,0	B45196E1335+10*
	6,8	B	0,06	0,5	4,5	B45196E1685+20*
	10	B	0,06	0,6	3,5	B45196E1106+20*
	15	C	0,06	1,0	2,4	B45196E1156+30*
	22	C	0,06	1,4	2,0	B45196E1226+30*
10 (6,3)	47	D	0,06	3,0	1,1	B45196E1476+40*
	68	D	0,06	4,3	0,8	B45196E1686+40*
	1,5	A	0,06	0,5	10	B45196E2155+10*
	2,2	A	0,06	0,5	7,0	B45196E2225+10*
	4,7	B	0,06	0,5	4,5	B45196E2475+20*
	6,8	B	0,06	0,7	3,5	B45196E2685+20*
	10	C	0,06	1,0	2,4	B45196E2106+30*
16 (10)	15	C	0,06	1,5	2,0	B45196E2156+30*
	33	D	0,06	3,3	1,1	B45196E2336+40*
	47	D	0,06	4,7	0,8	B45196E2476+40*
	1,0	A	0,04	0,5	10	B45196E3105+10*
	1,5	A	0,06	0,5	8,0	B45196E3155+10*
	3,3	B	0,06	0,6	5,0	B45196E3335+20*
	4,7	B	0,06	0,8	3,5	B45196E3475+20*
6,8	6,8	C	0,06	1,1	2,4	B45196E3685+30*
	10	C	0,06	1,6	2,0	B45196E3106+30*
	22	D	0,06	3,6	1,1	B45196E3226+40*
	33	D	0,06	5,3	1,0	B45196E3336+40*

1) Replace 196E by 198E 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) $\mu\text{A}$	$Z_{\max}$ (20°C, 100 kHz) $\Omega$	Ordering code <sup>1)</sup>  Tinned terminals
20 (13)	0,68	A	0,04	0,5	12	B45196E4684+10*
	1,0	A	0,04	0,5	9,0	B45196E4105+10*
	2,2	B	0,06	0,5	6,0	B45196E4225+20*
	3,3	B	0,06	0,7	4,5	B45196E4335+20*
	4,7	C	0,06	1,0	2,4	B45196E4475+30*
	6,8	C	0,06	1,4	2,0	B45196E4685+30*
	15	D	0,06	3,0	1,2	B45196E4156+40*
25 (16)	22	D	0,06	4,4	1,0	B45196E4226+40*
	0,47	A	0,04	0,5	13	B45196E5474+10*
	0,68	A	0,04	0,5	10	B45196E5684+10*
	1,5	B	0,06	0,5	7,0	B45196E5155+20*
	2,2	B	0,06	0,6	5,0	B45196E5225+20*
	3,3	C	0,06	0,9	2,8	B45196E5335+30*
	4,7	C	0,06	1,2	2,3	B45196E5475+30*
	6,8	D	0,06	1,7	1,8	B45196E5685+40*
35 (23)	10	D	0,06	2,5	1,2	B45196E5106+40*
	15	D	0,06	3,8	1,0	B45196E5156+40*
	0,10	A	0,04	0,5	28	B45196E6104+10*
	0,15	A	0,04	0,5	23	B45196E6154+10*
	0,22	A	0,04	0,5	19	B45196E6224+10*
	0,33	A	0,04	0,5	15	B45196E6334+10*
	0,47	B	0,04	0,5	11	B45196E6474+20*
	0,68	B	0,04	0,5	8,0	B45196E6684+20*
	1,0	B	0,04	0,5	7,0	B45196E6105+20*
	1,5	C	0,06	0,6	4,8	B45196E6155+30*
	2,2	C	0,06	0,8	3,2	B45196E6225+30*
	3,3	C	0,06	1,2	2,4	B45196E6335+30*
	4,7	D	0,06	1,7	1,5	B45196E6475+40*
	6,8	D	0,06	2,4	1,2	B45196E6685+40*
10	D	0,06	3,5	1,0	B45196E6106+40*	

1) Replace 196E by 198E 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) $\mu\text{A}$	$Z_{\max}$ (20°C, 100 kHz) $\Omega$	Ordering code <sup>1)</sup>  Tinned terminals
50 (33)	0,10	A	0,04	0,5	27	B45196E7104+10*
	0,15	B	0,04	0,5	22	B45196E7154+20*
	0,22	B	0,04	0,5	18	B45196E7224+20*
	0,33	B	0,04	0,5	14	B45196E7334+20*
	0,47	C	0,04	0,5	7,2	B45196E7474+30*
	0,68	C	0,04	0,5	6,4	B45196E7684+30*
	1,0	C	0,04	0,5	4,8	B45196E7105+30*
	1,5	D	0,06	0,8	4,0	B45196E7155+40*
	2,2	D	0,06	1,1	2,8	B45196E7225+40*
	3,3	D	0,06	1,7	1,6	B45196E7335+40*
4,7	D	0,06	2,4	1,2	B45196E7475+40*	

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**Published by EPCOS AG**

**Corporate Communications, P.O. Box 80 17 09, 81617 Munich, GERMANY**

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