nichicon Tech Topics

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High Voltage Aluminum Polymer Capacitors: CV Series-125 Volt – Industry First

Nichicon has enhanced its high voltage aluminum electrolytic polymer capacitors. The current CV family of polymer capacitors is now available in 125 volts—an industry first. In the surface mount CV series, capacitance values of 6.8uF to 15uF are available.

There are key advantages to aluminum polymer capacitors:

Advantage #1: Low ESR

Polymer aluminum electrolytic capacitors offer very low ESR ratings versus standard aluminum electrolytic capacitors. Nichicon offers ESR ratings down to 5 milli-Ohms in other series in its family of polymer capacitors.

Advantage #2: Excellent Frequency Characteristic

Using the high conductivity of a functional polymer with an electrolyte, the ESR is greatly improved, obtaining the frequency characteristic nearly equal to a film capacitor.

Advantage #3: Usage with High Ripple Currents

Polymers have higher ripple current capability.

Advantage #4: Steady ESR and Capacitance

ESR and capacitance have steady characteristics over temperature change and a wide frequency range. At low temperatures, polymers are very reliable.

Advantage # 5: Cost Savings

One polymer capacitor has the same ripple current and ESR capabilities as 7 to 9 standard aluminum capacitors in parallel. This creates a great advantage in reducing cost and pc boards real estate!

CV Product Offering

Nichicon's CV family of polymer capacitors offers:

- Smaller overall case sizes and higher capacitance values than standard aluminum

Polymer

Quick Facts

- Cost Effective
- Excellent Frequency Characteristics
- High Ripple Current Usage
- Excellent Ripple Voltage Smoothing
- Excellent Noise Absorption
- Reduces Board Placements
- Saves PC Real Estate
- Excellent Transient Response Capability
- Steady ESR and Capacitance
- Low ESR

electrolytics

- ESR ratings down to 48 milli-Ohms
- Surface-mount versions with many size options
- 16V to 125V maximum Vdc ratings
- 5.6uF to 680uF capacitances
- Load life of 3000 hours at 105C
- High ripple currents up to 4400 mArms
- SMD type: Lead free reflow soldering condition at 260C peak

Markets

* DC-DC Converter for Automotive * LED Backlight * Industrial Equipment * AC-DC Power Supply for Personal Computer * Cellular Phone * General Household Goods * Outdoor and Indoor Wireless Equipment * General LED Applications *

Applications

There is a wide variety of applications for conductive polymer aluminum solid electrolytic capacitors and in this Tech Topic we have merely scratched the surface. We encourage you to contact your Nichicon Account Representative to assist you if you have any additional questions.

Filtering

Primary and secondary filtering for DC-DC converter and secondary filtering for switching power supply.

Noise Absorption

Noise absorption in the DC/DC Converter and Power Supply Line.

Smoothing

Smoothing of ripple voltage.

Data sheets for the CV series are attached and also can be found on Nichicon's web site at ***www.nichicon.com****.*

CONDUCTIVE POLYMER ALUMINUM SOLID ELECTROLYTIC CAPACITORS

nichicon

CV Chip Type, High Voltage / Long Life series

For SMD | High Ripple Current | Low Impedance | For High Frequency | Long Life | Anti-Solvent Feature

Upgrade

- High voltage (to 125V), Low ESR, High ripple current.
- Load life of 3000 hours at 105°C.
- SMD type : Lead free reflow soldering condition at 260°C peak correspondence.
- Compliant to the RoHS directive (2002/95/EC).

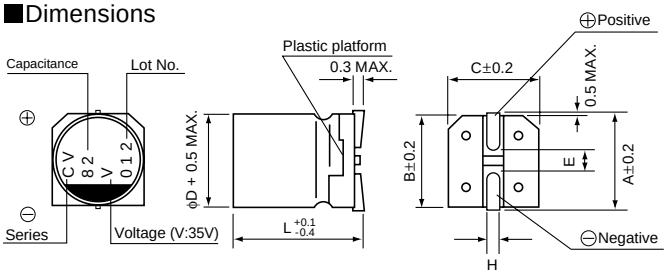
CX ← High Temperature — CV

■Specifications

Item	Performance Characteristics
Category Temperature Range	−55 to +105°C
Rated Voltage Range	16 to 125V
Rated Capacitance Range	5.6 to 680µF
Capacitance Tolerance	±20% at 120Hz, 20°C
Tangent of loss angle (tan δ)	Less than or equal to the specified value at 120Hz, 20°C
ESR (※ 1)	Less than or equal to the specified value at 100kHz, 20°C
Leakage Current (※ 2)	Less than or equal to the specified value . After 2 minutes' application of rated voltage at 20°C
Temperature Characteristics (Max.Impedance Ratio)	Z+105°C / Z+20°C ≦ 1.25 (100kHz) Z−55°C / Z+20°C ≦ 1.25
Endurance	The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 3000 hours at 105°C. Capacitance change: Within ± 20% of the initial capacitance value (※3) tan δ: 150% or less than the initial specified value ESR (※ 1): 150% or less than the initial specified value Leakage current (※2): Less than or equal to the initial specified value
Damp Heat (Steady State)	The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH. Capacitance change: Within ± 20% of the initial capacitance value (※3) tan δ: 150% or less than the initial specified value ESR (※ 1): 150% or less than the initial specified value Leakage current (※2): Less than or equal to the initial specified value
Resistance to Soldering Heat	After soldering the capacitor under the soldering conditions prescribed here, the capacitor shall meet the specifications listed at right, provided that it's temperature profile is measured at the capacitor top and the terminal. Pre-heating shall be done at 150 to 200°C and for 60 to 180 sec. The duration for over +230°C temperature at capacitor surface shall not exceed 60 seconds. In the case of peak temp, less than 250°C, reflow soldering shall be two times maximum. In the case of peak temp, less than 260°C, reflow soldering shall be once. Measurement for solder temperature profile shall be made at the capacitor top and the terminal. Capacitance change: Within ± 10% of the initial capacitance value (※3) tan δ: 130% or less than the initial specified value ESR (※ 1): 130% or less than the initial specified value Leakage current (※2): Less than or equal to the initial specified value
Marking	Navy blue print on the case top

※ 1 ESR should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.
※ 2 Conditioning : If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.
※ 3 Initial value : The value before test of examination of resistance to soldering.

■Dimensions



Type numbering system (Example : 35V 82µF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
P	C	V	1	V	8	2	0	M	C	L	1	G	S

- 1–3: Type
- 4–5: Series name
- 6–8: Rated voltage (35V)
- 9–11: Rated capacitance (82µF)
- 12: Capacitance tolerance (±20%)
- 13: Configuration
- 14: Size code
- Taping code

(mm)

Size	φ6.3×6L	φ8×7L	φ8×10L	φ8×12L	φ10×8L	φ10×10L	φ10×12.7L
φD	6.3	8.0	8.0	8.0	10.0	10.0	10.0
L	5.9	6.9	9.9	11.9	7.9	9.9	12.6
A	7.3	9.0	9.0	9.0	11.0	11.0	11.0
B	6.6	8.3	8.3	8.3	10.3	10.3	10.3
C	6.6	8.3	8.3	8.3	10.3	10.3	10.3
E	2.1	3.2	3.2	3.2	4.6	4.6	4.6
H	0.5 to 0.8	0.8 to 1.1	0.8 to 1.1	0.8 to 1.1	0.8 to 1.1	0.8 to 1.1	0.8 to 1.1

Voltage

V	16	20	25	35	50	63	80	100	125
Code	C	D	E	V	H	J	K	2A	2B

● Dimension table in next page.

CV series

■Standard Ratings

Rated Voltage (V)(code)	Surge Voltage (V)	Rated Capacitance (μF)	Case Size φD × L (mm)	tan δ	Leakage Current (μA)	ESR (mΩ) (at 100kHz 20°C)	Rated Ripple (mArms)	Part Number
16 (1C)	18.4	56	6.3×6	0.12	179	50	1000	PCV1C560MCL1GS
		82	△ 6.3×6	0.12	262	**47**	1300	PCV1C820MCL2GS
		100	8×7	0.12	320	36	1500	PCV1C101MCL1GS
		150	△ 8×7	0.12	480	34	1700	PCV1C151MCL2GS
		220	▲ 8×10	0.12	704	27	2000	PCV1C221MCL6GS
		220	10×8	0.12	704	31	2000	PCV1C221MCL1GS
		270	□ 8×10	0.12	864	21	3800	PCV1C271MCL7GS
		270	8×12	0.12	864	26	2300	PCV1C271MCL1GS
		270	△ 10×8	0.12	864	24	3200	PCV1C271MCL2GS
		330	10×10	0.12	1056	26	2400	PCV1C331MCL1GS
		390	△ 8×12	0.12	1248	20	4100	PCV1C391MCL2GS
		470	△ 10×10	0.12	1504	21	3900	PCV1C471MCL2GS
		470	10×12.7	0.12	1504	25	2800	PCV1C471MCL1GS
		680	△ 10×12.7	0.12	2176	19	4400	PCV1C681MCL2GS
20 (1D)	23.0	47	6.3×6	0.12	188	55	1000	PCV1D470MCL1GS
		56	△ 6.3×6	0.12	224	48	1300	PCV1D560MCL2GS
		68	8×7	0.12	272	45	1300	PCV1D680MCL1GS
		100	△ 8×7	0.12	400	42	1400	PCV1D101MCL2GS
		150	▲ 8×10	0.12	600	28	2000	PCV1D151MCL6GS
		150	10×8	0.12	600	33	1900	PCV1D151MCL1GS
		180	△ 10×8	0.12	720	**25**	3100	PCV1D181MCL2GS
		220	□ 8×10	0.12	880	**22**	3700	PCV1D221MCL7GS
		220	8×12	0.12	880	27	2300	PCV1D221MCL1GS
		270	△ 8×12	0.12	1080	21	4000	PCV1D271MCL2GS
		270	10×10	0.12	1080	27	2300	PCV1D271MCL1GS
		330	△ 10×10	0.12	1320	22	3800	PCV1D331MCL2GS
		330	10×12.7	0.12	1320	26	2700	PCV1D331MCL1GS
		470	△ 10×12.7	0.12	1880	20	4300	PCV1D471MCL2GS
25 (1E)	28.7	33	6.3×6	0.12	165	60	1000	PCV1E330MCL1GS
		47	△ 6.3×6	0.12	235	49	1300	PCV1E470MCL2GS
		56	8×7	0.12	280	50	1300	PCV1E560MCL1GS
		82	△ 8×7	0.12	410	47	1400	PCV1E820MCL2GS
		120	▲ 8×10	0.12	600	29	1900	PCV1E121MCL6GS
		120	10×8	0.12	600	35	1800	PCV1E121MCL1GS
		150	□ 8×10	0.12	750	**23**	3600	PCV1E151MCL7GS
		150	8×12	0.12	750	28	2200	PCV1E151MCL1GS
		150	△ 10×8	0.12	750	26	3000	PCV1E151MCL2GS
		180	10×10	0.12	900	28	2300	PCV1E181MCL1GS
		220	△ 8×12	0.12	1100	22	3800	PCV1E221MCL2GS
		270	△ 10×10	0.12	1350	23	3700	PCV1E271MCL2GS
		270	10×12.7	0.12	1350	27	2700	PCV1E271MCL1GS
		390	△ 10×12.7	0.12	1950	21	4200	PCV1E391MCL2GS
35 (1V)	40.2	18	6.3×6	0.12	126	64	900	PCV1V180MCL1GS
		22	△ 6.3×6	0.12	154	50	1300	PCV1V220MCL2GS
		27	8×7	0.12	189	55	1200	PCV1V270MCL1GS
		39	△ 8×7	0.12	273	52	1400	PCV1V390MCL2GS
		56	8×10	0.12	392	31	1900	PCV1V560MCL1GS
		68	10×8	0.12	476	37	1800	PCV1V680MCL1GS
		82	□ 8×10	0.12	574	24	3600	PCV1V820MCL7GS
		82	8×12	0.12	574	29	2200	PCV1V820MCL1GS
		82	△ 10×8	0.12	574	27	3000	PCV1V820MCL2GS
		100	10×10	0.12	700	29	2200	PCV1V101MCL1GS
		120	□ 8×12	0.12	840	23	3800	PCV1V121MCL7GS
		120	△ 10×10	0.12	840	24	3700	PCV1V121MCL2GS
		150	10×12.7	0.12	1050	28	2600	PCV1V151MCL1GS
		180	△ 10×12.7	0.12	1260	22	4100	PCV1V181MCL2GS

CV series

■Standard Ratings

Rated Voltage (V)(code)	Surge Voltage (V)	Rated Capacitance (μF)	Case Size φD × L (mm)	tan δ	Leakage Current (μA)	ESR (mΩ) (at 100kHz 20°C)	Rated Ripple (mArms)	Part Number
50 (1H)	57.5	8.2	6.3×6	0.12	82	81	800	PCV1H8R2MCL1GS
		12	△ 6.3×6	0.12	120	55	1200	PCV1H120MCL2GS
		15	8×7	0.12	150	63	1100	PCV1H150MCL1GS
		22	△ 8×7	0.12	220	60	1300	PCV1H220MCL2GS
		33	▲ 8×10	0.12	330	36	1700	PCV1H330MCL6GS
		33	10×8	0.12	330	49	1500	PCV1H330MCL1GS
		39	8×12	0.12	390	34	2000	PCV1H390MCL1GS
		47	□ 8×10	0.12	470	29	3300	PCV1H470MCL7GS
		47	△ 10×8	0.12	470	37	2600	PCV1H470MCL2GS
		47	10×10	0.12	470	30	2200	PCV1H470MCL1GS
		56	△ 8×12	0.12	560	28	3400	PCV1H560MCL2GS
		68	△ 10×10	0.12	680	29	3400	PCV1H680MCL2GS
		68	10×12.7	0.12	680	29	2600	PCV1H680MCL1GS
		100	△ 10×12.7	0.12	1000	27	3600	PCV1H101MCL2GS
63 (1J)	72.4	5.6	6.3×6	0.12	71	105	700	PCV1J5R6MCL1GS
		8.2	△ 6.3×6	0.12	103	56	1200	PCV1J8R2MCL2GS
		10	8×7	0.12	126	75	1000	PCV1J100MCL1GS
		12	△ 8×7	0.12	151	70	1100	PCV1J120MCL2GS
		22	▲ 8×10	0.12	277	37	1700	PCV1J220MCL6GS
		22	10×8	0.12	277	56	1400	PCV1J220MCL1GS
		27	□ 8×10	0.12	340	30	3200	PCV1J270MCL7GS
		27	8×12	0.12	340	35	2000	PCV1J270MCL1GS
		27	△ 10×8	0.12	340	38	2500	PCV1J270MCL2GS
		33	10×10	0.12	416	31	2200	PCV1J330MCL1GS
		39	△ 8×12	0.12	491	29	3400	PCV1J390MCL2GS
		47	△ 10×10	0.12	592	30	3300	PCV1J470MCL2GS
		47	10×12.7	0.12	592	30	2500	PCV1J470MCL1GS
		56	△ 10×12.7	0.12	706	28	3400	PCV1J560MCL2GS
80 (1K)	92.0	10	8×10	0.12	160	43	1600	PCV1K100MCL1GS
		12	8×12	0.12	192	41	1800	PCV1K120MCL1GS
		15	10×10	0.12	240	39	1900	PCV1K150MCL1GS
		22	10×12.7	0.12	352	38	2200	PCV1K220MCL1GS
100 (2A)	115	6.8	8×10	0.12	136	48	1500	PCV2A6R8MCL1GS
		10	8×12	0.12	200	45	1700	PCV2A100MCL1GS
		12	10×10	0.12	240	42	1900	PCV2A120MCL1GS
		18	10×12.7	0.12	360	41	2100	PCV2A180MCL1GS
125 (2B)	143	6.8	8×10	0.12	170	93	1100	PCV2B6R8MCL1GS
		8.2	8×12	0.12	205	84	1300	PCV2B8R2MCL1GS
		12	10×10	0.12	300	69	1400	PCV2B120MCL1GS
		15	10×12.7	0.12	375	48	2000	PCV2B150MCL1GS

Rated ripple current (mArms) at 105°C 100kHz

No marked, [1] will be put at 12th digit of type numbering system.
△ : In this case, [2] will be put at 12th digit of type numbering system.
▲ : In this case, [6] will be put at 12th digit of type numbering system.
□ : In this case, [7] will be put at 12th digit of type numbering system.

- Taping specifications are given in page 23.
- Recommended land size, soldering by reflow are given in page 18, 19.
- Please refer to page 3 for the minimum order quantity.