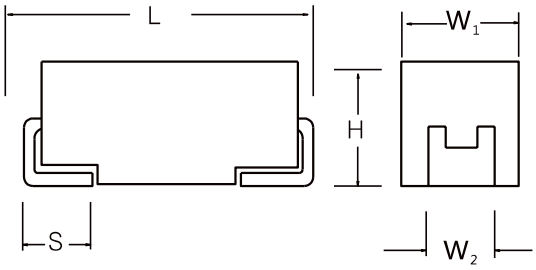
CA45L Low ESR Chip Tantalum Capacitors (SMD Tantalum Capacitors)

◆ Brief Introduction

Low ESR series of robust Mn02 solid tantalum electrolyte capacitors
Power supply applications, general medium power DC/DC convertors
Operating Standard: QJ/PWV330-2010
Military Part Qualified Factory
RoHS and REACH Compliance

◆ Specifications

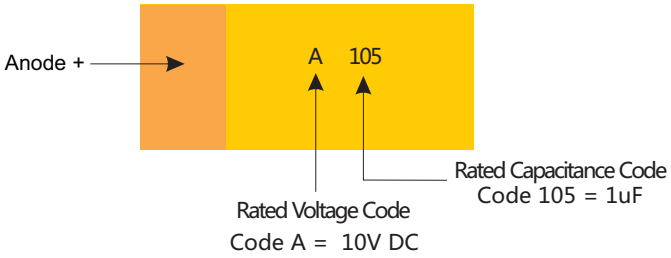
Operating Temperature Range: -55℃ ~ +125℃; >85℃(with rated voltage derating);
DC Leakage at 25℃: $I_o \leq 0.01 C_R U_R$ or 0.5uA (Choose the greater one)
Capacitance Range: 1uF~1000uF
Voltage Range: 4V, 6.3V, 10V, 16V, 20V, 25V, 35V, 50V
Capacitance Tolerance: K: +/-10%; M: +/-20% (+/-20% tolerance is standard)
SPQ: A,B case: 2000pcs/reel; C,D case: 500pcs/reel; E case: 400pcs/reel
Low ESR parameter please refer to Table 3
How to order, please refer to Part Number System



◆ Table 1 Dimensions (Unit: mm)

Case size	EIA Inch	EIA mm	L	W_1	H	S	W_2
A	1206	3216-16	3.20±0.20	1.60+0.20	1.60±0.20	0.80±0.20	1.20±0.20
B	1210	3528-19	3.50±0.20	2.80±0.20	1.90±0.20	0.80±0.20	2.20±0.20
C	2312	6032-25	6.00±0.20	3.20±0.20	2.50±0.20	1.30±0.20	2.20±0.20
D	2917	7343-28	7.30±0.20	4.30±0.20	2.80±0.20	1.30±0.20	2.40±0.20
E	2917	7343-43	7.30±0.40	4.30±0.40	4.10±0.40	1.30±0.20	2.40±0.20
V	2924	7361-36	7.30±0.40	6.10±0.40	3.60±0.40	1.35±0.20	3.00±0.20

◆ Marking on Chip Tantalum Capacitor Body



Voltage Code Table for Chip Tantalum Capacitors

Voltage Code	G	J	A	C	D	E	V	H	T
Rated Voltage	4V	6.3V	10V	16V	20V	25V	35V	40V	50V

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◆Table 2 Temperature Characteristics

Max					
t gδ(%)				DCL (μA)	
-55℃	25℃	85℃	125℃	85℃	125℃
6	4	6		$8\,I_0$	$10\,I_0$
8	6	8			
10	8	10			
12	10	12			
14	12	14			
18	16	18			

◆Table 3 Electrical Characteristics

Part Number	Case Code	Nominal Capacitance	Rated Voltage	Rated Temperature	Category Temperature	Category Voltage	Max DCL at +25℃	Max DF at +25℃ 100Hz	Max ESR +25℃Ω	Ripple Current (A) 100KHz Max		
		μF	V	℃	℃	V	μA	%	mΩ	+25℃	+85℃	+125℃
CA45LA476#004R1500	A	47	4	85	125	2.7	1.9	11	1500	0.208	0.125	0.083
CA45LB476#004R0900	B	47	4	85	125	2.7	1.9	8	900	0.289	0.173	0.115
CA45LB686#004R1000	B	68	4	85	125	2.7	2.7	8	1000	0.274	0.164	0.110
CA45LC686#004R0600	C	68	4	85	125	2.7	2.7	6	600	0.387	0.232	0.155
CA45LB107#004R0450	B	100	4	85	125	2.7	4.0	10	450	0.408	0.245	0.163
CA45LC107#004R0500	C	100	4	85	125	2.7	4.0	10	500	0.424	0.255	0.170
CA45LC157#004R0500	C	150	4	85	125	2.7	6.0	10	500	0.424	0.255	0.170
CA45LD157#004R0350	D	150	4	85	125	2.7	6.0	8	350	0.548	0.329	0.219
CA45LE157#004R0200	E	150	4	85	125	2.7	6.0	8	200	0.791	0.474	0.316
CA45LC227#004R0500	C	220	4	85	125	2.7	8.8	12	500	0.424	0.255	0.170
CA45LD227#004R0300	D	220	4	85	125	2.7	8.8	10	300	0.592	0.355	0.237
CA45LE227#004R0100	E	220	4	85	125	2.7	8.8	10	100	1.118	0.671	0.447
CA45LD337#004R0400	D	330	4	85	125	2.7	13.2	14	400	0.512	0.307	0.205
CA45LE337#004R0200	E	330	4	85	125	2.7	13.2	12	200	0.791	0.474	0.316
CA45LV337#004R0200	V	330	4	85	125	2.7	13.2	12	200	0.866	0.520	0.346
CA45LD477#004R0200	D	470	4	85	125	2.7	18.8	14	200	0.725	0.435	0.290
CA45LE477#004R0150	E	470	4	85	125	2.7	18.8	12	150	0.913	0.548	0.365
CA45LV477#004R0150	V	470	4	85	125	2.7	18.8	12	150	1.000	0.600	0.400
CA45LE687#004R0150	E	680	4	85	125	2.7	27.2	14	150	0.913	0.548	0.365
CA45LE108#004R0150	E	1000	4	85	125	2.7	40.0	15	150	0.913	0.548	0.365
CA45LA336#006R1500	A	33	6.3	85	125	4	2.1	8	1500	0.208	0.125	0.083
CA45LB336#006R0600	B	33	6.3	85	125	4	2.1	8	600	0.354	0.212	0.141
CA45LB476#006R0600	B	47	6.3	85	125	4	3.0	8	600	0.354	0.212	0.141
CA45LC476#006R0300	C	47	6.3	85	125	4	3.0	6	300	0.548	0.329	0.219
CA45LB686#006R0500	B	68	6.3	85	125	4	4.3	10	500	0.387	0.232	0.155
CA45LC686#006R0500	C	68	6.3	85	125	4	4.3	8	500	0.424	0.255	0.170
CA45LD686#006R0250	D	68	6.3	85	125	4	4.3	6	250	0.648	0.389	0.259
CA45LB107#006R0400	B	100	6.3	85	125	4	6.3	14	400	0.433	0.260	0.173
CA45LC107#006R0300	C	100	6.3	85	125	4	6.3	8	300	0.548	0.329	0.219
CA45LD107#006R0300	D	100	6.3	85	125	4	6.3	8	300	0.592	0.355	0.237
CA45LC157#006R0300	C	150	6.3	85	125	4	9.5	12	300	0.548	0.329	0.219
CA45LD157#006R0300	D	150	6.3	85	125	4	9.5	10	300	0.592	0.355	0.237
CA45LE157#006R0150	E	150	6.3	85	125	4	9.5	10	150	0.913	0.548	0.365

CA45L Low ESR Chip Tantalum Capacitors (SMD Tantalum Capacitors)

◆Table 3 Electrical Characteristics

Part Number	Case Code	Nominal Capacitance	Rated Voltage	Rated Temperature	Category Temperature	Category Voltage	Max DCL at +25℃	Max DF at +25℃ 100Hz	Max ESR +25℃Ω	Ripple Current (A) 100KHz Max		
		μF	V	℃	℃	V	μA	%	mΩ	+25℃	+85℃	+125℃
CA45LC227#006R0200	C	220	6.3	85	125	4	13.9	14	200	0.671	0.402	0.268
CA45LD227#006R0150	D	220	6.3	85	125	4	13.9	12	150	0.837	0.502	0.335
CA45LE227#006R0150	E	220	6.3	85	125	4	13.9	12	150	0.913	0.548	0.365
CA45LD337#006R0150	D	330	6.3	85	125	4	20.8	14	150	0.837	0.502	0.335
CA45LE337#006R0150	E	330	6.3	85	125	4	20.8	14	150	0.913	0.548	0.365
CA45LE477#006R0150	E	470	6.3	85	125	4	29.6	14	150	0.913	0.548	0.365
CA45LE687#006R0150	E	680	6.3	85	125	4	42.8	14	150	0.913	0.548	0.365
CA45LA106#010R1800	A	10	10	85	125	6.3	1.0	8	1800	0.190	0.114	0.076
CA45LA156#010R1000	A	15	10	85	125	6.3	1.5	8	1000	0.255	0.153	0.102
CA45LB156#010R0600	B	15	10	85	125	6.3	1.5	6	600	0.354	0.212	0.141
CA45LA226#010R1200	A	22	10	85	125	6.3	2.2	12	1200	0.233	0.140	0.093
CA45LB226#010R0400	B	22	10	85	125	6.3	2.2	6	400	0.433	0.260	0.173
CA45LB336#010R0450	B	33	10	85	125	6.3	3.3	8	450	0.408	0.245	0.163
CA45LC336#010R0400	C	33	10	85	125	6.3	3.3	6	400	0.474	0.285	0.190
CA45LD336#010R0300	D	33	10	85	125	6.3	3.3	6	300	0.592	0.355	0.237
CA45LB476#010R0500	B	47	10	85	125	6.3	4.7	10	500	0.387	0.232	0.155
CA45LB476#010R1000	B	47	10	85	125	6.7	4.7	10	1000	0.292	0.262	0.117
CA45LC476#010R0400	C	47	10	85	125	6.3	4.7	8	400	0.474	0.285	0.190
CA45LD476#010R0300	D	47	10	85	125	6.3	4.7	6	300	0.592	0.355	0.237
CA45LC686#010R0200	C	68	10	85	125	6.3	6.8	8	200	0.671	0.402	0.268
CA45LD686#010R0150	D	68	10	85	125	6.3	6.8	6	150	0.837	0.502	0.335
CA45LC107#010R0250	C	100	10	85	125	6.3	10.0	10	250	0.600	0.360	0.240
CA45LD107#010R0200	D	100	10	85	125	6.3	10.0	8	200	0.725	0.435	0.290
CA45LE107#010R0150	E	100	10	85	125	6.3	10.0	8	150	0.913	0.548	0.365
CA45LD157#010R0200	D	150	10	85	125	6.3	15.0	10	200	0.725	0.435	0.290
CA45LE157#010R0150	E	150	10	85	125	6.3	15.0	10	150	0.913	0.548	0.365
CA45LD227#010R0200	D	220	10	85	125	6.3	22.0	12	200	0.725	0.435	0.290
CA45LE227#010R0200	E	220	10	85	125	6.3	22.0	12	200	0.791	0.474	0.316
CA45LV227#010R0200	V	220	10	85	125	6.3	22.0	12	200	0.866	0.520	0.346
CA45LD337#010R0150	D	330	10	85	125	6.3	33.0	14	150	0.837	0.502	0.335
CA45LE337#010R0150	E	330	10	85	125	6.3	33.0	14	150	0.913	0.548	0.365
CA45LV337#010R0150	V	330	10	85	125	6.3	33.0	14	150	1.000	0.600	0.400
CA45LE477#010R0150	E	470	10	85	125	6.3	47.0	14	150	0.913	0.548	0.365
CA45LE687#010R0150	E	680	10	85	125	6.3	68.0	14	150	0.913	0.548	0.365
CA45LA685#016R2000	A	6.8	16	85	125	10	1.1	6	2000	0.180	0.108	0.072
CA45LB685#016R1200	B	6.8	16	85	125	10	1.1	6	1200	0.250	0.150	0.100
CA45LA106#016R1700	A	10	16	85	125	10	1.6	8	1700	0.196	0.117	0.078
CA45LB106#016R1200	B	10	16	85	125	10	1.6	6	1200	0.250	0.150	0.100
CA45LB156#016R0800	B	15	16	85	125	10	2.4	6	800	0.306	0.184	0.122
CA45LC156#016R0600	C	15	16	85	125	10	2.4	6	600	0.387	0.232	0.155
CA45LB226#016R0700	B	22	16	85	125	10	3.5	8	700	0.327	0.196	0.131
CA45LC226#016R0500	C	22	16	85	125	10	3.5	6	500	0.424	0.255	0.170
CA45LD226#016R0500	D	22	16	85	125	10	3.5	6	500	0.458	0.275	0.183
CA45LC336#016R0500	C	33	16	85	125	10	5.3	6	500	0.424	0.255	0.170
CA45LD336#016R0300	D	33	16	85	125	10	5.3	6	300	0.592	0.355	0.237
CA45LC476#016R0300	C	47	16	85	125	10	7.5	8	300	0.548	0.329	0.219
CA45LD476#016R0300	D	47	16	85	125	10	7.5	6	300	0.592	0.355	0.237
CA45LE476#016R0200	E	47	16	85	125	10	7.5	6	200	0.791	0.474	0.316
CA45LC686#016R1000	C	68	16	85	125	10	10.9	8	1000	0.300	0.180	0.120
CA45LD686#016R0200	D	68	16	85	125	10	10.9	8	200	0.725	0.435	0.290
CA45LE686#016R0200	E	68	16	85	125	10	10.9	6	200	0.791	0.474	0.316
CA45LC107#016R0800	C	100	16	85	125	10	16.0	12	800	0.335	0.201	0.134
CA45LD107#016R0200	D	100	16	85	125	10	16.0	8	200	0.725	0.435	0.290
CA45LE107#016R0200	E	100	16	85	125	10	16.0	8	200	0.791	0.474	0.316
CA45LD157#016R0500	D	150	16	85	125	10	24.0	12	500	0.458	0.275	0.183
CA45LE157#016R0200	E	150	16	85	125	10	24.0	10	200	0.791	0.474	0.316
CA45LE227#016R0100	E	220	16	85	125	11	35.2	12	100	1.285	1.156	0.848
CA45LE227#016R0200	E	220	16	85	125	11	35.2	12	200	0.908	0.817	0.366

◆Table 3 Electrical Characteristics

Part Number	Case Code	Nominal Capacitance	Rated Voltage	Rated Temperature	Category Temperature	Category Voltage	Max DCL at +25℃	Max DF at +25℃ 100Hz	Max ESR +25℃Ω	Ripple Current (A) 100KHz Max		
		μF	V	℃	℃	V	μA	%	mΩ	+25℃	+85℃	+125℃
CA45LV227#016R0200	V	220	16	85	125	10	35.2	12	200	0.866	0.520	0.346
CA45LE337#016R0180	E	330	16	85	125	10	52.8	12	180	0.833	0.500	0.333
CA45LV337#016R0180	V	330	16	85	125	10	52.8	12	180	0.913	0.548	0.365
CA45LE477#016R0450	E	470	16	85	125	10	75.2	16	450	0.527	0.316	0.211
CA45LA335#020R4000	A	3.3	20	85	125	15	0.7	6	4000	0.127	0.076	0.051
CA45LB335#020R3000	B	3.3	20	85	125	15	0.7	6	3000	0.158	0.095	0.063
CA45LA475#020R2500	A	4.7	20	85	125	15	0.9	6	2500	0.161	0.097	0.064
CA45LB475#020R1500	B	4.7	20	85	125	15	0.9	6	1500	0.224	0.134	0.089
CA45LC475#020R1000	C	4.7	20	85	125	15	0.9	6	1000	0.300	0.180	0.120
CA45LB685#020R1000	B	6.8	20	85	125	15	1.4	6	1000	0.274	0.164	0.110
CA45LC685#020R0800	C	6.8	20	85	125	15	1.4	6	800	0.335	0.201	0.134
CA45LB106#020R1200	B	10	20	85	125	15	2.0	6	1200	0.250	0.150	0.100
CA45LC106#020R0600	C	10	20	85	125	15	2.0	6	600	0.387	0.232	0.155
CA45LD106#020R0500	D	10	20	85	125	15	2.0	6	500	0.458	0.275	0.183
CA45LB156#020R1500	B	15	20	85	125	15	3.0	6	1500	0.224	0.134	0.089
CA45LC156#020R0800	C	15	20	85	125	15	3.0	6	800	0.335	0.201	0.134
CA45LD156#020R0600	D	15	20	85	125	15	3.0	6	600	0.418	0.251	0.167
CA45LC226#020R0600	C	22	20	85	125	15	4.4	6	600	0.387	0.232	0.155
CA45LD226#020R0400	D	22	20	85	125	15	4.4	6	400	0.512	0.307	0.205
CA45LC336#020R0600	C	33	20	85	125	15	6.6	6	600	0.387	0.232	0.155
CA45LD336#020R0400	D	33	20	85	125	15	6.6	6	400	0.512	0.307	0.205
CA45LC476#020R0300	C	47	20	85	125	15	9.4	8	300	0.548	0.329	0.219
CA45LD476#020R0250	D	47	20	85	125	15	9.4	8	250	0.648	0.389	0.259
CA45LE476#020R0250	E	47	20	85	125	15	9.4	6	250	0.707	0.424	0.283
CA45LD686#020R0250	D	68	20	85	125	15	13.6	8	250	0.648	0.389	0.259
CA45LE686#020R0250	E	68	20	85	125	15	13.6	6	250	0.707	0.424	0.283
CA45LD107#020R0300	D	100	20	85	125	15	20.0	10	300	0.592	0.355	0.237
CA45LE107#020R0250	E	100	20	85	125	15	20.0	10	250	0.707	0.424	0.283
CA45LD157#020R0450	D	150	20	85	125	15	30.0	10	450	0.483	0.290	0.193
CA45LE157#020R0180	E	150	20	85	125	15	30.0	10	180	0.833	0.500	0.333
CA45LE227#020R0450	E	220	20	85	125	15	44.0	12	450	0.527	0.316	0.211
CA45LV227#020R0250	V	220	20	85	125	15	44.0	12	250	0.775	0.465	0.310
CA45LE337#020R0450	E	330	20	85	125	15	66.0	12	450	0.527	0.316	0.211
CA45LV337#020R0450	V	330	20	85	125	15	66.0	12	450	0.577	0.346	0.231
CA45LA155#025R4500	A	1.5	25	85	125	17	0.5	6	4500	0.120	0.072	0.048
CA45LB155#025R3000	B	1.5	25	85	125	17	0.5	6	3000	0.158	0.095	0.063
CA45LA225#025R3000	A	2.2	25	85	125	17	0.6	6	3000	0.147	0.088	0.059
CA45LB225#025R2500	B	2.2	25	85	125	17	0.6	6	2500	0.173	0.104	0.069
CA45LB335#025R2000	B	3.3	25	85	125	17	0.8	6	2000	0.194	0.116	0.077
CA45LC335#025R1200	C	3.3	25	85	125	17	0.8	6	1200	0.274	0.164	0.110
CA45LB475#025R1000	B	4.7	25	85	125	17	1.2	6	1000	0.274	0.164	0.110
CA45LC475#025R1000	C	4.7	25	85	125	17	1.2	6	1000	0.300	0.180	0.120
CA45LB685#025R2000	B	6.8	25	85	125	17	1.7	6	2000	0.194	0.116	0.077
CA45LC685#025R1000	C	6.8	25	85	125	17	1.7	6	1000	0.300	0.180	0.120
CA45LD685#025R0700	D	6.8	25	85	125	17	1.7	6	700	0.387	0.232	0.155
CA45LB106#025R1500	B	10	25	85	125	17	2.5	8	1500	0.224	0.134	0.089
CA45LC106#025R0900	C	10	25	85	125	17	2.5	6	900	0.316	0.190	0.126
CA45LD106#025R0450	D	10	25	85	125	17	2.5	6	450	0.483	0.290	0.193
CA45LC156#025R0500	C	15	25	85	125	17	3.8	6	500	0.424	0.255	0.170
CA45LD156#025R0400	D	15	25	85	125	17	3.8	6	400	0.512	0.307	0.205
CA45LC226#025R0800	C	22	25	85	125	17	5.5	6	800	0.335	0.201	0.134
CA45LD226#025R0400	D	22	25	85	125	17	5.5	6	400	0.512	0.307	0.205
CA45LD336#025R0300	D	33	25	85	125	17	8.3	8	300	0.592	0.355	0.237
CA45LE336#025R0250	E	33	25	85	125	17	8.3	6	250	0.707	0.424	0.283
CA45LD476#025R0350	D	47	25	85	125	17	11.8	8	350	0.548	0.329	0.219
CA45LE476#025R0300	E	47	25	85	125	17	11.8	6	300	0.645	0.387	0.258

CA45L Low ESR Chip Tantalum Capacitors (SMD Tantalum Capacitors)

◆Table 3 Electrical Characteristics

Part Number	Case Code	Nominal Capacitance	Rated Voltage	Rated Temperature	Category Temperature	Category Voltage	Max DCL at +25℃	Max DF at +25℃ 100Hz	Max ESR +25℃Ω	Ripple Current (A) 100KHz Max		
		μF	V	℃	℃	V	μA	%	mΩ	+25℃	+85℃	+125℃
CA45LE686#025R0250	E	68	25	85	125	17	17.0	8	250	0.707	0.424	0.283
CA45LV686#025R0250	V	68	25	85	125	17	17.0	8	250	0.775	0.465	0.310
CA45LE107#025R0200	E	100	25	85	125	17	25.0	10	200	0.791	0.474	0.316
CA45LV107#025R0200	V	100	25	85	125	17	25.0	10	200	0.866	0.520	0.346
CA45LE157#025R0600	E	150	25	85	125	17	37.5	10	600	0.456	0.274	0.183
CA45LA684#035R6000	A	0.68	35	85	125	23	0.5	6	6000	0.104	0.062	0.042
CA45LA105#035R6000	A	1	35	85	125	23	0.5	6	6000	0.104	0.062	0.042
CA45LB105#035R2500	B	1	35	85	125	23	0.5	4	2500	0.173	0.104	0.069
CA45LB155#035R3000	B	1.5	35	85	125	23	0.5	6	3000	0.158	0.095	0.063
CA45LC155#035R2500	C	1.5	35	85	125	23	0.5	6	2500	0.190	0.114	0.076
CA45LB225#035R2500	B	2.2	35	85	125	23	0.8	6	2500	0.173	0.104	0.069
CA45LC225#035R2000	C	2.2	35	85	125	23	0.8	6	2000	0.212	0.127	0.085
CA45LB335#035R2500	B	3.3	35	85	125	23	1.2	6	2500	0.173	0.104	0.069
CA45LC335#035R1200	C	3.3	35	85	125	23	1.2	6	1200	0.274	0.164	0.110
CA45LB475#035R2000	B	4.7	35	85	125	23	1.6	8	2000	0.194	0.116	0.077
CA45LC475#035R0800	C	4.7	35	85	125	23	1.6	6	800	0.335	0.201	0.134
CA45LD475#035R0700	D	4.7	35	85	125	23	1.6	6	700	0.387	0.232	0.155
CA45LC685#035R0700	C	6.8	35	85	125	23	2.4	6	700	0.359	0.215	0.143
CA45LD685#035R0600	D	6.8	35	85	125	23	2.4	6	600	0.418	0.251	0.167
CA45LC106#035R0700	C	10	35	85	125	23	3.5	6	700	0.359	0.215	0.143
CA45LD106#035R0400	D	10	35	85	125	23	3.5	6	400	0.512	0.307	0.205
CA45LD156#035R0350	D	15	35	85	125	23	5.3	6	350	0.548	0.329	0.219
CA45LE156#035R0300	E	15	35	85	125	23	5.3	6	300	0.645	0.387	0.258
CA45LD226#035R0400	D	22	35	85	125	23	7.7	6	400	0.512	0.307	0.205
CA45LE226#035R0300	E	22	35	85	125	23	7.7	6	300	0.645	0.387	0.258
CA45LD336#035R0500	D	33	35	85	125	23	11.6	8	500	0.458	0.275	0.183
CA45LE336#035R0300	E	33	35	85	125	23	11.6	6	300	0.645	0.387	0.258
CA45LD476#035R0400	D	47	35	85	125	23	16.5	8	400	0.512	0.307	0.205
CA45LE476#035R0400	E	47	35	85	125	23	16.5	6	400	0.559	0.335	0.224
CA45LE686#035R0800	E	68	35	85	125	23	23.8	8	800	0.395	0.237	0.158
CA45LB684#050R3000	B	0.68	50	85	125	33	0.5	6	3000	0.158	0.095	0.063
CA45LB105#050R2500	B	1	50	85	125	33	0.5	6	2500	0.173	0.104	0.069
CA45LC105#050R1800	C	1	50	85	125	33	0.5	4	1800	0.224	0.134	0.089
CA45LC155#050R1800	C	1.5	50	85	125	33	0.8	6	1800	0.224	0.134	0.089
CA45LD155#050R1000	D	1.5	50	85	125	33	0.8	6	1000	0.324	0.194	0.130
CA45LC225#050R1500	C	2.2	50	85	125	33	1.1	6	1500	0.245	0.147	0.098
CA45LD225#050R0700	D	2.2	50	85	125	33	1.1	6	700	0.387	0.232	0.155
CA45LC335#050R0700	C	3.3	50	85	125	33	1.7	6	700	0.359	0.215	0.143
CA45LD335#050R0700	D	3.3	50	85	125	33	1.7	6	700	0.387	0.232	0.155
CA45LC475#050R0700	C	4.7	50	85	125	33	2.4	6	700	0.359	0.215	0.143
CA45LD475#050R0600	D	4.7	50	85	125	33	2.4	6	600	0.418	0.251	0.167
CA45LD685#050R0600	D	6.8	50	85	125	33	3.4	6	600	0.418	0.251	0.167
CA45LE685#050R0500	E	6.8	50	85	125	33	3.4	6	500	0.500	0.300	0.200
CA45LD106#050R0400	D	10	50	85	125	33	5.0	6	400	0.512	0.307	0.205
CA45LE106#050R0400	E	10	50	85	125	33	5.0	6	400	0.559	0.335	0.224
CA45LE156#050R0400	E	15	50	85	125	33	7.5	6	400	0.559	0.335	0.224
CA45LE226#050R0400	E	22	50	85	125	33	11.0	8	400	0.559	0.335	0.224

CA45L Low ESR Chip Tantalum Capacitors (SMD Tantalum Capacitors)

Important Note

1. Please do not use multimeter to test tantalum capacitors.
2. Capacitance and DF measured at :100Hz , U _ =2.2°$_{-1.0}$V , U~=1.0°$_{-0.5}$V,
   Frequency = 100Hz. Test only applied to series equivalent circuit.
3. Please refer to derating voltage or category voltage if temperature > 85°C
4. The DCL parameter should be read after 5 minutes when it connected to the circuit.
5. For special requirement please consult to our sales.

◆ How to order

CA45L	C	106	M	035	R	0100	-
↓	↓	↓	↓	↓	↓	↓	↓
Type	Case Size	Capacitance code	Tolerance	Rated DC Voltage	Package	ESR in mΩ	Additional characters may be added for special requirements
CA45L	See size table	pF Code: 1st two digits represent significant figures 3rd digit represents mulitplier (number of zeros to follow) 106 = 10uF 107 = 100uF	K: +/-10% M: +/-20%	Code 035: 35VDC 006 = 6.3VDC 010 = 10VDC 025 = 25VDC 035 = 35VDC 050 = 50VDC	R: Tape & Reel		

Chip Tantalum Capacitor Selection and Application Notes

1. Selection & application：（CA45 is a series of products with manganese dioxide cathode, and CA55 is a series of products with polymer cathode.）

1.1 Load voltage temperature derating：

Product model	Cathode material	Conditions of Use	-55℃ to 85℃	85℃ to 125℃
CA45	MnO_2	DC operating voltage derating according to operating temperature	U_R	80%U_R
		Maximum derating required for actual voltage	50%U_R	40%U_R
		Used in filter circuit	30%U_R	24%U_R
CA55	PEDOT	DC operating voltage derating according to operating temperature	U_R	80%U_R
		Maximum derating required for the actual voltage of products with UR ≤ 10V used in the filter circuit	90%U_R	72%U_R
		Maximum derating required for actual voltage of UR ≥ 10V products	80%U_R	64%U_R

When the operating ambient temperature is between 85℃ and 125℃, derating is required to avoid the adverse effects of inrush current. Calculate the derated voltage relative to the rated voltage UT using the following formula:

$U_t=(U_r-U_c)*(T-85)/40$

Note: UR : Rated Voltage (V); UC : Derated Voltage at 125℃ (V); T: Ambient Temperature (℃)

1.2 Protection resistance：

Process status category	Process state description	Requirements and instructions
Product testing process	Steady state leakage current test and withstand voltage test.	A 1K Ω resistor should be connected in series between the positive pole of the power supply and the capacitor.
Application process of switching power supply circuit.	There is an instantaneous current passing through.	Resistance of at least 3 Ω / V in series.

1.3 Reverse voltage：

Ambient temperature	Maximum allowable reverse voltage
25℃	10%U_R or 1V， 10% U_R or 1V, whichever is smaller
85℃	5%U_R or 0.5V， 5% U_R or 0.5V, whichever is smaller
125℃	1%U_R or 0.1V， 1% U_R or 0.1V, whichever is smaller

1.3.1 Tantalum capacitors are polar capacitors. Reverse voltage is forbidden；

1.3.2 If reverse voltage is unavoidable, the applied time must be as short as possible, and should not exceed the corresponding voltage value in the table

1.3.3 Even if the reverse voltage and temperature meet the requirements in the table, tantalum capacitors can not withstand the reverse voltage continuously

1.4 Ability to withstand ripple voltage：

Formula	Explain	Notices
E = Z*I	E：Ripple voltage Z：Impedance at specific frequency I： Ripple current	1、The power loss of ESR in capacitor does not exceed the appropriate value. 2、The sum of the peak values of DC voltage and ripple voltage shall not exceed the rated voltage. 3、The sum of negative peaks of DC voltage and ripple voltage shall not exceed the allowable reverse voltage.

1.5 Ability to withstand ripple current：

Formula	$I=\sqrt{\frac{P}{ESR}}xKxF$	Where: I = maximum allowable ripple current (A), P = power dissipation (mW),ESR = equivalent series resistance (mΩ), K = temperature derating factor,F = frequency derating factor
Explain	If ripple current is applied to the capacitor, Joule heat (power loss) will be generated inside the capacitor, which will affect the reliability of the capacitor. The maximum allowable ripple current (arms) of tantalum capacitor can be calculated according to the above formula	

Temperature	45℃	75℃	95℃	105℃	125℃
Derating factor **K**	1.00	0.95	0.85	0.50	0.40

Frequency	10KHz	100 KHz	500KHz	1MHz
Derating factor **F**	0.80	1.00	1.15	1.20

Case code	Size	**P** Power dissipation @+25℃ （mW）	
		CA45 Series	CA55 Series
A	3216-16(±0.20)	75	100
B	3528-19(±0.20)	85	125
C	6032-25(±0.30)	110	175
H	7343-19(±0.30)	120	185
F	7260-19(±0.30)	130	200
D	7343-28(±0.30)	150	225
E	7343-41(±0.30)	165	250
V	7361-36(±0.30)	250	360
W	7361-41(±0.30)	285	420
X	7360-60(±0.30)	390	560

1.6 Suggestions on circuit redundancy design：

1.6.1 Failure mode：

CA45 type manganese dioxide tantalum capacitor will generate heat and burn when high current passes through. CA55 conductive polymer tantalum capacitor will generate heat when high current passes through, which may lead to cracking and failure of the capacitor. This depends on the over-current situation, time and other passive factors. Enough redundancy in the circuit design can ensure the high reliability of tantalum capacitor.

1.6.2 Hidden danger of passive factors:

Although the vast majority of failures of tantalum capacitors are caused by passive factors, safety hidden danger can not be ignored. Capacitor failure will increase the risk of equipment failure using the capacitor, so it is necessary to consider the failure protection design that the circuit can still work normally under the common capacitor failure mode in circuit design. Common failure modes are leakage current rise or short circuit, other failure modes are capacity attenuation, loss or impedance rise or open circuit. It is unsafe to use beyond the rated value of the data sheet.

1.7 Store:

1.7.1 Environmental requirements:

Vacuum storage is recommended. If non vacuum storage is adopted, attention should be paid to the temperature of 10 ~ 30 ℃, humidity ≤ 60% RH, no acid, alkali and other corrosive gases.

1.7.2 Storage requirements:

The capacitor after unpacking the vacuum sealing bag is exposed to the air :

CA45 manganese tantalum dioxide capacitor: controlled according to MSL grade 1;

CA55 conductive polymer tantalum capacitor: controlled according to MSL Level 3 (CA55 product prevents moisture absorption).

1.7.3 Product moisture absorption treatment:

If the non vacuum storage period exceeds one year, it is recommended to dry the capacitor (125 ℃ Max / 4h Min) first, and then weld it after passing the test.If you don't have the right equipment to bake the products, you can contact us by telephone for assistance.

1.8 Welding:

1.8.1 Recommended welding conditions:

Reflow soldering SMT mounting is recommended.

1.8.1.1 Reflow soldering:

The peak setting temperature T_P of SMT should be ≤ 250 ℃, and the holding time within the range of 0 ℃ ~ - 5 ℃ of the peak temperature T_P should be ≤ 5s.

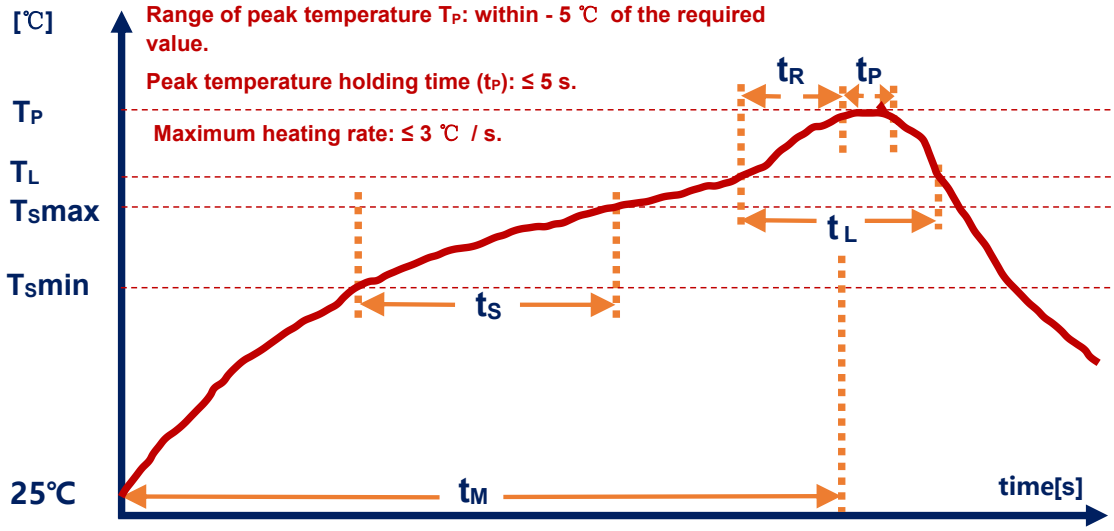
1.8.1.2 Manual welding:

If manual welding is required under special circumstances, the power of electric iron should be ≤ 25W, the temperature should be < 300 ℃, and the welding time should be < 3s. It is forbidden for the iron head to directly contact the product body, and the solder should be melted to make it contact with the capacitor pin for welding.

1.8.2 Precautions for reflow soldering:

The recommended reflow oven temperature setting for lead-free soldering is shown in the table below.

Equipment type	8 temperature zone		10 temperature zone	
Category	Upper	Lower	Upper	Lower
1 zone	120℃	120℃	100℃	100℃
2 zone	150℃	150℃	120℃	120℃
3 zone	160℃	160℃	150℃	150℃
4 zone	170℃	170℃	155℃	155℃
5 zone	200℃	200℃	160℃	160℃
6 zone	230℃	230℃	170℃	170℃
7 zone	250℃	250℃	200℃	200℃
8 zone	180℃	180℃	230℃	230℃
9 zone	/	/	250℃	250℃
10 zone	/	/	180℃	180℃



Solder type		Tin lead solder	Lead free solder
T_S Min	Minimum preheating temperature	100°C	150°C
T_S Max	Maximum preheating temperature	150°C	200°C
t_S	Preheating time	60~120s	60~120s
T_L ~ T_P	Heating rate	≤3°C/s	≤3°C/s
T_L	Melting point of solder paste	183°C	217°C
t_L	Melting time of solder paste	60~150s	60~150s
T_P	Peak temperature	220°C*/235°C**	245°C*/250°C**
t_P	Holding time of peak temperature (-5℃~0℃)	≤10s	≤3s* or 5s**
T_P ~ T_L	Cooling rate	≤6°C/s	≤6°C/s
t_M	Time from 25 ° C to peak temperature	≤6 min	≤8 min

Note: All temperatures are based on product size and measure the ambient temperature at 1cm height above the PCB board.
"*" corresponds to a, B, C shells and "* *" corresponds to other shell numbers.d.

Note: CA45 is a chip solid electrolytic tantalum capacitor with manganese dioxide as the main cathode. Other derivative models such as CA45L, QCA45, CA45H, etc., share the same application requirements and precautions as CA45.
CA55 is a chip solid electrolytic tantalum capacitor with conductive polymer as the main cathode. Other derivative models such as QCA55, CA55H, etc., share the same application requirements and precautions as CA55.