■ Structural Diagram and Introduction of CA45 Series

（1） Product Structure Diagram

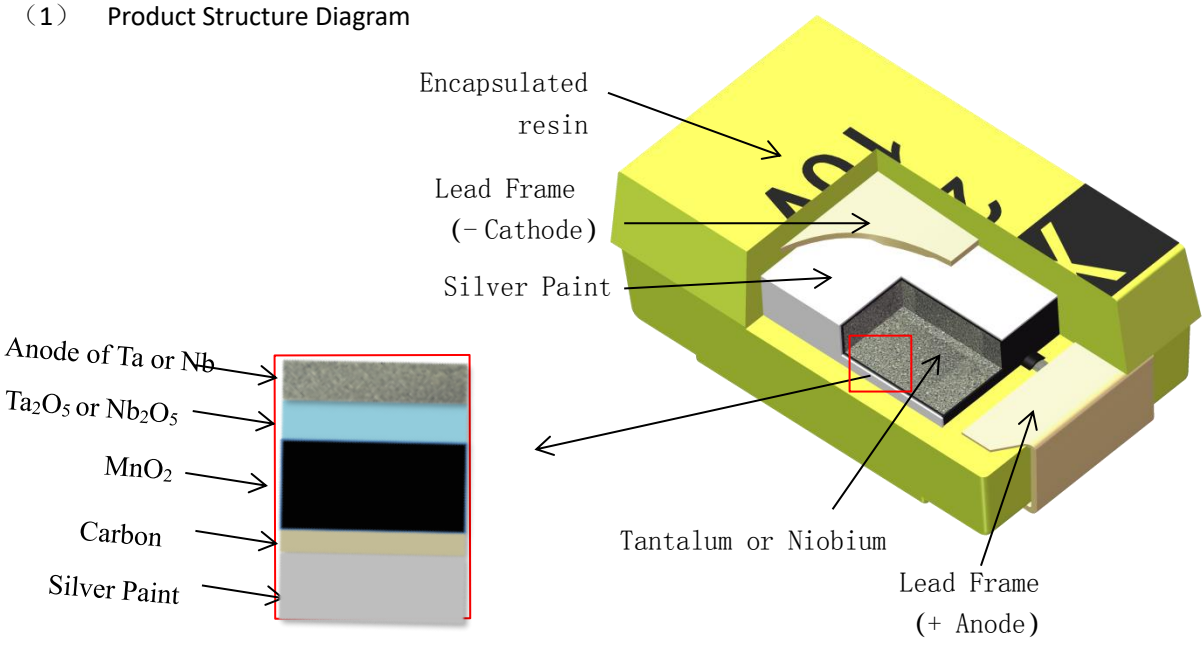


Fig.9 Structural of CA45 Series

CA45 series capacitors use tantalum as Anode. A dielectric film is formed on the surface of tantalum particles by special process. Conductive manganese dioxide is deposited outside the dielectric film by decomposition process as the negative electrode of the capacitor and is extracted by carbon and silver slurry. And then forming the capacitor with large capacitance in small volume.

According to the difference of ESR, CA45 series is divided into CA45 series, CA45A series, CA45B (series low ESR) and CA45U series(ultra low ESR).

CN45 series showing better ability in resisting RMS and surge voltage, almost can work at rated voltage. Even if after dielectric breakdown, the capacitor still keep non burn.

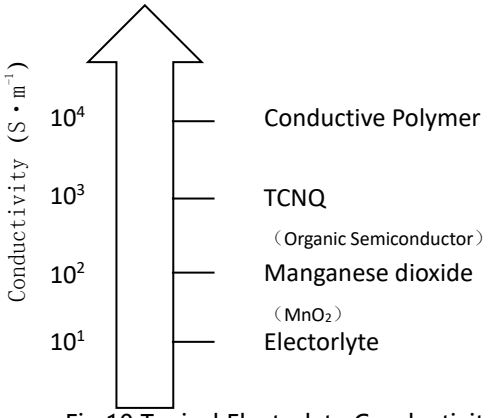


Fig.10 Typical Electrolyte Conductivity Diagram

■ Tape & Reel Packaging Information

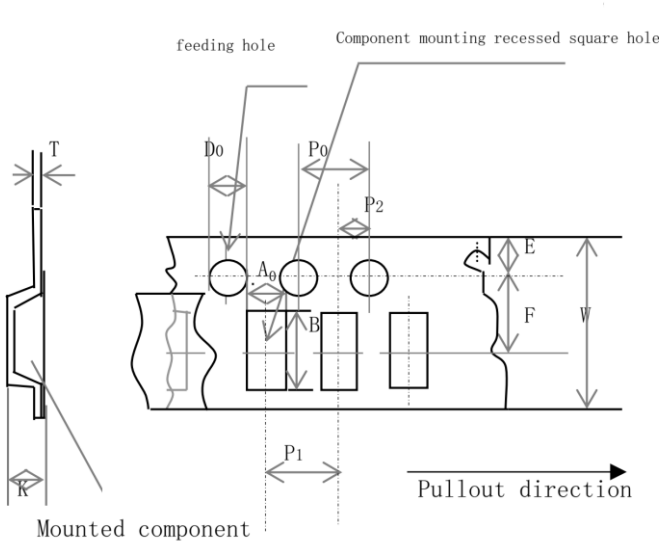
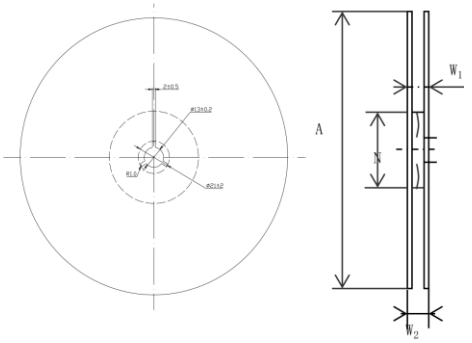


Fig.11 CA45 Series Packaging Tape

Tab：Detailed Size of Packing Tape

unit:mm

Case	A_0±0.2	B_0±0.2	K±0.2	W±0.3	F±0.1	P_1±0.1	E±0.1	P_2±0.1	P_0±0.1	$D_0{}^{+0.1}_{0}$	T
P	1.4	2.2	1.2	8	3.5	4	1.75	2	4	1.5	0.2~0.3
A	1.9	3.5	1.9								
B	3.1	3.8	2.1								
C	3.7	6.4	2.9		5.5						
D	4.8	7.7	3.2	12	5.7	8					
E	4.8	7.7	4.2								



壳号	Tape width	A±2.0	N(Min.)	W_2±1.0	W_1±0.3
P,A,B	8	180	60	11.4	9
C,D,E	12	180	60	15.4	13

Fig.12　Diagram And Size of CA45 Series Tape

■ Performance Characteristic of CA45 Series

Item		Performance			Test Conditions
Operating temperature		-55℃ ~ 125℃			Above 85℃, use derated voltage
Rated voltage		2.5V ~ 50V			
Surge voltage		Refer to List of Surge Voltage			Temperature:85℃
Capacitance		0.1μF ~ 1000μF			Test frequency：120Hz
Capacitance tolerance		±20%，±10%			Test frequency：120Hz
Tangent of loss angle（tanδ）		Refer to Spec Coding and Spec Table Specification Table			Test frequency：120Hz
LC		Refer to Spec Coding and Spec Table			Five minutes after rated voltage charging
ESR		Refer to Spec Coding and Spec Table			Test frequency：100KHz
		ΔC/C	tanδ	LC	
Surge voltage test		Lower than 10% initial specification	Below the initial specification	Below the initial specification	
Characteristic of temperature	-55℃	± 10% or ± 12%，±15%*1	Lower than 1.5 times initial specification		
	+85℃	±10% or± 12%，±15%*1	Lower than 1.5 times initial specification	Lower than 10 times initial	
	+125℃	± 10% or ± 12%，±20%*1	Lower than 2 times initial specification	Lower than 12.5 times initial specification	
Temperature cycle		Lower than 10% initial	Lower than 1.5 times initial	Lower than 1.5 times initial	-55℃~+125℃ 5 cycle
Resistance to soldering heat		Lower than 10% initial	Lower than 1.5 times initial test	Lower than initial test	Solder dip：260℃ 10 second
					Solder reflow：Tmax=260℃
Humidity		±20%	Lower than 1.5 times initial specification	Lower than 1.5 times initial specification	40℃ 90~95%RH 500h
Endurance		±10%	Lower than initial specification	Lower than 1.25 times initial specification	85℃：Rated voltage 2000h 125℃：Reduced voltage 2000h
Failure rate		λ_0=1%/1000hrs			

Note：*1 Some specifications may be different, please consult our company for details.

■ CA45 Series Surge Voltage

Rated voltage(V)		2.5	4	6.3	10	16	20	25	35	50
Category voltage (V)		1.6	2.5	4	6.3	10	13	16	20	32
Surge voltage (V)	85℃	2.8	5	7	12	18	23	29	40	57
	125℃	1.8	3	5	7	12	15	18	23	37

■CA45 Series Capacitance and Rated Voltage Range

Cap（μF） \ U_R（V）	2.5	4	6.3	10	16	20	25	35	50
0.1						P	P	P/A	A
0.15						P	P/A	P/A	A/B
0.22						P	P	P/A	A/B
0.33						P	P/A	P/A	A/B
0.47						P	P/A	P/A/B	A/B/C
0.68					A	P/A	P/A	A/B	A/B/C
1.0					P/A	P/A	P/A/B	A/B	B/C
1.5				P/A	P/A	P/A	A/B	A/B/C	B/C/D
2.2			P/A	P/A/B	P/A	P/A/B	A/B/C	A/B/C	B/C/D
3.3		P/A	P/A	P/A/B	P/A/B	A/B	A/B/C	B/C	C/D
4.7		P/A	P/A	P/A/B/C	A/B/C	A/B/C	A/B/C	B/C/D	C/D/E
6.8		P/A	P/A/B	P/A/B	A/B/C	A/B/C	B/C	C/D	D/E
10		P/A/B	P/A/B	P/A/B/C	A/B/C	B/C	B/C/D	C/D/E	D/E
15	P	P/A/B	A/B/C	A/B/C	A/B/C	B/C/D	C/D	D/E	D/E
22	P	P/A/B/C	A/B/C	A/B/C	A/B/C/D	B/C/D	C/D	D/E	E
33	P	P/A/B/C	A/B/C	B/C/D	B/C/D	C/D	D/E	D/E	
47		A/B/C	A/B/C/D	B/C/D	B/C/D	C/D/E	D/E	E	
68		A/B/C/D	A/B/C/D	B/C/D	C/D	D/E	D/E		
100		A/B/C/D	B/C/D	B/C/D/E	C/D/E	D/E	E		
150		B/C/D	B/C/D	C/D/E	D/E	E			
220		B/C/D	C/D/E	D/E	E	E			
330		C/D/E	C/D/E	D/E	E				
470		D/E	D/E	E					
680		D/E	E						
1000		E							

■ CA45 Series Ordering Information

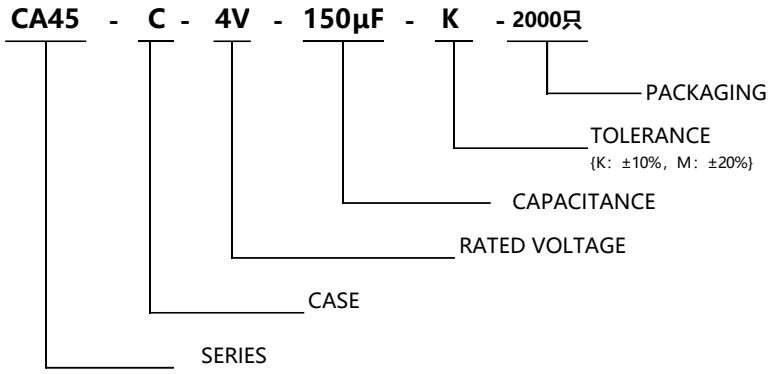


Fig.13 CA45 Series ordering information

■ MX-CAP Marking

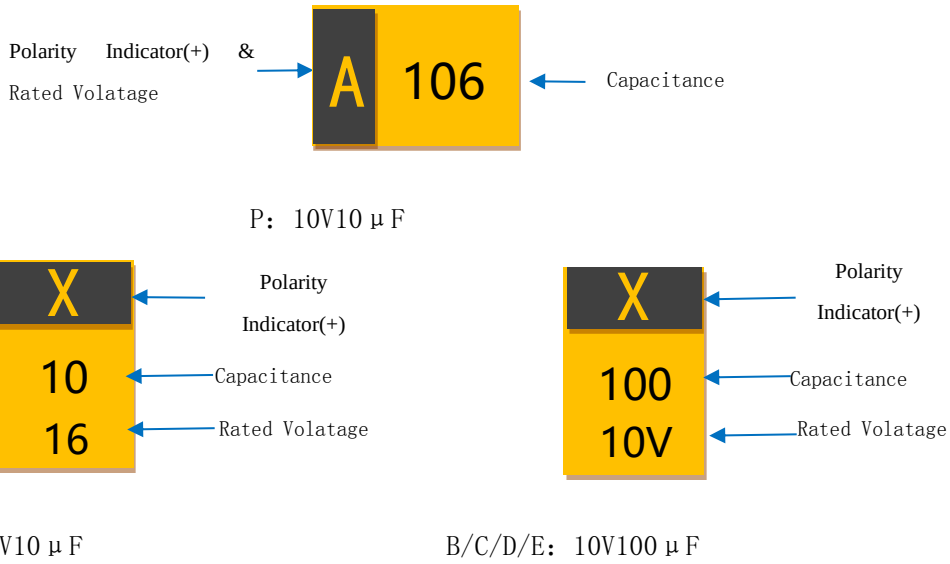


Fig.14 MX-CAP Marking

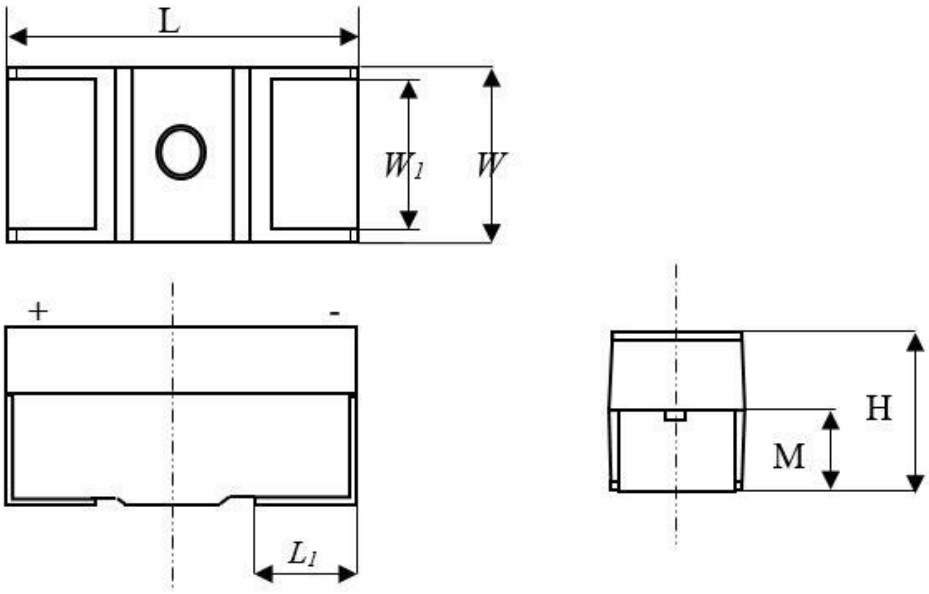
Tab：Rated voltage and capacitance code of case P

Rated voltage	2.5 V		4 V		6.3 V		10 V		16 V		20 V		25 V		35 V	
Voltage code	e		G		J		A		C		D		E		V	
Capacitance（μF）	0.1	0.15	0.22	0.33	0.47	0.68	1	1.5	2.2	3.3	4.7	6.8	10	15	22	33
Capacitance code	104	154	224	334	474	684	105	155	225	335	475	685	106	156	226	336

Tab. Case Dimensions

Case		Dimensions mm				
Xinyun	EIA	L	W	H	L_1	W_1
P	2012-12	2.0±0.2	1.25±0.2	1.2±0.2	$0.5^{0}_{-0.1}$	0.9±0.1
A	3216-16	3.2±0.2	1.6±0.2	1.6±0.2	0.65±0.2	1.2±0.2
B	3528-19	3.5±0.2	2.8±0.2	1.9±0.2	0.8±0.2	2.2±0.2
C	6032-25	6.0±0.3	3.2±0.3	2.5±0.3	1.3±0.2	1.8±0.2
D	7343-28	7.3±0.3	4.3±0.3	2.8±0.3	1.3±0.2	2.4±0.2
E	7343-41	7.3±0.3	4.3±0.3	3.8±0.3	1.3±0.2	2.4±0.2

■ MX-CAP Outline Diagram and Size of Case



Note：The chip corresponding to the end of the factory sign in the product sign is positive pole.

Fig.15 CA45 Series Outline Size Diagram

■ Specification of CA45 Series

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
2.5V	15	P	10	8			0.5	6
	22	P	8	6			0.5	6
	33	P	6	4			0.7	18
4V	3.3	A	10	8	4		0.5	6
	3.3	P	25	20			0.5	6
	4.7	A	8	6	3.5		0.5	6
	4.7	P	15	12			0.5	6
	6.8	A	8	6	3		0.5	6
	6.8	P	12	10			0.5	6
	10	B	4	3.5	1.2		0.5	6
	10	A	8	6	2		0.5	6
	10	P	10	8	6	3	0.5	6
	15	B	5	3.5	1.2		0.6	6
	15	A	6	4	1.5		0.6	6
	15	P	7	6	5.5	5	0.6	6
	22	C	3.2	1.8	0.5		0.9	6
	22	B	5	3.5	0.6		0.9	6
	22	A	6	4	1.5		0.9	6
	22	P	7	4			0.9	18
	33	C	2.2	1.8	0.5		1.3	6
	33	B	3.5	2.5	0.6		1.3	6
	33	A	6	4	3		1.3	6
	33	P	8	4			1.3	18
	47	C	2	1	0.5		1.9	6
	47	B	3	2	0.5		1.9	6
	47	A	4	2.5	2	0.5	1.9	10
	68	D	1.1	0.8	0.2		2.7	6
	68	C	2	1.2	0.25		2.7	6
	68	B	4.2	3.5	2		2.7	6
	68	A	5	4	3		2.7	15
	100	D	0.9	0.7	0.2		4	8
	100	C	1.5	0.8	0.2		4	8
	100	B	2	0.9	0.65	0.5	4	10
	100	A	6	4	3	2.5	4	20
	150	D	1	0.5	0.15		6	8

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
4V	150	C	1.5	1	0.2	0.1	6	8
	150	B	3	2	1	0.5	6	12
	220	D	1	0.5	0.15	0.1	8.8	8
	220	C	1.5	1	0.3		8.8	8
	220	B	2	1.1	0.4	0.3	8.8	15
	330	E	0.7	0.5	0.15	0.1	13.2	10
	330	D	0.9	0.5	0.15	0.1	13.2	10
	330	C	1.7	0.9	0.3	0.15	13.2	10
	330	B	2	1.5	0.3		13.2	18
	470	E	0.7	0.5	0.15	0.1	18.8	10
	470	D	0.7	0.5	0.15	0.1	18.8	10
	680	E	0.7	0.5	0.1		27.2	12
	680	D	0.7	0.5	0.15	0.1	27.2	14
	1000	E	0.7	0.5	0.1	0.08	40	16
6.3V	2.2	A	10	8	6		0.5	6
	2.2	P	25	20			0.5	6
	3.3	A	8	8	6	2.1	0.5	6
	3.3	P	15	12			0.5	6
	4.7	A	8	6	3.5		0.5	6
	4.7	P	12	10			0.5	6
	6.8	B	4.5	3.5	1.2		0.5	6
	6.8	A	8	6	2	1.8	0.5	6
	6.8	P	10	8			0.5	6
	8.2	B	5	3.5	1		0.5	6
	10	B	5	3.5	1	0.5	0.6	6
	10	A	8	4	2	1.5	0.6	6
	10	P	8	6	4	3	0.6	6
	15	C	3	1.8	0.6		0.9	6
	15	B	5	3.5	0.7		0.9	6
	15	A	6	3.5	2	1.5	0.9	6
	22	C	2.2	1.8	0.5		1.4	6
	22	B	5	3.5	0.6	0.4	1.4	6
	22	A	6	4	3	0.9	1.4	6
	33	C	2.5	1.8	0.3		2.1	6
	33	B	3.5	2.5	0.6	0.45	2.1	6
	33	A	5	2.5	2	0.6	2.1	10
	47	D	1.1	0.8	0.22		3	6

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
6.3V	47	C	2	1	0.25		3	6
	47	B	3	2	0.5	0.35	3	6
	47	A	5	3.5	2.5	0.8	3	12
	68	D	0.9	0.8	0.2		4.3	6
	68	C	2	1.2	0.25	0.2	4.3	6
	68	B	1.5	0.9	0.65	0.5	4.3	8
	68	A	5	4	3	1.5	4.3	18
	100	D	1.2	0.7	0.15		6.3	8
	100	C	1.5	0.9	0.3	0.15	6.3	8
	100	B	5	3	1.5	0.4	6.3	15
	100	A	5	3	2.5	1.5	6.3	18
	150	D	1	0.5	0.15	0.125	9.5	8
	150	C	1.5	1	0.3	0.25	9.5	8
	150	B	2.8	2.5	1.5	0.8	9.5	20
	220	E	0.7	0.5	0.15		13.9	8
	220	D	1	0.5	0.15	0.125	13.9	8
	220	C	2.4	1.2	0.3		13.9	10
	220	B	2.5	1.5	0.5		13.9	18
	330	E	0.9	0.4	0.15	0.1	20.8	10
	330	D	0.9	0.4	0.15	0.125	20.8	10
	330	C	1.8	1.0	0.7	0.2	20.8	15
	470	E	0.7	0.4	0.15	0.1	29.6	10
	470	D	0.9	0.4	0.15	0.1	29.6	12
	680	E	0.9	0.5	0.1	0.06	42.8	12
10V	1.5	A	10	8	6		0.5	6
	1.5	P	25	20			0.5	6
	2.2	B	5	3.5	1.5		0.5	6
	2.2	A	10	8	6	1.8	0.5	6
	2.2	P	15	12	10	6	0.5	6
	3.3	B	5	3.5	1.5	1.2	0.5	6
	3.3	A	9	6	4	3	0.5	6
	3.3	P	15	10	8	6	0.5	6
	4.7	C	3	2			0.5	6
	4.7	B	4.5	3.5	1.5	1.4	0.5	6
	4.7	A	8	5	3	1.4	0.5	6
	4.7	P	10	8	6	5	0.5	6

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
10V	6.8	B	5	3.5	1.2	1	0.7	6
	6.8	A	8	4	3	1.8	0.7	6
	6.8	P	8	5.2	4.5	4	0.7	6
	10	C	3	1.8	0.6		1	6
	10	B	6	3.5	0.8		1	6
	10	A	8	4	1.8	0.9	1	6
	10	P	8	6	5	4	1	15
	15	C	2.5	1.5	0.5		1.5	6
	15	B	5	2.8	0.7	0.6	1.5	6
	15	A	8	6	4	1	1.5	8
	22	C	1.8	1.6	0.4	0.3	2.2	6
	22	B	5	2.4	0.7	0.5	2.2	6
	22	A	10	6	2.5	0.9	2.2	10
	33	D	1.1	0.8	0.25		3.3	6
	33	C	2.5	1.6	0.3	0.15	3.3	6
	33	B	4	1.8	1.4	0.65	3.3	6
	33	A	5	2.5	1.5	0.7	3.3	15
	47	D	0.9	0.8	0.22	0.1	4.7	6
	47	C	2	1	0.3	0.2	4.7	6
	47	B	2.4	1	0.65	0.5	4.7	8
	47	A	5	2.5	1.8	1.2	4.7	18
	68	D	1.5	0.8	0.2	0.15	6.8	6
	68	C	2	1.2	0.3	0.2	6.8	6
	68	B	5	3	1.5	0.6	6.8	10
	100	E	0.8	0.5	0.15	0.125	10	8
	100	D	1.2	0.7	0.15	0.125	10	8
	100	C	1.7	1.2	0.2	0.15	10	8
	100	B	4	3	1.5	0.4	10	15
	150	E	0.8	0.5	0.15	0.1	15	8
	150	D	1	0.5	0.15	0.1	15	8
	150	C	2	0.9	0.7	0.15	15	10
	220	E	1	0.5	0.15	0.125	22	8
	220	D	1	0.5	0.15	0.125	22	8
	220	C	2	0.9	0.5		22	15
	330	E	0.9	0.5	0.1	0.06	33	10
	330	D	1.2	0.5	0.15	0.1	33	10
	470	E	0.5	0.2	0.1	0.06	47	10

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
16V	0.1	A	34	20	10		0.5	4
	0.68	A	20	18			0.5	4
	1	A	12	10	6	4	0.5	4
	1	P	16	14			0.5	4
	1.5	A	10	8	6		0.5	6
	1.5	P	15	12			0.5	6
	2.2	B	5	3			0.5	6
	2.2	A	12	6	4	3.5	0.5	6
	2.2	P	15	10	8		0.5	6
	3.3	B	5.5	3.5	2		0.5	6
	3.3	A	9	5	4	3.5	0.5	6
	3.3	P	10	8			0.5	6
	4.7	C	3	2.4			0.8	6
	4.7	B	4	3.5	1.5	0.8	0.8	6
	4.7	A	8	4	3	2	0.8	6
	4.7	P	8	6			0.8	8
	6.8	C	3.6	1.9	0.8		1.1	6
	6.8	B	6	2.5	1.2	0.6	1.1	6
	6.8	A	9	3.5	3	1.5	1.1	6
	10	C	2.5	1.8	0.6	0.5	1.6	6
	10	B	6	2.8	0.8	0.5	1.6	6
	10	A	10	7	3	1	1.6	8
	15	C	2.5	1.8	0.4	0.3	2.4	6
	15	B	5	2.5	0.8	0.5	2.4	6
	15	A	10	8			2.4	12
	22	D	1.1	0.8	0.25		3.5	6
	22	C	3	1.6	0.35	0.3	3.5	6
	22	B	5	2.2	1	0.6	3.5	6
	22	A	10	8	6	4	3.5	12
	33	D	0.9	0.8	0.25	0.2	5.3	6
	33	C	2.5	1.2	0.3	0.225	5.3	6
	33	B	5	2.1	1.2	0.5	5.3	12
	47	D	1.5	0.8	0.2	0.15	7.5	6
	47	C	2	1	0.5	0.35	7.5	6
	47	B	4	3	2.5	1.2	7.5	12
	68	D	1.5	0.7	0.15	0.1	10.9	6
	68	C	3	1.2	0.3	0.2	10.9	8
	100	E	0.8	0.7	0.15	0.125	16	8

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
16V	100	D	1.2	0.7	0.15	0.125	16	8
	100	C	3	1.5	0.8	0.2	16	10
	150	E	1	0.5	0.15	0.1	24	8
	150	D	1.8	0.7	0.4	0.15	24	10
	220	E	1	0.5	0.4	0.15	35.2	10
	330	E	0.8	0.5	0.25	0.2	53	12
20V	0.1	P	30	25			0.5	4
	0.15	P	30	25			0.5	4
	0.22	P	30	25			0.5	4
	0.33	P	30	25			0.5	4
	0.47	P	25	18			0.5	4
	0.68	A	15	12	8		0.5	4
	0.68	P	18	14			0.5	4
	1	A	10	9	5.5	3	0.5	4
	1	P	15	12	8	6	0.5	4
	1.5	A	16	6.5	4.5	3	0.5	6
	1.5	P	12	10			0.5	6
	2.2	B	5	3.5	1.5		0.5	6
	2.2	A	12	7	4	3	0.5	6
	2.2	P	10	6			0.5	10
	3.3	B	4	3	1.3		0.7	6
	3.3	A	9	4.5	4	2.5	0.7	6
	4.7	C	3	2.4	0.6		0.9	6
	4.7	B	6	3	1		0.9	6
	4.7	A	10	4	3	1.8	0.9	6
	6.8	C	2.4	1.9	0.6		1.4	6
	6.8	B	6	2.5	1	0.6	1.4	6
	6.8	A	12	6	3	1	1.4	8
	10	C	4	1.8	0.5		2	6
	10	B	6	2.1	1	0.5	2	6
	15	D	1.1	1	0.35		3	6
	15	C	4	1.7	0.4		3	6
	15	B	6	2	0.7	0.5	3	6
	22	D	0.9	0.8	0.3	0.15	4.4	6
	22	C	1.8	1.2	0.4	0.2	4.4	6
	22	B	2	1		0.6	4.4	6

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
20V	33	D	1.5	0.8	0.25	0.2	6.6	6
	33	C	3	1.2	0.4	0.3	6.6	6
	33	B	5	4	3		6.6	10
	47	E	0.8	0.7	0.25		9.4	6
	47	D	1.5	0.7	0.3	0.2	9.4	6
	47	C	2	0.9	0.8		9.4	8
	68	E	0.8	0.7	0.2	0.15	13.6	6
	68	D	1.5	0.7	0.2	0.15	13.6	6
	100	E	1	0.5	0.15	0.1	20	8
	100	D	2	0.9	0.15	0.1	20	8
	150	E	1.5	0.5	0.3		30	10
	220	E	1	0.6			44	10
25V	0.1	P	30	25			0.5	6
	0.15	A	21	19			0.5	4
	0.15	P	25	20			0.5	6
	0.22	P	25	21			0.5	6
	0.33	A	18	15	10		0.5	4
	0.33	P	20	17			0.5	6
	0.47	B	12	9	6		0.5	4
	0.47	A	14	11	9	7	0.5	4
	0.47	P	18	15			0.5	6
	0.68	B	14	8	4		0.5	4
	0.68	A	17	10	6	4	0.5	4
	0.68	P	15	13			0.5	6
	1	B	6.5	5	2		0.5	4
	1	A	16	8	4		0.5	4
	1	P	10	8	6	4	0.5	8
	1.2	B	7	5	1.5		0.5	6
	1.5	B	6.5	5	1.5		0.5	6
	1.5	A	16	7.5	3		0.5	6
	2.2	C	5	3.5	1	0.6	0.6	6
	2.2	B	8	4	1.2	0.9	0.6	6
	2.2	A	16	7	4	2.5	0.6	6
	3.3	C	4	2.5	1.2		0.8	6
	3.3	B	7	3.5	2	1.5	0.8	6
	3.3	A	9	3.7	3	1.5	0.8	6
	4.7	C	2.5	2.4	0.6		1.2	6
	4.7	B	6	3.5	1	0.9	1.2	6
	4.7	A	8	6	4		1.2	8

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
25V	6.8	C	3	1.9	0.6	0.5	1.7	6
	6.8	B	6	2.8	2	0.7	1.7	6
	10	D	1.2	1	0.5	0.4	2.5	6
	10	C	4	1.5	0.6	0.5	2.5	6
	10	B	6	3	1.4	1	2.5	6
	15	D	1.5	1	0.35	0.3	3.8	6
	15	C	4	1.5	0.9	0.3	3.8	6
	22	D	1.8	0.8	0.3	0.2	5.5	6
	22	C	3.5	1.4	1	0.4	5.5	6
	33	E	0.9	0.7	0.3		8.3	6
	33	D	1.5	0.7	0.4	0.3	8.3	6
	47	E	1.2	0.7	0.2	0.125	11.7	6
	47	D	1.5	0.7	0.3	0.15	11.7	6
	68	E	1.2	0.7	0.3	0.2	17	6
	68	D	2	0.7	0.5	0.3	17	6
	100	E	0.9	0.3	0.25	0.15	25	8
35V	0.1	A	34	20	10		0.5	4
	0.1	P	35	29			0.5	6
	0.15	A	21	19	6		0.5	4
	0.15	P	30	24			0.5	6
	0.22	A	20	18	6		0.5	4
	0.22	P	25	21			0.5	6
	0.33	A	18	15	6		0.5	4
	0.33	P	20	17			0.5	6
	0.47	B	10	8	2.5		0.5	4
	0.47	A	18	11	4		0.5	4
	0.47	P	18	15			0.5	6
	0.68	B	8	6.5	2.5		0.5	4
	0.68	A	17	8	6		0.5	4
	1	B	6.5	5	2		0.5	4
	1	A	16	7.5	6	3	0.5	4
	1.5	C	6	4.5	2.5		0.5	6
	1.5	B	12	5	3		0.5	6
	1.5	A	16	7.5	5		0.5	6
	2.2	C	5	3.5	1.5	1	0.8	6
	2.2	B	8	4	2.5	2	0.8	6
	2.2	A	16	10	8		0.8	6

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
35V	3.3	C	3	2.5	0.8	0.7	1.2	6
	3.3	B	7	3.2	1.3	1	1.2	6
	4.7	D	2	1.5	0.7		1.6	6
	4.7	C	5	2.2	0.7	0.6	1.6	6
	4.7	B	8	3.5	1.5	0.9	1.6	6
	6.8	D	1.3	1.2	0.5	0.4	2.4	6
	6.8	C	3	1.8	0.9	0.35	2.4	6
	10	E	1	0.7	0.4		3.5	6
	10	D	1.1	1	0.4	0.3	3.5	6
	10	C	3.5	1.6	1.2	0.6	3.5	6
	15	E	1.1	0.6	0.3		5.3	6
	15	D	2	0.8	0.35	0.3	5.3	6
	22	E	1	0.7	0.3	0.2	7.7	6
	22	D	1.8	0.7	0.4	0.3	7.7	6
	33	E	1.2	0.6	0.3	0.25	11.6	6
	33	D	2	0.9	0.5	0.3	11.6	6
	47	E	1.2	0.6	0.5	0.25	16.5	6
50V	0.1	A	22	20	10		0.5	4
	0.15	B	17	14	10		0.5	4
	0.15	A	28	15	10	9	0.5	4
	0.22	B	16	14	6		0.5	4
	0.22	A	20	18	8	7	0.5	4
	0.33	B	12	10	2.5		0.5	4
	0.33	A	20	15	7		0.5	4
	0.47	C	10	8	1.8		0.5	4
	0.47	B	16	8	2		0.5	4
	0.47	A	20	9.5	6		0.5	4
	0.68	C	9	7	1.6		0.5	4
	0.68	B	15	7.5	3		0.5	4
	0.68	A	20	7.9	6		0.5	4
	1	C	6	5.5	1.6		0.5	4
	1	B	10	6	4	3	0.5	4
	1.5	D	4	3.5	1		0.8	6
	1.5	C	8	4.5	1.5		0.8	6
	1.5	B	8	7			0.8	6
	2.2	D	3	2.5	0.8		1.1	6

■ Specification of CA45 Series (Continued)

Rated voltage	Rated capacitance	Case	ESR max 100KHz +25℃ Ω				DCL max μA +25℃	Tan δ max % +25℃
			CA45	CA45A	CA45B	CA45U		
50V	2.2	C	7	3	1.5		1.1	6
	2.2	B	5	4	2		1.1	6
	3.3	D	3	2	0.8	0.7	1.7	6
	3.3	C	5	3	1.2	1	1.7	6
	4.7	E	1.2	1			2.4	6
	4.7	D	1.5	1.4	0.6	0.5	2.4	6
	4.7	C	2	1.4	1	0.8	2.4	6
	6.8	E	1.5	1	0.5		3.4	6
	6.8	D	2	1	0.7	0.6	3.4	6
	10	E	1.8	0.7	0.4	0.3	5	6
	10	D	2	0.8	0.7	0.5	5	6
	15	E	1.8	0.7	0.4	0.25	7.5	6
	15	D	1.5	0.8			7.5	6
	22	E	1.5	0.7			11	6

■CA45 Series Recommended Soldering Parameters

1. Manual soldering：Soldering temperature: between 280 and 320℃，no more than 5 seconds.The tip of soldering Iron can only touch the end or lead wire. performed with care.

2. Reflow soldering：Recommended reflow conditions are shown in Fig.16 below.

3. Wave soldering：Recommended wave soldering conditions are shown in Fig.17 below.

Tab: Recommended specification of reflow

Soldering temperature	Lead-free Ta Cap
Minimum preheating temperature Tsmin	150℃
Maximum preheating temperature Tsmax	200℃
Duration from Tsmin to Tsmax ts	60s-120s
Liquefaction temperature T_L	217℃
Time above liquefaction temperature tL	60s-150s
Heating rate of liquefaction temperature to peak temperature	1℃/s-3℃/s
Peak temperature T_P	250℃b
	260℃c
Duration of peak temperature within 5℃ t_P	Max 30s
Cooling rate	2℃/s-6℃/s
Time from 25 ℃ to peak temperature	Max 8min

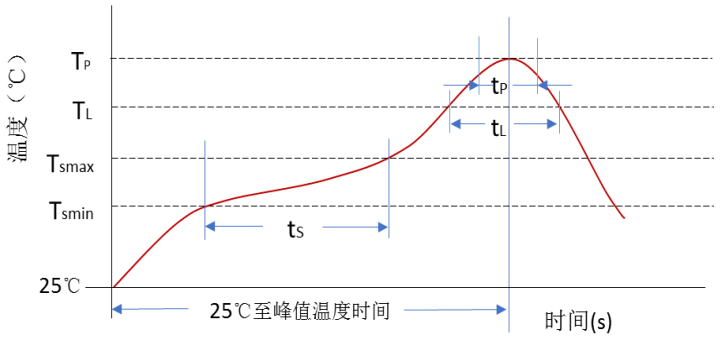


Fig.16 Recommended Soldering Curve For Reflow Soldering

Note：a The temperature in the soldering parameters refers to the surface temperature of tantalum capacitors；

b Be suitable for big case such as D and E. If the surface temperature of big case tantalum capacitor is over 250℃, manual welding is recommended；

c Be suitable for small case such ad P,A,B and C. If the surface temperature of small case tantalum capacitor is over 250℃, manual soldering is recommended；

Tab：Recommended specification of wave soldering

Soldering parameters	Tantalum capacitance
Minimum preheating temperatureTsmin	70℃
Maximum preheating temperature Tsmax	130℃
Duration from Tsmin to Tsmax ts	40s-60s
Difference between Tsmax and peak temperatureTP ΔT	80℃～150℃
Peak temperature TP	235℃～260℃
Soldering time Δtmax	Contact time per peak 5s, Total not exceeding 10s
Cooling rate	2℃/s-5℃/s

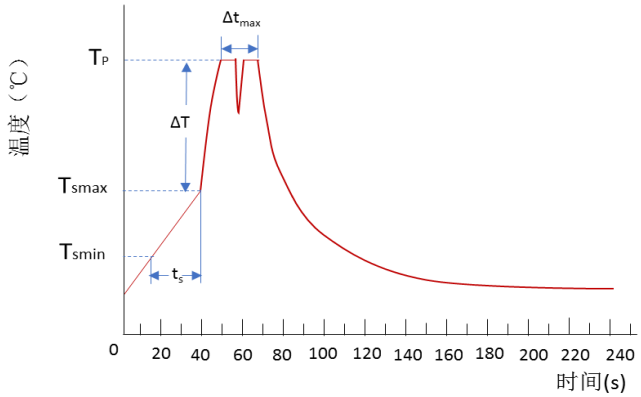


Fig.17 Recommended Soldering Curve For Wave Soldering