

**Enjoy
Reliable
Success**



ALUMINIUM ELECTROLYTIC CAPACITORS

SMD • RADIAL • SNAP-IN • SCREW • SOLID POLYMER



Nantong **Jianghai** Capacitor Co. Ltd was established in 1959, and started production of Aluminium Electrolytic Capacitors in 1970. With over 1000 staff and production employees it has an annual output of 2.3 billion pieces for SMD, Radial, Snap-In, Lug and Screw type capacitors. In the decade from 1993 to 2002, **Jianghai** has won "Ten Years Championship" for its highest sales in Aluminium Electrolytic Capacitor industry in China. Sales revenue reached 55 Mio US\$ with a 20% share of export in 2002. For 10 years in sequence **Jianghai** has been at the top of similar industries in China.

Jianghai pays great attention to the investment in the aspect of technology and the renewal of production facilities. The main production equipment as well as the testing and measuring instruments were introduced from Japan. At the same time **Jianghai** also introduced the production technology and management methods required to produce quality capacitors from some major Japanese companies and established the long-term cooperation relationship with them.

Jianghai possesses wholly owned and joint venture factories for the manufacture of Aluminium Electrolytic Capacitors and also has the capability to produce key materials and parts required in the assembly.

Jianghai emphasizes especially on the research and development of new products. A "Research and Development Institute" has been set up for this purpose. Continuous innovation in management and technology by working together closely with the "Aluminium Electrolytic Technology Research Center" in China, **Jianghai** Company has been admitted to participate many important National Projects as "Torch Program", "Sparks Program" and "High-Tech Program". Close ties and long-term development and also cooperation relationship have been built up with some of the universities and colleges in China. One result of the leading position of **Jianghai**: all products are **100% leadfree** since years.

Jianghai has also listed as the number one for its production automation and "Test & Inspection" facilities.

Quality Milestones:

ISO 9001

ISO 14001

QS 9000

UL Approval -CZDS2.E227010 (Snap-In / Screw)

RoHS (EU/2002/95) & WEEE (EU/2002/96) compatible

Now **Jianghai's** Aluminium Electrolytic Capacitors are widely used in:

**Colour TV and Set Top Boxes,
Power Supplies,
Conversion Electric Appliances,
Computers, Digital Audio and Video Equipment,
Electronic Lighting Ballast,
Drives and Controls,
Automotive,
Aviation & Military devices**

The major customers of **Jianghai** are GE, Lambda, APC, Emerson, Hitachi, Alcatel, Konka, Lincoln, Panasonic, Philips, ASIRobicon, Sharp, Samsung, Osram, Kenwood, TTE, etc.

In 1998, **Jianghai** took over the complete set of production technology for manufacturing 105°C, high frequency, from a leading Japanese company (OEM-production). A Joint-Venture agreement in 1999 with Hitachi AIC and since 2002 with Evox-Rifa secures a worldwide leading position for high quality high voltage capacitors.

In 2004 the **Jianghai** Europe GmbH was founded with the aim to enter directly into the European Market with best performance in the field. The combination of warehouse in Germany, Sales Engineers spread over Europe as well as a distribution network guarantees an excellent technical support of the European customers.



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Type:	Code:	Terminal:	Voltage (V_{DC}):	Capacitance (µF):	Life Time:	
CDVS	BS	SMD	4 – 100	0,1 – 1500	2000 – 3000h at 85°C	12
CDVH	VH	SMD	4 – 100	0,1 – 2200	2000 – 3000h at 105°C	14
CDVZ	VZ	SMD	6,3 – 50	1,0 – 1500	2000 – 3000h at 105°C	16
CD110	PT	Radial	6,3 – 450	0,1 – 15000	3000 – 4000h at 85°C	18
CD261	LK	Radial	160 – 500	6,8 – 220	8000 – 10000h at 105°C	20
CD263	BK	Radial	6,3 – 450	0,1 – 15000	2000 – 3000h at 105°C	22
CD269	PH	Radial	10 – 63	47 – 3300	2500h at 125°C	25
CD281	LL	Radial	6,3 – 100	0,47 – 15000	3000 – 12000h at 105°C	27
CD282	XX	Radial	6,3 – 50	22 – 6800	2500 – 6000h at 105°C	30
CD287	GC	Radial	6,3 – 100	0,47 – 15000	4000 – 10000h at 105°C	32
CD289	PB	Radial	6,3 – 50	22 – 18000	4000h at 105°C	35
CD293	BZ	Snap-In	10 – 500	68 – 82000	4000h at 85°C	37
CD294	BW	Snap-In	16 – 500	39 – 47000	4000h at 105°C	40
CD295	BC	Snap-In	10 – 450	68 – 22000	6000h at 85°C	43
CD296	KC	Snap-In	16 – 450	56 – 47000	5000h at 105°C	46
CD297	BB	Snap-In	10 – 450	68 – 47000	7000h at 105°C	49
CD135	BP	Screw	10 – 450	270 – 820000	4000h at 85°C	52
CD136	PK	Screw	10 – 450	180 – 680000	4000h at 105°C	56
CD137	PX	Screw	350 – 550	1000 – 22000	10000h at 85°C	59
CD138	PC	Screw	350 – 450	1000 – 18000	10000h at 85°C	61
HCP	CP	Solid Polymer Radial	4 – 16	68 – 1200	2000h at 105°C	63
<i>Handling Precautions</i>						65

SMD, Radial, Snap-In

EC	R	1C	PT	101	M	FF	25	0611
Electrolytic Capacitor	Terminal Type: SMD = V Radial = R Snap-In = S	Rated Voltage Code: For the code please refer to the pages of ratings.	Series: CDVS = BS CD293 = BZ CDVH = VH CD294 = BW CDVZ = VZ CD295 = BC CD110 = PT CD296 = KC CD261 = LK CD297 = BB CD263 = BK CD269 = PH CD281 = LL CD282 = XX CD287 = GC CD289 = PB	Capacitance Code: 0,47 = R47 1,0 = 010 2,2 = 2R2 47 = 470 100 = 101 1000 = 102 10000 = 103	Capacitance Tolerance: ±20% = M ±10% = K +30/-10% = Q +20/-0% = R	Lead Radial: Long Lead = LL Taped = FF Cut 5,0 mm = CB Cut 4,5 mm = CC Cut 4,0 mm = CD Cut 3,5 mm = CE Cut 3,0 mm = CF Form Kinked = FM* Form Axial 1 = FS* Form Axial 2 = FT*	Radial Pitch: 1,5 mm = 15 2,0 mm = 20 2,5 mm = 25 3,5 mm = 35 5,0 mm = 50 7,5 mm = 75 10,0 mm = 10 12,5 mm = 12	Dimension SMD, Radial, Snap-In: 4x7 = 0407 5x11,5 = 0511 10x20 = 1020 35x80 = 3580

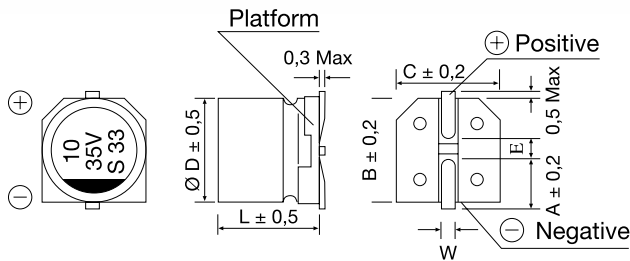
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* on request

SMD = FF taped SMD = T2

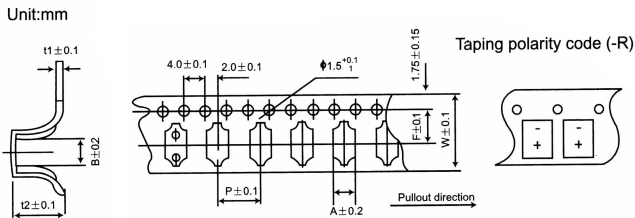
Snap-In:
4,0mm Pin Length = T4 **2 Pin = P2**
6,3mm Pin Length = T6 3 Pin = P3
4 Pin = P4

SMD Type

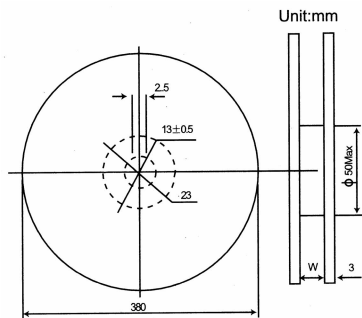


ØDxL	4x5,4	5x5,4	6,3x5,4	6,3x7,7	8x10,5	10x10,5
A	1,8	2,1	2,4	2,5	2,9	3,2
B	4,3	5,3	6,6	6,6	8,3	10,3
C	4,3	5,3	6,6	6,6	8,3	10,3
E	1,0	1,3	2,2	2,2	3,1	4,5
L	5,4	5,4	5,4	7,7	10,5	10,5
W	0,5 – 0,8			0,8 – 1,1		

Taping dimensions

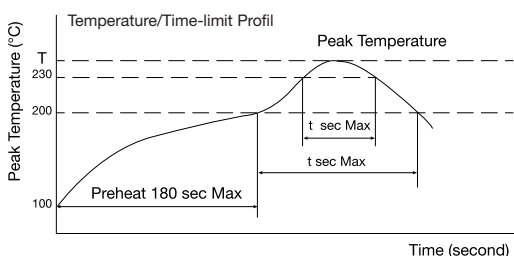


Size (DxL)	w ±0,3	A ±0,2	B ±0,1	P ±0,1	t2 ±0,2	F ±0,1	t1 ±0,1
4x5,4	12,0	5,0	5,0	8,0	5,8	5,5	0,4
5x5,4	12,0	6,0	6,0	12,0	5,8	5,5	0,4
6,3x5,4	16,0	7,0	7,0	12,0	5,8	7,5	0,4
6,3x7,7	16,0	7,0	7,0	12,0	8,4	7,5	0,4
8x10,5	24,0	8,7	8,7	16,0	11,0	11,5	0,4
10x10,5	24,0	10,7	10,7	16,0	11,0	11,5	0,4



diameter	w
4	14
5	14
6,3	18
8; 10	26

Recommended soldering



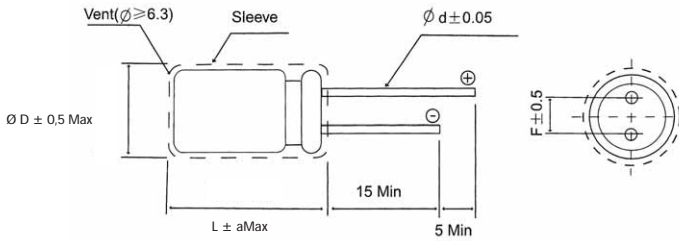
Allowable Range of Peak Temperature

Size	T (°C)	t (second)	t ₁ (second)
Ø4~6.3	250	90	40
Ø8x10,5	240	90	30
Ø10x10,5	235	60	30

For more details please contact your local sales office.

Radial Type

Long Lead: Type LL



Ø D	4	5	6,3	8	10	12,5	16	18	20	22	25
F	1,5	2,0	2,5	3,5	5,0		7,5	10,0	10,0	12,5	
Ø d	0,45	0,5	0,5	0,6			0,8	1,0	1,0	1,0	
a _{max}	1,5	1,5	1,5	L < 16: 1,5							
				L ≥ 16: 2,0							

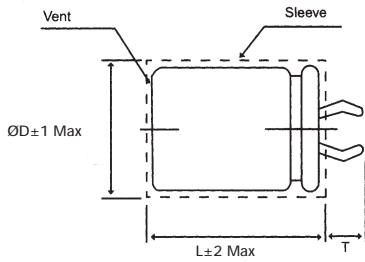
Ammopack: Type FF

Code	Case Range		Dimensions				Form	Ammopack	
	Ø D	L (max)	H ± 0,75	Ho ± 0,5	F ± 0,5	P ± 0,1			
FF	4~6	13,0	18,5	-	2,5	12,7	A		
	8	13,0	18,5	-	3,5	12,7	A		
	4~8	7,0	17,5	16,0	5,0	12,7	B		
	5~6,3	13,0	18,5						
	8	22,0	20,0						
		10	22,0	18,5	-		15,0		A
		12,5	22,0	18,5	-		25,4		C
FD	12,5	27,0	18,5	-		25,4	C		
FF	16	27,0	18,5	-	7,5	30,0	C		

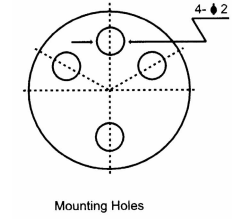
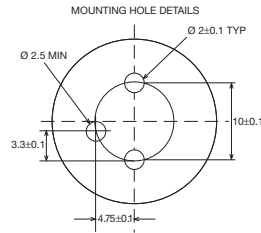
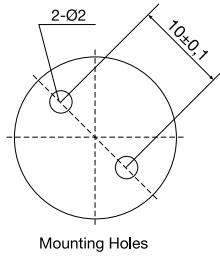
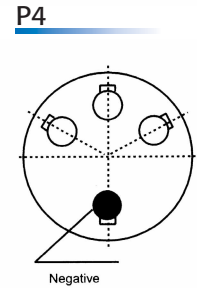
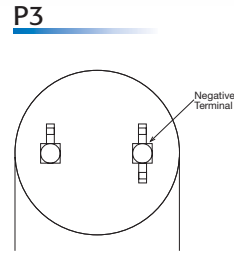
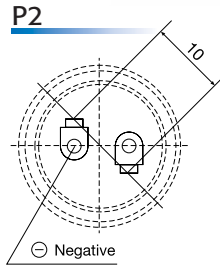
Cut Lead: Type C

Lead Configuration	Straight Lead					Bended Lead
	Form	CB	CC	CD	CE	CF
I [mm]	5,0 ± 0,5	4,5 ± 0,5	4,0 ± 0,5	3,5 ± 0,5	3,0 ± 0,5	

Snap-In Type:



Terminal	T6	T4
T	6,3 ± 1,0	4,0 ± 1,0



Screw Type

EC	G	1C	BP	101	M	B	E	160	A361
Electrolytic Capacitor	Terminal Type: Screw = G	Rated Voltage Code: For the code please refer to the pages of ratings.	Series: CD135 = BP CD136 = PK CD137 = PX CD138 = PC	Capacitance Code: 100 = 101 1000 = 102 10000 = 103	Capacitance Tolerance: $\pm 20\%$ = M $\pm 10\%$ = K $+30/-10\%$ = Q $+20/-0\%$ = R	Mounting: Bolt = B No double sleeve = N 2 stoppers bracket + double sleeve = I 3 stoppers bracket + double sleeve = Y No bracket, but double sleeve = D	Diameter: 36 = A 40 = B 51 = C 64 = D 77 = E 90 = F 101 = G	Length: 53 = 053 65 = 065 96 = 096 100 = 100 115 = 115 236 = 236	For Terminal Code see tables below

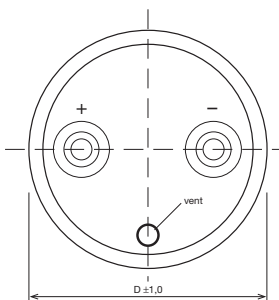
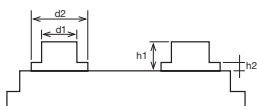
Terminal Code

Code	ØD	Screw	Pitch P	d1	d2	h1	h2
A361	36	M5	12,7	8,0	11,0	6,8	1,8
A362	36	10-32	12,7	8,0	11,0	6,8	1,8
A511	51	M5	21,8	10,0	13,0	6,8	1,8
D551	55	M5	21,8	10,0	13,0	5,5	0
A641	64	M5	28,2	10,0	15,5	6,8	1,8
A642	64	M5	28,2	15,0	20,0	7,3	3,5
A643	64	1/4-28	28,2	15,0	20,0	7,3	3,5
B641	64	1/4-28	28,2	17,2	0	6,4	0
A771	77	M5	31,4	10,0	15,5	6,3	1,3
A772	77	M6	31,4	10,0	15,5	6,3	1,3

Code	ØD	Screw	Pitch P	d1	d2	h1	h2
B771	77	M6	31,4	17,2	0	3,17	0
B772	77	M6	31,4	17,2	0	6,4	0
B773	77	M8	31,4	17,2	0	3,17	0
B774	77	M5	31,4	17,2	0	6,4	0
C771	77	M5	31,4	17,2	0	3,5	0
C772	77	M6	31,4	17,2	0	3,5	0
C773	77	M5	31,4	17,2	0	5,5	0
A901	90	M5	31,4	10,0	15,5	6,3	1,3
A902	90	M6	31,4	10,0	15,5	6,3	1,3
B901	90	M6	31,4	17,2	0	6,4	0

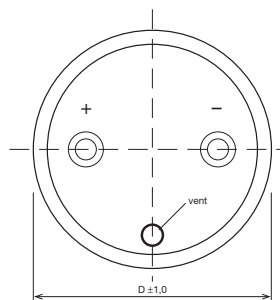
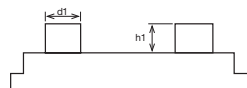
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Terminal A



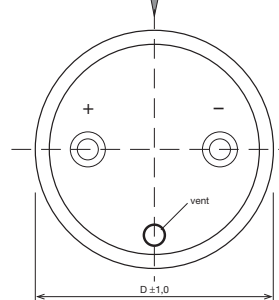
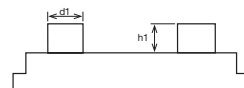
d1: ± 0,3 mm / d2: ± 0,3 mm

Terminal B

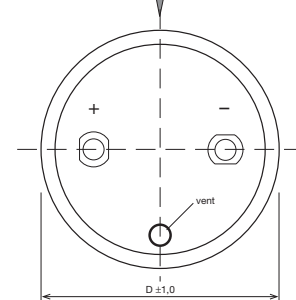
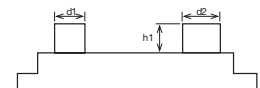


h1: ± 0,3 mm / h2: ± 0,3 mm

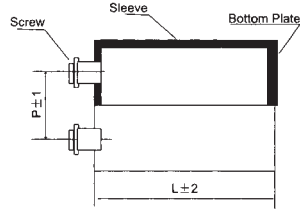
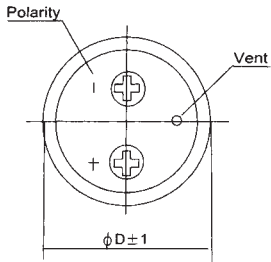
Terminal C



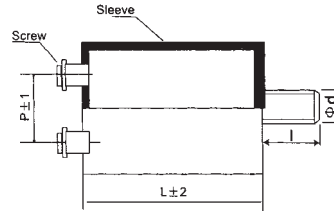
Terminal D



Standard



Bolt Mounting

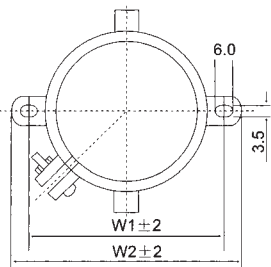


ϕD	ϕd	l
$\phi 36$	M8	12
$\geq \phi 51$	M12	16

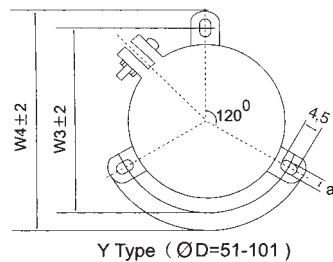
Terminal Detail



Bracket Mounting:



I Type ($\phi D=36$)
Height: 30 mm



Y Type ($\phi D=51-101$)

Diameter D	W1	W2	W3	W4	a
36	48,0	58,0	-	-	-
51	-	-	63,5	73,0	7,0
64	-	-	76,2	85,1	7,0
77	-	-	88,9	98,4	7,0
90	-	-	101,6	111,1	8,0
101	-	-	115,0	127,0	8,0

Accessories for capacitor mounting are available on request.



Overview

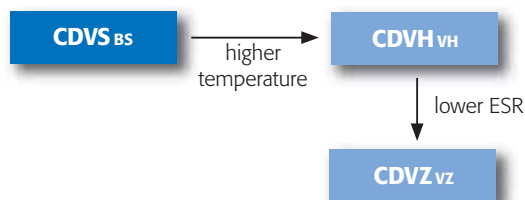
		Life Time, Temperature Range				
Radial 6V - 100V	large	Standard & Miniature 1 500 - 4 000h/85°C	Semi-Professional 1 500 - 3 000h/105°C	Professional / Long Life 3 000 - 12 000h/105°C		Extra Long Life High Temperature 1 500 - 2 500h/125°C
	small					
		CD110 PT standard, page 18 CD11C CX 7 mm height CD50S WL 5 mm height CD11A PA for Audio, low noise	CD263 BK standard, page 22 CD70H QG 7 mm height CD50H WH 5 mm height	CD286 GK standard CD287 GC low ESR, page 32 CD289 PB low impedance, page 35 CD283 DZ extra low impedance	CD281 LL ultra low imp., page 27 CD282 XX extra low imp., page 30	CD265 TW standard CD269 PH high current, page 25
Radial 160V - 450V	large	Standard & Miniature 3 000 - 4 000h/85°C	Semi-Professional 1 500 - 4 000h/105°C	Professional/Long Life 6 000 - 10 000h 105°C	Extra Long Life High Temperature 3 000h/125°C	
	small					
		CD110 PT standard, page 18	CD263 BK standard, page 22 CD11H PD high current	CD267 PM larger CD264 KH low impedance	CD266 FK ultra low Imp. CD261 LK extra low imp., page 20	CD11G GW high voltage
SMD	large	Standard & Miniature 1 000 - 3 000h/85°C	Semi-Professional 2 000 - 3 000h/105°C			
	small					
		CDVS BS standard, page 12 CDVB VB bipolar	CDVH VH standard, page 14 CDVZ VZ low impedance, page 16			
Snap-In	large	Standard 4 000h/85°C	Professional 6 000h/85°C	Standard 4 000h/105°C	Professional 5 000 - 9 000h/105°C	
	small					
		CD293 BZ page 37 CD291 PE CD292 PF CD29S PJ	CD295 BC page 43	CD294 BW page 40	CD29D HR high current CD296 KC page 46	CD297 BB page 49 CD299 PG
Screw	large	Standard 4 000h/85°C	Professional 10 000h/85°C	High End 30 000h/85°C	Standard 4 000/105°C	Professional 8 000/105°C
	small					
		CD135 BP page 52 CD135X BX high voltage	CD138 PC page 61 CD137 PX high voltage, page 59	CD13L PL	CD136 PK page 56	CD139 BL

Other series/types bipolar, low leakage on request

Series CDVS BS

- Surface Mount
- Standard 85°C

2 000 – 3 000h at 85°C



Item	Characteristics									
Operating Temperature Range (°C)	-40 ~ +85									
Voltage Range (V)	4 ~ 100									
Capacitance Range (µF)	0,1 ~ 2200									
Leakage Current (20°C)	After 2 minutes application of rated voltage, leakage current is not more than 0,01CV or 3µA, whichever is greater.									
Capacitance Tolerance (20°C, 120Hz)	±20%									
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	4	6,3	10	16	25	35	50	63	100
	Tan δ (max)	0,38	0,28	0,22	0,18	0,14	0,12	0,12	0,10	0,10
Stability at Low Temperature (120Hz)	Rated Voltage (V)	4	6,3	10	16	25	35	50	63	100
	Impedance Ratio (max)	Z _{-25°C} /Z _{+20°C}	7	3	3	2	2	2	2	2
Z _{-40°C} /Z _{+20°C}		15	8	6	4	4	3	3	3	3
Resistance to Soldering Heat	After reflow soldering according to Reflow Soldering Condition and restored at room temperature, they meet the characteristics requirements listed at right.									
	Capacitance Change	Within ±10% of initial value								
	Tan δ	Initial specified value or less								
	Leakage Current	Initial specified value or less								

	Useful Life	Load Life	Endurance Test	Shelf Life
Life Time	∅ ≤ 6 : 2 000h ∅ ≥ 8 : 3 000h	2 000h	∅ ≤ 6 : 1 000h ∅ ≥ 8 : 2 000h	1 000h
Leakage Current	Not more than specified value	Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±50% of initial value	Within ±20% of initial value (≤4V : 30%)	Within ±20% of initial value	Within ±20% of initial value (≤4V : 30%)
Dissipation Factor	Not more than 300% of specified value	Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
Coefficient	0,70	1,00	1,17	1,36	1,50

Temperature Coefficient

Temperature (°C)	+70	+85
Factor	1,20	1,00

Ratings for Series CDVS BS

V _{DC} Code	Rated Capacitance	ESR 20°C, 120 Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(Ω)	(mA _{rms})	(mm)
4 OG	33	15,280	26	4x5,4
	47	10,730	34	4x5,4
	56	9,000	39	4x5,4
	68	7,420	45	5x5,4
	100	5,040	61	5x5,4
	150	3,360	74	6,3x5,4
	220	2,290	82	6,3x5,4
	330	1,530	150	6,3x7,7
	470	1,070	150	6,3x7,7
	680	0,740	300	8x10,5
	1000	0,500	330	8x10,5
1500	0,340	450	10x10,5	
6,3 OJ	22	16,890	31	4x5,4
	33	11,260	31	4x5,4
	33	11,260	39	5x5,4
	47	7,910	36	4x5,4
	47	7,910	47	5x5,4
	56	6,630	46	5x5,4
	68	5,460	52	5x5,4
	68	5,460	62	6,3x5,4
	100	3,720	55	5x5,4
	100	3,720	71	6,3x5,4
	150	2,480	78	6,3x5,4
	220	1,690	95	6,3x5,4
	330	1,130	150	6,3x5,4
	470	0,790	300	8x10,5
	680	0,550	300	8x10,5
	1000	0,370	330	8x10,5
	1000	0,370	430	10x10,5
1500	0,250	450	10x10,5	
10 IA	22	13,270	28	4x5,4
	22	13,270	35	5x5,4
	33	8,850	32	4x5,4
	33	8,850	43	5x5,4
	47	6,210	43	5x5,4
	47	6,210	59	6,3x5,4
	56	5,210	57	6,3x5,4
	68	4,290	72	6,3x5,4
	100	2,920	76	6,3x5,4
	150	1,950	88	6,3x5,4
	220	1,330	150	6,3x7,7
	330	0,880	280	8x10,5
	470	0,620	300	8x10,5
	680	0,430	380	10x10,5
	1000	0,290	450	10x10,5
16 IC	10	23,890	25	4x5,4
	15	15,920	28	4x5,4
	22	10,860	28	4x5,4
	22	10,860	39	5x5,4
	33	7,240	40	5x5,4
	33	7,240	57	6,3x5,4
	47	5,080	44	5x5,4
	47	5,080	68	6,3x5,4
	56	4,270	74	6,3x5,4
	68	3,510	80	6,3x5,4
	100	2,390	86	6,3x5,4
	150	1,590	135	6,3x7,7
	220	1,090	150	6,3x7,7
	220	1,090	215	8x10,5
	330	0,720	280	8x10,5
	470	0,510	330	8x10,5
	470	0,510	420	10x10,5
	680	0,350	450	10x10,5
	1000	0,240	490	10x10,5
25 IE	4,7	39,530	19	4x5,4
	10	18,580	20	4x5,4
	10	18,580	28	5x5,4
	15	12,380	34	5x5,4
	22	8,440	35	5x5,4
	22	8,440	52	6,3x5,4
	33	5,630	42	5x5,4
	33	5,630	63	6,3x5,4
	47	3,950	68	6,3x5,4
	56	3,320	82	6,3x5,4
	68	2,730	94	6,3x5,4

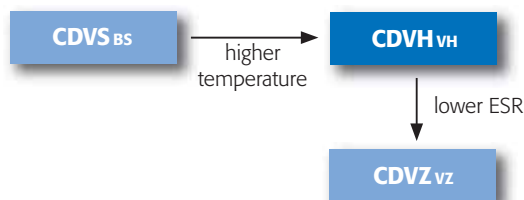
V _{DC} Code	Rated Capacitance	ESR 20°C, 120 Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(Ω)	(mA _{rms})	(mm)
25 IE	100	1,860	130	6,3x7,7
	150	1,240	200	8x10,5
	220	0,840	250	8x10,5
	330	0,560	310	8x10,5
	330	0,560	340	10x10,5
	470	0,400	400	10x10,5
	35 IV	3,3	48,250	18
4,7		33,880	20	4x5,4
10		15,920	20	4x5,4
10		15,920	30	5x5,4
22		7,240	54	6,3x5,4
33		4,380	60	6,3x5,4
47		3,390	70	6,3x5,4
56		2,840	80	6,3x7,7
68		2,340	110	6,3x7,7
100		1,590	120	6,3x7,7
100		1,590	175	8x10,5
150	1,060	220	8x10,5	
220	0,720	270	8x10,5	
220	0,720	310	10x10,5	
330	0,480	350	10x10,5	
50 IH	0,1	1526,010	1,0	4x5,4
	0,22	693,640	2,3	4x5,4
	0,33	462,430	3,5	4x5,4
	0,47	324,680	5,0	4x5,4
	1	152,600	10	4x5,4
	1,5	101,730	12	4x5,4
	2,2	69,360	15	4x5,4
	3,3	46,240	18	4x5,4
	4,7	32,470	19	4x5,4
	4,7	32,470	23	5x5,4
	10	15,260	34	6,3x5,4
	22	6,940	60	6,3x5,4
	33	4,620	85	6,3x7,7
	47	3,250	90	6,3x7,7
	56	2,730	110	6,3x7,7
	68	2,240	170	8x10,5
	100	1,530	200	8x10,5
150	1,020	240	10x10,5	
220	0,690	320	10x10,5	
63 IJ	0,1	1326,960	1,0	4x5,4
	0,22	603,170	2,3	4x5,4
	0,33	402,110	3,5	4x5,4
	0,47	282,330	5,0	4x5,4
	1	132,700	10	4x5,4
	1,5	88,460	12	4x5,4
	2,2	60,320	15	4x5,4
	3,3	40,210	20	5x5,4
	4,7	28,230	23	5x5,4
	4,7	28,230	30	6,3x5,4
	10	13,270	34	6,3x5,4
	10	13,270	55	6,3x7,7
	22	6,030	70	6,3x7,7
	22	6,030	140	8x10,5
	33	4,020	160	8x10,5
47	2,820	170	8x10,5	
47	2,820	230	10x10,5	
56	2,370	250	10x10,5	
68	1,950	260	10x10,5	
100	1,330	280	10x10,5	
100 2A	1	126,060	10	4x5,4
	1,5	84,040	15	6,3x5,4
	2,2	57,300	20	6,3x5,4
	3,3	38,200	28	6,3x5,4
	3,3	38,200	45	6,3x7,7
	4,7	26,820	30	6,3x5,4
	4,7	26,820	50	6,3x7,7
	10	12,610	50	6,3x7,7
	10	12,610	110	8x10,5
	22	5,730	120	8x10,5
	22	5,730	180	10x10,5
33	3,820	190	10x10,5	
47	2,680	200	10x10,5	

Custom products are available on request.

Series CDVH vH

- Surface Mount
- Standard 105°C

2 000 – 3 000h at 105°C



Item	Characteristics										
Operating Temperature Range (°C)	-40 ~ +105										
Voltage Range (V)	4 ~ 100										
Capacitance Range (µF)	0,1 ~ 2200										
Leakage Current (20°C)	After 2 minutes application of rated voltage, leakage current is not more than 0,01CV or 3µA, whichever is greater.										
Capacitance Tolerance (20°C, 120Hz)	±20%										
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	4	6,3	10	16	25	35	50	63	100	
	Tan δ (max)	0,38	0,30	0,24	0,19	0,16	0,14	0,12	0,12	0,12	
Stability at Low Temperature (120Hz)	Rated Voltage (V)	4	6,3	10	16	25	35	50	63	100	
	Impedance Ratio (max)	Z _{-25°C} /Z _{+20°C}	7	4	3	2	2	2	2	2	3
		Z _{-40°C} /Z _{+20°C}	15	8	6	4	4	3	3	3	4
Resistance to Soldering Heat	After reflow soldering according to Reflow Soldering Condition and restored at room temperature, they meet the characteristics requirements listed at right.									Capacitance Change	Within ±10% of initial value
										Tan δ	Initial specified value or less
										Leakage Current	Initial specified value or less

	Useful Life	Load Life	Endurance Test	Shelf Life
Life Time	Ø ≤ 6 : 2 000h Ø ≥ 8 : 3 000h	Ø ≤ 6 : 1 000h Ø ≥ 8 : 2 000h	Ø ≤ 6 : 1 000h Ø ≥ 8 : 2 000h	1 000h
Leakage Current	Not more than specified value	Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±50% of initial value	Within ≤ 16V: ±30% ≥ 25V: ±20% of initial value	Within ≤ 16V: ±30% ≥ 25V: ±20% of initial value	Within ≤ 16V: ±30% ≥ 25V: ±20% of initial value
Dissipation Factor	Not more than 300% of specified value	Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~
Coefficient	0,70	1,00	1,17	1,36	1,50

Temperature Coefficient

Temperature (°C)	+70	+85	+105
Factor	2,00	1,70	1,00

Ratings for Series CDVH VH

V _{DC} Code	Rated Capacitance	ESR 20°C, 120 Hz	Max. Ripple Current 105°C, 120 Hz	Size Ø DxL
(V)	(µF)	(Ω)	(mA _{rms})	(mm)
4 0G	33	15,280	18	4x5,4
	33	15,280	30	5x5,4
	47	10,730	24	4x5,4
	47	10,730	36	5x5,4
	100	5,040	43	5x5,4
	100	5,040	60	6,3x5,4
	150	3,360	52	6,3x5,4
	220	2,290	57	6,3x5,4
	330	1,530	100	6,3x7,7
	470	1,070	105	6,3x7,7
	680	0,740	210	8x10,5
	1000	0,500	230	8x10,5
	1500	0,340	315	10x10,5
2200	0,230	340	10x10,5	
6,3 0J	22	18,090	22	4x5,4
	33	12,060	22	4x5,4
	33	12,060	27	5x5,4
	47	8,470	25	4x5,4
	47	8,470	33	5x5,4
	100	3,980	39	5x5,4
	100	3,980	50	6,3x5,4
	150	2,650	55	6,3x5,4
	220	1,810	67	6,3x5,4
	220	1,810	105	6,3x7,7
	330	1,210	105	6,3x7,7
	470	0,850	210	8x10,5
	680	0,590	210	8x10,5
	1000	0,400	230	8x10,5
	1000	0,400	300	10x10,5
1500	0,270	315	10x10,5	
10 1A	22	14,480	20	4x5,4
	22	14,480	25	5x5,4
	33	9,650	22	4x5,4
	33	9,650	30	5x5,4
	47	6,780	30	5x5,4
	47	6,780	41	6,3x5,4
	100	3,180	53	6,3x5,4
	150	2,120	62	6,3x5,4
	220	1,450	105	6,3x7,7
	330	0,970	196	8x10,5
	470	0,680	210	8x10,5
	680	0,470	270	10x10,5
	1000	0,320	315	10x10,5
16 1C	10	25,120	18	4x5,4
	22	11,460	20	4x5,4
	22	11,460	27	5x5,4
	33	7,640	28	5x5,4
	33	7,640	40	6,3x5,4
	47	5,360	31	5x5,4
	47	5,360	48	6,3x5,4
	100	2,520	60	6,3x5,4
	150	1,680	95	6,3x7,7
	220	1,150	105	6,3x7,7
	220	1,150	150	8x10,5
	330	0,760	195	8x10,5
	470	0,540	230	8x10,5
	470	0,540	295	10x10,5
	680	0,370	315	10x10,5
1000	0,250	340	10x10,5	
25 1E	4,7	45,170	13	4x5,4
	10	21,230	14	4x5,4
	10	21,230	20	5x5,4
	22	9,650	25	5x5,4
	22	9,650	36	6,3x5,4
	33	6,430	29	5x5,4
	33	6,430	44	6,3x5,4
	47	4,520	48	6,3x5,4
	100	2,120	91	6,3x7,7
	150	1,420	100	6,3x7,7

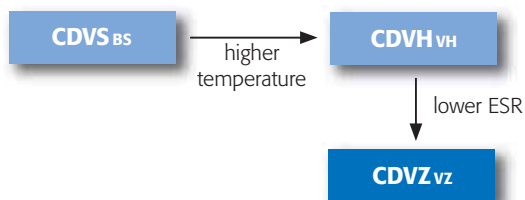
V _{DC} Code	Rated Capacitance	ESR 20°C, 120 Hz	Max. Ripple Current 105°C, 120 Hz	Size Ø DxL
(V)	(µF)	(Ω)	(mA _{rms})	(mm)
25 1E	150	1,420	140	8x10,5
	220	0,970	175	8x10,5
	330	0,640	220	8x10,5
	330	0,640	240	10x10,5
	470	0,450	280	10x10,5
35 1V	3,3	56,300	13	4x5,4
	4,7	39,530	14	4x5,4
	10	18,580	14	4x5,4
	10	18,580	21	5x5,4
	22	8,440	38	6,3x5,4
	33	5,630	42	6,3x5,4
	47	3,950	50	6,3x5,4
	47	3,950	70	6,3x7,7
	100	1,860	84	6,3x7,7
	100	1,860	120	8x10,5
	150	1,240	155	8x10,5
	220	0,840	190	8x10,5
	220	0,840	220	10x10,5
	330	0,560	245	10x10,5
	470	0,400	280	10x10,5
50 1H	0,1	1539,280	0,7	4x5,4
	0,22	699,670	1,6	4x5,4
	0,33	466,450	2,5	4x5,4
	0,47	327,510	3,5	4x5,4
	1	153,930	7,0	4x5,4
	2,2	69,970	11	4x5,4
	3,3	46,640	13	4x5,4
	4,7	32,750	13	4x5,4
	4,7	32,750	16	5x5,4
	10	15,390	24	6,3x5,4
	22	7,000	42	6,3x5,4
	22	7,000	51	6,3x7,7
	33	4,660	60	6,3x7,7
	47	3,280	63	6,3x7,7
	47	3,280	120	8x10,5
100	1,540	140	8x10,5	
100	1,540	170	10x10,5	
150	1,030	170	10x10,5	
220	1,000	220	10x10,5	
63 1J	0,1	1459,660	0,7	4x5,4
	0,22	663,480	1,6	4x5,4
	0,33	442,320	2,5	4x5,4
	0,47	310,570	3,5	4x5,4
	1	145,970	7,0	4x5,4
	2,2	66,350	11	4x5,4
	3,3	44,230	13	5x5,4
	4,7	31,060	16	5x5,4
	10	14,600	24	6,3x5,4
	10	14,600	39	6,3x7,7
100 2A	22	6,630	49	6,3x7,7
	22	6,630	98	8x10,5
	33	4,420	112	8x10,5
	47	3,110	119	8x10,5
	47	3,110	160	10x10,5
	100	1,460	196	10x10,5
	1	139,330	7,0	4x5,4
	2,2	63,330	14	6,3x5,4
	3,3	42,220	20	6,3x5,4
	3,3	42,220	32	6,3x7,7
4,7	29,640	21	6,3x5,4	
4,7	29,640	35	6,3x7,7	
10	13,930	35	6,3x7,7	
10	13,930	77	8x10,5	
22	6,330	84	8x10,5	
22	6,330	126	10x10,5	
33	4,220	133	10x10,5	
47	2,960	140	10x10,5	

Custom products are available on request.

Series CDVZ vZ

2 000 – 3 000h at 105°C

- Low Impedance at 105°C



Item	Characteristics							
Operating Temperature Range (°C)	-55 ~ +105							
Voltage Range (V)	6,3 ~ 50							
Capacitance Range (µF)	1 ~ 1500							
Leakage Current (20°C)	After 2 minutes application of rated voltage, leakage current is not more than 0,01CV or 3µA, whichever is greater.							
Capacitance Tolerance (20°C, 120Hz)	±20%							
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	6,3	10	16	25	35	50	
	Tan δ (max)	0,22	0,19	0,16	0,14	0,12	0,12	
Stability at Low Temperature (120Hz)	Rated Voltage (V)	6,3	10	16	25	35	50	
	Impedance Ratio (max)	Z _{-25°C} /Z _{+20°C}	3	2	2	2	2	2
		Z _{-55°C} /Z _{+20°C}	5	4	4	3	3	3
Resistance to Soldering Heat	After reflow soldering according to Reflow Soldering Condition and restored at room temperature, they meet the characteristics requirements listed at right.						Capacitance Change	Within ±10% of initial value
							Tan δ	Initial specified value or less
							Leakage Current	Initial specified value or less

	Useful Life	Load Life	Endurance Test	Shelf Life
Life Time	∅ ≤ 6 : 2 000h ∅ ≥ 8 : 3 000h	∅ ≤ 6 : 1 000h ∅ ≥ 8 : 2 000h	∅ ≤ 6 : 1 000h ∅ ≥ 8 : 2 000h	1 000h
Leakage Current	Not more than specified value	Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±50% of initial value	Within ±20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value	Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency	50Hz	120Hz	300Hz	1kHz	10kHz~100kHz
Coefficient	0,35	0,50	0,64	0,83	1,00

Temperature Coefficient

Temperature (°C)	+70	+85	+105
Factor	2,00	1,75	1,00

Ratings for Series CDVZ vz

V _{DC} Code	Rated Capacitance	Max Imp 20°C, 100 kHz	Max. Ripple Current 105°C, 100kHz	Size ∅ DxL
(V)	(µF)	(Ω)	(mArms)	(mm)
6,3 OJ	22	3,00	60	4x5,4
	33	3,00	60	4x5,4
	33	1,80	95	5x5,4
	47	3,00	60	4x5,4
	47	1,80	95	5x5,4
	68	1,80	95	5x5,4
	68	1,00	140	6,3x5,4
	100	1,80	95	5x5,4
	100	1,00	140	6,3x5,4
	150	1,00	140	6,3x5,4
	150	0,60	230	6,3x7,7
	220	1,00	140	6,3x5,4
	220	0,60	230	6,3x7,7
	330	0,60	230	6,3x7,7
	470	0,30	450	8x10,5
	680	0,30	450	8x10,5
1 000	0,30	450	8x10,5	
1 000	0,15	670	10x10,5	
1 500	0,15	670	10x10,5	
10 1A	22	3,00	60	4x5,4
	22	1,80	95	5x5,4
	33	3,00	60	4x5,4
	33	1,80	95	5x5,4
	47	1,80	95	5x5,4
	47	1,00	140	6,3x5,4
	68	1,00	140	6,3x5,4
	100	1,00	140	6,3x5,4
	100	0,60	230	6,3x7,7
	150	1,00	140	6,3x5,4
	150	0,60	230	6,3x7,7
	220	0,60	230	6,3x7,7
	330	0,30	450	8x10,5
	470	0,30	450	8x10,5
	680	0,15	670	10x10,5
	1 000	0,15	670	10x10,5
16 1C	10	3,00	60	4x5,4
	15	3,00	60	4x5,4
	15	1,80	95	5x5,4
	22	3,00	60	4x5,4
	22	1,80	95	5x5,4
	33	1,80	95	5x5,4
	33	1,00	140	6,3x5,4
	47	1,80	95	5x5,4
	47	1,00	140	6,3x5,4
	68	1,00	140	6,3x5,4
	68	0,60	230	6,3x7,7
	100	1,00	140	6,3x5,4
	100	0,60	230	6,3x7,7
	150	0,60	230	6,3x7,7
	220	0,60	230	6,3x7,7
	220	0,30	450	8x10,5
	330	0,30	450	8x10,5
	330	0,15	670	10x10,5
	470	0,30	450	8x10,5
	470	0,15	670	10x10,5
680	0,15	670	10x10,5	
1 000	0,15	670	10x10,5	

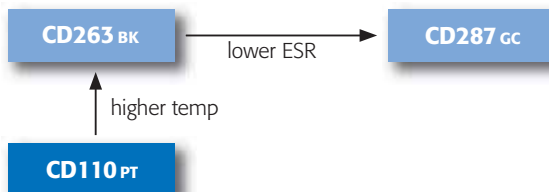
V _{DC} Code	Rated Capacitance	Max Imp 20°C, 100 kHz	Max. Ripple Current 105°C, 100kHz	Size ∅ DxL
(V)	(µF)	(Ω)	(mArms)	(mm)
25 1E	4,7	3,00	60	4x5,4
	6,8	3,00	60	4x5,4
	10	3,00	60	4x5,4
	10	1,80	95	5x5,4
	15	1,80	95	5x5,4
	22	1,80	95	5x5,4
	22	1,00	140	6,3x5,4
	33	1,80	95	5x5,4
	33	1,00	140	6,3x5,4
	47	1,00	140	6,3x5,4
	47	0,60	230	6,3x7,7
	68	0,60	230	6,3x7,7
	100	0,60	230	6,3x7,7
	150	0,60	230	6,3x7,7
	150	0,30	450	8x10,5
	220	0,30	450	8x10,5
330	0,30	450	8x10,5	
330	0,15	670	10x10,5	
470	0,15	670	10x10,5	
35 1V	1	3,00	60	4x5,4
	1,5	3,00	60	4x5,4
	2,2	3,00	60	4x5,4
	3,3	3,00	60	4x5,4
	4,7	3,00	60	4x5,4
	6,8	1,80	95	5x5,4
	10	3,00	60	4x5,4
	10	1,80	95	5x5,4
	15	1,80	95	5x5,4
	22	1,80	95	5x5,4
	22	1,00	140	6,3x5,4
	33	1,00	140	6,3x5,4
	47	1,00	140	6,3x5,4
	47	0,60	230	6,3x7,7
	68	0,60	230	6,3x7,7
	100	0,30	450	8x10,5
150	0,30	450	8x10,5	
220	0,30	450	8x10,5	
220	0,15	670	10x10,5	
330	0,15	670	10x10,5	
470	0,15	670	10x10,5	
50 1H	1	5,00	30	4x5,4
	1,5	5,00	30	4x5,4
	2,2	5,00	30	4x5,4
	3,3	5,00	30	4x5,4
	4,7	3,00	50	5x5,4
	6,8	2,00	70	6,3x5,4
	10	2,00	70	6,3x5,4
	15	2,00	70	6,3x5,4
	22	2,00	70	6,3x5,4
	22	1,00	120	6,3x7,7
	33	1,00	120	6,3x7,7
	47	1,00	120	6,3x7,7
	68	0,60	300	8x10,5
	100	0,60	300	8x10,5
	150	0,30	500	10x10,5
	220	0,30	500	10x10,5

Custom products are available on request.

Series CD110 PT

3 000 - 4 000h at 85°C

- Standard 85°C



Item	Characteristics																									
Operating Temperature Range (°C)	-40 ~ +85																									
Capacitance Tolerance (20°C, 120Hz)	±20%																									
Leakage Current (µA)	Rated Voltage (V)	6,3 - 100 160 - 450																								
	-	0,03CV or 4 whichever is greater. (at 20°C, after 1 minute) 0,03CV + 10 (at 20°C, after 2 minutes)																								
C: Nominal Capacitance (µF) V: Rated Voltage (V)																										
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	6,3 10 16 25 35 50 63 100 160 200 250 350 400 450																								
	tan δ	0,22 0,19 0,16 0,14 0,12 0,10 0,09 0,08 0,12 0,12 0,15 0,15 0,20 0,23																								
when nominal capacitance is over 1 000µF tan δ shall be added 0,02 to the listed value with increase of every 1 000µF																										
Temperature Stability (120Hz)	Rated Voltage (V)	6,3 10 16 25 35 50 63 100 160 200 250 350 400 450																								
	Impedance Ratio	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td>$Z_{-25°C}/Z_{+20°C}$</td> <td>4</td> <td>3</td> <td colspan="3">2</td> <td colspan="3">3</td> <td colspan="3">6</td> </tr> <tr> <td>$Z_{-40°C}/Z_{+20°C}$</td> <td>8</td> <td>6</td> <td>4</td> <td colspan="3">3</td> <td colspan="3">8</td> <td colspan="3">-</td> </tr> </table>	$Z_{-25°C}/Z_{+20°C}$	4	3	2			3			6			$Z_{-40°C}/Z_{+20°C}$	8	6	4	3			8			-	
$Z_{-25°C}/Z_{+20°C}$	4	3	2			3			6																	
$Z_{-40°C}/Z_{+20°C}$	8	6	4	3			8			-																

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	∅ ≤ 8 : 3 000h ∅ ≥ 10 : 4 000h	∅ ≤ 8 : 35 000h ∅ ≥ 10 : 50 000h	2 000h	2 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±50% of initial value		Within ±20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 150% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)					
	CV (µF,V)	50, 60	120	1K	10K	100K
6,3 ~ 16	-	0,80	1,00	1,10	1,20	1,20
25 ~ 35	≤ 1 000	0,80	1,00	1,50	1,70	1,70
	> 1 000	0,80	1,00	1,20	1,30	1,30
50 ~ 100	≤ 1 000	0,80	1,00	1,60	1,90	1,90
	> 1 000	0,80	1,00	1,20	1,30	1,30
160 ~ 450	-	0,80	1,00	1,30	1,50	1,60

Temperature Coefficient

Temperature (°C)	+70	+85
Factor	1,35	1,00

Ratings for Series CD110 PT

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Ripple Current at 85°C 120Hz	Size Ø DxL
(V)	(µF)	(Ω)	(mArms)	(mm)
6.3 (7.2) 0J	33	10,616	60	5x11
	47	7,454	70	5x11
	100	3,503	100	5x11
	220	1,592	200	5x11
	220	1,592	170	6,3x11
	330	1,062	270	6,3x11
	470	0,745	322	6,3x11
	470	0,745	300	8x11,5
	1000	0,350	546	8x11,5
	1000	0,350	530	10x12,5
	2200	0,159	1010	10x20
	2200	0,159	990	12,5x20
	3300	0,106	1230	10x20
	3300	0,106	1150	12,5x20
	4700	0,075	1710	12,5x20
10 (13) 1A	4700	0,075	1700	16x25
	6800	0,052	1930	12,5x25
	6800	0,052	1900	16x25
	10000	0,035	2450	16x25
	15000	0,023	2860	16x35,5
	15000	0,023	2900	18x35,5
	33	9,168	65	5x11
	47	6,437	99	5x11
	100	3,025	146	5x11
	220	1,375	240	6,3x11
	330	0,917	290	6,3x11
	330	0,917	270	8x11,5
	470	0,644	417	8x11,5
	1000	0,303	650	10x12,5
	2200	0,138	1080	10x20
2200	0,138	1050	12,5x20	
3300	0,092	1430	12,5x20	
4700	0,064	1780	12,5x25	
4700	0,064	1800	16x25	
6800	0,044	2220	16x25	
10000	0,030	2700	16x35,5	
10000	0,030	2750	18x35,5	
16 (20) 1C	10	25,480	50	5x11
	22	11,580	75	5x11
	33	7,720	92	5x11
	47	5,420	110	5x11
	100	2,550	160	5x11
	100	2,550	140	6,3x11
	220	1,160	264	6,3x11
	220	1,160	240	8x11,5
	330	0,770	383	8x11,5
	470	0,540	457	8x11,5
	470	0,540	420	10x12,5
	1000	0,250	791	10x16
	2200	0,120	1350	12,5x20
	3300	0,080	1690	12,5x25
	3300	0,080	1650	16x25
4700	0,540	2100	16x25	
6800	0,037	2580	16x35,5	
6800	0,037	2600	18x35,5	
10000	0,025	3130	18x35,5	
25 (32) 1E	4,7	47,430	38	5x11
	10	22,300	55	5x11
	22	10,130	82	5x11
	33	6,760	100	5x11
	47	4,743	118	5x11
	100	2,229	199	6,3x11
	220	1,013	349	8x11,5
	330	0,676	510	10x12,5
	470	0,474	545	10x12,5
	1000	0,223	996	10x20
	1000	0,223	1000	12,5x20
	2200	0,101	1660	12,5x25
	2200	0,101	1500	16x25
	3300	0,068	2030	16x25
	4700	0,047	2650	16x31,5
4700	0,047	2450	18x35,5	
35 (44) 1V	4,7	40,660	40	5x11
	10	19,110	59	5x11
	22	8,686	87	5x11
	33	5,790	107	5x11

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Ripple Current at 85°C 120Hz	Size Ø DxL
(V)	(µF)	(Ω)	(mArms)	(mm)
35 (44) 1V	47	4,066	130	5x11
	47	4,066	110	6,3x11
	100	1,911	214	6,3x11
	100	1,911	190	8x11,5
	220	0,869	443	10x12,5
	330	0,579	542	10x12,5
	470	0,407	664	10x16
	1000	0,191	1210	12,5x20
	2200	0,087	1950	16x25
	3300	0,058	2510	16x35,5
	3300	0,058	2250	18x35,5
	4700	0,041	2990	18x35,5
	0,1	1592,400	3	5x11
	0,22	723,800	6	5x11
	0,33	482,600	9	5x11
50 (63) 1H	0,47	338,800	13	5x11
	1	159,300	21	5x11
	2,2	72,400	31	5x11
	3,3	48,300	38	5x11
	4,7	33,900	45	5x11
	10	15,930	66	5x11
	22	7,240	98	5x11
	33	4,825	126	5x11
	33	4,825	100	6,3x11
	47	3,388	155	6,3x11
	100	1,592	260	8x11,5
	220	0,724	443	10x12,5
	330	0,483	595	10x16
	470	0,339	887	12,5x20
	1000	0,159	1400	12,5x25
1000	0,159	1350	16x25	
2200	0,072	2340	16x35,5	
2200	0,072	2100	18x35,5	
3300	0,048	2810	18x35,5	
63 (79) 1J	4,7	30,500	45	5x11
	10	14,330	66	5x11
	22	6,514	100	5x11
	33	4,343	140	6,3x11
	47	3,049	170	6,3x11
	47	3,049	150	8x11,5
	100	1,433	300	10x12,5
	220	0,651	470	10x16
	330	0,434	710	10x20
	330	0,434	650	12,5x20
	470	0,305	900	12,5x20
	1000	0,143	1300	16x25
	1000	0,143	1550	16x31,5
	0,1	1274,000	2,1	5x11
	0,22	580,000	4,7	5x11
0,33	386,000	7	5x11	
0,47	271,000	10	5x11	
1	127,400	21	5x11	
2,2	57,900	30	5x11	
3,3	38,600	40	5x11	
4,7	27,100	45	5x11	
100 (125) 2A	10	12,740	75	6,3x11
	22	5,790	130	6,3x11
	22	5,790	110	8x11,5
	33	3,860	180	8x11,5
	33	3,860	160	10x12,5
	47	2,710	230	10x12,5
	100	1,274	370	10x20
	100	1,274	380	12,5x20
	220	0,579	620	12,5x25
	220	0,579	720	16x25
	330	0,386	760	16x25
	470	0,271	1000	16x25
	470	0,271	1150	16x31,5
	1000	0,127	1380	18x40
	160 (200) 2C	0,47	406,600	15
1		191,100	22	6,3x11
2,2		86,900	32	6,3x11
3,3		57,900	40	6,3x11
3,3		57,900	35	8x11,5
4,7	40,660	48	6,3x11	
4,7	40,660	40	8x11,5	

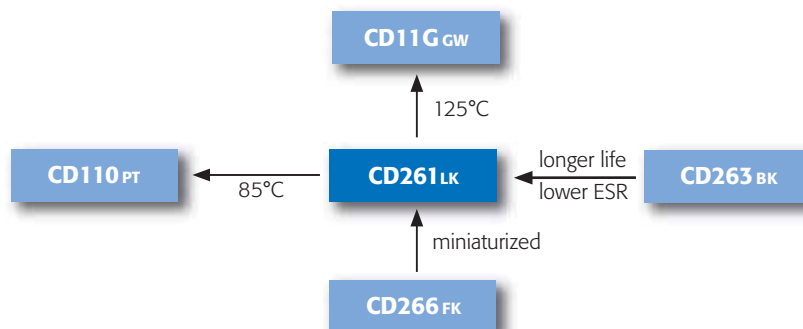
V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Ripple Current at 85°C 120Hz	Size Ø DxL	
(V)	(µF)	(Ω)	(mArms)	(mm)	
160 (200) 2C	10	19,110	81	8x11,5	
	10	19,110	70	10x12,5	
	22	8,690	151	10x16	
	33	5,790	202	10x20	
	47	4,066	266	12,5x20	
	100	1,911	422	12,5x25	
	100	1,911	400	16x25	
	220	0,869	730	16x31,5	
	220	0,869	730	18x35,5	
	330	0,579	1080	18x31,5	
	0,47	406,600	15	6,3x11	
	1	191,100	22	6,3x11	
	2,2	86,900	32	6,3x11	
	3,3	57,900	40	6,3x11	
	200 (250) 2D	3,3	57,900	35	8x11,5
4,7		40,660	56	8x11,5	
4,7		40,660	50	10x12,5	
10		19,110	94	8x11,5	
10		19,110	75	10x16	
22		8,690	170	10x16	
33		5,790	223	12,5x20	
47		4,066	265	12,5x20	
100		1,911	483	16x25	
220		0,869	882	18x35,5	
0,47		508,200	15	6,3x11	
1		238,900	22	6,3x11	
2,2		108,600	32	6,3x11	
3,3		72,400	48	8x11,5	
250 (300) 2E		3,3	72,400	35	10x12,5
	4,7	50,820	56	8x11,5	
	4,7	50,820	40	10x12,5	
	10	23,890	101	10x16	
	22	10,860	182	12,5x20	
	33	7,238	243	12,5x25	
	47	5,082	295	12,5x25	
	47	5,082	240	16x25	
	100	2,389	528	16x31,5	
	100	2,389	440	18x35,5	
	0,47	508,200	15	6,3x11	
	1	238,900	22	6,3x11	
	1	238,900	15	8x11,5	
	2,2	108,600	38	8x11,5	
	350 (400) 2V	2,2	108,600	30	10x12,5
3,3		72,400	53	10x12,5	
4,7		50,800	65	10x12,5	
10		23,890	115	10x20	
22		10,860	197	12,5x25	
33		7,238	277	16x25	
47		5,082	330	16x25	
100		2,389	507	18x31,5	
0,47		508,200	15	6,3x11	
1		238,900	22	6,3x11	
1		238,900	15	8x11,5	
2,2		144,800	38	8x11,5	
2,2		144,800	20	10x12,5	
3,3		96,500	54	10x12,5	
400 (450) 2G		4,7	67,800	71	10x16
	10	31,850	123	12,5x20	
	22	14,480	197	12,5x25	
	22	14,480	140	16x25	
	33	9,650	277	16x25	
	47	6,780	361	16x31,5	
	47	6,780	260	18x35,5	
	1	318,500	25	8x11,5	
	1	318,500	15	10x12,5	
	2,2	144,800	38	8x11,5	
	2,2	144,800	20	10x12,5	
	3,3	96,500	54	10x12,5	
	450 (500) 2W	4,7	77,900	76	10x20
		10	36,600	123	12,5x20
		22	16,650	226	16x25
33		11,100	304	16x31,5	
33		11,100	200	18x35,5	
47		7,792	380	16x35,5	

Custom products are available on request.

Series CD261 LK

- High Reliability
- Power Supplies
- Electronic Lighting Ballast
- General Industry

8 000 – 10 000h at 105°C



Item	Characteristics							
Operating Temperature Range (°C)	-25 ~ +105							
Rated Voltage Range (V)	160~500							
Capacitance Tolerance (20°C, 120Hz)	±20%							
Leakage Current (µA) (20°C)	After 1 Minute: $I_L \leq 0,04CV + 100$ C: Nominal Capacitance (µF) V: Rated Voltage (V)							
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	160	200	250	350	400	450	500
	tan δ	0,15	0,15	0,15	0,20	0,20	0,20	0,20
Temperature Stability (Impedance Ratio 120Hz)	Wv(v)	160	200	250	350	400	450	500
	$Z_{-25^\circ\text{C}}/Z_{+20^\circ\text{C}}$	3	3	4	6	6	6	6

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	$\emptyset \leq 10$: 8000h $\emptyset \geq 12$: 10000h	> 200000h	$\emptyset \leq 10$: 8000h $\emptyset \geq 12$: 10000h	$\emptyset \leq 10$: 6000h $\emptyset \geq 12$: 8000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±30% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 300% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz)	50	120	1K	10K	100K
Coefficient	0,30	0,50	0,80	0,90	1,00

Temperature Coefficient

Temperature (°C)	≤65	85	105
Coefficient	2,1	1,7	1,0

Ratings for Series CD261 LK

V _{DC} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Ripple Current 105°C 100kHz	Size Ø DxL
(V)	(µF)	(Ω)	(mA _{rms})	(mm)
160 (200) 2C	10	23,885	250	10x16
	22	10,857	500	10x20
	33	7,238	500	10x20
	47	5,082	660	12,5x20
	68	3,513	760	12,5x25
	68	3,513	760	16x20
	100	2,389	1 120	16x25
	100	2,389	1 120	18x20
	150	1,592	1 360	16x31,5
	150	1,592	1 360	18x25
	220	1,086	1 400	16x31,5
	220	1,086	1 400	18x25
200 (250) 2D	10	23,885	250	10x16
	22	10,857	500	10x20
	33	7,238	600	12,5x20
	47	5,082	660	12,5x20
	68	3,513	760	12,5x25
	68	3,513	760	16x20
	100	2,389	1 120	16x25
	100	2,389	1 120	18x20
	150	1,592	1 360	16x31,5
	150	1,592	1 360	18x25
	220	1,086	1 700	18x31,5
	250 (300) 2E	10	23,885	280
22		10,857	600	12,5x20
33		7,238	600	12,5x20
47		5,082	720	12,5x25
47		5,082	720	16x20
68		3,513	920	16x25
68		3,513	920	18x20
100		2,389	1 200	16x31,5
100		2,389	1 200	18x25
150		1,592	1 500	18x31,5

V _{DC} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Ripple Current 105°C 100kHz	Size Ø DxL	
(V)	(µF)	(Ω)	(mA _{rms})	(mm)	
350 (400) 2V	6,8	46,834	220	10x16	
	10	31,847	280	10x20	
	22	14,476	350	12,5x20	
	33	9,651	500	16x20	
	47	6,776	660	16x25	
	47	6,776	660	18x20	
	68	4,683	850	16x31,5	
	68	4,683	850	18x25	
	400 (450) 2G	6,8	46,834	220	10x16
10		31,847	280	10x20	
22		14,476	430	12,5x25	
22		14,476	430	16x20	
33		9,651	640	16x25	
33		9,651	640	18x20	
47		6,776	840	16x31,5	
47		6,776	840	18x25	
68		4,683	1 000	18x31,5	
450 (500) 2W	6,8	46,834	150	10x20	
	10	31,847	320	12,5x20	
	22	14,476	560	16x25	
	22	14,476	560	18x20	
	33	9,651	700	16x31,5	
	33	9,651	700	18x25	
	47	6,776	880	18x31,5	
	500 (550) 2H	6,8	56,200	165	12,5x20
		10	38,210	350	12,5x25
22		17,370	610	16,5x31,5	
22		17,370	615	18x25	
33		11,580	800	18x35,5	

Custom products are available on request.

Series CD263 BK

2 000 – 3 000h at 105°C

- Standard 105°C



Item	Characteristics																																																									
Operating Temperature Range (°C)	-55 ~ +105	-40 ~ +105																																																								
Rated Voltage Range (V)	6,3~100	160~450																																																								
Capacitance Tolerance (20°C, 120Hz)	±20%																																																									
Leakage Current (µA)	0,01CV or 3µA whichever is greater (at 20°C after 2 minutes)																																																									
	CV≤1000:0,1 CV+40 (at 20°C after 1 minute) CV>1000:0,04 CV+100 (at 20°C after 1 minute)																																																									
C: Nominal Capacitance (µF); V: Rated Voltage (V)																																																										
Dissipation Factor (20°C, 120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6,3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>tan δ</td> <td>0,22</td> <td>0,19</td> <td>0,16</td> <td>0,14</td> <td>0,12</td> <td>0,10</td> <td>0,09</td> <td>0,08</td> <td>0,15</td> <td>0,15</td> <td>0,15</td> <td>0,20</td> <td>0,20</td> <td>0,20</td> </tr> </tbody> </table>														Rated Voltage (V)	6,3	10	16	25	35	50	63	100	160	200	250	350	400	450	tan δ	0,22	0,19	0,16	0,14	0,12	0,10	0,09	0,08	0,15	0,15	0,15	0,20	0,20	0,20														
	Rated Voltage (V)	6,3	10	16	25	35	50	63	100	160	200	250	350	400	450																																											
tan δ	0,22	0,19	0,16	0,14	0,12	0,10	0,09	0,08	0,15	0,15	0,15	0,20	0,20	0,20																																												
when normal capacitance is over 1 000µF tan δ shall be added 0,02 to the listed value with increase of every 1 000µF																																																										
Temperature Stability (120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6,3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160</th> <th>200</th> <th>250</th> <th>350</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td colspan="2">$Z_{-25°C}/Z_{+20°C}$</td> <td colspan="2">4</td> <td colspan="2">3</td> <td colspan="4">2</td> <td colspan="4">3</td> </tr> <tr> <td colspan="2">$Z_{-40°C}/Z_{+20°C}$</td> <td colspan="2">8</td> <td colspan="2">6</td> <td colspan="2">4</td> <td colspan="2">3</td> <td colspan="2">8</td> <td colspan="2">6</td> </tr> </tbody> </table>														Rated Voltage (V)	6,3	10	16	25	35	50	63	100	160	200	250	350	400	450	Impedance Ratio	$Z_{-25°C}/Z_{+20°C}$		4		3		2				3				$Z_{-40°C}/Z_{+20°C}$		8		6		4		3		8		6	
	Rated Voltage (V)	6,3	10	16	25	35	50	63	100	160	200	250	350	400	450																																											
	Impedance Ratio	$Z_{-25°C}/Z_{+20°C}$		4		3		2				3																																														
$Z_{-40°C}/Z_{+20°C}$		8		6		4		3		8		6																																														

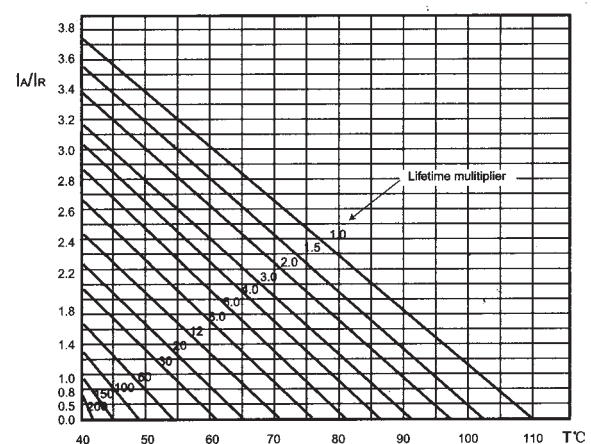
	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	$\emptyset \leq 8$: 2 000h $\emptyset \geq 10$: 3 000h	> 100 000h	$\emptyset \leq 8$: 1 000h $\emptyset \geq 10$: 2 000h	2 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 150% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)		50, 60	120	1K	10K	100K
	Capacitance (µF)						
6,3 ~ 16	0,1 ~ 4,7		-	0,40	0,70	0,80	1,00
	10 ~ 47		-	0,50	0,80	0,90	1,00
	100 ~ 220		-	0,70	0,90	0,90	1,00
	330 ~ 1 000		-	0,80	0,90	1,00	1,00
	2 200 ~ 15 000		-	0,90	1,00	1,00	1,00
160 ~ 450	0,47 ~ 220		0,80	1,00	1,30	1,40	1,60

Life Time Diagram



I_w = actual ripple current at 100 KHz
 I_r = rated ripple current at 100Hz or 100KHz, 105°C

Ratings for Series CD263 BK

V _{DC} (Surge Voltage) Code	Capacitance	ESR 20°C, 100kHz	Max. Impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
6,3 (7,2) 0J	33	10,62	2,500	5,000	105	5x11
	47	7,45	1,500	3,000	120	5x11
	100	3,50	1,200	2,400	130	5x11
	220	2,03	1,200	2,400	180	5x11
	220	1,59	0,870	1,740	180	6,3x11
	330	1,06	0,580	1,160	220	6,3x11
	470	0,95	0,550	1,100	250	6,3x11
	470	0,75	0,390	0,780	315	8x11,5
	1000	0,45	0,370	0,740	435	8x11,5
	1000	0,35	0,230	0,460	500	10x12,5
	2200	0,20	0,140	0,280	720	10x20
	2200	0,16	0,095	0,190	1000	12,5x20
	3300	0,14	0,120	0,240	882	10x20
	3300	0,11	0,090	0,180	1050	12,5x20
	4700	0,09	0,090	0,180	1120	12,5x20
	4700	0,07	0,061	0,122	1670	16x25
	6800	0,07	0,090	0,180	1380	12,5x20
	6800	0,05	0,056	0,112	1740	16x25
	10000	0,04	0,061	0,122	1750	16x25
	10000	0,04	0,045	0,090	2110	16x31,5
15000	0,03	0,042	0,084	2040	16x35,5	
15000	0,02	0,036	0,072	2580	18x35,5	
10 (13) 1A	22	13,75	2,500	5,000	92	5x11
	33	9,17	1,900	3,800	105	5x11
	47	6,44	1,500	3,000	120	5x11
	100	3,03	1,200	2,400	130	5x11
	220	1,38	0,580	1,160	220	6,3x11
	330	1,16	0,540	1,080	230	6,3x11
	330	0,92	0,470	0,940	265	8x11,5
	470	0,64	0,390	0,780	315	8x11,5
	1000	0,38	0,250	0,500	500	10x12,5
	1000	0,30	0,180	0,360	615	10x16
	2200	0,17	0,170	0,340	761	10x20
	2200	0,14	0,090	0,180	1050	12,5x20
	3300	0,12	0,086	0,172	1010	12,5x20
	3300	0,09	0,068	0,136	1300	12,5x25
	4700	0,08	0,068	0,136	1250	12,5x25
	4700	0,06	0,056	0,112	1740	16x25
	6800	0,06	0,056	0,112	1570	16x25
	6800	0,04	0,045	0,090	2110	16x31,5
	10000	0,04	0,042	0,084	1910	16x35,5
	10000	0,03	0,036	0,072	2580	18x35,5
16 (20) 1C	10	25,48	2,500	5,000	92	5x11
	22	11,58	1,900	3,800	105	5x11
	33	7,72	1,500	3,000	120	5x11
	47	5,42	1,200	2,400	130	5x11
	100	3,18	1,200	2,400	150	5x11
	100	2,55	0,580	1,160	220	6,3x11
	220	1,45	0,540	1,080	250	6,3x11
	220	1,16	0,470	0,940	290	8x11,5
	330	0,77	0,390	0,780	315	8x11,5
	470	0,68	0,660	1,320	350	8x11,5
	470	0,54	0,230	0,460	500	10x12,5
	1000	0,32	0,210	0,420	610	10x16
	1000	0,25	0,120	0,240	825	10x20
	2200	0,14	0,095	0,190	961	12,5x20
	2200	0,12	0,068	0,136	1300	12,5x25
	3300	0,10	0,068	0,136	1200	12,5x25
	3300	0,08	0,056	0,112	1740	16x25
	4700	0,07	0,052	0,104	1490	16x25
	4700	0,05	0,045	0,090	2110	16x31,5
	6800	0,05	0,042	0,084	1830	16x35,5
6800	0,04	0,036	0,072	2580	18x35,5	

V _{DC} (Surge Voltage) Code	Capacitance	ESR 20°C, 100kHz	Max. Impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL	
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)			
25 (32) 1E	4,7	47,43	3,000	6,000	85	5x11	
	10	22,29	2,500	5,000	92	5x11	
	22	10,13	1,900	3,800	105	5x11	
	33	6,76	1,500	3,000	120	5x11	
	47	4,74	1,200	2,400	130	5x11	
	100	2,23	0,580	1,160	220	6,3x11	
	220	1,01	0,390	0,780	315	8x11,5	
	330	0,68	0,230	0,460	500	10x12,5	
	470	0,54	0,210	0,420	429	10x12,5	
	470	0,47	0,180	0,360	615	10x16	
	1000	0,25	0,120	0,240	705	10x20	
	1000	0,22	0,090	0,180	1050	12,5x20	
	2200	0,12	0,068	0,136	1180	12,5x25	
	2200	0,10	0,056	0,112	1740	16x25	
	3300	0,08	0,056	0,112	1440	16x25	
	3300	0,07	0,045	0,090	2110	16x31,5	
	4700	0,05	0,050	0,100	1880	16x31,5	
	4700	0,05	0,036	0,072	2580	18x35,5	
	35 (44) 1V	4,7	40,66	2,500	5,000	92	5x11
		10	19,11	1,800	3,600	105	5x11
22		8,69	1,500	3,000	120	5x11	
33		5,79	1,500	3,000	130	5x11	
47		4,74	1,700	3,400	90	5x11	
47		4,07	0,580	1,160	220	6,3x11	
100		2,23	0,800	1,600	151	6,3x11	
100		1,91	0,390	0,780	315	8x11,5	
220		0,87	0,230	0,460	500	10x12,5	
330		0,68	0,250	0,500	384	10x12,5	
330		0,58	0,180	0,360	615	10x16	
470		0,47	0,210	0,420	470	10x16	
470		0,41	0,120	0,240	825	10x20	
1000		0,22	0,095	0,190	857	12,5x20	
1000		0,19	0,068	0,136	1300	12,5x25	
2200		0,10	0,056	0,112	1380	16x25	
2200		0,09	0,045	0,090	2110	16x31,5	
3300		0,07	0,042	0,084	1780	16x35,5	
3300		0,06	0,036	0,072	2580	18x35,5	
4700		0,05	0,036	0,072	2120	18x35,5	
50 (63) 1H	0,10	1592,4	18,000	45,000	10	5x11	
	0,22	723,80	13,000	32,500	15	5x11	
	0,33	482,53	10,000	25,000	18	5x11	
	0,47	338,80	7,000	17,500	23	5x11	
	1	159,24	4,900	12,250	35	5x11	
	2,2	72,38	4,200	10,500	53	5x11	
	3,3	48,25	3,900	9,750	65	5x11	
	4,7	33,88	3,600	9,000	82	5x11	
	10	15,92	2,700	6,750	100	5x11	
	22	7,24	1,900	4,750	125	5x11	
	33	5,79	1,900	4,750	90	5x11	
	33	4,83	1,100	2,750	195	6,3x11	
	47	3,39	0,900	2,250	245	6,3x11	
	100	1,59	0,500	1,250	385	8x11,5	
	220	0,87	0,380	0,950	314	10x12,5	
	220	0,72	0,270	0,675	505	10x16	
	330	0,58	0,270	0,675	421	10x16	
	330	0,48	0,180	0,450	675	10x20	
	470	0,34	0,120	0,300	895	12,5x20	
	1000	0,19	0,120	0,300	1000	12,5x25	
1000	0,16	0,076	0,190	1495	16x25		
2200	0,09	0,065	0,163	1660	16x35,5		
2200	0,07	0,050	0,125	2190	18x35,5		
3300	0,06	0,055	0,138	1990	18x35,5		

Custom products are available on request.

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
63 (79) 1J	4,7	30,49	5,800	17,400	74	5x11
	10	14,33	3,600	10,800	95	5x11
	22	6,51	2,100	6,300	130	6,3x11
	33	4,34	1,700	5,100	160	6,3x11
	47	3,39	1,800	5,400	120	6,3x11
	47	3,05	1,200	3,600	305	8x11,5
	100	1,43	0,650	1,950	395	10x12,5
	220	0,72	0,480	1,440	335	10x16
	220	0,65	0,320	0,960	505	10x20
	330	0,48	0,320	0,960	510	10x20
	330	0,43	0,220	0,660	660	12,5x20
	470	0,34	0,220	0,660	640	12,5x20
	470	0,30	0,160	0,480	850	12,5x25
	1000	0,16	0,130	0,390	930	16x25
1000	0,14	0,098	0,294	1430	16x31,5	
100 (125) 2A	0,10	1273,90	25,000	100,000	1,5	5x11
	0,22	579,04	21,000	84,000	3,4	5x11
	0,33	386,03	18,000	72,000	5	5x11
	0,47	271,04	13,000	52,000	30	5x11
	1	127,39	11,000	44,000	45	5x11
	2,2	57,90	9,200	36,800	60	5x11
	3,3	38,60	7,200	28,800	67	5x11
	4,7	27,10	6,300	25,200	75	5x11
	10	12,74	3,300	13,200	110	6,3x11
	22	5,79	3,500	14,000	93	6,3x11
	22	5,79	1,400	5,600	165	8x11,5
	33	3,86	1,500	6,000	130	8x11,5
	33	3,86	0,940	3,760	305	10x12,5
	47	2,71	1,100	4,400	165	10x12,5
	47	2,71	0,680	2,720	320	10x16
	100	1,27	0,500	2,000	265	10x20
	100	1,27	0,280	1,120	585	12,5x20
	220	0,58	0,220	0,880	440	12,5x25
	220	0,58	0,160	0,640	1120	16x25
	330	0,39	0,130	0,520	1290	16x25
470	0,27	0,150	0,600	715	16x25	
470	0,27	0,110	0,440	1350	16x31,5	

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Impedance		Ripple Current 105°C, 120Hz	Size ∅ DxL
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
160 (200) 2C	0,47	508,20	—	—	12	6,3x11
	1	238,85	—	—	18	6,3x11
	2,2	108,57	—	—	26	6,3x11
	3,3	96,51	—	—	28	6,3x11
	3,3	72,38	—	—	37	8x11,5
	4,7	67,76	—	—	34	6,3x11
	4,7	50,82	—	—	44	8x11,5
	10	31,85	—	—	58	8x11,5
	10	23,89	—	—	75	10x12,5
	22	14,48	—	—	107	10x16
	22	10,86	—	—	135	10x20
	33	9,65	—	—	143	10x20
	33	7,24	—	—	175	12,5x20
	47	5,08	—	—	230	12,5x25
	100	3,18	—	—	299	12,5x25
	100	2,39	—	—	330	16x25
	220	1,45	—	—	554	16x31,5
	220	1,09	—	—	500	18x35,5
	330	0,97	—	—	764	18x35,5
	200 (250) 2D	0,47	508,20	—	—	12
1		238,85	—	—	18	6,3x11
2,2		108,57	—	—	26	6,3x11
3,3		96,51	—	—	28	6,3x11
3,3		72,38	—	—	37	8x11,5
4,7		67,76	—	—	40	8x11,5
4,7	50,82	—	—	50	10x12,5	

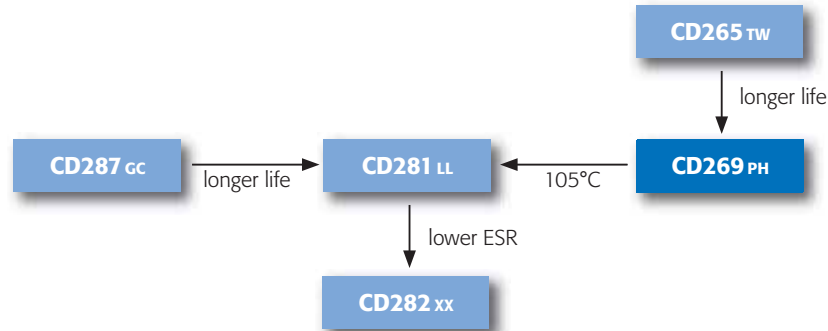
V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Impedance		Ripple Current 105°C, 120Hz	Size ∅ DxL
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
200 (250) 2D	10	31,85	—	—	66	10x12,5
	10	23,89	—	—	80	10x16
	22	10,86	—	—	135	10x20
	33	9,65	—	—	160	12,5x20
	33	7,24	—	—	190	12,5x25
	47	6,78	—	—	188	12,5x20
	47	5,08	—	—	230	12,5x25
	100	3,18	—	—	342	16x25
	100	2,39	—	—	360	16x31,5
	220	1,45	—	—	624	18x35,5
	220	1,09	—	—	525	18x40
	0,47	508,20	—	—	12	6,3x11
	1	238,85	—	—	18	6,3x11
	2,2	144,76	—	—	23	6,3x11
2,2	108,57	—	—	30	8x11,5	
3,3	96,51	—	—	34	8x11,5	
3,3	72,38	—	—	43	10x12,5	
4,7	67,76	—	—	40	8x11,5	
4,7	50,82	—	—	50	10x12,5	
10	31,85	—	—	74	10x16	
10	23,89	—	—	90	10x20	
22	14,48	—	—	130	12,5x20	
22	10,86	—	—	155	12,5x25	
33	7,24	—	—	190	12,5x25	
47	6,78	—	—	205	12,5x25	
47	5,08	—	—	225	16x25	
100	3,18	—	—	374	16x31,5	
100	2,39	—	—	340	18x35,5	
350 (400) 2V	0,47	677,60	—	—	11	6,3x11
	1	382,17	—	—	16	6,3x11
	2,2	173,71	—	—	27	8x11,5
	3,3	96,51	—	—	36	10x12,5
	4,7	81,31	—	—	45	10x12,5
	4,7	67,76	—	—	47	10x16
	10	31,85	—	—	79	10x20
	22	14,48	—	—	130	12,5x25
	33	9,65	—	—	160	16x25
	47	8,13	—	—	234	16x25
	47	6,78	—	—	210	16x31,5
	1	382,17	—	—	16	6,3x11
	1	318,47	—	—	18	8x11,5
	2,2	173,71	—	—	27	8x11,5
2,2	144,76	—	—	30	10x12,5	
3,3	115,81	—	—	38	10x12,5	
3,3	96,51	—	—	40	10x16	
4,7	81,31	—	—	38	10x16	
4,7	67,76	—	—	52	10x20	
10	31,85	—	—	79	12,5x20	
22	17,37	—	—	140	12,5x25	
22	14,48	—	—	130	16x25	
33	11,58	—	—	196	16x25	
33	9,65	—	—	175	16x31,5	
47	8,13	—	—	256	16x31,5	
47	6,78	—	—	220	18x35,5	
400 (450) 2G	1	382,17	—	—	18	8x11,5
	1	318,47	—	—	19	10x12,5
	2,2	173,71	—	—	31	10x12,5
	2,2	144,76	—	—	29	10x16
	3,3	115,81	—	—	42	10x16
	3,3	96,51	—	—	35	10x20
	4,7	81,31	—	—	54	10x20
	4,7	67,76	—	—	50	12,5x20
	10	38,22	—	—	87	12,5x20
	10	31,85	—	—	75	12,5x25
	22	17,37	—	—	160	16x25
	22	14,48	—	—	110	16x31,5
	33	11,58	—	—	215	16x31,5
	33	9,65	—	—	150	18x35,5
450 (500) 2W	1	382,17	—	—	18	8x11,5
	1	318,47	—	—	19	10x12,5
	2,2	173,71	—	—	31	10x12,5
	2,2	144,76	—	—	29	10x16
	3,3	115,81	—	—	42	10x16
	3,3	96,51	—	—	35	10x20
	4,7	81,31	—	—	54	10x20
	4,7	67,76	—	—	50	12,5x20
	10	38,22	—	—	87	12,5x20
	10	31,85	—	—	75	12,5x25
	22	17,37	—	—	160	16x25
	22	14,48	—	—	110	16x31,5
	33	11,58	—	—	215	16x31,5
	33	9,65	—	—	150	18x35,5

Custom products are available on request.

Series CD269 PH

- High Reliability
- Automotive
- Professional Applications

2 500h at 125°C



Item	Characteristics														
Operating Temperature Range (°C)	-40 ~ +125														
Rated Voltage Range (V)	10~63														
Capacitance Tolerance (20°C, 120Hz)	±20%														
Leakage Current (µA)	Less than 0,04 CV (at 20°C, after 2 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)														
Dissipation Factor (20°C, 120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> </tr> </thead> <tbody> <tr> <td>tan δ</td> <td>0,20</td> <td>0,16</td> <td>0,14</td> <td>0,12</td> <td>0,10</td> <td>0,09</td> </tr> </tbody> </table>	Rated Voltage (V)	10	16	25	35	50	63	tan δ	0,20	0,16	0,14	0,12	0,10	0,09
	Rated Voltage (V)	10	16	25	35	50	63								
tan δ	0,20	0,16	0,14	0,12	0,10	0,09									
add 0,02 to every 1 000µF increase over 1 000µF															

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	2 500h	> 200 000h	2 000h	2 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±30% of initial value	Within ±20% of initial value	Within ±30% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 300% of specified value	Not more than 200% of specified value	Not more than 300% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 125°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 125°C guaranteed	Ur Ir = 0 125°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz) \ Capacitance (µF)	120	1K	10K	100K
47~100	0,40	0,75	0,90	1,00
220~330	0,50	0,85	0,95	1,00
470~1 000	0,60	0,88	0,96	1,00
2 200~3 300	0,75	0,90	0,98	1,00

Temperature Coefficient

Temperature (°C)	+85	+105	+125
Factor	2,1	1,8	1,0

Ratings for Series CD269 PH

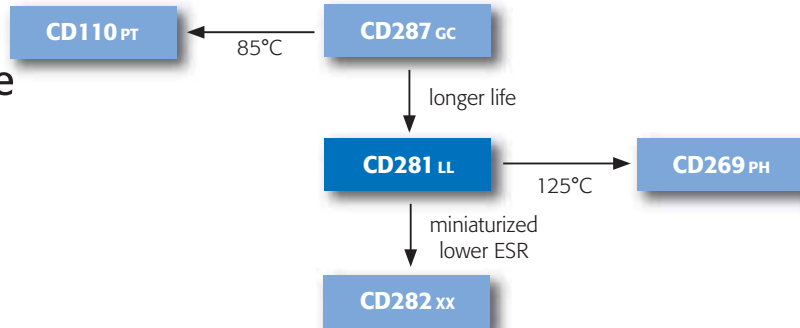
V _{DC} (Surge Voltage) Code	Capacitance	ESR 20°C, 100 Hz	Max. Impedance		Max. Ripple Current 125°C, 100kHz	Size Ø DxL
			20°C, 100 kHz (Ω)	-10°C, 100 kHz(Ω)		
(V)	(µF)	(Ω)			(mA _{rms})	(mm)
10 (13) 1A	330	0,965	0,330	0,660	340	8x12
	470	0,678	0,240	0,480	500	10x12,5
	1 000	0,318	0,120	0,240	770	10x20
	2 200	0,145	0,061	0,122	1 250	12,5x25
	3 300	0,097	0,050	0,100	1 380	16x25
16 (20) 1C	220	1,158	0,330	0,660	340	8x12
	330	0,772	0,240	0,480	500	10x12,5
	470	0,542	0,200	0,400	630	10x16
	1 000	0,255	0,077	0,154	920	12,5x20
	2 200	0,116	0,050	0,100	1 380	16x25
25 (32) 1E	220	1,013	0,230	0,460	480	8x15
	330	0,676	0,200	0,400	630	10x16
	470	0,474	0,120	0,240	770	10x20
	1 000	0,223	0,061	0,122	1 250	12,5x25
35 (44) 1V	100	1,911	0,330	0,660	340	8x12
	220	0,869	0,200	0,400	630	10x16
	330	0,579	0,120	0,240	770	10x20
	470	0,407	0,077	0,154	920	12,5x20
	1 000	0,191	0,050	0,100	1 380	16x25
50 (63) 1H	100	1,592	0,360	0,720	420	10x12,5
	220	0,724	0,200	0,400	655	10x20
	330	0,483	0,120	0,240	780	12,5x20
	470	0,339	0,100	0,200	1 060	12,5x25
63 (79) 1J	47	3,049	0,680	2,040	245	8x12
	100	1,433	0,380	1,140	425	10x16
	220	0,651	0,180	0,540	665	12,5x20
	330	0,434	0,140	0,420	900	12,5x25

Custom products are available on request.

Series CD281 LL

3 000 - 12 000h at 105°C

- Longest Life Time
- Lowest Impedance
- Power Supply



Item	Characteristics								
Operating Temperature Range (°C)	-55 ~ +105								
Rated Voltage Range (V)	6,3~100								
Capacitance Tolerance (20°C, 120Hz)	±20%								
Leakage Current (µA)	0,02CV or 3µA whichever is greater (at 20°C, after 2 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)								
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	6,3	10	16	25	35	50	63	100
	Tan δ	0,22	0,19	0,16	0,14	0,12	0,10	0,09	0,08
When nominal capacitance is over 1 000µF tan δ shall be added 0,02 to the listed value with increase of every 1 000µF									
Characteristics of Low Temperature (120Hz)	Rated Voltage (V)	6,3 ~ 100							
	Z _{-55°C} /Z _{+20°C}	3							

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	Ø 5 : 3 000h Ø 6 - 8 : 5 000h Ø 10 : 7 000h Ø 12 : 10 000h Ø ≥ 16 : 12 000h	Ø ≥ 6: >250 000h	Ø 5 : 2 000h Ø 6 - 8 : 3 000h Ø 10 : 5 000h Ø 12 : 7 000h Ø ≥ 16 : 8 000h	Ø 5 : 3 000h Ø 6 - 8 : 4 000h Ø 10 : 6 000h Ø 12 : 8 000h Ø ≥ 16 : 10 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz) \ Capacitance (µF)	120	1K	10K	100K
0,47~4,7	0,40	0,68	0,78	1,00
5,6~47	0,50	0,76	0,87	1,00
56~270	0,70	0,85	0,90	1,00
330~1 000	0,80	0,93	0,98	1,00
1 200~15 000	0,90	0,95	1,00	1,00

Temperature Coefficient

Temperature (°C)	+70	+85	+105
Factor	1,96	1,68	1,00

Ratings for Series CD281 LL

V _{dc} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Max. Impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL
			20°C, 100kHz(Ω)	-10°C, 100kHz(Ω)		
(V)	(μF)	(Ω)			(mArms)	(mm)
6,3 (7,2) 0J	100	3,503	0,650	1,300	175	5x11,5
	150	2,335	0,460	0,920	235	5x15
	220	1,592	0,300	0,600	290	6,3x11
	330	1,062	0,200	0,400	400	6,3x15
	470	0,745	0,170	0,340	488	8x12
	680	0,515	0,130	0,260	617	8x15
	680	0,515	0,120	0,240	613	10x12,5
	820	0,427	0,095	0,190	734	10x16
	1000	0,350	0,095	0,190	800	08x20
	1200	0,292	0,065	0,130	1010	10x20
	1200	0,292	0,065	0,130	1010	12,5x15
	1500	0,234	0,055	0,110	1190	10x25
	2200	0,159	0,045	0,090	1440	10x30
	2200	0,159	0,042	0,084	1400	12,5x20
	2700	0,130	0,038	0,076	1690	12,5x25
	2700	0,130	0,046	0,092	1310	16x15
	3300	0,106	0,043	0,086	1460	18x15
	3900	0,090	0,032	0,064	1950	12,5x30
	4700	0,075	0,028	0,056	2220	12,5x35
	4700	0,075	0,034	0,068	1660	16x20
	5600	0,063	0,026	0,052	2390	12,5x40
	5600	0,063	0,028	0,056	2070	16x25
	5600	0,063	0,030	0,060	1850	18x20
	6800	0,052	0,025	0,050	2350	16x31,5
	6800	0,052	0,027	0,054	2120	18x25
8200	0,043	0,022	0,044	2550	16x35,5	
10000	0,035	0,023	0,046	2410	18x31,5	
12000	0,029	0,020	0,040	2970	16x40	
12000	0,029	0,020	0,040	2680	18x35,5	
15000	0,023	0,019	0,038	3010	18x40	
10 (13) 1A	82	3,690	0,650	1,300	175	5x11,5
	100	3,025	0,460	0,920	235	5x15
	180	1,681	0,300	0,600	290	6,3x11
	220	1,375	0,200	0,400	400	6,3x15
	330	0,917	0,170	0,340	488	8x12
	470	0,644	0,130	0,260	617	8x15
	470	0,644	0,120	0,240	613	10x12,5
	560	0,540	0,095	0,190	734	10x16
	680	0,445	0,095	0,190	800	08x20
	1000	0,303	0,065	0,120	1010	10x20
	1000	0,303	0,065	0,130	1010	12,5x15
	1200	0,252	0,055	0,110	1190	10x25
	1500	0,202	0,045	0,090	1440	10x30
	1800	0,168	0,042	0,084	1400	12,5x20
	1800	0,168	0,046	0,092	1310	16x15
	2200	0,138	0,038	0,076	1690	12,5x25
	2200	0,138	0,043	0,086	1460	18x15
	2700	0,112	0,032	0,064	1950	12,5x30
	3300	0,092	0,028	0,056	2220	12,5x35
	3300	0,092	0,034	0,068	1660	16x20
	3900	0,078	0,026	0,052	2390	12,5x40
	3900	0,078	0,028	0,056	2070	16x25
	3900	0,078	0,030	0,060	1850	18x20
	4700	0,064	0,027	0,054	2120	18x25
	5600	0,054	0,025	0,050	2350	16x31,5
6800	0,044	0,022	0,044	2550	16x35,5	
6800	0,044	0,023	0,046	2410	18x31,5	
8200	0,037	0,020	0,040	2970	16x40	
8200	0,037	0,020	0,040	2680	18x35,5	
10000	0,030	0,019	0,038	3010	18x40	
16 (20) 1C	56	4,550	0,650	1,300	175	5x11,5
	82	3,107	0,460	0,920	235	5x15
	120	2,123	0,300	0,600	290	6,3x11
	180	1,415	0,200	0,400	400	6,3x15
	270	0,944	0,170	0,340	501	8x12
	330	0,772	0,130	0,260	575	8x15
	330	0,772	0,120	0,240	625	10x12,5
	390	0,653	0,095	0,190	795	10x16
	470	0,542	0,095	0,190	760	08x20
	680	0,375	0,065	0,130	1010	10x20
	680	0,375	0,065	0,130	1010	12,5x15

V _{dc} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Max. Impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL	
			20°C, 100kHz(Ω)	-10°C, 100kHz(Ω)			
(V)	(μF)	(Ω)			(mArms)	(mm)	
16 (20) 1C	820	0,311	0,055	0,110	1190	10x25	
	1200	0,212	0,045	0,090	1430	10x30	
	1200	0,212	0,042	0,084	1400	12,5x20	
	1500	0,170	0,038	0,076	1690	12,5x25	
	1500	0,170	0,046	0,092	1340	16x15	
	1500	0,170	0,043	0,086	1490	18x15	
	2200	0,116	0,032	0,064	1950	12,5x30	
	2200	0,116	0,034	0,068	1730	16x20	
	2700	0,094	0,030	0,060	2200	12,5x35	
	2700	0,094	0,030	0,060	2070	16x25	
	2700	0,094	0,030	0,060	1870	18x20	
	3300	0,077	0,026	0,052	2390	12,5x40	
	3900	0,065	0,025	0,050	2350	16x31,5	
	3900	0,065	0,027	0,054	2160	18x25	
	4700	0,054	0,022	0,044	2550	16x35,5	
	4700	0,054	0,023	0,046	2450	18x31,5	
	5600	0,045	0,020	0,040	2900	16x40	
	6800	0,037	0,020	0,040	2730	18x35,5	
	8200	0,031	0,019	0,038	3060	18x40	
	25 (32) 1E	39	5,716	0,650	1,300	175	5x11,5
		56	3,981	0,460	0,920	235	5x15
		82	2,719	0,300	0,600	290	6,3x11
		120	1,858	0,200	0,400	400	6,3x15
		180	1,238	0,170	0,340	503	8x12
		220	1,013	0,130	0,260	575	8x15
220		1,013	0,120	0,240	629	10x12,5	
270		0,826	0,095	0,190	795	10x16	
330		0,676	0,095	0,190	751	08x20	
470		0,474	0,065	0,130	1010	10x20	
470		0,474	0,065	0,130	1010	12,5x15	
560		0,398	0,055	0,110	1190	10x25	
820		0,272	0,045	0,090	1440	10x30	
820		0,272	0,042	0,084	1400	12,5x20	
820		0,272	0,046	0,092	1360	16x15	
1000		0,223	0,038	0,076	1690	12,5x25	
1200		0,186	0,043	0,086	1500	18x15	
1500		0,149	0,032	0,064	1950	12,5x30	
1500		0,149	0,034	0,068	1730	16x20	
1800		0,124	0,028	0,056	2200	12,5x35	
1800		0,124	0,028	0,056	2070	16x25	
1800		0,124	0,030	0,060	1890	18x20	
2200		0,101	0,026	0,052	2390	12,5x40	
2700		0,083	0,025	0,050	2350	16x31,5	
2700		0,083	0,027	0,054	2180	18x25	
3300	0,068	0,022	0,044	2550	16x35,5		
3300	0,068	0,023	0,046	2470	18x31,5		
3900	0,057	0,020	0,040	2900	16x40		
3900	0,057	0,020	0,040	2740	18x35,5		
4700	0,047	0,019	0,038	3070	18x40		
35 (44) 1V	27	7,077	0,650	1,300	175	5x11,5	
	39	4,900	0,460	0,920	235	5x15	
	56	3,412	0,300	0,600	290	6,3x11	
	82	2,330	0,200	0,400	400	6,3x15	
	120	1,592	0,170	0,340	501	8x12	
	150	1,274	0,120	0,240	625	10x12,5	
	180	1,062	0,130	0,260	575	8x15	
	180	1,062	0,095	0,190	795	10x16	
	220	0,869	0,095	0,190	760	08x20	
	330	0,579	0,065	0,130	1010	10x20	
	330	0,579	0,065	0,130	1010	12,5x15	
	390	0,490	0,055	0,110	1190	10x25	
	560	0,341	0,045	0,090	1450	10x30	
	560	0,341	0,042	0,084	1400	12,5x20	
	560	0,341	0,046	0,092	1360	16x15	
	680	0,281	0,038	0,076	1690	12,5x25	
	680	0,281	0,043	0,086	1520	18x15	
	1000	0,191	0,032	0,064	1950	12,5x30	
	1000	0,191	0,034	0,068	1730	16x20	
	1200	0,159	0,028	0,056	2200	12,5x35	

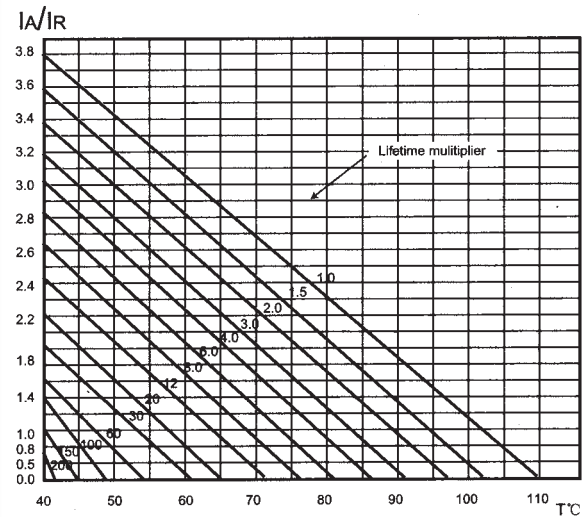
Custom products are available on request.

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL
			20°C, 100kHz(Ω)	-10°C, 100kHz(Ω)		
(V)	(μF)	(Ω)			(mArms)	(mm)
35 (44) 1V	1 200	0,159	0,028	0,056	2 070	16x25
	1 200	0,159	0,030	0,060	1 900	18x20
	1 500	0,127	0,026	0,052	2 390	12,5x40
	1 800	0,106	0,025	0,050	2 350	16x31,5
	1 800	0,106	0,027	0,054	2 200	18x25
	2 200	0,087	0,022	0,044	2 550	16x35,5
	2 200	0,087	0,023	0,046	2 490	18x31,5
	2 700	0,071	0,020	0,040	2 900	16x40
	2 700	0,071	0,020	0,040	2 770	18x35,5
	3 300	0,058	0,019	0,038	3 110	18x40
50 (63) 1H	0,47	338,800	3,900	7,800	22	5x11,5
	1	159,300	3,500	7,000	36	5x11,5
	2,2	72,400	3,000	6,000	54	5x11,5
	3,3	48,300	2,600	5,200	63	5x11,5
	4,7	33,900	2,200	4,400	75	5x11,5
	10	15,900	1,400	2,800	110	5x11,5
	18	8,846	0,950	1,900	120	5x11,5
	27	5,898	0,550	1,100	135	5x15
	39	4,083	0,360	0,720	148	6,3x11
	56	2,843	0,280	0,560	153	6,3x15
	68	2,342	0,200	0,400	360	8x12
	82	1,942	0,180	0,360	460	8x15
	82	1,942	0,180	0,360	443	10x12,5
	100	1,592	0,150	0,300	553	10x16
	120	1,327	0,130	0,260	670	08x20
	180	0,885	0,085	0,170	676	10x20
	180	0,885	0,095	0,190	745	12,5x15
	220	0,724	0,075	0,150	876	10x25
	330	0,483	0,055	0,110	1 010	10x30
	330	0,483	0,060	0,120	979	12,5x20
	330	0,483	0,065	0,130	982	16x15
	470	0,339	0,044	0,088	1 180	12,5x25
	470	0,339	0,048	0,096	1 080	18x15
	560	0,284	0,040	0,080	1 310	12,5x30
	680	0,234	0,036	0,072	1 470	12,5x35
	680	0,234	0,045	0,090	1 210	16x20
	820	0,194	0,034	0,068	1 590	12,5x40
	820	0,194	0,038	0,076	1 490	16x25
	820	0,194	0,036	0,072	1 450	18x20
	1 000	0,159	0,032	0,064	1 890	16x31,5
	1 000	0,159	0,032	0,064	1 720	18x25
	1 200	0,133	0,028	0,056	2 140	16x35,5
	1 500	0,106	0,026	0,052	2 410	16x40
	1 500	0,106	0,026	0,052	1 970	18x31,5
	1 800	0,088	0,025	0,050	2 310	18x35,5
2 200	0,072	0,024	0,048	2 530	18x40	
63 (79) 1J	12	11,940	1,200	3,600	120	5x11,5
	18	7,962	0,850	2,600	135	5x15
	27	5,308	0,550	1,700	148	6,3x11
	39	3,675	0,380	1,100	153	6,3x15
	47	3,049	0,320	0,960	360	8x12
	56	2,559	0,230	0,690	448	10x12,5
	68	2,108	0,240	0,720	469	8x15
	68	2,108	0,170	0,510	553	10x16
	82	1,748	0,170	0,510	682	08x20
	120	1,194	0,120	0,360	676	10x20
	150	0,955	0,100	0,300	876	10x25
	150	0,955	0,110	0,330	745	12,5x15
	180	0,796	0,085	0,260	1 020	10x30
	220	0,651	0,075	0,230	979	12,5x20
	220	0,651	0,080	0,240	928	16x15
	270	0,531	0,065	0,200	1 180	12,5x25
	330	0,434	0,065	0,200	1 200	18x15
	390	0,367	0,055	0,170	1 310	12,5x30
	390	0,367	0,057	0,170	1 210	16x20
	470	0,305	0,048	0,140	1 470	12,5x35
	470	0,305	0,052	0,160	1 490	16x25
	470	0,305	0,058	0,170	1 460	18x20
	560	0,256	0,042	0,130	1 590	12,5x40
	680	0,211	0,042	0,130	1 890	16x31,5
	680	0,211	0,050	0,150	1 740	18x25

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. impedance		Ripple Current 105°C, 100kHz	Size ∅ DxL
			20°C, 100kHz(Ω)	-10°C, 100kHz(Ω)		
(V)	(μF)	(Ω)			(mArms)	(mm)
63 (79) 1J	820	0,175	0,036	0,110	2 140	16x35,5
	820	0,175	0,042	0,130	1 990	18x31,5
	1 000	0,143	0,032	0,096	2 410	16x40
	1 000	0,143	0,035	0,110	2 340	18x35,5
	1 200	0,119	0,032	0,096	2 560	18x40
	100 (125) 2A	5,6	22,750	1,900	7,600	57
8,2		15,540	1,300	5,200	74	5x15
12		10,620	1,100	4,400	78	6,3x11
18		7,077	0,620	2,500	85	6,3x15
22		5,790	0,530	2,100	275	8x12
27		4,718	0,470	1,900	319	10x12,5
33		3,860	0,350	1,400	360	08x15
33		3,860	0,320	1,300	424	10x16
39		3,266	0,270	1,100	490	08x20
56		2,275	0,250	1,000	499	10x20
68		1,873	0,180	0,720	634	10x25
68		1,873	0,200	0,800	613	12,5x15
100		1,274	0,150	0,600	739	10x30
100		1,274	0,130	0,520	805	12,5x20
120		1,062	0,110	0,440	857	12,5x25
120		1,062	0,130	0,500	706	16x15
150		0,849	0,120	0,480	871	18x15
180		0,708	0,090	0,360	1 120	12,5x30
180		0,708	0,110	0,440	916	16x20
220		0,579	0,075	0,300	1 240	12,5x35
220		0,579	0,081	0,320	1 290	16x25
270		0,472	0,060	0,240	1 330	12,5x40
270		0,472	0,085	0,340	1 170	18x20
330		0,386	0,059	0,230	1 630	16x31,5
330		0,386	0,071	0,280	1 500	18x25
390		0,327	0,052	0,210	1 750	16x35,5
390		0,327	0,058	0,230	1 630	18x31,5
470		0,271	0,045	0,180	1 920	16x40
560		0,227	0,054	0,220	1 920	18x35,5
680		0,187	0,041	0,160	2 100	18x40

Custom products are available on request.

Life Time Diagram



IA=actual ripple current at 100 KHz

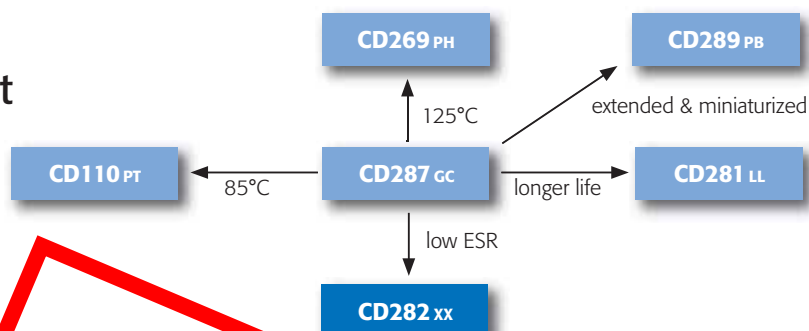
IR=rated ripple current at 100KHz, 105°C

Multiplier of useful life as a function of ambient temperature and ripple current load

Series CD282 xx

- Lowest Impedance
- High Ripple Current
- SMPS
- UPS

2 500 – 6 000h at 105°C



DO NOT USE FOR NEW DESIGN IN Replaced by Series CD284 XY

Item	Characteristics			
Operating Temperature Range (°C)	-40 ~ +105			
Rated Voltage Range (V)	25, 35, 50			
Capacitance Tolerance (20°C, 120Hz)	±20%			
Leakage Current (µA) (20°C)	≤ 0,10			
Dissipation Factor (20°C, 120Hz)	when nominal capacitance	35	50	
	value with increase of every 1 000µF	0,12	0,10	
Characteristics of low Temperature (120Hz)	Rated Voltage (V)	25	35	50
	Impedance Ratio $Z_{-25°C}/Z_{+20°C}$	2	2	2
	Z_T/Z_{20} (Max.) $Z_{-40°C}/Z_{+20°C}$	3	3	3

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	$\varnothing \leq 6$: 2 500h $\varnothing 8$: 3 500h $\varnothing 10$: 5 000h $\varnothing \geq 12$: 6 000h	$\varnothing \geq 10$: >250 000h	$\varnothing \leq 6$: 2 000h $\varnothing 8$: 3 000h $\varnothing 10$: 4 000h $\varnothing \geq 12$: 5 000h	$\varnothing \leq 6$: 2 000h $\varnothing 8$: 3 000h $\varnothing 10$: 4 000h $\varnothing \geq 12$: 5 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±25% of initial value	Within ±20% of initial value	Within ±25% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz) \ Capacitance (µF)	50	120	1K	10K	100K
22~33	0,45	0,55	0,75	0,90	1,00
39~330	0,60	0,70	0,85	0,95	1,00
390~1 000	0,65	0,75	0,90	0,98	1,00
1 200~6 800	0,75	0,80	0,95	1,00	1,00

Temperature Coefficient

Temperature (°C) \ Rated Voltage (V)	+70	+80	+105
6,3~50	2,0	1,7	1,0

Ratings for Series CD282 xx

V _{dc} (Surge Voltage) Code	Capacitance (μF)	ESR 20°C, 100Hz (Ω)	Max. Impedance		Ripple Current 105°C, 100kHz (mArms)	Size ∅ DxL (mm)
			20°C, 100kHz(Ω)	-10°C, 100kHz(Ω)		
6,3 (7,2) 0J	150	2,335	0,300	1,000	250	5x11,5
	330	1,062	0,130	0,410	405	6,3x11,5
	560	0,626	0,072	0,220	760	8x12
	820	0,427	0,056	0,170	995	8x16
	1 000	0,350	0,053	0,160	1 030	10x12,5
	1 200	0,292	0,041	0,130	1 250	8x20
	1 200	0,292	0,038	0,120	1 430	10x16
	1 500	0,234	0,023	0,069	1 820	10x20
	2 200	0,159	0,022	0,066	2 150	12,5x20
	3 300	0,106	0,021	0,053	2 770	12,5x25
	3 900	0,090	0,018	0,041	3 290	12,5x30
	4 700	0,075	0,016	0,039	3 400	12,5x35
	5 600	0,063	0,015	0,039	3 400	16x20
	5 600	0,063	0,015	0,043	3 460	16x25
10 (13) 1A	100	3,025	0,300	1,000	250	5x11,5
	220	1,375	0,130	0,410	405	6,3x11,5
	470	0,644	0,072	0,220	760	8x12
	680	0,445	0,056	0,170	995	8x16
	680	0,445	0,053	0,160	1 030	10x12,5
	1 000	0,303	0,041	0,130	1 030	10x12,5
	1 000	0,303	0,038	0,120	1 430	10x16
	1 200	0,252	0,023	0,069	1 820	10x20
	1 500	0,202	0,022	0,066	2 150	10x25
	2 200	0,138	0,021	0,053	2 360	12,5x20
	3 300	0,092	0,018	0,045	2 770	12,5x25
	3 900	0,078	0,016	0,041	3 290	12,5x30
	3 900	0,078	0,015	0,039	3 140	16x20
	4 700	0,064	0,018	0,045	3 400	12,5x35
5 600	0,054	0,016	0,043	3 460	16x25	
16 (20) 1C	56	4,550	0,300	1,000	250	5x11,5
	120	2,123	0,130	0,410	405	6,3x11,5
	330	0,772	0,072	0,220	760	8x12
	470	0,542	0,056	0,170	995	8x16
	470	0,542	0,053	0,160	1 030	10x12,5
	680	0,375	0,041	0,130	1 250	8x20
	680	0,375	0,038	0,120	1 430	10x16
	1 000	0,255	0,023	0,069	1 820	10x20
	1 200	0,212	0,022	0,066	2 150	10x25
	1 500	0,170	0,021	0,053	2 360	12,5x20
	2 200	0,116	0,018	0,045	2 770	12,5x25
	2 700	0,094	0,016	0,041	3 290	12,5x30
	2 700	0,094	0,015	0,039	3 140	16x20
	3 300	0,077	0,018	0,045	3 400	12,5x35
3 900	0,065	0,016	0,043	3 460	16x25	
25 (32) 1E	47	4,743	0,300	1,000	250	5x11,5
	100	2,229	0,130	0,410	405	6,3x11,5
	220	1,013	0,072	0,220	760	8x12
	330	0,676	0,056	0,170	995	8x16
	330	0,676	0,053	0,160	1 030	10x12,5
	470	0,474	0,041	0,130	1 250	8x20
	470	0,474	0,038	0,120	1 430	10x16
	680	0,328	0,023	0,069	1 820	10x20
	820	0,272	0,022	0,066	2 150	10x25
	1 000	0,223	0,021	0,053	2 360	12,5x20
	1 500	0,149	0,018	0,045	2 770	12,5x25
	1 800	0,124	0,016	0,041	3 290	12,5x30
	1 800	0,124	0,018	0,045	3 140	16x20
	2 200	0,101	0,015	0,039	3 400	12,5x35
2 700	0,083	0,016	0,043	3 460	16x25	

V _{dc} (Surge Voltage) Code	Capacitance (μF)	ESR 20°C, 100Hz (Ω)	Max. Impedance		Ripple Current 105°C, 100kHz (mArms)	Size ∅ DxL (mm)
			20°C, 100kHz(Ω)	-10°C, 100kHz(Ω)		
35 (44)	33	5,790	0,300	1,000	250	5x11,5
	56	3,412	0,130	0,410	405	6,3x11,5
	150	1,274	0,072	0,220	760	8x12
	220	0,869	0,056	0,170	995	8x16
	220	0,869	0,053	0,160	1 030	10x12,5
	270	0,708	0,041	0,130	1 250	8x20
	330	0,579	0,038	0,120	1 430	10x16
	470	0,407	0,023	0,069	1 820	10x20
	560	0,341	0,022	0,066	2 150	10x25
	680	0,281	0,021	0,053	2 360	12,5x20
	680	0,281	0,019	0,045	2 770	12,5x25
	820	0,216	0,016	0,041	3 290	12,5x30
	820	0,216	0,015	0,039	3 140	16x20
	1 000	0,179	0,015	0,043	3 400	12,5x35
1 000	0,159	0,021	0,056	3 010	16x25	

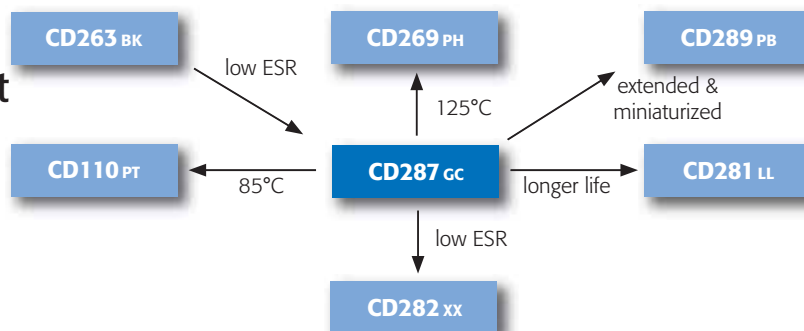
**DO NOT USE FOR
NEW DESIGN IN
Replaced by Series CD284 XY**

Custom products are available on request.

Series CD287 GC

- Low Impedance
- High Ripple Current
- SMPS
- UPS

4 000 – 10 000h at 105°C



Item	Characteristics								
Operating Temperature Range (°C)	-55 ~ +105								
Rated Voltage Range (V)	6,3~100								
Capacitance Range (µF)	0,47~15 000								
Capacitance Tolerance (20°C, 120Hz)	±20%								
Leakage Current (µA)	0,02CV or 3µA whichever is greater (at 20°C, after 2 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)								
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	6,3	10	16	25	35	50	63	100
	tan δ	0,22	0,19	0,16	0,14	0,12	0,10	0,09	0,08
when nominal capacitance is over 1 000µF tan δ shall be added 0,02 to the listed value with increase of every 1 000µF									
Temperature Stability (120Hz)	Rated Voltage (V)	6,3	10	16	25	35	50	63	100
	Z _{-55°C} /Z _{+20°C}	3	3	3	3	3	3	3	3

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	Ø ≤ 6 : 4 000h Ø 8-10 : 6 000h Ø ≥ 12 : 10 000h	Ø ≥ 8: > 250 000h	Ø ≤ 6 : 2 000h Ø 8-10 : 3 000h Ø ≥ 12 : 5 000h	Ø ≤ 6 : 3 000h Ø 8-10 : 5 000h Ø ≥ 12 : 7 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz) \ Capacitance (µF)	120	1K	10K	100K
0,47~4,7	0,40	0,68	0,78	1,00
5,6~47	0,50	0,76	0,87	1,00
56~270	0,70	0,85	0,90	1,00
330~1 000	0,80	0,93	0,98	1,00
1 200~15 000	0,90	0,95	1,00	1,00

Temperature Coefficient

Temperature (°C)	+70	+85	+105
Coefficient	1,96	1,68	1,00

Ratings for Series CD287 GC

V _{DC} (Surge Voltage) Code	Capacitance (µF)	ESR 20°C, 100kHz (Ω)	Max. Impedance		Max. Ripple Current 105°C, 100kHz (mArms)	Size ∅ DxL (mm)
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
6,3 (7,2) 0J	100	3,503	0,650	1,300	175	5x11,5
	150	2,335	0,460	0,920	235	5x15
	220	1,592	0,300	0,600	290	6,3x11,5
	330	1,062	0,200	0,400	400	6,3x15
	470	0,745	0,170	0,340	488	8x12
	680	0,515	0,130	0,260	617	8x15
	680	0,515	0,120	0,240	613	10x12,5
	820	0,427	0,095	0,190	734	10x16
	1 000	0,350	0,095	0,190	800	8x20
	1 200	0,292	0,065	0,130	1 010	10x20
	1 200	0,292	0,065	0,130	1 010	12,5x15
	1 500	0,234	0,055	0,110	1 190	10x25
	2 200	0,159	0,045	0,090	1 440	10x30
	2 200	0,159	0,042	0,084	1 400	12,5x20
	2 700	0,130	0,038	0,076	1 690	12,5x25
	2 700	0,130	0,046	0,092	1 310	16x15
	3 300	0,106	0,043	0,086	1 460	18x15
	3 900	0,090	0,032	0,064	1 950	12,5x30
	4 700	0,075	0,028	0,056	2 220	12,5x35
	4 700	0,075	0,034	0,068	1 660	16x20
	5 600	0,063	0,026	0,052	2 390	12,5x40
	5 600	0,063	0,028	0,056	2 070	16x25
	5 600	0,063	0,030	0,060	1 850	18x20
	6 800	0,052	0,025	0,050	2 350	16x31,5
6 800	0,052	0,027	0,054	2 120	18x25	
8 200	0,043	0,022	0,044	2 550	16x35,5	
10 000	0,035	0,023	0,046	2 410	18x31,5	
12 000	0,029	0,020	0,040	2 970	16x40	
12 000	0,029	0,020	0,040	2 680	18x35,5	
15 000	0,023	0,019	0,038	3 010	18x40	
10 (13) 1A	82	3,690	0,650	1,300	175	5x11,5
	100	3,025	0,460	0,920	235	5x15
	180	1,681	0,300	0,600	290	6,3x11,5
	220	1,375	0,200	0,400	400	6,3x15
	330	0,917	0,170	0,340	488	8x12
	470	0,644	0,130	0,260	617	8x15
	470	0,644	0,120	0,240	613	10x12,5
	560	0,540	0,095	0,190	734	10x16
	680	0,445	0,095	0,190	800	8x20
	1 000	0,303	0,065	0,130	1 010	10x20
	1 000	0,303	0,065	0,130	1 010	12,5x15
	1 200	0,252	0,055	0,110	1 190	10x25
	1 500	0,202	0,045	0,090	1 440	10x30
	1 800	0,168	0,042	0,084	1 400	12,5x20
	1 800	0,168	0,046	0,092	1 310	16x15
	2 200	0,138	0,038	0,076	1 690	12,5x25
	2 200	0,138	0,043	0,086	1 460	18x15
	2 700	0,112	0,032	0,064	1 950	12,5x30
	3 300	0,092	0,028	0,056	2 220	12,5x35
	3 300	0,092	0,034	0,068	1 660	16x20
	3 900	0,078	0,026	0,052	2 390	12,5x40
	3 900	0,078	0,028	0,056	2 070	16x25
	3 900	0,078	0,030	0,060	1 850	18x20
	4 700	0,064	0,027	0,054	2 120	18x25
	5 600	0,054	0,025	0,050	2 350	16x31,5
	6 800	0,044	0,022	0,044	2 550	16x35,5
	6 800	0,044	0,023	0,046	2 410	18x31,5
	8 200	0,037	0,020	0,040	2 970	16x40
	8 200	0,037	0,020	0,040	2 680	18x35,5
	10 000	0,030	0,019	0,038	3 010	18x40

V _{DC} (Surge Voltage) Code	Capacitance (µF)	ESR 20°C, 100kHz (Ω)	Max. Impedance		Max. Ripple Current 105°C, 100kHz (mArms)	Size ∅ DxL (mm)
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
16 (20) 1C	56	4,550	0,650	1,300	175	5x11,5
	82	3,107	0,460	0,920	235	5x15
	120	2,123	0,300	0,600	290	6,3x11,5
	180	1,415	0,200	0,400	400	6,3x15
	270	0,944	0,170	0,340	501	8x12
	330	0,772	0,130	0,260	575	8x15
	330	0,772	0,120	0,240	625	10x12,5
	390	0,653	0,095	0,190	795	10x16
	470	0,542	0,095	0,190	760	8x20
	680	0,375	0,065	0,130	1 010	10x20
	680	0,375	0,065	0,130	1 010	12,5x15
	820	0,311	0,055	0,110	1 190	10x25
	1 200	0,212	0,045	0,090	1 430	10x30
	1 200	0,212	0,045	0,090	1 400	12,5x20
	1 500	0,170	0,038	0,076	1 690	12,5x25
	1 500	0,170	0,046	0,092	1 340	16x15
	1 500	0,170	0,043	0,086	1 490	18x15
	2 200	0,116	0,032	0,064	1 950	12,5x30
	2 200	0,116	0,034	0,068	1 730	16x20
	2 700	0,094	0,028	0,056	2 200	12,5x35
	2 700	0,094	0,028	0,056	2 070	16x25
	2 700	0,094	0,030	0,060	1 870	18x20
	3 300	0,077	0,026	0,052	2 390	12,5x40
	3 900	0,065	0,025	0,050	2 350	16x31,5
3 900	0,065	0,027	0,054	2 160	18x25	
4 700	0,054	0,020	0,040	2 550	16x35,5	
4 700	0,054	0,023	0,046	2 450	18x31,5	
5 600	0,045	0,020	0,040	2 900	16x40	
6 800	0,037	0,020	0,040	2 730	18x35,5	
8 200	0,031	0,019	0,038	3 060	18x40	
25 (32) 1E	39	5,716	0,650	1,300	175	5x11,5
	56	3,981	0,460	0,920	235	5x15
	82	2,719	0,300	0,600	290	6,3x11,5
	120	1,858	0,200	0,400	400	6,3x15
	180	1,238	0,170	0,340	503	8x12
	220	1,013	0,130	0,260	575	8x15
	220	1,013	0,120	0,240	629	10x12,5
	270	0,826	0,095	0,190	795	10x16
	330	0,676	0,095	0,190	751	8x20
	470	0,474	0,065	0,130	1 010	10x20
	470	0,474	0,065	0,130	1 010	12,5x15
	560	0,398	0,055	0,110	1 190	10x25
	820	0,272	0,045	0,090	1 440	10x30
	820	0,272	0,042	0,084	1 400	12,5x20
	820	0,272	0,046	0,092	1 360	16x15
	1 000	0,223	0,038	0,076	1 690	12,5x25
	1 200	0,186	0,043	0,086	1 500	18x15
	1 500	0,149	0,032	0,064	1 950	12,5x30
	1 500	0,149	0,034	0,068	1 730	16x20
	1 800	0,124	0,028	0,056	2 200	12,5x35
	1 800	0,124	0,028	0,056	2 070	16x25
	1 800	0,124	0,030	0,060	1 890	18x20
	2 200	0,101	0,026	0,052	2 390	12,5x40
	2 700	0,083	0,025	0,050	2 350	16x31,5
2 700	0,083	0,027	0,054	2 180	18x25	
3 300	0,068	0,022	0,044	2 550	16x35,5	
3 300	0,068	0,023	0,046	2 470	18x31,5	
3 900	0,057	0,020	0,040	2 900	16x40	
3 900	0,057	0,020	0,040	2 740	18x35,5	
4 700	0,047	0,019	0,038	3 070	18x40	

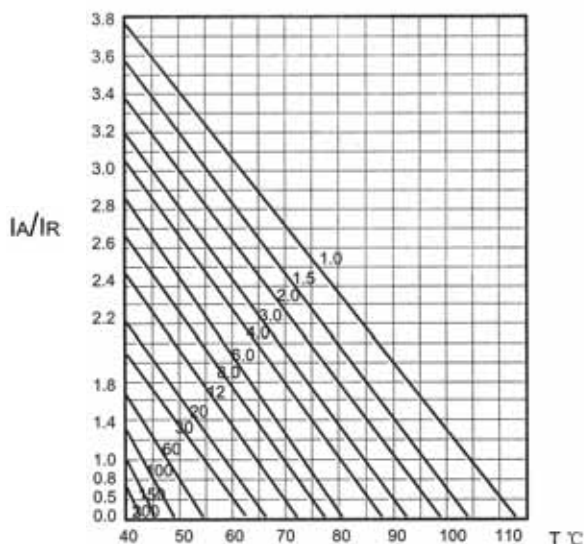
Custom products are available on request.

V _{DC} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Impedance		Max. Ripple Current 105°C, 100kHz	Size ∅ DxL
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
(V)	(μF)	(Ω)	(mArms)	(mm)		
35 (44) 1V	27	7,077	0,650	1,300	175	5x11,5
	39	4,900	0,460	0,920	235	5x15
	56	3,412	0,300	0,600	290	6,3x11,5
	82	2,330	0,200	0,400	400	6,3x15
	120	1,592	0,170	0,340	501	8x12
	150	1,274	0,120	0,240	625	10x12,5
	180	1,062	0,130	0,260	575	8x15
	180	1,062	0,095	0,190	795	10x16
	220	0,869	0,095	0,190	760	8x20
	330	0,579	0,065	0,130	1010	10x20
	330	0,579	0,065	0,130	1010	12,5x15
	390	0,490	0,055	0,110	1190	10x25
	560	0,341	0,045	0,090	1450	10x30
	560	0,341	0,042	0,084	1400	12,5x20
	560	0,341	0,046	0,092	1360	16x15
	680	0,281	0,038	0,076	1690	12,5x25
	680	0,281	0,043	0,086	1520	18x15
	1000	0,191	0,032	0,064	1950	12,5x30
	1000	0,191	0,034	0,068	1730	16x20
	1200	0,159	0,028	0,056	2200	12,5x35
	1200	0,159	0,028	0,056	2070	16x25
	1200	0,159	0,030	0,060	1900	18x20
	1500	0,127	0,026	0,052	2390	12,5x40
	1800	0,106	0,025	0,050	2350	16x31,5
	1800	0,106	0,027	0,054	2200	18x25
	2200	0,087	0,022	0,044	2550	16x35,5
	2200	0,087	0,023	0,046	2490	18x31,5
	2700	0,071	0,020	0,040	2900	16x40
	2700	0,071	0,020	0,040	2770	18x35,5
	3300	0,058	0,019	0,038	3110	18x40
50 (63) 1H	0,47	338,80	3,900	7,800	22	5x11,5
	1,0	159,24	3,500	7,000	36	5x11,5
	2,2	72,38	3,000	6,000	54	5x11,5
	3,3	48,25	2,600	5,200	63	5x11,5
	4,7	33,88	2,200	4,400	75	5x11,5
	10	15,92	1,400	2,800	110	5x11,5
	18	8,846	0,950	1,900	120	5x11,5
	27	5,898	0,550	1,100	135	5x15
	39	4,083	0,360	0,720	148	6,3x11,5
	56	2,843	0,280	0,560	153	6,3x15
	68	2,342	0,200	0,400	360	8x12
	82	1,942	0,180	0,360	460	8x15
	82	1,942	0,180	0,360	443	10x12,5
	100	1,592	0,150	0,300	553	10x16
	120	1,327	0,130	0,260	670	8x20
	180	0,885	0,085	0,170	676	10x20
	180	0,885	0,095	0,190	745	12,5x15
	220	0,724	0,075	0,150	876	10x25
	330	0,483	0,055	0,110	1010	10x30
	330	0,483	0,060	0,120	979	12,5x20
	330	0,483	0,065	0,130	982	16x15
	470	0,339	0,044	0,088	1180	12,5x25
	470	0,339	0,048	0,096	1180	18x15
	560	0,284	0,040	0,080	1310	12,5x30
	680	0,234	0,036	0,072	1470	12,5x35
	680	0,234	0,045	0,090	1210	16x20
	820	0,194	0,034	0,068	1590	12,5x40
	820	0,194	0,038	0,076	1490	16x25
	820	0,194	0,036	0,072	1450	18x20
	1000	0,159	0,032	0,064	1890	16x31,5
1000	0,159	0,032	0,064	1720	18x25	
1200	0,133	0,028	0,056	2140	16x35,5	
1500	0,106	0,026	0,052	2410	16x40	
1500	0,106	0,026	0,052	1970	18x31,5	
1800	0,088	0,025	0,050	2310	18x35,5	
2200	0,072	0,024	0,048	2530	18x40	
63 (79) 1J	12	11,94	1,200	3,600	120	5x11,5
	18	7,962	0,850	2,600	135	5x15
	27	5,308	0,550	1,700	148	6,3x11,5
	39	3,675	0,380	1,100	153	6,3x15
	47	3,049	0,320	0,960	360	8x12
	56	2,559	0,230	0,690	448	10x12,5
	68	2,108	0,240	0,720	469	8x15
	68	2,108	0,170	0,510	553	10x16
	82	1,748	0,170	0,510	682	8x20
	120	1,194	0,120	0,360	676	10x20
	150	0,955	0,100	0,300	876	10x25
	150	0,955	0,110	0,330	745	12,5x15
180	0,796	0,085	0,260	1020	10x30	

V _{DC} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Impedance		Max. Ripple Current 105°C, 100kHz	Size ∅ DxL	
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)			
(V)	(μF)	(Ω)	(mArms)	(mm)			
63 (79) 1J	220	0,651	0,075	0,230	979	12,5x20	
	220	0,651	0,080	0,240	982	16x15	
	270	0,531	0,065	0,200	1180	12,5x25	
	330	0,434	0,065	0,200	1200	18x15	
	390	0,367	0,055	0,170	1310	12,5x30	
	390	0,367	0,057	0,170	1210	16x20	
	470	0,305	0,048	0,140	1470	12,5x35	
	470	0,305	0,052	0,160	1490	16x25	
	470	0,305	0,058	0,170	1460	18x20	
	560	0,256	0,042	0,130	1590	12,5x40	
	680	0,211	0,042	0,130	1890	16x31,5	
	680	0,211	0,050	0,150	1740	18x25	
	820	0,175	0,036	0,110	2140	16x35,5	
	820	0,175	0,042	0,130	1990	18x31,5	
	1000	0,143	0,032	0,096	2410	16x40	
	1000	0,143	0,035	0,110	2340	18x35,5	
	1200	0,119	0,032	0,096	2560	18x40	
	100 (125) 2A	5,6	22,750	1,900	7,600	57	5x11,5
		8,2	15,540	1,300	5,200	74	5x15
		12	10,620	1,100	4,400	78	6,3x11,5
18		7,077	0,620	2,500	85	6,3x15	
22		5,790	0,530	2,100	275	8x12	
27		4,718	0,470	1,900	319	10x12,5	
33		3,860	0,350	1,400	360	8x15	
33		3,860	0,320	1,300	424	10x16	
39		3,266	0,270	1,100	490	8x20	
56		2,275	0,250	1,000	499	10x20	
68		1,873	0,180	0,720	634	10x25	
68		1,873	0,200	0,800	613	12,5x15	
100		1,274	0,150	0,600	739	10x30	
100		1,274	0,130	0,520	805	12,5x20	
120		1,062	0,110	0,440	857	12,5x25	
120		1,062	0,130	0,500	706	16x15	
150		0,849	0,120	0,480	871	18x15	
180		0,708	0,090	0,360	1120	12,5x30	
180		0,708	0,110	0,440	916	16x20	
220		0,579	0,075	0,300	1240	12,5x35	
220	0,579	0,081	0,320	1290	16x25		
270	0,472	0,060	0,240	1330	12,5x40		
270	0,472	0,085	0,340	1170	18x20		
330	0,386	0,059	0,230	1630	16x31,5		
330	0,386	0,071	0,280	1500	18x25		
390	0,327	0,052	0,210	1750	16x35,5		
390	0,327	0,058	0,230	1630	18x31,5		
470	0,271	0,045	0,180	1920	16x40		
560	0,227	0,054	0,220	1920	18x35,5		
680	0,187	0,041	0,160	2100	18x40		

Custom products are available on request.

Life Time Diagram

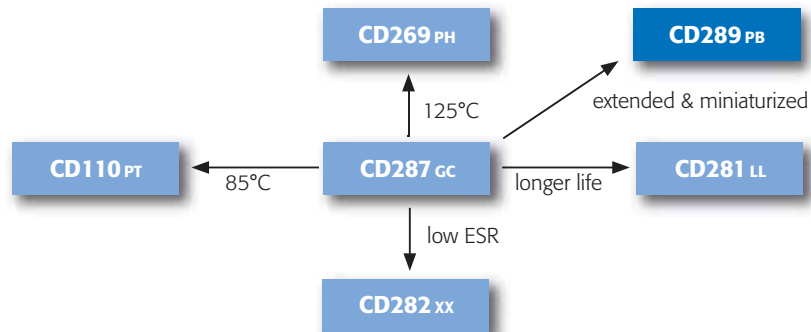


Multiplier of useful life as a function of ambient temperature and ripple current load
 I_a =actual ripple current 120 KHz
 I_r =rated ripple current at 100KHz, 105°C

Series CD289 PB

- Low Impedance
- Extended Range
- Miniaturized

4 000h at 105°C



Item	Characteristics														
Operating Temperature Range (°C)	-55 ~ +105														
Rated Voltage Range (V)	6,3~50														
Capacitance Tolerance (20°C, 120Hz)	±20%														
Leakage Current (µA)	0,02 CV or 3µA whichever is greater (at 20°C, after 2 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)														
Dissipation Factor (20°C, 120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6,3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>tan δ</td> <td>0,22</td> <td>0,19</td> <td>0,16</td> <td>0,14</td> <td>0,12</td> <td>0,10</td> </tr> </tbody> </table>	Rated Voltage (V)	6,3	10	16	25	35	50	tan δ	0,22	0,19	0,16	0,14	0,12	0,10
	Rated Voltage (V)	6,3	10	16	25	35	50								
tan δ	0,22	0,19	0,16	0,14	0,12	0,10									
when nominal capacitance is over 1 000µF tan δ shall be added 0,02 to the listed value with increase of every 1 000µF															
Characteristic of Low Temperature	Impedance at -10°C, 100kHz < 200% of initial specified value at +20°C, 100kHz														

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	4 000h	> 200 000h	2 000h	3 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±20% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 200% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,4 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

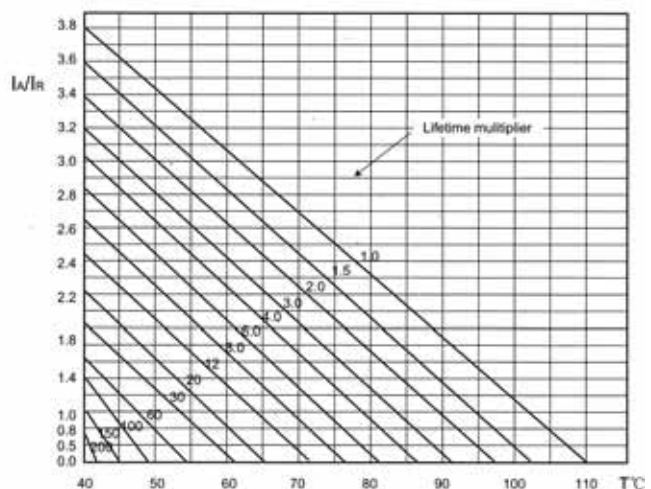
Frequency Coefficient

Frequency (Hz) \ Cap (µF)	120	1K	10K	≥ 100K
22~180	0,40	0,75	0,90	1,00
220~560	0,50	0,85	0,94	1,00
680~1 800	0,60	0,87	0,95	1,00
2 200~3 900	0,75	0,90	0,95	1,00
4 700~18 000	0,85	0,95	0,98	1,00

Temperature Coefficient

Temperature (°C) \ Rated Voltage (V)	+70	+85	+105
Factor	2,0	1,7	1,0

Life Time Diagram



Multiplier of useful life as a function of ambient temperature and ripple current load
 L_w = actual ripple current at 100kHz
 L_r = rated ripple current at 100kHz, 105°C

Ratings for Series CD289 PB

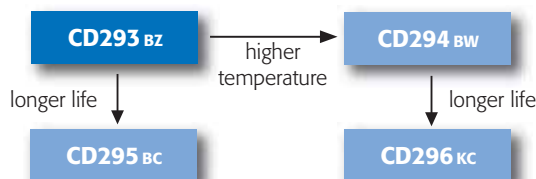
V _{pc} (Surge Voltage) Code	Capacitance (μF)	ESR 20°C, 100kHz (Ω)	Max. Impedance		Max. Ripple Current 105°C, 100kHz (mArms)	Size ∅ DxL (mm)
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
6.3 (7.2) 0J	150	2,335	0,500	1,000	175	5x11,5
	330	1,062	0,250	0,500	290	6,3x11,5
	470	0,745	0,180	0,360	400	6,3x15
	680	0,515	0,120	0,240	555	8x12
	820	0,427	0,090	0,180	760	10x12,5
	1000	0,350	0,090	0,180	730	8x16
	1200	0,292	0,080	0,160	810	8x20
	1200	0,292	0,068	0,136	1050	10x16
	1500	0,234	0,052	0,104	1220	10x20
	2200	0,159	0,045	0,090	1440	10x25
	2700	0,130	0,037	0,074	1690	10x30
	3300	0,106	0,038	0,076	1660	12,5x20
	3900	0,090	0,030	0,060	1950	12,5x25
	4700	0,075	0,025	0,050	2310	12,5x30
	5600	0,063	0,022	0,044	2510	12,5x35
	5600	0,063	0,022	0,044	2210	16x20
	6800	0,052	0,017	0,034	2870	12,5x40
	6800	0,052	0,022	0,044	2560	16x25
	6800	0,052	0,028	0,056	2490	18x20
	8200	0,043	0,019	0,038	3010	16x30
10000	0,035	0,017	0,034	3150	16x35,5	
10000	0,035	0,020	0,040	2740	18x25	
12000	0,029	0,015	0,030	3710	16x40	
12000	0,029	0,018	0,036	3330	18x30	
15000	0,023	0,016	0,032	3680	18x35,5	
18000	0,019	0,015	0,030	3800	18x40	
10 (13) 1A	100	3,025	0,500	1,000	175	5x11,5
	220	1,375	0,250	0,500	290	6,3x11,5
	330	0,917	0,180	0,360	400	6,3x15
	470	0,644	0,120	0,240	555	8x12
	680	0,445	0,090	0,180	730	8x16
	680	0,445	0,090	0,180	760	10x12,5
	1000	0,303	0,080	0,160	810	8x20
	1000	0,303	0,068	0,136	1050	10x16
	1200	0,252	0,052	0,104	1220	10x20
	1500	0,202	0,045	0,090	1440	10x25
	1800	0,168	0,037	0,074	1690	10x30
	2200	0,138	0,038	0,076	1660	12,5x20
	3300	0,092	0,030	0,060	1950	12,5x25
	3900	0,078	0,029	0,058	2310	12,5x30
	3900	0,078	0,029	0,038	2210	16x20
	4700	0,064	0,022	0,044	2510	12,5x35
	5600	0,054	0,017	0,034	2870	12,5x40
	5600	0,054	0,022	0,044	2560	16x25
	5600	0,054	0,028	0,056	2490	18x20
	6800	0,044	0,020	0,040	3010	16x30
6800	0,044	0,020	0,040	2740	18x25	
8200	0,037	0,017	0,034	3150	16x35,5	
8200	0,037	0,018	0,036	3330	18x30	
10000	0,030	0,015	0,030	3710	16x40	
10000	0,030	0,015	0,030	3680	18x35,5	
12000	0,025	0,015	0,030	3800	18x40	
16 (20) 1C	47	5,421	0,500	1,000	175	5x11,5
	100	2,548	0,250	0,500	290	6,3x11,5
	220	1,158	0,180	0,360	400	6,3x15
	330	0,772	0,120	0,240	555	8x12
	470	0,542	0,090	0,180	760	10x12,5
	560	0,455	0,080	0,160	810	8x20
	680	0,375	0,068	0,136	1050	10x16
	1000	0,255	0,052	0,104	1220	10x20
	1200	0,212	0,045	0,090	1440	10x25
	1500	0,170	0,037	0,074	1690	10x30
	1500	0,170	0,038	0,076	1660	12,5x20
	2200	0,116	0,030	0,060	1950	12,5x25
	2700	0,094	0,029	0,058	2310	12,5x30
	2700	0,094	0,029	0,058	2210	16x20
	3300	0,077	0,022	0,044	2510	12,5x35
	3900	0,065	0,028	0,056	2490	18x20
	3900	0,065	0,017	0,034	2870	12,5x40
	3900	0,065	0,022	0,044	2560	16x25
	4700	0,054	0,019	0,038	3010	16x30
	4700	0,054	0,020	0,040	2740	18x25
5600	0,045	0,017	0,034	3150	16x35,5	
5600	0,045	0,018	0,036	3330	18x30	
6800	0,037	0,015	0,030	3710	16x40	
8200	0,031	0,016	0,032	3680	18x35,5	
10000	0,025	0,015	0,030	3800	18x40	

V _{pc} (Surge Voltage) Code	Capacitance (μF)	ESR 20°C, 100kHz (Ω)	Max. Impedance		Max. Ripple Current 105°C, 100kHz (mArms)	Size ∅ DxL (mm)
			20°C, 100kHz (Ω)	-10°C, 100kHz (Ω)		
25 (32) 1E	47	4,743	0,500	1,000	175	5x11,5
	100	2,229	0,250	0,500	290	6,3x11,5
	150	1,486	0,180	0,360	400	6,3x15
	220	1,013	0,120	0,240	555	8x12
	330	0,676	0,090	0,180	730	8x16
	330	0,676	0,090	0,180	760	10x12,5
	390	0,572	0,080	0,160	810	8x20
	470	0,474	0,068	0,136	1050	10x16
	680	0,328	0,052	0,104	1220	10x20
	820	0,272	0,045	0,090	1440	10x25
	1000	0,223	0,037	0,074	1690	10x30
	1000	0,223	0,038	0,076	1660	12,5x20
	1500	0,149	0,030	0,060	1950	12,5x25
	1800	0,124	0,025	0,050	2310	12,5x30
	1800	0,124	0,029	0,058	2210	16x20
	2200	0,101	0,022	0,044	2510	12,5x35
	2200	0,101	0,028	0,056	2490	18x20
	2700	0,083	0,017	0,034	2870	12,5x40
	2700	0,083	0,022	0,044	2560	16x25
	3300	0,068	0,019	0,038	3010	16x30
3300	0,068	0,020	0,040	2740	18x25	
3900	0,057	0,017	0,034	3150	16x35,5	
3900	0,057	0,018	0,036	3330	18x30	
4700	0,047	0,015	0,030	3710	16x40	
4700	0,047	0,016	0,032	3680	18x35,5	
5600	0,040	0,015	0,030	3800	18x40	
35 (44) 1V	33	5,790	0,500	1,000	175	5x11,5
	56	3,412	0,250	0,500	290	6,3x11,5
	100	1,911	0,180	0,360	400	6,3x15
	150	1,274	0,120	0,240	555	8x12
	220	0,869	0,090	0,180	730	8x16
	220	0,869	0,090	0,180	760	10x12,5
	270	0,708	0,080	0,160	810	8x20
	330	0,579	0,068	0,136	1050	10x16
	470	0,407	0,052	0,104	1220	10x20
	560	0,341	0,045	0,090	1440	10x25
	680	0,281	0,037	0,074	1690	10x30
	680	0,281	0,038	0,076	1660	12,5x20
	1000	0,191	0,030	0,060	1950	12,5x25
	1200	0,159	0,025	0,050	2310	12,5x30
	1200	0,159	0,029	0,058	2210	16x20
	1500	0,127	0,022	0,044	2510	12,5x35
	1800	0,106	0,017	0,034	2870	12,5x40
	1800	0,106	0,022	0,044	2560	16x25
	1800	0,106	0,028	0,056	2490	18x20
	2200	0,087	0,019	0,038	3010	16x30
2200	0,087	0,020	0,040	2740	18x25	
2700	0,071	0,017	0,034	3150	16x35,5	
2700	0,071	0,018	0,036	3330	18x30	
3300	0,058	0,015	0,030	3710	16x40	
3300	0,058	0,016	0,032	3680	18x35,5	
3900	0,049	0,015	0,030	3800	18x40	
50 (63) 1H	22	7,238	0,900	1,800	155	5x11,5
	47	3,388	0,450	0,900	260	6,3x11,5
	68	2,342	0,310	0,620	360	6,3x15
	100	1,592	0,220	0,440	485	8x12
	120	1,327	0,160	0,320	635	8x16
	120	1,327	0,160	0,320	620	10x12,5
	180	0,885	0,120	0,240	730	8x20
	180	0,885	0,130	0,260	850	10x16
	220	0,724	0,088	0,180	1010	10x20
	330	0,483	0,073	0,150	1250	10x25
	390	0,408	0,054	0,110	1500	10x30
	390	0,408	0,059	0,120	1480	12,5x20
	560	0,284	0,044	0,088	1840	12,5x25
	680	0,234	0,039	0,078	2220	12,5x30
	680	0,234	0,048	0,096	1840	16x20
	820	0,194	0,033	0,066	2290	12,5x35
	820	0,194	0,042	0,084	1980	18x20
	1000	0,159	0,029	0,058	2500	12,5x40
	1000	0,159	0,034	0,068	2240	16x25
	1200	0,133	0,028	0,056	2700	16x30
1200	0,133	0,029	0,058	2610	18x25	
1500	0,106	0,025	0,050	2800	16x35,5	
1800	0,088	0,021	0,042	3200	16x40	
1800	0,088	0,025	0,050	3000	18x30	
2200	0,072	0,023	0,046	3100	18x35,5	
2700	0,059	0,020	0,040	3400	18x40	

Series CD293 BZ

- General Purpose

4 000h at 85°C



Item	Characteristics																																									
Operating Temperature Range (°C)	-40 ~ +85	-25 ~ +85																																								
Rated Voltage Range (V)	10~400	450~500																																								
Capacitance Tolerance (20°C, 120Hz)	±20%																																									
Leakage Current (µA)	0,01CV or 1,5mA whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF), V: Rated Voltage (V)																																									
Dissipation Factor (20°C, 120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage (V) \ Cap (µF)</th> <th>10~16</th> <th>25</th> <th>35~50</th> <th>63</th> <th>80~100</th> </tr> </thead> <tbody> <tr> <td>≤2 700</td> <td>–</td> <td>–</td> <td>0,20</td> <td>0,15</td> <td>0,15</td> </tr> <tr> <td>3 300~4 700</td> <td>–</td> <td>0,35</td> <td>0,25</td> <td>0,20</td> <td>0,15</td> </tr> <tr> <td>5 600~6 800</td> <td>0,40</td> <td>0,35</td> <td>0,30</td> <td>0,20</td> <td>0,20</td> </tr> <tr> <td>≥8 200</td> <td>0,40</td> <td>0,35</td> <td>0,35</td> <td>0,25</td> <td>–</td> </tr> </tbody> </table>	Rated Voltage (V) \ Cap (µF)	10~16	25	35~50	63	80~100	≤2 700	–	–	0,20	0,15	0,15	3 300~4 700	–	0,35	0,25	0,20	0,15	5 600~6 800	0,40	0,35	0,30	0,20	0,20	≥8 200	0,40	0,35	0,35	0,25	–	<table border="1"> <thead> <tr> <th>Rated Voltage \ Ø (mm)</th> <th>160~200</th> <th>250~500</th> </tr> </thead> <tbody> <tr> <td>22~30</td> <td>0,10</td> <td>0,15</td> </tr> <tr> <td>35</td> <td>0,12</td> <td>0,15</td> </tr> </tbody> </table>		Rated Voltage \ Ø (mm)	160~200	250~500	22~30	0,10	0,15	35	0,12	0,15
	Rated Voltage (V) \ Cap (µF)	10~16	25	35~50	63	80~100																																				
	≤2 700	–	–	0,20	0,15	0,15																																				
	3 300~4 700	–	0,35	0,25	0,20	0,15																																				
	5 600~6 800	0,40	0,35	0,30	0,20	0,20																																				
≥8 200	0,40	0,35	0,35	0,25	–																																					
Rated Voltage \ Ø (mm)	160~200	250~500																																								
22~30	0,10	0,15																																								
35	0,12	0,15																																								
Temperature Stability (120Hz)	<table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>10</th> <th>10~35</th> <th>50~100</th> <th>160~200</th> <th>250~400</th> <th>450~500</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>$Z_{-25°C}/Z_{+20°C}$</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>4</td> <td>4</td> </tr> <tr> <td>$Z_{-40°C}/Z_{+20°C}$</td> <td>18</td> <td>15</td> <td>10</td> <td>6</td> <td>8</td> <td>–</td> </tr> </tbody> </table>							Rated Voltage	10	10~35	50~100	160~200	250~400	450~500	Impedance Ratio	$Z_{-25°C}/Z_{+20°C}$	5	4	3	3	4	4	$Z_{-40°C}/Z_{+20°C}$	18	15	10	6	8	–													
	Rated Voltage	10	10~35	50~100	160~200	250~400	450~500																																			
Impedance Ratio	$Z_{-25°C}/Z_{+20°C}$	5	4	3	3	4	4																																			
	$Z_{-40°C}/Z_{+20°C}$	18	15	10	6	8	–																																			

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	4 000h	> 75 000h	2 000h	3 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±15% of initial value	Within ±10% of initial value	Within ±15% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 150% of specified value	Not more than 130% of specified value	Not more than 150% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur 1,2 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V) \ Frequency (Hz)	50	120	1K	10K	100K
≤ 50	0,95	1,00	1,10	1,15	1,15
63 ~ 100	0,95	1,00	1,16	1,30	1,33
≥ 160	0,95	1,00	1,20	1,50	1,55

Temperature Coefficient

Rated Voltage (V) \ Temperature (°C)	+40	+55	+70	+85
< 160	2,1	1,8	1,5	1,0
≥ 160	1,7	1,5	1,3	1,0

Useful Life

Depending on Ambient Temperature and Ripple Current

CD293	x1,0	x1,3	x1,5	x1,6	x1,7	x1,8	x1,9	x2,0	x2,1
40°C	90	71	58	52	47	41	36	32	27
45°C	64	50	41	37	33	29	25		
50°C	45	35	29	26	23				
55°C	32	25	20						
60°C	22	17	14						
65°C	16	12							
70°C	11	8							
75°C	8								
80°C	5								
85°C	4								

(khrs)

Ratings for Series CD293 BZ

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
10 (13) 1A	10000	63,694	2,50	22x25
	12000	59,713	2,90	22x25
	15000	53,079	3,20	22x30
	15000	53,079	3,10	25x25
	18000	48,655	3,60	22x35
	18000	48,655	3,60	25x30
	22000	43,428	4,00	22x40
	22000	43,428	4,10	25x35
	22000	43,428	4,10	30x25
	33000	38,603	4,60	25x40
	33000	38,603	4,80	30x30
	33000	38,603	4,80	35x25
	39000	36,747	5,20	25x45
	39000	36,747	5,30	30x35
	47000	33,880	5,80	25x50
	47000	33,880	6,00	30x40
	47000	33,880	6,00	35x30
	56000	31,278	6,70	30x45
	56000	31,278	6,80	35x35
	68000	28,100	7,50	30x50
68000	28,100	7,70	35x40	
82000	24,274	8,70	35x45	
16 (20) 1C	8200	67,966	2,20	22x25
	10000	55,732	2,60	22x30
	10000	55,732	2,60	25x25
	12000	53,079	2,90	22x35
	15000	47,771	3,30	22x40
	15000	47,771	3,30	25x30
	15000	47,771	3,40	30x25
	18000	44,232	3,80	22x45
	18000	44,232	3,70	25x35
	22000	43,428	4,20	22x50
	22000	43,428	4,20	25x40
	22000	43,428	4,20	30x30
	22000	43,428	4,40	35x25
	27000	41,283	5,00	25x45
	27000	41,283	5,00	30x35
	33000	38,603	5,60	30x40
	33000	38,603	5,60	35x30
	39000	34,705	6,20	30x45
	39000	34,705	6,30	35x35
	47000	30,492	7,00	30x50
47000	30,492	7,20	35x40	
56000	25,591	8,00	35x45	
25 (32) 1E	5600	85,305	2,00	22x25
	6800	70,251	2,30	22x30
	6800	70,251	2,30	25x25
	8200	58,257	2,60	22x35
	10000	55,732	2,90	22x40
	10000	55,732	2,80	25x30
	10000	55,732	3,00	30x25
	12000	46,444	3,30	22x45
	12000	46,444	3,20	25x35
	12000	46,444	3,40	30x30
	15000	42,463	3,70	25x40
	15000	42,463	3,90	35x25
	18000	39,809	4,30	25x50
	18000	39,809	4,20	30x35
	18000	39,809	4,40	35x30
	22000	36,190	4,80	30x40
	22000	36,190	5,00	35x35
	33000	26,539	6,50	35x40
	39000	22,456	7,50	35x45
	35 (44) 1V	3300	96,506	1,80
3900		89,825	2,10	22x30
4700		84,700	2,20	25x25
5600		71,087	2,30	22x35
5600		71,087	2,30	25x30
6800		58,543	2,90	22x40
6800		58,543	2,60	25x35
6800		58,543	2,70	30x25
8200		58,257	2,80	22x50
8200		58,257	2,80	25x40
8200		58,257	2,80	30x30
8200		58,257	2,90	35x25
10000		47,771	3,10	25x45
10000		47,771	3,20	30x35
12000		46,444	3,50	25x50
12000		46,444	3,50	30x40
12000		46,444	3,60	35x30
15000		42,463	4,10	30x45
15000		42,463	4,10	35x35
18000		35,386	4,60	30x50
18000	35,386	4,70	35x40	
22000	32,571	5,30	35x45	
27000	26,539	7,00	35x50	

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
50 (63) 1H	2200	130,284	1,70	22x25
	2700	106,157	1,90	22x30
	2700	106,157	1,90	25x25
	3300	96,506	2,00	22x35
	3900	81,659	2,10	22x35
	3900	81,659	2,10	25x30
	3900	81,659	2,40	30x25
	4700	67,760	2,40	22x40
	4700	67,760	2,40	25x35
	4700	67,760	2,40	30x30
	5600	62,557	2,50	22x50
	5600	62,557	2,50	25x40
	5600	62,557	2,50	30x30
	5600	62,557	2,60	35x25
	6800	53,859	2,80	25x45
	6800	53,859	2,80	30x35
	8200	48,547	3,20	25x50
	8200	48,547	3,00	30x40
	8200	48,547	3,00	35x30
	63 (79) 1J	10000	47,771	3,40
10000		47,771	3,40	35x35
12000		39,809	3,80	30x50
12000		39,809	3,80	35x40
15000		37,155	4,50	35x50
1500		127,389	1,60	22x25
1800		106,157	1,75	22x30
2200		101,332	2,00	22x30
2200		101,332	2,00	25x25
2700		88,464	2,20	22x35
2700		88,464	2,30	25x30
3300		72,380	2,30	22x40
3300		72,380	2,30	25x35
3300		72,380	2,30	30x25
3900		61,244	2,50	22x45
3900		61,244	2,60	25x40
3900		61,244	2,60	30x30
4700		60,984	2,80	30x30
5600		51,183	3,10	25x45
5600		51,183	3,20	30x35
5600	51,183	3,30	35x30	
6800	46,834	3,60	30x40	
6800	46,834	2,70	35x25	
6800	46,834	3,70	35x35	
8200	42,722	3,70	30x50	
8200	42,722	3,80	35x40	
10000	39,809	4,30	35x45	
12000	37,155	4,80	35x50	
1000	191,083	1,30	22x25	
1200	159,236	1,50	22x30	
1500	127,389	1,70	25x25	
1800	115,004	1,90	22x35	
1800	115,004	1,90	25x30	
2200	108,570	2,10	22x40	
2200	108,570	2,20	25x35	
2200	108,570	2,20	30x25	
2700	88,464	2,50	22x50	
2700	88,464	2,50	25x40	
2700	88,464	2,50	30x30	
2700	88,464	2,50	35x25	
3300	72,380	2,80	25x45	
3300	72,380	2,80	30x35	
3900	61,244	3,10	25x50	
3900	61,244	3,20	30x40	
3900	61,244	3,20	35x30	
4700	57,596	3,60	30x45	
4700	57,596	3,60	35x35	
5600	48,339	3,50	30x50	
5600	48,339	3,50	35x40	
6800	46,834	4,10	35x50	
680	187,336	1,10	22x25	
820	155,352	1,20	22x30	
1000	127,389	1,40	25x25	
1200	119,427	1,60	22x35	
1200	119,427	1,60	25x30	
1500	95,541	1,80	22x40	
1500	95,541	1,70	25x35	
1500	95,541	1,80	30x25	
1800	88,464	2,10	22x50	
1800	88,464	2,00	25x40	
1800	88,464	2,10	30x30	
1800	88,464	2,20	35x25	
2200	72,380	2,20	25x45	
2200	72,380	2,30	30x35	
2200	72,380	2,50	35x30	
2700	70,771	2,60	25x50	
2700	70,771	2,70	30x40	
3300	62,729	3,00	30x45	
3300	62,729	3,10	35x35	
3900	61,244	3,40	30x50	
3900	61,244	3,40	35x40	
4700	50,820	4,00	35x50	

Custom products are available on request.

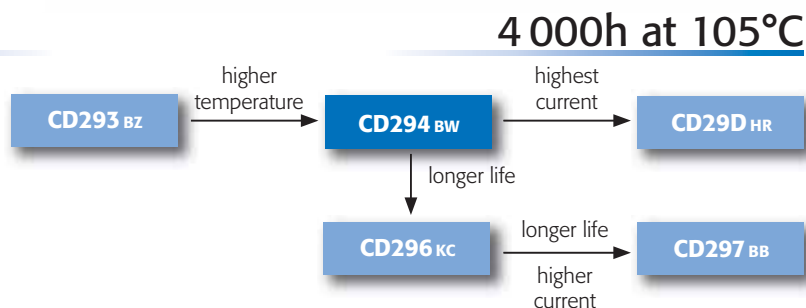
V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
160 (200) 2C	220	723,799	1,10	22x25
	270	589,762	1,20	22x25
	330	482,532	1,30	22x25
	390	408,297	1,50	22x30
	390	408,297	1,50	25x25
	470	338,799	1,65	25x30
	560	284,349	1,90	22x35
	560	284,349	1,90	25x30
	560	284,349	2,00	30x25
	680	234,170	2,10	22x40
	680	234,170	2,20	25x35
	820	194,190	2,50	22x50
	820	194,190	2,40	25x40
	820	194,190	2,50	30x30
	820	194,190	2,40	35x25
	1000	191,083	2,70	25x45
	1000	191,083	2,80	30x35
	1000	191,083	2,70	35x30
	1200	159,236	3,10	25x50
	1200	159,236	3,20	30x40
1200	159,236	3,00	35x35	
1500	127,389	3,70	30x45	
1500	127,389	3,50	35x40	
1800	106,157	3,90	35x45	
2200	86,856	4,50	35x50	
180 (225) 2K	270	707,714	1,20	22x25
	330	579,039	1,40	22x30
	390	489,956	1,50	25x25
	470	406,559	1,70	22x35
	470	406,559	1,70	25x30
	470	406,559	1,80	30x25
	560	341,219	1,90	22x40
	560	341,219	2,00	25x35
	680	281,004	2,30	22x50
	680	281,004	2,20	25x40
	680	281,004	2,30	30x30
	680	281,004	2,20	35x25
	820	233,028	2,50	25x45
	820	233,028	2,60	30x35
	820	233,028	2,50	35x30
	1000	191,083	2,90	25x50
	1000	191,083	2,90	30x40
	1200	159,236	3,30	30x45
	1200	159,236	3,10	35x35
	1500	127,389	3,60	35x45
1800	106,157	4,10	35x50	
200 (250) 2D	220	868,558	1,10	22x25
	270	707,714	1,20	22x30
	330	579,039	1,40	22x30
	330	579,039	1,40	25x25
	390	489,956	1,60	22x35
	390	489,956	1,60	25x30
	470	406,559	1,80	22x40
	470	406,559	1,90	30x25
	560	341,219	2,00	22x45
	560	341,219	2,00	25x35
	560	341,219	2,10	30x30
	560	341,219	2,00	35x25
	680	281,004	2,30	25x40
	680	281,004	2,40	30x35
	820	233,028	2,60	25x50
	820	233,028	2,70	30x40
	820	233,028	2,50	35x30
	1000	191,083	3,10	30x45
	1000	191,083	2,80	35x35
	1200	159,236	3,40	30x50
1200	159,236	3,20	35x40	
1500	127,389	3,80	35x50	
250 (300) 2E	100	1910,828	0,68	22x25
	180	1061,571	0,94	22x25
	220	868,558	1,10	22x30
	220	868,558	1,10	25x25
	270	707,714	1,20	22x35
	330	579,039	1,40	22x40
	330	579,039	1,40	25x30
	330	579,039	1,50	30x25
	390	489,956	1,60	22x45
	390	489,956	1,60	25x35
	470	406,559	1,80	22x50
	470	406,559	1,80	25x40
	470	406,559	1,80	30x30
	470	406,559	2,40	35x25
	560	341,219	2,00	25x45
	560	341,219	2,00	30x35
	680	281,004	2,30	30x40
	680	281,004	2,60	35x30
	820	233,028	2,60	30x45
	820	233,028	2,60	35x35
1000	191,083	3,00	35x40	
1200	159,236	3,40	35x45	

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
350 (400) 2V	82	2330,278	0,64	22x25
	100	1910,828	0,80	22x25
	120	1592,357	0,82	22x30
	120	1592,357	0,81	25x25
	150	1273,885	0,94	22x35
	150	1273,885	0,94	25x30
	180	1061,571	1,10	22x40
	180	1061,571	1,10	30x25
	220	868,558	1,20	22x45
	220	868,558	1,20	25x35
	220	868,558	1,20	30x30
	220	868,558	1,30	35x25
	270	707,714	1,40	25x45
	270	707,714	1,40	30x35
	330	579,039	1,60	25x50
	330	579,039	1,60	35x30
	390	489,956	1,70	30x40
	390	489,956	1,80	35x35
	470	406,559	2,00	30x45
	470	406,559	2,00	35x40
560	341,219	2,30	35x45	
680	281,004	2,60	35x50	
820	233,028	2,80	35x60	
400 (450) 2G	68	2341,701	0,55	22x25
	82	1941,898	0,65	22x25
	100	1592,357	0,70	22x30
	100	1592,357	0,70	25x25
	120	1326,964	0,79	22x35
	150	1061,571	0,90	22x40
	150	1061,571	0,89	25x30
	150	1061,571	0,95	30x25
	180	884,643	1,00	22x45
	180	884,643	1,00	25x35
	180	884,643	1,10	30x30
	180	884,643	1,20	35x25
	220	723,798	1,10	22x50
	220	723,798	1,20	25x40
	220	723,798	1,20	30x35
	270	589,762	1,30	25x45
	270	589,762	1,40	30x40
	270	589,762	1,50	35x30
	330	579,039	1,60	30x45
	330	579,039	1,70	35x35
390	489,956	1,80	30x50	
390	489,956	1,80	35x40	
470	406,559	2,10	35x45	
560	341,219	2,30	35x50	
680	281,004	2,50	35x50	
450 (500) 2W	68	2810,041	0,57	22x30
	82	2330,278	0,68	22x25
	100	1910,828	0,72	22x35
	100	1910,828	0,73	25x30
	120	1592,357	0,80	22x40
	120	1592,357	0,83	25x35
	150	1273,885	0,95	22x50
	150	1273,885	0,95	25x40
	150	1273,885	0,98	30x30
	180	1061,571	1,10	25x45
	180	1061,571	1,10	30x35
	180	1061,571	1,20	35x25
	220	868,558	1,20	25x50
	220	868,558	1,30	30x40
	220	868,558	1,30	35x30
	270	707,714	1,40	30x45
	270	707,714	1,50	35x35
	330	579,039	1,70	30x50
	390	489,956	1,90	35x45
	470	406,559	2,20	35x50
100	1910,828	0,90	30x25	
120	1592,357	1,00	30x30	
120	1592,357	1,00	35x25	
150	1273,885	1,20	30x35	
180	1061,571	1,40	30x40	
180	1061,571	1,30	35x30	
220	868,558	1,60	30x45	
220	868,558	1,50	35x35	
270	707,714	1,80	30x50	
270	707,714	1,70	35x40	
330	579,039	2,00	35x45	
390	489,956	2,30	35x50	

Custom products are available on request.

Series CD294 BW

- Higher Temperature
- UPS
- SMPS
- Inverter
- Drives/Controls



Item	Characteristics																
Operating Temperature Range (°C)	-40 ~ +105 (≥160V: -25 ~ +105)																
Rated Voltage Range (V)	16~500																
Capacitance Tolerance (20°C, 120Hz)	±20%																
Leakage Current (µA)	0,01CV or 1,5mA, whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF), V: Rated Voltage (V)																
Dissipation Factor (20°C, 120Hz)	<table border="1"> <thead> <tr> <th>WV (V)</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63~100</th> <th>160~400</th> <th>450~500</th> </tr> </thead> <tbody> <tr> <td>tan δ</td> <td>0,50</td> <td>0,40</td> <td>0,35</td> <td>0,30</td> <td>0,20</td> <td>0,15</td> <td>0,20</td> </tr> </tbody> </table>	WV (V)	16	25	35	50	63~100	160~400	450~500	tan δ	0,50	0,40	0,35	0,30	0,20	0,15	0,20
	WV (V)	16	25	35	50	63~100	160~400	450~500									
tan δ	0,50	0,40	0,35	0,30	0,20	0,15	0,20										
Temperature Stability (120Hz)	<table border="1"> <thead> <tr> <th colspan="2">Rated Voltage (V)</th> <th>10~100</th> <th>160~200</th> <th>250~500</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio</td> <td>$Z_{-25°C}/Z_{+20°C}$</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>$Z_{-40°C}/Z_{+20°C}$</td> <td>15</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	Rated Voltage (V)		10~100	160~200	250~500	Impedance Ratio	$Z_{-25°C}/Z_{+20°C}$	4	4	4	$Z_{-40°C}/Z_{+20°C}$	15	-	-		
Rated Voltage (V)		10~100	160~200	250~500													
Impedance Ratio	$Z_{-25°C}/Z_{+20°C}$	4	4	4													
	$Z_{-40°C}/Z_{+20°C}$	15	-	-													

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	4 000h	> 200 000h	2 000h	3 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,6 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)					
	50	120	1K	10K	20K	100K
≤ 100	0,95	1,00	1,10	1,15	1,15	1,20
160~250	0,87	1,00	1,11	1,18	1,20	1,40
≥ 350	0,80	1,00	1,14	1,14	1,20	1,65

Temperature Coefficient

Temperature (°C)	+40	+55	+70	+85	+105
Factor	2,7	2,5	2,1	1,7	1,0

Useful Life

Depending on Ambient Temperature and Ripple Current

CD294	x1,0	x1,5	x2,0	x2,2	x2,3	x2,4	x2,5	x2,6	x2,7
40°C	200	200	194	162	148	134	121	109	97
45°C	200	197	137	115	104	95	85	77	69
50°C	181	139	97	81	74	67	60	54	48
55°C	128	98	68	57	52	47	42	38	34
60°C	90	69	48	40	37	33	30	27	
65°C	64	49	34	28	26	23	21		
70°C	45	34	24	20	18	16			
75°C	32	24	17	14	13				
80°C	22	17	12	10					
85°C	16	12	8						
90°C	11	8							
95°C	8								
100°C	5								
105°C	4								

Ratings for Series CD294 BW

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
10 (13) 1A	10000	95,541	1,30	22x25
	12000	79,618	1,50	22x30
	15000	63,694	1,90	22x40
	18000	53,079	2,20	25x30
	22000	43,428	2,60	25x40
16 (20) 1C	6800	117,085	1,60	22x25
	8200	97,095	1,80	22x25
	10000	79,618	1,99	22x30
	10000	79,618	1,99	25x25
	12000	66,348	2,28	22x35
	12000	66,348	2,30	25x30
	12000	66,348	2,38	30x25
	15000	53,079	2,64	22x40
	15000	53,079	2,68	25x35
	18000	44,232	2,98	22x45
	18000	44,232	3,04	25x40
	18000	44,232	3,00	30x30
	18000	44,232	3,10	35x25
	22000	36,190	3,40	25x45
	22000	36,190	3,39	30x35
	27000	29,488	3,81	25x50
	27000	29,488	3,83	30x40
	27000	29,488	3,74	35x30
	33000	24,127	4,30	30x45
	33000	24,127	4,24	35x35
	39000	20,415	4,74	30x50
39000	20,415	4,72	35x40	
47000	16,940	5,27	35x45	
25 (32) 1E	4700	135,520	1,55	22x25
	5600	113,740	1,70	22x25
	6800	93,668	1,91	22x30
	6800	93,668	1,91	25x25
	8200	77,676	2,14	22x35
	8200	77,676	2,16	25x30
	8200	77,676	2,25	30x25
	10000	63,694	2,40	22x40
	10000	63,694	2,44	25x35
	12000	53,079	2,69	22x45
	12000	53,079	2,74	25x40
	12000	53,079	2,70	30x30
	12000	53,079	2,80	35x25
	15000	42,463	3,15	25x45
	15000	42,463	3,13	30x35
	15000	42,463	3,22	35x30
	18000	35,386	3,54	25x50
	18000	35,386	3,54	30x40
	22000	28,952	4,24	30x45
	22000	28,952	3,96	35x35
	27000	23,590	4,75	35x45
33000	19,301	5,39	35x50	
35 (44) 1V	3300	168,886	1,43	22x25
	3900	142,904	1,65	22x30
	4700	118,580	1,78	25x25
	5600	99,522	2,02	22x35
	5600	99,522	2,04	25x30
	5600	99,522	2,12	30x25
	6800	81,960	2,28	22x40
	6800	81,960	2,31	25x35
	8200	67,966	2,67	22x50
	8200	67,966	2,60	25x40
	8200	67,966	2,56	30x30
	8200	67,966	2,78	35x25
	10000	55,732	2,92	25x45
	10000	55,732	2,92	30x35
	12000	46,444	3,26	25x50
	12000	46,444	3,28	30x40
	12000	46,444	3,20	35x30
	15000	37,155	3,74	30x45
	15000	37,155	3,69	35x35
	18000	30,962	4,16	35x40
	22000	25,333	4,92	35x50
50 (63) 1H	1800	265,393	1,31	22x25
	2200	217,140	1,45	22x35
	2700	176,929	1,70	22x30
	2700	176,929	1,70	25x25
	3300	144,760	1,98	22x35
	3300	144,760	2,00	25x30
	3900	122,489	2,25	22x40
	3900	122,489	2,28	25x35
	3900	122,489	2,22	30x25
	4700	101,640	2,56	22x45
	4700	101,640	2,58	30x30
	4700	101,640	2,67	35x25
	5600	85,305	2,89	22x50
	5600	85,305	2,81	25x40
	5600	85,305	2,95	30x35

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
50 (63) 1H	6800	70,251	3,37	25x50
	6800	70,251	3,39	30x40
	6800	70,251	3,31	35x30
	8200	58,257	3,71	30x45
	8200	58,257	3,66	35x35
	10000	47,771	4,09	30x50
	10000	47,771	4,07	35x40
	12000	39,809	4,50	35x45
63 (79) 1J	1200	265,393	1,25	22x25
	1500	212,314	1,35	22x25
	1800	176,929	1,52	22x30
	1800	176,929	1,52	25x25
	2200	144,760	1,73	22x35
	2200	144,760	1,75	25x30
	2700	117,952	1,97	22x40
	2700	117,952	1,99	25x35
	2700	117,952	1,93	30x25
	3300	96,506	2,32	22x50
	3300	96,506	2,27	25x40
	3300	96,506	2,24	30x30
	3300	96,506	2,41	35x25
	3900	81,659	2,54	25x45
	3900	81,659	2,55	30x35
	4700	67,760	2,88	25x50
	4700	67,760	2,90	30x40
	4700	67,760	2,83	35x30
	5600	56,870	3,28	30x45
	5600	56,870	3,24	35x35
	6800	46,834	3,73	30x50
6800	46,834	3,71	35x40	
8200	38,838	4,16	35x45	
10000	31,847	4,69	35x50	
820	388,380	1,11	22x25	
1000	318,471	1,25	22x25	
1200	265,393	1,39	22x30	
1200	265,393	1,39	25x25	
1500	212,314	1,61	22x35	
1500	212,314	1,62	25x30	
1800	176,929	1,83	22x40	
1800	176,929	1,81	30x25	
2200	144,760	2,09	22x45	
2200	144,760	2,01	25x35	
2200	144,760	2,10	30x30	
2200	144,760	2,17	35x25	
2700	117,952	2,43	25x45	
2700	117,952	2,43	30x35	
3300	96,506	2,76	25x50	
3300	96,506	2,78	30x40	
3300	96,506	2,71	35x30	
3900	81,659	3,12	30x45	
3900	81,659	3,07	35x35	
4700	67,760	3,56	30x50	
4700	67,760	3,50	35x40	
5600	56,870	3,87	35x45	
6800	46,834	4,19	35x50	
80 (100) 1K	560	568,699	1,07	22x25
	680	468,340	1,20	22x25
	820	388,380	1,35	22x30
	820	388,380	1,35	25x25
	1000	318,471	1,54	22x35
	1000	318,471	1,56	25x30
	1200	265,393	1,76	25x35
	1200	265,393	1,71	30x25
	1200	265,393	1,74	22x40
	1500	212,314	1,99	22x45
	1500	212,314	2,03	25x40
	1500	212,314	2,00	30x30
	1500	212,314	2,07	35x25
	1800	176,929	2,28	25x45
	1800	176,929	2,27	30x35
	1800	176,929	2,27	30x35
	2200	144,760	2,57	25x50
	2200	144,760	2,59	30x40
	2200	144,760	2,52	35x30
	2700	117,952	2,94	30x45
	2700	117,952	2,90	35x35
3300	96,506	3,32	30x50	
3300	96,506	3,31	35x40	
3900	81,659	3,69	35x45	
4700	67,760	4,14	35x50	
160 (200) 2C	330	579,039	1,16	22x25
	390	489,956	1,43	22x30
	470	406,559	1,52	22x35
	470	406,559	1,55	25x25
	560	341,219	1,62	22x40

Custom products are available on request.

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
160 (200) 2C	560	341,219	1,73	25x30
	680	281,004	1,70	22x45
	680	281,004	1,81	25x35
	680	281,004	1,82	30x25
	820	233,028	1,81	22x50
	820	233,028	1,98	25x40
	820	233,028	1,98	30x30
	820	233,028	1,93	35x25
	1000	191,083	2,04	25x45
	1000	191,083	2,14	30x35
	1200	159,236	2,12	25x50
	1200	159,236	2,22	30x40
	1200	159,236	2,40	35x30
	1500	127,389	2,46	30x45
	1500	127,389	2,53	35x35
	1800	106,157	2,98	35x45
2200	86,856	3,10	35x50	
180 (225) 2K	270	707,714	1,08	22x25
	330	579,039	1,30	22x30
	390	489,956	1,35	25x25
	470	406,559	1,50	22x35
	470	406,559	1,62	25x30
	560	341,219	1,62	22x40
	560	341,219	1,69	25x35
	560	341,219	1,67	30x25
	680	281,004	1,76	22x50
	680	281,004	1,72	25x40
	680	281,004	1,74	30x30
	680	281,004	1,92	35x25
	820	233,028	1,78	25x45
	820	233,028	1,85	30x35
	1000	191,083	1,91	25x50
	1000	191,083	2,01	30x40
1000	191,083	2,16	35x30	
1200	159,236	2,19	30x45	
1200	159,236	2,34	35x35	
1500	127,389	2,36	30x50	
1500	127,389	2,56	35x40	
1800	106,157	2,67	35x45	
220	868,558	1,08	22x25	
200 (250) 2D	270	707,714	1,20	22x30
	330	579,039	1,30	22x30
	330	579,039	1,35	25x25
	390	489,956	1,41	22x35
	470	406,559	1,50	22x40
	470	406,559	1,47	25x30
	470	406,559	1,56	30x25
	560	341,219	1,58	22x45
	560	341,219	1,65	25x35
	680	281,004	1,68	22x50
	680	281,004	1,80	25x40
	680	281,004	1,82	30x30
	680	281,004	1,96	35x25
	820	233,028	1,87	25x50
	820	233,028	1,99	30x35
	820	233,028	2,07	35x30
1000	191,083	2,17	30x45	
1000	191,083	2,22	35x35	
1200	159,236	2,22	30x50	
1200	159,236	2,42	35x40	
1500	127,389	2,59	35x45	
1800	106,157	2,70	35x50	
250 (300) 2E	180	1061,571	0,94	22x25
	220	868,558	1,10	22x30
	220	868,558	1,15	25x25
	270	707,714	1,13	22x35
	330	579,039	1,20	22x40
	330	579,039	1,30	25x30
	330	579,039	1,30	30x25
	390	489,956	1,26	22x45
	390	489,956	1,41	25x35
	470	406,559	1,37	22x50
	470	406,559	1,52	25x40
	470	406,559	1,36	30x30
	470	406,559	1,40	35x25
	560	341,219	1,59	25x45
	560	341,219	1,57	30x35
	560	341,219	1,56	35x30
680	281,004	1,66	25x50	
680	281,004	1,76	30x40	
820	233,028	1,83	30x45	
820	233,028	1,82	35x35	
1000	191,083	1,87	30x50	
1000	191,083	1,99	35x40	
1200	159,236	2,10	35x45	

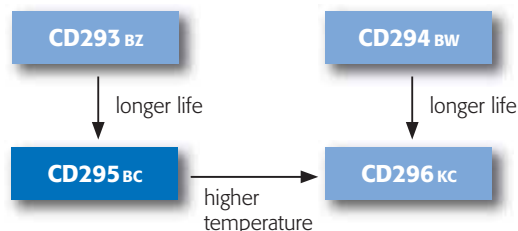
V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
350 (400) 2V	68	2529,037	0,56	22x25
	82	2097,250	0,68	22x25
	100	1719,745	0,70	22x30
	100	1719,745	0,70	25x25
	120	1433,121	0,73	22x35
	150	1146,497	0,79	22x40
	150	1146,497	0,82	25x30
	150	1146,497	0,82	30x25
	180	955,414	0,81	22x45
	180	955,414	0,89	25x35
	180	955,414	0,90	30x30
	220	781,702	0,93	22x50
	220	781,702	0,97	25x40
	220	781,702	0,98	35x25
	270	636,943	1,01	25x50
	270	636,943	1,05	30x35
270	636,943	1,01	35x30	
330	521,135	1,16	30x45	
330	521,135	1,16	35x35	
390	440,960	1,26	30x50	
390	440,960	1,26	35x40	
470	365,903	1,35	35x45	
560	307,097	1,51	35x50	
680	252,904	1,65	35x50	
400 (450) 2G	68	2529,037	0,47	22x25
	82	2097,250	0,56	22x30
	82	2097,250	0,65	25x25
	100	1719,745	0,60	22x30
	120	1433,121	0,64	22x35
	120	1433,121	0,70	25x30
	120	1433,121	0,78	30x25
	150	1146,497	0,70	22x40
	150	1146,497	0,73	25x35
	180	955,414	0,78	22x50
	180	955,414	0,82	25x40
	180	955,414	0,83	30x30
	180	955,414	0,86	35x25
	220	781,702	0,87	25x45
	220	781,702	0,86	30x35
	270	636,943	0,94	25x50
270	636,943	0,95	30x40	
270	636,943	0,91	35x30	
330	521,135	1,11	30x45	
330	521,135	1,13	35x35	
390	440,960	1,15	30x50	
390	440,960	1,26	35x40	
470	365,903	1,31	35x45	
560	307,097	1,50	35x50	
56	3070,974	0,47	22x25	
450 (500) 2W	68	2529,037	0,56	22x30
	68	2529,037	0,65	25x25
	82	2097,250	0,64	22x35
	100	1719,745	0,70	22x40
	100	1719,745	0,70	25x30
	100	1719,745	0,78	30x25
	120	1433,121	0,73	22x45
	120	1433,121	0,73	25x35
	150	1146,497	0,78	22x50
	150	1146,497	0,82	25x40
	150	1146,497	0,83	30x30
	150	1146,497	0,86	35x25
	180	955,414	0,87	25x45
	180	955,414	0,86	30x35
	220	781,702	0,94	25x50
	220	781,702	0,95	30x40
220	781,702	0,91	35x30	
270	636,943	1,11	30x45	
270	636,943	1,13	35x35	
330	521,135	1,15	30x50	
330	521,135	1,26	35x40	
390	440,960	1,31	35x45	
470	365,903	1,50	35x50	
500 (550) 2H	39	4409,603	0,35	22x30
	47	3659,032	0,41	22x35
	56	3070,974	0,47	22x40
	68	2529,037	0,54	22x45
	82	2097,250	0,62	25x40
	100	1719,745	0,67	25x45
	120	1433,121	0,77	25x50
	120	1433,121	0,72	35x30
	150	1146,497	0,85	30x40
	180	955,414	1,01	30x50
	220	781,702	1,12	35x45
	270	636,943	1,29	35x50

Custom products are available on request.

Series CD295 BC

- Long Life at 85°C
- High Ripple Current

6 000h at 85°C



Item	Characteristics									
Operating Temperature Range (°C)	-40 ~ +85				-25 ~ +85					
Rated Voltage Range (V)	10~400				450					
Capacitance Tolerance (20°C, 120Hz)	±20%									
Leakage Current (µA)	0,01CV or 1,5mA whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)									
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	10	16	25	35	50	63~100	160~250	350~450	
	tan δ	0,80	0,60	0,50	0,40	0,30	0,20	0,15	0,15	
Temperature Stability (120Hz)	Rated Voltage (V)	10	16~35	50~100	160~200	250~400	450			
	Impedance Ratio	Z _{-25°C} /Z _{+20°C}	5	4	3	3	4	4		
		Z _{-40°C} /Z _{+20°C}	18	15	10	6	8	-		

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	6 000h	> 100 000h	5 000h	5 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur 1,2 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)				
	50	120	1K	10K	100K
≥ 50	0,95	1,00	1,10	1,15	1,15
63~100	0,95	1,00	1,16	1,30	1,33
≥ 160	0,90	1,00	1,20	1,50	1,55

Temperature Coefficient

Rated Voltage (V)	Temperature (°C)			
	+40	+55	+70	+85
< 160	2,1	1,8	1,5	1,0
≥ 160	1,7	1,5	1,3	1,0

Useful Life

Depending on Ambient Temperature and Ripple Current

CD295	x1,0	x1,3	x1,5	x1,6	x1,7	x1,8	x1,9	x2,0	x2,1
40°C	135	106	88	79	70	62	54	48	41
45°C	96	75	62	55	49	44	38		
50°C	67	53	44	39	35				
55°C	48	37	31						
60°C	33	26	22						
65°C	24	18							
70°C	16	13							
75°C	12								
80°C	8								
85°C	6								

(khrs)

Ratings for Series CD295 BC

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL	
(V)	(µF)	(mΩ)	(Arms)	(mm)	
10 (13) 1A	10000	111,465	2,50	22x25	
	12000	92,887	2,70	22x25	
	15000	74,310	3,20	22x30	
	15000	74,310	3,10	25x25	
	18000	61,925	3,60	22x35	
	18000	61,925	3,60	25x30	
	22000	50,666	4,00	22x40	
	22000	50,666	4,10	25x35	
	22000	50,666	4,10	30x25	
16 (20) 1C	8200	97,095	2,20	22x25	
	10000	79,618	2,60	22x30	
	10000	79,618	2,60	25x25	
	12000	66,348	2,90	22x35	
	15000	53,079	3,30	22x40	
	15000	53,079	3,30	25x30	
	15000	53,079	3,40	30x25	
	18000	44,232	3,80	22x45	
	18000	44,232	3,70	25x35	
	22000	36,190	4,20	22x50	
	22000	36,190	4,20	25x40	
	22000	36,190	4,20	30x30	
	22000	36,190	4,40	35x25	
	25 (32) 1E	5600	127,957	2,00	22x25
		6800	105,377	2,30	22x30
6800		105,377	2,30	25x25	
8200		87,385	2,60	22x35	
10000		71,656	2,90	22x40	
10000		71,656	2,80	25x30	
10000		71,656	3,00	30x25	
12000		59,713	3,30	22x45	
12000		59,713	3,20	25x35	
12000		59,713	3,40	30x30	
15000		47,771	3,70	25x40	
15000		47,771	3,90	35x25	
18000		39,809	4,30	25x50	
18000		39,809	4,20	30x35	
18000		39,809	4,40	35x30	
22000		32,571	4,80	30x40	
22000		32,571	5,00	35x35	
35 (44) 1V		3300	168,886	1,80	22x25
		3900	142,904	2,10	22x30
		4700	118,580	2,20	25x25
	5600	99,522	2,30	22x35	
	5600	99,522	2,30	25x30	
	6800	81,960	2,90	22x40	
	6800	81,960	2,60	25x35	
	6800	81,960	2,70	30x25	
	8200	67,966	2,80	22x50	
	8200	67,966	2,80	25x40	
	8200	67,966	2,80	30x30	
	8200	67,966	2,90	35x25	
	10000	46,444	3,10	25x45	
	10000	55,732	3,20	30x35	
	12000	46,444	3,50	25x50	
	12000	46,444	3,50	30x40	
	12000	46,444	3,60	35x30	
	15000	37,155	4,10	30x45	
	15000	37,155	4,10	35x35	
	18000	30,962	4,60	30x50	
18000	30,962	4,70	35x40		
22000	25,333	5,30	35x45		
50 (63) 1H	2200	180,950	1,70	22x25	
	2700	147,440	1,90	22x30	
	2700	147,440	1,90	25x25	
	3300	120,633	2,00	25x30	
	3900	102,074	2,10	22x35	
	3900	102,074	2,10	25x30	
	3900	102,074	2,40	30x25	
	4700	84,700	2,40	22x40	
	4700	84,700	2,40	25x35	
	5600	71,087	2,50	22x50	
	5600	71,087	2,50	25x40	
	5600	71,087	2,50	30x30	
	5600	71,087	2,60	35x25	
	6800	58,543	2,80	25x45	
	6800	58,543	2,80	30x35	

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL	
(V)	(µF)	(mΩ)	(Arms)	(mm)	
50 (63) 1H	8200	48,547	3,20	25x50	
	8200	48,547	3,00	30x40	
	8200	48,547	3,00	35x30	
	10000	39,809	3,40	30x45	
	10000	39,809	3,40	35x35	
	12000	33,174	3,80	30x50	
	12000	33,174	3,80	35x40	
	15000	26,539	4,50	35x50	
	63 (79) 1J	1500	212,314	1,60	22x25
		1800	176,929	1,80	22x25
2200		144,760	2,00	22x30	
2200		144,760	2,00	25x25	
2700		117,952	2,20	22x35	
2700		117,952	2,30	25x30	
3300		96,506	2,30	22x40	
3300		96,506	2,30	25x35	
3300		96,506	2,30	30x25	
3900		81,659	2,50	22x45	
3900		81,659	2,60	25x40	
3900		81,659	2,60	30x30	
3900		81,659	2,70	35x25	
4700		67,760	2,90	30x30	
5600		56,870	3,10	25x45	
5600		56,870	3,20	30x35	
5600		56,870	3,30	35x30	
6800		46,834	3,60	30x40	
6800		46,834	3,70	35x35	
80 (100) 1K		8200	38,838	3,70	30x50
	8200	38,838	3,80	35x40	
	10000	31,847	4,30	35x45	
	12000	26,539	4,80	35x50	
	1000	318,471	1,30	22x25	
	1200	265,393	1,50	22x30	
	1500	212,314	1,70	25x25	
	1800	176,929	1,90	22x35	
	1800	176,929	1,90	25x30	
	2200	144,760	2,10	22x40	
	2200	144,760	2,20	25x35	
	2200	144,760	2,20	30x25	
	2700	117,952	2,50	22x50	
	2700	117,952	2,50	25x40	
	2700	117,952	2,50	30x30	
	2700	117,952	2,50	35x25	
	3300	96,506	2,80	25x45	
	3300	96,506	2,80	30x35	
	3900	81,659	3,10	25x50	
	3900	81,659	3,20	30x40	
3900	81,659	3,20	35x30		
4700	67,760	3,60	30x45		
4700	67,760	3,60	35x35		
5600	56,870	3,50	30x50		
5600	56,870	3,50	35x40		
6800	46,834	4,10	35x50		
100 (125) 2A	680	421,506	1,10	22x25	
	820	349,542	1,20	22x30	
	1000	286,624	1,40	25x25	
	1200	238,854	1,60	22x35	
	1200	238,854	1,60	25x30	
	1500	191,083	1,80	22x40	
	1500	191,083	1,70	25x35	
	1500	191,083	1,80	30x25	
	1800	159,236	2,10	22x50	
	1800	159,236	2,00	25x40	
	1800	159,236	2,10	30x30	
	1800	159,236	2,20	35x25	
	2200	130,284	2,20	25x45	
	2200	130,284	2,30	30x35	
	2200	130,284	2,50	35x30	
	2700	106,157	2,60	25x50	
	2700	106,157	2,70	30x40	
3300	86,856	3,00	30x45		
3300	86,856	3,10	35x35		
3900	73,493	3,40	30x50		
3900	73,493	3,40	35x40		
4700	60,984	4,00	35x50		

Custom products are available on request.

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
160 (200) 2C	220	781,702	0,98	22x25
	270	636,943	1,10	22x25
	330	521,135	1,30	22x25
	390	440,960	1,50	22x30
	390	440,960	1,50	25x25
	470	365,903	1,70	22x25
	560	307,097	1,90	22x35
	560	307,097	1,90	25x30
	560	307,097	2,00	30x25
	680	252,904	2,10	22x40
	680	252,904	2,20	25x35
	820	209,725	2,50	22x50
	820	209,725	2,40	25x40
	820	209,725	2,50	30x30
	820	209,725	2,40	35x25
	1000	171,975	2,70	25x45
	1000	171,975	2,80	30x35
	1000	171,975	2,70	35x30
	1200	143,312	3,10	25x50
	180 (225) 2K	1200	143,312	3,20
1200		143,312	3,00	35x35
1500		114,650	3,70	30x45
1500		114,650	3,50	35x40
1800		95,541	3,90	35x45
2200		78,170	4,50	35x50
270		636,943	1,20	22x25
330		521,135	1,40	22x30
390		440,960	1,50	25x25
470		365,903	1,70	22x35
470		365,903	1,70	25x30
470		365,903	1,80	30x25
560		307,097	1,90	22x40
560		307,097	2,00	25x35
680		252,904	2,30	22x50
680		252,904	2,20	25x40
680		252,904	2,30	30x30
680		252,904	2,20	35x25
820		209,725	2,50	25x45
820		209,725	2,60	30x35
820	209,725	2,50	35x30	
1000	171,975	2,90	25x50	
1000	171,975	2,90	30x40	
1200	143,312	3,30	30x45	
1200	143,312	3,10	35x35	
1500	114,650	3,60	35x45	
1800	95,541	4,10	35x50	
200 (250) 2D	220	781,702	1,10	22x25
	270	636,943	1,20	22x25
	330	521,135	1,40	22x30
	330	521,135	1,40	25x25
	390	440,960	1,60	22x35
	390	440,960	1,60	25x30
	470	365,903	1,80	22x40
	470	365,903	1,90	30x25
	560	307,097	2,00	22x45
	560	307,097	2,00	25x35
	560	307,097	2,10	30x30
	560	307,097	2,00	35x25
	680	252,904	2,30	25x40
	680	252,904	2,40	30x35
	820	209,725	2,60	25x50
	820	209,725	2,70	30x40
	820	209,725	2,50	35x30
	1000	171,975	3,10	30x45
	1000	171,975	2,80	35x35
	1200	143,312	3,40	30x50
1200	143,312	3,20	35x40	
1500	114,650	3,80	35x50	
250 (300) 2E	100	1719,745	0,72	22x25
	180	955,414	0,94	22x25
	220	781,702	1,10	22x30
	220	781,702	1,10	25x25
	270	636,943	1,20	22x35
	330	521,135	1,40	22x40
	330	521,135	1,40	25x30
	330	521,135	1,50	30x25
	390	440,960	1,60	22x45
	390	440,960	1,60	25x35
	470	365,903	1,80	22x50
	470	365,903	1,80	25x40

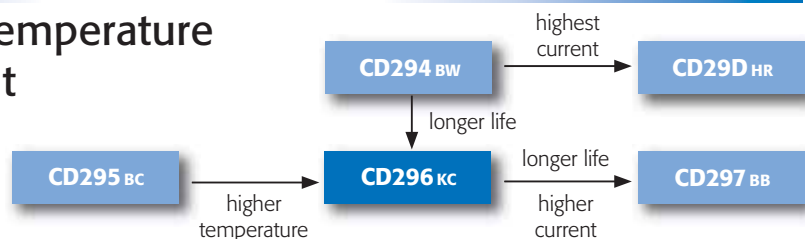
V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 85°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
250 (300) 2E	470	365,903	1,80	30x30
	470	365,903	1,90	35x25
	560	307,097	2,00	25x45
	560	307,097	2,00	30x35
	680	252,904	2,30	30x40
	680	252,904	2,40	35x30
	820	209,725	2,60	30x45
	820	209,725	2,60	35x35
	1000	171,975	3,00	35x40
	1200	143,312	3,40	35x45
	82	2097,250	0,64	22x25
	100	1719,745	0,72	22x25
	120	1433,121	0,82	22x30
	120	1433,121	0,81	25x25
350 (400) 2V	150	1146,497	0,94	22x35
	150	1146,497	0,94	25x30
	180	955,414	1,10	22x40
	180	955,414	1,10	30x25
	220	781,702	1,20	22x45
	220	781,702	1,20	25x35
	220	781,702	1,20	30x30
	220	781,702	1,30	35x25
	270	636,943	1,40	25x45
	270	636,943	1,40	30x35
	330	521,135	1,60	25x50
	330	521,135	1,60	35x30
	390	440,960	1,70	30x40
	390	440,960	1,80	35x35
	470	365,903	2,00	30x45
	470	365,903	2,00	35x40
	560	307,097	2,30	35x45
	680	252,904	2,60	35x50
	820	209,725	2,80	35x60
	400 (450) 2G	68	2529,037	0,55
82		2097,250	0,60	22x25
100		1719,745	0,70	22x30
100		1719,745	0,70	25x25
120		1433,121	0,79	22x35
150		1146,497	0,90	22x40
150		1146,497	0,89	25x30
150		1146,497	0,95	30x25
180		955,414	1,00	22x45
180		955,414	1,00	25x35
180		955,414	1,10	30x30
180		955,414	1,20	35x25
220		781,702	1,10	22x50
220		781,702	1,20	25x40
220		781,702	1,20	30x35
270		636,943	1,30	25x45
270		636,943	1,40	30x40
270		636,943	1,60	35x30
330		521,135	1,60	30x45
330		521,135	1,70	35x35
390	440,960	1,80	30x50	
390	440,960	1,80	35x40	
470	365,903	2,10	35x45	
560	307,097	2,30	35x50	
450 (500) 2W	68	2529,037	0,57	22x30
	82	2097,250	0,64	22x35
	100	1719,745	0,72	22x35
	100	1719,745	0,73	25x30
	120	1433,121	0,80	22x40
	120	1433,121	0,83	25x35
	150	1146,497	0,95	22x50
	150	1146,497	0,95	25x40
	150	1146,497	0,98	30x30
	180	955,414	1,10	25x45
	180	955,414	1,10	30x35
	180	955,414	1,20	35x25
	220	781,702	1,20	25x50
	220	781,702	1,30	30x40
220	781,702	1,30	35x30	
270	636,943	1,40	30x45	
270	636,943	1,50	35x35	
330	521,135	1,70	30x50	
390	440,960	1,90	35x45	
470	365,903	2,20	35x50	

Custom products are available on request.

Series CD296 KC

- Long Life at High Temperature
- High Ripple Current

5 000h at 105°C



Item	Characteristics							
Operating Temperature Range (°C)	-40 ~ +105 (≥160V: -25 ~ +105)							
Rated Voltage Range (V)	16~450							
Capacitance Tolerance (20°C, 120Hz)	±20%							
Leakage Current (µA)	0,01CV or 1,5mA whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)							
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	16	25	35	50	63~100	160~400	450
	tan δ	0,50	0,40	0,35	0,30	0,20	0,15	0,20
Temperature Stability (120Hz)	Rated Voltage (V)		10~100		160~200		250~450	
	Impedance Ratio	Z _{-25°C} /Z _{+20°C}	4		4		4	
		Z _{-40°C} /Z _{+20°C}	15		-		-	

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	5 000h	> 200 000h	3 000h	4 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,6 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)				
	50	120	1K	10K	≥20K
≤ 100	0,95	1,00	1,10	1,15	1,15
160~250	0,87	1,00	1,11	1,18	1,20
≥ 350	0,80	1,00	1,14	1,14	1,20

Temperature Coefficient

Temperature (°C)	+40	+55	+70	+80	+105
Factor	2,7	2,5	2,1	1,7	1,0

Useful Life

Depending on Ambient Temperature and Ripple Current

CD296	x1,0	x1,5	x2,0	x2,2	x2,3	x2,4	x2,5	x2,6	x2,7
40°C	200	200	200	200	185	168	151	136	122
45°C	200	200	171	144	131	118	107	96	86
50°C	200	174	121	101	92	84	75	68	61
55°C	160	123	85	72	65	59	53	48	43
60°C	113	87	60	50	46	42	37	34	
65°C	80	61	42	36	32	29	26		
70°C	56	43	30	25	23	21			
75°C	40	30	21	18	16				
80°C	28	21	15	12					
85°C	20	15	10						
90°C	14	10							
95°C	10								
100°C	7								
105°C	5								

(khrs)

Ratings for Series CD296 KC

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
10 (13) 1A	10000	100,318	1,60	22x30
	12000	83,599	1,80	22x35
	15000	66,879	2,00	22x40
	18000	55,732	2,40	22x45
	22000	45,599	2,50	25x40
16 (20) 1C	6800	105,377	1,60	22x25
	8200	87,385	1,80	25x25
	10000	71,656	1,99	22x30
	10000	71,656	1,99	25x25
	12000	59,713	2,28	22x35
	12000	59,713	2,30	25x30
	12000	59,713	2,38	30x25
	15000	47,771	2,64	22x40
	15000	47,771	2,68	25x35
	18000	39,809	2,98	22x45
	18000	39,809	3,04	25x40
	18000	39,809	3,00	30x30
	18000	39,809	3,10	35x25
	22000	32,571	3,40	25x45
	22000	32,571	3,39	30x35
	27000	26,539	3,81	25x50
	27000	26,539	3,83	30x40
	27000	26,539	3,74	35x30
	33000	21,714	4,30	30x45
	33000	21,714	4,24	35x35
39000	18,373	4,74	30x50	
39000	18,373	4,72	35x40	
47000	15,246	5,27	35x45	
25 (32) 1E	4700	121,968	1,55	22x25
	5600	102,366	1,70	25x25
	6800	84,301	1,91	22x30
	6800	84,301	1,91	25x25
	8200	69,908	2,14	22x35
	8200	69,908	2,16	25x30
	8200	69,908	2,25	30x25
	10000	57,325	2,40	22x40
	10000	57,325	2,44	25x35
	12000	47,771	2,69	22x45
	12000	47,771	2,74	25x40
	12000	47,771	2,70	30x30
	12000	47,771	2,80	35x25
	15000	38,217	3,15	25x45
	15000	38,217	3,13	30x35
	15000	38,217	3,22	35x30
	18000	31,847	3,54	25x50
	18000	31,847	3,54	30x40
	22000	26,057	4,24	30x45
	22000	26,057	3,96	35x35
27000	21,231	4,75	35x45	
33000	17,371	5,39	35x50	
35 (44) 1V	3300	151,998	1,43	22x25
	3900	128,613	1,65	22x30
	4700	106,722	1,78	25x25
	5600	89,570	2,02	22x35
	5600	89,570	2,04	25x30
	5600	89,570	2,12	30x25
	6800	73,764	2,28	22x40
	6800	73,764	2,31	25x35
	8200	61,170	2,67	22x50
	8200	61,170	2,60	25x40
	8200	61,170	2,56	30x30
	8200	61,170	2,78	35x25
	10000	50,159	2,92	25x45
	10000	50,159	2,92	30x35
	12000	41,799	3,26	25x50
	12000	41,799	3,28	30x40
	12000	41,799	3,20	35x30
	15000	33,439	3,74	30x45
	15000	33,439	3,69	35x35
	18000	27,866	4,16	35x40
22000	22,800	4,92	35x50	
50 (63) 1H	1800	238,854	1,31	22x25
	2200	195,426	1,45	22x25
	2700	159,236	1,70	22x30
	2700	159,236	1,70	25x25
	3300	130,284	1,98	22x35
	3300	130,284	2,00	25x30
	3900	110,240	2,25	22x40
	3900	110,240	2,28	25x35
	3900	110,240	2,22	30x25
	4700	91,476	2,56	22x45
	4700	91,476	2,58	30x30
	4700	91,476	2,67	35x25

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
50 (63) 1H	5600	76,774	2,89	22x50
	5600	76,774	2,81	25x40
	5600	76,774	2,95	30x35
	6800	63,226	3,37	25x50
	6800	63,226	3,39	30x40
	6800	63,226	3,31	35x30
	8200	52,431	3,71	30x45
	8200	52,431	3,66	35x35
	10000	42,994	4,09	30x50
	10000	42,994	4,07	35x40
12000	35,828	4,50	35x45	
63 (79) 1J	1200	238,854	1,25	22x25
	1500	191,083	1,25	22x25
	1800	159,236	1,52	22x30
	1800	159,236	1,52	25x25
	2200	130,284	1,73	22x35
	2200	130,284	1,75	25x30
	2700	106,157	1,97	22x40
	2700	106,157	1,99	25x35
	2700	106,157	1,93	30x25
	3300	86,856	2,32	22x50
	3300	86,856	2,27	25x40
	3300	86,856	2,24	30x30
	3300	86,856	2,41	35x25
	3900	73,493	2,54	25x45
	3900	73,493	2,55	30x35
	4700	60,984	2,88	25x50
	4700	60,984	2,90	30x40
	4700	60,984	2,83	35x30
	5600	51,183	3,28	30x45
	5600	51,183	3,24	35x35
6800	42,151	3,73	30x50	
6800	42,151	3,71	35x40	
8200	34,954	4,16	35x45	
10000	28,662	4,69	35x50	
80 (100) 1K	820	349,542	1,11	22x25
	1000	286,624	1,20	22x30
	1200	238,854	1,39	22x30
	1200	238,854	1,39	25x25
	1500	191,083	1,61	22x35
	1500	191,083	1,62	25x30
	1800	159,236	1,83	22x40
	1800	159,236	1,81	30x25
	2200	130,284	2,09	22x45
	2200	130,284	2,01	25x35
	2200	130,284	2,10	30x30
	2200	130,284	2,17	35x25
	2700	106,157	2,43	25x45
	2700	106,157	2,43	30x35
	3300	86,856	2,76	25x50
	3300	86,856	2,78	30x40
	3300	86,856	2,71	35x30
	3900	73,493	3,12	30x45
	3900	73,493	3,07	35x35
	4700	60,984	3,56	30x50
4700	60,984	3,50	35x40	
5600	51,183	3,87	35x45	
6800	42,151	4,19	35x50	
100 (125) 2A	560	511,829	1,07	22x25
	680	421,506	1,20	22x30
	820	349,542	1,35	22x30
	820	349,542	1,35	25x25
	1000	286,624	1,54	22x35
	1000	286,624	1,56	25x30
	1200	238,854	1,76	25x35
	1200	238,854	1,71	30x25
	1200	238,854	1,74	22x40
	1500	191,083	1,99	22x45
	1500	191,083	2,03	25x40
	1500	191,083	2,00	30x30
	1500	191,083	2,07	35x25
	1800	159,236	2,28	25x45
	1800	159,236	2,27	30x35
	2200	130,284	2,57	25x50
	2200	130,284	2,59	30x40
	2200	130,284	2,52	35x30
	2700	106,157	2,94	30x45
	2700	106,157	2,90	35x35
3300	86,856	3,32	30x50	
3300	86,856	3,31	35x40	
3900	73,493	3,69	35x45	
4700	60,984	4,14	35x50	

Custom products are available on request.

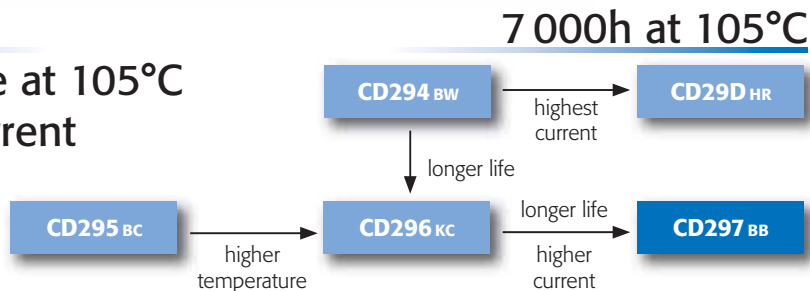
V _{dc} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
160 (200) 2C	330	521,135	1,16	22x25
	390	440,960	1,43	22x30
	470	365,903	1,52	22x35
	470	365,903	1,55	25x25
	560	307,097	1,62	22x40
	560	307,097	1,73	25x30
	680	252,904	1,70	22x45
	680	252,904	1,81	25x35
	680	252,904	1,82	30x25
	820	209,725	1,81	22x50
	820	209,725	1,98	25x40
	820	209,725	1,98	30x30
	820	209,725	1,93	35x25
	1000	171,975	2,04	25x45
	1000	171,975	2,14	30x35
	1200	143,312	2,12	25x50
	1200	143,312	2,22	30x40
	1200	143,312	2,40	35x30
	1500	114,650	2,46	30x45
	1500	114,650	2,53	35x35
1800	95,541	2,98	35x45	
2200	78,170	3,10	35x50	
180 (225) 2K	270	636,943	1,08	22x25
	330	521,135	1,30	22x30
	390	440,960	1,35	25x25
	470	365,903	1,50	22x35
	470	365,903	1,62	25x30
	560	307,097	1,62	22x40
	560	307,097	1,69	25x35
	560	307,097	1,67	30x25
	680	252,904	1,76	22x50
	680	252,904	1,72	25x40
	680	252,904	1,74	30x30
	680	252,904	1,72	35x25
	820	209,725	1,78	25x45
	820	209,725	1,85	30x35
	1000	171,975	1,91	25x50
	1000	171,975	2,01	30x40
	1000	171,975	2,16	35x30
	1200	143,312	2,19	30x45
	1200	143,312	2,34	35x35
	1500	114,650	2,36	30x50
1500	114,650	2,56	35x40	
1800	95,541	2,67	35x45	
200 (250) 2D	220	781,702	1,08	22x25
	270	636,943	1,20	22x30
	330	521,135	1,30	22x30
	330	521,135	1,35	25x25
	390	440,960	1,41	22x35
	470	365,903	1,50	22x40
	470	365,903	1,47	25x30
	470	365,903	1,56	30x25
	560	307,097	1,58	22x45
	560	307,097	1,65	25x35
	680	252,904	1,68	22x50
	680	252,904	1,80	25x40
	680	252,904	1,82	30x30
	680	252,904	1,96	35x25
	820	209,725	1,87	25x50
	820	209,725	1,99	30x35
	820	209,725	2,07	35x30
	1000	171,975	2,17	30x45
	1000	171,975	2,22	35x35
	1200	143,312	2,22	30x50
1200	143,312	2,42	35x40	
1500	114,650	2,59	35x45	
1800	95,541	2,70	35x50	
250 (300) 2E	180	955,414	0,94	22x25
	220	781,702	1,10	22x30
	220	781,702	1,15	25x25
	270	636,943	1,13	22x35
	330	521,135	1,20	22x40
	330	521,135	1,30	25x30
	330	521,135	1,30	30x25
	390	440,960	1,26	22x45
	390	440,960	1,41	25x35
	470	365,903	1,37	22x50
	470	365,903	1,52	25x40
	470	365,903	1,36	30x30
	470	365,903	1,40	35x25
	560	307,097	1,59	25x45
	560	307,097	1,57	30x35
	560	307,097	1,56	35x30
	680	252,904	1,66	25x50
	680	252,904	1,76	30x40

V _{dc} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(mΩ)	(Arms)	(mm)
250 (300) 2E	820	209,725	1,83	30x45
	820	209,725	1,82	35x35
	1000	171,975	1,87	30x50
	1000	171,975	1,99	35x40
	1200	143,312	2,10	35x45
	1200	143,312	2,10	35x45
350 (400) 2V	68	2529,037	0,56	22x25
	82	2097,250	0,62	22x25
	100	1719,745	0,70	22x30
	100	1719,745	0,70	25x25
	120	1433,121	0,73	22x35
	150	1146,497	0,79	22x40
	150	1146,497	0,82	25x30
	150	1146,497	0,82	30x25
	180	955,414	0,81	22x45
	180	955,414	0,89	25x35
	180	955,414	0,90	30x30
	220	781,702	0,93	22x50
	220	781,702	0,97	25x40
	220	781,702	0,98	35x25
	270	636,943	1,01	25x50
	270	636,943	1,05	30x35
	270	636,943	1,01	35x30
	330	521,135	1,16	30x45
	330	521,135	1,16	35x35
	400 (450) 2G	390	440,960	1,26
390		440,960	1,26	35x40
470		365,903	1,35	35x45
560		307,097	1,51	35x50
680		252,904	1,68	35x50
68		2529,037	0,47	22x25
82		2097,250	0,56	22x30
82		2097,250	0,65	25x25
100		1719,745	0,60	25x25
120		1433,121	0,64	22x35
120		1433,121	0,70	25x30
120		1433,121	0,78	30x25
150		1146,497	0,70	22x40
150		1146,497	0,73	25x35
180		955,414	0,78	22x50
180		955,414	0,82	25x40
180		955,414	0,83	30x30
180		955,414	0,86	35x25
220		781,702	0,87	25x45
220		781,702	0,86	30x35
450 (500) 2W	270	636,943	0,94	25x50
	270	636,943	0,95	30x40
	270	636,943	0,91	35x30
	330	521,135	1,11	30x45
	330	521,135	1,13	35x35
	390	440,960	1,15	30x50
	390	440,960	1,26	35x40
	470	365,903	1,31	35x45
	560	307,097	1,50	35x50
	56	3070,974	0,47	22x25
	68	2529,037	0,56	22x30
	68	2529,037	0,65	25x25
	82	2097,250	0,64	22x35
	100	1719,745	0,70	22x40
	100	1719,745	0,70	25x30
	100	1719,745	0,78	30x25
	120	1433,121	0,73	22x45
	120	1433,121	0,73	25x35
	150	1146,497	0,78	22x50
	150	1146,497	0,82	25x40
150	1146,497	0,83	30x30	
150	1146,497	0,86	35x25	
180	955,414	0,87	25x45	
180	955,414	0,86	30x35	
220	781,702	0,94	25x50	
220	781,702	0,95	30x40	
220	781,702	0,91	35x30	
270	636,943	1,11	30x45	
270	636,943	1,13	35x35	
330	521,135	1,15	30x50	
330	521,135	1,26	35x40	
390	440,960	1,31	35x45	
470	365,903	1,50	35x50	

Custom products are available on request.

Series CD297 BB

- Extended Life Time at 105°C
- Highest Ripple Current
- High Professional



Item	Characteristics											
Operating Temperature Range (°C)	-40 ~ +105						-25 ~ +105					
Rated Voltage Range (V)	16~100						16~450					
Capacitance Tolerance (20°C, 120Hz)	±20%											
Leakage Current (µA)	0,01CV or 1,5mA whichever is smaller (at 20 °C, after 5 minutes) C: Nominal Capacitance (µF); V: Rated Voltage (V)											
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	10	16	25	35	50	63	80	100	160~250	350~400	450
	tan δ	0,55	0,50	0,45	0,40	0,35	0,30	0,25	0,20	0,15	0,20	0,25
Temperature Stability (120Hz)	Rated Voltage (V)		10~100				160~250			350~450		
	Impedance Ratio	Z _{-25°C} /Z _{+20°C}	4				3			8		
		Z _{-40°C} /Z _{+20°C}	15				-			-		

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	7 000h	> 200 000h	5 000h	5 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 2,0 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)				
	50/60	120	500	1K	≥10K
10~100	0,90	1,00	1,05	1,10	1,15
160~250	0,80	1,00	1,20	1,30	1,50
315~450	0,80	1,00	1,20	1,25	1,40

Useful Life

Depending on Ambient Temperature and Ripple Current

CD297	x1,0	x1,5	x2,0	x2,2	x2,3	x2,4	x2,5	x2,6	x2,7
40°C	200	200	200	167	143	121	102	86	71
45°C	200	200	158	118	101	86	72	60	50
50°C	200	200	112	83	71	60	51	43	35
55°C	200	145	79	59	50	43	36	30	25
60°C	158	102	56	41	35	30	25	21	
65°C	112	72	39	29	25	21	18		
70°C	79	51	28	20	17	15			
75°C	56	36	19	14	12				
80°C	39	25	14	10					
85°C	28	18	9						
90°C	19	12							
95°C	14								
100°C	9								
105°C	7								

(khrs)

Ratings for Series CD297 BB

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL
(V)	(µF)	(Ω)	(Arms)	(mm)
10 (13) 1A	8200	0,107	1,36	22x25
	10000	0,088	1,65	22x30
	12000	0,073	1,85	22x35
	12000	0,073	1,82	25x25
	15000	0,058	2,12	22x40
	15000	0,058	2,11	25x30
	15000	0,058	2,14	30x25
	18000	0,049	2,40	22x45
	18000	0,049	2,32	25x35
	22000	0,040	2,59	25x40
	22000	0,040	2,73	30x30
	27000	0,032	3,01	25x45
	27000	0,032	3,13	30x35
	27000	0,032	3,05	35x30
	33000	0,027	3,43	25x50
	33000	0,027	3,53	30x40
	33000	0,027	3,49	35x35
	39000	0,022	3,78	30x45
	39000	0,022	3,96	35x40
	47000	0,019	4,58	30x50
47000	0,019	4,60	35x45	
56000	0,016	5,06	35x50	
16 (20) 1C	5600	0,128	1,44	22x25
	6800	0,105	1,66	22x30
	8200	0,087	1,67	25x25
	10000	0,072	2,08	22x35
	10000	0,072	2,07	25x30
	12000	0,060	2,36	22x40
	12000	0,060	2,37	25x35
	12000	0,060	2,13	30x25
	15000	0,048	3,69	22x45
	15000	0,048	2,72	25x40
	15000	0,048	2,54	30x30
	18000	0,040	3,06	25x45
	18000	0,040	3,02	30x35
	18000	0,040	3,09	35x30
	22000	0,033	3,39	25x50
	22000	0,033	3,46	30x40
	27000	0,027	3,88	30x45
	27000	0,027	3,85	35x35
	33000	0,022	4,33	30x50
	33000	0,022	4,33	35x40
39000	0,018	4,96	35x45	
47000	0,015	5,49	35x50	
25 (32) 1E	3900	0,165	1,31	22x25
	4700	0,137	1,55	22x30
	5600	0,115	1,77	22x35
	5600	0,115	1,56	25x25
	6800	0,095	2,02	22x40
	6800	0,095	1,88	25x30
	8200	0,079	2,27	22x45
	8200	0,079	2,18	25x35
	8200	0,079	1,92	30x25
	10000	0,064	2,56	22x50
	10000	0,064	2,53	25x40
	10000	0,064	2,38	30x30
	12000	0,054	2,79	25x45
	12000	0,054	2,70	30x35
	12000	0,054	2,76	35x30
	15000	0,043	3,13	30x40
	18000	0,036	3,52	30x45
	18000	0,036	3,50	35x35
	22000	0,029	3,92	30x50
	22000	0,029	3,95	35x40
27000	0,024	4,72	35x50	
35 (44) 1V	2700	0,212	1,29	22x25
	3300	0,174	1,54	22x30
	3900	0,147	1,77	22x35
	3900	0,147	1,55	25x25
	4700	0,122	2,01	22x40
	4700	0,122	1,87	25x30
	5600	0,102	2,25	22x45
	5600	0,102	2,18	25x35
	5600	0,102	1,80	30x25
	6800	0,084	2,49	22x50
	6800	0,084	2,45	25x40
	6800	0,084	2,28	30x30
	8200	0,070	2,80	25x45
	8200	0,070	2,69	30x35
	10000	0,057	3,04	30x40
	10000	0,057	2,78	35x30
	12000	0,048	3,38	30x45
	12000	0,048	3,30	35x35
	15000	0,038	3,88	35x40
	18000	0,032	4,40	35x45

Custom products are available on request.

V _{dc} (Surge Voltage) Code	Capacitance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL	
(V)	(µF)	(Ω)	(Arms)	(mm)	
50 (63) 1H	1500	0,334	1,21	22x25	
	2200	0,228	1,52	22x30	
	2200	0,228	1,46	25x25	
	2700	0,186	1,77	22x35	
	2700	0,186	1,76	25x30	
	3300	0,152	2,02	22x40	
	3300	0,152	1,72	30x25	
	3900	0,129	2,27	22x45	
	3900	0,129	2,20	25x35	
	3900	0,129	2,09	30x30	
	4700	0,107	2,43	25x40	
	5600	0,090	2,72	25x45	
	5600	0,090	2,58	30x35	
	5600	0,090	2,35	35x30	
	6800	0,074	3,01	30x40	
	6800	0,074	2,91	35x35	
	8200	0,061	3,63	30x50	
	8200	0,061	3,36	35x40	
	10000	0,050	3,79	35x45	
	12000	0,042	4,06	35x50	
63 (79) 1J	1000	0,430	1,10	22x25	
	1500	0,287	1,41	22x30	
	1500	0,287	1,38	25x25	
	1800	0,239	1,62	22x35	
	1800	0,239	1,63	25x30	
	2200	0,195	1,85	22x40	
	2200	0,195	1,66	30x25	
	2700	0,159	2,10	22x45	
	2700	0,159	2,03	25x35	
	2700	0,159	2,01	30x30	
	3300	0,130	2,33	25x40	
	3900	0,110	2,58	25x45	
	3900	0,110	2,46	30x35	
	3900	0,110	2,31	35x30	
	4700	0,091	2,82	30x40	
	4700	0,091	2,77	35x35	
	5600	0,077	3,22	30x45	
	5600	0,077	3,20	35x40	
	6800	0,063	3,61	35x45	
	8200	0,052	3,94	35x50	
820	0,437	1,09	22x25		
80 (100) 1K	1000	0,358	1,29	22x30	
	1200	0,299	1,48	22x35	
	1200	0,299	1,32	25x25	
	1500	0,239	1,70	22x40	
	1500	0,239	1,74	25x30	
	1500	0,239	1,58	30x25	
	1800	0,199	1,91	22x45	
	1800	0,199	1,86	25x35	
	2200	0,163	2,22	25x45	
	2200	0,163	2,02	30x30	
	2700	0,133	2,50	30x35	
	2700	0,133	2,18	35x30	
	3300	0,109	2,69	30x40	
	3300	0,109	2,60	35x35	
	3900	0,092	2,94	30x45	
	3900	0,092	3,00	35x40	
	4700	0,076	3,44	35x45	
	5600	0,064	3,72	35x50	
	100 (125) 2A	560	0,512	1,01	22x25
		680	0,422	1,19	22x30
820		0,350	1,33	22x35	
820		0,350	1,26	25x25	
1000		0,287	1,56	22x40	
1000		0,287	1,52	25x30	
1000		0,287	1,47	30x25	
1200		0,239	1,76	22x45	
1200		0,239	1,76	25x35	
1200		0,239	1,76	30x30	
1500		0,191	2,00	22x50	
1500		0,191	2,03	25x40	
1800		0,159	2,29	25x45	
1800		0,159	2,19	30x35	
1800		0,159	2,05	35x30	
2200		0,130	2,52	30x40	
2200		0,130	2,48	35x35	
2700		0,106	2,86	30x45	
2700		0,106	2,87	35x40	
3300		0,087	3,25	35x45	
3900	0,073	3,56	35x50		
160 (200) 2C	220	0,782	0,63	22x25	
	270	0,637	0,76	22x30	
	330	0,521	0,90	22x35	
	330	0,521	0,84	25x25	
	390	0,441	0,97	25x30	
	390	0,441	1,00	30x25	

V _{dc} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL	
(V)	(µF)	(Ω)	(Arms)	(mm)	
160 (200) 2C	470	0,366	1,11	22x40	
	470	0,366	1,14	25x35	
	470	0,366	1,17	30x30	
	560	0,307	1,26	22x45	
	680	0,253	1,44	22x50	
	680	0,253	1,43	25x40	
	680	0,253	1,50	30x35	
	820	0,210	1,63	25x45	
	820	0,210	1,66	30x40	
	820	0,210	1,63	35x30	
	1000	0,172	1,89	30x45	
	1000	0,172	1,89	35x35	
	1200	0,143	2,16	30x50	
	1200	0,143	2,23	35x40	
	1500	0,115	2,61	35x45	
	1800	0,096	2,97	35x50	
	180 (225) 2K	220	0,782	0,63	22x25
		270	0,637	0,76	22x30
270		0,637	0,76	25x25	
330		0,521	0,90	22x35	
330		0,521	0,90	25x30	
390		0,441	1,03	22x40	
390		0,441	1,06	25x35	
390		0,441	1,02	30x25	
470		0,366	1,17	22x45	
470		0,366	1,17	30x30	
560		0,307	1,32	22x50	
560		0,307	1,32	25x40	
560		0,307	1,33	30x35	
680		0,253	1,51	25x45	
680		0,253	1,49	35x30	
820		0,210	1,71	25x50	
820		0,210	1,74	30x40	
820		0,210	1,75	35x35	
1000		0,172	2,01	30x45	
1000		0,172	2,07	35x40	
1200	0,143	2,25	30x50		
1200	0,143	2,23	35x45		
1500	0,115	2,76	35x50		
200 (250) 2D	180	0,955	0,57	22x25	
	220	0,782	0,70	22x30	
	270	0,637	0,83	22x35	
	270	0,637	0,76	25x25	
	330	0,521	0,96	22x40	
	330	0,521	0,90	25x30	
	390	0,441	1,06	25x35	
	390	0,441	1,02	30x25	
	470	0,366	1,17	22x45	
	470	0,366	1,22	25x40	
	470	0,366	1,17	30x30	
	560	0,307	1,39	25x45	
	560	0,307	1,38	30x35	
	680	0,253	1,58	25x50	
	680	0,253	1,61	30x40	
	680	0,253	1,49	35x30	
	820	0,210	1,85	30x45	
	820	0,210	1,75	35x35	
	1000	0,172	2,11	30x50	
	1000	0,172	2,07	35x40	
1200	0,143	2,38	35x45		
1500	0,115	2,76	35x50		
250 (300) 2E	150	1,146	0,52	22x25	
	180	0,955	0,64	22x30	
	180	0,955	0,62	25x25	
	220	0,782	0,76	22x35	
	220	0,782	0,76	25x30	
	270	0,637	0,88	22x40	
	270	0,637	0,90	25x35	
	270	0,637	0,85	30x25	
	330	0,521	1,01	22x45	
	330	0,521	1,00	30x30	
	390	0,441	1,13	22x50	
	390	0,441	1,13	25x40	
	390	0,441	1,15	30x35	
	470	0,366	1,29	25x45	
	470	0,366	1,24	35x30	
	560	0,307	1,45	25x50	
	560	0,307	1,48	30x40	
	560	0,307	1,49	35x35	
	680	0,253	1,71	30x45	
	680	0,253	1,74	35x40	
820	0,210	1,94	30x50		
1000	0,172	2,20	35x45		
350 (400) 2V	68	2,529	0,34	22x25	
	82	2,097	0,40	22x30	
	100	1,720	0,47	25x25	
	120	1,433	0,52	22x35	
	120	1,433	0,53	25x30	
	150	1,146	0,59	22x40	

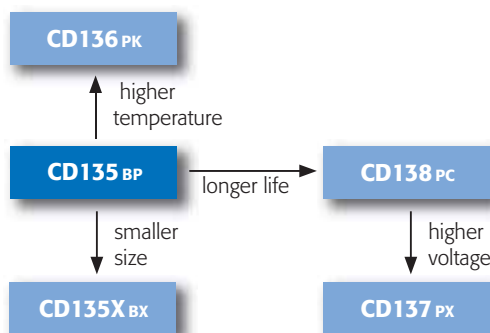
V _{dc} (Surge Voltage) Code	Capaci- tance	ESR 20°C, 100Hz	Max. Ripple Current 105°C, 120Hz	Size Ø DxL	
(V)	(µF)	(Ω)	(Arms)	(mm)	
350 (400) 2V	150	1,146	0,60	25x35	
	180	0,955	0,68	22x45	
	180	0,955	0,70	25x40	
	180	0,955	0,71	30x30	
	220	0,782	0,78	22x50	
	220	0,782	0,82	25x45	
	220	0,782	0,82	30x35	
	270	0,637	0,94	25x50	
	270	0,637	0,93	30x40	
	270	0,637	0,90	35x30	
	330	0,521	1,05	30x45	
	330	0,521	1,01	35x35	
	390	0,441	1,18	30x50	
	390	0,441	1,13	35x40	
	470	0,366	1,26	35x45	
	560	0,307	1,39	35x50	
	400 (450) 2G	68	2,529	0,38	22x30
		82	2,010	0,41	25x25
100		1,720	0,46	22x35	
100		1,720	0,48	25x30	
100		1,720	0,48	30x25	
120		1,433	0,53	22x40	
120		1,433	0,55	25x35	
120		1,433	0,56	30x30	
150		1,146	0,63	22x50	
150		1,146	0,65	25x40	
180		0,955	0,72	25x45	
180		0,955	0,74	30x35	
220		0,782	0,79	25x50	
220		0,782	0,85	30x40	
220		0,782	0,89	35x30	
270		0,637	0,98	30x45	
270		0,637	0,96	35x35	
330		0,521	1,12	30x50	
330		0,521	1,12	35x40	
390		0,441	1,27	35x45	
470	0,366	1,33	35x50		
450 (500) 2W	68	2,529	0,38	22x30	
	82	2,097	0,44	22x35	
	82	0,210	0,46	30x25	
	100	1,720	0,50	22x40	
	100	1,720	0,52	25x35	
	120	1,433	0,58	22x50	
	120	1,433	0,58	25x40	
	120	1,433	0,58	30x30	
	150	1,146	0,66	25x45	
	150	1,146	0,68	30x35	
	180	0,955	0,74	25x50	
	180	0,955	0,77	35x30	
	220	0,782	0,88	30x45	
	220	0,782	0,88	35x35	
	270	0,637	0,77	30x40	
	270	0,637	0,99	30x50	
	270	0,637	1,01	35x40	
	330	0,521	1,15	35x45	
390	0,441	1,28	35x50		
820	0,210	0,45	25x30		

Custom products are available on request.

Series CD135 BP

- Standard 85°C
- High Ripple Current

4 000h at 85°C



Item	Characteristics	
Operating Temperature Range (°C)	-40 ~ +85	-25 ~ +85
Rated Voltage Range (V)	10~250	350~450
Capacitance Tolerance (20°C, 120Hz)	±20%	
Leakage Current (µA)	0,02CV or 5mA, whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF), V: Rated Voltage (V)	
Dissipation Factor	See Ratings Table	

Life Time	Useful Life		Load Life	Endurance Test	Shelf Life
	4 000h	> 75 000h	2 000h	2 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur 1,2 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency (Hz)							
	50	120	300	1K	3K	5K	10K	20K
10~50	0,95	1,00	1,04	1,10	1,12	1,13	1,15	1,15
63~100	0,95	1,00	1,06	1,16	1,20	1,25	1,30	1,36
160~200	0,90	1,00	1,10	1,20	1,35	1,40	1,50	1,55
250~450	0,80	1,00	1,10	1,20	1,35	1,40	1,50	1,55

Temperature Coefficient

Rated Voltage (V)	Temperature (°C)			
	+40	+55	+70	+85
10~100	2,1	1,8	1,5	1,0
160~450	2,6	2,2	1,7	1,0

Useful Life

Depending on Ambient Temperature and Ripple Current

CD135	x1,0	x1,3	x1,5	x1,6	x1,7	x1,8	x1,9	x2,0	x2,1
40°C	90	71	58	52	47	41	36	32	27
45°C	64	50	41	37	33	29	25		
50°C	45	35	29	26	23				
55°C	32	25	20						
60°C	22	17	14						
65°C	16	12							
70°C	11	8							
75°C	8								
80°C	5								
85°C	4								

(khrs)

Ratings for Series CD135 BP

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
10 (13) 1A	33 000	0,80	34,74	4,3	36x53
	39 000	0,80	29,40	4,7	36x53
	47 000	0,80	24,39	5,2	36x65
	56 000	0,80	20,47	6,1	36x83
	68 000	0,80	16,86	6,7	36x83
	82 000	0,80	13,98	7,7	36x100
	100 000	0,80	11,46	8,8	36x100
	120 000	0,80	9,55	10,0	36x121
	150 000	1,00	9,55	10,8	36x121
	180 000	1,00	7,96	12,0	51x96
	220 000	1,50	9,77	11,2	51x121
	270 000	1,50	7,96	12,8	51x121
	330 000	1,50	6,51	15,3	64x96
	390 000	1,50	5,51	17,3	64x115
	470 000	2,00	6,10	16,7	64x130
	560 000	2,00	5,12	19,0	77x115
680 000	2,00	4,22	21,7	77x130	
820 000	2,00	3,50	24,7	77x155	
16 (20) 1C	22 000	0,60	39,09	4,1	36x53
	27 000	0,60	31,85	4,5	36x53
	33 000	0,60	26,06	5,0	36x53
	39 000	0,60	22,05	5,9	36x65
	47 000	0,60	18,30	6,4	36x83
	56 000	0,60	15,35	7,3	36x83
	68 000	0,60	12,65	8,4	36x100
	82 000	0,80	13,98	8,3	36x100
	100 000	0,80	11,46	9,5	36x121
	120 000	0,80	9,55	10,9	36x121
	150 000	1,00	9,55	11,3	51x96
	180 000	1,00	7,96	12,8	51x115
	220 000	1,00	6,51	15,3	51x130
	270 000	1,00	5,31	17,6	64x96
	330 000	1,50	6,51	16,8	64x115
	390 000	1,50	5,51	18,3	64x130
470 000	1,50	4,57	21,3	77x115	
560 000	1,50	3,84	23,6	77x130	
680 000	1,50	3,16	27,6	77x155	
820 000	2,00	3,50	27,1	90x157	
25 (32) 1E	15 000	0,50	47,77	3,7	36x53
	18 000	0,50	39,81	4,1	36x53
	22 000	0,50	32,57	4,5	36x53
	27 000	0,50	26,54	5,0	36x65
	33 000	0,50	21,71	5,9	36x83
	39 000	0,50	18,37	6,7	36x83
	47 000	0,50	15,25	7,7	36x100
	56 000	0,60	15,35	7,9	36x100

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL	
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)	
25 (32) 1E	68 000	0,60	12,65	9,1	36x121	
	82 000	0,60	10,49	10,4	36x121	
	100 000	0,80	11,46	10,3	51x96	
	120 000	0,80	9,55	11,7	51x115	
	150 000	0,80	7,64	14,1	51x130	
	180 000	0,80	6,37	15,7	64x96	
	220 000	1,00	6,51	16,1	64x115	
	270 000	1,00	5,31	18,6	64x130	
	330 000	1,00	4,34	21,9	64x155	
	390 000	1,20	4,41	22,0	77x115	
	470 000	1,20	3,66	25,6	77x155	
	560 000	1,20	3,07	27,9	90x131	
	680 000	1,20	2,53	32,5	90x157	
	35 (44) 1V	10 000	0,40	57,32	3,4	36x53
		12 000	0,40	47,77	3,7	36x53
		15 000	0,40	38,22	4,2	36x65
18 000		0,40	31,85	4,9	36x83	
22 000		0,40	26,06	5,7	36x83	
27 000		0,40	21,23	6,3	36x100	
33 000		0,40	17,37	7,2	36x100	
39 000		0,50	18,37	7,3	36x121	
47 000		0,50	15,25	8,7	51x96	
56 000		0,60	15,35	8,6	51x96	
68 000		0,60	12,65	9,8	51x115	
82 000		0,60	10,49	11,6	64x96	
100 000		0,60	8,60	13,3	64x115	
120 000		0,60	7,17	14,8	64x121	
150 000		0,80	7,64	14,9	64x130	
180 000		0,80	6,37	17,0	77x115	
220 000	0,80	5,21	20,0	77x130		
270 000	1,00	5,31	20,3	77x155		
330 000	1,00	4,34	23,5	90x131		
390 000	1,00	3,67	26,4	90x157		
470 000	1,00	3,05	29,6	90x157		
50 (63) 1H	5 600	0,30	76,77	3,0	36x53	
	6 800	0,30	63,23	3,3	36x53	
	8 200	0,30	52,43	3,6	36x53	
	10 000	0,30	42,99	4,0	36x65	
	12 000	0,30	35,83	4,7	36x83	
	15 000	0,30	28,66	5,5	36x83	
	18 000	0,30	23,89	6,2	36x100	
	22 000	0,40	26,06	6,3	36x121	
	27 000	0,40	21,23	7,1	36x121	
	33 000	0,40	17,37	8,2	51x96	
39 000	0,50	18,37	8,1	51x96		
47 000	0,50	15,25	9,3	51x115		

Custom products are available on request.

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
50 (63) 1H	56 000	0,50	12,80	10,5	64x96
	68 000	0,50	10,54	12,0	64x96
	82 000	0,50	8,74	13,7	64x115
	100 000	0,60	8,60	14,7	77x115
	120 000	0,60	7,17	16,7	77x115
	150 000	0,60	5,73	19,3	77x130
	180 000	0,60	4,78	21,9	77x155
	220 000	0,60	3,91	21,4	90x131
	270 000	0,60	3,18	24,6	90x157
63 (79) 1J	3 900	0,25	91,87	2,7	36x53
	4 700	0,25	76,23	3,0	36x53
	5 600	0,25	63,98	3,3	36x53
	6 800	0,25	52,69	3,6	36x65
	8 200	0,25	43,69	4,3	36x83
	10 000	0,25	35,83	4,9	36x83
	12 000	0,25	29,86	5,6	36x100
	15 000	0,30	28,66	5,9	36x100
	18 000	0,30	23,89	6,7	36x121
	22 000	0,30	19,54	7,8	36x121
	27 000	0,40	21,23	7,4	51x96
	33 000	0,40	17,37	8,4	51x96
	39 000	0,40	14,70	9,5	51x115
	47 000	0,40	12,20	11,3	51x130
	56 000	0,40	10,24	12,8	64x115
	68 000	0,50	10,54	12,7	64x121
	82 000	0,50	8,74	14,5	64x130
	100 000	0,50	7,17	16,7	77x115
	120 000	0,50	5,97	18,9	77x130
	80 (100) 1K	150 000	0,50	4,78	22,4
180 000		0,60	4,78	22,4	90x131
220 000		0,60	3,91	26,2	90x157
3 300		0,25	108,57	2,5	36x53
3 900		0,25	91,87	2,8	36x53
4 700		0,25	76,23	3,0	36x65
5 600		0,25	63,98	3,6	36x83
6 800		0,25	52,69	3,9	36x83
8 200		0,25	43,69	4,5	36x83
10 000		0,25	35,83	5,2	36x100
12 000		0,25	29,86	5,9	36x100
15 000		0,25	23,89	6,8	36x121
18 000		0,25	19,90	7,8	36x121
22 000		0,30	19,54	8,0	51x96
200 (250) 2D		27 000	0,30	15,92	9,2
	33 000	0,30	13,03	10,5	51x115
	39 000	0,30	11,02	12,0	51x130
	47 000	0,30	9,15	13,6	64x115
	56 000	0,40	10,24	13,4	64x130
	68 000	0,40	8,43	15,4	77x115

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
80 (100) 1K	82 000	0,40	6,99	17,5	77x130
	100 000	0,40	5,73	20,5	77x155
	120 000	0,40	4,78	22,4	90x131
	150 000	0,40	3,82	26,5	90x157
	100 (125) 2A	1 800	0,25	199,04	1,9
2 200		0,25	162,85	2,1	36x53
2 700		0,25	132,70	2,3	36x53
3 300		0,25	108,57	2,6	36x65
3 900		0,25	91,87	3,0	36x83
4 700		0,25	76,23	3,5	36x83
5 600		0,25	63,98	3,9	36x100
6 800		0,25	52,69	4,5	36x100
8 200		0,25	43,69	5,1	36x121
10 000		0,25	35,83	5,9	36x121
12 000		0,25	29,86	6,4	51x75
15 000		0,25	23,89	7,0	51x96
18 000		0,25	19,90	8,3	51x115
22 000		0,25	16,29	10,0	51x130
27 000		0,25	13,27	11,5	64x115
33 000		0,25	10,86	11,9	64x130
39 000		0,25	9,19	13,4	77x115
47 000		0,35	10,67	14,2	77x130
56 000		0,35	8,96	16,0	77x155
68 000		0,35	7,38	18,8	90x131
82 000	0,35	6,12	20,5	90x157	
100 000	0,35	5,02	24,0	90x171	
160 (200) 2C	3 300	0,25	108,57	5,18	36x121
	3 900	0,25	91,87	5,33	51x75
	4 700	0,25	76,23	5,85	51x75
	5 600	0,25	63,98	7,03	51x96
	6 800	0,25	52,69	7,77	51x96
	8 200	0,25	43,69	9,14	51x115
	10 000	0,25	35,83	10,36	64x96
	12 000	0,25	29,86	11,32	64x96
	15 000	0,25	23,89	14,28	64x130
	18 000	0,25	19,90	15,61	64x130
200 (250) 2D	22 000	0,25	16,29	18,28	77x130
	27 000	0,25	13,27	20,24	77x130
	33 000	0,25	10,86	23,75	90x131
	39 000	0,25	9,19	27,86	90x157
	2 200	0,25	162,85	3,92	36x100
	2 700	0,25	132,70	4,70	36x121
	3 300	0,25	108,57	4,92	51x75
	3 900	0,25	91,87	5,33	51x75
	4 700	0,25	76,23	6,44	51x96
	5 600	0,25	63,98	7,55	51x115
6 800	0,25	52,69	8,77	51x130	
8 200	0,25	43,69	9,40	64x96	

Custom products are available on request.

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
200 (250) 2D	10 000	0,25	35,83	10,36	64x96
	12 000	0,25	29,86	12,06	77x96
	15 000	0,25	23,89	14,43	77x96
	18 000	0,25	19,90	16,50	77x130
	22 000	0,25	16,29	19,61	77x155
	27 000	0,25	13,27	21,51	90x131
	33 000	0,25	10,86	25,53	90x157
250 (300) 2E	1 500	0,25	238,85	3,22	36x100
	1 800	0,25	199,04	3,52	36x100
	2 200	0,25	162,85	4,00	51x75
	2 700	0,25	132,70	4,44	51x75
	3 300	0,25	108,57	5,40	51x96
	3 900	0,25	91,87	6,29	51x115
	4 700	0,25	76,23	7,10	64x96
	5 600	0,25	63,98	7,77	64x96
	6 800	0,25	52,69	9,14	64x115
	8 200	0,25	43,69	10,03	64x115
	10 000	0,25	35,83	11,66	64x130
	12 000	0,25	29,86	12,88	77x115
	15 000	0,25	23,89	15,10	77x130
	18 000	0,25	19,90	17,69	77x155
22 000	0,25	16,29	20,91	90x157	
350 (400) 2V	390	0,20	734,93	1,67	36x53
	470	0,20	609,84	2,15	36x83
	560	0,20	511,83	2,37	36x83
	680	0,20	421,51	2,59	36x83
	820	0,20	349,54	3,07	36x100
	1 000	0,20	286,62	3,41	36x100
	1 200	0,20	238,85	3,81	51x75
	1 500	0,20	191,08	4,26	51x75
	1 800	0,20	159,24	5,14	51x96
	2 200	0,20	130,28	5,70	51x96
	2 700	0,20	106,16	7,14	51x130
	3 300	0,20	86,86	7,92	51x130
	3 900	0,20	73,49	9,00	64x115
	4 700	0,20	60,98	10,33	64x130
	5 600	0,20	51,18	11,36	77x115
	6 800	0,20	42,15	13,10	77x130
	8 200	0,20	34,95	15,43	77x155
	10 000	0,20	28,66	18,13	90x157
	12 000	0,20	23,89	20,02	90x157
	15 000	0,20	19,11	24,50	90x196
18 000	0,20	15,92	28,83	90x236	

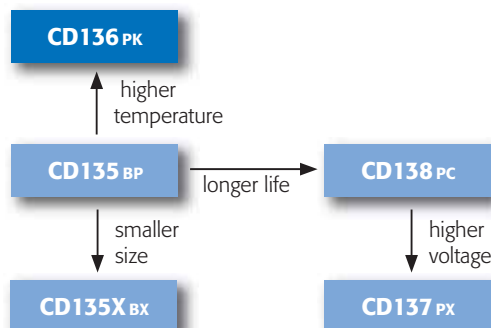
V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
400 (450) 2G	330	0,20	868,56	1,52	36x53
	390	0,20	734,93	1,96	36x83
	470	0,20	609,84	2,15	36x83
	560	0,20	511,83	2,37	36x83
	680	0,20	421,51	2,82	36x100
	820	0,20	349,54	3,07	36x100
	1 000	0,20	286,62	3,48	51x75
	1 200	0,20	238,85	3,82	51x75
	1 500	0,20	191,08	4,70	51x96
	1 800	0,20	159,24	5,15	51x96
	2 200	0,20	130,28	6,44	51x120
	2 700	0,20	106,16	6,96	64x96
	3 300	0,20	86,86	8,22	64x115
	3 900	0,20	73,49	9,40	64x130
	4 700	0,20	60,98	10,44	77x115
	5 600	0,20	51,18	11,92	77x130
	6 800	0,20	42,15	14,06	77x155
8 200	0,20	34,95	16,43	90x157	
10 000	0,20	28,66	18,28	90x157	
12 000	0,20	23,89	21,84	90x196	
15 000	0,20	19,11	26,31	90x236	
450 (500) 2W	270	0,20	1 061,57	1,37	36x53
	330	0,20	868,56	1,82	36x83
	390	0,20	734,93	1,96	36x83
	470	0,20	609,84	2,15	36x83
	560	0,20	511,83	2,55	36x100
	680	0,20	421,51	2,81	36x100
	820	0,20	349,54	3,18	51x75
	1 000	0,20	286,62	3,48	51x75
	1 200	0,20	238,85	4,22	51x96
	1 500	0,20	191,08	5,07	51x115
	1 800	0,20	159,24	5,85	51x130
	2 200	0,20	130,28	6,29	64x96
	2 700	0,20	106,16	7,48	64x115
	3 300	0,20	86,86	8,66	64x130
	3 900	0,20	73,49	9,47	77x115
	4 700	0,20	60,98	10,88	77x130
	5 600	0,20	51,18	12,80	77x155
6 800	0,20	42,15	15,00	90x157	
8 200	0,20	34,95	16,50	90x157	
10 000	0,20	28,66	20,00	90x196	
12 000	0,20	23,89	23,61	90x236	

Custom products are available on request.

Series CD136 PK

- Standard 105°C

4 000h at 105°C



Item	Characteristics	
Operating Temperature Range (°C)	-40 ~ +105	-25 ~ +105
Rated Voltage Range (V)	10~100	160~450
Capacitance Tolerance (20°C, 120Hz)	±20%	
Leakage Current (µA)	0,02CV or 5mA, whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF), V: Rated Voltage (V)	
Dissipation Factor (20°C, 120Hz)	Tan δ shall not exceed the values shown in the table of ratings	
Temperature Stability (120Hz)	Capacitance change 10~100V _{DC} : Capacitance at -40°C shall not be less than 60% of the 20°C value 160~450V _{DC} : Capacitance at -25°C shall not be less than 70% of the 20°C value	

	Useful Life		Load Life	Endurance Test	Shelf Life
Life Time	4 000h	> 200 000h	2 000h	2 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 105°C ≤ 1% Failure Rate	Ur 1,9 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 105°C guaranteed	Ur Ir = 0 105°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz)	50,60	120	300	1K	≥ 10K
Factor	0,80	1,00	1,10	1,30	1,40

Temperature Coefficient

Temperature (°C)	+40	+55	+70	+85	+105	
Factor	4,9	3,9	3,0	1,8	1,0	
	≥ 250 V _{DC}					
	≥ 350 V _{DC}	3,8	3,3	2,5	2,0	1,0

Useful Life

Depending on Ambient Temperature and Ripple Current

CD136	x1,0	x1,2	x1,4	x1,6	x1,7	x1,8	x1,9	x2,0	x2,1
40°C	200	200	200	200	200	200	200	194	178
45°C	200	200	200	185	172	160	148	137	125
50°C	181	165	148	130	122	113	105	97	89
55°C	128	116	104	92	86	80	74	68	62
60°C	90	82	74	65	61	56	52	48	
65°C	64	58	52	46	43	40	37		
70°C	45	41	37	32	30	28			
75°C	32	29	26	23	21				
80°C	22	20	18	16					
85°C	16	14	13						
90°C	11	10							
95°C	8								
100°C	5								
105°C	4								

(khrs)

Ratings for Series CD136 PK

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 105°C,120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
10 (13) 1A	27000	0,45	37,15	4,90	36x53
	33000	0,50	30,40	5,10	36x53
	39000	0,50	25,72	5,90	36x65
	47000	0,50	21,34	7,10	36x83
	56000	0,60	17,91	7,10	36x83
	68000	0,60	14,75	8,50	36x100
	82000	0,65	12,23	8,90	36x100
	100000	0,65	12,90	10,70	36x121
	120000	0,75	10,75	11,00	51x83
	150000	0,80	8,60	13,20	51x96
	180000	0,80	7,17	15,70	51x121
	220000	0,85	8,47	16,80	51x121
	270000	1,00	6,90	19,60	64x115
	330000	1,20	5,65	19,70	64x115
	390000	1,50	4,78	21,30	77x115
	470000	1,80	4,88	21,40	77x115
	560000	2,00	4,09	23,60	77x144
	680000	2,40	3,37	26,00	90x145
16 (20) 1C	18000	0,40	39,81	4,20	36x53
	22000	0,40	32,57	4,70	36x53
	27000	0,45	26,54	5,50	36x65
	33000	0,45	21,71	5,70	36x65
	39000	0,50	18,37	6,80	36x83
	47000	0,50	15,25	7,10	36x83
	56000	0,55	12,80	8,40	36x100
	68000	0,55	10,54	8,80	36x100
	82000	0,65	12,23	10,70	51x83
	100000	0,65	10,03	10,80	51x83
	120000	0,65	8,36	13,10	51x96
	150000	0,70	6,69	15,30	51x121
	180000	0,80	6,37	15,70	51x121
	220000	0,85	5,21	19,20	64x115
	270000	1,00	4,25	19,60	64x115
	330000	1,30	3,47	21,10	77x115
	390000	1,50	4,41	21,30	77x115
	470000	1,60	3,66	24,20	77x144
560000	2,00	3,07	28,10	90x145	
680000	2,40	2,53	28,50	90x145	
25 (32) 1E	10000	0,35	50,16	2,90	36x53
	15000	0,35	33,44	4,20	36x83
	22000	0,35	22,80	5,10	36x83
	33000	0,40	17,37	6,30	36x100
	47000	0,40	12,20	8,00	51x75
	68000	0,50	10,54	10,00	51x115
	100000	0,60	8,60	11,30	64x96
	150000	0,80	5,73	12,90	64x115
	220000	1,00	5,21	14,80	77x115
	330000	1,00	3,47	19,90	90x131

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 105°C,120Hz	Size ∅ DxL	
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)	
35 (44) 1V	6800	0,30	63,23	2,60	36x53	
	10000	0,30	42,99	3,70	36x83	
	15000	0,30	28,66	4,50	36x83	
	22000	0,35	22,80	5,50	36x100	
	33000	0,40	17,37	6,70	51x75	
	47000	0,45	13,72	8,10	51x96	
	68000	0,50	10,54	10,00	51x115	
	100000	0,60	8,60	12,10	64x115	
	150000	0,70	6,69	13,80	77x115	
	220000	0,70	4,56	17,60	90x131	
	50 (63) 1H	3300	0,20	86,86	2,20	36x53
		4700	0,25	76,23	3,30	36x53
		6800	0,25	52,69	3,40	36x83
10000		0,25	35,83	4,10	36x83	
15000		0,30	28,66	4,90	36x100	
22000		0,35	22,80	5,90	51x75	
33000		0,40	17,37	7,80	51x115	
47000		0,40	12,20	9,50	64x96	
68000		0,45	9,48	11,60	64x115	
100000		0,50	7,17	14,10	77x115	
150000		0,50	4,78	18,90	90x131	
63 (79) 1J	2200	0,15	97,71	2,10	36x53	
	3300	0,20	86,86	2,20	36x53	
	4700	0,20	60,98	3,10	36x83	
	6800	0,20	42,15	3,70	36x83	
	10000	0,25	35,83	4,40	36x100	
	15000	0,25	23,89	5,70	51x75	
	22000	0,30	19,54	6,80	51x96	
	33000	0,30	13,03	9,20	64x96	
	47000	0,35	10,67	10,90	64x115	
	68000	0,40	8,43	13,00	77x115	
	100000	0,40	5,73	17,20	90x131	
80 (100) 1K	2200	0,15	97,71	2,10	36x53	
	3300	0,15	65,14	3,00	36x83	
	4700	0,15	45,74	3,60	36x83	
	6800	0,20	42,15	4,00	36x100	
	10000	0,20	28,66	5,20	51x75	
	15000	0,25	23,89	6,20	51x96	
	22000	0,25	16,29	8,20	64x96	
	33000	0,30	13,03	9,70	77x96	
100 (125) 2A	47000	0,30	9,15	12,50	77x115	
	68000	0,30	6,32	16,40	90x131	
	1000	0,15	214,97	1,40	36x53	
	1500	0,15	143,31	1,70	36x53	
	2200	0,15	97,71	2,50	36x83	
	3300	0,15	65,14	3,00	36x83	
	4700	0,15	45,74	3,90	36x100	
	6800	0,15	31,61	5,00	51x75	

Custom products are available on request.

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 105°C,120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
100 (125) 2A	10000	0,15	21,50	6,50	51x96
	15000	0,20	19,11	7,60	64x96
	22000	0,20	13,03	9,70	77x96
	33000	0,25	10,86	11,80	77x130
	47000	0,25	7,62	15,00	90x131
160 (200) 2C	470	0,15	457,38	1,00	36x53
	680	0,15	316,13	1,10	36x53
	1000	0,15	214,97	1,70	36x83
	1500	0,15	143,31	2,00	36x83
	2200	0,15	97,71	2,70	36x100
	3300	0,15	65,14	3,50	51x83
	4700	0,15	45,74	4,40	51x96
	6800	0,15	31,61	5,90	64x96
	10000	0,15	21,50	7,60	77x96
	15000	0,15	14,33	10,30	77x130
	22000	0,15	9,77	13,20	90x131
200 (250) 2D	330	0,15	651,42	0,80	36x53
	470	0,15	457,38	1,00	36x53
	680	0,15	316,13	1,10	36x53
	1000	0,15	214,97	1,70	36x83
	1500	0,15	143,31	2,20	36x100
	2200	0,15	97,71	2,80	51x75
	3300	0,15	65,14	3,70	51x96
	4700	0,15	45,74	4,90	64x96
	6800	0,15	31,61	6,30	64x115
250 (300) 2E	10000	0,15	21,50	8,10	77x115
	15000	0,15	14,33	10,90	90x131
	330	0,15	651,42	0,80	36x53
	470	0,15	457,38	1,00	36x53
	680	0,15	316,13	1,40	36x83
350 (400) 2V	1000	0,15	214,97	1,90	36x100
	1500	0,15	143,31	2,30	51x75
	2200	0,15	97,71	3,10	51x96
	3300	0,15	65,14	4,20	64x96
	4700	0,15	45,74	5,40	64x115
	6800	0,15	31,61	6,90	77x115
	10000	0,15	21,50	9,30	77x155
	15000	0,15	14,33	12,20	90x157
	180	0,15	1194,27	0,80	36x53
	220	0,15	977,13	0,80	36x53
	270	0,15	796,18	1,00	36x53
	330	0,15	651,42	1,10	36x53
	390	0,15	551,20	1,30	36x65
470	0,15	457,38	1,40	36x65	
560	0,15	383,87	1,60	36x83	
680	0,15	316,13	1,60	36x83	
820	0,15	262,16	1,80	36x100	
1000	0,15	214,97	2,20	36x121	
1200	0,15	179,14	2,40	51x75	
1500	0,15	143,31	3,00	51x100	
1800	0,15	119,43	3,60	51x115	

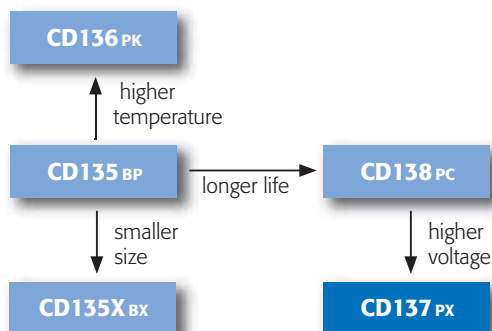
V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 105°C,120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
350 (400) 2V	2200	0,15	97,71	4,00	51x121
	2700	0,15	79,62	4,60	64x96
	5600	0,15	38,39	8,30	77x130
	6800	0,15	31,61	9,50	77x155
400 (450) 2G	1000	0,15	214,97	2,50	51x75
	1200	0,15	179,14	3,00	51x96
	1500	0,15	143,31	3,60	51x115
	1800	0,15	119,43	4,10	51x130
	2200	0,15	97,71	4,50	64x96
	2700	0,15	79,62	5,30	64x115
	3300	0,15	65,14	6,20	64x130
	3900	0,15	55,12	7,20	64x155
		0,15	55,12	6,80	77x115
	4700	0,15	45,74	8,70	64x195
		0,15	45,74	7,80	77x130
	5600	0,15	38,39	9,60	64x195
		0,15	38,39	9,20	77x155
	6800	0,15	31,61	10,70	90x157
8200	0,15	26,22	11,80	90x157	
10000	0,15	21,50	14,10	90x196	
450 (500) 2W	220	0,15	977,13	1,10	36x53
	330	0,15	651,42	1,50	36x100
	470	0,15	457,38	2,10	51x83
	680	0,15	316,13	2,70	51x96
	1000	0,15	214,97	4,20	51x100
	1500	0,15	143,31	5,70	51x130
	2200	0,15	97,71	7,30	64x115
	3300	0,15	65,14	10,10	77x130
	4700	0,15	45,74	12,60	77x155
	5600	0,15	38,39	15,80	90x157

Custom products are available on request.

Series CD137 PX

- Long Life
- High Reliability
- High Voltage

10 000h at 85°C



Item	Characteristics
Rated Voltage Range (V)	350, 400, 450, 500, 550
Operating Temperature Range (°C)	-40 ~ +85°C
Capacitance Tolerance (20°C, 120Hz)	±20%
Dissipation Factor (20°C, 120Hz)	350, 400, 450V. DC: 0,15 500, 550V. DC: 0,20
Leakage Current (µA)	0,01CV or 5mA, whichever is smaller (at 20°C, after 5 minutes) C: Nominal Capacitance (µF), V: Rated Voltage (V)

Life Time	Useful Life		Load Life	Endurance Test	Shelf Life
	10000h	> 200000h	5 000h	5 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±15% of initial value	Within ±10% of initial value	Within ±15% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 175% of specified value	Not more than 130% of specified value	Not more than 175% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur 1,2 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz)	50, 60	120	300	1K	≥ 10K
Factor	0,7	1,0	1,1	1,3	1,4

Temperature Coefficient

Temperature (°C)	40	60	85
Factor	1,89	1,67	1,00

Useful Life

Depending on Ambient Temperature and Ripple Current

CD137	x1,0	x1,2	x1,3	x1,4	x1,5	x1,6	x1,7	x1,8	x1,9
40°C	200	200	200	200	200	200	200	200	186
45°C	200	200	200	200	200	191	164	139	118
50°C	200	200	180	159	139	120	103	88	74
55°C	156	127	113	100	88	76	65	55	47
60°C	98	80	72	63	55	48	41	35	29
65°C	62	51	45	40	35	30	26	22	18
70°C	39	32	28	25	22	19	16	14	11
75°C	25	20	18	16	14	12	10		
80°C	15	12	11	10					
85°C	10								

(khrs)

Ratings for Series CD137 PX

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
350 (400) 2V	2 700	0,15	79,62	9,7	51x115
	3 300	0,15	65,14	11,3	51x130
	3 900	0,15	55,12	12,0	64x96
	4 700	0,15	45,74	14,0	64x115
	5 600	0,15	38,39	16,1	64x130
	6 800	0,15	31,61	17,9	77x115
	8 200	0,15	26,22	20,6	77x130
	10 000	0,15	21,50	24,4	77x155
	12 000	0,15	17,91	27,9	77x171
		0,15	17,91	26,7	90x131
	15 000	0,15	14,33	31,9	90x157
	18 000	0,15	11,94	38,1	90x196
22 000	0,15	9,77	45,5	90x236	
400 (450) 2G	2 200	0,15	97,71	8,8	51x115
	2 700	0,15	79,62	10,2	51x130
	3 300	0,15	65,14	11,0	64x96
	3 900	0,15	55,12	12,8	64x115
	4 700	0,15	45,74	14,8	64x130
	5 600	0,15	38,39	16,2	77x115
	6 800	0,15	31,61	18,7	77x130
	8 200	0,15	26,22	22,0	77x155
	10 000	0,15	21,50	26,7	77x195
		0,15	21,50	24,2	90x131
	12 000	0,15	17,91	28,5	90x157
	15 000	0,15	14,33	34,8	90x196
	18 000	0,15	11,94	41,2	90x236
	22 000	0,15	9,77	47,00	101x237
450 (500) 2W	1 800	0,15	119,43	7,6	51x115
	2 200	0,15	97,71	8,8	51x130
	2 700	0,15	79,62	9,5	64x96
	3 300	0,15	65,14	11,2	64x115
	3 900	0,15	55,12	12,8	64x130
	4 700	0,15	45,74	14,1	77x115
	5 600	0,15	38,39	16,2	77x130
	6 800	0,15	31,61	19,1	77x155
	8 200	0,15	26,22	23,0	77x195
		0,15	26,22	21,0	90x131
	10 000	0,15	21,50	25,7	90x171
	12 000	0,15	17,91	29,7	90x196
		0,15	17,91	29,30	101x175
	15 000	0,15	14,33	35,9	90x236
		0,15	14,33	34,20	101x195
	18 000	0,15	11,94	40,5	101x237

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
500 (550) 2H	1 200	0,20	214,97	6,2	51x115
		0,20	214,97	6,3	64x96
	1 500	0,20	171,97	7,3	51x130
		0,20	171,97	7,1	64x96
	1 800	0,20	143,31	8,3	64x115
	2 200	0,20	117,26	9,6	64x130
	2 700	0,20	95,54	10,7	77x115
	3 300	0,20	78,17	12,4	77x130
	3 900	0,20	66,14	14,4	77x155
	4 700	0,20	54,89	16,5	77x171
		0,20	54,89	15,8	90x131
	5 600	0,20	46,06	19,0	77x195
		0,20	46,06	18,6	90x157
	6 800	0,20	37,94	21,2	90x171
	8 200	0,20	31,46	24,5	90x196
		0,20	31,46	24,20	101x175
10 000	0,20	25,80	29,3	90x236	
	0,20	25,80	27,90	101x195	
12 000	0,20	21,50	33,10	101x237	
550 (600) 2Y	1 000	0,20	257,96	5,9	51x130
	1 200	0,20	214,97	6,8	64x115
	1 500	0,20	171,97	8,0	64x130
	1 800	0,20	143,31	8,7	77x115
	2 200	0,20	117,26	10,1	77x130
	2 700	0,20	85,54	12,0	77x155
	3 300	0,20	78,17	13,3	77x155
	3 900	0,20	66,14	15,5	90x157
	4 700	0,20	54,89	17,6	70x171
	5 600	0,20	46,06	20,3	90x196
6 800	0,20	37,94	24,1	90x236	
	0,20	31,46	27,30	101x237	

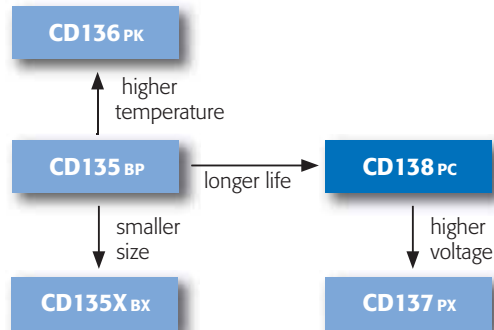
on request

Custom products are available on request.

Series CD138 PC

- Long Life
- High Reliability
- High Voltage

10 000h at 85°C



Item	Characteristics
Rated Voltage Range (V)	350 ~ 450
Operating Temperature Range (°C)	-40 ~ +85
Capacitance Tolerance (20°C, 120Hz)	±20%
Dissipation Factor (20°C, 120Hz)	Less than the value specified in the standard products tables
Leakage Current (µA)	0,01CV or 5mA, whichever is smaller (at 20°C, after 5 minutes) where C: Nominal Capacitance (µF), V: Rated Voltage (V)

Life Time	Useful Life		Load Life	Endurance Test	Shelf Life
	10000h	> 200000h	5000h	5000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ±30% of initial value		Within ±20% of initial value	Within ±10% of initial value	Within ±20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	Ur Ir 85°C ≤ 1% Failure Rate	Ur 1,2 x Ir 40°C ≤ 1% Failure Rate	Ur Ir 85°C guaranteed	Ur Ir = 0 85°C	No voltage applied. After test: Ur to be applied for 30min, 24 to 48h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency (Hz)	50, 60	120	300	1K	≥10K
Factor	0,70	1,00	1,10	1,30	1,40

Temperature Coefficient

Temperature (°C)	+40	+60	+85
Factor	1,89	1,67	1,00

Useful Life

Depending on Ambient Temperature and Ripple Current

CD138	x1,0	x1,2	x1,3	x1,4	x1,5	x1,6	x1,7	x1,8	x1,9
40°C	200	200	200	200	200	200	200	200	186
45°C	200	200	200	200	200	191	164	139	118
50°C	200	200	180	159	139	120	103	88	74
55°C	156	127	113	100	88	76	65	55	47
60°C	98	80	72	63	55	48	41	35	29
65°C	62	51	45	40	35	30	26	22	18
70°C	39	32	28	25	22	19	16	14	11
75°C	25	20	18	16	14	12	10		
80°C	15	12	11	10					
85°C	10								

(khrs)

Ratings for Series CD138 PC

V _{DC} (Surge Voltage) Code	Rated Capacitance	Dissipation Factor	ESR 20°C, 120Hz	Ripple Current 85°C, 120Hz	Size ∅ DxL
(V)	(μF)	MAX	(mΩ)	(Arms)	(mm)
350 (400) 2V	1200	0,15	214,97	5,50	51x83
	1500	0,15	171,97	6,10	51x83
	1800	0,15	143,31	7,40	51x96
	2200	0,15	117,26	8,20	51x96
	2700	0,15	95,54	10,20	51x130
	3300	0,15	78,17	11,30	51x130
	3900	0,15	66,14	12,80	64x115
	4700	0,15	54,89	14,80	64x130
	5600	0,15	46,06	16,30	77x115
	6800	0,15	37,94	18,80	77x130
	8200	0,15	31,46	22,10	77x155
	10000	0,15	25,80	25,90	90x157
	12000	0,15	21,50	28,40	90x157
	15000	0,15	17,20	34,60	90x196
18000	0,15	14,33	41,40	90x236	
400 (450) 2G	1000	0,15	214,97	5,00	51x83
	1200	0,15	179,14	5,50	51x83
	1500	0,15	143,31	6,70	51x96
	1800	0,15	119,43	7,40	51x96
	2200	0,15	97,71	9,20	51x130
	2700	0,15	79,62	9,90	64x96
	3300	0,15	65,14	11,80	64x115
	3900	0,15	55,12	13,50	64x130
	4700	0,15	45,74	14,90	77x115
	5600	0,15	38,39	17,00	77x130
	6800	0,15	31,61	20,20	77x155
	8200	0,15	26,22	23,50	90x157
	10000	0,15	21,50	25,90	90x157
	12000	0,15	17,91	31,00	90x196
15000	0,15	14,33	37,50	90x236	
450 (500) 2W	1000	0,15	214,97	5,00	51x83
	1200	0,15	179,14	6,00	51x96
	1500	0,15	143,31	7,20	51x115
	1800	0,15	119,43	8,30	51x130
	2200	0,15	97,71	9,00	64x96
	2700	0,15	79,62	10,70	64x115
	3300	0,15	65,14	12,40	64x130
	3900	0,15	55,12	13,60	77x115
	4700	0,15	45,74	15,60	77x130
	5600	0,15	38,39	18,30	77x155
	6800	0,15	31,61	21,40	90x157
	8200	0,15	26,22	23,50	90x157
	10000	0,15	21,50	28,30	90x196
12000	0,15	17,91	33,60	90x236	

Custom products are available on request.

Aluminium solid electrolytic capacitor with conductive polymer

This capacitor is winding type aluminium electrolytic capacitors that uses conductive polymer (Polythiophene system) as electrolyte and realized low ESR and high permissible ripple current at high frequencies band. It is very suitable for noise suppressing in smoothing circuits of DC-DC converter or high frequencies circuits.



Series HCP CP

2 000h at 105°C

- Very Low ESR
- High Ripple Current

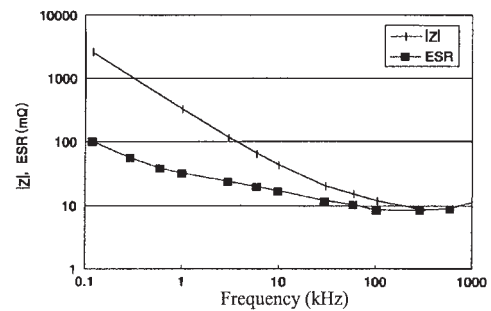
Item	Characteristics
Operating Temperature Range (°C)	-55 ~ +105
Rated Voltage Range (V)	4 ~ 16
Nominal Capacitance Range (20°C, 120Hz)	68 ~ 1 200µF
Capacitance Tolerance (20°C, 120Hz)	-20% ~ +20%
Leakage Current (µA)	The initial specified value or less (value in characteristics list)
Dissipation Factor (tan δ)	The initial specified value or less (value in characteristics list)
Surge Voltage	Rated Voltage x 1,15
Temperature Characteristics	Z (-25°C) / Z (+20°C) 1,00 – 1,25 Stability at 100kHz Z (+105°C) / Z (+20°C) 0,75 – 1,00 Stability at 100kHz
High Temperature Load Test	105°C, 2 000h, Rated Voltage applied Capacitance change: within ±20% of the initial measured value Tan δ: ≤150% of initial specified value ESR: ≤150% of initial specified value DC Leakage Current: The initial specified value
Moisture Resistance	60°C, 90~95% RH 500H, Rate Voltage applied Capacitance change: within ± 20% of the initial measured value Tan δ: ≤150% of initial specified value ESR: ≤150% of initial specified value DC Leakage Current: The initial specified value
Surge Voltage Characteristics	The capacitor shall be subjected to 1 000 cycles consists of charging at the designated surge voltage for 30s and discharged for approx. 5mon 30s. Capacitance change: within ± 5% of the initial measured value Tan δ: ≤ within initial specified value DC Leakage Current: The initial specified value

Ratings for Series HCP CP

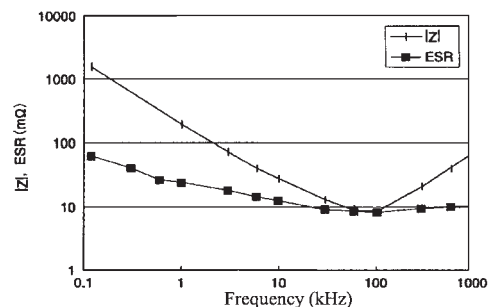
V _{DC} Code	Capacitance	Leakage Current	Tan δ 20°C, 120Hz	ESR 20°C, 100kHz	Ripple Current 105°C, 100kHz	Case Size Ø DxL (mm)
				(mΩ)	(mA _{rms})	
4 0G	510	204,0	0,08	16	4 080	8x11,5
	560	224,0	0,08	14	4 080	8x11,5
	620	248,0	0,08	13	4 080	8x11,5
	680	272,0	0,08	13	4 840	10x12,5
	750	300,0	0,08	12	4 840	10x12,5
	820	328,0	0,08	12	5 040	10x12,5
	1 200	960,0	0,15	12	5 040	10x12,5
6,3 0J	150	18,9	0,07	30	2 780	8x11,5
	220	27,7	0,07	30	3 000	8x11,5
	330	207,9	0,08	25	3 500	8x11,5
	390	245,7	0,08	16	3 810	8x11,5
	470	296,1	0,08	16	3 810	8x11,5
	560	352,8	0,08	14	4 330	10x12,5
	680	428,4	0,08	13	4 840	10x12,5
10 1A	820	516,6	0,15	12	5 040	10x12,5
	100	20,0	0,07	30	2 670	8x11,5
	150	30,0	0,07	29	3 020	10x12,5
	220	44,0	0,07	27	3 370	10x12,5
	330	330,0	0,08	21	4 140	10x12,5
	390	390,0	0,08	18	4 510	10x12,5
16 1C	470	470,0	0,08	15	4 510	10x12,5
	68	21,8	0,06	36	2 700	8x11,5
	100	32,0	0,06	30	2 740	8x11,5
	150	48,0	0,06	28	3 260	10x12,5

ESR

Typical data



Frequency characteristics of Impedance, ESR (6,3V; 470µF)



Frequency characteristics of Impedance, ESR (4V; 820µF)



Handling Precautions

Warranty: The information contained in this catalogue does not form part of any quotation or contract, is believed to be accurate, reliable and up to date. However, agreement on these specifications does not mean that the customer may not claim for replacement of individual defective capacitors within the terms of delivery. We cannot however assume any liability beyond the replacement of defective components. This applies in particular to any further consequences of component failure. Furthermore it must be taken into consideration that the figures stated for life times and failure rate refer to the average production status and are therefore to be understood as mean values (statistic expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life support applications, devices or systems where malfunction of these products can reasonable be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of Jianghai do so at their own risk and agree fully indemnify JIANGHAI for any damages resulting from such improper use or sale.

Polarity: Electrolytic capacitors are polar and shall never be used with incorrect polarity, as there is a possible danger of shortening or destruction.

Voltage: The Rated Voltage should not be exceeded because the life time will become shorter than stated.

Reverse Voltage: AC or Reverse Voltage should be avoided.

Temperature Range: Use electrolytic capacitors only according to specified operation temperature range.

Over-Current: Currents exceeding the rated ripple currents should be avoided.

Ripple Current: The combined value of DC voltage and peak AC voltage shall not exceed the rated voltage and shall not be below 0V. Use of aluminium electrolytic capacitors under ripple current with wide amplitude is equivalent to quick charge-discharge operation. If ripple voltage with amplitude over 60Vp-p is expected please contact JIANGHAI.

Rapid Charging/Discharging: In this way of application severe heat is generated, gas may be emitted which may lead to explosion. Consult JIANGHAI about specially designed capacitors designed for such kind of applications.

Balancing Capacitors: Consider balance resistors if capacitors are used in parallel/serial connections.

Life Time: There are many different life time definitions known without any true standard definition. Take especially care when capacitors are compared that the capacitor

fulfil the needed requirements. JIANGHAI published all conditions to be as transparent as possible.

- **Useful Life,** load life, typical life, service life is that period of time, during which a given failure percentage may occur, under well defined conditions and requirements. Useful life data are usually calculated with a confidence level of 60%. See further details in specifications and data sheets.

- **Endurance Test:** In IEC 60384-4 the criteria for the acceptable drift of electrical parameters after the endurance test are defined.

- **Shelf Life:** Definition of time with acceptable drift of capacitor parameters without load at maximum temperature.

Vibration and Mechanical Stress: Capacitors are sensitive for vibration and mechanical forces applied on the leads. Do not use capacitors which has been dropped onto a hard surface.

Insulation: If any defect of the sleeve is visible, the component should not be used – same for all kinds of damages visible. A capacitor should be electrically isolated from among the following parts: Aluminium case, cathode lead wire, anode lead wire and circuit pattern, auxiliary terminal of snap-in type. The PVC sleeve is not recognized as an isolator and therefore the standard capacitor should not be used in a place where insulation function is needed. Please contact JIANGHAI if higher grade of insulation is required.

Environmental Condition:

- Avoid direct contact with water, salt solution, oil, dewing conditions
- Halogens generally, especially fumigation treatment with bromides must be avoided (also flame retardant agents)
- Avoid exposing to direct sunshine, Ozone, ultraviolet rays and radiation
- Air Pressure: Max: 150kPa, Min 8kPa

Storage:

- Temperature 5 to 30°C, Humidity below 75%
- Aluminium Electrolytic capacitors should not be stored in damp conditions such as water, saltwater spray or oil spray. Also do not store in an environment full of hazardous gas (hydrogen sulphide, sulphurous acid gas, nitrous acid, chlorine gas, ammonia or bromide gas, halogens.
- Electrolytic capacitors may accumulate charge naturally during storage. In this case a discharge through a 1kOhm resistor before use.
- Leakage current may be increased during long storage time. In this case the capacitor should be subject to the rated voltage treatment through a 1kOhm resistor before use for 1 hour, than it should be discharged through a resistor of about 1 Ohm/Volt.
- Storage times above 1 year should be avoided or rated voltage treatment may be necessary.

Soldering: Soldering conditions (temperature, times) should be within specified conditions, especially for SMD components. Avoid high soldering temperatures as this may reduce life time or damage the capacitor. Do never dip the capacitor body into melted solder. Flux should not be adhered to capacitor's body but only to its terminals.

Cleaning and Coating: Do not use fixing agents or cleaning substances containing halogens and the epoxy resin coating materials. Also never use solvents containing: 1-1-1 trichloroethane, alkali, petroleum, xylene, acetones, ketones, esters. In case of questions see detailed instructions.

Mounting: Other devices which are mounted near the capacitor should not touch the capacitor. Additional heat coming from other components near the capacitor may have an impact on life time of the capacitor. Do never bend or twist the capacitor after soldering to avoid stress on the leads. Larger can sized should only be built in a upright position with connectors on top. No printed board circuit tracks are allowed between the lead pads of the capacitor.

Maintenance: Periodical inspection should be carried out for the capacitor: visual inspection to check pressure relief open or leakage of electrolyte, electrical characteristics as leakage current, capacitance, dissipation factor.

Electrolyte and Separator Paper: Electrolyte and separator paper used in Aluminium Capacitors may be flammable. Also electrolyte is electrically conductive. Therefore in case Electrolyte gets in contact with PC board it may cause corrosion of circuit pattern or short circuit between patterns, and may lead to smoke generation or ignition in worst case.

Caution during Use of Capacitors: Do not touch the terminals of capacitors. Keep the capacitor free from conductive solution, such as acids, alkali and so on. Ensure that the operational environment of the equipment in which the capacitor has been built is within the specified condition mentioned in the catalogue or specification sheets.

Vent: The vent needs a space to work well. Make enough space of more than 2mm for diameter ≤ 16 mm, more than 3mm for diameter 18-35mm, more than 5mm for case diameter 40mm and larger.

Emergency Actions: When the pressure relief vent is open and some gas blows out from the capacitor, please turn the main switch of the equipment off or pull out the plug from the power outlet immediately. During pressure relief vent operation, extremely hot gas ($>100^\circ\text{C}$) may blow out of the capacitors. Do not stand close to the capacitors. In case of eye contact, flush the open eye(s) with large amount of clean water immediately. In case of ingestion, gargle with water immediately, do not swallow. Do not touch electrolyte but wash skin with soap and water in case of skin contact.

Defintions of Electrical Parameters:

Separate documents as application notes, equivalent circuit diagrams and so on are available on request.

Packaging: see details in databook. Further information on request



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