



CAPACITOR MANUFACTURER **TANCAP TECHNOLOGY CO., LTD.**

Add: No.8,Tengfeng 3rd Rd., Fenghuang 3rd Industrial Park, Fuyong, Bao'anDist, Shenzhen, China P.C:518103

Tel:+86-755-27863400 Fax:+86-755-27862551 E-mail: info@china-capacitors.com www.china-capacitors.com

Specifications for approval

NO.Q/TANCAP.CA45.19-06-03

Product Name: CA45 CHIP TANTALUM CAPACITORS

Customer: _____

Type and Specification: Full-Range

Material Code of Customer: _____

WRITTEN	CHECKED	APPROVED
Zhang Wei	Xu Xinhuai	XuSuling

Signature of Approval: _____

TANCAP TECHNOLOGY CO., LTD.

Add: No.8, Tengfeng 3rd Rd, Fenghuang 3rd Industrial Park, Fuyong, Bao'anDist, Shenzhen, China

Tel: +86-755-27863861 27863400

Fax: +86-755-27862551

Http: www.china-capacitors.com

E-mail: sales@china-capacitors.com

Product Name	CA45 CHIP TANTALUM CAPACITORS	
1.Scope: This specification applies to CHIP TANTALUM CAPACITORS produced by our factory for use in electronic equipment.		
2.Performing Standard: 《electronic component detailed standard CA45 Surface Mounted Solid Capacitor Evaluation Standard E》 Q/TANCAP.45-02		
3.Testing Condition: Room Temperature 25℃，relative Humidity 60 to 70%，Air Pressure 800 to 1060mbar.		
4.Handling: It is mandatory to fully discharge capacitor to avoid failure test results. Product is polarity component, it is prohibited to connect positive poles and negative poles reversely to avoid product performance failure.		
5.Checking List:		
Item	Characteristics	Testing Method
Drawing and dimension	See table (4).	Measured with Gauge
Appearance	Complete Marking 、 Clear、centered.	visual
Leakage current	Less than 0.01CV or 0.5μA （whichever is greater）	Pressurize related voltage between two poles(Series connecting 1K current-limiting resistor) Read
Capacitance tolerance	±10%（K）; ±20%（M）	The measurement frequency: 100（120）HZ Voltage: 0.3±0.02V

Item	Characteristics				Testing Method					
Dissipation factor ($\text{tg}\delta$)	See table (6).				The measurement frequency: 100 (120) HZ Voltage: $0.3\pm 0.02\text{V}$					
ESR	See table (6).				The measurement frequency: 100(120)KHZ					
Solderability	Soldering coverage rate $\geq 95\%$				Dip capacitor into flux for two seconds, then remove excessive amount of flux, dip capacitor into $245\pm 3^\circ\text{C}$ welding slot with 10mm depth for three seconds, withdraw capacitor, clean capacitor with proper amount of solution, use ten times the microscope to observe.					
Temperature Performance Table(1)	Capacitance (μF)	Change of capacitance (%)			Max D.F (%)				Max DCL (μA)	
		-55 $^\circ\text{C}$	+85 $^\circ\text{C}$	+125 $^\circ\text{C}$	-55 $^\circ\text{C}$	+25 $^\circ\text{C}$	+85 $^\circ\text{C}$	+125 $^\circ\text{C}$	+85 $^\circ\text{C}$	+125 $^\circ\text{C}$
	≤ 1.0	-10	+10	+12	Below 1.5*(+25 $^\circ\text{C}$ value)	See table 6.	below 1.5*(+25 $^\circ\text{C}$ value)	$10 \cdot I_0$	$12.5 \cdot I_0$	
	1.5-68									
	100-220									
	330-470									
	>470									

Product Name	CA45 CHIP TANTALUM CAPACITORS				
6.How To Order					
1)Product description:					
CA45	106	M	035	D	T
Type	Capacitance(PF)	Tolerance	Rated Voltage	Case	Packaging
Chip Tantalum Capacitors	105 10×10 ⁵ This is expressed in Pico farads. The first two digits are the significant figures. The third is the number of zeros to follow.	±10% (K); ±20% (M)	2.5V=002 4V=004 6.3V=006 10V=010 16V=016 20V=020 25V=025 35V=035 50V=050	P:2.0*1.2 A:3.2*1.6 B:3.5*2.8 C:6.0*3.2 D:7.3*4.3 E:7.3*4.3	T=Tape and reel

2)Product mark and code:

P Size

+

JA

Polarity

Cap Code

Rated Voltage Code

Example: 6.3V105

A Size

+

V 474

Polarity

Cap Code

Rated Voltage Code

Example: 35V474

B/C/D /E/ Size

+

476
16V

Polarity

Cap Code

Rated Voltage Code

Example: 16V476

Remark: Only CA45-476*010BT with “H”mark

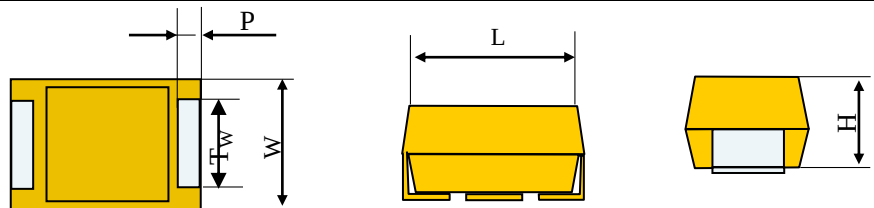
Rated Voltage Code: Table(2)

Code	e	G	J	A	C	D	E	V	T
Rated Voltage	2.5V	4V	6.3V	10V	16V	20V	25V	35V	50V

(P Size)Capacitance code: Table(3)

Cap C _R (uF)	Cap code	Cap C _R (uF)	Cap code	Cap C _R (uF)	Cap code	Cap C _R (uF)	Cap code
0.1	<u>A</u>	0.47	<u>s</u>	2.2	J	10	<u>A</u>
0.15	<u>E</u>	0.68	<u>W</u>	3.3	N	15	<u>E</u>
0.22	<u>J</u>	1	A	4.7	S	22	<u>J</u>
0.33	<u>N</u>	1.5	E	6.8	W	33	<u>N</u>

3)Drawing And Dimension:



Table(4)

CASE CODE	EIA/IECQ	L	W	H	P	T _w
P	2012	2.0±0.2	1.2±0.2	1.2±0.2	0.5±0.3	1.2±0.1
A	3216	3.2±0.2	1.6±0.2	1.6±0.2	0.8±0.3	1.2±0.1
B	3528	3.5±0.2	2.8±0.2	1.9±0.2	0.8±0.3	2.2±0.1
C	6032	6.0±0.3	3.2±0.3	2.5±0.3	1.3±0.3	2.2±0.1
D	7343	7.3±0.3	4.3±0.3	2.8±0.3	1.3±0.3	2.4±0.1
E	7343	7.3±0.3	4.3±0.3	4.0±0.3	1.3±0.3	2.4±0.1

7.Product electrical performance Parameters corresponding table

1) Capacitor case sizes of rated voltage Table(5)

VR ≤+85℃		2.5(e)	4(G)	6.3(J)	10(A)	16(C)	20(D)	25(E)	35(V)	50(T)
VC ≤+125℃		1.7	2.5	4	6.3	10	13	16	23	33
VS ≤+85℃		3.2	5	8	13	20	26	32	46	60
VR ≤+125℃		2.2	3.4	5	8	12	16	20	26	38
Temperature range: -55℃~+125℃										
Cap C _R (uF)	Cap code	Case size								
0.1	1						P		A	A
0.15	154						P		A	A/B
0.22	224						P		A	A/B
0.33	334						P	A	A	A/B
0.47	474					P	P	A	A/B	A/B/C
0.68	684				P	P	P/A	A	A/B	A/B/C
1.0	105			P	P	P/A	A	A/B	A/B	B/C
1.5	155		P	P	P/A	P/A	A/B	A/B	A/B/C	C/D
2.2	225		P	P/A	P/A/B	A/B	A/B	A/B/C	B/C	C/D
3.3	335		P/A	P/A	P/A/B	A/B	A/B/C	A/B/C	B/C	C/D
4.7	475		P/A	P/A	P/A/B	A/B	A/B/C	A/B/C	B/C/D	C/D
6.8	685		P/A	P/A/B	P/A/B	A/B/C	A/B/C	B/C/D	C/D	D/E
10	106		A/B	P/A/B	A/B/C/P	A/B/C	B/C/D	B/C/D	C/D/E	D/E
15	156		A/B	P/A/B/C	A/B/C	A/B/C	B/C/D	C/D	D/E	E
22	226		A/B/C	P/A/B/C	A/B/C/	B/C/D	B/C/D	C/D	D/E	
33	336	A	A/B/C	A/B/C	A/B/C/D	B/C/D	C/D	D/E	E	
47	476	A	A/B/C	A/B/C/D	A/B/C/D	C/D	D/E	D/E	E	
68	686	A	A/B/C/D	A/B/C/D	B/C/D	C/D	D/E	E		
100	107	B	A/B/C/D	A/B/C/D	B/C/D	C/D/E	D/E	E		
150	157	B	B/C/D	B/C/D/E	C/D/E	D/E	E			
220	227	B/C	B/C/D	B/C/D/E	D/E	E				
330	337	B/C/D	C/D/E	D/E	D/E					
470	477	C/D	C/D/E	D/E	E					
680	687	D/E	D/E	D/E						
1000	108	D/E								

2) Refer to number electrical specification Table (6)

U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ES (Ω) Max. 100kHz	TANCAP Part number
2.5v 85℃ (1.7v 125℃)						
2.5	A	33	0.8	6	3	CA45-336*002A*
2.5	A	47	1.2	6	3	CA45-476*002A*
2.5	A	68	1.	6	1.5	CA45 686*002A*
2.5	B	100	2.5	8	1.4	CA45-107*002B*
2.5	B	150	3.8	8	1.6	CA45-157*002B*
2.5	B	220	5.5	8	1.6	CA45-227*002B*
2.5	C	220	5.5	8	0.9	CA45-227*002C*
2.5	B	330	8.3	12	1.6	CA45-337*002B*
2.5	C	330	8.3	12	0.9	CA45-337*002C*
2.5	D	330	8.3	12	0.9	CA45-337*002D*
2.5	C	470	11.8	12	0.9	CA45-477*002C*
2.5	D	470	11.8	12	0.9	CA45-477*002D*
2.5	D	680	17	14	0.9	CA45-687*002D*
2.5	E	680	17	14	0.5	CA45-687*002E*
2.5	D	1000	25	14	0.5	CA45-108*002D*
2.5	E	1000	25	14	0.5	CA45-108*002E*
4.0v 85℃ (2.5v 125℃)						
4	P	1.5	0.5	6	20	CA45-155*004P*
4	P	2.2	0.5	6	18	CA45-225*004P
4	P	3.3	0.5	6	15	CA45-335*004P*
4	P	4.7	0.5	6	12	CA45-475*004P*
4	P	6.8	0.5	6	10	CA45-685*004P*
4	A	3.3	0.5	6	8	CA45-335*004A*
4	A	4.7	0.5	6	8	CA45-475*004A*
4	A	6.8	.5	6	6	CA45-685*004A*
4	A	10	0.5	6	6	CA45-106*004A*
4	B	10	0.5	6	3.5	CA45-106*004B*
4	A	15	0.6	6	4	CA45-156*004A*
4	B	15	0.6	6	3.5	CA45-156*004B*
4	A	22	0.9	6	4	CA45-226*004A*
4	B	22	0.9	6	3.5	CA45-226*004B*
4	C	22	0.9	6	1.8	CA45-226*004C*
4	A	33	1.3	6	4	CA45-336*004A*
4	B	33	1.3	6	3.5	CA45-336*004B*
4	C	33	1.3	6	1.8	CA45-336*004C*
4	A	47	1.9	6	3	CA45-476*004A*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 4.0v 85℃ (2.5v 125℃)						
4	B	47	1.9	6	2.5	CA45-476*004B*
4	C	47	1.9	6	1.8	CA45-476*004C*
4	A	68	2.7	18	2.5	CA45-686*004A
4	B	68	2.7	6	1.8	CA45-686*004B*
4	C	68	2.7	6	1.6	CA45-686*004C*
4	D	68	2.7	6	0.8	CA45-686*004D*
4	A#	100	4	20	2.0	CA45-107*004A*
4	B*	100	4	8	1.8	CA45-107*004B*
4	C	100	4	8	1.2	CA45-107*004C*
4	D	100	4	8	0.8	CA45-107*004D*
4	B*	150	6	15	2.0	CA45-157*004B*
4	C	150	6	8	1.2	CA45-157*004C*
4	D	150	6	8	1.2	CA45-157*004D*
4	B#	220	8.8	18	2.0	CA45-227*004B*
4	C	220	8.8	8	1.2	CA45-227*004C*
4	D	220	8.8	8	0.9	CA45-227*004D*
4	C	330	13.2	12	0.9	CA45-337*004C*
4	D	330	13.2	12	0.9	CA45-337*004D*
4	E	330	13.2	12	0.9	CA45-337*004E*
4	C	470	18.8	12	0.9	CA45-477*004C*
4	D	470	18.8	12	0.9	CA45-477*004D*
4	E	470	18.8	12	0.5	CA45-477*004E*
4	D#	680	27.2	14	0.5	CA45-687*004D*
4	E#	680	27.2	14	0.5	CA45-687*004E*
6.3v 85℃ (4.0v 125℃)						
6.3	P	1	0.5	6	25	CA45-105*006P*
6.3	P	1.5	0.5	6	10	CA45-155*006P*
6.3	P	2.2	0.5	6	20	CA45-225*006P*
6.3	A	2.2	0.5	6	8	CA45-225*006A*
6.3	P	3.3	0.5	6	10	CA45-335*006P*
6.3	A	3.3	0.5	6	8	CA45-335*006A*
6.3	P	4.7	0.5	6	7	CA45-475*006P*
6.3	A	4.7	0.5	6	6	CA45-475*006A*
6.3	P	6.8	0.5	8	6	CA45-685*006P*
6.3	A	6.8	0.5	6	6	CA45-685*006A*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	CR (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 6.3v 85℃ (4.0v 125℃)						
6.3	B	6.8	0.5	6	3.5	CA45-685*006B*
6.3	P	10	0.6	6	8	CA45-106*006P*
6.3	A	10	0.6	6	4	CA45-106*006A*
6.3	B	10	0.6	6	3.5	CA45-106*006B*
6.3	P	15	0.9	12	5	CA45-156*006P*
6.3	A	15	0.9	6	3.5	CA45-156*006A*
6.3	B	15	0.9	6	3.5	CA45-156*006B*
6.3	C	15	0.9	6	1.8	CA45-156*006C*
6.3	P	22	1.4	18	10	CA45-226*006P*
6.3	A	22	1.4	6	4	CA45-226*006A*
6.3	B	22	1.4	6	3.5	CA45-226*006B*
6.3	C	22	1.4	6	1.8	CA45-226*006C*
6.3	A	33	2.1	8	3.0	CA45-336*006A*
6.3	B	33	2.1	6	2.5	CA45-336*006B*
6.3	C	33	2.1	6	1.8	CA45-336*006C*
6.3	A	47	4	10	3.5	CA45-476*006A*
6.3	B	47	4	6	2	CA45-476*006B*
6.3	C	47	4	6	1.6	CA45-476*006C*
6.3	D	47	4	6	0.8	CA45-476*006D*
6.3	A#	68	4.3	16	2.0	CA45-686*006A*
6.3	B	68	4.3	10	0.9	CA45-686*006B*
6.3	C	68	4.3	6	1.2	CA45-686*006C*
6.3	D	68	4.3	6	0.8	CA45-686*006D*
6.3	A#	100	6.3	30	4.0	CA45-107*006A
6.3	B*	100	6.3	10	3	CA45-107*006B*
6.3	C	100	6.3	8	0.9	CA45-107*006C*
6.3	D	100	6.3	8	0.8	CA45-107*006D*
6.3	B#	150	9.5	15	1.5	CA45-157*006B*
6.3	C	150	9.5	10	1.2	CA45-157*006C*
6.3	D	150	9.5	8	0.9	CA45-157*006D*
6.3	E	150	9.5	8	0.5	CA45-157*006E*
6.3	B	220	13.9	18	1.0	CA45-227*006B*
6.3	C	220	13.9	8	0.9	CA45-227*006C*
6.3	D	220	13.9	8	0.9	CA45-227*006D*
6.3	E	220	13.9	8	0.9	CA45-227*006E*
6.3	D	330	20.8	8	0.9	CA45-337*006D*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 6.3v 85℃ (4.0v 125℃)						
6.3	E	330	20.8	12	0.9	CA45-337*006E*
6.3	D *	470	29.6	12	0.4	CA45-477*006D*
6.3	E *	470	29.6	12	0.4	CA45-477*006E*
6.3	D#	680	42.8	14	0.5	CA45-687*006D*
6.3	E #	680	42.8	14	0.5	CA45-687*006E*
10v 85℃ (6.3v 125℃)						
10	P	0.68	0.5	4	28	CA45-684*010P*
10	P	1	0.5	4	25	CA45-105*010P*
10	P	1.5	0.5	6	15	CA45-155*010P*
10	A	1.5	0.5	6	8	CA45-155*010A*
10	P	2.2	0.5	6	10	CA45-225*010P*
10	A	2.2	0.5	6	8	CA45-225*010A*
10	B	2.2	0.5	6	3.5	CA45-225*010B*
10	P	3.3	0.5	8	10	CA45-335*010P*
10	A	3.3	0.5	6	6	CA45-335*010A*
10	B	3.3	0.5	6	5	CA45-335*010B*
10	P	4.7	0.5	8	6	CA45-475*010P*
10	A	4.7	0.5	6	5	CA45-475*010A*
10	B	4.7	0.5	6	3.5	CA45-475*010B*
10	A	6.8	0.7	6	4	CA45-685*010A*
10	P	6.8	0.7	8	6	CA45-685*010P*
10	B	6.8	0.7	6	3.5	CA45-685*010B*
10	P	10	1	14	6	CA45-106*010P*
10	A	10	1	6	4	CA45-106*010A*
10	B	10	1	6	3.5	CA45-106*010B*
10	C	10	1	6	1.8	CA45-106*010C*
10	A	15	1.5	6	6	CA45-156*010A*
10	B	15	1.5	6	2.8	CA45-156*010B*
10	C	15	1.5	6	1.8	CA45-156*010C*
10	A	22	2.2	8	6	CA45-226*010A*
10	B	22	2.2	6	2.4	CA45-226*010B*
10	C	22	2.2	6	1.8	CA45-226*010C*
10	A #	33	3.3	15	3.0	CA45-336*010A*
10	B	33	3.3	6	1.8	CA45-336*010B*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 10v 85℃ (6.3v 125℃)						
10	C	33	3.3	6	1.6	CA45-336*010C*
10	D	33	3.3	6	0.8	CA45-336*010D*
10	A	47	4.7	15	2.5	CA45-476*010A*
10	B	47	4.7	8	1	CA45-476*010B*
10	C	47	4.7	6	1.2	CA45-476*010C*
10	D	47	4.7	6	0.8	CA45-476*010D*
10	B #	68	6.8	10	3	CA45-686*010B*
10	C	68	6.8	6	1.2	CA45-686*010C*
10	D	68	6.8	6	0.8	CA45-686*010D*
10	C	100	10	8	1.2	CA45-107*010C*
10	B#	100	10	15	1.2	CA45-107*010B*
10	D	100	10	8	0.9	CA45-107*010D*
10	C #	150	15	10	1.5	CA45-157*010C*
10	D	150	15	8	0.9	CA45-157*010D*
10	E	150	15	8	0.9	CA45-157*010E*
10	D	220	22	8	0.5	CA45-227*010D*
10	E	220	22	8	0.5	CA45-227*010E*
10	D *	330	33	12	0.5	CA45-337*010D*
10	E *	330	33	12	0.5	CA45-337*010E*
10	E *	470	47	12	0.5	CA45-477*010E*
16v 85℃ (10v 125℃)						
16	P	0.47	0.5	4	25	CA45-474*016P*
16	P	0.68	0.5	4	25	CA45-684*016P*
16	P	1	0.5	4	20	CA45-105*016P*
16	A	1	0.5	4	11	CA45-105*016A*
16	P	1.5	0.5	6	20	CA45-155*016P*
16	A	1.5	0.5	6	8	CA45 155*016A*
16	A	2.2	0.	6	6	CA45-225*016A*
16	B	2.2	0.5	6	4.6	CA45-225*016B*
16	A	3.3	0.5	6	5	CA45-335*016A*
16	B	3.3	0.5	6	3.5	CA45-335*016B*
16	A	4.7	0.8	6	4	CA45-475*016A*
16	B	4.7	0.8	6	3.5	CA45-475*016B*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 16v 85℃ (10v 125℃)						
16	B	6.8	1.1	6	2.5	CA45-685*016B*
16	A	6.8	1.1	6	3.5	CA45-685*016A*
16	C	6.8	1.1	6	1.9	CA45-685*016C*
16	A *	10	1.6	8	3.2	CA45-106*016A*
16	B	10	1.6	6	2.8	CA45-106*016B*
16	C	10	1.6	6	2	CA45-106*016C*
16	A#	15	2.4	10	3.5	CA45-156*016A*
16	B	15	2.4	6	2.5	CA45-156*016B*
16	C	15	2.4	6	1.8	CA45-156*016C*
16	B	22	3.5	6	2.2	CA45-226*016B*
16	C	22	3.5	6	1.6	CA45-226*016C*
16	D	22	3.5	6	1.1	CA45-226*016D*
16	B *	33	5.3	8	2.1	CA45-336*016B*
16	C	33	5.3	6	1.5	CA45-336*016C*
16	D	33	5.3	6	0.9	CA45-336*016D*
16	C	47	7.5	6	1.4	CA45-476*016C*
16	D	47	7.5	6	0.9	CA45-476*016D*
16	C	68	10.9	6	1.3	CA45-686*016C*
16	D	68	10.9	6	0.9	CA45-686*016D*
16	C	100	16	8	1.2	CA45-107*016C*
16	D	100	16	8	0.9	CA45-107*016D*
16	E	100	16	8	0.9	CA45-107*016E*
16	D *	150	24	12	0.9	CA45-157*016D*
16	E *	150	24	10	0.5	CA45-157*016E*
16	E *	150	24	10	0.5	CA45-157*016E*
16	E #	220	35.2	10	0.5	CA45-227*016E*
20v 85℃ (13v 125℃)						
20	P	0.1	0.5	4	25	CA45-104*020P*
20	P	0.15	0.5	4	25	CA45-154*020P*
20	P	0.22	0.5	4	25	CA45-224*020P*
20	P	0.33	0.5	4	25	CA45-334*020P*
20	P	0.47	0.5	4	25	CA45-474*020P*
20	P	0.68	0.5	4	25	CA45-684*020P*
20	A	0.68	0.5	4	12	CA45-684*020A

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 20v 85°C (13v 125°C)						
20	A	1	0.5	4	9	CA45-105*020A*
20	A	1.5	0.5	6	6.5	CA45-155*020A*
20	B	1.5	0.5	6	5	CA45-155*020B*
20	A	2.2	0.5	6	7	CA45-225*020A*
20	B	2.2	0.5	6	3.5	CA45-225*020B*
20	A	3.3	0.7	6	4.5	CA45-335*020A*
20	B	3.3	0.7	6	3	CA45-335*020B*
20	C	3.3	0.7	6	2.5	CA45-335*020C*
20	A	4.7	0.9	6	4	CA45-475*020A*
20	C	4.7	0.9	6	2.4	CA45-475*020C*
20	B	4.7	0.9	6	3	CA45-475*020B*
20	A	6.8	1.4	6	6	CA45-685*020A*
20	B	6.8	1.4	6	2.5	CA45-685*020B*
20	C	6.8	1.4	6	2	CA45-685*020C*
20	B	10	2	6	2.1	CA45-106*020B*
20	C	10	2	6	1.8	CA45-106*020C*
20	D	10	2	6	1.3	CA45-106*020D*
20	B	15	3	6	2	CA45-156*020B*
20	C	15	3	6	1.7	CA45-156*020C*
20	D	15	3	6	1	CA45-156*020D*
20	B #	22	4.4	8	2.5	CA45-226*020B
20	C	22	4.4	6	1.6	CA45-226*020C*
20	D	22	4.4	6	0.9	CA45-226*020D*
20	C	33	6.6	6	1.5	CA45-336*020C*
20	D	33	6.6	6	0.9	CA45-336*020D*
20	D	47	9.4	6	0.9	CA45-476*020D*
20	E	47	9.4	6	0.9	CA45-476*020E*
20	D *	68	13.6	6	0.9	CA45-686*020D*
20	E	68	13.6	6	0.9	CA45-686*020E*
20	D *	100	20	8	0.9	CA45-107*020D*
20	E *	100	20	8	0.5	CA45-107*020E*
20	E *	150	30	8	0.5	CA45-157*020E*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
25v 85°C (16v 125°C)						
25	A	0.33	0.5	4	15	CA45-334*025A*
25	A	0.47	0.5	4	14	CA45-474*025A*
25	A	0.68	0.5	4	10	CA45-684*025A*
25	A	1	0.5	4	8	CA45-105*025 *
25	B	1	0.5	4	5	CA45-105*025B*
25	A	1.5	0.5	6	7.5	CA45-155*025A*
25	B	1.5	0.5	6	5	CA45-155*025B*
25	A	2.2	0.6	6	7	CA45-225*025A*
25	B	2.2	0.6	6	4.5	CA45-225*025B*
25	C	2.2	0.6	6	3.5	CA45-225*025C*
25	A	3.3	0.8	6	4.5	CA45-335*025A*
25	B	3.3	0.8	6	3.5	CA45-335*025B*
25	A #	4.7	1.2	8	2.5	CA45-475*025A*
25	B	4.7	1.2	6	2.8	CA45-475*025B*
25	C	4.7	1.2	6	2.4	CA45-475*025C*
25	B	6.8	1.7	6	2.8	CA45-685*025B*
25	C	6.8	1.7	6	2	CA45-685*025C*
25	D	6.8	1.7	6	1.4	CA45-685*025D*
25	B	10	2.5	8	3	CA45-106*025B*
25	C	10	2.5	6	1.8	CA45-106*025C*
25	D	10	2.5	6	1.2	CA45-106*025D*
25	C	15	3.8	6	1.6	CA45-156*025C*
25	D	15	3.8	6	1	CA45-156*025D*
25	C	22	5.5	6	1.4	CA45-226*025C*
25	D	22	5.5	6	0.9	CA45-226*025D*
25	D	33	8.3	6	0.9	CA45-336*025D*
25	E	33	8.3	6	0.9	CA45-336*025E*
25	D *	47	11.8	6	0.9	CA45-476*025D*
25	E *	47	11.8	6	0.9	CA45-476*025E*

Product Name		CA45 CHIP TANTALUM CAPACITORS				
U _R (V)	Case Size	C _R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
Continue 25v 85°C (16v 125°C)						
25	E *	68	18	6	0.9	CA45-686*025E*
25	E *	100	25	10	0.6	CA45-107*025E*
35v 85°C (23v 125°C)						
35	A	0.1	0.5	4	24	CA45-104*035A*
35	A	0.15	0.5	4	21	CA45-154*035A*
35	A	0.22	0.5	4	18	CA45-224*035A*
35	A	0.33	0.5	4	15	CA45-334*035A*
35	A	0.47	0.5	4	12	CA45-474*035A*
35	B	0.47	0.5	4	10	CA45-474*035B*
35	A	0.68	0.5	4	8	CA45-684*035A*
35	B	0.68	0.5	4	8	CA45-684*035B*
35	A	1	0.5	4	7.5	CA45-105*035A*
35	B	1	0.5	4	6.5	CA45-105*035B*
35	A	1.5	0.5	6	7.5	CA45-155*035A*
35	B	1.5	0.5	6	5.2	CA45-155*035B*
35	C	1.5	0.5	6	4.5	CA45-155*035C*
35	B	2.2	0.8	6	4.2	CA45-225*035B*
35	C	2.2	0.8	6	3.5	CA45-225*035C*
35	B	3.3	1.2	6	3.5	CA45-335*035B*
35	C	3.3	1.2	6	2.5	CA45-335*035C*
35	B	4.7	1.6	6	3.5	CA45-475*035B*
35	C	4.7	1.6	6	1.5	CA45-475*035C*
35	D	4.7	1.6	6	1.5	CA45-475*035D*
35	C	6.8	2.4	6	1.8	CA45-685*035C*
35	D	6.8	2.4	6	1.3	CA45-685*035D*
35	C	10	3.5	6	1.6	CA45-106*035C*
35	D	10	3.5	6	1	CA45-106*035D*
35	E	10	3.5	6	0.9	CA45-106*035E*
35	D	15	5.3	6	0.9	CA45-156*035D*
35	E	15	5.3	6	0.8	CA45-156*035E*
35	D	22	7.7	6	0.9	CA45-226*035D*
35	E	22	7.7	6	0.7	CA45-226*035E*
35	E	33	11.6	6	0.6	CA45-336*035E*

U_R (V)	Case Size	C_R (uF)	DCL (uA) Max.	DF (%) Max.	ESR (Ω) Max. 100kHz	TANCAP Part number
50v 85℃ (33v 125℃)						
35	E	47	16.5	8	0.6	CA45-476*035E*
50	A	0.1	0.5	4	22	CA45-104*050A*
50	A	0.15	0.5	4	15	CA45-154*050A*
50	B	0.15	0.5	4	16	CA45-154*050B*
50	A	0.22	0.5	4	18	CA45-224*050A*
50	B	0.22	0.5	4	14	CA45-224*050B*
50	A	0.33	0.5	4	12	CA45-334*050A*
50	B	0.33	0.5	4	12	CA45-334*050B*
50	A	0.47	0.5	4	9.5	CA45-474*050A*
50	B	0.47	0.5	4	9.5	CA45-474*050B*
50	C	0.47	0.5	4	8	CA45-474*050C*
50	A	0.68	0.5	4	8	CA45-684*050A*
50	B	0.68	0.5	4	8	CA45-684*050B*
50	C	0.68	0.5	4	7	CA45-684*050C*
50	B	1	0.5	6	7	CA45-105*050B*
50	C	1	0.5	4	5.5	CA45-105*050C*
50	C	1.5	0.8	6	4.5	CA45-155*050C*
50	D	1.5	0.8	6	4	CA45-155*050D*
50	C	2.2	1.1	6	3	CA45-225*050C*
50	D	2.2	1.1	6	2.5	CA45-225*050D*
50	C	3.3	1.7	6	2.5	CA45-335*050C*
50	D	3.3	1.7	6	2	CA45-335*050D*
50	C	4.7	2.4	6	1.4	CA45-475*050C*
50	D	4.7	2.4	6	1.4	CA45-475*050D*
50	D	10	5	6	0.8	CA45-106*050D*
50	E	10	5	6	0.7	CA45-106*050E*

Remark:

- All technical data measured at 25 °C.
- Capacitance and loss test conditions: $U = 1.7 \sim 2.2V$, $U_{\text{partial}} = 0 \sim 1V$ (RMS), the measurement frequency: 100(120)HZ
- The leakage current should be measured after 5 minutes application of rated voltage should +125 °C with voltage derating.

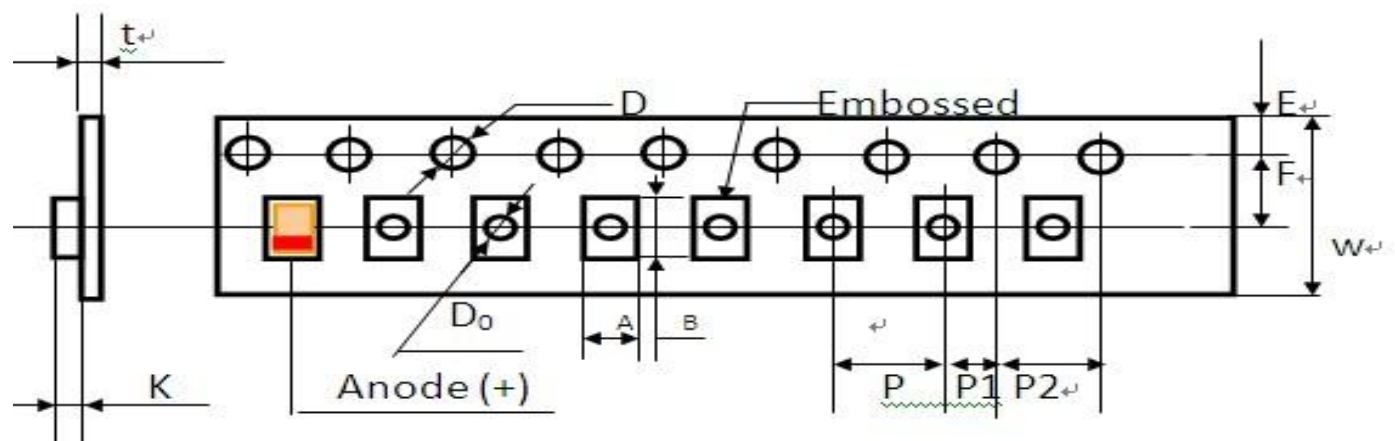
Note: 1) "*" indicates that 125 °C Capacitance change of $\pm 15\%$.

2) "#" Indicates that the capacity change rate of 125 °C $\pm 20\%$, provided only the capacity deviation of the M-Class.

8.Taping And Packing

1) Carrier Tape

Carrier tape dimension

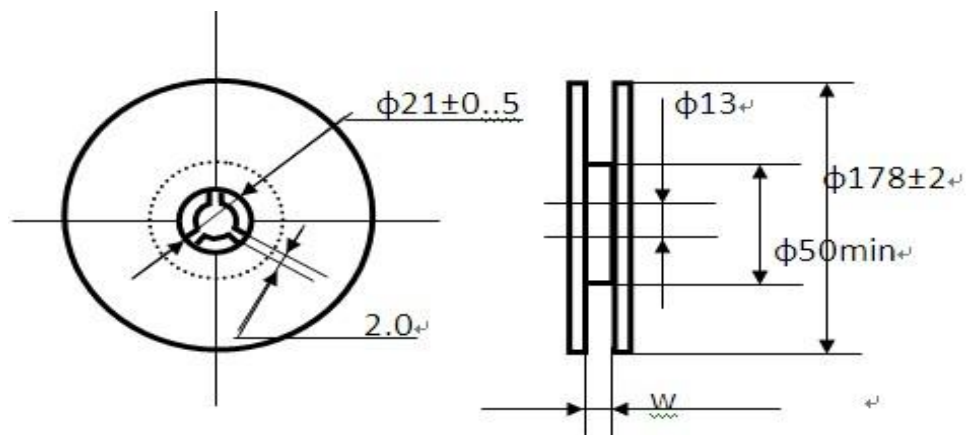


CARRIER TAPE DIMENSION: Table(7)

Unit (mm)

Case Code	$W \pm 0.3$	$F \pm 0.1$	$E \pm 0.1$	$P \pm 0.1$	$P1 \pm 0.1$	$P2 \pm 0.1$	$D \pm 0.1$	$D_0 \text{ min}$	$t \pm 0.3$	$A \pm 0.2$	$B \pm 0.2$	$K \pm 0.2$
P	8	3.5	1.75	4	2	4	$\phi 1.5$	$\phi 1.0$	0.2	1.4	2.2	1.2
A	8	3.5	1.75	4	2	4	$\phi 1.5$	$\phi 1.0$	0.2	1.9	3.5	1.9
B	8	3.5	1.75	4	2	4	$\phi 1.5$	$\phi 1.0$	0.3	3.3	3.8	2.1
C	12	5.5	1.75	8	2	4	$\phi 1.5$	$\phi 1.5$	0.3	3.7	6.4	3.0
D	12	5.5	1.75	8	2	4	$\phi 1.5$	$\phi 1.5$	0.3	4.8	7.7	3.3
E	12	5.5	1.75	8	2	4	$\phi 1.5$	$\phi 1.5$	0.3	4.8	7.7	4.1

2) Reel Specification Table(8)



Case Code	W	Qty/reel (178mm)
P	8.4+1.5	3000
A、B	8.4+1.5	2000
C、D	12.4+2	500
E	12.4+2	400

Correct Use of Tantalum Chip Capacitors

1. Ripple Current and Ripple Voltage

If ripple current is applied, heat is generated within capacitor by Joule's heat (power dissipation) and it may affect to reliability of the capacitor.

(1) Power Dissipation

The actual power dissipated in capacitor is calculated using the formula1.:

$$P = I^2 \times ESR \dots \dots \dots \text{Formula 1}$$

Where:

P: power Dissipation (Watts)

I: Ripple Current (Arms)

ESR: Equivalent Series Resistance (Ω)

Table 1 Dissipation Ratings

Case Code	Maximum Power Dissipation Watts, 100KHz, at 25°C
P	0.025
A	0.075

B	0.085
C	0.110
D	0.150
E	0.150

(2) Ripple Current

Using P Max from Table 1, maximum ripple current (Arms) may be determined as follow:

$$I = VP/ESR \times K \times F \dots \dots \dots \text{Formula 2}$$

Where:

K: Temperature Derating Factor.... Table 2

F: Frequency Derating Factor...Table 3

ESR: Refer to Ratings

Table 2: Temperature Derating Factor

Temperature	Temperature Derating Factor K
25°C	1
85°C	0.9
125°C	0.4

Table 3: Frequency Derating Factor

Type	10KHz	100 KHz	500 KHz	1MHz
MnO2	0.80	1.00	1.15	1.20
Polymer	0.75	1.00	1.10	1.30

Ripple voltage E is calculated using the formula 3.

$$E = Z \times I \dots \dots \dots \text{Formula 3}$$

Where:

E: Ripple voltage

Z: Impedance at specified frequency

(3) Ripple Voltage

The ripple voltage that may be applied is limited by three criteria:

- (a) The power dissipated in the ESR of the capacitor must not exceed the appropriate value specified in Table 1.
- (b) The sum of DC voltage and peak value of the ripple voltage must not exceed the rated voltage.
- (c) The negative peak value of the ripple voltage must not exceed the permissible reverse voltage value specified in the following section, Reverse Voltage.

2. Reverse Voltage

Because the solid tantalum capacitor is of polar type, do not apply a reverse voltage to it. If reverse voltage cannot be avoided, it must be applied for a short time and must not exceed the following values:

25°C10% max. of rated voltage or 1Vdc, whichever is smaller.

85°C5% max. of rated voltage or 0.5Vdc, whichever is smaller.

125°C1% max. of rated voltage or 0.1Vdc, whichever is smaller.

The capacitors should not be operated continuously in reverse mode, even within these limits.

3. Applied Voltage

- (1) For general application, apply 70% or less of the rated voltage to the capacitor.
- (2) When the capacitor is used in a power line or a low-impedance circuit, keep the applied voltage within 30% of the rated voltage to avoid the adverse influence of inrush current.
- (3) Derated voltage at 85°C or more.
- (4) When using a Chip-type capacitor at a temperature of 85°C or higher, calculate reduced voltage UT from the following expression. Note, however, that the ambient temperature must not exceed 125°C

$$UT = (UR - UC)(T - 85) / 40$$

Where:

UR: rated voltage (V)

UC: derated voltage at 125°C

T: ambient temperature (°C)

4. Current (Series Resistance)

Reliability of tantalum capacitor is increased by inserting a series resistance of at least $3\Omega/V$ into circuits where current flow is momentary (Switching circuit, charge/discharge circuits, etc) If the capacitor is in a low-impedance circuit, the voltage applied to the capacitor should be less than 1/2 to 1/3 of DC rated voltage.

5. In the Case of Short-Circuit

Manganese oxide tantalum capacitor (conventional tantalum capacitor) is heated and may generate fire and be burned depending upon its excess current, time and other factors.

When design the circuit, provide as much margin as possible to maintain capacitor reliability.

6. Product Soldering

SMT Tantalum Capacitor is suitable for Reflow soldering, not suitable for wave flow soldering and hand soldering. Reflow soldering temperature must be $\leq 260^\circ\text{C}$ for $5 < \text{seconds}$. If hand soldering is necessary, soldering iron power should be $\leq 25\text{W}$, temperature $< 300^\circ\text{C}$, soldering time < 3 seconds, it is prohibited to contact soldering iron top with product leads and main product, use melted tin solder to contact lead soldering

