



**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

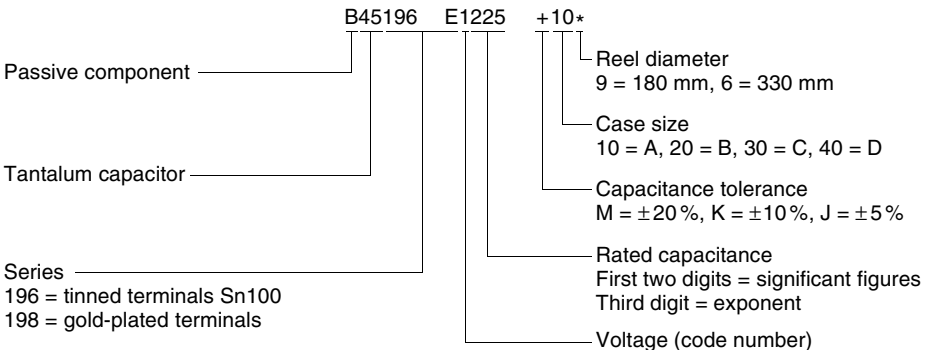
**Soldering**

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

**Delivery mode**

Taped and reeled in accordance with IEC 60286-3

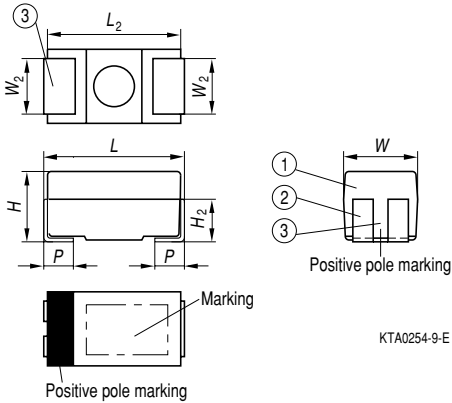
**Ordering code structure**




**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)	

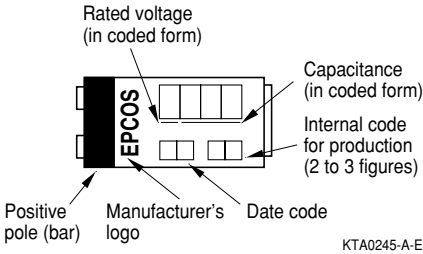
**Dimensional drawing**


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

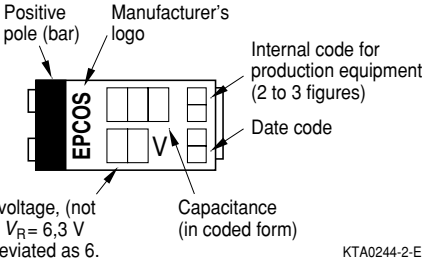
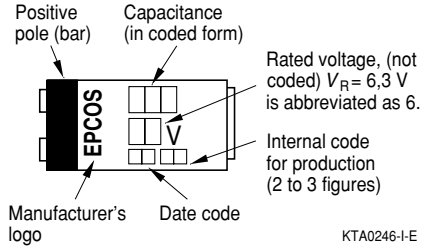
Case size	Dimensions in mm (inches)						
	<i>L</i>	<i>W</i>	<i>H</i>	<i>L</i> <sub>2</sub> typ.	<i>W</i> <sub>2</sub> ± 0,1 ±(,004)	<i>H</i> <sub>2</sub> typ.	<i>p</i> ± 0,3 ±(,012)
A (10)	3,2 ± 0,2 (,126±,008)	1,6 ± 0,2 (,063±,008)	1,6 ± 0,2 (,063±,008)	3,0 (,118)	1,2 (,047)	1,0 (,039)	0,8 (,031)
B (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)

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 = $10^4$ 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	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	$C_R$  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 <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 = ± 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) $\mu\text{A}$	$Z_{\max}$ (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*	

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



**Herausgegeben von EPCOS AG**

**Unternehmenskommunikation, Postfach 80 17 09, 81617 München, DEUTSCHLAND**

**☎ ++49 89 636 09, FAX (0 89) 636-2 26 89**

© EPCOS AG 2002. Vervielfältigung, Veröffentlichung, Verbreitung und Verwertung dieser Broschüre und ihres Inhalts ohne ausdrückliche Genehmigung der EPCOS AG nicht gestattet.

Bestellungen unterliegen den vom ZVEI empfohlenen Allgemeinen Lieferbedingungen für Erzeugnisse und Leistungen der Elektroindustrie, soweit nichts anderes vereinbart wird.

Diese Broschüre ersetzt die vorige Ausgabe.

Fragen über Technik, Preise und Liefermöglichkeiten richten Sie bitte an den Ihnen nächstgelegenen Vertrieb der EPCOS AG oder an unsere Vertriebsgesellschaften im Ausland. Bauelemente können aufgrund technischer Erfordernisse Gefahrstoffe enthalten. Auskünfte darüber bitten wir unter Angabe des betreffenden Typs ebenfalls über die zuständige Vertriebsgesellschaft einzuholen.

**Published by EPCOS AG**

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

**☎ ++49 89 636 09, FAX (0 89) 636-2 26 89**

© EPCOS AG 2002. Reproduction, publication and dissemination of this brochure and the information contained therein without EPCOS' prior express consent is prohibited.

Purchase orders are subject to the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry recommended by the ZVEI (German Electrical and Electronic Manufacturers' Association), unless otherwise agreed.

This brochure replaces the previous edition.

For questions on technology, prices and delivery please contact the Sales Offices of EPCOS AG or the international Representatives.

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our Sales Offices.